Original Article

School Teachers' Knowledge of Developmental and Behavioral Disorders in Saudi Arabia: A Nationwide Survey

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Abstract

Background: Childhood developmental and behavioral disorders (CDABD), such as autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), and learning disability (LD), have gained significant attention globally, including in Saudi Arabia. Early identification of these disorders is crucial for improving outcomes, and teachers play a pivotal role in recognizing symptoms, often before they are identified by healthcare professionals.

Objectives: The aim of this study was to assess the level of knowledge and attitudes of Saudi preschool and elementary school teachers regarding CDABD and explore factors contributing to their knowledge gaps.

Methods: A cross-sectional questionnaire-based study was conducted among 822 teachers from government, private, and international schools across Saudi Arabia. The questionnaire elicited the knowledge of teachers regarding normal child development, ASD, ADHD, LD, and available support services, as well as their attitudes.

Results: The lowest median teacher knowledge score was for ASD (median = 33.3, IQR = 33.3-50), while the highest median teacher knowledge score was for LD (median = 66.7, IQR = 33.3-66.7). In terms of normal development, less than half the teachers correctly answered >50 of the items correctly, with the lowest knowledge being regarding the child empathy development (3.9%); the highest correct response rate was regarding the presentation of absence seizure (79.6%). Teachers' knowledge regarding availability of services and support systems for children with disabilities in Saudi Arabia was extremely poor, as all items had <10% correct responses. In terms of attitude, teachers strongly supported increasing resources and specialized education services (>95%).

Conclusions: This study found that in Saudi Arabia, there are significant gaps in school teachers' knowledge, particularly regarding ASD and ADHD as well as about availability of resources. This study highlights the importance of improving teacher training, public awareness, and access to support services to improve outcomes for children with CDABD.

Keywords: Attention deficit hyperactivity disorder, autism spectrum disorder, childhood developmental and behavioral disorders, learning disabilities, Saudi Arabia, school teacher, knowledge

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INTRODUCTION

Deficits in social interaction, motor coordination, cognition, behavior, speech, and language are common features of childhood developmental and behavioral disorders (CDABD), which significantly impact learning and daily functioning.[1,2] The most frequently encountered conditions in developmental and behavioral pediatrics include autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), learning disabilities (LD), and developmental coordination disorder.[3,4]

In recent years, these conditions have gained considerable attention, both globally and in Saudi Arabia, owing to the increasing number of diagnosed cases.[1-5] In the cities of Makkah and Jeddah in the Western Province, the prevalence of ASD was estimated to be 2.81 per 1000 children.[6] In the Eastern Province, 16.4% of male primary school children in the city of Dammam had ADHD,[7] which was higher than that reported in a more recent study from Jeddah.[8] The prevalence of LD in the capital city Riyadh was reported to be 23.89%, with dyslexia and dysgraphia being the most common types.[9] Nationwide epidemiological studies of these disorders are limited.

Many cases are diagnosed in early childhood, often because of the guardian's observation of developmental delays or regression. However, some symptoms may go unnoticed or guardians may assume that the child will outgrow them until the child reaches school age, when a keen teacher identifies them, particularly as the child begins to struggle with academic performance.[10] Generally, teachers are exposed to a substantial number of students throughout their careers, which enables them to recognize discrepancies between peers of the same age. This highlights the fundamental role of teachers in identifying the alarming signs of these disorders, assuming that they are well-versed and aware of such conditions. Furthermore, there is limited emphasis on the importance of early intervention at this stage and its impact on children's long-term development. Addressing these disorders early in life allows children to thrive in areas such as cognitive function, academic performance, behavior, and social communication, compared with those who do not receive the necessary treatment.[11-13]

Few studies have been published on this topic by institutes in Saudi Arabia, as it remains an emerging field in the country. Nevertheless, the establishment of specialized clinics and centers for children with disabilities aimed at delivering optimal care to these patients and addressing their needs at an early stage is on the horizon. The aim of this study was to assess the level of knowledge and attitudes of preschool and elementary school teachers in Saudi Arabia regarding CDABD and its associated factors.

