



Prevalence of Attention Deficit Hyperactivity Disorder Among Students with Learning Disabilities

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Abstract

Attention deficit hyperactivity disorder (ADHD) is a common developmental disorder worldwide, occurring among children and adolescents across cultures and societies. ADHD manifests itself in difficulties with concentration, distraction, hyperactivity, and impulsive behavior. ADHD poses a challenge in school settings, affecting students' ability to follow lessons, adhere to instructions, and complete academic tasks. Omani schools are witnessing cases of ADHD, which calls for educational and health attention to develop effective strategies to reduce the prevalence of ADHD among school students. Therefore, this study aimed to identify the prevalence of Attention Deficit Hyperactivity Disorder (ADHD) among Omani students with learning disabilities (LDs). A descriptive survey design was employed, with a sample of 861 students with LDs from different governorates in Oman. To assess ADHD symptoms, a standardized scale was developed based on the criteria outlined in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). The final version of the scale comprised 25 items distributed across two core domains: Inattention and Hyperactivity/Impulsivity. Findings revealed that 28% of students with LDs met the criteria for ADHD, with Inattention being the predominant subtype (58%). ADHD was more prevalent among male students (73%) and was most commonly observed in students in grades 1-4 (75%). Additionally, 63% of ADHD cases were identified in students with Arabic language difficulties, particularly in reading and writing. The study highlights the need for systematic ADHD screening among students with LDs and recommends the adoption of the developed scale for early identification and intervention.

Keywords:

ADHD;
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1- Introduction

Learning disabilities (LDs) are a major focus within special education due to their significant impact on students' academic performance. Research has linked these disabilities to developmental disorders affecting visual and auditory perception, which interfere with essential learning processes. Studies also suggest that LDs stem from disruptions in fundamental psychological functions, influencing key academic skills such as reading, writing, and mathematics [1]. These challenges often arise from functional disturbances in the central nervous system, affecting the brain's ability to process, store, and retrieve information accurately [2]. LDs encompass a broad spectrum of disorders that impair abilities in listening, speaking, reading, writing, reasoning, or mathematical comprehension [3]. While they vary in severity, they are distinct from intellectual, sensory, physical, behavioral, or emotional impairments and are not caused by environmental, cultural, or economic factors [4].

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Students with LDs often have typical or above-average intellectual abilities but show significant variability in academic performance across different domains. This inconsistency has led educators to use the achievement-ability discrepancy model as a diagnostic criterion, suggesting that these challenges stem from neurological differences in information processing rather than sensory, intellectual or behavioral deficits [5]. Despite their cognitive potential, students with LDs frequently struggle with memory, attention, perception, thinking, and language, contributing to academic underperformance and lagging behind their non-disabled peers by three years [6]. In addition to poor school performance, their educational challenges include sensory-perceptual difficulties, motor coordination deficits, cognitive and metacognitive impairments, social-emotional issues, motivation problems, learned helplessness, and attention deficits [7]. LDs are classified into two broad categories: developmental LDs, which involve deficits in fundamental cognitive processes like perception, attention, memory, and oral language, and academic LDs, which manifest as difficulties in reading, writing, and mathematics [8]. These classifications facilitate accurate diagnosis and effective intervention strategies.

Among students with LDs, ADHD is a common comorbid condition, further complicating academic achievement and classroom behavior [9, 10]. ADHD causes cognitive and emotional challenges [11], and sometimes family issues due to parental difficulties in managing the condition [12]. Neuroimaging studies have identified structural abnormalities in brain regions such as the frontal lobe in children with ADHD, with these structures appearing smaller than in unaffected peers [13]. The DSM-5 defines ADHD as a persistent pattern of attention deficits and/or hyperactivity that is more frequent than observed in peers of the same age group [14]. Affected individuals are often constantly active to the point that their behavior becomes problematic at school or at home [15]. ADHD is considered a chronic disorder with neurological and behavioral underpinnings, featuring developmentally inappropriate levels of inattention, hyperactivity, and impulsivity [16] that interfere with social interactions, academic performance and, later, professional life. There are three subtypes of ADHD: Inattention, Hyperactivity-Impulsivity and Combined, where individuals display symptoms of both inattention and hyperactivity-impulsivity [17]. The DSM-5 outlines the diagnostic criteria for ADHD as follows:

