

Teachers' recognition of children with ADHD: role of subtype and gender

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Background: This study investigates the ability of primary school teachers to recognise Attention Deficit/Hyperactivity Disorder (ADHD), and the impact of subtype and child gender on recognition and proposed management. **Method:** Primary school teachers read one of four types of vignette describing the behaviour of a 9-year-old child: either a boy or a girl with inattentive or combined subtype of ADHD. Teachers were asked about their conceptualisation of the child's difficulties and their thoughts about need for specialist referral and other interventions. **Results:** Of 496 teachers, 99% identified the presence of a problem. Subtype (combined) of ADHD influenced teachers' recognition of ADHD and agreement that medication might be helpful. Only 13% of teachers thought that medication might be helpful. **Conclusions:** Results suggest a need for better teacher awareness about inattentive subtype of ADHD.

Key Practitioner Message:

- Epidemiological data show that ADHD is underdiagnosed in girls and in children with inattentive subtype, while research and clinical experience suggest that teachers are important in the process of recognition and referral of children with possible ADHD
- Using a case vignette, teachers were more likely to conceptualise the problems as ADHD and think that medication might be helpful for a child with combined subtype than for a child with inattentive subtype of ADHD
- We found no evidence that teachers were less likely to recognise ADHD in girls than in boys
- Teachers strongly endorsed nonpharmacological intervention approaches for children with ADHD, but few thought that medication would be beneficial; many teachers expressed their views that medication should be 'a last resort'
- During the diagnostic process for a child with suspected ADHD, or when offering training to teachers, clinicians should try to increase teacher awareness about inattentive subtype of ADHD

Keywords: ADD/ADHD; school children; gender; symptomatology; attention

Introduction

Attention Deficit/Hyperactivity Disorder (ADHD) is a common childhood neurodevelopmental disorder (Ford, Goodman, & Meltzer, 2003; Froehlich et al., 2007; Swanson et al., 1998). The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV TR) (American Psychiatric Association, 2000) specifies three subtypes of ADHD according to the most prominent group of symptoms: predominantly inattentive, predominantly hyperactive/impulsive, and combined (having symptoms of inattention and hyperactivity/impulsivity). In all subtypes, the maladaptive behaviour is present before the age of seven, is evident in two or more settings, is inconsistent with the child's developmental level and has a negative impact on social and academic domains. Research shows that ADHD symptoms persist into adolescence and adulthood (Fayyad et al., 2007; Langley et al., 2010; Ramtekkar, Reiersen, Todorov, & Todd, 2010; Taylor, Fauset, & Harpin, 2010) increasing the risk of low quality of life, impairment in academic and occupational functioning, other

psychiatric problems and antisocial behaviour (Cumyn, French, & Hechtman, 2009; Danckaerts et al., 2010; Langley et al., 2010).

Epidemiological data suggest that ADHD remains underdiagnosed (Bussing, Zima, Gary, & Garvan, 2003; Sayal, Goodman, & Ford, 2006a), although an increase in recognition over the last decade has been reported in the United Kingdom (Sayal, Ford, & Goodman, 2010). In particular, girls are underrepresented in clinical samples compared with community samples (Biederman et al., 2002, 2005; Ramtekkar et al., 2010), suggesting that their ADHD symptoms are less frequently recognised. Gender differences in service use have been reported in most studies (Bussing et al., 2003; Froehlich et al., 2007; Gaub & Carlson, 1997; Graetz, Sawyer, Baghurst, & Hirte, 2006). Possible explanations for this include different symptom expression in boys and girls (Biederman et al., 2002; Levy, Hay, Bennett, & McStephen, 2005), for example, involving a higher prevalence of inattentive subtype in girls and more oppositional behaviour in boys; actual gender differences in neural activation (Valera et al., 2010); and

differences in adults' perception of the same behaviour in boys and girls (Biederman et al., 2005). Research and clinical experience suggest that children with inattentive subtype of ADHD are at risk of remaining undiagnosed and therefore untreated (National Institute for Health & Clinical Excellence, 2008; Ramtekkar et al., 2010).

