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To cite this article: Charlotte W. Greenway & Alison Rees Edwards (2020): Knowledge and attitudes towards attention-deficit hyperactivity disorder (ADHD): a comparison of teachers and teaching assistants, Australian Journal of Learning Difficulties

To link to this article: <https://doi.org/10.1080/19404158.2019.1709875>



Published online: 03 Jan 2020.



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Knowledge and attitudes towards attention-deficit hyperactivity disorder (ADHD): a comparison of teachers and teaching assistants

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ABSTRACT

Attention-deficit hyperactivity disorder (ADHD) rates in classrooms have increased considerably in recent years. Previous literature has acknowledged the significance of teachers' knowledge and attitudes towards ADHD when making referral and intervention decisions. Using Mulholland, Cumming and Jung's (2015) knowledge (SASK) and attitude (SASA) scales, ADHD training and perceived support were compared across public school teachers ($n = 165$) and teaching assistants (TAs) ($n = 157$) in the UK. Results indicated that teachers and TAs displayed adequate levels of knowledge, and TAs held better knowledge and more positive feelings towards ADHD than teachers. Training increased knowledge for TAs, but not for teachers, and training and support appeared important for both the teachers and TAs' attitudes. Both teachers and TAs reported inadequate training and expressed a desire for further ADHD training, and a significant association was found between knowledge and attitudes for teachers only. The implications for these findings are discussed.

ARTICLE HISTORY

Received 23 January 2019

Accepted 24 December 2019

Introduction

Attention-deficit hyperactivity disorder (ADHD) is described as a neurodevelopmental condition that causes delays in areas of the brain responsible for regulatory behaviours (Crowley, 2014). Worldwide figures on ADHD prevalence rates in children are estimated at 7.2% (Thomas, Sanders, Doust, Beller, & Glasziou, 2015). ADHD is defined as a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development (American Psychiatric Association [APA], 2013). Inattention symptoms include difficulty with task completion, sustained attention and following instructions. Symptoms of hyperactivity and impulsivity include fidgeting, excessive talking, and impulse control. Diagnosis is made when children exhibit six or more symptoms of inattention and hyperactivity-impulsivity before the age of 12 years for at least six months, across two or more settings (e.g. home and school). The symptoms of ADHD mean that children find classroom environments challenging because of the expectation to follow the rules, sit quietly, listen and complete tasks (Kendall, 2016; Kos, Richdale, & Hay, 2006). Thus, these children are at an elevated risk of learning difficulties, academic underachievement and expulsion from school (Willoughby, 2003).

Since diagnosis is reliant on observing symptoms across two or more settings (APA, 2013), clinicians often use observations made in a school setting. Behaviours at school are monitored by teachers and those who work closely with children, such as teacher aides. Therefore, their knowledge and attitudes towards ADHD are pivotal when observing initial ADHD-type behaviours and if necessary, in making referrals for assessment (Veenman, Luman, & Oosterlaan, 2017). Consequently, poor knowledge risks the ability to identify the warning signs of ADHD-type behaviours (Mulholland, Cumming, & Jung, 2015), while negative attitudes may influence how teachers and teacher aides respond to children with ADHD.

Teachers' knowledge and attitudes towards ADHD

In recent years, research on teachers' knowledge of ADHD has reported mixed findings. For example, Youssef, Hutchinson, and Youssef (2015) study of teachers from Trinidad and Tobago and Shroff, Hardikar-Sawant, and Prabhudesai (2017) study of teachers from Mumbai report low levels of teacher knowledge (45 and 49% of correct responses, respectively); whereas, the Greek teachers in Stampoltzis and Antonopoulou (2013) study and Australian teachers in Mulholland et al. (2015) study report higher levels (62% of correct responses). The literature has also shown inconsistencies in teachers' knowledge about the characteristics, aetiology and management of ADHD, with some studies reporting the greatest knowledge for symptoms (Anderson, Watt, Noble, & Shanley, 2012; Shroff et al., 2017) and others for treatments (Amiri, Noorazar, Fakhari, Daroukoleae, & Gharehgoz, 2017; Mulholland et al., 2015). Similarly, some studies have reported that knowledge is poorest for diagnosis and assessment (Mulholland et al., 2015; Mwaba, Roman, & Topkin, 2015), while others report the poorest knowledge for the aetiology of ADHD (Amiri et al., 2017; Stampoltzis & Antonopoulou, 2013). Alongside cultural differences, inconsistent knowledge levels could be linked to the studies' reports on training and experience of teaching a child with ADHD. For example, in Youssef et al. (2015) the teachers who had received training had greater knowledge than those without, but the authors do not make it clear what percentage of teachers had received training compared to those who had not. Similarly, Shroff et al. (2017) did not ask teachers about prior experience or training, which may have contributed to the high levels of knowledge reported in their study. A second reason behind the differences in knowledge across studies may be linked to the instrument used. In the three studies where teacher knowledge was low, the authors used the Knowledge of Attention Deficit Disorders Scale (KADDS; Scituito, Terjesen, & Frank, 2000) or a modified version of it. The KADDS popularity stems from its simple scoring and brief instructions for use (Soroa, Gorostiaga, & Balluerka, 2013). However, its initial validation based on a small sample, without subscale factor analysis and subsequent modifications have brought its reliability and validity into question (Saecker, Skinner, Skinner, Rowland, & Kirk, 2010). In an attempt to address some of the criticisms aimed at the instruments (i.e. reliability, validity and tendency to explore false factual information surrounding ADHD), Mulholland et al. (2015) created an ADHD-specific knowledge scale (SASK) and an ADHD-specific attitude scale (SASA). As with previous knowledge measures, the SASK examines knowledge of aetiology, treatments, symptoms, and prevalence/assessment of ADHD. The SASA examines cognitive beliefs: thoughts and beliefs about ADHD; affective states: feelings towards ADHD; and perceived control: perceived control of an individual's behaviour toward ADHD. Utilising their scales on 116 school teachers in Sydney, Australia, the authors

