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Knowledge Awareness of Camouflage Skills in Females with High-Functioning Autism Among Health Care Providers in Miami-Dade County, Florida: A Quality Improvement Project

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CAMOUFLAGE SKILLS IN FEMALES WITH AUTISM

Knowledge Awareness of Camouflage Skills in Females with High-Functioning Autism
Among Health Care Providers in Miami-Dade County, Florida: A Quality Improvement
Project

A Scholarly Project Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences

Florida International University

In partial fulfillment of the requirements
For the Degree of Doctor of Nursing Practice

By

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Abstract

Healthcare providers are more likely to recognize autism in males than females in the United States (U.S.). Females with high-functioning autism are under screened, misdiagnosed, or receive an autism diagnosis at a later age at higher rates than their male counterparts in the U.S. Research indicates that camouflage skills in females with high-functioning autism, as well as knowledge deficits among healthcare providers contribute to the clinical problem. The purpose of this quality improvement project was to increase knowledge awareness of camouflage skills in females with high-functioning autism among healthcare providers in Miami-Dade County, Florida. This project aimed to contribute to the body of nursing knowledge on females with high-functioning autism. A descriptive, cross-sectional, pre- and post- test design was utilized to conduct the project. A convenience sampling method was also employed to recruit eight participants and access data at an outpatient psychiatric clinic in Miami-Dade County, Florida. The project, including the educational intervention, was conducted remotely, and participants completed pre- and post- test surveys using Qualtrics and the modified Camouflaging Autistic Traits Questionnaire (CAT-Q) to assess their knowledge of awareness of camouflage skills in females with high-functioning autism. Results revealed a significant difference between pre- and posttest mean scores, with participants scoring higher on the posttest after an educational intervention, $t(7) = 5.96, p = 0.001, (p < 0.05)$. Healthcare providers should be educated about camouflage skills in females with high-functioning autism to improve healthcare outcomes in this population.

Keywords: *females, autism, camouflage, misdiagnosis, healthcare provider*

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DNP PROJECT REPORT

INTRODUCTION

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social interactions or communication, as well as restricted repetitive patterns of behaviors or interests with a childhood onset (American Psychiatric Association, 2013). Three functional levels of autism have been examined: mild or high-functioning autism, moderate autism, and severe autism (American Psychiatric Association, 2013). However, this quality improvement project focused on females with mild or high-functioning autism. Individuals with high-functioning autism are able to speak in full sentences, engage in communication, and attempt to form friends; however, they experience difficulties with social interactions (American Psychiatric Association, 2013). Individuals with high-functioning autism are also verbally fluent and do not have intellectual disabilities (Rynkiewicz et al., 2016).

The literature indicates disparities between genders with ASD in the United States (U.S.; American Psychiatric Association, 2013; Hull et al., 2017). Healthcare providers are more likely to recognize ASD in males than females in the U.S. (Hull et al., 2017). American males also receive a diagnosis of ASD at higher ratios (4:1) than American females, especially when there is no intellectual disability or language delay in females (American Psychiatric Association, 2013). The absence of intellectual disabilities or language delays, as well as knowledge deficits among healthcare providers regarding camouflage skills in females with high-functioning autism contributes to high misdiagnosed rates in this population (Dean et al., 2017; Hull et al., 2017; Ratto et al., 2018).

Autism spectrum disorder (ASD) manifests differently among genders. Females with high-functioning autism have more developed intellectual and language skills when compared to males, masking the disorder (Ratto et al., 2018). While boys display deficits in motor, play, or imitation skills, girls with high-functioning autism rarely present with deficits in these areas (Ratto et al., 2018). Females with high-functioning autism memorize words or phrases from videos and apply them to social settings. They make eye contact during conversations, use learned phrases or jokes in conversations, mimic the social behaviors of peers, imitate facial expressions or gestures, and learn social scripts to interact with others (Lai et al., 2017).

Females with high-functioning autism are also more affectionate than males with the disorder (Ratto et al., 2018). Males with ASD isolate from peers, unlike girls with the disorder who are concerned about being liked by others (Ratto et al., 2018). Additionally, when compared to males, females with high-functioning autism have less repetitive behaviors and are more animated (Ratto et al., 2018; Rynkiewicz et al., 2016). In a cross-sectional study ($N = 33$), females with ASD displayed vivid gestures and were more expressive than males with ASD (Rynkiewicz et al., 2016). These traits camouflage the disorder in this gender group (Lai et al., 2017; Ratto et al., 2018; Rynkiewicz et al., 2016).

Females with high-functioning autism are at risk for psychiatric disorders. Camouflage skills are exhausting for females with high-functioning autism. Females with high-functioning autism suffer from depression, anxiety, and suicidal behavior (Lai et al., 2017). According to current literature, 50% of females with high-functioning autism suffer from depression (Rynkiewicz et al., 2019). However, the prevalence of suicidal

ideation and attempts in this population is as high as 66% and 35%, respectively (Rynkiewicz et al., 2019). Moreover, suicide accounts for 0.31% of premature death among females with ASD, which is 0.04% higher than the general population (Rynkiewicz et al., 2019). Families of females with autism spend significant costs on mental health services aimed at improving coping skills and reducing bullying in this population (Cage & Troxell-Whitman, 2019). The purpose of this project was to increase knowledge awareness among healthcare providers in Miami-Dade County, Florida, regarding camouflage skills in females with high-functioning autism. The aim of this project was to contribute to the body of nursing knowledge on females with high-functioning autism.

Problem Statement

Early screening and identification of ASD is recommended by the American Academy of Pediatrics (Pierce et al., 2019). However, females with autism are under screened, misdiagnosed, or receive an autism diagnosis at a later age at higher rates than their male counterparts in the United States (Hull et al., 2017). Studies suggest that camouflage skills in females with high-functioning autism, as well as knowledge deficits among healthcare providers negatively contribute to the clinical problem (Dean et al., 2017; Ratto et al., 2018). If a quality improvement project is not conducted in this area, then females with high-functioning autism will continue to be misdiagnosed in the U.S.

Advanced Literature Review

This researcher conducted an advanced literature review using Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), and Psychology INFO (Psych INFO) databases. Key terms included *females, autism, camouflage, misdiagnosis, gender-specific symptoms, knowledge awareness, and healthcare provider*. Search limitations included full text articles, academic journals source, randomized controlled trial, female population, articles published from 2016 to 2021, and articles written in English and Spanish. Articles with relevant concepts such as autism, females, camouflage traits, coping mechanism, misdiagnose, knowledge awareness, and healthcare provider were selected. The articles discussed in this advanced literature review addressed the clinical problem, purpose, aim, and PICO clinical question of this quality improvement project.

Allely (2019) conducted a systematic review with the purpose of exploring the camouflage skills in females with autism in the U.S. The design or methodology used in this study is a systematic PRISMA review. Due to the lack of research related to this topic, the researcher adopted an inclusive approach with no exclusion criteria, and a total of eight studies were analyzed (Allely, 2019). The findings of this study suggested that there is a camouflage trait among females with ASD. According to this study, there is lack of knowledge from healthcare providers to identify this ASD phenotype in females (Allely, 2019). Future research needs to be conducted in this area so that healthcare providers can better identify camouflage skills to make accurate evaluations and diagnoses (Allely, 2019).

