

College Student Perceptions of ADHD: Links Between Prior Knowledge and Stigma

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A Senior Thesis submitted in partial fulfillment  
of the requirements for graduation  
in the Honors Program  
Liberty University  
Spring 2020

Acceptance of Senior Honors Thesis

This Senior Honors Thesis is accepted in partial fulfillment of the requirements for graduation from the Honors Program of Liberty University.

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April 14, 2020

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### Abstract

Attention deficit hyperactivity disorder (ADHD) is characterized by persistent inattention, which might or might not accompany hyperactivity and impulsivity, that noticeably interferes with functioning and development in at least two settings. It is a commonly diagnosed childhood mental health disorder. Public knowledge and attitudes towards ADHD are an important consideration for those who are going to potentially be working with that population. Research has shown older children and parents may attribute ADHD behavior to poor social skills or immaturity. Teachers often report feeling unprepared to have a student with ADHD and would like more training. Some research has shown the perpetuation of common misconceptions of ADHD by parents and teachers. This research sought to determine if there was a correlation between knowledge of ADHD and stigma towards individuals with ADHD and to determine if students majoring in psychology differed from their peers on knowledge about ADHD or attitudes towards individuals with ADHD. After surveying 131 students from a faith-based, private university in Virginia, it was found that those majoring in psychology did not have significant differences in knowledge of ADHD or stigma towards people with ADHD when compared to students in other majors. Both knowledge and stigma scores were high across groups and no significant correlation between knowledge and attitudes was found. Findings have implications for university students diagnosed with ADHD and administrators working to reduce the stigma of ADHD on campus.

*Keywords:* ADHD, psychology students, knowledge, experiences, attitudes

### College Student Perceptions of ADHD: Links between Prior Knowledge and Stigma

Attention deficit hyperactivity disorder (ADHD) affects up to 11% of children (Lawrence, Estrada, & McCormick, 2017). There is some debate as to whether it should be considered a neurological disorder, developmental disorder, or a psychiatric disorder (Akram, Thomson, Boyter, & McLarty, 2009). ADHD is characterized by persistent inattention, with or without hyperactivity and impulsivity, that markedly interferes with functioning and development in at least two settings, such as at school and at home. Symptoms often become more noticeable when a child starts school (Mulholland, 2016). It is estimated at least one child in every elementary school classroom is affected by ADHD (Barnett, Corkum, & Elik, 2011). Over 6.4 million children in the United States have at one time been diagnosed with ADHD making it the most commonly diagnosed childhood mental health disorder. White children are more likely to be diagnosed than African American or Hispanic children, and male children are more likely to be diagnosed than female children. Males are also more likely to experience disruptive symptoms such as hyperactivity and impulsiveness whereas females are more likely to experience attentional issues that are often characterized as forgetfulness or laziness. This discrepancy in symptomology is a possible explanation for males being twice as likely to be diagnosed than females.

ADHD has long-term and often far reaching implications for the individual's education, safety, and employment (Lawrence et al., 2017). ADHD symptoms can often conceal comorbid learning disorders, and children with ADHD are three times more likely to be diagnosed with a learning disability than children without ADHD. Left undiagnosed, comorbid learning disabilities could have a significant lifelong impact on academic achievement and career opportunities (Mulholland, 2016). In addition, social relationships are often negatively impacted

by ADHD symptoms such as difficulty maintaining eye contact, infringing personal space, interrupting others, hyperawareness of the perceptions of others, verbal impulsivity, and inattentiveness. Peers who do not have ADHD symptoms may view children with ADHD negatively— leading to isolation, feelings of worthlessness, and despair, which may contribute to the commonly comorbid diagnoses of anxiety and depression. Teachers and health care providers may also develop a negative view of children with ADHD, which could influence their interactions with children with ADHD (Lawrence et al., 2017).

### **Literature Review**

Overall awareness of what ADHD is could lead to fewer misunderstandings of the population of people with ADHD. By changing the knowledge and attitudes in parents and health care providers, a decrease in stigmatization and increase in appropriate treatment could be evidenced. Many studies have sought to measure knowledge of ADHD, attitudes towards people with ADHD, and some measure both in order to measure the correlation between them.

### **Knowledge About ADHD**

Changing knowledge and attitudes related to ADHD in teachers can lead to a change in classroom strategies (Barnett et al., 2011). In a qualitative study performed by Lawrence et al. (2017), teachers' understanding of ADHD and experiences with students with ADHD were examined as well as teachers' sources of knowledge and educational strategies for students with ADHD. Fourteen current or retired teachers who had classroom experience with students with ADHD from North and South Carolina participated in the study. The interviews covered topics such as general knowledge about ADHD, source of knowledge of ADHD, personal experiences with students with ADHD, problematic behaviors of students with ADHD including hyperactivity, inattention, and social interactions, observations of gender differences,

environmental influences on ADHD such as family, social, and economic, peer interactions, healthcare provider interactions in diagnosis and medication adjustments, and the administrative processes involved in providing services to children with ADHD. Teachers' knowledge about ADHD was derived mostly from informal sources such as peers and in-service trainings with the exception of one teacher pursuing a doctoral degree who received minimal instruction in her coursework which was focused primarily on autism.

Most of the teachers felt they had received inadequate education about ADHD and expressed a desire to learn more about both the general and specific aspects of ADHD. A few reported their knowledge was gained from their experiences with their own child, relative, or family friend. Lawrence et al. (2017) found that those with family experience described themselves as having greater insight, understanding, and patience with their students while those without family experience expressed more skepticism regarding the validity of the diagnoses of ADHD in their students. It was hypothesized by some teachers that the southern culture of politeness and assuming inadequate punishment for hyperactive behavior play a significant role in how people perceive and treat children with ADHD. Teachers also remarked it was more socially acceptable to be a male with ADHD than a female. Age also seemed to affect how peers treated students with ADHD with younger children being more accepting than middle school aged children. Most teachers expressed that they believed poor home environments and a lack of discipline, parental involvement, or encouragement towards independence were contributing towards ADHD symptoms (Lawrence et al., 2017).

Classroom techniques used in conjunction with medication include allowing activity, assuring positive interactions, redirecting, communicating consequences, decreasing distractions, and utilizing varied methods of instruction. Teachers reported a mix of success with their various

strategies noting, for example, the consequence of missing recess often worsened problem behavior in children with hyperactivity whereas moving their seat to the back of the room where they could move without distracting the other students was successful for some students with ADHD. These strategies were often gained from conversations with other teachers and self-education through reading rather than formal education methods. Often teachers experience emotional distress when considering their students with ADHD and worry primarily about the students' future career possibilities. Other sources of stress for teachers include class size, extra time needed for interventions, lack of training, and severity of the ADHD (Lawrence et al., 2017).