reported adequate levels of knowledge (those with <50–85% correct answers). Knowledge was highest on questions relating to treatments (71.3%) and lowest on prevalence/assessment (39.5%). For the SASA scale, teachers held both positive and negative attitudes simultaneously. For example, 64% of teachers agreed that children with ADHD were rewarding to work with, and 70% indicated that ADHD caused them to experience stress. However, the small sample size, non-specification of school-type (primary or secondary) and lack of comparison group warrant further examination. Hence, the present study uses the SASK and SASA scales with a larger sample to include both primary and secondary school teachers and a comparison group. Teachers' attitudes towards ADHD are critical to making decisions on behavioural and treatment interventions (Blotnicky-Gallant, Martin, McGonnell, & Corkum, 2015). According to Eagly and Chaiken (1993) Tripartite model of attitudes, an attitude is a tendency to evaluate something with some degree of favour or disfavour, and consists of three components: cognitive, affect and behaviour. The cognitive component refers to thoughts and beliefs; the affect component, emotions; and the behaviour component refers to actions taken. Using these components, Anderson et al. (2012) compared the attitudes of in-service teachers and pre-service teachers with and without teaching experience. They measured global attitudes using a vertical 11-point attitude thermometer scale, and beliefs, affect and behaviours towards ADHD using open-ended responses and participant rated valences. The open-ended qualitative responses were transformed into quantitative data by asking the participants to rate the negative and positive valence on a numeric Likert scale of each comment they had written in the open-ended section. The results showed that global attitudes were positive for all three groups, but negative for stereotypical and teaching beliefs. The authors suggest that this tendency to hold both positive and negative attitudes simultaneously termed ambivalent attitudes highlights an important dimension in understanding attitudes that are often missed when measuring global attitudes. Attitudinal ambivalence was also reported in a later study (Anderson, Watt, & Shanley, 2017), where teachers described more consistent behaviours towards children with ADHD (i.e. adapting lessons and giving the child attention and support), but less consistent beliefs about ADHD (i.e. not agreeing that children with ADHD are rewarding to teach). The authors suggest that ambivalent attitudes are unsurprising due to the disruptive behaviour associated with ADHD and the often conflicting information presented by the media. They also argue that attitudinal ambivalence can challenge the stability of a teacher's attitude, and can lead to inconsistent decisions, actions and communication with children with ADHD. Therefore, further examination of teachers' attitudes is important so that positive attitudes can be encouraged and negative attitudes addressed through appropriate support and training opportunities. Although Anderson et al. (2017) highlight the implications of ambivalent attitudes, they did not examine the effect of training or experience of teaching a child with ADHD on attitudes. This study addresses this gap using the SASA (Mulholland et al., 2015), increasing what is known about the beliefs and feelings that teachers hold towards ADHD.

Teaching assistants' knowledge and attitudes towards ADHD

Even though many classrooms employ additional staff to support children with ADHD, very little is known about the knowledge and attitudes of these paraprofessionals. Depending on the country of origin, such individuals have many titles, which include

teacher aides, classroom assistants, and learning support assistants. Known as teaching assistants (TAs) in the UK, their role is to support children with educational needs and behavioural difficulties. Often seen as intermediaries between home and school (Alborz, Pearson, Farrell, & Howes, 2009), TAs play an essential part in enabling children with ADHD to be maintained in mainstream classes (Groom, 2006) and also offer essential assistance to teachers dealing with ADHD-type behaviours (Blatchford et al., 2009).

Considering the amount of time TAs spend working one-to-one with children with ADHD, it is surprising that many schools do not offer them an induction, training or appraisals (Groom, 2006), which may result in a lack of provision for monitoring their knowledge and opportunities to discuss their feelings or the support they may require (Farrell, Alborz, Howes, & Pearson, 2010). An understanding of what TAs know and how they feel about ADHD has implications for both classroom practice and the support provided to children with ADHD. However, to our knowledge, no other studies have examined TAs' knowledge and attitudes towards ADHD.

Factors affecting knowledge and attitudes towards ADHD

To-date research has focused on several factors that appear to affect teachers' knowledge and attitudes towards ADHD. These include years of service, ADHD-specific training and experience of teaching a child with ADHD. Using the KADDS (Sciutto et al., 2000), Alkahtani (2013) and Ward (2014) reported that teachers' knowledge was positively correlated with training and years of service. However, overall knowledge levels between the two studies differed significantly (correct responses were 17 and 56%, respectively). The differences in knowledge levels could be because of the diverse training opportunities offered to the teachers across their respective cultures. For example, Saudi Arabian teachers in Alkahtani's study did not receive ADHD training as part of their teaching practice (Abed, Pearson, Clarke, & Chambers, 2014). In contrast, Ward's study was carried out in Ireland, where pre-service teachers receive structured ADHD training as part of their studies. The higher knowledge scores in Ward's study demonstrate the significance of pre-service training and highlight the influence of cultural differences. Research on the effect of training on teachers' attitudes is less-forthcoming. In one study, Lasisi, Ani, Lasebikan, Sheikh, and Omigbodun (2017) reported that teachers held less negative attitudes following a three-hour training session (and a half-hour booster session two weeks later). However, the authors acknowledge several limitations to their study that include inferior sampling methods and time and resource constraints. Therefore, to address the paucity of literature on the effect of training on attitudes, teachers and TAs were asked whether or not they had received training on ADHD.