Fusar-Poli et al. (2020) conducted a quantitative study to examine the phenomenon of misdiagnoses among adults with autism in Taiwan. The sample size of this study was 161 subjects (Fusar-Poli et al., 2020). Investigators used Kolmogorov Smirnov Levene's tests, the Mann Whitney U test, and the Chi-squared and Fisher's exact tests to analyze the data (Fusar-Poli et al., 2020). In this article, the researchers presented evidence suggesting that there is a prevalence between 2.4% and 9.9% of unrecognized autism among psychiatric inpatient adults (Fusar-Poli et al., 2020). Moreover, the investigators reported 3.2% patients treated for severe psychiatric disability had ASD (Fusar-Poli et al., 2020). In Taiwan, the researchers found 0.6% misdiagnosed adults with ASD (Fusar-Poli et al., 2020).

Fusar-Poli et al. (2020) also reported that 2.6% of patients referred to treatment due to psychosis had Asperger's syndrome. The findings of this study suggested that females often obtain delayed diagnosis compared to males, in direct relation to the female's autism phenotype (Fusar-Poli et al., 2020). Women develop camouflage skills in social situations increasing their risk to go undiagnosed (Fusar-Poli et al., 2020). In this study, researchers associate the lack of awareness among clinicians, regarding the different phenotypes of autism presentation between males and females, to the late diagnosis in the female population (Fusar-Poli et al., 2020). Researchers noticed that the gold standard tool used to diagnose autism, Autism Diagnostic Observation Schedule, Second Edition (ADOS-2) scores in the social interaction, communication, and repetitive behaviors domains were significantly lower in the female group compared to the male group (Fusar-Poli et al., 2020). The reason for this, according to the researchers in this study, was that the ADOS-2 was developed using the typical male phenotype of ASD,

which excludes some of the female characteristics (Fusar-Poli et al., 2020). Fusar-Poli et al. (2020) recommended to increase knowledge awareness among healthcare providers related to the female camouflage skill, since it is poorly recognized by pediatric and adult psychiatrists (Fusar-Poli et al., 2020).

Hull et al. (2020) conducted a narrative review, exploring camouflage skills in females with autism in the U.S. In this article, the researchers correlated the current higher prevalence of autism among males than females with the camouflage skill. The researchers performed a literature review and analyzed the current available data related to the camouflage skill and other female phenotypes in autism. The investigators discussed 15 articles in this study. In one of them, females reported higher camouflaging scores than males, and it was linked to an activation of ventromedial prefrontal cortex (Hull et al, 2020). Researchers also mention an important advance in the diagnosis process since new tools to identify the camouflage skill have already been developed. These new tools are the Camouflaging Autistic Traits Questionnaire (CAT-Q) and the Questionnaire for Autism Spectrum Conditions (Q-ASC) (Hull et al., 2020).

The CAT-Q tool is used for measuring camouflage skills in adults with autism (Hull et al., 2020). The Q-ASC is a parent report tool to better assess autistic traits in children without intellectual disability (Hull et al., 2020). Hull et al. (2020) recommended to increase research focused on children with camouflage traits since research has mainly focused on adults with ASD (Hull et al., 2020). The investigators also recommend that mental health providers or those involved in the diagnosis of ASD need to be aware of camouflage skills during the diagnostic process (Hull et al., 2020). Every provider must know how to identify these skills so the correct diagnosis can be made. Moreover,

clinicians need to be aware of the link between camouflage skills in females with high-functioning autism and poor mental health outcomes to better serve patients with autism. The camouflage skill is associated with increased rates of depression and anxiety among individuals with ASD (Hull et al., 2020). Future researchers should also investigate when and how these camouflage skills develop in females with autism (Hull et al., 2020).

Duvekot et al. (2017) conducted a quantitative study to analyze gender differences between males and females. The participants were undiagnosed children from a prospective cohort study. The sample included 428 of the 1281 screened children from ages 5 to 10 years. In the statistical analysis, the chi-square test and Mplus 7.3 were used. The researchers used standardized diagnostic instruments to diagnose ASD with a similar screening rate. However, girls were less likely to be diagnosed with ASD based on those standardized instruments (Duvekot et al., 2017). In their findings, researchers found gender differences between autistic males and females. Researchers reported that girls have higher emotional/behavioral issues than males but also fewer repetitive behaviors when compared to boys (Duvekot et al., 2017).

However, in the category of sensory issues, the presentation of this symptom within the ASD criteria had no gender differences (Duvekot et al., 2017). Hence, boys and girls had the same sensory profile issues commonly seen in ASD. These findings could be one of the reasons for the risk of females being unidentified when providers diagnose using the current gold standard diagnostic tools. For instance, in a sample of adults with ASD, only 21% of women met clinical criteria, whereas 58% of men met the criteria when using the Autism Diagnostic Observation Schedule (ADOS) tool (Duvekot et al., 2017). The authors suggested that this could be because of the women's ability to

mask their symptoms (Duvekot et al., 2017). Researchers recommend that healthcare providers need to get training in gender-specific scoring when using standardized instruments (Duvekot et al., 2017).

Cage and Troxell-Whitman (2019) conducted a quantitative, cross-sectional study to examine the emotional and financial consequences of camouflage skills among adults with autism. The study consisted of 262 subjects. Among people with ASD, there is a high prevalence of mental health conditions such as depression, social anxiety, and suicidal behavior (Cage & Troxell-Whitman, 2019). According to research, these mental health problems are present in 79% of autistic individuals and are associated with camouflage skills that may result in increased healthcare costs (Cage & Troxell-Whitman, 2019). Researchers recommended that medical providers should be aware of camouflage traits in individuals with autism during the diagnosis process to prevent increased healthcare costs.

Dean et al. (2017) conducted a quantitative study to explore camouflage traits among girls and boys with autism in the U.S. The methodology used data from a multisite randomized control trial. The sample of 24 females and 24 males consisted of randomly selected males and females with ASD. The results of this study supported the camouflage skills in females with ASD and their ability to mask their symptoms in social situations (Dean et al., 2017). Researchers reported that healthcare providers need to avoid overlooking camouflage traits and compensatory behaviors in individuals with autism. Future researchers should develop protocols in educational settings when working with children with ASD to reduce the gender bias (Dean et al., 2017).

Significance

This quality improvement project is significant in the discipline of nursing. It has implications for nursing practice, research, and health policy.

Significance to Nursing Practice

Healthcare providers, including advanced practice registered nurses, have an important role in the process of diagnosis; hence, it is important for nurses to identify camouflage skills in females with high-functioning autism in clinical practice. Nurses could develop screening tools to identify camouflage skills in females with high-functioning autism and assist practitioners with accurate evaluations and diagnoses. This project could discover new knowledge and bridge gaps in nursing practice. The findings of this study could also increase health outcomes in females with high-functioning autism in Miami-Dade County, Florida.

Significance to Nursing Research

Camouflage skills in females with high-functioning autism has not been sufficiently and comprehensively researched in the discipline of nursing. This quality improvement project could stimulate other nurses to increase research in females with autism. It is also important to train healthcare providers on diagnosing females with high-functioning autism. Increasing research and education in this area could reduce misdiagnosed rates in females with high-functioning autism. Each individual with ASD presents with their own combination of symptoms related to social-communication difficulties; hence, there are research projects supported by the National Institutes of Health (NIH) to identify biomarkers that improve clinical measures regarding this condition (National Institute of Mental Health [NIH], 2015).

Significance to Health Policy

Females are less likely to be diagnosed with ASD than males (American Psychiatric Association, 2013). Nurses could develop policies that assist healthcare providers to identify camouflage skills in females with high-functioning autism. Such policies, guidelines, or protocols could decrease misdiagnosed rates in this population. Nurses should also create comprehensive policies that meet the health needs of females with high-functioning autism.

