

## Teachers' Knowledge of ADHD: Review and Recommendations

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Attention-Deficit/Hyperactivity Disorder (ADHD) is a highly prevalent and concerning disorder in the classroom (Bekle, 2004). Teachers need to provide supports for these students, yet it is often the case that they lack sufficient knowledge to do so (e.g., Alkahanti, 2013). This paper provides a review of recent literature (2004 to the present) regarding teacher knowledge of ADHD in English-speaking countries. This includes a discussion of overall themes, areas of knowledge and misunderstanding, with emphasis on the need to ensure that teachers have basic knowledge of the etiology, symptoms, and treatments of ADHD. Accurate ADHD knowledge and ongoing professional development would likely benefit schools and communities.

*Keywords: Attention-Deficit/Hyperactivity Disorder, ADHD, teacher knowledge, teacher beliefs, professional development*

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It is assumed that teachers completing their university programs will enter the classroom with the most current and relevant information regarding teaching and learning. Pre-service teachers frequently receive excellent training in many areas of school practice, including curriculum development, formative and summative assessment techniques, and classroom management (McCrimmon, 2015). However, although novice teachers are generally equipped to deal with the learning needs of typically-developing students in their classrooms, they often struggle when it comes to working with children with exceptional learning needs. In today's schools, it is anticipated that most classrooms will have some students with social-emotional, learning, or behavioural challenges. As a poignant example, mental health concerns in children are at an all-time high, with up to 20% of Canadian students identified as having mental health concerns (Waddell, McEwan, Shepherd, Offord, & Hua, 2005). Learning disabilities currently affect 5-15%, while attentional and behavioural concerns are identified in 5-7% of students (American Psychiatric Association [APA], 2013). The wide range of percentages may result from differing diagnostic criteria or procedures (Nigg & Barkley, 2014).

Given the high percentage of children with learning and attentional difficulties in the classroom, it is important to ensure that teachers have an adequate understanding of the issues that may be impacting their students and how they, as teachers, may be able to best support their students. Unfortunately, not all teachers may receive this training, potentially resulting in daily frustrations with challenging students and sometimes leading to teacher burnout (Bekle, 2004).

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One population that often experiences challenges in the classroom environment is children with Attention-Deficit/Hyperactivity Disorder (ADHD).

Teachers are an incredibly important resource in the diagnosis and intervention of children with ADHD. Sax and Kautz (2003) found that since teachers are generally the first to witness children in an academic context, they are often the first to suggest an assessment for ADHD. Although children with ADHD are present in most classrooms, teachers report that they often feel unprepared as to how to best support these students (Vereb & DiPerna, 2004). Having a strong knowledge of the important aspects of ADHD (e.g., symptoms, incidence, evidence-based treatments) may help teachers to feel more confident working with students with ADHD (Ohan, Cormier, Hepp, Visser, & Strain, 2008). Accurate knowledge of ADHD may also help to reduce the perpetuation of common myths and stigmas about ADHD, which may create a more positive learning environment for these students (Bell, Long, Garvin, & Bussing, 2011).

The purpose of this article is to review and critique the current state of teacher knowledge regarding children with ADHD. Specifically, following a brief review of the current literature surrounding ADHD, the primary emphasis is on exploring what is currently known about teacher knowledge of ADHD, highlighting the limited number of published studies that address this issue. A detailed analysis of teacher knowledge regarding the etiology, incidence, characteristics, and treatment of ADHD will be examined. Finally, recommendations regarding specific areas of teacher professional development are provided as a guide for increasing teacher capacity in working with students with ADHD. The primary goal of this review is to provide incentive to further the education of teachers in the realm of ADHD, and inform areas in which teacher education and training can be focused or improved.

### **Attention-Deficit/Hyperactivity Disorder**

ADHD is one of the most prevalent childhood disorders, with 5-7% of children under 18 years affected by the condition (APA, 2013), suggesting that in a typical classroom of 30 students, at least one student will have ADHD. Boys are more often impacted by ADHD than girls, with a 2:1 or 3:1 ratio of males to females and it can affect children in their preschool years through childhood and into adulthood (Barkley, 2014), highlighting the lifelong impact that ADHD may have on individuals.

