

Teacher Knowledge of Attention-Deficit/Hyperactivity Disorder and Classroom Management

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There is limited research on teacher knowledge of Attention Deficit Hyperactivity Disorder (ADHD) and classroom management; however, research suggests that teacher knowledge of ADHD influences teaching behaviors. This study investigates general education teachers' and special education teachers' knowledge of ADHD and the interaction with classroom management. In this study, 17 teachers responded to surveys about knowledge of ADHD and classroom management. Teachers scored an average of 61% on the knowledge of ADHD questionnaire. Contrary to the hypothesis, teacher knowledge of ADHD was not significantly related to classroom management. The relationship between knowledge of ADHD and classroom management needs further examination to determine if the two constructs are significantly related.

Keywords: ADHD, classroom management, general education, special education

School-age children spend the majority of their time at school and in the classroom. This setting may be one of the most difficult places for children with attention deficit/hyperactivity disorder (ADHD) because it requires children to engage in behaviors that go against the core symptoms of ADHD (Kos, Richdale, & Jackson, 2006). ADHD is a neurodevelopmental disorder that is defined by impairing levels of inattention, disorganization, and/or hyperactivity-impulsivity (American Psychiatric Association, 2013). ADHD affects a wide

range of children with about 4% to 7% being formally diagnosed, usually during early childhood (American Psychiatric Association, 2000). Given the prevalence of ADHD, a general education teacher is likely to have a child with ADHD in their classroom. Furthermore, elementary school teachers are likely to be among the first people to notice ADHD related behaviors (Tannock & Martinussen, 2001). In order to recognize these symptoms, knowledge about ADHD is important. In addition, information about ADHD can influence teachers' behaviors and perceptions of the

disorder (Ohan, Cormier, Hepp, Visser, & Strain, 2008). For example, if a teacher has a higher level of knowledge about ADHD, it might increase the likelihood that they would refer a student for assessment. It may also influence how supportive they will be of behavioral treatments in the classroom (Ohan et al., 2008). Despite the importance of teacher knowledge of ADHD, little research has been conducted and mixed results have been reported regarding the level of teacher knowledge of ADHD.

Ohan et al. (2008) and Kos et al. (2004) surveyed teacher knowledge of ADHD and reported average correct scores of 76% and 52.6%, respectively. Kos and colleagues reported a significant positive relationship between a teacher having taught a student with ADHD and teacher knowledge of ADHD. Sciutto et al. (2000) reported a small, but statistically significant positive correlation between the number of children with ADHD taught and years of teaching experience with knowledge of ADHD. Contradictory research, however, demonstrates a teacher's confidence in their ability to teach children with ADHD is not positively related as Sciutto and colleagues identified but negatively related (Ohan et al., 2008).

Children with ADHD in a School Setting

ADHD affects children in many different ways, particularly in a school setting. Children with ADHD exhibit the following characteristic behaviors: inattention, hyperactivity, and impulsivity (American Psychiatric Association, 2000). These core characteristics have implications for how a child will behave in a school setting. For example, a child with impulsivity might speak out in class without permission or talk to other students at inappropriate times. An overactive child might have problems staying seated, thus,

they are often fidgeting with objects, rocking in their chairs, or repetitively tapping their hands or feet (DuPaul & Stoner, 2003). These behaviors ADHD-related behaviors can result in difficulties with academic performance and peer relationships.

ADHD and Children's Academic Achievement

A child with ADHD may be likely to experience difficulties in an academic environment as a result of many symptoms of ADHD, including inattention, disruptive and aggressive behavior, problems with working memory, planning, and organization (Daley & Birchwood, 2010). Children with ADHD are more likely to have lower scores on all academic subjects compared to children without ADHD (Barry, Lyman, & Klinger, 2002; Loe & Feldman, 2007).