- **Inattention** – Six or more symptoms persisting for at least six months, significantly impacting social and academic activities. Symptoms include difficulty sustaining attention, failing to notice details, trouble following instructions, poor time management, and frequent task incompleteness.
- **Hyperactivity-Impulsivity** – Six or more symptoms persisting for at least six months, such as excessive fidgeting, restlessness, inability to engage in quiet activities, impatience, excessive talking, and frequent interruptions.

ADHD is one of the most prevalent behavioral disorders among children [18], affecting approximately 3-5% of school-aged students, with rates reaching 20% among children from low socioeconomic backgrounds [19]. Recent data indicates an ADHD prevalence of 11% among children aged 4-17, with 8.8% formally diagnosed and 6% receiving medication [20]. Gender-based studies consistently indicate higher ADHD rates among boys [21]. One study reported a prevalence of 31.2% among boys compared to 24.3% among girls [22]. Persons who have ADHD are more likely to have children with ADHD [23]. Global prevalence rates vary, with estimates at 6.5% in the U.S., 9.5% in Canada, and 7% in China. In the Arab world, reported rates include 6.5% in Egypt, 13% in Saudi Arabia, 25% in Algeria, and 20% in Jordan [24]. On the other hand, the prevalence of ADHD among Omani students with LDs reached 30% and 8.8% among general education students [25]. A meta-analysis found global ADHD prevalence rates of 7.6% for children aged 3-12 and 5.6% for adolescents aged 12-18 [26].

Understanding the complex relationship between ADHD and LDs is challenging, as multiple factors may contribute to their co-occurrence. Researchers speculate that genetics may play a role in this link [27]. Consequently, attention deficits could act as a key mediator between ADHD and poor academic performance [28]. Studies indicate a significant overlap between the two conditions, with some estimates suggesting that 31-45% of individuals with ADHD also have learning disabilities, and vice versa [29]. About one-third of individuals with LDs are diagnosed with ADHD [30].

Beyond academic challenges, ADHD exacerbates difficulties in memory, motor coordination, and cognitive processing among students with LDs [31]. These students often struggle with reading, writing, mathematics, and comprehension [32], as well as have social difficulties that affect their ability to form peer relationships [28]. Research highlights that students with both ADHD and LDs are at an increased risk for behavioral issues, delinquency, and a reduced sensitivity to punishment [33]. Comprehensive intervention programs, including psychological counseling, behavioral therapy, family support, and medication, are crucial for managing ADHD symptoms, particularly when integrated into learning disability programs [34]. Such programs help students enhance their attention and concentration, making academic adjustments more manageable for teachers and parents alike [15]. Since hyperactivity affects both behavior and academic performance, students with ADHD are often criticized for their excessive activity and lower academic achievement [35]. Since ADHD is classified as a behavioral disorder, early therapeutic interventions are essential to mitigate future negative behaviors [36].

Given the strong association between ADHD and LDs, as well as the significant impact of ADHD on academic performance, understanding its prevalence and characteristics in this student population is crucial. Such insights can help with the early recognition of symptoms as well as the development of effective educational interventions. A previous study in Oman examined the coexistence of ADHD among Omani Schoolchildren, reporting a 30% overlap [10]. However, the study was limited to students in grades 1– 4 (Educational Cycle 1) and only included schools in Muscat,

the capital. Additionally, it did not differentiate between ADHD subtypes. To address these gaps, the present study investigates the prevalence of ADHD among students with LDs in basic education schools across different governorates of Oman. It expands the scope to include students in grades 1–10 and specifically examines the following research questions:

- What is the overall prevalence of ADHD among Omani students with LDs?
- What is the prevalence of ADHD subtypes (Inattentive, Hyperactive-Impulsive, Combined) among Omani students with LDs?
- Does ADHD prevalence vary based on gender, educational stage, and type of learning disability?