The *Diagnostic and Statistical Manual of Mental Disorders – 5<sup>th</sup> edition* (DSM-5) indicates that ADHD is characterized by persistent pattern of inattention and/or hyperactivity-impulsivity (APA, 2013). Children and youth with inattentive symptoms have difficulty sustaining attention, persisting on tasks, following instructions, and resisting distractions. Parents and teachers often note that these children do not listen well, cannot concentrate, and fail to finish assignments (Barkley, 2014). In the classroom, these symptoms may appear as making careless mistakes on assignments, difficulty organizing materials (e.g., their desk or notebooks), as well as frequently losing materials. Hyperactive symptoms often appear as excessive motor activity at inappropriate times. Children who demonstrate these symptoms are often described as being “driven by a motor,” or always on the go. In the classroom, these symptoms may appear as constant fidgeting, leaving their desk when staying seated is expected, inappropriate running or climbing, or excessive talking (APA, 2013). Lastly, symptoms of impulsivity involve actions without forethought that could potentially harm the child or others. They often stem from a desire for immediate reward or difficulty delaying gratification (APA, 2013). These symptoms often include some form of social intrusiveness or inappropriate motor action. In the classroom, these behaviours may appear as

blurting out answers, intruding into others' conversations, and playing with or using others' belongings without permission.

While the symptoms and characteristics of ADHD have been well-documented and outlined in the DSM-5, there are still many misconceptions surrounding ADHD, including those related to its actual existence (i.e., "is ADHD a real disorder?"; Strydom & Du Plessis, 2001), dietary treatments (Bekle, 2004), use of medication for treatment (Scuitto, 2015), and parenting practices (Selekman, 2002), to name a few. Some individuals propose that the symptoms of ADHD are better accounted for by other conditions (e.g., lack of sleep) or learning identifications (e.g., giftedness), and that ADHD does not exist as a distinct disorder (Strydom & Du Plessis, 2001). As well, others believe that ADHD is caused by ingesting too much sugar or red food dye and that simple changes in diet may alleviate problems (Bekle, 2004). Others deem that the use of stimulant medication, an evidence-based treatment for ADHD, leads to "drugging" of a child and may be a potential gateway drug for more problematic substances (Scuitto, 2015). Poor parenting techniques are also often thought to be a cause of childhood ADHD, where some individuals believe that had parents been more (or less) strict in their child-rearing, the difficulties with ADHD could have been avoided (Selekman, 2002).

Taken together, it is clear that there is still some inconsistency regarding the overall knowledge of ADHD. Parents, teachers, and the general public may benefit from an accurate awareness of the issues surrounding ADHD and are able to discern fact from fiction so as to ensure that individuals with ADHD are better understood. It may be particularly important for teachers to have an accurate understanding of the etiology, behavioural presentation, and effective treatment and intervention strategies for children with ADHD, given that there is a high likelihood that they encounter these children on a daily basis.

### **Teacher Knowledge of ADHD**

Teachers play a vital role in the early identification, diagnosis, and support of children with ADHD. Teachers may be the first individuals to witness children in a context where there are demands that challenge the attentional capabilities of students (i.e., where children are expected to remain seated in their desks, etc.). As such, teachers are often among the first individuals to identify atypical levels of attention abilities in a student and suggest that further investigation into these issues is warranted (Sax & Kautz, 2003).

To provide the best support and education to students with ADHD, it would be ideal for teachers to have an in-depth knowledge surrounding the incidence, etiology, symptoms, interventions, and difficulties associated with the disorder. However, some studies have suggested that elementary-school teachers do not possess an adequate or sufficient amount of knowledge of the factors related to ADHD (e.g., Alkahtani, 2013; Ghanizadeh, Bahredar, & Moeini, 2005). Having limited or incorrect knowledge of ADHD may lead to the ongoing perpetuation of misconceptions (Bekle, 2004), gender biases (Jackson & King, 2004), poor use of classroom interventions (Blotnicky-Gallant, Martin, McGonnell, & Corkum, 2015), or the use of inappropriate punishment techniques (Ghanizadeh et al., 2005).