Teachers are important in the recognition and referral of children with ADHD (Ford et al., 2003; Sayal & Goodman, 2009; Sayal, Hornsey, Warren, MacDiarmid, & Taylor, 2006b) because they have many opportunities to observe the child's behaviour in comparison with that of normative peers, while the observation of a child in a clinical setting may not reveal the core symptoms of the disorder. Teachers may initiate the process by raising concerns about a child's inattention or hyperactivity, and they are frequently the first person parents consult when they notice these problems (Sayal et al., 2006a). Specialist child health services routinely request information from schools as part of the diagnostic process to confirm the pervasive nature of the impairment (Committee on Quality Improvement, American Academy of Pediatrics, 2000; National Institute for Health & Clinical Excellence, 2008).

Vignette methodology has been widely used to assess factors that influence teacher recognition and perceptions about interventions; for example, the child's behavioural difficulties, ADHD subtype, and gender have been proposed as having an influence on the likelihood of teachers conceptualising the problem as ADHD and initiating a referral to specialist services (Groenewald, Emond, & Sayal, 2009; Pisecco, Huzinec, & Curtis, 2001; Sciotto, Nolfi, & Bluhm, 2004). Previous research suggests that child gender might influence adults' social judgment and socio-cultural expectations of appropriate behaviours; for example, using vignette methodology, Maniadaki, Sonuga-Barke and Kakouros (2003) found that child gender influenced teacher judgments of whether disruptive behaviours were perceived as being typical. More specifically with ADHD, adults (parents and educators) described a greater sense of self-efficacy in relation to girls than boys (Maniadaki, Sonuga-Barke, & Kakouros, 2006). However, other factors are also important. Adults' judgments about the severity of ADHD or behavioural problems also influence their views about appropriateness of referral for further assessment (Abidin & Robinson, 2002; Maniadaki et al., 2006).

Some studies suggest that symptom type and the gender of the child generate a bias in teachers' perception of the difficulties and management decisions (Pisecco et al., 2001; Sciotto et al., 2004). In an attempt to clarify teachers' recognition of ADHD in girls, a recent study found that teachers' recognition of ADHD was greater in a vignette describing a girl with combined ADHD than with inattentive ADHD (Groenewald et al., 2009).

In this study, we investigate the relative effect of gender and subtype on teacher recognition practice. This study expands on the previous study by including both genders as well as inattentive and combined ADHD subtypes (Groenewald et al., 2009). We focus on these subtypes as, amongst children who met criteria for ADHD in a large UK prevalence study involving a nationally representative community sample (Ford et al., 2003), the predominantly hyperactive/impulsive subtype of ADHD was very uncommon (4% of 8-10-year-old children with ADHD) compared with the inattentive

(36%) and combined (60%) subtypes. Furthermore, longitudinal data demonstrate that the predominantly hyperactive/impulsive subtype of ADHD tends not to be stable over time with many young children in this group meeting criteria for the combined subtype as they reach school-age (Lahey, Pelham, Loney, Lee, & Willcutt, 2005). In keeping with developing evidence about a gender bias in referral, we anticipated that teachers would more readily identify ADHD in boys. We also expected that combined subtype of ADHD would be easier to recognise than inattentive subtype (Graetz et al., 2006; Groenewald et al., 2009; Sciotto et al., 2004). We hypothesized that gender and subtype would have an interactive effect (i.e. inattentive ADHD in a girl would have the lowest rate of recognition as ADHD, whereas combined ADHD in a boy would have the highest).

Method

Sample and setting

We wrote to the head teacher of all (186) mainstream primary (elementary) schools in Nottinghamshire, United Kingdom, to invite their participation in a questionnaire survey about children's needs. Seventeen head teachers opted out. Eight questionnaires were sent to each of the remaining 169 schools as we anticipated that each school had at least 8 qualified teaching staff (the class teachers from Reception year to Year 6 and a Head Teacher).