METHODS

Study design, participants, and data collection

This cross-sectional questionnaire-based study was conducted between September–December 2021. The questionnaire was distributed to 176,844 government, private, and international preschool and elementary school teachers in Saudi Arabia, according to the Ministry of Education's statistics.

The study was approved by the Institutional Review Board of Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. Electronic informed consent was obtained from all participants prior to completing the questionnaire. Participation was entirely voluntary, and all responses were collected anonymously. No incentives were provided, and no reminders were sent.

The survey was conducted as an open survey accessible only to all Saudi preschool and elementary school teachers throughout the country. All Saudi teachers in these institutions throughout the country were included in the study; those with incomplete or missing data were excluded. Participants were invited through official email communication and internal school communication platforms (such as Madrasati and Noor), by sharing the electronic link and QR code of the survey. The questionnaire was distributed by the Planning and Development Department of the Ministry of Education. The questionnaire comprised several sections: demographics; questions on normal child development, ASD, ADHD, and LD; available support services; and attitudes and perceptions.

Questionnaire

The questionnaire was adapted from a previously validated version with modifications to suit the Saudi educational context, and permission was obtained from the authors for its use.[14] The questionnaire was translated into Arabic by two bilingual Arabic–English academics using a bidirectional validation to ensure accuracy. Content validation was performed by two developmental pediatricians. A pilot study involving 30 participants from three schools in the Eastern Province was conducted to ensure internal consistency, which was assessed using the Cronbach's alpha test (0.77). The pilot study targeted for internal consistency testing was tested using both languages separately yielding a high correlation (+0.96), indicating a

high reliability. Following data collection, the responses were extracted using Excel for cleaning and analysis.

Statistical analysis

Analyses were performed using STATA version 17 (StataCorp LLC, College Station, TX, USA). Data were described using frequency and percentage tables and barographs, while the median, interquartile range (IQR), and box-whisker plot were used to describe the distribution of continuous variables after examining them for normal distribution. The Chi-square test was used to compare the correct responses of the participants in relation to their grade level of teaching.

RESULTS

Participant demographics

This study included 822 participants (response rate: 0.46%), the majority of whom were female (83.9%), aged 40–44 years (27%), teaching primary school students (66.6%), working in government schools (82.0%), with a bachelor's degree (77.7%), and with no previous training in dealing with children with disabilities (53.4%) or previous experience with children with disabilities (75.9%). Further details are presented in Table 1.

Knowledge of child development and childhood developmental and behavioral disorders

The lowest median teacher knowledge score was for ASD (median = 33.3, IQR = 33.3-50), while the highest median teacher knowledge score was for LD (median = 66.7, IQR = 33.3-66.7) [Figure 1].

Table 2 summarizes the participants' knowledge of normal child development. The item with the lowest correct response rate (3.9%) was about normal child empathy development: "Empathy is a skill that develops over time during early- and middle-childhood." In contrast, the item with the highest correct response rate (79.6%) was the one about presentation of absence seizure: "A child who appears inattentive may actually be having fits." However, in general, the majority of normal-development knowledge items (15/25) were answered correctly by less than half of the participants. Regarding ASD, as shown in Figure 2, the item with the highest correct response rate (>90%) was "ASD is curable if diagnosed early and the appropriate intervention is provided". In contrast, the item with the lowest correct response rate (<10%) was "A child with ASD often presents with speech and language delay between 2 and 3 years old." As shown in Figure 3, regarding ADHD and LD, the item with lowest corrected response rate (approximately 10%) was "Medication can help to improve learning in some children with ADHD." In contrast, the item with highest corrected response rate (>80%) was "Children with ADHD will outgrow their inattention and hyperactivity."