The literature on the effect of years of service on knowledge is inconsistent. Mulholland et al. (2015) observed that as teaching experience increased, so did the knowledge of ADHD, whereas Stampoltzis and Antonopoulou (2013) and Shroff et al. (2017) report no significant relationship between years of service and knowledge. Weyandt, Fulton, Schepman, Verdi, and Wilson (2009) reported that teachers with fewer years of service demonstrated significantly greater knowledge than those with more years of service, suggesting that for many, teaching experience does not equate to having greater knowledge. The reasons why teachers with less teaching experience hold greater knowledge of ADHD could be because of curriculum changes in teacher education and an increase in media coverage surrounding ADHD (Clarke, 2011).

There appears to be less research that investigates years of service on teachers' attitudes. In their comparison of in-service teachers and pre-service teachers with and without teaching experience, Anderson et al. (2012) stated that as teachers gained in-service experience they demonstrated more positive behaviours toward children with ADHD than pre-service teachers with experience, but less positive affect compared with pre-service teachers without experience. Furthermore, when pre-service teachers began their teacher-training courses, attitudes towards ADHD were positive, but with increased teaching experience, attitudes became less favourable. The authors suggest that the decline in attitudes may have occurred because as teachers gain experience with ADHD, they develop an awareness of the difficulties faced by the individual and other children in their classroom which can lead to ambivalent attitudes. With such inconsistencies across studies, it is essential to continue examining the effect of these factors on teachers' knowledge and attitudes towards ADHD so that policymakers may tailor their professional development programmes to specific groups. Also, examining how these factors affect the knowledge and attitudes of non-teaching staff who work closely with children with ADHD (TAs) will add a new dimension to current classroom-based decisions that are often influenced by an individual's knowledge and attitudes.

The relationship between knowledge and attitudes towards ADHD

The literature on the relationship between knowledge and attitudes towards ADHD also reveals inconsistent results, with some studies reporting positive correlations (Alfageer et al., 2018; Nur & Kavakci, 2010) and others, no relationship at all (Anderson et al., 2017; Youssef et al., 2015). In one study (Ohan, Cormier, Hepp, Visser, & Strain, 2008), teachers with average to high knowledge reported more helpful behaviours towards children with ADHD and more favourable beliefs about interventions than did teachers with low knowledge. In contrast, Liang and Gao (2016) found no relationship between knowledge and attitudes in their study of secondary school teachers in Hong Kong. Although knowledge levels were average (69%), attitudes were, on the whole, negative, with teachers citing cultural factors and the ineffectiveness of teacher education in Hong Kong as significant contributors to their negative beliefs. The inconsistencies in these studies highlight the need for further research on how knowledge of ADHD affects teachers' attitudes towards ADHD.

The present study

Given that teachers and TAs are often the first to identify ADHD-type behaviours, their knowledge and attitudes towards the disorder are crucial to providing the best support for children with ADHD. Furthermore, a clear understanding of the factors that affect how classroom staff think and feel about ADHD can be used to inform decisions when re-evaluating training opportunities. Hence, this study examines the effect of years of service, training and experience in working with ADHD on the knowledge and attitudes of teachers and TAs. A further factor that appears to be missing from the literature is the importance of the support received by teachers and TAs working with children with ADHD (see Liang & Gao, 2016). Consequently, teachers and TAs were asked if they had received support. Based on the deficiencies of previous instruments that have measured knowledge and attitudes towards ADHD, the present study uses the SASK, and SASA (Mulholland et al., 2015) to (1) establish

whether teachers and TAs differ in their knowledge and attitudes towards ADHD, (2) establish any differences dependent on school-type (primary vs secondary), years of service, experience with ADHD, ADHD training, and perceived support, (3) identify a relationship between the knowledge and attitudes towards children with ADHD.

Method

Participants and procedure

Teachers

A total of 95 (33 males and 62 females) secondary school teachers and 70 (18 males and 52 females) primary school teachers from public schools in South Wales, UK, voluntarily completed an anonymous online survey. For secondary school teachers, ages ranged from 21 to 62 years ($M = 41$, $SD = 4.23$) and years of service ranged from 1 to 27 years ($M = 17$, $SD = 4.96$). For primary school teachers, ages ranged from 21 to 59 years ($M = 33$, $SD = 3.69$) and years of service ranged from 1 to 24 years ($M = 15$, $SD = 3.25$).

TAs

A total of 80 (13 males and 67 females) secondary school TAs and 77 (6 males and 71 females) primary school TAs from public schools in South Wales, UK, voluntarily completed an anonymous online survey. For secondary school TAs, ages ranged from 19 to 61 years ($M = 41$, $SD = 3.23$) and years of service ranged from 1 to 11 years ($M = 7$, $SD = 2.10$). For primary school TAs, ages ranged from 18 to 60 years ($M = 37$, $SD = 2.95$) and years of service ranged from 1 to 15 years ($M = 10$, $SD = 3.98$). [Table 1](#) shows the demographic information for all teachers and TAs.

Recruitment

Emails explaining the nature of the study were sent to the Heads of 200 schools in South Wales; 81 secondary schools and 119 primary schools. A link to the survey was placed at the end of the email, and the Heads were asked to disseminate to all teachers and TAs in their schools. Three hundred and eighty-five participants responded, taken from a sample of 58 primary schools and 34 secondary schools. However, 63 questionnaires (23 primary school teachers, 9 primary school TAs and 31 secondary school teachers) were not included in the analysis because respondents failed to complete over half of the questions on the knowledge questionnaire, and made no attempt to answer the items on the attitude scale. The answers omitted differed across individuals and did not follow a specific pattern. Therefore, it was decided to exclude the 63 questionnaires, and analysis was carried out on the remaining 322 responses.

Ethics approval was granted by the University of Wales Trinity Saint David. Participants were informed in the original email and on the information sheet at the start of the survey that participation in the study was voluntary and that they could withdraw from the study at any time by closing the web browser. The questionnaire required only the necessary demographic information to ensure anonymity and confidentiality.