Conversely, when teachers are found to have a greater knowledge of ADHD, a greater likelihood of more positive outcomes for these students are reported. For example, Ohan et al. (2008) reported that teachers with a higher knowledge of ADHD were more likely to believe that students exhibiting ADHD-like symptoms would benefit from an assessment to better understand the specific challenges that these students may be facing. Teachers also saw benefits to making changes in the home and school environments to improve ADHD symptoms, rather than simply

relying on medication to “fix” the concerns (Ohan et al., 2009). Those with greater knowledge of ADHD were also more likely to have more positive attitudes towards those with ADHD (Bekle, 2004), understand the academic and social difficulties that these children may face (Ohan et al., 2008), and recognize and acknowledge the potential stigma faced by those with ADHD (Blotnicky-Gallant et al., 2015). However, knowledgeable teachers may also experience a “label bias,” where with higher knowledge of ADHD, they see more impairment and feel more negative emotions towards those identified with ADHD (Ohan, Visser, Strain, & Allen, 2011). As well, greater teacher knowledge of ADHD is also associated with lower levels of confidence in teaching those with ADHD (Ohan et al., 2008), perhaps as a result of teachers having a better understanding of their own strengths and limitations in working with this population.

### **Measuring Teacher Knowledge**

There are numerous assessment tools that may be used to measure knowledge of ADHD, such as the Knowledge of Attention Deficit Disorder Scale (KADDS; Sciutto, Terjesen, & Frank 2000), the Attention-Deficit/Hyperactivity Disorder Knowledge and Opinion Survey (AKOS; Bennett, Power, Rostain, & Carr, 1996), the ADHD Knowledge Scale (Jerome, Gordon, & Hustler, 1994), the Knowledge of ADHD Rating Evaluation (KARE; Vereb & DiPerna, 2004), and the Knowledge About ADHD Questionnaire (KADD-Q; West, Taylor, Houghton, & Hudyma, 2005).

The KADDS (Sciutto et al., 2000) is a commonly-used ADHD knowledge scale. It is a 36-item true/false and “don’t know” scale that is divided into three subscales: symptoms/diagnosis of ADHD, general information (nature, causes, impact of ADHD), and treatment. This scale includes 18 positive and 18 negative items. For example, one negative item states “Electroconvulsive therapy (i.e., shock treatment) has been found to be an effective treatment for severe causes of ADHD.” The KADDS has been found to have adequate reliability and validity for both the overall scale and each of the subscales.

The AKOS (Bennett et al., 1996) is unique in that it measures the rater’s opinions of concepts related to ADHD (e.g., medication use), in addition to their objective knowledge. The knowledge section includes 17 true/false items regarding the symptoms, diagnosis, treatments, causes, and prevalence of ADHD (e.g., “Medication often reduces a child’s tendency to be aggressive with others at school”). The opinion section includes twenty-five 6-point Likert items (strongly disagree – strongly agree) with items related to medication acceptability, counselling acceptability, and counselling feasibility, such as “I believe that medication could help my child with ADHD.”

The ADHD Knowledge Scale (Jerome et al., 1994) is believed to be the first scale developed to measure the knowledge of elementary school teachers regarding ADHD. Many of the other measurement tools mentioned in this review were developed from this scale. This scale includes 20 items in true/false format and can be divided into subscales regarding the biological and non-volitional factors of ADHD, family influences, causation, and medical and educational interventions; for example, “ADHD often results from a chaotic, dysfunctional family life.”

The KARE (Vereb & DiPerna, 2004) includes items regarding the knowledge of ADHD and the acceptance of medication and behavioural treatments. The knowledge section includes 43-items in two subscales: knowledge of etiology, symptoms, and prognosis, and knowledge about treatments used for ADHD. The acceptance section includes 10 items in two subscales: level of acceptance of medication use, and level of acceptance of behavioural intervention. The knowledge section uses a true/false/don’t know format and the opinion section uses a 4-point Likert format (not at all likely – very likely). Sample items include “To be diagnosed with ADHD, a child must

exhibit relevant symptoms in two or more settings (e.g., home, school)” from the knowledge section, and “How necessary are behaviour management techniques for treating students with ADHD?” from the opinion scale.