Procedure and measures

Four types of vignette were used; these were based on the diagnostic criteria for ADHD (American Psychiatric Association, 2000) and were adapted from the ones used in a previous study with primary school teachers (Groenewald et al., 2009). As described in that study, the vignette development was based on DSM-IV criteria for ADHD (American Psychiatric Association, 2000) and was refined following feedback from and piloting with teachers, educational psychologists and clinicians (paediatricians and child and adolescent psychiatrists). Two vignettes described the behaviour of a 9-year-old girl or boy with inattentive subtype of ADHD, and two related to a 9-year-old girl or boy with combined subtype. The vignettes describing a child with inattentive ADHD included behaviours such as: makes careless mistakes, daydreams, does not listen when spoken to and has difficulty doing things in an organised way. The vignettes describing a child with combined ADHD included all symptoms of inattention described in the other vignette, plus: fidgety, constantly runs about, blurts out answers, interrupts and has difficulty waiting turn. In each type of vignette, it was emphasised that the child's behaviour is different from that of peers, the difficulties have been observed by previous teachers and by parents, and have a negative impact on the child's academic progress and behaviour at school and at home.

Each questionnaire comprised one of the four vignettes (see examples in online appendix) and six questions. Each school was sent two copies of each type of vignette (i.e. a total of 8 questionnaires). They were asked to distribute one questionnaire to each teacher and each respondent was asked to complete only one questionnaire.

The questions were identical for all four types of vignette, and enquired about:

- 1 Teachers' conceptualisation of the problem: typical behaviour for age, learning difficulty, hyperactivity, emotional difficulties, ADHD, behavioural difficulty and attention difficulty.
- 2 Whether they would consult any of the following before considering a referral to specialist services: parents, school nurse, teaching colleague, education-based behaviour support service, educational psychologist and 'other'.
- 3 Perceived need for referral: Teachers' views on the need for a specialist assessment (paediatrician or Child and Adolescent Mental Health Services), asking them to place a line along a 10-cm visual analogue scale according to the degree of need.
- 4 Factors influencing their decision on the previous question: impact of difficulties on the child, peers or teacher, parents' views about referral, stigma, personal experience of specialist services, lack of awareness of what they offer and 'other'.
- 5 Teachers' views (yes/no) on whether the child might benefit from the following interventions: medication, work with parents, learning support and behavioural interventions.
- 6 Demographic details of the teacher: gender, age, years of teaching experience and whether they had been Special Educational Needs Coordinator (SEN-Co) (a teacher who oversees the provision for children with learning difficulties or disabilities).

Teachers could choose as many options as they wished in questions 1, 2 and 4. There was a space for written comments beside the option 'other' and at the end of the questionnaire.

This study does not fall under the remit of the National Health Service (NHS) National Research Ethics Service because it does not involve NHS patients or staff. Research and Development approval was obtained from Nottinghamshire Healthcare NHS Trust.

Sample size

We performed a sample size calculation (power .8 and two-sided α .05) based on previous findings (Groenewald et al., 2009) where ADHD was recognised by teachers in 29% of girls. The estimated intraclass correlation coefficient (ICC) was .0033. Assuming that three teachers from each school replied, we needed 118 participating schools (354 participating teachers) to be able to detect a difference involving 44% of boys and 29% of girls with ADHD being recognised (Odds Ratio [OR] 1.92), and 34 schools to detect a difference between ADHD inattentive type (33%) and combined type (50%) (OR 2.00). On the basis of previous work (Groenewald et al., 2009), we invited all primary schools in Nottinghamshire ($n = 186$) to participate to allow for an anticipated teacher response of 50%.

Statistical analysis

Chi-squared and Analysis of Variance tests were used to examine the relationship between type of vignette and teacher's conceptualisation of the difficulties, suggested management and factors influencing their decision to refer the child to specialist services.

Logistic regression was used to investigate which factors (ADHD subtype, child gender, and years of

teaching experience) predicted teachers' recognition of ADHD. All three predictor variables were included in the models. A two-way interaction between ADHD subtype and child gender was also included in these models. The effects of these factors were expressed as estimated odds ratios.