McGee and colleagues (1991) followed preschoolers who were identified as hyperactive through adolescence and found that these children had poorer reading ability at ages seven and nine than the control group. By age fifteen, they were behind the control group in reading performance and had significantly more deficits in reading compared to the control group. Other researchers have examined how children with ADHD have difficulty in mathematics. Kaufmann and Nuerk (2008) examined various components of mathematical processing. They reported no differences between children with ADHD and the control group on explicitly trained simple and complex calculation skills. However, performance was significantly worse on basic number processing abilities compared to the control group. Overall, children with ADHD may have more difficulty in academics due to difficulty with attention, organization, and/or

hyperactivity. As such, these students need more support in the classroom. Children with ADHD are more likely to use remedial academic services, be placed in special education classes, attend tutoring, participate in afterschool programs, and receive special accommodations (Loe & Feldman, 2007).

Oftentimes, the academic performance of students with ADHD is compromised because of their difficulties with sustaining attention (DuPaul & Stoner, 2003). Specifically, being overactive and impulsive can often lead to students with ADHD not paying attention to tasks, which may result in the student's first misunderstanding what is required to complete that task, and as a result, failing to finish the task (Kos et al., 2006).

ADHD and Children's Peer Relationships

ADHD not only affects a student's academics but their relationships as well. Peer relationships are vital to development and children's well-being. Children with ADHD typically have difficulty forming and maintaining reciprocated friendships which are an important component in peer relationships. (Kellner, Houghton, & Douglas, 2003; Kos et al. 2006). Additionally, children with ADHD often experience low acceptance among peers. For example, 50% of the number of children with ADHD have been rejected by their peers (Hoza, 2005; Hoza, 2007). Overall, children with ADHD are less socially preferred, have fewer dyadic friends, and are more often rejected by their peers.

There are various reasons why children with ADHD have a range of difficulties with peer relations. First, children with ADHD may have difficulty reading social cues and as a result, may respond inappropriately (Kos et al., 2006). In addition, children with ADHD may have

limited opportunities to develop the social skills necessary for social interaction due to inattention (Hoza, 2007). Hyperactive and impulsive behaviors may also contribute to generally unrestrained and overbearing social behavior that makes children with ADHD aversive to their peers (Hoza, 2007). Children with ADHD may also behave in ways that are considered controlling, trouble-making, and aggressive, which can be perceived by their peers as negative (Kos et al., 2006). As a result of many of these behaviors, children with ADHD are often perceived negatively by their peers and have difficulties with peer relationships. Given the tendencies of children with ADHD to foster poor peer relationships, the responsibility to help facilitate appropriate relationships may fall to the classroom teacher.

Teacher Knowledge of ADHD and Classroom Management

Children spend the majority of their time at school, which includes spending time with their teachers. Teachers play a vital role in a child's education. If a child is diagnosed with ADHD and a treatment plan established, it may be the responsibility of the teacher to implement an intervention in the classroom. As such, if teachers are aware of their needs, they are better equipped to develop teaching and learning strategies along with behavior management strategies that are appropriate and effective (Geng, 2011).

Children with ADHD have academic difficulties, but they can be supported by a teacher who understands their unique needs and develop learning programs that are best for them (Geng, 2011). There are many interventions that are very beneficial to students with ADHD, especially for students who struggle with verbal and nonverbal communication. The use of

appropriate gestures is very important in teaching children with ADHD and whether teachers use these gestures is often influenced by teachers' characteristics such as patience, tolerance, and an understanding of ADHD. Teachers' verbal communication is also very important in creating a positive classroom environment. Wording is a key component of learning and has an impact that can be either positive or negative. As such, it is essential for teachers to understand productive and appropriate ways of talking to students with ADHD (Geng, 2011).

Equipping teachers to teach children with ADHD may improve their confidence in teaching, as well as their overall well-being (Geng, 2011). An increase in knowledge may also help teachers be more confident and motivated to educate children with symptoms of ADHD and change their classroom management (Gastra, Groen, Tucha & Tucha, 2016).

Research suggests teacher factors have an impact on the achievement and behavioral outcomes of children with ADHD (Baumgaertel, Wolraich, & Dietrich, 1995). One of these teacher variables includes knowledge of ADHD. Variables that may affect treatment effectiveness include a teacher's knowledge of a student's problem, knowledge of the intervention, or the acceptability of the intervention (Vereb & DiPerna, 2004).