Table 1. Demographic information of respondents in frequencies and percentages.

Demographic variables	Teachers		TAs	
	<i>n</i>	%	<i>n</i>	%
Gender	165	51	157	49
Male	51	31	19	12
Female	114	69	138	88
School type				
Primary	70	42	77	49
Secondary	95	58	80	51
Educational qualification				
Certificate	1	0.5	22	14
Diploma	2	1	52	33
Bachelor's degree	100	60.5	44	28
Graduate diploma	28	17	8	5
Master's degree	26	16	3	2
Other	8	5	28	18
Experience with ADHD				
Yes	157	95	145	92
No	8	5	12	8
Training on ADHD				
Yes	105	64	104	66
No	60	36	53	34
Support from school				
Yes	70	42	85	54
No	95	58	72	46

Materials

The survey included an information sheet, a demographic questionnaire, an ADHD-specific knowledge (SASK) scale, an ADHD-specific attitudes (SASA) scale (Mulholland et al., 2015) and a debrief sheet. Both teachers and TAs received the same questionnaires. Some of the words in the original questions of the SASA were altered to make them more appropriate for TAs. For example, the question “it is challenging to teach students who exhibit behaviours associated with ADHD” was changed to “it is challenging to teach/work with students who exhibit...” Demographic information asked about participants’ gender, age, school-type, highest qualification and years of service. Responses for experience with ADHD, ADHD training and perceived support from their school with regards to ADHD required a YES or NO response. ADHD training was defined as attending at least one training session that incorporated information and strategies for dealing with ADHD in the classroom. Perceived support was categorised as those who believed they had received help from their colleagues or headteacher while working with children with ADHD. The SASK scale assesses teacher knowledge about aetiology, treatment, symptoms and prevalence/assessment via 20 questions, using a true/false/don’t know answer choice. Question examples are “children with ADHD tend to have poor concentration” and “children with ADHD benefit from stricter parenting and schooling”. Mulholland et al. (2015) report that internal consistency and reliability was calculated using the split-half method and the Cronbach’s alpha was reported as .878. The SASA scale assesses teacher attitude towards ADHD-type behaviours via 30 questions using a six-point Likert scale ranging from strongly disagree to strongly agree. The scale has a Cronbach’s alpha of .893. The SASK has four subscales: (1) Feelings about teaching students who exhibit ADHD-type behaviours (with four positive and six negative

items). (2) Beliefs about ADHD and its associated behaviours (with two positive and seven negative items). (3) Knowledge, training and accommodations regarding ADHD (with three knowledge and training items and three accommodations items). (4) A desire for better training regarding ADHD (four items). Factor analysis on the four subscales had eigenvalues of greater than one (subscale one; 4.527, two; 2.143, three; 1.789 and four; 1.194), and accounted for 68.95% of the total variance of the original data set analysed. Question examples are “students who exhibit behaviours associated with ADHD misbehave because they don’t want to follow the set rules” and “I believe ADHD is over-diagnosed”.

Analysis

Research questions 1 and 2

Correct response analysis (CRA) was performed on the SASK to determine the number of correct answers given by teachers and TAs (in percentages). The ‘don’t know’ response was included by the scale’s author to avoid guessing and creating inflation of correct responses. Using SPSS version 24, four independent-samples *t*-tests were used to calculate the differences between teacher’s and TA’s knowledge on the four SASK subscales. Two separate two-way analysis of variance (ANOVA) were calculated, the first on teacher-type and school-type and the second, on perceived support and training. A further independent-samples *t*-test was calculated to determine a difference in knowledge between teachers and TAs who had received training. A Pearson correlation was calculated to analyse the relationship between years of service and knowledge of ADHD.

Frequency analysis (FA) was performed on responses to the SASA, and percentage scores for positive and negative feelings and positive and negative beliefs were presented for teachers and TAs. Each attitude item was given a score. Strongly disagree was awarded 6 points through to strongly agree, which was awarded 1 point. Factors that affect attitudes (teacher-type $\times$ training $\times$ perceived support) were analysed using four three-way ANOVAs for positive and negative feelings, and positive and negative beliefs. To control for familywise error following multiple follow-up *t*-tests on the three-way ANOVAs, Tukey’s HSD was calculated. Years of service across teachers and TAs was measured with two Pearson correlations. The scores on the knowledge and training and the desire for further training subscales were summed and analysed using two independent *t*-tests. No analysis was carried out on experience working with/teaching children with ADHD because of the high percentage of teachers and TAs who had reported previous experience (95% and 92%, respectively).

Research question 3

The total scores from the SASK and SASA (negative items were reversed) were analysed with two Pearson correlations. The first, to determine the relationship between knowledge and attitudes for teachers, the second, for TAs.

Results

Knowledge (SASK)

Both teachers and TAs scored adequately on the knowledge scale (<50–85% correct). Teachers answered an average of 62% of questions correctly compared with 69% for TAs.

TAs scored significantly better than teachers on three out of the four subscales (Table 2). Both teachers and TAs answered more questions correctly on symptom questions (74% and 84%, respectively) and poorest knowledge was on prevalence/assessment and aetiology. Table 2 presents the findings on the subscales following the running of four independent-samples *t*-tests.

Total knowledge scores on the SASK were used to determine differences in knowledge across teacher-type (teacher and TA) and school-type (primary and secondary). Results of a two-way ANOVA revealed a significant main effect for teacher-type, with a small effect size, $F(1, 318) = 9.46, p = .002, \eta_p^2 = .029$, but not for school-type $F(1, 318) = 1.18, p = .277, \eta_p^2 = .004$, or the interaction $F(1, 318) = 1.48, p = .224, \eta_p^2 = .005$, with a small to medium effect, respectively. The main effect for teacher-type indicates that TAs had significantly greater knowledge than teachers ($M = 49.54, SD = 4.46$ and $M = 47.98, SD = 4.63$, respectively).