Quantitative studies have also been performed to assess knowledge of ADHD in teachers. Alkahtani (2013) surveyed 429 teachers using the Knowledge of Attention Deficit Disorder Scale (KADDS) along with a demographic questionnaire to determine the level of knowledge of ADHD. Information regarding their prior training regarding ADHD was also gathered. The descriptive statistics and correlational test used to analyze the data found teachers' knowledge of ADHD was insufficient. However, there was a positive correlation between amount of training received related to ADHD and knowledge ADHD. There was also a positive correlation between knowledge of ADHD and self-reported confidence in teaching a student with ADHD.

Teachers in other countries have also been assessed for knowledge of ADHD. Data from 113 elementary school teachers in Nova Scotia Canada were gathered to determine knowledge of ADHD and how it affects behaviors and beliefs about ADHD. The Knowledge of Attention Deficit Disorders Scale (KADDS) was used to assess teachers' knowledge of ADHD. There was not a significant relationship between knowledge of ADHD and beliefs about ADHD in this sample. There was a significant correlation between Behaviour Management practices and the

Total Beliefs score indicating that fewer negative beliefs about ADHD were related to higher reported use of evidence-based behavior management strategies. Teachers reported more frequent use of less intensive intervention strategies than of high-intensive intervention strategies when working with children with ADHD (Iotnicky-Gallant, Martin, McGonnell, & Corkum, 2014).

Similarly, elementary teachers in Australia were surveyed to determine their knowledge of ADHD and its impact on their behavior and perceptions. Despite many teachers' unpreparedness to manage the academic, social, and emotional needs of students with ADHD, the teachers are often the ones that make recommendations to the parents that are regularly followed whether they are correct or incorrect. Teachers often notice the symptoms of ADHD so it is important they are aware of the criteria of ADHD so they know when a recommendation of treatment should be made. Teachers are also expected to implement, evaluate, and support treatment plans and it is important they understand ADHD in order to fulfill those roles effectively. While teacher knowledge in North America has been found to be generally good, there are specific areas of weakness such as in the area of treatment. It was found that two-thirds of teachers from the North America survey believed that reduction of sugar was an effective treatment of ADHD and those misconceptions can lead to the spread of misinformation, stigmatization, and ineffective treatment of ADHD. Studies from New Zealand and Australia have shown similar results to those from North America. In a study by Ohan et al. (2008), 140 elementary school teachers took a survey. Every teacher reported teaching at least one student with ADHD and over half reported having taught over 20 students with ADHD. Responses for each item are true/false and this study chose to use 19 of the 20 items. After completing the ADHD Knowledge Scale, participants read a vignette of a child showing ADHD symptoms who

met DSM- IV criteria. Nine items were rated on 9-point Likert scales to determine teacher behavior towards and perceptions of children with ADHD. Items included things such as expected disruption to classroom and teachers' confidence in managing the child. Approximate upper (high knowledge) and lower (low knowledge) quartile groups were divided in order to determine if knowledge correlated to behavior and attitudes. No demographic data significantly impacted knowledge of ADHD and therefore demographic data was not used as covariates. Teachers with high and average knowledge were more likely to acknowledge the impact on the child's classroom and peer relationships. Teachers with low knowledge were more likely to report high confidence in handling the child's problems. This study suggests that students whose teachers have average or high knowledge of ADHD may receive better support and experience better adjustment than students whose teachers have low knowledge, highlighting the need for increased education in teachers about ADHD. It has also been suggested teachers holding negative views of ADHD may unintentionally illicit more negative behaviors in their students with ADHD (Ohan, Cormier, Hepp, Visser, & Strain, 2008).

Research has also demonstrated that parents and teachers may differ on knowledge about ADHD. A sample of primary school and secondary school teachers as well as parents of children with ADHD. Teachers with special education qualifications scored higher than those who did not. Items that had high percentages for the response option "Don't Know" included whether biofeedback, homeopathic remedies, or electroconvulsive therapy were effective treatment options suggesting that parents and teachers are not aware of what treatments are and are not effective for ADHD. The Knowledge about Attention Deficit Disorder Questionnaire (KADD-Q) was shown to be internally consistent when measuring teachers' and parents' knowledge of ADHD. Knowledge from this sample was shown to be highest regarding causes with knowledge

of characteristics being lower and knowledge about treatments being the lowest. Results showed parents to be more knowledgeable about causes and about ADHD overall when compared to teachers. It was also found that both parents and teachers have misconceptions about ADHD. It has been shown that 35%-50% of children with ADHD will have a comorbid specific learning disorder in the area of reading, writing, language, or math. Despite most individuals with ADHD reporting average or above-average intelligence, students with ADHD are at a high risk for academic underachievement, especially if their ADHD is undiagnosed and unmanaged (West, Taylor, Houghton, & Hudyma, 2005).

Researchers have also compared parents' knowledge of ADHD with the knowledge of their adolescents. A longitudinal cohort study was performed from 1998 and 2008 with six study waves. Three hundred seventy-four interviews were conducted and average of 7.7 years after the initial screening in 1998. Of the 374 interviews, 56% were with adolescents from the group deemed high-risk for ADHD and 44% were from the low-risk group which served as the control. The results indicated a high rate of belief in the sugar etiology in parent and adolescents, 25% and 27% respectively. The majority, 85% of parents and 67% of adolescents, also believed medication is overused in the treatment of ADHD. African American participants expressed lower levels of ADHD awareness than Caucasian participants. While almost all adolescents (93%) reported having heard of ADHD only 49% considered themselves knowledgeable about it (Bussing, Zima, Mason, Meyer, White, & Garvan, 2012). This study suggests possible areas of weakness in knowledge of ADHD. The belief that sugar elimination diets are effective can cause parents and adolescents to feel they can treat ADHD on their own without the help of a medical professional. Moreover, the belief that medication is overused may hinder help-seeking behavior due to a fear that they will be prescribed a medication they do not need. Some children who are

at a high-risk for having ADHD may not be knowledgeable about it, though most adolescents from this study have at least heard about ADHD, which is a good first step towards increasing knowledge of ADHD.

