

ORIGINAL ARTICLES

Teachers' Knowledge of Attention-Deficit/Hyperactivity Disorder in a Portuguese County

Maria Inês Fernandes¹ , Susana Correia de Oliveira¹ , Patrícia Sousa¹ , Francisca Dias de Freitas¹ , Sofia Vasconcelos¹ ,
Maria Isolina Aguiar¹ , Bárbara Pereira¹ 

ABSTRACT

Introduction and Goals: Attention-Deficit/Hyperactivity Disorder (ADHD) is a common, although often overdiagnosed, disorder among children and adolescents that negatively affects their lives. Teachers play a key role in the academic success of these students, highlighting the importance of dispelling misconceptions in order to improve school performance. The goal of this study is to evaluate teachers' knowledge about this disorder.

Methods: We performed a cross-sectional analytical study using an online, anonymous questionnaire administered to teachers from schools in a Portuguese city. The level of knowledge of each teacher was obtained through the median of the sum of the correct answers.

Results: A total of 131 teachers responded to the survey. Most participants reported having no prior knowledge of ADHD. The median score was 55% (IQR 47-64%). Higher scores were observed among younger teachers and those with less teaching experience (≤ 45 years old and ≤ 20 years of teaching; $p < 0,001$ and $p = 0,008$ respectively), as well as among teachers working in private schools ($p < 0,001$) and those who had received prior training in ADHD ($p = 0,002$).

Discussion and Conclusion: Although teachers play a vital role in recognition and management of ADHD, our findings indicate that their overall knowledge of the disorder is limited, with a median score of 55%. Several misconceptions were identified throughout the study that should be addressed. Training in this area is crucial to enhance teachers' understanding of ADHD and to improve the educational strategies provided to students with this condition.

Keywords: Attention-Deficit Hyperactivity Disorder; questionnaire; school performance; teachers

1. Pediatrics Department, Hospital Senhora da Oliveira, Unidade Local de Saúde do Alto Ave. 4835-044 Guimarães, Portugal.
maria-ines-coelho@hotmail.com; susanaoliveira@ulsaave.min-saude.pt; patriciasousa@ulsaave.min-saude.pt; mariafranciscasfreitas@ulsaave.min-saude.pt;
sofiavasconcelos@ulsaave.min-saude.pt; mariaaguiar@ulsaave.min-saude.pt; barbarapereira@ulsaave.min-saude.pt

INTRODUCTION

The American Psychiatric Association's fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) defines Attention-Deficit Hyperactivity Disorder (ADHD) in children as the presence of six or more symptoms in either the inattentive or hyperactive and impulsive domains, or both for more than six months and that occur in two or more settings (for instance, at school and at home).⁽¹⁾

ADHD is a common (although perhaps over diagnosed) and highly heritable psychiatric disorder, with a prevalence of over 5% within children and adolescents that negatively affects the lives of patients and their parents, being responsible for a significant burden.^(2,3) Although knowledge about ADHD over the last few years has improved, assessment and treatment continue to present a challenge, especially when there are wrong beliefs of teachers, who should play a key role in the early detection of signs of behavioral difficulties and in managing them.⁽³⁾ Some studies have shown a significant correlation between teachers' knowledge of ADHD and their confidence in effectively teaching children with ADHD, fostering an inclusive classroom, and managing their behavior, ultimately contributing to the academic success of those students.⁽⁴⁻⁷⁾ Even though psychotropic medication may improve classroom behavior, pharmacologic treatment is rarely enough to overcome the many challenges seen in school setting.^(4,8) Teachers' misbeliefs and lack of knowledge about ADHD has been documented in numerous studies both national and international and negatively affects children's school performance.^(9,10)

Our main goal is to assess teachers' knowledge of ADHD in our county and identify factors associated with greater knowledge to help promote it.

METHODS

An investigation protocol was elaborated to define the objectives and methodology of the study. The protocol was later approved by the Ethics Committee of the hospital where the study took place.

This was a cross-sectional analytical study conducted in a secondary hospital in the north of Portugal, from the 1st to the 30th of April 2023.

Data collection was carried out using the application of a self-completion questionnaire, disseminated via email to a convenience sample, answered online and anonymously through Google Forms. The target population of the study consisted of primary and lower secondary school teachers from the county/city of Guimarães.

Guimarães is a medium-sized city located in the northern region of Portugal and combines cultural heritage with a developing socioeconomic profile. The city has a diverse educational landscape, including both public and private schools, and serves urban as well as semi-rural populations.

Socioeconomically, Guimarães reflects a mix of middle-income households alongside pockets of social vulnerability, particularly in suburban and rural areas. The local economy is based on traditional industries such as textiles and manufacturing, alongside growing sectors like education and tourism. Educational resources vary across schools, and access to training on neurodevelopmental conditions may differ accordingly. Cultural attitudes toward mental health and special education are gradually evolving but may still be influenced by stigma or lack of information in certain communities. These contextual factors are relevant when interpreting findings related to teachers' knowledge and perceptions of ADHD in this region.