Linear regression was performed to investigate how well these factors (ADHD subtype, child gender, and years of teaching experience) predicted teachers' views that a specialist referral was necessary on the 10-cm visual analogue scale. A 2-way interaction between subtype of ADHD and child gender was included in the models to explore whether recognition of ADHD subtypes differed for boys and girls. The effects of these factors were expressed as estimated means and 95% confidence intervals.

All regression models were adjusted for the clustered nature of the data, i.e. teachers being grouped within schools. We adjusted for clustering using random effects models: teachers were regarded as a (random) sample from the population of all teachers, and inference was made about the variation between teachers in general. Analysis was performed using the statistical programming language R, version 2.10.0 (R Development Core Team, 2004).

Results

Sample characteristics

Two-thirds (65%; 110/169) of schools returned at least one questionnaire and the estimated response rate was 36% (496/1352). Similar numbers of teachers completed each vignette. The demographic characteristics of the teachers are shown in Table 1. Most (85%) teachers were female, their mean age was 40.5 years and 58% had over 10 years of teaching experience. Twenty-four percent of teachers had been SENCo for their school. The demographics of teachers were similar for each vignette, suggesting successful distribution of vignettes within school. Participating and non-participating schools had similar Key Stage 2 results (tests taken by children in England at age 11) (Department for Children, Schools & Families, 2009) and these were similar to the national average, which suggests that our sample was nationally representative.

Teachers' conceptualisation of difficulties

The majority of teachers (99%; 491/496) identified the presence of a problem (see Table 2). ADHD subtype had an influence on teachers' ability to recognise ADHD: 33% (85/260) of vignettes involving inattentive subtype versus 56% (133/236) of vignettes of combined subtype were identified as having ADHD. This is a difference of 24%, 95% confidence interval 15% to 32%. The options

Table 1. Demographic characteristics of the teachers

Variable	Mean value (SD) or numbers (%)
Age (years)	40.5 (10.9)
Gender: female	418 (85%)
Teaching experience	
<5years	105 (21%)
5-10years	103 (21%)
>10years	283 (58%)
SENCo experience	119 (24%)

SENCo: Special Educational Needs Co-ordinator.
SD: Standard Deviation.

Table 2. Teachers' conceptualisation of difficulties

Teachers' views	Inattentive boy n = 131 (%)	Combined boy n = 118 (%)	Inattentive girl n = 129 (%)	Combined girl n = 118 (%)	p value
Typical behaviour for child's age	3 (2)	1 (1)	1 (1)	0	.326
Learning difficulty	70 (53)	48 (41)	73 (57)	50 (42)	.025
Attention difficulty	119 (91)	102 (86)	121 (94)	103 (87)	.271
Hyperactivity	10 (8)	44 (37)	7 (5)	37 (31)	<.001
Behavioural difficulty	17 (13)	44 (37)	15 (12)	40 (34)	<.001
Emotional difficulty	60 (46)	48 (41)	70 (54)	64 (54)	.089
ADHD	43 (33)	69 (59)	42 (33)	64 (54)	<.001

Note: Teachers could endorse as many categories as they wished.

ADHD: Attention Deficit/Hyperactivity Disorder.

The terms inattentive boy, combined boy, inattentive girl and combined girl refer to the subtype of ADHD and gender of the child described in the vignette included in the questionnaires.

'hyperactivity' and 'behavioural difficulties' were more frequently endorsed for the combined subtype of ADHD than for the inattentive subtype. No gender difference in recognition was found: 45% (112/249) of boys and 43% (106/247) of girls were identified as having ADHD, a difference of 2%, 95% confidence interval -7% to 11%. In the logistic regression analysis, only combined subtype was associated with recognition of ADHD (OR = 2.81; 95% CI 1.93-4.08; $p < .001$). There was no interaction between gender and ADHD subtype.