The “next generation” of teachers have also been participants of studies assessing knowledge of ADHD. Knowledge of ADHD was measured in 911 undergraduate students. Those preparing to become teachers were compared to those of various other majors. While the education majors had more accurate knowledge than their peers, there is still room for improvement in their training regarding ADHD. It is likely a teacher will encounter at least one student with ADHD during each year of service, so it is important for teacher trainees to have adequate knowledge of ADHD upon completion of their training. During their teaching careers it will be important for them to accurately identify warning signs and avoid misinterpreting misbehaviors as ADHD-type behavior so that evaluations are only recommended to those who warrant them. Many studies comparing the knowledge of in-service teachers to pre-service teachers showed the former to be more knowledgeable in the United States, Australia, and Canada; however, in Scotland researchers found pre-service teachers to be more knowledgeable (Canu & Mancil, 2012). These findings suggest Scotland may have a teacher-training process that now includes greater information on ADHD and that in the United States, Australia, and Canada teachers learn more about ADHD once they become teachers.

There have also been positive associations between direct teaching of students with ADHD and greater knowledge of ADHD, greater confidence in teaching a child with ADHD, and greater endorsement of in-class behavioral intervention use (Canu & Mancil, 2012). In a study by Kos, Richdale, and Jackson (2004) 48 out of 100 in-service teachers overestimated their knowledge of ADHD. This finding suggests teachers may be overly confident and may be less

likely to seek out accurate knowledge of ADHD. While experience with children with ADHD has shown a limited effect on knowledge of ADHD, in-depth teacher workshops have increased understanding and decreased negative bias in teachers. A sample of teachers in Virginia were surveyed to examine their knowledge of ADHD and it was found that 36% of teachers believed the prevalence rate of ADHD was higher than 16%, which is significantly greater than current government estimates. There are several other areas in which teacher knowledge is lacking. Despite reporting a high desire for more specific training regarding ADHD, most pre-service teachers reported having little training during their years of formal education. In a randomly selected examination of teacher training programs in the United States, it was found that only 16% provided instruction on emotional and behavioral problems including their characteristics and how to identify them (State, Kern, Starosta, & Mukherjee, 2011). The average time spent on these materials was a mere 11 minutes. In a study comparing teacher trainee knowledge of ADHD to their peers, 534 students completing their final semester internship and 377 undergraduate students from the first week of introductory and intermediate level psychology courses representing 39 different areas of study were surveyed on their knowledge of ADHD. As was hypothesized, the teacher trainees had greater actual knowledge of ADHD (60.6%) than their comparison group who answered 54.6% correctly (Canu & Mancil, 2012). Though statistically significant, it was a small finding overall.

### **Attitudes Toward Individuals with ADHD**

Studies on ADHD have also been concerned with the participants' attitudes towards individuals with ADHD, including perceptions of the individual and stigmatization of treatment. Treatment of ADHD can be controversial and there is concern about the rise in prescribing methylphenidate and other psychostimulants to those with ADHD despite plentiful statistical

evidence of their effectiveness. Well-established psychosocial treatments of ADHD include behavioral parent training and behavioral contingency management in school settings. Efforts to increase the use of these evidence-based treatments have not been as successful as hoped with only 50% of children with ADHD being reported by physicians as receiving care in accordance with the practice parameter of the American Academy of Child and Adolescent Psychiatry. Potential influencers of the use of evidence-based practices are the social perceptions, such as anticipated stigma, of the affected youth, their parents, health professionals, teachers, and peers. There are few studies on the perceptions of ADHD treatment in youth, and while the youth report positive effects of stimulant medications on attention, behavior, and social function, less than 50% wanted to continue taking medication. Parents generally rate medication as more beneficial than youth, and parents tend to rate behavioral interventions as more acceptable than medication. Those parents with personal experience of medication treatment rate it as more effective than parents without personal experience. In the health profession, school nurses were found to be generally knowledgeable and supportive of medication despite personal skepticism about its safety and use, psychiatrists were more concerned about side effects than family doctors, but both indicated stimulant medication is effective (Bussing, Koro-Ljungberg, Noguchi, Mason, Mayerson, & Garvan, 2011). Attitudes concerning medication is a small part of the assessment of general attitudes towards ADHD, but it is of concern because people with ADHD may feel stigmatized based on their medication status alone.

Other studies have taken a more holistic look at the stigmatization of ADHD. Using a mixed methods approach, quantitative and qualitative items were included in a survey attempting to analyze the attitudes of adolescents, parents, health professionals, and teachers. Vignettes were presented followed by items consisting of treatment options which were each rated on a 5-point

Likert scale to assess acceptability, perceived effectiveness, potential to be embarrassing, likelihood to cause undesirable effects, and self-rated knowledge of treatment. Participants were then asked to rate their willingness to use or recommend the treatment. Past ADHD treatment services use was measured using the Child and Adolescent Services Assessment (CASA) which is a parent report of all mental health service use that has been proven to have excellent agreement with medical records of receiving outpatient services and details of the child's medication regimens. Adolescents expressed lower willingness than adults for all ADHD interventions. Parents and health professionals indicated a higher willingness to use counseling than teachers. Short acting medication was associated with academic, learning, and school disruptions as well as stigma and embarrassment to a greater extent than long-acting medication (Bussing et al., 2011).

People with ADHD are at high risk of experiencing stigma, prejudices, and discrimination. The focus of a study by Mueller, Fuermaier, Koerts and Tucha (2012) was stigma related to ADHD in children with ADHD, adults with ADHD, and relatives or close friends of people with ADHD, as well as the influence of stigma on authority figures' attitudes towards people with ADHD. Experimental studies in which unaffected people observed individuals with ADHD often yielded results showing the unaffected participants to discredit the individuals displaying ADHD symptoms and describe their behavior as childish and socially inappropriate (Mueller et al., 2012). Coleman et al. (2009) surveyed 1,091 children with ADHD and found that many held negative beliefs about their condition which could indicate either negative self-stigma or a lack of knowledge of ADHD.