The survey consisted of two parts. The first part aimed to evaluate the socio-professional characteristics of the teachers to characterize participants, namely in terms of gender, age, length of teacher service, teaching cycles, basic training, teaching methods, school where he/she teaches, prior ADHD focused training interventions (including face-to-face workshops and online learning programs) and self-assessment of knowledge on the subject. The second part included a test with 47 items, adapted from the Knowledge of Attention Deficit Disorder (KADDS), constructed by Scituito and Feldhamer, and of Knowledge Regarding ADHD, constructed by Kos translated and adapted to Portuguese by Alvarez, still pending validation for the Portuguese language.^(5,10,11)

This second part of the study addresses three distinct areas of knowledge, divided by Alvarez into "Symptoms/Diagnosis", "Intervention (Treatment/Strategies)" and "Associated Characteristics".⁽¹⁰⁾ The correct answers were scored with one point and incorrect answers were scored zero, with a maximum of 47 points. The level of knowledge of each teacher about ADHD was obtained through the median of the sum of correct answers, which was later transformed in a percentage.

The data obtained was coded and recorded in a computer database (Excel®) and subsequently analyzed using the SPSS v.26.0 program. The Mann-Whitney test was used to compare independent samples and the Chi-Square test was applied when comparing two categorical variables, with p-value <0.05 considered statistically significant.

RESULTS

We received 131 responses to the survey, with a predominance of female teachers (n=104, 79.4%). The median age of teachers was 49 years (IQR 44-56 years) and most have been teaching for 21 years or more (n=95, 72.5%). Of these 131 teachers, only 29.0% (n=38) were 45 years old or younger. Most teachers had a university degree (n=78, 59.5%), while 32 teachers held a master's degree or a doctorate. Most teachers taught elementary school students (n=65, 49.6%) in public schools (n=98, 74.8%). We found that most teachers reported not having prior training on ADHD (n=98, 74.8%), with this

being more common among those teaching in public schools (22.4 vs. 33.3%, $p = 0.155$).

In self-assessment of knowledge, the majority of teachers rated their knowledge of ADHD as reasonable (3 out of 5).

Median score on the survey was 55% (IQR 47-64%) and it was slightly higher in females and in teachers with higher academic training (**Table 1**).

We found that teachers with 21 or more years of service had lower ratings than teachers with less experience (median 53%, IQR 45-64% vs. 62%, IQR 55-66%; p -value 0.008). Similarly, younger teachers (≤ 45 years old) had better ratings in the survey compared to teachers aged >45 years (median 62%, IQR 56.5-66% vs. 53%, IQR 45-61%; p -value <0.001).

Teachers who taught in private schools had better ratings than those in public schools (median 62%, IQR 55-66% vs. 53%, IQR 45-62%; p -value <0.001 ; **Table 2**). The same is true for teachers with prior ADHD training compared to those without training (median 66%, IQR 57-62% vs. 53%, IQR 45-

60%; p -value <0.001 ; **Table 2**).

We verified that teachers with fewer years of service (20 years or less) had more training on ADHD compared to teachers with more teaching experience (44.4% vs. 17.9%; p -value 0.002; **Table 2**).

We found that teachers who rated their knowledge as bad (2), fair (3) or good (4) showed the following median survey scores of 36% (IQR 19-49%), 55% (IQR 46.5- 62%) and 63% (IQR 53-70%), respectively.

We also verified that several questions had frequently incorrect or unknown answers (**Table 3**).

Regarding the three categories of knowledge assessed in the survey (**Table 4**), teachers revealed greater knowledge in the area of "Symptoms/Diagnosis" (median of correct answers of 66.7%), followed by "Intervention (Treatment/Strategies)" (median of correct answers of 53.9%) and, finally, "Associated Characteristics" (median of correct answers of 43.8%), p -value <0.001 .

Table 1 - Descriptive analysis of gender, age, length of service, type of teaching, academic qualifications, prior training and self-assessment, as well as the median score and interquartile range (IQR).

		n	%	Score (median, %)	IQR (%)	p-value
Gender	Male	27	20.6	55	40-62	0.372
	Female	104	79.4	57	47.5-64	
Age	≤ 45 y.o.	38	29.0	62	56.5-66	<0.001
	>45 y.o.	93	71.0	53	45-61	
Length of service	≤ 20 y.	36	27.5	62	55-66	0.008
	> 20 y.	95	72.5	53	45-64	
Type of teaching	Public	98	74.8	53	45-62	<0.001
	Private	33	25.2	62	55-66	
Academic training	Bachelor	5	3.8	55	47-64	0.403
	Degree	78	59.6			
	Post-Graduate	3	2.3			
	Post-Graduate with specialization	13	9.9			
	Masters	29	22.1	57	49.5-69	
	Doctorate	3	2.3			
Prior training in ADHD	Yes	33	25.2	66	57-72	<0.001

ADHD: Attention-Deficit Hyperactivity Disorder; IQR: interquartile range; y.o.: years old.