Perceived support and training for both teachers and TAs were analysed using two separate two-way ANOVAs. For teachers, a significant main effect for perceived support was found with a small effect size, $F(1, 161) = 4.07, p = .045, \eta_p^2 = .025$. Here, teachers who believed they received support from their schools had better knowledge than those without support ($M = 49.01, SD = 4.21$ and $M = 47.37, SD = 4.86$, respectively). No main effect for ADHD training, $F(1, 161) = .45, p = .504, \eta_p^2 = .003$, or interaction was found, $F(1, 161) = 3.82, p = .052, \eta_p^2 = .023$. The effect sizes were small. For TAs, there was no significant main effect for perceived support, $F(1, 153) = .03, p = .870, \eta_p^2 = .000$. For training, a significant main effect was revealed, with a small effect size, $F(1, 153) = 6.04, p = .015, \eta_p^2 = .038$. Here, TAs with training had better knowledge than those without training ($M = 50.19, SD = 4.08$ and $M = 48.28, SD = 4.93$, respectively). However, no significant interaction was found, $F(1, 153) = 2.80, p = .096, \eta_p^2 = .018$. The effect size was small. An independent-samples *t*-test revealed significant differences in knowledge with a small to medium effect size between teachers and TAs who had received training, $t(207) = 2.88, p = .004$, Cohen's $d = 0.39$. Here, TAs with training had better knowledge than teachers with training ($M = 50.19, SD = 4.08$ and $M = 48.47, SD = 4.56$, respectively). A further independent-samples *t*-test revealed no significant differences in knowledge between teachers and TAs who had received support, $t(153) = 1.47, p = .142$, Cohen's $d = 0.24$. The effect size was small (Cohen, 1988). Finally, two Pearson correlations were conducted on knowledge scores and years of service for teachers and TAs. Both correlations revealed no significant association (teachers: $r(165) = .04, p = .478$; TAs: $r(157) = .01, p = .456$). Thus, knowledge was not related to years of service in teachers or TAs.

Table 2. Means, standard deviations (*SD*) and *p*-values for teacher's and TA's knowledge on the SASK subscales (percentage of correct answers).

	Teacher		TA		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Aetiology	13.06	2.21 (48)	13.61	1.87 (55)	.016
Treatment	9.50	1.80 (60)	9.91	1.72 (63)	.039
Symptoms	22.89	2.70 (74)	24.05	2.45 (84)	.000
Prevalence/assessment	4.30	1.34 (48)	4.26	1.26 (46)	.807

Attitudes (SASA)

Feelings and beliefs

On the whole, teachers and TAs tended to agree with statements about positive feelings and beliefs towards ADHD, but TAs agreed with more positive feeling statements than teachers (92% and 70%, respectively). Almost 89% of TAs agreed that ‘ADHD is a benefit to the growth of my teaching/assistant skills’ compared with just 59% of teachers, and 94% of TAs compared with 73% of teachers felt that “students with ADHD are rewarding to work with”. A similar percentage of TAs and teachers agreed with the positive belief that ADHD is a valid diagnosis (90% and 89%, respectively). The percentages for agreeing with negative feeling statements were much lower for TAs than teachers (42% and 69%, respectively). For example, 61% disagreed that ADHD interferes with their teaching/work, compared with just 7% of teachers, and under half (43%) agreed that “behaviours associated with ADHD are irritating in the classroom” (for teachers: 79%). Forty-eight percent of TAs agreed that “ADHD-type behaviours cause me to experience stress”. The figure was much higher for teachers (61%). Almost three-quarters (74%) of all TAs disagreed with negative belief statements, compared to 46% of teachers. For example, 52% of teachers agreed that “students need more structure and discipline, not assistance with their academic work” compared with 46% of TAs. Fifty-seven percent of TAs and 29% of teachers disagreed with the negative belief that ADHD is over-diagnosed, and 92% of TAs disagreed that “children who exhibit ADHD type behaviours are deliberately misbehaving”, compared with 69% of teachers.

Knowledge, training and accommodation

More TAs than teachers agreed that they were knowledgeable about ADHD (57% and 43%, respectively), and 66% of them agreed that they could effectively teach/work with students with ADHD (compared to 48% of teachers). A similar number of TAs and teachers believed that they had received adequate professional development (32% and 30%, respectively). For accommodation questions, the majority of teachers (87%) and TAs (84%) agreed that they would “refer a student to the school counsellor for a possible ADHD assessment”, while only 37% of TAs, compared to 77% of teachers, agreed that they already “change lessons/plans and teaching/work styles to accommodate those with ADHD”.

The desire for further training

Ninety-two percent of teachers and 96% of TAs would like to know more about ADHD and classroom interventions and be more effective in teaching/working with children with ADHD-type behaviours. The next section examines the inferential statistics for teachers and TAs across the four subscales.

Inferential analyses

Positive feelings

Table 3 shows the positive and negative feeling scores for the SASA. A significant main effect for teacher-type with a large effect size was found, $F(1, 314) = 79.05, p < .001, \eta_p^2 = .201$. Here, TAs scored higher on positive feeling items than teachers ($M = 18.83, SD = 2.36$ and $M = 16.13, SD = 2.64$, respectively). No significant two-way interactions were found for teacher-type $\times$ training or teacher-type $\times$ perceived support ($F(1, 314) = 1.43, p = .705$,

Table 3. Means and standard deviations (*SD*) for positive and negative feeling scores on the SASA by teacher-type, perceived support and ADHD-specific training.