2- Method

2-1- Study Design

This study used a descriptive quantitative design. This design relies on providing an accurate description of the phenomenon as it exists in reality through quantitative expression, which provides a numerical description of the magnitude of the phenomenon under study. Therefore, the current study instrument was used to determine the prevalence of ADHD among students with LDs from various Omani governorates from the perspective of LDs program teachers.

2-2- Participants

The study involved 861 students out of 13531 students with LDs enrolled in Omani basic education schools for the academic year 2020/2021. These participants were enrolled in LDs program, which is attached to basic general education schools in the Oman governorates. Participants were selected using convenience sampling, with the assistance of teachers of LDs program. Table 1 and Figure 1 show the demographic details of the participants.

Table 1. Participant Demographic Details

Variable	Level	N	%
* Educational Cycle	First	726	84%
	Second	135	16%
Type of Learning Disability	Arabic Language	648	75%
	Mathematics	213	25%
Gender	Male	694	81%
	Female	167	19%

* First educational cycle refers to grades 1–4. Second educational cycle refers to grades 5–6.

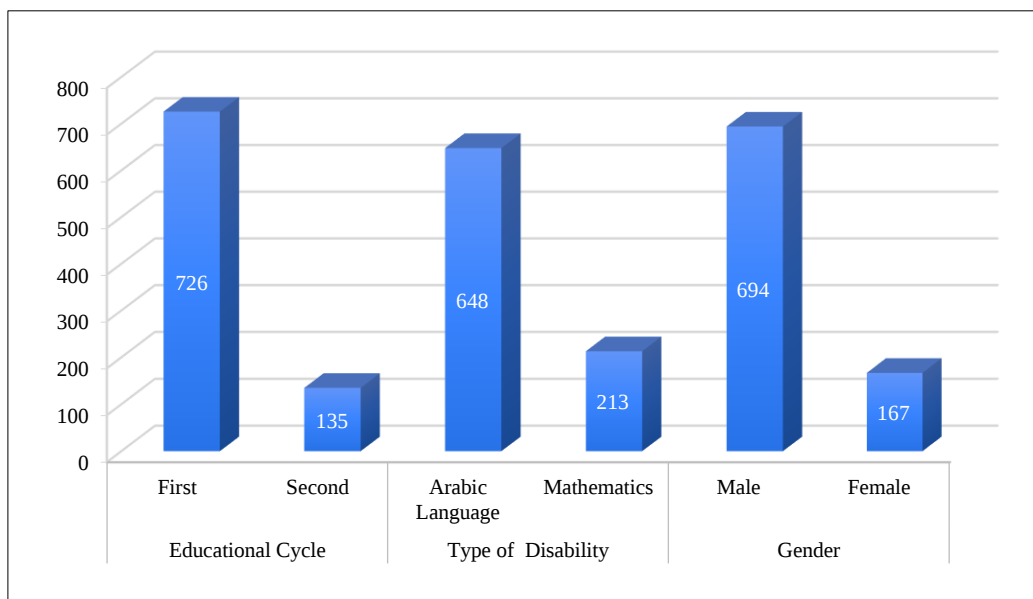


Figure 1. Participant Demographic Details

2-3- Instrument

To achieve the objectives of this study, an ADHD scale was developed based on the criteria outlined in the DSM-5, published by the American Psychiatric Association [14]. Additionally, several established scales were consulted, including the ADHD Rating Scale, Conners' Rating Scale (CRS-3), and the WHO Adult ADHD Self-Report Scale (ASRS). The initial version of the scale comprised 25 items, divided into two main domains: Inattention (items 1–13) and Hyperactivity & Impulsivity (items 14–25). Responses were recorded on a binary scale (Yes/No), with scores assigned as follows: 0 for No and 1 for Yes. The scale's items were formulated to reflect classroom practices and prevailing Arab social and cultural patterns in Omani schools.