However, teachers often lack the knowledge and skills to develop and implement effective classroom interventions (Barkley, DuPaul, & McMurray, 1990). This lack of knowledge can have negative implications. Teachers may lack the knowledge skills to develop and implement effective interventions for children with ADHD (Gastra et al. 2016). It is important to ensure that they are informed

on how to interact and talk to kids with ADHD to prevent any negative outcomes. Despite the importance of teachers being knowledgeable about ADHD, little research has been conducted on the impact of teachers' understanding of ADHD, philosophies on intervention, experience, and tolerance levels with respect to ADHD behaviors in the classroom (Sherman, Rasmussen, & Baydala, 2008). These various beliefs and behaviors are likely to be reflected in a teacher's classroom management.

The Current Study

Due to the gap in the literature, the current study examined teacher knowledge of ADHD and the association between teacher knowledge of ADHD and classroom management. Based on previous research, we hypothesized that teachers with a higher level of knowledge of ADHD will be more likely to implement classroom management strategies that support students with ADHD and more frequently use procedures for appropriate social and academic behavior. This hypothesis suggests that teachers with a higher level of knowledge of ADHD will be better able to support their students with ADHD in the classroom as measured by reports of management skills. To guide our analyses we asked the following research questions:

Research Questions

1. To what extent are teachers knowledgeable about ADHD?
2. Does knowledge of ADHD impact self-reported management skills?

Method

Participants

A total of 17 teachers were surveyed from two rural elementary schools in the Midwest. Principals were contacted about the study and forwarded information to

approximately 60 teachers. A majority of teachers reported being female ($n = 16$). The majority of teachers identified as White/Caucasian ($n = 15$), one reported they were Hispanic, and one identified as some other race. Teachers ranged in age from 21-56 ($SD = 11.83$) and had 14.31 years of teaching experience on average ($SD = 10.73$; range = 1.00-31.00). On average, teachers had taught 30.88 students with ADHD over their careers ($SD = 23.00$; range = 5-100). Four teachers reported additional ADHD training, while the majority of teachers ($n = 13$) reported no additional training.

Measures

Knowledge of ADHD questionnaire.

The 25-item survey assessed teacher's knowledge of ADHD (Kos et al., 2004). Teachers responded with *true*, *false*, or *I don't know*. The survey included items from Jerome et al. (1994) and Sciutto (2000). The questionnaire was reviewed for questionnaire content and piloted on a convenience sample of nine primary school teachers to assess the wording and appropriateness of the questions (Kos et al., 2004). Reliability and validity measures were not reported by Kos and colleagues (2004). See *Appendix A* for the questionnaire.

Classroom management questionnaire. The 40-item questionnaire assessed methods teachers used in dealing with two types of classroom situations including appropriate social behavior and academic behavior and inappropriate social and academic behavior (Rosén, Taylor, O'Leary, & Sanderson, 1990). There were two subscales in the survey (see Appendix B). The first examined teachers' procedures for appropriate social and academic behavior (i.e., proactive classroom management) and consisted of 21 items.

The second examined teachers' procedures for inappropriate social and academic behavior (i.e., negative classroom management) and consisted of 19 items. For each item, teachers evaluated the frequency in which it is used with a four-point Likert scale (0 = *Not at all*, 1 = *Just a little*, 2 = *Pretty much*, or 3 = *Very much*). The questionnaire has similar reliability and validity as the Conners Teacher Rating Scales, with reliability ranging from .70 to .90 and stable factor structures (Goyette, Conners, & Ulrich, 1978; Rosén, Taylor, O'Leary, & Sanderson, 1990).

Demographic and background questions. Modeled after questions asked by Jerome, Gordon, and Hustler (1994); the questionnaire contained demographic questions (i.e., age, gender, ethnicity, education), teaching experience (i.e., number of years taught, grades taught), teachers' experience instructing a child with ADHD (i.e., number of students taught with ADHD).

Data Analysis

To answer our first research question, we used descriptive statistics from the knowledge of ADHD questionnaire. We averaged respondents' percentages correct while also analyzing modal incorrect responses to identify if any trends in knowledge gaps occurred.