Finally, the KADD-Q (West et al., 2005) was developed in Australia and is an extended version of the KADDS (Scuitto et al., 2000). It includes 67 items in a true/false/don't know format, measuring three areas of knowledge: causes, characteristics, and treatment of ADHD.

The scales described above are all psychometrically sound and used frequently within the ADHD knowledge literature (Soroa, Gorostiaga, & Balluerka, 2013). The KADDS (Scuitto et al., 2000) is possibly the most accessible and useful to teachers, as it is frequently used in the literature, is relatively short, includes solely knowledge (rather than opinion) items, and includes a “don't know” response option. Other scales, such as the AKOS (Bennett et al., 1996) and the KARE (Vereb & DiPerna, 2004) may be particularly useful when looking to assess both knowledge and opinions about ADHD. The KADD-Q (West et al., 2005) may be useful when looking for a very in-depth assessment of teachers' knowledge, as it is quite long (67 items).

### **Review Parameters**

The authors obtained empirical studies using the PsycINFO database, as well as Google Scholar to ensure that no relevant papers were overlooked. The key search terms entered into PsycINFO included “ADHD”, “ADHD and teachers”, “knowledge and ADHD”, and “teachers and knowledge and ADHD.” The authors included studies that assessed in-service elementary school teachers' knowledge of ADHD only and were based in English-language countries. Studies that solely examined pre-service teachers or undergraduate populations were excluded. The search of peer-reviewed articles was limited to the last ten years (2004 to the present) to provide the most up-to-date information regarding teacher knowledge. Previously published review articles of ADHD knowledge that may incorporate teachers were not included in the current review, although these articles were examined to ensure that no papers were missed. The authors reviewed reference lists of all appropriate articles to ensure no studies were overlooked.

### **Teacher Knowledge: Etiology**

Empirical studies have shown mixed information in terms of teachers' knowledge and understanding of the etiology (causes), of ADHD. However, typically teachers perform relatively well on these questions, with accuracy scores often falling within the range of 50-92% correct (Blotnicky-Gallant et al., 2015; Ohan et al., 2008; West, et al., 2005). This wide range may be a result of differing scales used to measure knowledge of ADHD etiology. Specifically, teachers correctly identified questions related to the biological nature of ADHD and the lack of relationship to ineffective parenting. Interestingly, West et al. (2005) noted that teachers were generally aware that ADHD was not caused by a lack of motivation to control behaviour, indicating a more positive attitude towards the disorder than those who simply attributed poor behaviour to poor choice. Teachers were also more confident in their answers on questions related to etiology, as this category had the lowest number of “Don't Know” responses compared to the other subscales.

Bekle (2004) noted that teachers had strong and appropriate knowledge of the etiology of ADHD. Specifically, it was found that teachers correctly believed that ADHD has a biological basis, and that this disorder was not caused by a lack of behavioural volition, familial environments, or racial background. Similarly, Ohan et al. (2008), also using the ADHD Knowledge Scale, found high levels of knowledge regarding the causes of ADHD and provided a breakdown of the number of correct responses for each item. They indicated that in their sample,

teachers knew that ADHD was not related to poor parenting practices (78.8%) or a chaotic/dysfunctional family life (85.5%), that children with ADHD were born with biological vulnerabilities towards inattention and poor self-control (79.5%), and that the disorder could be inherited (62%). Teachers from this sample also knew that ADHD was not caused by a lack of desire to follow rules or complete assignments (92%), lack of willingness to try (91.2%), nor a consequence of defiance or oppositionality (78.5%). Few teachers, however, were able to identify that ADHD was not caused by sugar or food additives (27%).

Anderson, Watt, and Noble (2012), using the KADD-Q (West et al., 2005), found that teachers answered 65.5% of the causation-related questions correctly, while Blotnicky-Gallant et al. (2015), using the KADDS (Scuitto et al., 2000), indicated that teachers knew that ADHD was not a result of ineffective parenting, but did not mention teachers' responses regarding the biological nature of ADHD.