Purpose

The purpose of this project was to increase knowledge awareness among healthcare providers in Miami-Dade County, Florida, regarding camouflage skills in females with high-functioning autism. The aim of this project was to contribute to the body of nursing knowledge on females with high-functioning autism.

Objectives

This quality improvement project helped healthcare providers understand camouflage skills in females with high-functioning autism. This project could assist healthcare providers to identify camouflage skills in females with high-functioning autism, as well as decrease misdiagnosed rates in this population.

PICO Clinical Question

1. Is there a significant difference between pre- and posttest results among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida, after an educational intervention regarding camouflage skills in females with high-functioning autism?

Hal: There is a significant difference between pre and posttest results among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida, after an educational intervention regarding camouflage skills in females with high-functioning autism.

Definition of Terms

Knowledge Awareness

This researcher provided an educational training session to healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida. The goal of the educational intervention was to increase knowledge awareness among healthcare providers regarding camouflage skills in females with high-functioning autism to prevent misdiagnosis. The Camouflaging Autistic Traits Questionnaire (CAT-Q) was used to measure knowledge awareness before and after the educational intervention. This instrument has a Cronbach's alpha of 94% and reliability of 77% (Hull, 2019).

Age

This ratio variable refers to the age of healthcare providers who provide care to patients at an outpatient psychiatric clinic in Miami-Dade County, Florida. This variable was classified as follows: (a) 20 to 40 years or (b) 41 years or older.

Gender

This nominal variable refers to the gender of healthcare providers who deliver care to patients at an outpatient psychiatric clinic in Miami-Dade County, Florida. This variable was classified as follows: (a) male or (b) female.

Role

This nominal variable refers to healthcare providers who provide care to patients at an outpatient psychiatric clinic in Miami-Dade County, Florida. These healthcare providers diagnose, treat, and care for patients with behavioral problems. This variable was classified as follows: (a) advanced practice registered nurse (APRN) or (b) physician (MD or DO).

Level of Education

This demographic variable refers to the level of education of the healthcare provider at an outpatient psychiatric clinic in Miami-Dade County, Florida. This is also a nominal variable. Level of education was classified as follows: (a) master's degree or (b) doctoral degree. Participants with master's degree was specific to master of science in nursing (MSN), and participants with doctoral degree included doctor of science in nursing (DNP) and medical doctor (MD).

Years of Clinical Experience

This demographic variable refers to the years of practice experience among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida. It is a nominal variable. The variable was categorized as follows: (a) less than 5 years of clinical experience or (b) more than 5 years of clinical experience.

Specialty

This demographic data refers to the specialty of healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida. The variable is also nominal. Specialty was categorized as follows: (a) pediatrics or (b) adults or geriatrics.

Perceived Knowledge of Topic

This demographic data refers to the baseline knowledge of healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida, before the implementation of the educational intervention. The variable is also nominal. Perceived knowledge of topic was categorized as follows: (a) none, (b) moderate, or (c) competent.

Conceptual Underpinning and Theoretical Framework of the Project

The theoretical framework that guided this project was the Experiential Learning Theory by David Allen Kolb (1939 to present). This framework was developed in 1984 and has four stages related to the learning process (Engels & de Gara, 2010). The Experiential Learning Theory is applicable to adult learners such as healthcare providers. Knowledge awareness of camouflage skills in females with high-functioning autism among healthcare providers will be measured before and after an educational intervention. Four conceptual models of the Experiential Learning Theory describe how healthcare providers gain and apply new knowledge to clinical practice (Yang et al., 2014).

The four constructs of the theory are: concrete, reflective observation, abstract conceptualization, and active experimentation (Yang et al., 2014). During the concrete construct, healthcare providers gain new knowledge about patients as they complete initial evaluations, including history and physical examinations (Yang et al., 2014). In the second construct, reflective observation, healthcare providers reflect on the new knowledge and form differential diagnoses based on education and clinical experience (Yang et al., 2014). The third construct, abstract conceptualization, involves the

formation of a final hypothesis and diagnosis based on clinical experience (Yang et al., 2014). Lastly, the fourth phase is active experimentation, where healthcare providers apply new knowledge to clinical practice (Yang et al., 2014). This theory was based on the following assumptions: Learning is a process not a result; learning occurs through experience that modify knowledge; all learning is a re-learning; learning requires conflicts and differences; learning is an integral process of adaptation; learning is the result of the person's thinking, feelings, perceptions, and behavior; learning is the result of the interaction between a human and the environment; and learning is a process of knowledge creation (Dernova, 2015).

DNP PROJECT REPORT METHODOLOGY

The purpose of this project was to increase knowledge awareness among healthcare providers in Miami-Dade County, Florida, regarding camouflage skills in females with high-functioning autism. The aim of this project was to contribute to the body of nursing knowledge on females with ASD. This researcher conducted an advanced literature review and discovered gaps related to healthcare providers and females with high-functioning autism. Findings from the literature review were also used to develop a PICO clinical question and provide justification for conducting this project. The subsequent sections will discuss the study design, setting, sample, inclusion criteria, exclusion criteria, intervention, measures and instruments, data collection procedures, data analysis, and protection of human subjects.

Study Design

A descriptive, cross-sectional, pre- and posttest study design was used to conduct this quality improvement project. These designs will be discussed in the next paragraphs.

Descriptive Design

There are two types of study designs: observational and interventional (Aggarwal & Ranganathan, 2019). Among the observational types, the simplest is the descriptive design (Aggarwal & Ranganathan, 2019). In this type of study, the researcher can study and describe the distribution of variables, without the need of a causal or hypothesis (Aggarwal & Ranganathan, 2019). Within descriptive study designs, several subtypes exist such as case reports, case series, cross-sectional studies, and ecological studies (Aggarwal & Ranganathan, 2019).

Cross-Sectional Design

In cross-sectional study designs, the researcher collects information of variables of interest as they exist within the population at a particular time (Aggarwal & Ranganathan, 2019). These types of studies provide a preview of the prevalence of a variable at a specific point in time, thus they are helpful when assessing healthcare needs (Aggarwal & Ranganathan, 2019). These types of studies are usually simple and inexpensive (Aggarwal & Ranganathan, 2019).

Pre- and Posttest Design

These types of designs measure the frequency that a particular outcome occurs before and after the implementation of an intervention (Thiese, 2014). Pre- and posttest designs could be single arm or multiple arms (Thiese, 2014). Single arm pre- and posttest designs measure one group before and after the intervention (Thiese, 2014). However, multiple arm designs measure two or more groups and then compare the outcomes between those groups (Thiese, 2014). The single arm pre- and posttest design was used to conduct this quality improvement project.

PICO Clinical Question

1. Is there a significant difference between pre and posttest results among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida, after an educational intervention regarding camouflage skills in females with high-functioning autism?

Hal: There is a significant difference between pre and posttest results among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County,

Florida, after an educational intervention regarding camouflage skills in females with high-functioning autism.

Setting

This quality improvement project was conducted at an outpatient psychiatric clinic in Miami-Dade County, Florida.

Sample

A convenience sampling method was used to recruit participants and access data. The sample size consisted of eight participants. Participants included healthcare providers such as advanced practice registered nurses and physicians that have an active role in diagnosing and prescribing medication in the psychiatric field at an outpatient psychiatric clinic in Miami-Dade County, Florida.