We used descriptive and correlational statistics to analyze data for our second research question. Respondents' scores were averaged to identify whether proactive classroom management techniques are used. Secondly, Pearson's correlation statistics were used to analyze any relationship between knowledge of ADHD and proactive versus negative classroom management.

Procedure

Following Institutional Review Board approval, the first author emailed an electronic survey link to principals who were asked to forward the study to teachers. The return rate was 28% (n=17) out of 60 teachers. Before inputting their responses to the questionnaire, subjects were prompted to read the consent form and either “Agree” or “Decline” to participate in the study. Participation in this study was completely voluntary. Participants were asked to then complete the questionnaire on their own electronic devices; either laptop or smartphone. The survey took approximately 20-30 minutes to complete.

Table 1

Teacher Knowledge of ADHD

	Mean	Standard Deviation
1. Average Correct	61.31	.15
2. Average Incorrect	18.10	.05
3. I don't know	19.91	.13

Two questions had the greatest variability in responses. Item 17 stated *The cause of ADHD is unknown*; 41.2% of respondents answered correctly (true) in that to date, causes of ADHD are unknown, however, 58.8% of respondents replied *I don't know*. Item five stated *If a child responds to stimulant medication (e.g. Ritalin) then they probably have ADHD* which is a false statement. Respondents were nearly evenly divided with 29.4% marking *true*, 35.3% marking *false*, and 35.3% marking *I don't know*.

Relationship between Teacher Knowledge of ADHD and Classroom Management

Results

Teachers' Knowledge of ADHD

The current study examined teachers' knowledge of ADHD. From the descriptive statistics, teachers' knowledge of ADHD ranged from 35% to 85%. On average, teachers scored correctly on 61.31% of items, ($SD = .15$). In addition, on average, teachers responded incorrectly to 18.10% of the items, ($SD = .05$) and incorrect responses ranged from 8% to 35%. Finally, teachers responded on average with *I don't know* to 19.91% of items, ($SD = .13$) and ranged from 0% to 46%. These results are summarized below in Table 1.

From the descriptive statistics teachers reported using more proactive classroom management techniques ($M = 2.48$; $SD = 0.52$; range: 0-3) compared to negative classroom management techniques ($M = 1.88$; $SD = 0.58$; range: 0-3). The results from the correlation statistics showed a significant relationship between teacher knowledge of those who responded correctly to items and those who responded either incorrectly, $r(15) = -0.497$, $p < .05$ or with *I don't know*, $r(15) = -0.784$, $p < .001$. There was no significant relationship between teacher knowledge of ADHD and classroom management (see Table 2 for details).

Table 2
Teacher Knowledge of ADHD and Classroom Management

	Correct	Incorrect	I don't know	Proactive Classroom Management	Negative Classroom Management
Correct	-	-	-	-	-
Incorrect	-.497*	-	-	-	-
I don't know	.784**	-.118	-	-	-
Proactive Classroom Management	.126	-.101	-.078	-	-
Negative Classroom Management	-.184	.324	-.203	.327	-

Note. * $p < .05$ (two-tailed). ** $p < .001$ (two-tailed).

Discussion

The aim of the current study was to examine the extent of teacher knowledge of students having ADHD and the relationship between teacher knowledge of ADHD and classroom management techniques. Answering our first research question, teachers scored correctly on 61.31% of items, incorrectly on 18.10% of the items, and responded with *I don't know* to 19.91% of the items. Additionally, teachers used positive classroom management techniques more than negative classroom management techniques, however, there was no significant relationship between teacher knowledge of ADHD and classroom management.

Extent of Teacher Knowledge

Teachers in this study scored within the range of correct responses of previous research using the same Knowledge of ADHD questionnaire (Kos et al., 2004; Ohan et al., 2008). Given that 779,000 students

receive special education services every year for ADHD (Heward, Alber-Morgan, & Konrad, 2017), with many more at risk for diagnosis, correct knowledge of ADHD in the 60th percentile seems low. Ohan and colleges (2008) reported that teachers had misconceptions most commonly about the cause and treatments of ADHD. Similarly, the current study found that teachers most commonly had variable responses to questions about medication and the causes of ADHD. When a disability such as ADHD does not have a medically based cause, a void is available for misinformation and faux science to fill. A prime example is the settled debate around a causal link between vaccines and autism (Dudley et al., 2018) that still swirls with skepticism within the general public (Fox, 2018, June 12). It is imperative that teacher preparation programs and professional developments continue to dispel myths and misinformation. It is naïve to assume teachers will automatically gain knowledge

with experience and potentially detrimental to allow a void of knowledge to remain.