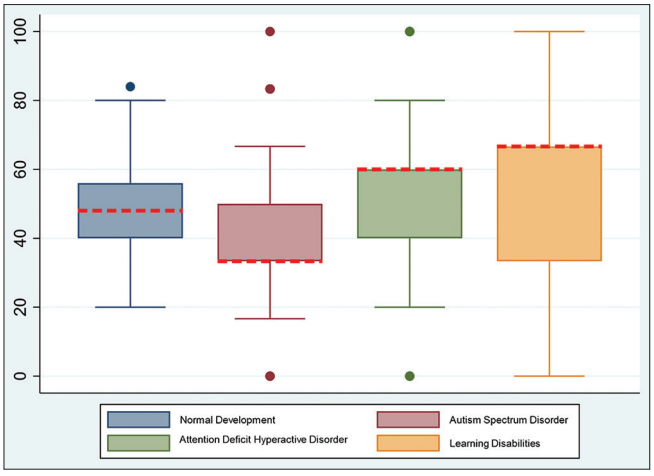

Figure 1: Box and Whisker plot showing the distribution of knowledge scores

Table 1: Summary of participant characteristics (*N*=822)

Variables	*n* (%)
Gender	
Male	132 (16.1)
Female	690 (83.9)
Age	
<24	5 (0.6)
25–29	69 (8.4)
30–34	133 (16.2)
35–39	194 (23.6)
40–44	222 (27.0)
45–49	149 (18.1)
≥50	50 (18.1)
Education sector	
Governmental school	674 (82.0)
Private school	124 (15.1)
International school	24 (2.9)
Grade level of teaching	
Preschool	275 (33.5)
Primary school	547 (66.6)
Province	
Central	197 (24.0)
Western	119 (14.5)
Eastern	173 (21.1)
Southern	262 (31.9)
Northern	71 (8.7)
Geographical areas	
City	567 (69)
Village	247 (30.1)
Hamlet	8 (1.0)
Qualifications	
Diploma	149 (18.1)
Bachelor	640 (77.9)
Postgraduate	33 (4.0)
Training	
Yes	383 (46.6)
No	439 (53.4)
Working experience	
No previous experience	624 (75.9)
Yes, current or previous experience	198 (24.1)

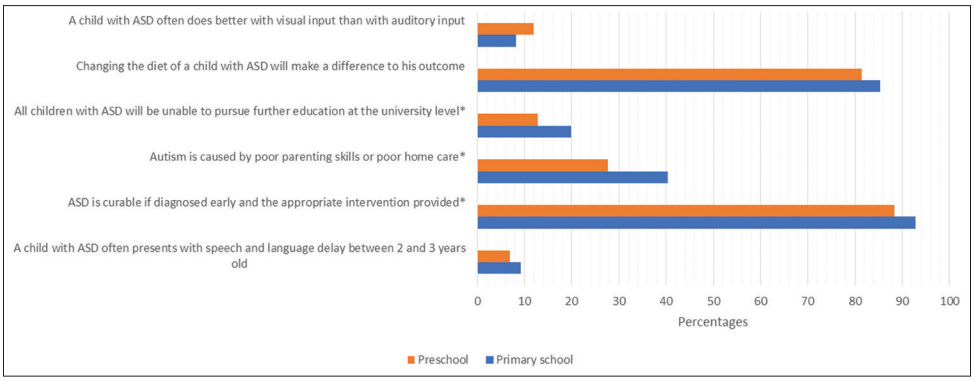

Figure 2: Distribution of correct response rates for autism-related items by teaching grade. *Indicates Chi-square $P < 0.05$