To validate and confirm the reliability of the scale, face validity was assessed by presenting it to 13 experts from Sultan Qaboos University. They provided feedback on the linguistic clarity and relevance of the items for each domain. Based on their suggestions, which primarily focused on linguistic refinements, the final scale consisted of 25 items divided into two domains: 1) Inattention and 2) Hyperactivity & Impulsivity. Reliability was evaluated by administering the final version to a pilot sample of 50 students with LDs, randomly selected from the study population. Internal consistency was measured using the Kuder-Richardson Formula 20 (KR-20), which is appropriate for binary response items (0 or 1). The pilot study sample indicated high reliability, with a coefficient of 0.813 for Inattention and 0.883 for Hyperactivity/Impulsivity.

2-4- Procedures

The ADHD scale was created using Google Forms and included sections for demographic information, response instructions, and scale items. Before implementation by teachers in LDs program, it was ensured that the students targeted for this study were not taking medications that could reduce ADHD symptoms, such as Ritalin, Dexedrine, or other psychostimulants. Additionally, ADHD symptoms had been observed and documented over a period of at least six months. The Omani Ministry of Education distributed the scale link to all teachers of learning disabilities program across basic education schools. These teachers are special education specialists and have training and experience in identifying students with ADHD. To ensure accurate identification of the prevalence of ADHD among students with LDs, data were collected by the resource room teacher, as they were most closely monitoring student performance. The scale's instructions emphasized that the term of LDs does not include intellectual or sensory disabilities or cultural deprivation, and instructed teachers to exclude symptoms that could be explained by these factors.

2-5- Data Analysis

Descriptive statistics were used to address the study's research questions. Frequencies and percentages were computed to determine the overall prevalence of ADHD among students with LDs. Additionally, the prevalence of ADHD subtypes (Inattentive, Hyperactive-Impulsive, and Combined) was analyzed using frequency distributions. To examine variations in ADHD prevalence based on gender, educational stage, and type of learning disability, subgroup analyses were conducted using categorical data comparisons.

3- Results

3-1- Research Question 1: What is the overall prevalence rate of ADHD among Omani students with LDs?

To address our first research question, frequencies and percentages were extracted to determine the overall prevalence rate of ADHD among students with LDs. Figure 1 shows the general prevalence rate of ADHD among affected and unaffected students, based on the rating of teachers in LDs Program. As illustrated in Figure 2, 242 out of 861 students were identified as having ADHD, resulting in an overall prevalence rate of 28.10%. This rate was determined based on the presence of six or more symptoms in each domain of the ADHD scale among students with LDs as rated by their teachers in LDs program.

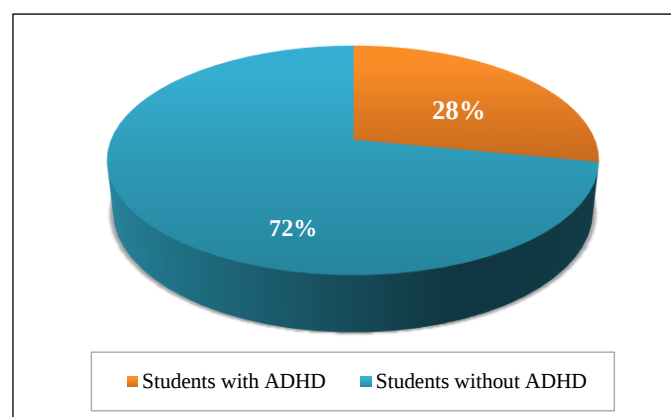


Figure 2. Overall prevalence of ADHD among Omani students with LDs

3-2- Research Question 2: What is the prevalence of ADHD subtypes (Inattentive, Hyperactive-Impulsive, Combined) among Omani students with LDs?

To address this question, frequencies and percentages were calculated for the three ADHD subtypes: Inattentive, Hyperactive-Impulsive, and Combined. As shown in Figure 3, the Inattentive subtype was the most prevalent, accounting for 58.26% of cases, followed by the Hyperactive-Impulsive subtype at 26.86%. The Combined subtype was the least common, representing 14.88% of cases.