	Teacher				TA			
	Positive		Negative		Positive		Negative	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Perceived support								
Training	17.05	2.13	22.74	3.31	18.73	2.02	17.98	3.86
No training	15.13	3.58	24.13	4.13	19.32	1.84	19.00	3.10
No perceived support								
Training	15.78	2.99	24.92	3.28	19.27	2.80	18.61	3.54
No training	16.55	2.20	23.55	2.56	18.00	2.55	19.50	4.89

$\eta_p^2 = .000$ and $F(1, 314) = .58, p = .445, \eta_p^2 = .002$, respectively). The effect sizes were small. However, the three-way interaction was significant, with a large effect size, $F(1, 314) = 14.06, p < .001, \eta_p^2 = .043$. Independent-samples *t*-tests were run to test the differences between all 12 combinations (for teacher type, training and perceived support). To control for type I errors, a Tukey's HSD adjusted alpha of .004 was used. There were three significant *t*-test results. The first, TAs held significantly more positive feelings than teachers when both groups received training and support, $t(113) = 4.33, p < .001$, Cohen's $d = 0.80$. The effect size was large (Cohen, 1988). The second, TAs held significantly more positive feelings than teachers when both groups received training, but no support, $t(92) = 5.81, p < .001$, Cohen's $d = 1.20$. The effect size was very large (Sawilowsky, 2009). Finally, TAs held significantly more positive feelings than teachers when both groups received no training but had received support $t(38) = 4.89, p < .001$, Cohen's $d = 1.40$. The effect size was very large (Sawilowsky, 2009).

Negative feelings

A significant main effect for teacher-type with a small effect size $F(1, 314) = 134.65, p < .001, \eta_p^2 = .300$ revealed that teachers scored higher in negative feeling items than TAs ($M = 23.84, SD = 3.29$ and $M = 18.77, SD = 3.88$, respectively). No other analyses reached significance.

Positive beliefs

Table 4 shows the positive and negative belief scores for the SASA. No significant main effect or interactions were found.

Table 4. Means and standard deviations (*SD*) for positive and negative belief scores on the SASA by teacher-type, perceived support and ADHD-specific training.

	Teacher				TA			
	Positive		Negative		Positive		Negative	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Perceived support								
Training	8.45	1.52	26.13	2.56	8.43	1.38	18.58	4.21
No training	8.33	1.75	23.16	5.06	8.12	1.53	18.68	3.76
No perceived support								
Training	8.44	1.64	24.84	4.04	8.52	1.52	17.36	4.94
No training	8.66	1.63	24.15	3.79	8.32	1.72	19.20	5.72

Negative beliefs

A significant main effect for teacher-type, $F(1, 314) = 133.36, p < .001, \eta_p^2 = .298$, with a small effect size revealed that teachers scored higher in negative belief items than TAs ($M = 24.57, SD = 3.73$ and $M = 18.64, SD = 4.69$, respectively). No significant two-way interactions were found for teacher-type $\times$ training or teacher-type $\times$ perceived support ($F(1, 314) = .034, p = .86, \eta_p^2 = .000$ and $F(1, 314) = .33, p = .56, \eta_p^2 = .001$, respectively). However, the three-way interaction with a small effect size was significant, $F(1, 314) = 18.81, p = .003, \eta_p^2 = .027$. Independent-samples t -tests were used to test the differences between all 12 combinations (for teacher type, training, perceived support). A Tukey's HSD adjusted alpha of .004 was used. There were five significant t -test results. The first, teachers held significantly more negative beliefs than TAs when both groups received training and support, $t(113) = 6.95, p < .001$, Cohen's $d = 1.31$. The effect size was very large (Sawilowsky, 2009). The second, teachers held significantly more negative beliefs than TAs when both groups received training, but no support, $t(92) = 8.06, p < .001$, Cohen's $d = 1.66$. The effect size was very large (Sawilowsky, 2009). Thirdly, teachers held significantly more negative beliefs than TAs when both groups received no training but had received support $t(38) = 5.32, p < .001$, Cohen's $d = 1.67$. The effect size was very large (Sawilowsky, 2009). The same was found when both groups received no support or training, $t(71) = 3.80, p < .001$, Cohen's $d = 0.87$. The effect size was large (Cohen, 1998). Finally, significantly more negative beliefs were present in teachers with support and no training, compared to those with support and training, $t(68) = 3.14, p = .002$, Cohen's $d = 0.74$. The effect size was medium (Cohen, 1998).

Pearson correlations between years of service and beliefs and feelings towards ADHD were calculated. For teachers, a significant negative association was found for positive beliefs and years of service, $r(165) = -.84, p = .023$. Here, an increase in years of service means a decrease in positive beliefs. For all other correlations, there were no associations.

The items for subscale three (knowledge, training and accommodation) were summed and an independent t -test calculated. Results revealed no significant differences between teachers and TAs, $t(320) = 3.43, p = .732$, Cohen's $d = 0.04$. The effect size was small (Cohen, 1998) ($M = 29.19, SD = 3.58$ and $M = 29.34, SD = 4.24$, respectively). Similarly, the final subscale of desire for further training found no significant differences in scores for teachers and TAs, $t(320) = 1.92, p = .056$, Cohen's $d = 0.17$. The effect size was small (Cohen, 1998) ($M = 14.38, SD = 2.20$ and $M = 14.83, SD = 2.00$, respectively).

Correlation between knowledge and attitudes

The final research question that addressed the relationship between knowledge and attitudes towards children with ADHD was analysed using Pearson correlations on total SASK and total SASA scores (high score = positive attitude). For teachers, a significant positive correlation, $r(165) = .15, p = .49$, indicated that high knowledge scores were related to positive attitude scores. For TAs, no significant correlation was found between their knowledge and attitude scores ($r(157) = -.13, p = .108$).