It has been recommended that knowledge about ADHD etiology and its potential impact on the patient's life should be increased in order to decrease stigmatizing attitudes and

perceptions towards ADHD. Children with ADHD are less favored by peers as potential friends and the behaviors of children with ADHD are often described by their peers as being highly disruptive to the classroom environment. Researchers studying peer attitudes towards children with ADHD, children with high levels of aggressiveness, children in a wheelchair, and children with Down Syndrome found that children with ADHD and children with high levels of aggressiveness were viewed more negatively than the other children mentioned. Causation attributions have been shown to predict stigmatizing attitudes with those blaming parental failure, substance abuse, or the individual's low effort preferring the most distance from the vignette depicting a child with ADHD. It has also been found that revealing the diagnosis and medication status of a child with ADHD to potential playmates increased the playmates willingness to interact with the child with ADHD when compared to being informed only of the diagnosis or only the medication status. However, introducing a child with ADHD as being highly disruptive and having a hard time negatively affected peer ratings and altered peer behavior during play (Mueller et al., 2012).

A survey of American adults assessing desire for social distance from vignettes of children with either ADHD, depression, or asthma without diagnostic labels showed that adults desired the greatest distance from the children with ADHD and depression. The adults displayed a degree of rejection two to three times higher towards children with ADHD than the other two conditions. Approximately 25% of adults reported they did not want their children to be friends with the child displaying ADHD symptoms (Mueller et al., 2012).

In teachers, it was found that showing a videotape of a child with stereotypical ADHD behavior led to negative predictions of the child's future, such as college attendance and employment, but when teachers read an essay written by a child with ADHD they did not judge

it to be inferior to the control essays written by unaffected peers showing that the teachers' attitudes were more greatly affected by behavior than academic performance. Both teachers and parents tend to more negatively rate females with ADHD than males with ADHD showing gender plays a role in stigmatizing attitudes. Children with ADHD often underestimate their academic abilities to a greater extent than their undiagnosed peers with males especially underestimating their mathematical skills (Mueller et al., 2012).

In an Australian survey of public attitudes toward the acceptability of ADHD medication, it was found only 35.6% of participants found ADHD medication to be acceptable. Those who reported knowing someone with ADHD were more likely to find medication to be an acceptable treatment. Public attitudes towards psychotropic drug use is often less positive than the attitudes of health professionals. In parents, it was found that those with some contact to a person with ADHD were more likely to agree with the statement that too many children are medicated for ADHD. The majority, 68.9%, of participants in this survey stated they did not know anyone who had been treated for ADHD with medications. Approximately 29% of participants knew someone who had been treated for ADHD with prescription drugs and a mere 2.5% reported having received medication treatment for ADHD themselves. Those with greater than 10 years of education were more likely to have positive attitudes towards prescription drug treatment of ADHD than those with less than 10 years of education. Asking a person with a recent ADHD diagnosis if they know anyone with ADHD may be a quick way to assess prior knowledge and attitudes towards ADHD drug treatment (Partridge, Lucke, & Hall, 2012).

Teachers are not the only adults being surveyed about ADHD. A sample of undergraduate students revealed more socially negative ratings of a young adult diagnosed with ADHD when compared to a person with a medical problem, like asthma, or an ambiguous

weakness, such as a heightened level of perfectionism. A sample of adults was less likely to consider ADHD a mental illness and consider it serious than they would depression. Adults also reported that they were less willing to have social contact with children and adolescents with ADHD. These adults also assumed ADHD is caused by “incapacity of discipline” and a “bad character” (Fuermaier et al., 2012, p. 2).

In the schools, peers are more likely to negatively appraise children and adolescents and view them to be more violent and antisocial. Children have also been reported to believe that children with ADHD or depression are at fault for their condition because of low effort (Coleman et al., 2009). Stigmatization of individuals with ADHD has been linked to a reduced quality of life with the specific consequences of diminished self-esteem and self-efficacious beliefs. The stigmatization of pharmacological treatment in particular can be a cause of non-compliance. Over three-fourths of parents reported being affected by stigma in forms such as being accused of causing their child to have ADHD, which could immensely affect family life. There is a lack of psychometrically validated questionnaires assessing stigmatization of ADHD (Fuermaier et al., 2012).

Labeling bias has also been a concern of those who believe it may be better to leave children with ADHD undiagnosed. In a study aimed at labeling bias in teachers, participants read four vignettes of children, either male or female, with ADHD. Half of the vignettes had a diagnostic label of ADHD and half were without a diagnostic label of ADHD. Participants were then asked about their expectations for treatment effectiveness, their emotional reactions, and their behavioral reactions regarding the child presented in the vignette via a survey. Undergraduate education students were included as participants in this study so the attitudes of the next generation of teachers could be compared to the current generation’s attitudes.

Participants consisted of 34 elementary teachers and 32 elementary education students in Canada. Behavior problems were interpreted as more serious in those labeled with an ADHD diagnosis than those who were not labelled as having ADHD. A significant effect was found in 9 of the 11 questions addressing participants' expectation, emotions, and behaviors in which participants rated the ADHD labeled children as having more serious problems and being more disruptive to the classroom and peer relationships (Ohan, Visser, Strain, & Allen, 2011). Overall, these studies suggest the stigmatization of ADHD within different populations is still an issue that needs to be addressed.

### **Links Between Knowledge and Attitudes**

Some studies have compared knowledge of ADHD and stigmatization of ADHD in order to test whether the two variables are correlated. An experimental study was performed to assess the effectiveness of a web-based medium designed to support knowledge, attitude, and behavioral change in 19 elementary school teachers in Nova Scotia, Canada. The intervention consisted of a 7-week course of PowerPoint presentations, web links, and discussion board activities related to various aspects of ADHD. Teachers spent approximately 30-60 minutes per week on the site. Pre- and post- intervention self-reports were completed to assess knowledge, attitudes, and behavior. Knowledge increased after the intervention as well as a positive change in attitudes related to perceived control in the teachers' classrooms. The teachers did not report any changes in their classroom behaviors after the intervention. The teachers were satisfied with the sessions and rated them highly. These findings suggest that web-based learning opportunities could be utilized due to its increased accessibility to rural teachers (Barnett et al., 2011).

Many researchers are interested in assessing teachers' knowledge of ADHD because they are often the first to notice ADHD-type behaviors and initiate the diagnostic process through

referrals and recommendations. Teachers' perceptions of students who display ADHD symptoms can be affected by their knowledge of ADHD and there is a link between ADHD-specific knowledge and attitudes and teacher classroom behavior (Mulholland, 2016). Mulholland (2016) aimed to create and validate a reliable research instrument that can assess both ADHD-specific knowledge and attitudes in teachers. The theoretical framework behind this research is tri-dimensional with each dimension consisting of subcategories that refer to both personal and professional attitudes. The three dimensions are cognitive beliefs, affective states, and perceived control. A survey was distributed to 596 teachers across New South Wales schools of various areas. The survey, called the ASKAT, consisted of four sections. Section A consisted of demographic questions and section B consisted of 20 questions that assessed teacher knowledge of ADHD with true/false/don't know response options. Section C measured teacher attitudes of ADHD using 30 items on a six-point Likert scale and section D used four open-ended questions to gain further information about teachers' attitudes and feelings about ADHD and its behavioral manifestations. It was determined that the ASKAT was a valid method of measuring ADHD knowledge and attitudes in teachers (Mulholland, 2016).