These findings suggest that teachers generally have an adequate knowledge of some aspects of the etiology of ADHD, and are particularly aware of the biological and familial influences on the disorder. However, some aspects, particularly around food-related influences, appear to have lower accuracy, although this result may be due to individual differences within each paper (i.e., each of these studies used different assessment measures). It may be that teachers do have a sufficient knowledge of the etiology of ADHD, but an extended and in-depth measurement may be warranted to properly assess this dimension of knowledge. Ensuring that teachers have an understanding of the etiology of ADHD—mainly, that it is biologically-based and not driven by motivation or parenting practices, may help reduce teachers' negative views, thus creating a more understanding and supportive school environment.

### **Teacher Knowledge: Prevalence and Incidence**

There is little empirical research on teachers' knowledge of the prevalence and incidence of ADHD, as this information is usually included as a single item in a general knowledge of ADHD subscale. For example, the KADDS stated "Most estimates suggest that ADHD occurs in approximately 15% of school age children" (Scuitto et al., 2000). Results from these types of scales have shown that information in this area is also not common knowledge for teachers. Among the questions on the scale, the single question asked regarding the incidence of ADHD in West et al. (2005) provided the highest "Don't Know" responses from teachers. Similarly, in Kos, Richdale, and Jackson (2004), only 35% of teachers were correctly able to identify that ADHD occurs in about 5% of school-aged children, while Bekle (2004) noted that many teachers (55%) did not know that in most classrooms, there is at the minimum one child with ADHD.

Kos et al. (2004) did, however, show that their sample had significant knowledge of the sex differences in the prevalence of ADHD, indicating that teachers were aware that ADHD, although more common in males (81.7% of teachers correctly responded), impacts both males and females (95.8%). Bekle (2004) also found that teachers had sufficient knowledge of the sex differences in ADHD. Further, all teachers surveyed were aware that ADHD does not occur more frequently in minority groups than in Caucasians (Bekle, 2004).

It may be important for teachers to have an understanding of the prevalence of ADHD, so they are able to accurately estimate the number of students with ADHD they may have in their classrooms. Additionally, teachers who do not know actual prevalence rates may be more at-risk of over-identification of students (Ohan et al., 2011). As many of the reviewed studies did not examine teachers' knowledge of prevalence rates, it is difficult to pinpoint where teachers stand, even though an understanding of the incidence of ADHD may be incredibly important to the

success and education of students with ADHD. A more accurate understanding of incidence rates of ADHD may help to mitigate or prevent these negative effects.

### **Teacher Knowledge: Symptoms and Diagnosis**

Overall, research has found that teachers tend to have a sufficient knowledge of the characteristics, symptoms, and diagnostic process associated with ADHD. Kos et al. (2004) found that most teachers were able to correctly identify that inattentiveness in the absence of hyperactivity is sufficient for a diagnosis of ADHD (77.5% of the sample of teachers), that there are subtypes of ADHD (75% of the sample), and that children from any walk of life can have this disorder (96.7% of the sample). They also understood that the ability to focus in some situations (e.g., playing video games) does not rule out a diagnosis of this disorder (77.5%). However, they did lack an understanding that adherence to set rules is difficult for children with ADHD (22.5%).

Bekle (2004) as well as Ohan et al. (2008) both found promising results regarding teachers' knowledge of the symptoms and diagnosis of ADHD using the ADHD Knowledge Scale. Both groups indicated that they knew that a child can be diagnosed with ADHD (97% of sample responded correctly), but not necessarily be overactive (79.8%), that these children are often quite variable in their day-to-day school performance (100% and 93.6%, respectively), and that they often have good focus for things such as video games (100% and 88.1%, respectively). There were some discrepancies between these two studies regarding teacher knowledge surrounding the fact that children with ADHD do not outgrow their disorder and become symptom-free as adults (70% and 57.3%, respectively), and are at high risk of becoming delinquent as teenagers (73% and 50.4%, respectively). Ohan et al. (2008) suggested that these discrepancies may be due to the limited sample size of the Bekle (2004) study (30 teachers), compared to their own (140 teachers).