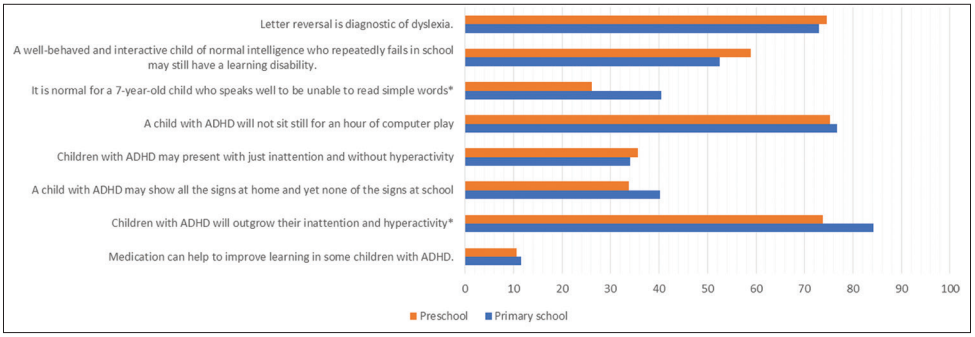

Figure 3: Distribution of correct responses toward ADHD and learning disability Knowledge sections items by teaching grade. * Indicates Chi-square $P < 0.05$

Table 2: Distribution of correct response rate for normal child development knowledge

Items	Correct responses	
	Answer	*n* (%)
1. At 3 years old, it is acceptable for a child to be still unsteady when walking	False	209 (25.4)
2. It is normal for a 1.5-year-old child to have already developed definite hand preference	False	622 (75.7)
3. A child only develops make-believe play at 4 years old	False	290 (35.3)
4. A 3-year-old child should be learning to take turns at play	True	149 (18.1)
5. A 5-year-old child should be able to exchange conversation about daily activities and experiences	True	55 (6.7)
6. A child who appears inattentive may actually be having fits	True	654 (79.6)
7. It is normal for a 3-year-old child not to understand simple instructions	False	238 (29.0)
8. It is normal for a boy to start speaking at the age of 2	False	643 (78.2)
9. It is normal for 3-year-old children to frequently mouth objects (put things in their mouth)	False	417 (50.7)
10. There is no cause for concern if a 3-year-old child can recognize all the letters of the alphabets and numbers but does not speak in sentences	False	519 (63.1)
11. Most children are slightly hyperactive and inattentive before the age of 5	True	167 (20.3)
12. A child with poor language skills can appear hyperactive and inattentive	True	164 (20.0)
13. Children who have learning or behavioral problems may have underlying family concerns	True	116 (14.1)
14. A child of 5 years who frequently sexually stimulates himself in school should alert the teacher to a suspicion of sexual abuse	True	173 (21.1)
15. All children with speech and language delay should have a hearing test done	True	36 (4.4)
16. It is normal for 9 years old to control their anger most of the time	True	313 (38.1)
17. Empathy is a skill that develops overtime during early and middle childhood	True	32 (3.9)
18. Most of 7 years old don't have solid sense of time (minutes, hours)	False	626 (76.2)
19. Only by 6 years of age, 100% of the speech is expected to be intelligible to nonfamiliar adult	False	603 (73.4)
20. It is normal for 9 years to be still fearful of monsters and darkness	False	536 (65.2)
21. Most of the children at the age of 6 years are able to tie their shoelaces	False	442 (53.8)
22. Children at 8 years of age are able to draw a diamond	True	345 (42.0)
23. Children from 6–12 years develop at the same rate	False	179 (21.8)
24. At 7–9 year the children view the cause of illness as a person, object, or action that is external to the child	True	300 (36.5)
25. A child who is 5 years understands that death is final and universal	False	170 (20.7)

Available support services

As shown in Table 3, in general, there was poor knowledge regarding available support services in the Kingdom of Saudi Arabia, as <10% of the participants correctly

answered any of the item in the section, with the lowest correct response rate being 1.2% for the item "Is there an association for children with disabilities in the Kingdom?" However, as shown in Table 4, most participants agreed that "the Kingdom should allocate more resources for the provision of service for children with disabilities" (96.7%) and that all preschools and elementary schools should have special education teachers and therapists to "provide services for children with disabilities who are attending classes there (93.92%).

As shown in Table 4, in terms of attitude regarding current care for practice for children with abnormal development, most participants agreed that "There should be special education teachers within the pre-school and elementary school community" (97.45%) and "There is a need to implement changes in the classroom set-up to accommodate their needs" (95.26%).