Teachers' proposed management of the child's difficulties

The likelihood of teachers considering a need for referral to specialist services, expressed as a mean value on a scale 0-10 (Table 3) was 5.9 for a boy with combined sub-type and approximately 5.4 for the other three conditions. In the linear regression analysis, child gender, ADHD subtype and years of experience of the teacher did not predict teachers' perceived need for referral. In their written comments, teachers most frequently said that 'it is too early to make a decision', 'the child's difficulties are not severe enough' and 'the main support would come from school', occasionally making comments about the high threshold for referral acceptance. All non-pharmacological intervention approaches were strongly endorsed by teachers (learning support: 100%; work with parents: 97%; behavioural interventions: 95%). In contrast, only 13% of teachers thought that medication might be helpful, particularly for the combined subtype of ADHD for both genders (OR = 3.26; 95% CI 1.82-5.84; $p < .001$).

Teachers most commonly (90%) endorsed the impact of the difficulties on the child as influencing their decision on need for referral (Table 4). The impact of the difficulties on the child's peers was also frequently endorsed for the combined subtype of ADHD.

Discussion

This study highlights the influence of ADHD subtype on teachers' recognition of ADHD. Teachers who read a vignette describing a child with combined subtype of ADHD were more likely to conceptualise the problems as ADHD and to think that medication might be helpful. The child's gender did not influence teachers' views and other parameters (need for specialist referral or non-pharmacological interventions) were not influenced by ADHD subtype or child gender. Therefore, our hypothesis about the interactive effect of ADHD subtype and the gender of the child on teachers' recognition of ADHD was only partially confirmed.

These findings are in agreement with a previous study (Groenewald et al., 2009), which found higher rates of recognition for combined subtype of ADHD. Our findings support the possibility that the higher male-to-female ratio in referred samples compared with community samples reflects a different symptom expression across genders, i.e. girls having more inattentive subtype, which is less frequently recognised as ADHD and referred to specialist services (Biederman et al., 2002).

The lack of gender influence on teachers' recognition and proposed management of ADHD contrasts with existing literature. In our study, ADHD subtype seemed more important than child gender. Using a similar methodology, other studies found that child gender influenced teachers' views on interventions for ADHD (Pisecco et al., 2001) and the likelihood of a referral to a school psychologist (Sciutto et al., 2004). Our findings might reflect an improvement in teachers' awareness of the existence of ADHD in girls and of the need for the same strategies to be implemented irrespective of the child's gender.

Teachers' reluctance to endorse the use of medication may be partially explained by teachers' opinion that medication should be 'a last resort'. Many of them also

Table 3. Teachers' views on management

Proposed management	Inattentive boy n = 131	Combined boy n = 118	Inattentive girl n = 129	Combined girl n = 118	p value
Need for referral (0-10) (mean, 95% CI)	5.36 (5.02-5.71)	5.89 (5.50-6.29)	5.41 (5.04-5.78)	5.42 (5.06-5.78)	F = 1.74 p = .158
Might benefit from medication (Yes)	9 (7%)	24 (25%)	12 (11%)	22 (21%)	$\chi^2 = 17.99 p < .001$

The terms inattentive boy, combined boy, inattentive girl and combined girl refer to the subtype of Attention deficit/hyperactivity disorder and gender of the child described in the vignette included in the questionnaires.

Table 4. Factors influencing decision whether to refer

Teacher views	Inattentive boy <i>n</i> = 131 (%)	Combined boy <i>n</i> = 118 (%)	Inattentive girl <i>n</i> = 129 (%)	Combined girl <i>n</i> = 118 (%)	<i>p</i> value
Impact of difficulties:					
on the child	112 (86)	112 (95)	117 (91)	107 (91)	.095
on child's peers	42 (32)	77 (65)	40 (31)	71 (60)	<.001
on teacher	55 (42)	61 (52)	51 (40)	56 (48)	.216
Parents' negative response to a suggested referral	25 (19)	23 (20)	26 (20)	19 (16)	.858
Label/stigma for child	23 (18)	27 (23)	26 (20)	13 (11)	.100
Personal experience of specialist services	23 (18)	30 (25)	27 (21)	28 (24)	.456
Lack of awareness of what specialist health services offer	39 (30)	11 (9)	32 (25)	29 (25)	.001