West et al. (2005), using the KADD-Q, found that teachers from their sample only had 59% accuracy regarding the characteristics of ADHD. Teachers had specifically limited knowledge that children with ADHD often talk excessively in class (48%) and tend to be verbally aggressive (39%), but do not have poor body posture (38%). They were, however, aware that children with ADHD often have poor concentration (95%), are often inattentive (93%), and can act impulsively (86%). Anderson et al. (2012), who also used the KADD-Q, found that teachers from their sample had a 73% accuracy on this subscale. The discrepancy between these studies may be due to sample differences, as West et al. used an Australian sample whereas Anderson et al. (2012) used an American sample. There may be a difference in the training received by teachers in these samples.

Finally, 80% of teachers in Blotnicky-Gallant et al. (2015) correctly answered items on the symptoms and diagnosis subscale of the KADDS (Scuitto et al., 2000). Of note, 95.6% of their sample were aware that a child with ADHD can have sustained attention to a video game or TV while still having difficulty sustaining attention to class or homework. This sample was also aware that the majority of children with ADHD will experience some form of poor school performance in elementary school (82.5% correctly answered).

Based on these studies, it appears as though teachers have a sufficient basic knowledge regarding the symptoms and behavioural presentation associated with ADHD. Across studies, the majority of teachers knew that the ability to focus on enjoyable and stimulating activities such as video games and television does not discount the difficulties focusing in class or on homework. They were also correctly aware that ADHD can have multiple presentations that include hyperactivity, inattention, impulsivity, or any combination of the three. There was some inconsistency regarding the day-to-day presentation of the disorder, such as verbal aggression and

talking excessively, as well the future consequences, such as risks for later teenage delinquency. Education focused on increasing these areas of knowledge could aid in faster identification of ADHD, potentially preventing some of these negative consequences.

### **Teacher Knowledge: Treatments**

For almost all papers included in this review, teacher knowledge of treatments for ADHD was lower than any other knowledge-related domain. As well, this area demonstrated the largest number of myths or misconceptions related to ADHD, with accuracy scores ranging from 42% (Anderson et al., 2012) to 68.8% correct (Blotnicky-Gallant et al., 2015). Some papers examined in this review provided only overall correct scores, while others broke down their results into categories (e.g., medication or diet-related treatments).

Overall, teacher knowledge regarding medication use was limited. West et al. (2005) found that teachers' knowledge of ADHD treatment was below chance, with scores of only 47.8% accuracy on this subscale. However, they found that most teachers were aware that stimulant medication is effective to reduce symptoms of inattention (93%), and a combination of medication and behavioural management is ideal (89%). West et al. (2005) also noted a lack of knowledge related to the side effects of stimulant medication, including anxiety (38% correct). Kos et al. (2004) also examined knowledge regarding treatment of ADHD. Teachers knew that medication was not a cure for ADHD (84%), and that educational interventions are beneficial even with medication use (75%). All other questions, however, demonstrated a significant deficit in knowledge related to treatment. For example, the questions "if a child responds to stimulant medication then they probably had ADHD" and "children with ADHD always need a quiet environment to concentrate" were endorsed by almost 50% of respondents (47.5% and 50.8%, respectively). In addition, approximately one in four (21.7%) believed that prolonged use of stimulant medication may lead to increased addiction in adulthood.

Teachers from both Bekle (2004) and Ohan et al. (2008) were also aware that educational interventions are beneficial to support the use of medication (83% and 91%, respectively), that medication is not the only effective treatment for ADHD (73% and 76%, respectively), and that these children typically behave better in one-to-one interactions than groups (93% and 85%, respectively). There was some discrepancy regarding whether ADHD children require a quiet, sterile environment in order to concentrate, with Bekle (2004) reporting 93% accuracy and Ohan et al. (2008) only reporting 76%. Finally, Vereb and DiPerna (2004) reported an average of 54.4% correctly-answered items regarding treatments, including questions like, "Behaviour management techniques can improve a child's ability to pay attention in class" and "Medication will help a child with ADHD achieve better grades in school."