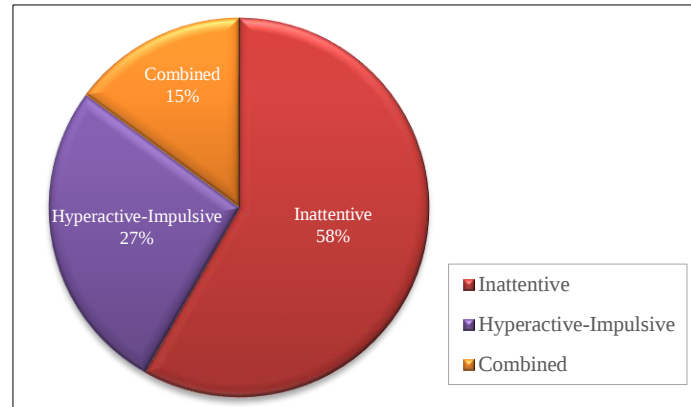


Figure 3. Prevalence based on subtypes of ADHD

3-3- Research Question 3: Does the prevalence of ADHD vary by gender, educational stage, and type of learning disability among Omani students with learning disabilities?

To address our final research question, frequencies and percentages of ADHD were calculated according to the variables of gender, educational stage, and type of learning disability. Table 2 and Figure 4 indicate that, 73.14% of ADHD cases were observed among male students, while 26.86% were observed among female students. Additionally, three-quarters of ADHD cases (75.21%) were reported among students in the first cycle, compared to one-quarter (24.79%) in the second cycle. Results also showed that the prevalence of ADHD is higher among students with LDs in Arabic language (63.22%), compared to students with LDs in mathematics (36.78%).

Table 2. Prevalence of ADHD by gender, educational stage and type of learning disability

Variable	Gender	F	%
Gender	Male	177	73.14%
	Female	65	26.86%
	Total	242	100%
Educational Stage	First Cycle	182	75.21%
	Second Cycle	60	24.79%
	Total	242	100%
Type of Learning Disability	Arabic Language	153	63.22%
	Mathematics	89	36.78%
	Total	242	100%

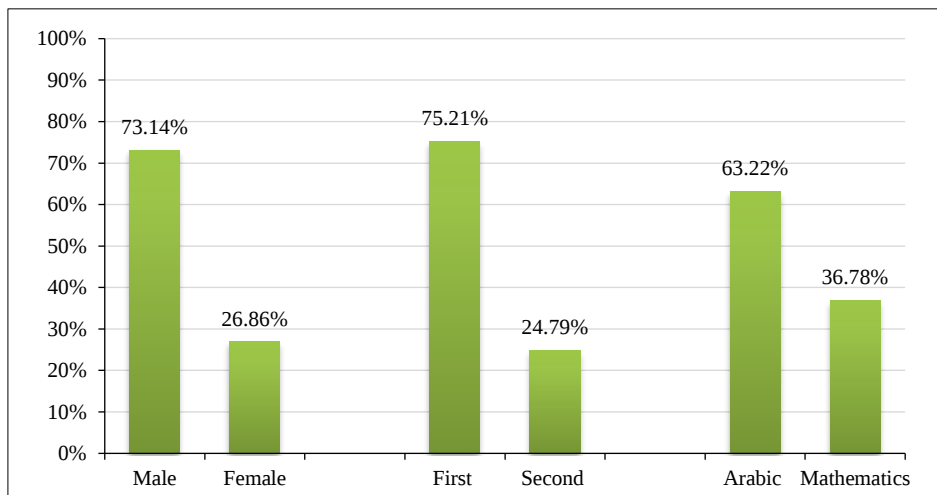


Figure 4. Prevalence of ADHD by study variables

4- Discussion

4-1- Overall Prevalence of ADHD Among Omani Students with LDs

Results indicate that the overall prevalence of ADHD among students with LDs is 28.10%, as rated by teachers in LDs program. This finding is consistent with the literature, which highlights an overlap between LDs and ADHD, estimated by some studies to range from 10% to 25% [37]. The present results align with the work of Cantwell and Baker who found a significant correlation between ADHD and LDs [38]. The high prevalence of ADHD in this population is often attributed to comorbidity - the co-occurrence of symptoms and shared characteristics between the two conditions [39]. Research suggests that comorbidity rates between LDs and ADHD can range from as high as 31% to 45%, though these rates vary by academic skill. For example, the overlap between dyslexia and ADHD was found to be 25% to 48% [40]. Whereas, the comorbidity rate for mathematical difficulties and ADHD falls between 11% and 30% [41]. These findings reinforce the relationship between ADHD and LDs.