The terms inattentive boy, combined boy, inattentive girl and combined girl refer to the subtype of Attention deficit/hyperactivity disorder and gender of the child described in the vignette included in the questionnaires.

expressed this as a written comment. This explanation is supported by teachers' high endorsement of all non-pharmacological interventions. Studies show that teachers prefer behavioural and educational interventions over medication (Curtis, Pisecco, Hamilton, & Moore, 2006; Ohan, Cormier, Hepp, Visser, & Strain, 2008). This is consistent with NICE recommendations that medication should be prescribed only for ADHD with moderate/severe impairment (National Institute for Health & Clinical Excellence, 2008). A further factor that may explain the reluctance to endorse medication is that teachers most frequently (89%) chose the option 'attention difficulties' as a conceptualisation of the vignette; the option 'ADHD' was chosen by 43% of teachers only. This suggests that teachers recognised the presence of an attention problem, but did not consider appropriate to attach a diagnosis to it, hence, they did not think that medication would be beneficial. Teachers' significantly higher endorsement of medication for combined subtype may reflect their better ability to recognise it as ADHD.

The scores for perceived need for referral to specialist services (paediatricians, child and adolescent psychiatrists) were low considering that the vignettes included a sufficient number of symptoms of ADHD required to meet diagnostic criteria, as well as comments on the pervasiveness of the symptoms and their negative impact on the child's functioning. Teachers' views, as expressed in their written comments, highlighted their willingness to deal with the difficulties within the school but also a perception that the difficulties were not sufficiently severe to meet the threshold to be seen by specialist health services.

Methodological issues

Our results are based on a much larger sample than previous similar research and simultaneously examined gender and ADHD subtype (Groenewald et al., 2009; Pisecco et al., 2001; Scitutto et al., 2004). The questionnaire distribution meant that similar numbers of teachers with comparable demographic characteristics read each vignette. Although the vignettes only described ADHD cases, teachers were not aware of the study hypothesis as they were asked to participate in a survey about children's needs.

Several methodological limitations should be highlighted. We do not know precisely how the questionnaires were distributed within the schools and whether schools had full staff numbers or vacancies. Although the overall

teacher response rate was lower than expected, amongst participating schools more teachers than expected took part in the study. The participating schools also appeared to be nationally representative. The use of vignettes is an accepted methodology to elicit teacher's views; however, it can be argued that the reported findings may not reflect teachers' decisions and their actual behaviour in everyday practice. Finally, we focused on the two most common subtypes of ADHD and future research could investigate the role of all 3 subtypes.

Clinical and training implications

When collaborating with or making enquiries of teachers during the diagnostic process for ADHD, clinicians should stress the importance of assessing the child's concentration and attention span even in the absence of symptoms of hyperactivity or impulsivity. This becomes more relevant as the child moves into adolescence, when hyperactivity is less prominent. Teachers need to be informed when medication is initiated for ADHD and their views should be sought when monitoring progress, both to optimise children's treatment and to add to teachers' experience of the potential benefits of pharmacological treatment. NICE guidelines (National Institute for Health & Clinical Excellence, 2008) highlight the need to provide training for teachers; our results suggest that one of the aims should be an increase in teachers' awareness of inattentive subtype of ADHD as a possible cause of difficulties at school.

Future research

To better clarify the role of gender and subtype on teachers' recognition of ADHD, research is necessary to study teachers' perceptions and management of children with ADHD in the classroom situation. Qualitative research exploring teachers' views would inform our understanding of their conceptualisation of the problems and the use of medication.

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Supporting information

Additional Supporting Information may be found in the online version of this article:

Appendix

Please note: Wiley-Blackwell are not responsible for the content or functionality of any supporting materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.

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