Inclusion Criteria

Healthcare providers that work in the psychiatric field at an outpatient psychiatric clinic in Miami-Dade County, Florida, and attained a master or doctoral degree participated in this project. Only healthcare providers who work in pediatric, adult, or geriatric specialties were considered for this project. Furthermore, healthcare providers who diagnose and treat patients at an outpatient psychiatric clinic in Miami-Dade County, Florida, also participated in this project.

Exclusion Criteria

Healthcare providers who do not work at this particular outpatient psychiatric clinic in Miami-Dade County, Florida, did not participate in the project. Healthcare providers in other specialties not listed in the inclusion criteria (pediatric, adult, or

geriatric) were not included in this quality improvement project. Furthermore, healthcare providers who do not diagnose patients at this outpatient psychiatric clinic in Miami-Dade County, Florida, were excluded from this project.

Intervention

Upon Institutional Review Board (IRB) approval from Florida International University (FIU), this researcher obtained permission from the owner of the outpatient psychiatric clinic to conduct the quality improvement project and collect data. Invitations to participants were sent via email. The purpose and an overview of the project was provided to potential participants in the email. After they accepted the online invitation to participate in the project, subjects completed a researcher-developed demographic instrument online using Qualtrics. After the demographic questionnaire, participants completed an online pretest survey using the Camouflaging Autistic Traits Questionnaire to assess their knowledge awareness of camouflage skills in females with high-functioning autism.

Participants then watched a 10-minute voice over PowerPoint presentation about camouflage skills in females with high-functioning autism. Immediately after the presentation, participants completed an online posttest survey using the Camouflaging Autistic Traits Questionnaire to reassess their knowledge awareness of camouflage skills in females with high-functioning autism after the educational intervention. Participants were tested individually before and after the intervention on the same day. The online demographic, pre- and posttest surveys took approximately 40 minutes to complete. This project was implemented remotely through a computer and consisted of once a week encounters, for a total of 8 weeks of training and testing. The educational intervention

contained research-based information regarding camouflage skills in females with high-functioning autism as well as information about validated tools to identify these traits during the diagnosis process.

Measures and Instruments

Participants completed a researcher-developed demographic instrument online using Qualtrics. The following demographic data was obtained from participants: (a) age (a. 20 to 40 years or b. 41 years or older); (b) gender (a. male; or b. female); (c) level of education (a. master's degree or b. doctoral degree); (d) role (a. Advanced Practice Registered Nurse (APRN) or b. Physician (MD or DO); (e) years of clinical experience (a. less than 5 years of clinical experience or b. more than 5 years of clinical experience); (f) specialty (a. pediatrics; or b. adults or geriatrics); and (g) perceived knowledge of topic (a. none, or b. moderate, or c. competent). Participants also completed the modified Camouflaging Autistic Traits Questionnaire (CAT-Q) before and after an educational intervention to assess their knowledge awareness of camouflaging skills in females with high-functioning autism. This questionnaire is a validated tool used to assess camouflage skills in adult females. It has an internal consistency of ($\alpha = 0.94$) and a reliability of ($r = 0.77$) (Hull, 2019). The items of this questionnaire were based on identified camouflage skills; it also included reverse-coded items based on the opposite of the camouflage behaviors (Hull, 2019). These behaviors were categorized into compensation (social and communication skills), masking (skills to present as less autistic to others), and assimilation (skills to fit in uncomfortable social situations) (Hull, 2019).

The modified CAT-Q answered by participants in this project include 16 items to be responded using a 3-point Likert scale where 1 = True, 0 = False, and 0 = Don't know.

The items are: *When females with ASD interact with others, they deliberately imitate the other person's body language or facial expressions; Females with ASD learn about gestures and body language by watching television or films and reading books. They also apply these learned behaviors to social interactions; Females with ASD attempt to increase their social skills by imitating others; Females with ASD repeat phrases that they have heard from others in the exact same way that they first heard them; Females with ASD attempt to appear "natural" in social settings by practicing facial expressions, gestures, and body language; Females with ASD use behaviors that they learned from watching other people interacting; Females with ASD study human behavior to improve their social skills; Females with ASD develop a script to follow in social situations; Females with ASD monitor and adjust their body language or facial expressions to appear "relaxed" in social situations; Females with ASD monitor and adjust their body language or facial expressions to appear "interesting" in social interactions; Females with ASD think about the impression they make on others; Females with ASD believe they hold "natural" conversations; Females with ASD avoid social interactions; Females with ASD feel like they are "performing" rather than being themselves in social situations; Females with ASD force themselves to interact with others when they are in social situations; Females with ASD believe they are pretending to be "natural" in social settings and need support from others to socialize.* The modified CAT-Q answered by participants in this project also include four items to be responded using a 3-point Likert scale where 0 = True, 1 = False, and 0 = Don't know. The items are: *Females with ASD feel free to be themselves in social situations; Females with ASD rarely feel they need to put on an "act" to get through social situations; Females with ASD do not pay attention*

to their face or body language during social interaction; Females with ASD do not feel the need to make eye contact with others. There was a total of 20 items in the modified CAT-Q.

Data Collection Procedures

Upon IRB approval from FIU, this researcher obtained permission from the owner of the outpatient psychiatric clinic to conduct the quality improvement project and collect data. A convenience sampling method was used to recruit participants and access data electronically. After participants accepted the online invitation, they completed a researcher-developed demographic instrument online using Qualtrics. The following demographic data was obtained from participants: (a) age (a. 20 to 40 years or b. 41 years or older); (b) gender (a. male or b. female); (c) level of education (a. master's degree or b. doctoral degree); (d) role (a. Advanced Practice Registered Nurse (APRN) or b. Physician (MD or DO); (e) years of clinical experience (a. less than 5 years of clinical experience or b. more than 5 years of clinical experience); (f) specialty (a. pediatrics or b. adults or geriatrics); (g) perceived knowledge of topic (a. none, or b. moderate, or c. competent).

Participants then completed an initial online modified CAT-Q survey (pretest) using Qualtrics to assess their knowledge awareness of camouflage skills in females with high-functioning autism. Project participants then were prompted to watch a 10-minute voice over PowerPoint presentation. After the educational intervention, participants completed the same online CAT-Q survey (posttest) to reassess their knowledge awareness of camouflage skills in females with high-functioning autism. The participants were required to click on a link to be prompted to the demographic questionnaire, the

initial online pre- CAT-Q survey, the voiceover PowerPoint presentation, and the post-CAT-Q survey. Participants took approximately 40 minutes to complete the demographic questionnaire, watch the voiceover Power Point presentation, and complete the pre- and post-CAT-Q surveys using Qualtrics. Data collection was tabulated anonymously to electronic spreadsheets and maintained on a password-protected laptop computer where only the researcher had access to the data.

Data Analysis

Data was collected using Qualtrics. The researcher analyzed data using the Statistical Package for Social Sciences (SPSS) version 25.0. This researcher conducted the calculations (mean, median, mode, and standard deviation) for variables using descriptive analysis. The *t*-test was used to discover significant differences between pre- and posttest results. A *p*-value of less than 0.05 was considered statistically significant (Polit & Beck, 2017).