According to our results, teachers' years of experience was not related to higher knowledge of ADHD. Exposure to children with ADHD in the classroom, however, was an important factor in teachers' knowledge and the majority of the teachers from the current study reported educating a wide range of number of children with ADHD. Although Scuitto et al. (2000) used a different questionnaire, results from their survey support our findings that teachers with more experience teaching students with ADHD score higher on knowledge of ADHD measures.

It is intuitive that increased experience and exposure to students with ADHD elevates knowledge of ADHD, but we hypothesized that knowledge of ADHD would translate into appropriate classroom management procedures for students having ADHD. Our results do not support previous research nor that hypothesis.

Teacher Knowledge and Classroom Management

Our hypothesis of a correlation between increased knowledge of ADHD and proactive classroom management to support students with ADHD was not supported by the results of this study. Gastra et al. (2016) suggested an increase in teacher knowledge may help teachers be more confident and motivated to educate children with symptoms of ADHD and change their classroom management. We did not measure whether an increase in knowledge affected confidence and motivation, however, a statistical correlation was not present between knowledge and classroom management. These findings may be due to the fact that our sample already implemented proactive classroom management and as a result, a

statistical correlation was not affected by the level of knowledge.

It is encouraging that respondents reported using effective classroom management procedures given previous research suggesting teachers consistently feel underprepared to work with challenging behaviors (Oliver & Reschly, 2010). Disruptive and aggressive behaviors negatively impact academic achievement and peer relationships of students with ADHD (Daley & Birchwood, 2010) and must be countered with evidence-based classroom management strategies.

Limitations and Future Research

There are at least three limitations in the current study. First, the sample size was small and homogeneous. Because of this, differences in ethnicity and gender could not be examined. This may have also led to some relationships being insignificant. There also was not a large enough group of teachers who did have additional training on ADHD to examine differences in knowledge levels between teachers that did not. In future research, examining a larger and more diverse sample would be beneficial and able to examine if teacher characteristics are related to teacher knowledge of ADHD. Secondly, the current study utilized self-report measures to examine knowledge of ADHD and classroom management. Self-report may not be the most accurate method to collect information on how teachers manage their classrooms. Classroom observation in conjunction with self-reported measures may be a more accurate method to gather information about teachers' knowledge and classroom management and provide another source of data. Finally, in the current study, teachers reported that they did not know the answers to many of the

questions. Future research could examine if additional ADHD training is related to teachers answering more correctly and if teachers have a desire for additional training.

Implications

The first implication of our findings is that teacher knowledge of ADHD is low, which can be a barrier to teachers being able to best help students with ADHD in their classroom. Level of knowledge of ADHD can also influence teachers' behaviors and perceptions and may also influence how supportive teachers are of behavioral treatments for ADHD in the classroom (Ohan et al., 2008). Low scores in the current study and in other similar studies may also imply that there has been little improvement in improving teacher knowledge of ADHD. While there have been gains in research this may not translate to teachers and schools (Ohan et al., 2008). The lamented research-to-practice gap apparently continues around knowledge of ADHD.

The second implication of our findings is that increasing knowledge of ADHD may not positively increase teachers' classroom management of students with ADHD. It is important to consider that when training teachers who work with students having ADHD, those trainings should not only include information to increase knowledge but specifically identify best practices for classroom management of students with ADHD. Given the unique challenges students with ADHD experience in school settings (Kos et al., 2006),

proactive classroom management professional developments that target appropriate social and academic behaviors are warranted.