Teachers also overwhelmingly supported the idea that changes in food intake and/or sugar reduction is an effective treatment for ADHD. Specifically, teachers indicated a strongly-held sugar/food additives belief, where 66% believed that diet changes were an appropriate treatment, and many believed that homeopathic remedies (67%), fish oil supplements (66%), and biofeedback (86%) were effective treatments (West et al., 2005). In Kos et al. (2004), 86% of this sample indicated that they believed that special diets were helpful in treating children with ADHD, perpetuating long-held misconceptions. However, in a single-item analysis, Blotnicky-Gallant et al. (2015) found that 41% of their teacher sample disagreed with the statement regarding the reduction of sugar and food additives to reduce symptoms of ADHD. Participants in Bekle (2004) and Ohan et al. (2008) also upheld the myth that diets can be helpful in treating ADHD, with 23% and 13% accuracy, respectively.

In comparing the above studies, it seems that more recent studies (e.g., Blotnick-Gallant et al., 2015) report more accurate treatment knowledge than older studies (e.g., West et al., 2005). This may speak highly of the updated training and professional development that teachers are currently receiving. It is also important to note that teachers are not responsible for treating ADHD, and thus are not required to have in-depth knowledge of the different treatments available. However, as Anderson et al. (2012) noted, teachers are often responsible for implementing certain behavioural interventions and observing the effectiveness of medication throughout the school day. Equipping teachers with the appropriate knowledge regarding medical, behavioural, and educational management strategies for ADHD could help to improve their confidence in teaching these students. This has the potential to make these interventions more successful and create a more effective learning environment for their students with ADHD.

## **Summary**

Teachers from these various studies showed a varied but adequate knowledge of ADHD in a number of areas. Promisingly, their most knowledgeable areas were of the etiology and characteristics/symptoms of ADHD. This finding may be critical, as having a good understanding of the etiology of ADHD may prevent inappropriate judgment of the parent or child. Similarly, having a good understanding of the appearance of ADHD will allow teachers to appropriately identify children with attentional concerns and may enable them to acquire further supports for this child.

Teachers also demonstrated relatively limited knowledge regarding effective treatments for children with ADHD. Some teachers were aware that medication and behavioural management together would be an ideal treatment, but a majority either disagreed with or were unsure of the accuracy of this statement. However, teachers surveyed in more recent studies had more accurate treatment knowledge than older studies, suggesting that teacher training and professional development may be dispelling some older myths and misconceptions. Ensuring that teachers have appropriate and correct knowledge of evidence-based ADHD treatments may allow them to better support and manage students with ADHD.

## **Limitations in Current Research**

There were some limitations to the studies included in this review. First, there was little empirical research regarding teachers' knowledge of the prevalence of ADHD. Few teachers knew the incidence rate of ADHD in the school-aged population. As knowledge of incidence rates made up such a small part of the overall knowledge assessment (often only one question), it is difficult to determine whether this finding is an accurate representation of teacher knowledge. As an understanding of the incidence of ADHD may help to prevent an over-identification of children with ADHD, future studies on teacher knowledge of ADHD may wish to provide a greater focus in this domain.

A second limitation of this article is the focus on English-speaking countries only. Although this review purposefully focused on understanding teacher knowledge of ADHD in English-language countries, it is also important to understand the broader cultural perspective on this disorder. There are studies examining teachers' knowledge of ADHD in other countries, such as Saudi Arabia (e.g., Alkahtani, 2013). However, accurate ADHD knowledge in these countries was significantly more varied than that of English-language countries. For example, Alkahtani (2013) reported that teachers in their Saudi Arabian sample answered only 19% of the ADHD knowledge questions correctly. There may be a variety of explanations for the differences in

ADHD knowledge throughout the world, but these findings lend support to the idea that it is necessary to also consider the background of teachers when exploring knowledge of ADHD, as the impact of culture may play a significant role in the acceptance and understanding of the disorder.

### **Recommendations**

This review of teacher knowledge of ADHD has confirmed some of the areas of need when addressing gaps in understanding or, indeed, *misunderstanding* of ADHD. Specifically, it is necessary to ensure that all teachers, both novice and experienced, have an adequate understanding of ADHD so they are better able to identify, support, and manage students with ADHD. As such, the following recommendations are a guide for building capacity in teachers to support students with ADHD, highlighting needs for both pre-service and in-service teachers, and noting the importance of ongoing professional development.