Table 5 details the group effect sizes across four distinct clinical and developmental domains, specifically the normal development score, ASD score, ADHD score, and LD score. The data indicates that gender differences are minimal across all assessed domains, with effect sizes ranging from −0.157 to 0.011 for the comparison between females and males. In contrast, more pronounced differences are observed when comparing grade levels; specifically, preschool students showed notable differences from 1st grade students in the normal development ($d = -0.482$) and ASD ($d = -0.351$) domains. Furthermore, the impact of training yielded consistent, moderate effect sizes across all four scores, with values ranging from −0.198 to −0.250 when comparing participants who received training against those who did not.

DISCUSSION

The aim of this study was to assess the knowledge and

Table 3: Distribution of correct responses for items related to awareness of support services and agencies available in the Kingdom of Saudi Arabia

Support services and agencies section items	Correct response rate	
	Answer	*n* (%)
1. Is there a general department for special education in the Ministry of Education in the Kingdom?	Yes	35 (4.3)
2. Is there an intellectual education department in the Ministry of Education in the Kingdom?	Yes	36 (4.4)
3. Is there a department for visual impairment in the Ministry of Education in the Kingdom?	Yes	47 (5.7)
4. Is there a department for hearing impairment in the Ministry of Education in the Kingdom?	Yes	49 (6.0)
5. Is there a department for behavioral disorders and autism in the Ministry of Education in the Kingdom?	Yes	70 (8.5)
6. Is there a department for learning disabilities in the Ministry of Education in the Kingdom?	Yes	56 (6.8)
7. Is there a department for physical impairment in the Ministry of Education in the Kingdom?	Yes	64 (7.8)
8. Is there an association for children with disabilities in the Kingdom?	Yes	10 (1.2)

Table 4: Distribution of participant agreement rates regarding the current attitude and practice toward children with developmental abnormalities

Attitudes and perception section	Disagree, *n* (%)	Agree, *n* (%)
1. Children with disabilities should be integrated into mainstream school	353 (42.9)	469 (57.1)
2. All pre-schools and elementary schools should allow children requiring special education to attend their classes while awaiting placement	185 (22.5)	637 (77.5)
3. Preschools and elementary schools should allow the presence of parents in class for children with disabilities	444 (54.0)	378 (46.0)
4. All preschools and elementary schools should have special education teachers and therapists to provide services for children with disabilities who are attending classes there	50 (6.1)	772 (93.9)
5. There is adequate provision of services for children with disabilities in Saudi Arabia	350 (42.6)	472 (57.4)
6. The government should allocate more resources for the provision of services for children with disabilities	27 (3.3)	795 (96.7)
Practices section		
1. Is the family involved in the child's individual educational plan?	214 (26.0)	608 (74.0)
2. Is the study plan based on the current level of performance of the child?	287 (34.9)	535 (65.1)
3. Is there an assistant teacher in the class?	563 (68.5)	259 (31.5)
4. Are the classrooms equipped to enable the teacher to benefit from technical and electronic resources?	496 (60.3)	326 (39.7)
5. I feel equipped to handle children with disabilities	636 (77.4)	186 (22.6)
6. I am interested to attend training in the area of childhood developmental and behavioral disorders	188 (22.9)	634 (77.1)
7. If adequately trained, I am willing to have children with disabilities in my class	302 (36.7)	520 (63.3)
8. I am keen to be a partner in their management, e.g., use of specific visual aids, medication use supervision	303 (36.9)	519 (63.2)
9. I am happy to have parents or therapists sit in as helpers	217 (26.4)	605 (73.6)
10. There should be special education teachers within the pre-school and Elementary school community	21 (2.6)	801 (97.5)
11. I see the need to implement changes in the classroom set-up to accommodate their needs	39 (4.7)	783 (95.3)
12. I want to make a difference in the education of children with disabilities	76 (9.3)	746 (90.8)
13. I feel I can make a difference in the education of children with disabilities	346 (42.1)	476 (57.9)
14. The parents are responsible for obtaining services for their children with disabilities	317 (38.6)	505 (61.4)
15. There a speech therapy specialist in my school	454 (55.3)	368 (44.8)
16. There is an occupational therapy specialist in my school	488 (59.4)	334 (40.6)