4-2- Prevalence of ADHD Subtypes Among Students with LDs

As shown in Figure 3, results indicate that the Inattentive subtype had the highest prevalence (58.26%), followed by Hyperactivity/Impulsivity (26.86%) and the Combined subtype (14.88%). This finding was expected, as attention plays a crucial role in academic learning. It enables children to filter sensory stimuli, form social relationships, develop appropriate habits, and adapt to their environment. Attention deficits hinder learning processes and can lead to deficits in information processing and executive functions. These neurodevelopmental challenges have been observed in studies comparing students with comorbid ADHD and LDs [42].

Previous research found that ADHD is associated with reading difficulties and negatively affects academic performance [27]. Therefore, students with ADHD face significant challenges in reading and mathematics [15]. Although these students may understand academic concepts, they struggle with their implementation. To address this, interventions should prioritize the timely application of knowledge rather than just acquisition strategies [43, 44]. This approach aligns with the findings of Daley and Birchwood, which highlight the connection between ADHD and low academic performance, largely attributed to cognitive deficits resulting from core ADHD symptoms [45]. From a theoretical perspective, the single-resource attention theory posits that attention is a limited-capacity resource that cannot be allocated to multiple stimuli or tasks simultaneously. Consequently, students with LDs struggle to distribute their attention across tasks, focusing on one stimulus while neglecting others. This presents a significant challenge in their learning process, given that attention is a critical cognitive function in education.

4-3- Prevalence of ADHD Based on Gender, Educational Stage, and Type of Learning Disability

The results presented in Table 2 and Figure 4 indicate that ADHD is significantly more prevalent among male students (73.14%) than female students (26.86%). This is consistent with a report by the American Psychological Association (APA) showing that ADHD prevalence rates are consistently higher in males than in females [46]. In the Arab world, a study in Algeria also reported higher prevalence rates among males (15.67%) than among females (9.34%). According to another study, males are at least three times more likely to be diagnosed with ADHD [47]. A reason for the higher reported rates of ADHD among male students may be that they tend to display hyperactive and impulsive behaviors, making them more likely to be referred for assessment and diagnosis while females predominantly exhibit inattentive symptoms, which may be overlooked. Thus, these results are consistent with global patterns, but some biases in teachers' estimates may have influenced the prevalence rates of ADHD, LDs, and communication disorders in favor of males. To mitigate this effect, the scale items focused on observable behavioral symptoms and provided clear instructions. Furthermore, resource room teachers have the expertise to distinguish between normal gender-related behaviors and typical symptoms of the disorder.

The results also indicate that ADHD is more prevalent among students with LDs in the first educational cycle (75.21%) than in the second cycle (24.79%). This finding aligns with previous research suggesting that attention-related challenges, such as difficulty following instructions and completing schoolwork, are more pronounced in younger students, leading to academic struggles and poor performance [48]. The DSM-IV estimates an ADHD prevalence of 3% to 7% among school-aged children, whereas the DSM-5 places it at 10% [15]. These figures suggest greater recognition of ADHD, likely due to advancements in medical research, diagnostic tools, and behavioral assessments. Rising ADHD prevalence has significant implications for academic achievement and social development. Raising awareness among families could help mitigate the academic, behavioral, and psychological consequences [49]. Early diagnosis and intervention are essential, as untreated symptoms may escalate into severe behavioral and neurological disorders [50]. From a medical perspective, prenatal health education, proper nutrition, psychological support, and stress management during pregnancy may contribute to reducing ADHD prevalence [51]. Furthermore, parental training programs, and evidence-based behavioral and educational interventions by teachers can improve educational outcomes for students with ADHD.

Table 2 and Figure 4 also show that ADHD is more prevalent among students with LDs in Arabic language skills (63.22%) than among those with mathematical difficulties (36.78%), based on teachers' ratings. This may be due to the higher number of students referred to LDs Program in Oman for Arabic-related challenges compared to mathematics.