Discussion

The results above offer some novel findings on how teachers and TAs compare in their knowledge and attitudes towards ADHD. The differences found with regard to the factors affecting knowledge and attitudes toward ADHD, and the association between knowledge and attitudes found in teachers only are discussed.

Knowledge

Teachers' knowledge scores match the adequate knowledge levels reported by Mulholland et al. (2015) and Stampoltzis and Antonopoulou (2013) and are higher than those reported by Youssef et al. (2015) and Shroff et al. (2017). The novel finding of significantly higher knowledge scores in TAs may be linked to their in-depth interactions with children with ADHD since many of the TAs in the UK are employed to work with these children or those who exhibit ADHD-type behaviours (Blatchford, Webster, & Russell, 2012). This finding has important implications for classroom practice and ADHD training programmes. Thus, researchers may wish to examine the experiences of TAs and how their knowledge and experiences can inform future training programmes that assist teachers when working with children with ADHD.

For both teachers and TAs, the most accurate knowledge focussed around symptoms and the poorest knowledge surrounded aetiology and prevalence/assessment. These findings are consistent with previous literature (Amiri et al., 2017; Mulholland et al., 2015; Shroff et al., 2017). The accurate knowledge of symptoms is not surprising since teachers and TAs deal with ADHD-type behaviours regularly and often rely on their knowledge of symptoms to inform classroom practice and make referrals for assessment. The inadequate understanding of aetiology and prevalence/assessment reported here, and in previous studies, indicate a need for future training programmes to incorporate and strengthen information on the causes and extent of ADHD in the classroom.

Although it was encouraging to see greater knowledge in TAs compared to teachers, knowledge for both was still only adequate (<50–85% correct). The adequate knowledge levels may be attributable to the lack of ADHD-specific training available on initial teacher-training courses in Wales and subsequent training opportunities for in-service teachers and TAs. Last year, the National Institute for Health and Care Excellence (NICE, 2018) guidelines for ADHD called for the Department of Education to provide more education for teachers and trainee teachers amidst concerns that around half of all cases of ADHD in school-aged children go undiagnosed.

Inadequate or out-of-date training may explain why teachers' knowledge was not greater in those who had received training. Teachers had significantly more years of service than TAs, which means that for many, their initial teacher training would have been over 15 years ago, when ADHD may not have featured heavily in their training. In contrast, TAs with training had a greater knowledge of ADHD than teachers with training and TAs without training. One explanation for this may be linked to current training opportunities accessed by TAs. Since TAs do not always receive training before starting their job, they may seek out different sources of information and attend more short courses that help to improve their knowledge (Burgess & Mayes, 2007). Furthermore, Liang and Gao (2016) suggest that experience with ADHD is more

important for knowledge than training, therefore, because TAs have more one-to-one interactions with children with ADHD, this could be why they scored higher on the SASK.

Nevertheless, since years of service appeared to make no difference to the level of knowledge expressed by both teachers and TAs, which contradicts Mulholland et al. (2015) but is consistent with Shroff et al. (2017), experience in the classroom may not be enough for building knowledge of ADHD. However, the failure to explore the effect of experience with ADHD due to the low numbers reporting no prior experience, and the lack of specific information on the training received, make conclusions difficult. Consequently, future researchers may wish to examine the source, duration and depth of experience and training received by teachers and TAs. The finding of greater knowledge in teachers who had received support compared to those who had not has implications for the schools themselves, in that more emphasis may need to be placed on ensuring that teachers receive support when working with children with ADHD. The lack of difference between TAs with and without support may be explained by the TAs role within the school. Since TAs are often part-time and not involved in all aspects of school-life (Webster, Russell, & Blatchford, 2012), they may not feel in a position to ask for help, which could be perceived as a lack of support. Research indicates that those who feel supported are more likely to engage in training opportunities and ways to improve their performance (Hustler et al., 2003). Therefore, further examination of the type of support received and required would be advantageous.

Attitudes

Overall, attitudes were encouraging and support previous literature (Mulholland et al., 2015), with teachers and TAs holding positive attitudes towards children with ADHD. However, as in previous studies (Amiri et al., 2017), respondents also held negative attitudes towards ADHD too. Consistent with the ambivalence reported by Anderson et al. (2012, 2017), the findings have implications for classroom interactions with children with ADHD. Mixed attitudes are perceived as unstable and malleable, which can affect an individual's future behaviours (Armitage & Conner, 2004). If such attitudes are vulnerable to influence, then with appropriate information and experience with ADHD, teachers and TAs can change certain beliefs and behaviours for the better. Thus, making the argument for continued ADHD training for attitude change essential.

The observation that TAs appear to hold more positive feelings and less negative feelings and beliefs than teachers offer novel findings since this study is the first to compare the feelings and beliefs of TAs and teachers. The differences indicate that teachers expressed more negative attitudes towards ADHD than TAs and that TAs see ADHD in a more positive light. These findings could be explained by the nature of the relationship between a TA and a child with ADHD. TAs spend more individual time with children with ADHD while the teacher concentrates on the rest of the class, resulting in less time dealing with ADHD-type behaviours (Sharples, Webster, & Blatchford, 2015). However, since the present study did not ask its respondents to comment on their relationship or the duration of time spent with children with ADHD, future researchers may wish to explore this further. The finding that more teachers, than TAs, felt that ADHD-type behaviours cause them to experience stress may be linked to the differences found in knowledge scores (lower in teachers) since previous literature has indicated an association between lower knowledge and higher levels of stress (Bahredar, Ghanizadeh, & Moeini, 2006). If this is the case, this has important implications for

the well-being of those working with ADHD and supports an immediate need for research to examine the impact of dealing with ADHD-type behaviours on a regular basis.