Table 2 - Association between prior training, type of teaching and length of service.

		Prior training in ADHD		No prior training		p-value
		n	%	n	%	
Type of Teaching	Public	22	22.4	76	77.6	0.155
	Private	11	33.3	22	66.7	
Length of service	≤ 20 y.	16	44.4	20	55.6	0.002
	> 20 y.	17	17.9	78	82.1	

ADHD: Attention-Deficit Hyperactivity Disorder; y.: years.

Table 3 - Mostly incorrect or unknown questions

Question	Original question	Number of correct answers (n)	Percentage of correct answers (%)
1.	Most estimates suggest that ADHD occurs in approximately 15% of school age children.	18	13.7
4.	ADHD children are typically more compliant with their fathers than with their mothers.	6	4.6
6.	ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population	22	16.8
23.	Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.	23	17.6
25.	Stimulant drugs are the most common type of drug used to treat children with ADHD.	29	22.1
27.	ADHD children generally experience more problems in novel situations than in familiar situations.	25	19.1
34	Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.	35	26.7
35.	Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD	29	22.1
38.	A child who is not overactive, but fails to pay attention, may have ADHD	39	29.8
42.	Children with ADHD always need a quiet environment to concentrate	28	21.4
46.	The cause of ADHD is unknown	39	29.8

ADHD: Attention-Deficit Hyperactivity Disorder.

Table 4 - Questionnaire questions divided by areas of knowledge and their Median score and IQR.

	Number of questions	Questions	Score (median %)	IQR (%)	p-value
Symptoms/ Diagnosis	18	3, 5, 7, 9, 11, 14, 16, 17, 19, 21, 24, 26, 28, 39, 32, 36, 38, 39	66.7	61.1-77.8	<0.001
Intervention (Treatment/ Strategies)	13	2, 8, 10, 12, 15, 18, 20, 23, 25, 34, 35, 44, 45	53.9	38.5-61.5	
Associated Characteristics	16	1, 4, 6, 13, 22, 27, 29, 31, 33, 37, 40, 41, 42, 43, 46, 47	43.8	31.3-56.3	

IQR: interquartile range.

DISCUSSION

The primary goal of this study was to evaluate the teacher's knowledge of ADHD, identify factors associated with greater knowledge and identify misconceptions to develop strategies for improving educational approaches. Despite the crucial role teachers play in early recognition, referral and management of ADHD, the overall median score was only 55%.

One of the limitations of this study lies in the fact that the instruments used as reference — the Knowledge of Attention Deficit Disorders Scale (KADDS) by Sciutto and Feldhammer, and the ADHD Knowledge Questionnaire by Kos, adapted into Portuguese by Álvarez — have not yet been fully validated for the Portuguese population. Although the present questionnaire was developed based on these tools and adapted to the cultural and educational context of the study sample, the absence of formally validated versions in Portuguese may affect the reliability and generalizability of the findings. Future studies should focus on the formal validation and standardization of such instruments for use in Portuguese-speaking contexts, thereby enhancing the methodological robustness of research in this area.

The selection of the KADDS and Kos's questionnaire as references in constructing the present instrument is supported by their widespread use, solid theoretical foundations, and acceptable psychometric properties reported in international studies.⁽¹²⁻¹⁴⁾ Both scales have demonstrated content and construct validity in assessing teacher knowledge of ADHD and are specifically designed to address the types of misconceptions commonly observed in educational contexts.⁽¹⁵⁾

Furthermore, despite the absence of formally validated instruments in Portuguese, the development of the questionnaire for this study ensured the inclusion of key conceptual domains such as etiology, symptoms, diagnosis, treatment, and educational strategies related to ADHD. Moreover, the adaptation of the instrument to the Portuguese educational and cultural context contributed to its ecological validity, making the results more relevant and applicable to

the realities experienced by teachers in this setting. The study also offers an original contribution by providing empirical data on teachers' knowledge about ADHD in a Portuguese city, an area with limited research to date. As such, these findings may serve as a valuable baseline for the development of future validation studies, as well as for the design of targeted training programs and awareness campaigns within the educational system.