Protection of Human Subjects

Institutional Review Board (IRB) approval from Florida International University (FIU) was obtained before the researcher conducted the project to ensure research ethics and protection of human subjects. The investigator completed the Collaborative Institutional Training Initiative (CITI) ethics certification for the protection of human subjects in social and behavioral research. Prior to participation, volunteers were provided with an overview of the project and their ability to withdrawal from the project at any time with no penalty. Potential benefits to participants included an increased knowledge awareness regarding camouflage skills in females with high-functioning autism. This quality improvement project could increase knowledge awareness among

healthcare providers regarding camouflage skills in females with high-functioning autism and improve patient outcomes in females with autism. This project involved minimal risk, harm, or discomfort. The probability and magnitude of risk, harm, or discomfort anticipated were not greater than those ordinarily encountered in daily life. The findings of this project contributed to the body of nursing knowledge on females with ASD. Furthermore, data collection was tabulated anonymously to electronic spreadsheets and maintained on a password-protected laptop computer where only the researcher had access to the data. Provisions to protect the privacy interests of the participants were considered since participation in this project was voluntarily, no identifiable private information was collected from participants, results of the project were reported in aggregate format, and an indirect identifier or unique code was randomly assigned to participants via Qualtrics.

DNP PROJECT REPORT RESULTS

The purpose of this project was to increase knowledge awareness among healthcare providers in Miami-Dade County, Florida, regarding camouflage skills in females with high-functioning autism. A descriptive, cross-sectional, pre- and posttest design was employed to conduct the project. The sample size consisted of eight participants. Data was collected using Qualtrics. The researcher analyzed the data using the Statistical Package for Social Sciences (SPSS) version 25.0. Furthermore, the *t*-test helped the researcher discover significant differences between pre and posttest results. The demographics will be discussed in the following paragraphs, and then, the results related to the PICO clinical question will be presented.

A total of $N = 8$ healthcare providers participated in this project. Nearly 90% of the participants were 41 years or older and only one participant was between the ages of 20 and 40 years, see Table 1 and Figure 1.

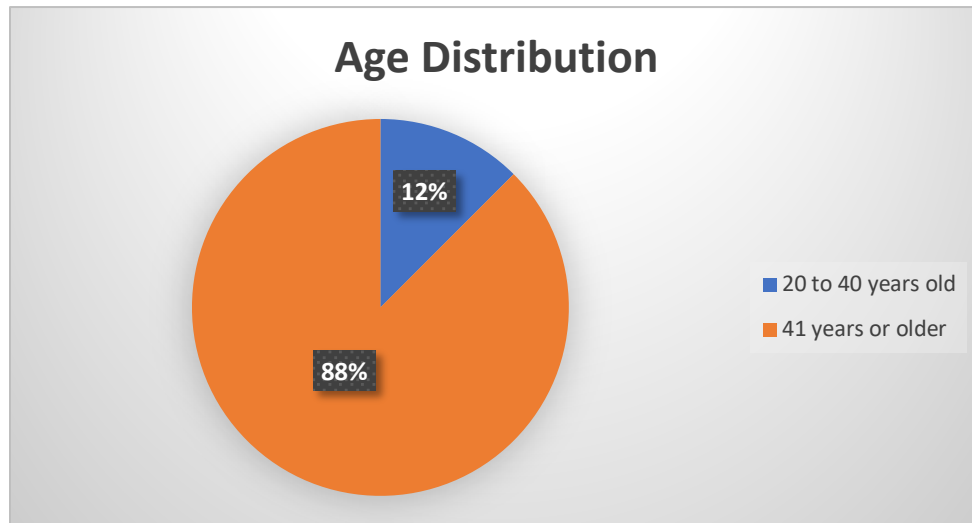
Table 1

Age of Healthcare Providers at an Outpatient Psychiatric Clinic ($N = 8$)

Age	Frequency	Percentage
20 to 40 years old	1	12.5%
41 years or older	7	87.5%
Total	8	100%

Figure 1

Age of Healthcare Providers at an Outpatient Psychiatric Clinic (N = 8)



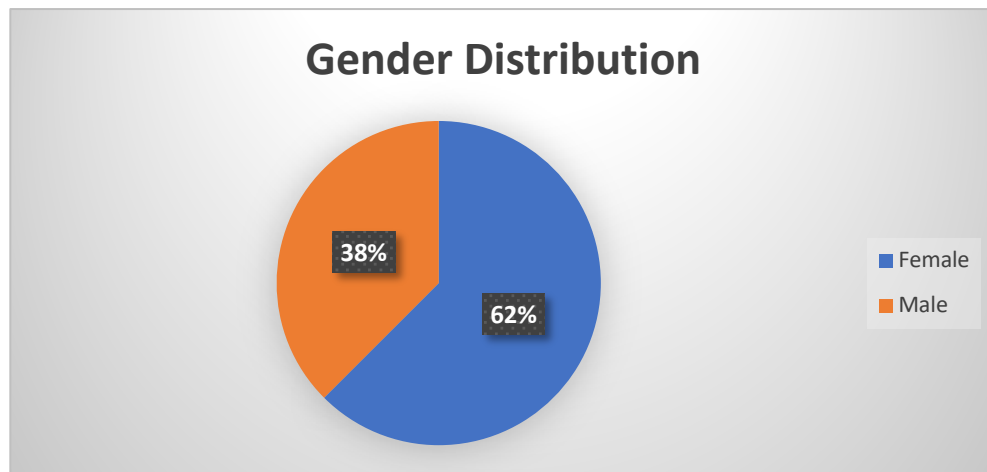
The gender of participants was classified as females or males for this project.

Most participants were females, and less than 40% of participants were males (see Table 2 and Figure 2).

Table 2

Gender of Healthcare Providers at an Outpatient Psychiatric Clinic (N = 8)

Gender	Frequency	Percentage
Males	3	37.5%
Females	5	62.5%
Total	8	100%

Figure 2*Gender of Healthcare Providers at an Outpatient Psychiatric Clinic (N = 8)*

Nurse practitioners (APRN) and physicians (MD or DO) were recruited for this project. Therefore, the role of the participants was categorized as APRN and MD or DO. Results indicated that over three-quarters of the sample consisted of APRNs, while less than 15% were MD or DO (see Table 3).

Table 3*Role of Healthcare Providers at an Outpatient Psychiatric Clinic (N = 8)*

Role	Frequency	Percentage
MD or DO	1	12.5%
APRN	7	87.5%
Total	8	100%

The level of education from each participant ranged from master's degree to doctoral degree. Participants attained a Master of Science in Nursing (MSN) degree, Doctor of Nursing Practice (DNP) degree, or medical degree (MD or DO). Results

revealed that more than half of the sample consisted of individuals with master's degrees while less than 40% consisted of individuals with doctoral degrees (see Table 4).

Table 4

Level of Education Among Healthcare Providers at an Outpatient Psychiatric Clinic (N = 8)

Level of Education	Frequency	Percentage
Doctoral degree	3	37.5%
Master's degree	5	62.5%
Total	8	100%

Years of clinical experience among the participants was collected and categorized as 5 years or less or more than 5 years. Demographic results indicated an equal distribution among participants. Half of the sample had less than 5 years of clinical experience and the other half had more than 5 years of clinical experience (see Table 5).

Table 5

Years of Clinical Experience Among Healthcare Providers at an Outpatient Psychiatric Clinic (N = 8)

Years of Clinical Experience	Frequency	Percentage
Less than 5 years	4	50%
More than 5 years	4	50%
Total	8	100%

Specialty among healthcare providers was categorized as pediatrics and adults or geriatrics. According to the demographic results, there were no pediatric healthcare providers in this sample. However, all the participants specialized in adult or geriatric mental health (see Table 6).