The relatively few questionnaires assessing stigmatization of ADHD often leave something to be desired. For instance, the ADHD Stigma Questionnaire (ASQ) was developed from the HIV Stigma Scale and it lacks questions specifically aimed at stigmatizing beliefs and perceptions related to ADHD. Items that assess beliefs about unreliability and aggravation of persons with ADHD should be included in a more comprehensive assessment of ADHD stigmatization. This research was focused on the stigmatization of adult ADHD in 1033 respondents, 439 of which were undergraduate psychology students, from the Netherlands. Items were generated based on the ASQ and four dimensions that laypeople may use to conceptualize

mental disorders including pathologizing, moralizing, medicalizing, and psychologizing. Sixty-four items using a 6-point Likert scale were developed and randomized for this survey. Eight demographic questions were asked prior to the 64 items and then questions assessing participants' self-rated knowledge of ADHD and their familiarity of adults with ADHD were included at the end of the survey to minimize biased responses to the 64 body questions. The mere label of a psychiatric condition has been shown to trigger stigmatization in some cases. The severe stigmatization of doubting the existence of ADHD in public can lead to undertreatment through a lack of available treatment, treatment being viewed as unnecessary, and help-seeking being diminished. In this research, it was shown that males held more stigmatizing attitudes than females. Teachers, physicians, and control participants did not differ on overall levels of stigmatization, however teachers showed greater sensitivity to the functioning of ADHD and physicians showed greater knowledge of etiology (Fuermaier et al., 2012).

Even with the vast amount of research on ADHD, there is still some controversy on attitudes toward the reliability of the diagnosis. A review of research on knowledge and attitudes about ADHD in children, adolescents, parents, teachers, healthcare professionals, and the public suggested that misconceptions about ADHD persist and that many people with ADHD, or parents of children with ADHD, still experience stigmatizing events. Parents, teachers, and healthcare professionals still express concerns that ADHD may be over-diagnosed, and medications may be prescribed for unsuitable reasons. In a survey of pediatricians and family physicians in Canada, attention and hyperactivity problems were the most frequently chosen topics for further professional development opportunities. Few of the medical providers reported making referrals for their patients with these issues; suggesting that the physicians desired to know more so they could better serve their patients. There is some disconnect on the different

views on how to treat ADHD from teachers, parents, and healthcare professionals. In a survey of parents and pediatricians, the majority of parents felt physicians should provide information about all treatment options whereas the majority of pediatricians felt they should explain their views on treatment options and provide supporting information in order to convince parents to use the treatment option the physician felt best. Parents also reported consulting friends and family about treatment options whereas pediatricians reported consulting teachers and other healthcare professionals. Teachers have shown to be significantly less willing to consider medication or counseling to be helpful and acceptable for children with ADHD when compared to parents and health care professionals. Teachers are also less likely to recommend educational interventions than health professionals (Moldavsky & Sayal, 2013).

The United States of America is not the only country concerned with the knowledge about and stigmatization of individuals with ADHD. An Australian survey has shown that television news and current affairs programs were the most common sources of ADHD knowledge in the general population. Knowledge about ADHD and attitudes towards medication and inclusive schooling were measured in the general Australian, parental population. Thirty-two items were developed for this survey including sections on ADHD characteristics, causes, diagnostic issues, and medication with the majority assessing knowledge and five measuring attitudes. Knowledge of characteristics of ADHD was good. Nearly 92% of participants agreed that children with ADHD have difficulty concentrating and 85% agreed that children with ADHD often behave without thinking about the consequences. Approximately 60% knew that children with ADHD may have comorbid learning disabilities and 66% knew they may have academic difficulties. Nearly half knew children with ADHD can have great difficulty communicating with others and 69% thought children with ADHD can have difficulties with

friendships. Knowledge of the causes of ADHD was poor with fewer than 20% identifying a genetic basis and heredity and the majority being uncertain about the role of factors such as diet, substance use, and birth complications. Knowledge of diagnostic issues was found to be lacking. Two-thirds of the sample believed ADHD is diagnosed too frequently and 66% did not know if there was a medical test effective for identifying children with ADHD. Over 63% believed too many children are treated with medication for ADHD showing negative attitudes towards ADHD medication to be in the majority. Fathers were more likely to believe that children with ADHD are just badly behaved when compared to mothers. The Australian community was shown to be more knowledgeable about the core features of ADHD than the United States community in which only 33% reported having heard of ADHD (Gilmore, 2010).

The Strength of Belief in ADHD Knowledge Scale (SBAKS) was used to measure the knowledge about ADHD in 196 participants, 37% of whom were college students enrolled in an introductory psychology course, in order to determine if knowledge affected attitudes towards treatments. The SBAKS consists of nine items which are used to measure whether the person believes the statement is true or false and their level of confidence in their response. Knowledge and misconceptions of ADHD were shown to be strong predictors of medication or dietary intervention treatment acceptability. Those with higher strength of knowledge of ADHD were more positive towards medication treatment whereas those with strong misconceptions about ADHD held more positive attitudes towards dietary interventions and more negative attitudes towards medication treatment. Participants who reported working with children regularly scored significantly higher on the strength of misconceptions scale than those who do not work with children. Participants who reported ADHD to be over-diagnosed were less likely to find medication to be an acceptable treatment (Sciutto, 2013).

Nearly two thirds of children who meet the criteria for ADHD are left undiagnosed and untreated. In countries such as the United Kingdom, general practitioners (GPs) refer patients to mental health specialists for a diagnosis of ADHD. A meta-analysis, using 11 studies from the UK, Australia, Canada, Finland, and Iran, was conducted to compile data regarding GPs attitudes and knowledge regarding ADHD. In one survey, only 6% of GPs reported receiving formal ADHD training. Another survey revealed that approximately 75% of GPs believed that children presenting with behavioral problems did not have ADHD and 50% believed ADHD was over-diagnosed. Most reported that family and social disruptions cause ADHD. Most GPs also reported they would not be happy managing a patient with ADHD citing lack of knowledge and time constraints as explanations. In Finland, approximately 41% of GPs reported they were not skilled at identifying a child with ADHD. Overall, GPs attitudes were determined to be mixed and often unhelpful regarding ADHD (Tatlow-Golden, Prihodova, Gavin, Cullen, & McNicholas, 2016).