Table 5: Group effect sizes (Cohen's *d*/Hedges' *g*)

Grouping	Levels	Domain	Cohen_*d*	Hedges_*g*	n_1	n_2
Gender	Female versus male	Normal development score	−0.089	−0.089	690	132
Gender	Female versus male	ASD score	−0.157	−0.157	690	132
Gender	Female versus male	ADHD score	−0.104	−0.104	690	132
Gender	Female versus male	LD score	0.011	0.011	690	132
Grade	Preschool versus 1st grade	Normal development score	−0.482	−0.481	260	147
Grade	Preschool versus 1st grade	ASD score	−0.351	−0.351	260	147
Grade	Preschool versus 1st grade	ADHD score	−0.22	−0.219	260	147
Grade	Preschool versus 1st grade	LD score	−0.013	−0.013	260	147
Training	Yes versus no	Normal development score	−0.236	−0.236	439	383
Training	Yes versus no	ASD score	−0.25	−0.25	439	383
Training	Yes versus no	ADHD score	−0.198	−0.198	439	383
Training	Yes versus no	LD score	−0.243	−0.243	439	383

ASD – Autism spectrum disorder; ADHD – Attention-deficit/hyperactivity disorder; LD – Learning disability

attitudes of Saudi preschool and elementary school teachers regarding CDABD, including ASD, ADHD, and LD. Our findings revealed a gap in knowledge across all categories, with variations in understanding between different types of disorders.

The most significant deficiency in knowledge was observed in the domain of autism, with a median score of 33.3%. This finding reflects a critical need for educational interventions, as the prevalence of autism continues to increase both globally and locally. National studies, such as AlZahrani's research in Taif,[1] have identified an increasing number of children diagnosed with autism. Similarly, Sabbagh *et al*.[6] reported on the prevalence and characteristics of children with autism attending centers in major Saudi cities. This highlights the urgency of addressing the lack of awareness among teachers, considering the well-documented benefits of early identification and intervention for autism, which improve long-term cognitive, behavioral, and social outcomes, as supported by a meta-analysis conducted by Shi *et al*.[11]

The comparatively higher knowledge scores in the domain of learning disorders could be attributed to the relatively higher prevalence of LD in Saudi Arabia compared with other disorders, as highlighted in El-Keshky and Alahmadi's study,[9] which assessed primary school teachers' knowledge of specific LD. However, despite having a better awareness of LDs, many participants still struggled with foundational concepts, such as identifying normal developmental milestones. For example, only 3.9% of participants correctly understood that empathy develops gradually in early and middle childhood. Such misconceptions may hinder the ability of teachers to detect subtle developmental delays early in the classroom. Moreover, the present study revealed a notable lack of knowledge regarding ADHD, a disorder that describes children who persistently manifest age-inappropriate traits of hyperactivity/impulsivity, and inattention,[15] and affects a significant portion of the pediatric population (8%, nationally).[16] Al Hamed *et al*.[7] found that ADHD was prevalent in 16.4% of male primary school children in Dammam, yet only approximately 10% of teachers in this study were aware of the potential role of medications in improving learning outcomes for children with this disorder. In addition to ADHD, ASD, which is a neurodevelopmental disorder characterized by deficits in social interactions and communications, and repetitive restricted patterns of behaviors and interests,[15] had the lowest median knowledge score among teachers in Saudi schools. This gap emphasizes the need for targeted professional development to educate teachers on effective management strategies for children with ADHD and ASD, which have been shown to significantly improve academic performance and behavioral skills.[12,13]

Teachers in the present study also displayed poor awareness of services available for children with disabilities, with <10% being knowledgeable about the support systems in the Kingdom. This is particularly concerning, as access to specialized services is crucial for early intervention and management of developmental and behavioral disorders. This observation could be attributed to the national deficiency in infrastructure of these support services, and the lack of clear service utilization guidelines. The overwhelming agreement among participants (96.7%) that more resources should be allocated to children with disabilities services in Saudi Arabia underscores the current deficiency in infrastructure and support for these children. The need for better data on childhood developmental disabilities has also been highlighted by Black and Lawn,[10] who emphasized the importance of improving the availability of early childhood developmental data.