Through this study, we identified several misconceptions in teachers' knowledge of ADHD (**Table 3**), as we found a high number of questions with a significant proportion of incorrect responses, meaning many teachers actually believe the incorrect information to be valid. While these findings are consistent with other national and international studies, we verified a higher overall score when comparing to these studies - 55% vs. 42,5% in a study in Spain, 42,6% in a study in South Africa, 47,8% in a study in the United States and 46,9% and 46,8% in Portuguese national studies.^(5,9,10,14,16) As these studies are over nine years-old, the improvement in our results may reflect the increased awareness of the importance of this issue over the years. Nevertheless, there remains a significant knowledge gap of ADHD, with considerable room for improvement.

We also verified that teachers had a greater knowledge of ADHD symptoms and diagnosis compared to other areas, which aligns with findings from previous studies.^(5,9,10,12,17) However, most misconceptions were related to associated characteristics, as seen in other papers.^(14,18,19) Despite years of increased study and awareness, the same lack of knowledge in these areas is still observed. It is consensual that school-based interventions are essential to manage this disease, as teachers play a crucial role in managing and minimizing ADHD learning difficulties.^(3,4,10,20) Stigma and misconceptions surrounding this illness negatively impact the adequacy of therapeutic interventions.⁽⁴⁾ Therefore, efforts must focus on addressing these gaps, with enhanced training needed, particularly in the areas of treatment and associated characteristics.

Prior training in ADHD was found to increase knowledge

in several studies which was compatible with our results.^(9,10,14,21) However, even though we verified we had a better score than other studies, the percentage of teachers who received prior training was similar.^(10,20) The low percentage of teachers with prior training, coupled with a significantly better score than those who didn't have prior training emphasizes the importance of training in order to improve students' outcomes.

On the other hand, similar to some other studies, we verified younger teachers and teachers with less experience scored better in the questionnaire.^(9,10,14) These results were not compatible with other studies.^(5,21) Although younger teachers theoretically had less teaching experience, they are expected to have more training in ADHD, as it is an increasingly recognized topic.^(5,10,21) While older teachers had little contact with the subject during their training process, younger teachers encountered it earlier, helping them overcome the stigma and misbeliefs mostly found in the older age groups. We found that younger teachers had significantly more training than older groups, which can help validate our theory.

We also verified teachers in private schools had more training than those who teach in public schools which may be explained by the greater emphasis private schools place on the quality of education and, consequently, on teacher training. This suggests private schools may better recognize the importance of ADHD related topics. One possible explanation for this finding lies in several structural and contextual advantages typically associated with these institutions. First, private schools often maintain smaller class sizes, allowing teachers to provide more individualized attention to students and to more readily identify behavioral or learning difficulties, including those associated with ADHD.⁽²²⁻²⁴⁾ In addition, private schools may have more financial resources to invest in ongoing professional development, including specialized training on neurodevelopmental disorders.^(25,26) Such paid training opportunities can enhance teachers' understanding of ADHD and equip them with effective classroom strategies. Furthermore, private school environments are frequently shaped by strong parental expectations for high academic achievement.⁽²²⁾ This pressure may motivate schools to adopt early identification and intervention practices, including a greater focus on ADHD, to ensure that all students perform to the best of their potential. Together, these factors may contribute to a more proactive and informed approach to ADHD within private school settings.

However, we did not find a significant relationship between having a higher academic degree and greater knowledge of ADHD, highlighting the need for sustained ADHD teacher training interventions, rather than prioritizing academic qualifications alone.⁽¹⁶⁾

CONCLUSION

Teacher training in ADHD is insufficient in our study

population. As demonstrated by our findings, such training is essential and should be incorporated into teachers' academic curricula. Through our study we identified which areas intervention was warranted, providing guidance for the development of training programs and educational initiatives tailored to this population. Specifically identifying and refuting misconceptions may be a useful strategy, as suggested previously in another study¹². Although we found better results than some other studies, we still believe improvement is needed.

Teachers play a central role in supporting students with ADHD, and demystifying some wrong beliefs is crucial to strengthening their understanding of the condition. This, in turn, will enable them to create a supportive classroom environment and develop effective strategies for addressing problem behaviors.

AUTHORSHIP

Maria Inês Fernandes – Conceptualization; Data Curation; Formal Analysis; Writing – original draft; Writing – review & editing

Susana Correia de Oliveira - Conceptualization; Data Curation; Formal Analysis; Writing – original draft; Writing – review & editing

Patrícia Sousa - Writing – review & editing

Francisca Dias de Freitas – Writing – review & editing

Sofia Vasconcelos - Writing – review & editing

Maria Isolina Aguiar – Supervision; Writing – review & editing

Bárbara Pereira - Supervision; Project administration; Writing – review & editing

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CORRESPONDENCE TO

Maria Inês Fernandes
Pediatrics Department
Hospital Senhora da Oliveira
Unidade Local de Saúde do Alto Ave
R. dos Cutileiros 114, Creixomil
4835-044 Guimarães
Email: maria-ines-coelho@hotmail.com

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