Studies have shown teachers in the USA and Australia often lack factual, clinical knowledge about ADHD and tend to believe and endorse myths associated with ADHD. The beliefs that ADHD is caused by diet, that it can be treated with dietary interventions, and that it is exclusive to childhood are some myths that are specifically mentioned. Teachers seem to be unprepared for coping with the behaviors of students with ADHD despite their undergraduate educations and continuing professional development activities. Several studies have found that teachers desire to receive more professional training and education related to ADHD and that their current sources of knowledge tend to be books, the media, friends, and parents of children with ADHD. The immediate and dramatic effects of stimulant medications, which are often prescribed for children with ADHD, should allow teachers to distinguish when medication has or

has not been taken. Many teachers feel that medication is overused and is seen as a quick fix for individual and societal disfunctions (Akram et al., 2009).

A self-administered questionnaire was distributed to 49 practicing teachers and 32 student teachers in Scotland in order to determine their beliefs about ADHD, their knowledge of medication, and their use of information resources. Thirty-three statements, which are included in the article, with True/False/Don't know responses were used to measure knowledge about ADHD and its pharmacological treatment. Both general knowledge of the disorder and its management, including medication, which consisted of 15 items, and specific details about medication, including expected cognitive, behavioral, and side effects, which consisted of 18 items, were assessed. Twelve statements with five-point Likert scale responses were used to measure attitudes and beliefs about the disorder. Demographic information pertaining to the number of years and type of teaching experience were collected along with the nature of any additional training on ADHD and their familiarity with specific ADHD websites. Findings indicated that general knowledge of ADHD was poor with an average correct response of 5.1 and 5.4 out of 15 for qualified and student teachers respectively. There was no significant difference in teachers with experience teaching a child with ADHD and those without experience. There was also no relationship between total scores and the number of years of service as a teacher. Detailed knowledge of medication was also found to be poor with a mean of 3.6 and 3.3 correct answers out of 18 statements for student and qualified teachers respectively. Every respondent expressed the belief that not all children with a diagnosis of ADHD should receive medicinal treatment. The majority of teachers reported their source of knowledge of ADHD to be gained from colleagues and the Internet. Approximately half of respondents reported using specialized literature and support teachers while few reported in-service training and consultations of

medical personnel as source of knowledge. Teachers are often considered to be the “front line” of support when it comes to ADHD, and it is therefore concerning that their knowledge is not significantly greater than student teachers who have little to no personal experience teaching a student with ADHD (Akram et al., 2009).

In addition to teachers and medical professionals, parents have also participated in research regarding knowledge of and attitudes toward ADHD. The knowledge, attitudes, and information sources regarding ADHD were examined in parents who had a child diagnosed with ADHD and compared to parents who did not have a child diagnosed with ADHD. A questionnaire with 58 items using a 5-point Likert scale was developed and distributed to parents. The first section assessed participants knowledge of ADHD and stimulant medication. The second section assessed participants opinions on ADHD and stimulant medication and the final section gathered information on the participants’ preferred sources of information on ADHD. It was found that parents who had a child with ADHD rated the effects of stimulant medication more positively and the side effects as less severe than the parents who did not have a child with ADHD. Parents with a child with ADHD also rated behavioral interventions as less effective than parents who did not have a child with ADHD. Those parents without a child with ADHD were more likely than those parents with a child with ADHD to believe that family stress and conflict contribute to ADHD symptoms (Stroh, Frankenberger, Cornell-Swanson, Wood, & Pahl, 2007).

### **Current Study**

Findings from the aforementioned research yielded mixed results regarding the relationship between knowledge and attitudes with some studies showing the two were correlated (Sciutto, 2013) and others finding no correlation (Tatlow-Golden et al., 2016). While some

research has been conducted to determine the knowledge and attitudes of undergraduate education majors as compared to practicing teachers or in undergraduate students as a representation of the general population, research had not yet been conducted to determine the knowledge and attitudes of undergraduate psychology majors with the purpose of comparing them to their peers. This research sought to address the following research questions: (a) Is knowledge of ADHD correlated with stigma toward individuals with ADHD? (b) Do psychology majors and non-psychology majors differ on knowledge of ADHD? and (c) Do psychology majors and non-psychology majors differ on stigma toward individuals with ADHD. It was hypothesized that knowledge of ADHD would be correlated with stigma towards individuals with ADHD, psychology majors would differ on knowledge about ADHD when compared with non-psychology majors, and psychology majors would differ on stigma towards individuals with ADHD when compared with non-psychology majors.

## **Method**

### **Participants**

In this study 131 participants were gathered from a private university in Virginia. College students were the target age for participants because they are or soon will be teachers, parents, counselors, psychologists, medical professionals, colleagues, peers, and/or mentors to individuals who have ADHD. Nine participants were removed for not completing all items on the survey. The remaining 122 participants included 21 males (17.2%), 100 females (81.9%), and one non-response. The participants' ages ranged from 18 to 28 ( $M=20.18$ ,  $SD=1.55$ ). Fifty-four participants were majoring in psychology (44.3%) and 24 were minoring in psychology (19.7%) leaving 44 in fields of study outside of psychology (36.1%). Participants self-reported an average of 5.11 psychology courses taken at this university with a range of 0 to 25 ( $SD=5.56$ ). Students

were currently enrolled in 0 to 9 psychology courses ( $M=2.12$ ,  $SD=1.58$ ). There were 109 White (89.3%), 5 Hispanic, Latino, or Spanish (4.1%), 4 Black or African American (3.3%), 2 Asian (1.6%), 1 American Indian or Alaska Native (0.8%), 1 Native Hawaiian or other Pacific Islander (0.8%), and no Middle Eastern or North African participants. Eleven participants were Freshman (9.0%), 23 were Sophomore (18.9%), 30 were Junior (24.6%), and 57 were Senior (46.7%). See Table 1 for a summary of key demographic variables.