Table 6

Specialty Among Healthcare Providers at an Outpatient Psychiatric Clinic (N = 8)

Specialty	Frequency	Percentage
Pediatrics	0	0%
Adults or Geriatrics	8	100%
Total	8	100%

Perceived knowledge of the topic was collected among participants using a researcher-developed demographic instrument. In this sample, over 60% of healthcare providers had no knowledge of the topic and less than 40% had some knowledge of camouflage skills in females with high-functioning autism (see Table 7).

Table 7

Perceived Knowledge of the Topic Among Healthcare Providers at an Outpatient Psychiatric Clinic (N = 8)

Perceived knowledge of topic	Frequency	Percentage
None	5	62.5%
Moderate	3	37.5%
Total	8	100%

PICO Clinical Question

The PICO clinical question was: Is there a significant difference between pre- and posttest results among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida, after an educational intervention regarding camouflage skills in females with high-functioning autism? The alternative hypothesis (*Ha1*) related to the PICO clinical question was: There is a significant difference between pre and posttest results among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida, after an educational intervention regarding camouflage skills in females with high-functioning autism. Results revealed that after the educational intervention, there was an increase in knowledge awareness among healthcare providers in Miami-Dade County, Florida, regarding camouflage skills in females with high-functioning autism. Pre- and posttest results among participants will be discussed in the next paragraphs.

The pretest was completed by eight participants ($N = 8$). In this pretest, each correct answer was scored with 1, and incorrect answers were scored with 0. According to Table 8, participants scored highest on item 12, which was the following question: *Females with ASD do not pay attention to their face or body language during social interactions*. However, participants scored lowest on item 14, which was the following question: *Females with ASD rarely feel they need to put on an “act” to get through social situations* (see Table 8).

Table 8*Pretest Results Among Participants at an Outpatient Psychiatric Clinic (N = 8)*

Item	Pre-Test	<i>M</i>	<i>Mdn</i>	<i>SD</i>
Correct				
Answers				
1	2	0.25	.00	0.463
2	3	0.38	.00	0.518
3	3	0.38	.00	0.518
4	3	0.38	.00	0.518
5	2	0.25	.00	0.463
6	3	0.38	.00	0.518
7	2	0.25	.00	0.463
8	1	0.13	.00	0.354
9	2	0.25	.00	0.463
10	2	0.25	.00	0.463
11	3	0.38	.00	0.518
12	7	0.13	.00	0.354
13	2	0.25	.00	0.463
14	0	0.00	.00	0.000
15	1	0.13	.00	0.354
16	5	0.63	1.00	0.518
17	3	0.38	.00	0.518
18	3	0.38	.00	0.518

19	3	0.38	.00	0.518
20	2	0.25	.00	0.463

Furthermore, the posttest was completed by $N = 8$ participants (see Table 9). In this posttest each correct answer was scored with 1 and incorrect answers were scored with 0. Participants scored highest on items 1 to 10, 12, 13, and 17. The questions for these items in order are: *When females with ASD interact with others, they deliberately imitate the other person's body language or facial expressions; Females with ASD learn about gestures and body language by watching television or films and reading books. They also apply these learned behaviors to social interactions; Females with ASD attempt to increase their social skills by imitating others; Females with ASD repeat phrases that they have heard from others in the exact same way that they first heard them; Females with ASD attempt to appear "natural" in social settings by practicing facial expressions, gestures, and body language; Females with ASD use behaviors that they learned from watching other people interacting; Females with ASD study human behavior to improve their social skills; Females with ASD develop a script to follow in social situations; Females with ASD monitor and adjust their body language or facial expressions to appear "relaxed" in social situations; Females with ASD monitor and adjust their body language or facial expressions to appear "interesting" in social interactions; Females with ASD do not pay attention to their face or body language during social interactions; Females with ASD think about the impression they make on others; Females with ASD feel like they are "performing" rather than being themselves in social situations.* Participants scored lowest on item 14 which was the following

question: *Females with ASD rarely feel they need to put on an “act” to get through social situations* (see Table 9).

Table 9

Posttest Results Among Participants at an Outpatient Psychiatric Clinic (N = 8)

Item	Post-Test	<i>M</i>	<i>Mdn</i>	<i>SD</i>
Correct				
Answers				
1	8	1.00	1.00	0.000
2	8	1.00	1.00	0.000
3	8	1.00	1.00	0.000
4	8	1.00	1.00	0.000
5	8	1.00	1.00	0.000
6	8	1.00	1.00	0.000
7	8	1.00	1.00	0.000
8	8	1.00	1.00	0.000
9	8	1.00	1.00	0.000
10	8	1.00	1.00	0.000
11	1	0.13	0.00	0.354
12	8	1.00	1.00	0.000
13	8	1.00	1.00	0.000
14	0	0.00	0.00	0.000
15	1	0.13	0.00	0.354
16	5	0.63	1.00	0.518

17	8	1.00	1.00	0.000
18	7	0.88	1.00	0.354
19	7	0.88	1.00	0.354
20	6	0.75	1.00	0.463

Results of this project revealed that the posttest mean score was higher than the pretest mean score. A two-tailed paired samples *t*-test was conducted to examine whether the mean difference of the posttest and the pretest was statistically significant. The result of the two-tailed paired samples *t*-test indicated a significant difference between pre- and posttest mean scores, with participants scoring greater on the posttest after the educational intervention, $t(7) = 5.96$, with a $p = 0.001$, ($p < 0.05$). Furthermore, based on data analysis and an alpha value of less than 0.05, the researcher could reject the null hypothesis and accept the alternative hypothesis (*H_{a1}*) (see Table 10).

Table 10

Two-Tailed Paired Samples t-Test Between Pre- and Posttest Mean Scores

	<i>M</i>	<i>SD</i>	95% Confidence Interval of the Difference	<i>t</i>	<i>df</i>	<i>p</i> value
Posttest - Pretest	9.63	4.57	Lower: 5.81 Upper: 13.44	5.96	7	0.001

**DNP PROJECT REPORT
SUMMARY AND DISCUSSION**

The purpose of this project was to increase knowledge awareness among healthcare providers in Miami-Dade County, Florida, regarding camouflage skills in females with high-functioning autism. The aim of this project was to contribute to the body of nursing knowledge on females with high-functioning autism. The study design used to conduct this project was a descriptive, cross-sectional, pre- and posttest design. The sample size consisted of eight participants at an outpatient psychiatric clinic in Miami-Dade County, Florida. A researcher-developed demographic instrument and the modified CAT-Q questionnaire was utilized to collect data and assess knowledge awareness of camouflage skills in females with high-functioning autism among healthcare providers.

Furthermore, the method used for collecting data and recruiting subjects was a convenience sampling technique, and the Qualtrics program was used to collect data from participants. The software used to analyze data was the Statistical Program for Social Sciences (SPSS) version 25.0. Results revealed that participants scored higher on the posttest after an educational intervention. Moreover, a significant difference was found between pre- and posttest mean scores, $t(7) = 5.96$, with a $p = 0.001$, ($p < 0.05$). The researcher will compare and contrast the findings of the project with current literature. This section will additionally discuss implications for advanced practice nursing, limitations of the project, recommendations, and conclusions.

Summary of the Results and Discussion

Results of this project showed that the mean (M) score of the pretest was 0.13, with a standard deviation (SD) of 0.35. Pretest results revealed that participants scored lowest on item 14, which was the following question: *Females with ASD rarely feel they need to put on an “act” to get through social situations.* Furthermore, the M score ($M = 1.00$; $SD = 0$) of the posttest was higher than the M score of the pretest. After the administration of an educational intervention, posttest results also revealed that participants scored lowest on item 14. The correct answer for this question was false since females with high-functioning autism do feel the need to put on an act to get through social situations. Females with high-functioning autism feel like they perform “acts” and develop scripts to follow in social situations instead of being themselves (Hull, 2019). It is imperative that healthcare providers receive training on camouflage skills in females with high-functioning autism to improve diagnostic and health outcomes in this population. Moreover, the researcher accepted the alternative hypothesis (H_a) related to the PICO clinical question because a significant difference was discovered between pre- and posttest mean scores, $t(7) = 5.96$, with a $p = 0.001$, ($p < 0.05$).