#### **Pre-service Educators**

It may be imperative to ensure that university training programs address issues of exceptional learners in their education degree programs. Inclusion of relevant courses allows pre-service teachers access to a broad range of information on students with a variety of learning needs, including those with ADHD. It may be particularly important for pre-service teachers to have specific instruction on disorders such as ADHD, given the relatively high prevalence in school-aged children. It is likely that teachers will encounter a student with ADHD in their classrooms on their first day of teaching, emphasizing the need for teachers to be prepared before walking into the classroom. Teachers who are armed with accurate knowledge and understanding of ADHD, including its etiology and treatment, may be more likely to recognize the needs of these students and work collaboratively to find ways to support them. Providing tools for these teachers in advance may ensure that their first year in the classroom runs more smoothly.

#### **Ongoing Professional Development**

There is also a need to ensure that teachers continue to receive ongoing professional development (PD). The requirement for PD is not unusual in the teaching world but is often focused on curriculum updates or changes, broad school-wide issues (e.g., bullying, truancy), or supporting struggling learners (e.g., specific instructional programs; Lumpe, 2007). Rarely is the emphasis on expanding knowledge or capacity in a specific population, such as children with ADHD, yet the importance of understanding and supporting these learners should not be overlooked (Lumpe, 2007).

Additionally, it may be beneficial to target new and experienced teachers separately in PD sessions related to ADHD. The focus of sessions for new teachers may focus on understanding what ADHD is, its symptoms and behaviours, classroom presentation and challenges, and general treatment approaches. An expanded focus on identifying areas of academic, social-emotional, and behavioural supports may also be useful for inexperienced staff. For more experienced teachers and staff, it may be more beneficial to provide an opportunity to understand what these teachers know or believe about ADHD and explore the accuracy of this information. Given that some studies have indicated that years of teaching is not necessarily correlated with ADHD knowledge (e.g., Vereb & DiPerna, 2004), it may be useful to ensure that experienced teachers have access to information on the current understanding of ADHD. The idea of “dispelling myths” may be

beneficial so as to allow teachers to explore their own accurate and inaccurate beliefs and how these beliefs may be impacting their work.

In addition, for teachers who are particularly interested in furthering their understanding of children with ADHD, it may be beneficial to turn to university or professional development programs that specifically focus on providing further education in this area. In particular, there is a need to ensure that teachers are able to support children with ADHD across a number of areas, including an understanding of mental health, classroom management, and learning. Education faculties at accredited post-secondary institutions may provide graduate-level courses that allow interested teachers to not only further their education, but to do so in an area of particular interest for them.

Finally, it may also be useful to connect schools and local organizations that support children with ADHD and their families. These organizations may be able to organization PD sessions for teachers or parents to allow greater access to information on how to support these students at home and at school. Increasing the connection between home, school, and community provides a stronger support for parents and teachers who may be struggling to support the needs of children with ADHD.

### Conclusion

This paper has provided a comprehensive review of the most current understanding of teacher knowledge of ADHD in English-speaking countries and the suggested areas of support for pre-service, novice, and experienced teachers. Through the enhancement of knowledge and understanding of ADHD, teachers may be better prepared to support children impacted by the disorder. Thus, in their classrooms, they can help to ensure that all children have the opportunity to thrive.

This article may be useful to teachers, school psychologists, and researchers. Teachers may use this information to examine and increase their own knowledge of ADHD, and to encourage their school divisions to provide supports and resources about ADHD. School psychologists and professionals may wish to use this article to develop professional development opportunities for their school districts, focusing on the identified areas of strengths and weaknesses in ADHD knowledge while incorporating some of the above recommendations. Lastly, researchers are encouraged to continue to examine teachers' (and other school professionals') knowledge of ADHD, particularly as the understanding of ADHD grows and changes in the literature. Researchers may also wish to develop teacher-focused ADHD knowledge scales, which address the information teachers need to bring into their classrooms.

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