Consequently, these students receive more remedial instruction in Arabic, influencing teachers' estimates of ADHD prevalence by LDs type. This finding is in line with previous studies. For instance, Brown found that 72% of students with ADHD had reading difficulties, 31% had mathematical difficulties, and 65% struggled with written expression [52]. Similarly, Barkley reported that students with ADHD experience academic challenges, with reading difficulties ranging from 8% to 39% and mathematical difficulties from 12% to 23% [53]. The negative impacts of ADHD on academic performance can lead to school failure, grade repetition, or referral to special education programs [54]. Integrating drama-based activities, such as psychodrama and curriculum dramatization, into school curricula may help mitigate ADHD symptoms and improve learning outcomes for affected students [55]. On the other hand, physical activity may contribute to improving motor skills, cognitive skills, and executive functions of children with ADHD [56].

5- Conclusion

This study highlights a notable prevalence of ADHD among students with LDs in the Sultanate of Oman, estimating it at 28.10%, with a significant skew towards male students (73.14%). These findings not only reinforce the comorbidity between ADHD and learning challenges as indicated by teacher ratings but also align with existing literature from other Arab studies, contributing valuable national data to the discourse on ADHD. Unlike previous research, this study covers all governorates of the Sultanate, providing decision-makers with comprehensive quantitative indicators on ADHD prevalence among Omani students with LDs. Additionally, it aimed to develop a standardized ADHD detection scale based on DSM-5 criteria, which could serve as a valuable tool for future national and regional studies. Given the high prevalence and its impact on students' academic and social outcomes, the study emphasizes the importance of thorough medical assessments and clinical evaluations involving parents and children. Such measures would help differentiate ADHD from other conditions with overlapping symptoms, ensuring accurate diagnosis and appropriate interventions. In this regard, Hossain et al. [57] emphasized the early diagnosis of ADHD through electroencephalography (EEG) as a non-invasive and effective method for detecting ADHD due to its ability to capture neural dynamics. Furthermore, the findings call for a nationwide survey to examine the co-occurrence of ADHD and LDs in greater depth. To support affected students, the study advocates for structured teacher training programs in both special and general education settings, as well as the integration of behavioral modification plans and individualized education programs for students diagnosed with or at risk of ADHD. These initiatives, along with comprehensive screening and intervention strategies, will enhance understanding and support for students facing these challenges, which can, in turn, contribute to improved educational outcomes in the region.

5-1- Limitations and Future Studies

The present study has a number of limitations that should be acknowledged. The use of a convenience sampling method instead of a random sampling approach may limit the generalizability of the findings, as the sample may not be fully representative of all Omani students with learning disabilities. Additionally, while efforts were made to ensure that students were not on ADHD medication during data collection, the absence of medical verification leaves room for uncertainty. Another limitation is that the study primarily relied on teacher ratings to assess ADHD, without incorporating multiple assessment methods such as clinical evaluations or parental reports. Future research should consider longitudinal approaches and incorporate multiple assessment sources, including clinical evaluations and parental input, to provide a more comprehensive understanding of ADHD prevalence.

6- Declarations

6-1- Author Contributions

Conceptualization, H.A. and S.A.; methodology, F.A.; software, Z.S.; validation, S.A., M.A., and F.A.; formal analysis, H.A.; investigation, Z.S.; resources, H.A.; data curation, H.A.; writing—original draft preparation, S.A.; writing—review and editing, Z.S.; visualization, M.A.; supervision, F.A.; project administration, S.A.; funding acquisition, F.A. All authors have read and agreed to the published version of the manuscript.

6-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

6-3- Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

6-4- Acknowledgements

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6-5- Institutional Review Board Statement

The study was approved by the Research Ethics Committee of the College of Education at Sultan Qaboos University (REAAF/EDU/PSYC/2024/12) and conducted in accordance with institutional guidelines. Additionally, official permission to carry out the study was obtained from the Ministry of Education in Oman.

6-6- Informed Consent Statement

Informed consent statement was obtained from all subjects involved in the study through the Omani parents of students with LDs

6-7- Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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