The third implication of our findings is that higher levels of knowledge are not significantly related to the number of years of teaching experience. Teachers with more years of teaching experience may tend to perceive themselves as having higher levels of knowledge about ADHD; however, this perception is oftentimes not reflective of actual knowledge levels (Kos et al, 2004). Teachers with more experience may feel that they do have sufficient levels of knowledge from their experience. This is important to consider because teachers with more years of experience may not seek out additional training about ADHD, but they should be encouraged to do so.

Conclusion

This study contributes to the field by adding to the literature on teacher knowledge of ADHD and how it relates to classroom management. High numbers of students with ADHD means special education and general education teachers are likely to have students diagnosed with ADHD in their classrooms. The current study found that the level of knowledge of ADHD does not relate to classroom management nor translates to more self-reported proactive classroom management. These results highlight the need for further education and professional development on basic knowledge of ADHD and evidence-based practices on proactive classroom management.

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Appendix A
ADHD Knowledge Survey

1. There are a greater number of boys than girls with ADHD
2. There is approximately 1 child in every classroom with a diagnosis of ADHD
3. IF medication is prescribed, educational interventions are often unnecessary
4. ADHD children are born with biological vulnerabilities toward inattention and poor self-control
5. If a child responds to stimulant medication (e.g., Ritalin) then they probably have ADHD
6. A child who is not overactive but fails to pay attention may have ADHD
7. ADHD is often caused by food additives
8. ADHD can be diagnosed in the doctor's office most of the time
9. Children with ADHD always need a quiet environment to concentrate
10. ADHD children are usually from single-parent families
11. Diets are usually not helpful in treating most children with ADHD
12. ADHD can be inherited
13. Medication is a cure for ADHD
14. All children with ADHD are overactive
15. There are subtypes of ADHD
16. ADHD affects male children only
17. The cause of ADHD is unknown
18. ADHD is the result of poor parenting practices
19. If a child can play video games for hours, then s/he probably doesn't have ADHD
20. Children with ADHD cannot sit still long enough to pay attention
21. ADHD is caused by too much sugar in the diet
22. Family dysfunction may increase the likelihood that a child will be diagnosed with ADHD
23. Children from any walk of life can have ADHD
24. Children with ADHD usually have good peer relations because of their outgoing nature
25. Children with ADHD generally display an inflexible adherence to specific routines and rituals

[ADHD knowledge survey adapted from: Kos, J. M., Richdale, A. L., & Jackson, M. S. (2004). Knowledge about attention-deficit/hyperactivity disorder: A comparison of in-service and preservice teachers. *Psychology in the Schools, 41*, 517-526.]

Appendix B

Classroom Management Questionnaire

Procedures for Appropriate Social and Academic Behavior

1. Praise or compliment
2. Hug, pat on the back, wink, etc.
3. Friendly/encouraging teasing
4. Show others the good work
5. Send a note or call parents
6. Special time with teacher
7. Use special materials/objects
8. Give a happy face, star, or other symbolic reward
9. Give sticker, food, or other material reward
10. Allow to run errands
11. Allow child to tutor
12. Stories, movies, parties
13. Give free time, less classwork or homework
14. Post progress/work
15. Assign as monitor/line leader
16. Do nothing special (ignore)
17. Bonus points/extra credit
18. Eat in room/talk to neighbor
19. Allow to choose own seat
20. Allow to skip ahead in work
21. Points given toward earning privileges

Procedure for Inappropriate Social and Academic Behavior

1. Reprimand privately
2. Send a note or call parents
3. Reassure/discuss with child
4. Take away a privilege
5. Reprimand loudly in class
6. Move desk by teacher, in corner, in hall
7. Threaten to punish
8. Take away a snack or recess
9. Tell child to put work away or head down
10. Send to principal
11. Do nothing special (ignore)
12. Detention/stay after school
13. Assign extra work or sentences to write
14. Bang book/ruler on desk
15. Write negative comment on academic work
16. Take chair away
17. Send to different or lower classroom
18. Take points off grade
19. Take away gym, art, etc.

[Classroom management questionnaire adapted from: Rosén, L. A., Taylor, S. A., O'Leary, S. G., & Sanderson, W. (1990) A survey of classroom management practices. *Journal of School Psychology, 28*, 257-269.]