The findings of this project connect with literature review. The pretest results demonstrated a lack of knowledge awareness of camouflage skills in females with high-functioning autism among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida. However, posttest mean scores of this project were higher than pretest mean scores. Educational training sessions among healthcare providers are imperative to improve quality of care. Research indicates a reduction in medical errors after educational training sessions among healthcare providers in the U.S. (Rodziewicz &

Hipskind, 2020). Similar to this quality improvement project, a recent study showed that healthcare providers ($N = 33$) had decreased knowledge awareness of human papilloma virus (HPV) self-testing in the U.S. (Presser et al., 2018). However, after an educational intervention, healthcare providers gained an increase in knowledge awareness of HPV self-testing (Presser et al., 2018).

Moreover, another cross-sectional, pre- and posttest study reported increased knowledge awareness of telehealth among 37 nurses after an educational training session (van Houwelingen et al., 2021). The educational intervention also increased competence in telehealth use among nurses (van Houwelingen et al., 2021). These results suggest that training is an effective strategy to gain knowledge (van Houwelingen et al., 2021). The findings of this quality improvement project validate the effectiveness of an educational intervention to increase knowledge. These findings can be related to another cross-sectional, pre- and posttest study that used an educational intervention to increase knowledge among nurses regarding human trafficking (Berishaj et al., 2019). The sample of this pre- and posttest study consisted of 93 nurses in the U.S. (Berishaj et al., 2019). Researchers in this study agreed that health care institutions in the U.S., must support continuous education among their staff (Berishaj et al., 2019). Researchers reported an increased awareness of human trafficking and related topics among nurses after an educational training session (Berishaj et al., 2019). Medical facilities should therefore train healthcare providers on camouflage skills in females with high-functioning autism to improve health outcomes in this population.

Implications for Advanced Practice Nursing

This quality improvement project had significant implications for nursing practice, research, and health policy. This project helped nurses and physicians to gain awareness of camouflage skills in females with high-functioning autism in clinical practice. Nurse practitioners and researchers could use the results of this project to develop new screening tools aimed at improving health outcomes in females with high-functioning autism. This project uncovered gaps in knowledge among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida. Nurses should therefore replicate and implement this project in diverse settings such as acute and primary care settings to improve healthcare outcomes in females with high-functioning autism.

Nurses could train healthcare providers and increase research in this area by analyzing the results of this project. Similarly, nurse administrators could develop health policies in clinical practice that meet the needs of females with high-functioning autism. The educational intervention provided during this quality improvement project could be used by other nurses to train healthcare providers on females with high-functioning autism and reduce misdiagnosed rates in females with high-functioning autism.

Limitations of the Project

Studies have limitations. The limitations of this project were:

1. Convenience sampling method does not involve randomization.
2. A low number of participants decrease the generalizability of the project. This project was conducted during the COVID-19 pandemic, which could have affected the sample size and data of this project.

3. A descriptive, cross-sectional, pre- and posttest design cannot be used to describe casualty between the variables.
4. The project was limited to physicians and advanced practice registered nurses; therefore, future researchers should include other key healthcare providers such as registered nurses, counselors, therapists, and psychologists.
5. No pediatric providers participated in this project; therefore, this project should be expanded to include child and adolescent healthcare providers.

Recommendations

Investigators should employ longitudinal study designs, including randomization method. A larger sample size could also increase the generalizability of the study. Researchers should administer this project at other clinical settings such as hospitals or community mental health clinics. Furthermore, future research should use qualitative designs to assess in-depth subjective data related to knowledge awareness of camouflage skills in females with high-functioning autism among health care providers. Studies should include psychologists with master's and doctoral degrees who have an active role diagnosing individuals with ASD to gain insight into this specialty group. This project did not have pediatric providers within the sample; it is imperative to include this clinical group in future studies since they have a significant role in diagnosing and treating females with high-functioning autism.

Conclusions

This quality improvement project increased knowledge awareness of camouflage skills in females with high-functioning autism among healthcare providers at an outpatient psychiatric clinic in Miami-Dade County, Florida. A two-tailed samples *t*-test

revealed a significant difference between pre- and posttest mean scores, $t(7) = 5.96$, with a $p = 0.001$, ($p < 0.05$). Furthermore, participants scored higher on posttests after an educational intervention. Therefore, nurses and healthcare providers should receive training regarding camouflage skills in females with high-functioning autism to prevent misdiagnoses and improve the quality of care in this population.

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Appendix A

FLORIDA INTERNATIONAL UNIVERSITY
INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



FLORIDA
INTERNATIONAL
UNIVERSITY

Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To: Dr. Francisco Brenes
CC: Tahnee Diaz Rodriguez
From: Elizabeth Juhasz, Ph.D., IRB Coordinator *EJ*
Date: August 3, 2021
Protocol Title: "Knowledge Awareness of Camouflage Skills in Females with High-Functioning Autism among Health Care Providers in Miami-Dade County, Florida: A Quality Improvement Project."

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-21-0346 **IRB Exemption Date:** 08/02/21
TOPAZ Reference #: 110671

As a requirement of IRB Exemption you are required to:

- 1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
- 2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
- 3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at <http://research.fiu.edu/irb>.

EJ

*Appendix B***FLORIDA INTERNATIONAL UNIVERSITY****SUPPORT LETTER FROM FACILITY**

Date: 5/26/2021

Francisco Brenes Ph.D., APRN-BC, FNP, PMHNP

Clinical Assistant Teaching Professor

Nicole Wertheim College of Nursing & Health Sciences

Florida International University

Dear Dr. Brenes:

Thank you for inviting Coastal Health Group, Inc., to participate in the DNP Project of Tahnee Diaz Rodriguez. I understand that this student will be conducting this project as part of the requirements for the Doctor in Nursing Practice program at Florida International University. After reviewing the proposal of the project titled "Knowledge Awareness of the Camouflage Skill in Females with High-Functioning Autism among Health Care Providers in Miami-Dade County, Florida: A Quality Improvement Project" I have warranted her permission to conduct the project in this company.

We understand that the project will be develop in our setting and will occur in two sessions in a four-week time frame and will probably be implemented afterward. We are also aware of our staff participation in supporting the student to complete this project, including warrant the student access to our facilities, give consent, deliver the pre-test questionnaire, provide the educational intervention and, immediately after, provide the post-test to the recruited participant. We will provide a peaceful environment to safeguard our participant privacy as well as adequate remote access to conduct the educational activity.

This project intends to evaluate if a structured education targeting providers will increase knowledge awareness of the camouflage skill in females with high-functioning autism. The project will be conducted with the previous consent of potential participants working in our facilities. Prior the implementation of this project, the Florida International University Institutional Review Board will evaluate and approve the procedures to conduct this project.

Evidence suggests clinical manifestation differences between males and females with autism. It is especially important for healthcare providers to receive training on the camouflage skill in females with high-functioning autism. The educational intervention could improve health outcomes in this population.