The results on the effect of training and support on teachers and TAs feelings and beliefs provide a complex pattern. For example, it appears that TAs with training and support feel more positive toward ADHD than teachers. Interestingly, since perceived support did not affect the TAs' knowledge on the SASK, perceived support might be more important to their attitudes rather than their knowledge. This makes sense since employees who feel supported exhibit more positive attitudes (Ali et al., 2010). Therefore, positive feelings towards ADHD should be encouraged during knowledge training sessions and more support from schools is needed to improve teachers' positive feelings towards ADHD. Why teachers with both training and support were less positive is unclear. Thus, research that examines the type and extent of training and support received by teachers and TAs would provide further clarity on the differences observed.

To add to the complexity, teachers appeared to hold more negative beliefs than TAs when both had received training with no support, and teachers with support and no training held more negative beliefs than teachers with both support and training. These findings suggest that for teachers, support may not be enough to negate negative beliefs, so training is needed to counter existing negative beliefs. However, training alone (without support) may be detrimental to teachers' beliefs about ADHD if training programmes are focussing too heavily on the negative behaviours and difficulties faced by children with ADHD. The negative consequences of training were reported by Ohan, Visser, Strain, and Allen (2011). They examined teacher perceptions of and reactions to children with and without the diagnostic label of ADHD. They reported that ADHD training was linked to higher negative impact ratings for emotional reactions. Thus, since many of the teachers in the present study with negative attitudes had training and experience with ADHD, it may be beneficial for them to discuss why they feel this way and to provide them with support to address their feelings and emotional responses with an aim to reframe the negative beliefs they hold. In relation to years of service, the decrease in teachers' positive beliefs with an increase in years, supports the results of Mulholland et al. (2015), that more experienced teachers were less tolerant of ADHD-type behaviours. However, caution is needed before making any firm conclusions, since teachers in the present sample had significantly longer years of service than TAs. Therefore, results may be due to a cohort effect whereby teachers trained years ago are negative because of different attitudes and knowledge of children's behaviours at the time of their initial training. Consequently, further research is needed here, since the present study did not address such questions through its design.

The results for the final subscales that examine perceived control (knowledge, training and accommodation; a desire for further training) support that of Mulholland et al. (2015), with teachers and TAs disagreeing that they had received adequate knowledge and training. However, this did not seem to affect their confidence to refer a student for ADHD assessment (three-quarters of teachers and TAs felt confident enough to do so). These figures are not surprising since the highest scores on the knowledge scale focussed on symptoms. However, good knowledge of symptoms may be sufficient for recognising ADHD-type behaviours, but knowledge of aetiology and treatments can help teachers to provide the best interventions and subsequent outcomes for children with ADHD (Bradshaw & Kamal, 2013). This and the fact that almost all participants agreed with a desire for further training stresses the need for ADHD training to concentrate on more

than symptoms. However, since many participants had received ADHD training, there appears to be a discrepancy between this and their perceptions of its adequacy. Therefore, discussions with teachers and TAs to establish what they require to help improve their knowledge and attitudes towards ADHD would be advantageous.

The final aim of the study was to explore an association between knowledge and attitudes towards ADHD. The significant positive correlation confirms previous findings (Alfageer et al., 2018; Nur & Kavakci, 2010) that knowledge informs teachers' (but not TAs') attitudes towards ADHD. However, adequate knowledge levels and the negative attitudes expressed by both groups suggest that more needs to be done to improve knowledge and subsequent attitudes towards children with ADHD.

Limitations and future research

The lack of specificity of training and perceived support may have been an issue here. Future studies may wish to explore the source, quantity and length of training and support to provide a clearer picture of their roles in knowledge and attitudes towards ADHD. The failure to explore the effect of experience with ADHD on both knowledge and attitudes was disappointing. Therefore, future researchers could examine this in more depth by asking teachers about the type and duration of their experience with ADHD. The SASK and SASA have only been used on teachers (not TAs) by the scales' author. Therefore, interpretations resulting from their use need caution until further studies have used them. More generally, the use of self-reported questionnaires tends to evoke socially accepted responses (King & Bruner, 2000). However, socially accepted response bias appears not to be an issue as a high number of negative attitudes were reported. Finally, the present study focused on quantitative data collection, which prevents the gaining of in-depth insights into the experiences of those working closely with ADHD. Therefore, researchers may wish to explore the nature and extent of teacher and TA experiences through the use of qualitative methods.

Conclusion

The results from the present study provide valuable information about teacher and TA knowledge and attitudes towards ADHD. Comparable to recent studies, teachers and TAs possessed only adequate knowledge of ADHD, which stresses the need for further knowledge training. The findings that teachers and TAs hold ambivalent attitudes towards ADHD indicate an immediate need to examine current initial teacher-training curriculum provision for new teachers and training programmes for long-serving teachers and TAs. In particular, colleges and universities would be wise to incorporate core ADHD content that provides knowledge about more than symptoms and the negative behaviours exhibited by children with ADHD. Such material, alongside experience with ADHD, may help to improve knowledge and negate the negative feelings and beliefs held by teachers and TAs. As expressed previously (Anderson et al., 2017), programmes should provide a platform to discuss experiences and concerns that reassure staff that their feelings toward ADHD are normal, given the often challenging circumstances surrounding ADHD-type behaviours in the classroom. The development of coping strategies and support in schools that improve classroom practices would ensure that teachers and TAs feel supported in their roles. Also, since TAs in the present study possessed greater knowledge and more positive attitudes than teachers did, educators and policymakers

may wish to work alongside TAs to help improve identification and intervention opportunities to ensure that both children and staff receive appropriate information and support that encourages positive individual and classroom outcomes.

Acknowledgments

We would like to thank Sarah Mulholland for granting us permission to use her SASK and SASA scales.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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