Although awareness of developmental and behavioral disorders is improving, educators' knowledge remains insufficient to adequately address the needs of the increasing number of diagnosed cases. A comprehensive public health strategy is necessary, including enhanced teacher training,

public awareness campaigns, and the establishment of specialized support centers across the Kingdom. Research by Shephard *et al*.[13] underscores the critical importance of early intervention, which can greatly improve outcomes in children with disorders, such as ASD, LD, and ADHD. Therefore, prioritizing teacher education and awareness is essential to ensure that these children receive the support they need.

The present study provides valuable insights into the knowledge and attitudes of preschool and elementary school teachers regarding CDABDs, focusing on a significant sector of the educational system in Saudi Arabia. Given the increasing number of students with developmental and behavioral disabilities, this study highlights the critical need for a stronger presence of the rehabilitation team, particularly speech-language pathologists, occupational therapists, and applied behavioral analysts, within school settings. Despite their essential role in supporting children with communication, sensory, and motor challenges, our findings suggest that <50% of the participating schools reported having access to such professionals. This gap in service availability may hinder early identification and appropriate intervention for affected students. Therefore, integrating rehabilitation specialists more effectively into educational systems is necessary to ensure timely support and improve long-term outcomes for students with disabilities.

By addressing this gap in existing literature, this study offers a critical baseline for future interventions and policy development aimed at improving teacher awareness and support for children with these disorders. A limitation of this study is that it relied on self-reported data from teachers regarding their knowledge and attitudes, which may have been subject to response bias or inaccurate self-assessment, affecting the reliability of the results. Future studies could incorporate objective assessments or observational tools to validate self-reported data and reduce bias. In addition, although the questionnaire underwent forward–backward translation, it was not subjected to comprehensive psychometric validation (e.g., test–retest reliability), which may have modestly limited the robustness and interpretability of the findings.

CONCLUSIONS

This study found that school teachers in Saudi Arabia had lowest knowledge regarding autism spectrum disorder and highest knowledge regarding learning disabilities. In terms of normal development, less than half the teachers answered >50 of the items correctly, with the lowest knowledge being regarding the child empathy development. Finally, teachers were found to have poor knowledge regarding the availability of support services for children with disabilities in Saudi Arabia. Collectively, this highlights the importance of improving teacher training, public awareness, and access to support services, to eventually help children with CDABD achieve their full potential. We recommend that future studies be conducted to examine the effectiveness of evidence-based teacher training programs that can be culturally appropriate in enhancing early detection and intervention for ADHD and autism spectrum disorder. Additionally, research should explore the impact of public awareness campaigns on improving recognition and understanding of CDABD among educators and parents.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia (Ref. no.: IRB-2021-01-228, date: July 01, 2021). All study participants provided written consent before inclusion in the study. The study adhered to the principles of the Declaration of Helsinki, 2013.

Peer review

This article was peer-reviewed by three independent and anonymous reviewers.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors upon request.

Author contributions

Conceptualization, F.O.A. and A.H.A.; methodology, F.O.A., and A.A.A.; validation, F.O.A. and A.H.A.; formal analysis, A.A.A.; data curation, A.M.A., F.H.A., and S.H.A.; writing—original draft preparation, A.A.A., A.M.A., F.H.A., and S.H.A.; writing—review and editing, F.O.A, D.S.A., M.A.A, and A.S.A.; visualization, F.O.A., and D.S.A.; supervision, F.O.A.; project administration, F.O.A.

All authors have read and agreed to the published version of the manuscript.

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Conflicts of interest

There are no conflicts of interest.

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