Table 1.  
*Demographic Breakdown of Sample*

	Characteristic	Frequency	Percentage
Biological sex	Male	21	17.2
	Female	100	82.0
	Non-response	1	0.8
Classification	Freshman	11	9.0
	Sophomore	23	18.9
	Junior	30	24.6
	Senior	57	46.7
Race/Ethnicity	White	109	89.3
	Hispanic, Latino, or Spanish	5	4.1
	Black or African American	4	3.3
	Asian	2	1.6
	American Indian or Alaska Native	1	0.8
	Middle Eastern or North African	0	0
	Native Hawaiian or other Pacific Islander	1	0.8
Psychology major	Yes	54	44.3
	No	68	55.7
Psychology minor	Yes	24	19.7
	No	96	78.7
Do you know anyone who has been diagnosed with ADHD?	Yes	112	91.8
	No	10	8.2

Have you been diagnosed with ADHD?	Yes	10	8.2
	No	112	91.8
Have you ever received formal training on ADHD (e.g. professional workshop or coursework)?	Yes	27	22.1
	No	95	77.9

## Procedures

Approval from the Liberty University Institutional Review Board was obtained prior to distribution of the surveys. Participants were recruited via a web-link posted on the psychology department's "Psychology Activities" webpage. Participants followed the link found on the webpage to a Qualtrics survey. Participants reviewed an informed consent document and acknowledged their agreement to participate. After consent was obtained, participant age was verified with a screening question: "Are you at least 18 years of age?" Those who answered "No" were taken to the end of the survey and no data were collected. Those who answered "Yes" were taken to the demographic section of the survey and completed nine items. After the demographic section, participants were taken to the knowledge scale, sourced from the Knowledge of Attention Deficit Disorders Scale, and completed 20 items (Mulholland, 2016). Upon completion of the knowledge section, participants continued to the attitudes scale, sourced from the ADHD Stigma Questionnaire, and completed 37 items (Fuermaier et al., 2012). Three items assessing personal experience were then completed, and the survey was concluded.

## Measures

**Areas of study.** Participants were asked to identify if they were majoring in psychology. If not, they were asked to list their major. In addition, they were asked if they were minoring in psychology.

**Knowledge of ADHD.** Participants' knowledge of ADHD was measured using 20 items adapted from the Knowledge of Attention Deficit Disorders Scale (Mulholland, 2016).

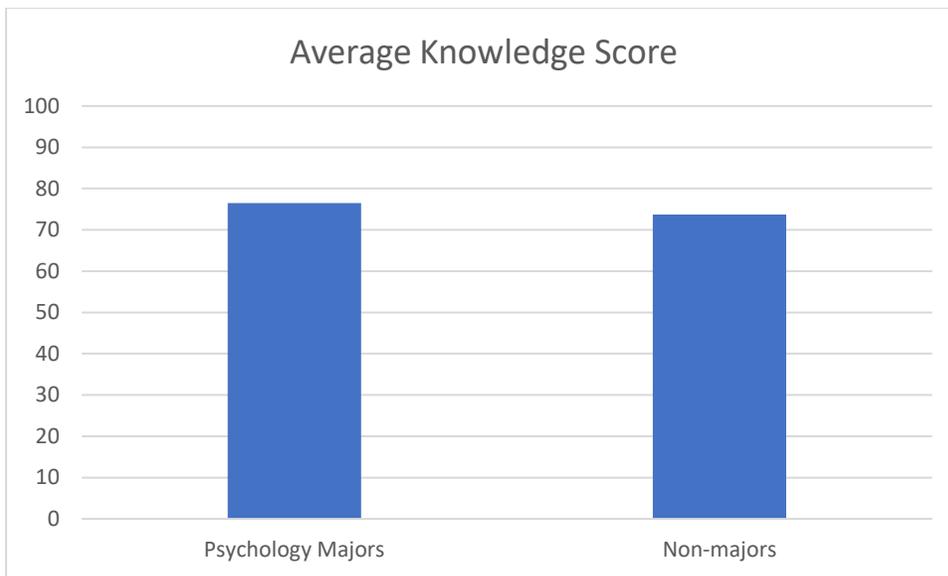
Permission from the scale author was obtained to change the word "children" to "individuals" for the purpose of this study. Each item assessed participant knowledge and consisted of statements, such as "Individuals with ADHD tend to have poor concentration," and participants selected from "True," "False," or "I don't know" options. Participants who did not answer all questions in this section were not included when calculating the data. Correct responses for answers were added up to get a raw score for the individual. The raw score was then divided by 20 and multiplied by 100 to give a percentage of correct responses for the individual. Percentage scores could range from 0 to 100 with higher percentages indicating higher levels of knowledge. Previous reliability was high (Cronbach's  $\alpha=0.878$ ) (Mulholland, 2016).

**Stigma.** Stigma (or attitudes) related to ADHD were measured using 37 Likert style items adapted from the ADHD Stigma Questionnaire (Fuermaier et al., 2012). Participants responded to items such as "ADHD is a childhood disorder and not seen in adults" by selecting how strongly they agreed or disagreed with the statement. Options ranged from -3 (strongly disagree) to 3 (strongly agree). Scores were added for a total score with higher scores indicating higher stigma. Five of the items were reverse coded, and items were presented in their original randomized order to control for possible range order effects (Fuermaier et al., 2012). Scores were averaged so that scores could range from 3, indicating high levels of stigma, to -3, indicating low levels of stigma. The overall reliability of this measure was reported to be high (Cronbach's  $\alpha=.91$ ) (Fuermaier et al., 2012).