The educational intervention will be provided electronically using a voice-over power point presentation and will last 10-15 minutes. Any data collected by Tahnee Diaz Rodriguez will be kept confidential and will be stored in a secure-encrypted online platform were only the researcher will have access to the data. We expect that Tahnee Diaz Rodriguez will not interfere with the normal office performance, behaving in a professional manner and providing the best care. As the owner at Coastal Health Group, Inc., I support the participation of our provider in this project and look forward to work with you.

Name: Sandra Murney, PMHNP-BC Role: owner
 Signature: [Handwritten Signature] Date: 6/8/21

*Appendix C***FLORIDA INTERNATIONAL UNIVERSITY****RECRUITMENT EMAIL LETTER****Recruitment Email for Knowledge Awareness of the Camouflage Skills in Females with High-Functioning Autism among Health Care Providers in Miami-Dade County, Florida: A Quality Improvement Project**

Dear Healthcare provider,

My name is Tahnee Diaz Rodriguez, and I am a student from the Graduate Nursing Department at Florida International University. I am writing to invite you to participate in my quality improvement project. The goal of this project is to increase the knowledge awareness of healthcare providers in Miami-Dade County, Florida, regarding camouflage skills in females with high-functioning autism. You are eligible to take part in this project because you are healthcare provider at Coastal Health Group, Inc., and you provide or may provide care to patients in this clinic. I am contacting you with the permission of the owner of the clinic, Dr. Sandra Pelaez-Munsey.

If you decide to participate in this project, you will be asked to complete a demographic survey for participation. You will complete a pre-test questionnaire, which is expected to take approximately 10-15 minutes. Then, you will then be asked to view an approximately 10-minute-long educational power point presentation online. After watching the video, you will be asked to complete the post-test questionnaire, which is expected to take approximately 10-15 minutes. No compensation will be provided.

Remember, this is completely voluntary. You can choose to be in the study or not. If you'd like to participate, please click on the link provided below to begin the pretest survey. After completing the pretest, notify the researcher by email so the educational intervention can be emailed to you. After watching the educational power point presentation online, notify the researcher one last time so the link for the post test can be sent to you via email.

If you have any questions about the study, please email or contact me at tdiaz070@fiu.edu or 787-674-0449.

Thank you very much.

Sincerely,

Tahnee Diaz Rodriguez, PMHNP-BC

*Appendix D***FLORIDA INTERNATIONAL UNIVERSITY****RESEARCHER-DEVELOPED DEMOGRAPHIC INSTRUMENT****Introduction:**

These two questionnaires are part of a quality improvement project aiming to increase knowledge awareness of healthcare providers in Miami-Dade County, Florida, regarding camouflage skills in females with high-functioning autism.

Please answer to the best of your knowledge. Your responses will help to understand gaps in knowledge and room for improvement.

- Do not write your name or other personal information.
- Your answers are anonymous and will be kept confidential.
- Your participation is voluntary.

RESEARCHER-DEVELOPED DEMOGRAPHIC INSTRUMENT

Please click on the appropriate response:

1. What is your age range?

- a. 20 to 40 years
- b. 41 years or older

2. What is your gender?

- a. Male
 - b. Female
3. What is your highest level of education?
- a. Master's degree
 - b. Doctoral degree
4. What is your current role?
- a. Advanced Practice Registered Nurse (APRN)
 - b. Physician (MD or DO)
5. How many years of clinical experience do you have?
- a. Less than 5 years
 - b. More than 5 years
6. What is your specialty at Coastal Health Group?
- a. Pediatrics
 - b. Adults or Geriatrics
7. What is your current knowledge regarding camouflage skills in females with autism spectrum disorder (ASD)?
- a. None
 - b. Moderate
 - c. Competent

*Appendix E***FLORIDA INTERNATIONAL UNIVERSITY****MODIFIED CAMOUFLAGING AUTISTIC TRAITS QUESTIONNAIRE (CAT-Q)****PRETEST-POSTTEST**

Please click on the appropriate response.

1. When females with ASD interact with others, they deliberately imitate the other person's body language or facial expressions.

- a. True
- b. False
- c. Don't Know

2. Females with ASD learn about gestures and body language by watching television or films, and reading books. They also apply these learned behaviors to social interactions.

- a. True
- b. False
- c. Don't Know

3. Females with ASD attempt to increase their social skills by imitating others.

- a. True
- b. False
- c. Don't Know

4. Females with ASD repeat phrases that they have heard from others in the exact same way that they first heard them.

- a. True
- b. False
- c. Don't Know

5. Females with ASD attempt to appear “natural” in social settings by practicing facial expressions, gestures, and body language.

- a. True
- b. False
- c. Don't Know

6. Females with ASD use behaviors that they learned from watching other people interacting.

- a. True
- b. False
- c. Don't Know

7. Females with ASD study human behavior to improve their social skills.

- a. True
- b. False
- c. Don't Know

8. Females with ASD develop a script to follow in social situations.

- a. True
- b. False
- c. Don't Know

9. Females with ASD monitor and adjust their body language or facial expressions to appear “relaxed” in social situations.

- a. True
- b. False
- c. Don't Know

10. Females with ASD monitor and adjust their body language or facial expressions to appear “interesting” in social interactions.

- a. True
- b. False
- c. Don't Know

11. Females with ASD do not feel the need to make eye contact with others.

- a. True
- b. False
- c. Don't Know

12. Females with ASD do not pay attention to their face or body language during social interactions.

- a. True
- b. False
- c. Don't Know

13. Females with ASD think about the impression they make on others.

- a. True

- b. False
 - c. Don't Know
14. Females with ASD rarely feel they need to put on an “act” to get through social situations.
- a. True
 - b. False
 - c. Don't Know
15. Females with ASD believe they hold “natural” conversations.
- a. True
 - b. False
 - c. Don't Know
16. Females with ASD avoid social interactions.
- a. True
 - b. False
 - c. Don't Know
17. Females with ASD feel like they are “performing” rather than being themselves in social situations.
- a. True
 - b. False
 - c. Don't Know

18. Females with ASD force themselves to interact with others when they are in social situations.

- a. True
- b. False
- c. Don't Know

19. Females with ASD believe they are pretending to be “natural” in social settings and need support from others to socialize.

- a. True
- b. False
- c. Don't Know

20. Females with ASD feel free to be themselves in social situations.

- a. True
- b. False
- c. Don't Know

*Appendix F***FLORIDA INTERNATIONAL UNIVERSITY****CITI ETHICS CERTIFICATION**

Completion Date 22-Jun-2021
Expiration Date 21-Jun-2024
Record ID 43062671

This is to certify that:

Tahnee Diaz

Has completed the following CITI Program course:

Basic/Refresher Course - Human Subjects Research
(Curriculum Group)
Social/Behavioral Human Research Course
(Course Learner Group)
2 - Refresher Course
(Stage)

Not valid for renewal of certification
through CME.

Under requirements set by:

Florida International University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w34e369bf-4170-4486-a056-524e04ff630c-43062671

*Appendix G***FLORIDA INTERNATIONAL UNIVERSITY****CV**

2012	BSN, University of Puerto Rico, Medical Science Campus, Puerto Rico.
2012 - 2014	Case Manager Registered Nurse, Triple-S, Puerto Rico.
2014 - 2018	Home IV Registered Nurse, Medicare and Much More, Inc., Puerto Rico.
2020	MSN, Florida International University, Miami, FL.
2020 - FL.	Psychiatric Mental Health Nurse Practitioner, Coastal Health Group, Inc., Miami,
2021	DNP, Florida International University, Miami, FL.