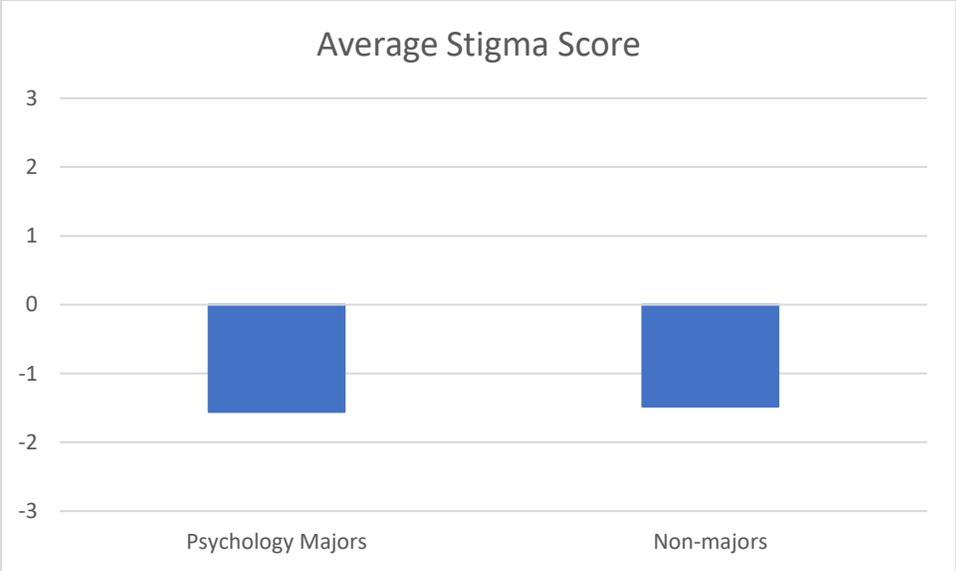
## Results

Participants levels of knowledge about ADHD ranged from 20 to 100 ( $M=74.9$ ,  $SD=13.3$ ) and levels of stigma toward individuals with ADHD ranged from -2.68 to +0.08 ( $M=-1.51$ ,  $SD=0.5$ ). Reliability for each measure was adequate for stigma (Cronbach's  $\alpha = .81$ ), but low for knowledge (Cronbach's  $\alpha = .65$ ). Knowledge and stigma scores were not correlated  $r(122) = .079$ ,  $p = -.160$ . The average knowledge score was not significantly different for psychology majors ( $M=76.5$ ,  $SD=10.5$ ) when compared with non-majors ( $M=73.7$ ,  $SD=15.1$ ),  $t(54) = .262$ ,  $p = 2.73$  (see Figure 1 for average knowledge scores). Finally, the stigma score was not significantly different for psychology majors ( $M = -1.56$ ,  $SD=0.42$ ) when compared with non-majors ( $M = -1.48$ ,  $SD=0.52$ ),  $t(68) = .365$ ,  $p = .08$  (see Figure 2 for average stigma scores).

*Figure 1. Differences in Psychology Majors and Non-Majors Knowledge*



*Figure 2. Differences in Psychology Majors and Non-majors Attitudes*



### Discussion

The first aim of this research was to determine whether knowledge of ADHD correlated with stigma toward individuals with ADHD. It was found that knowledge and stigma scores were not significantly correlated. Previous research has had mixed results with some finding no significant relationship (Iotnicky-Gallant et al., 2014) and others finding a significant correlation (Ohan et al., 2008). These competing findings could be linked to differences in how stigma and knowledge were operationalized. Some researchers tested the correlation between specific knowledge and attitudinal subscales (e.g., Expectation Beliefs and Symptoms/Diagnosis Knowledge; Iotnicky-Gallant et al., 2014); whereas others, including the current study, explored the correlation of total knowledge and total stigma scores (Ohan et al., 2008).

The second aim of this research was to determine if psychology majors and non-psychology majors differed on knowledge of ADHD and if psychology majors and non-psychology majors differed on attitudes toward individuals with ADHD. It was also found that there was no significant difference between psychology majors and their peers in knowledge of ADHD. There was, however, a trend ( $p < .10$ ) suggesting that psychology majors might have lower stigma. Future analyses should control for other possible confounds (e.g., knowing someone who has ADHD). It is possible that there was no difference between groups because related fields also included ADHD in their curriculum (e.g., education, nursing, family and consumer sciences). Previous research comparing psychology majors to their peers was not found and therefore cannot be compared to these findings. However, these findings are similar to those of Iotnicky-Gallant and colleagues (2014) in that beliefs were generally positive, as shown by the slight disagreement with negative statements regarding ADHD and slight agreement with positive statements about ADHD. In the current study, knowledge was generally high in this population. Results also showed that stigma was about midway between low and moderate,

which suggests that this sample may be more understanding of those with ADHD; however, this finding could also be linked to social desirability in participant responding. Interestingly, all respondents reported either knowing someone with ADHD or reported having ADHD, which could be related to lower stigma ratings, as well (Partridge et al., 2012). Future studies in which two distinct groups (those who know someone with ADHD versus those who do not know someone with ADHD) exist could further explore the differences between the two groups.

### **Limitations**

There are several limitations that should be considered in the current study. First, only a relatively small sample from a specific population was included. Participation in this survey was voluntary and convenience sampling was used, so participants who either had greater knowledge, interest, or experience could have self-selected to participate in this study. Therefore, it is limited in its generalizability. Future research should consider recruiting a greater number of participants from a larger geographical area to increase generalizability. Future researchers could consider alternate sampling methods in order to decrease the possibility that only those with greater knowledge or more positive attitudes chose to participate. Second, this study was correlational in nature and therefore will not be able to speak to the causation of misperceptions of ADHD. Future researchers may consider creating a study in which the link between knowledge of ADHD and the attitudes towards individuals with ADHD is assessed by major in order to see any potential variance. Another future study could address the question “Have you ever received formal training on ADHD (e.g. professional workshop or coursework)?” and see whether psychology majors differed from their peers in answering the question “yes” using a 2 by 2 ANOVA. .

In addressing measurement limitations, some questions from the scales used were oriented more towards children despite wording modification. Moreover, the broad categorization of psychology major versus non-psychology major might not be nuanced enough to avoid confounding variables. Future research studies could address this confound by surveying a larger sample size and dividing participants into more groups based on major or specific coursework. The construct validity of the knowledge scale was low (Cronbach's  $\alpha = .65$ ) and may be a potential issue with the measure. Future researchers may want to consider using a different scale for the knowledge variable. It is also worth noting, although the survey was taken anonymously, participants may have answered in a fashion they believed to be more socially desirable in order to preserve their self-image. Further, the survey was administered online so participants could have looked up answers on the internet while taking the survey in order to find the "correct" answers. Future research could take this possibility into account when interpreting results and may want to consider administering the survey in a proctored environment to prevent internet searches, use a platform that prevents participants from viewing other tabs or applications on their devices while taking the survey, or giving the survey in a paper format.

### **Implications**

The results of this survey can be used to add to the literature on misconceptions of and attitudes toward ADHD. This research revealed knowledge was fairly high and stigma was fairly low among this population, which is encouraging regarding the current knowledge of and stigma toward ADHD among university students. This study may also benefit participants with ADHD by showing them that their peers are not stigmatizing their ADHD. Moreover, it may be encouraging to see that the participants of this study were both knowledgeable about ADHD and held low stigmatizing attitudes towards people with ADHD.

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