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Examination of quality of life and expressed emotion in adolescents with attention deficit hyperactivity disorder with and without specific learning disorder

https://doi.org/10.1515/ijamh-2025-0075
Received May 24, 2025; accepted July 16, 2025;
published online July 28, 2025

Abstract

Objectives: This study aims to investigate the impact of specific learning disorder (SLD) on quality of life, expressed emotion, and clinical features in adolescents diagnosed with attention deficit hyperactivity disorder (ADHD).

Methods: A total of 35 adolescents participated in the study, 15 of whom were diagnosed with ADHD alone, while 20 were diagnosed with both ADHD and SLD. The adolescents completed the Childhood Anxiety Sensitivity Index (CASI), the Children's Depression Inventory (CDI), and the Pediatric Quality of Life Inventory (PedsQL). Parents filled out the Pediatric Quality of Life Inventory (PedsQL)-Proxy Report, the Expressed Emotion Scale (EES), and the Conners Parent Rating Scale-48 (CPRS-48).

Results: According to the children's self-reports, the ADHD+SLD group showed significantly lower physical health-related quality of life and a higher prevalence of depressive symptoms compared to their peers. However, based on parental reports, no significant differences were observed between the two groups in terms of the children's quality of life or the levels of expressed emotion among parents.

Conclusions: Adolescents with ADHD+SLD tend to perceive their physical health-related quality of life as lower. Therefore, it is crucial to identify this issue early and implement appropriate interventions.

Keywords: attention deficit-hyperactivity disorder; specific learning disorder; expressed emotion; quality of life

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Introduction

Attention deficit hyperactivity disorder (ADHD) and specific learning disorder (SLD) are two frequently comorbid neurodevelopmental conditions, with recent research indicating that around 45 % of children with ADHD also meet the criteria for SLD [1]. Children with both ADHD and SLD experience greater neurocognitive, educational, and social challenges than those with ADHD alone [2]. The negative effects of these disorders on quality of life have been observed clinically, and there are also studies conducted on this topic [3, 4]. Quality of life represents a comprehensive, patient-focused outlook that captures a person's view of their standing in life, including not just symptom relief but

also their overall health and well-being [5]. ADHD negatively affects all domains of quality of life, with a particularly impacting psychosocial aspects [6]. Nevertheless, research indicates that there are differences between parents' assessments and children's self-reports concerning the children's quality of life [3]. Although SLD is also known to impair quality of life, research in this area remains relatively scarce [4, 7].

Expressed emotion includes the emotions, perspectives, and actions exhibited by a family member or caregiver toward the patient [8]. The concept of expressed emotion consists of several components or behavioral patterns, including criticism, hostility, and emotional overinvolvement [9]. Research has demonstrated that parents of children with ADHD display elevated levels of negative expressed emotion, and that this expressed emotion correlates with the intensity of ADHD symptoms as well as comorbid issues like conduct problems [10]. Likewise, parents of children with SLD have been observed to show unfavorable attitudes toward their children [11]. Nevertheless, it is essential to recognize that research on expressed emotion in relation to SLD remains relatively scarce.

As far as we are aware, no existing research in the literature has simultaneously examined both quality of life and expressed emotion in adolescents diagnosed with ADHD and ADHD combined with SLD. While there is a more extensive body of literature related to ADHD diagnosis, it is noteworthy that studies on SLD are more limited. This study aims to explore how the presence of SLD influences these variables and how these effects differ from those observed in ADHD alone.

This research examined variations in quality of life, expressed emotion, and clinical characteristics across two separate groups: adolescents diagnosed solely with ADHD and adolescents diagnosed with both ADHD and SLD. It was anticipated that the group with co-occurring ADHD and SLD would show greater difficulties in expressed emotion and quality of life.

Materials and methods

The study included adolescents aged 11 to 18 who attended the child psychiatry outpatient clinic between July 1, 2019 and July 1, 2020 and were diagnosed with ADHD or both ADHD and SLD according to DSM-5 criteria [12]. The participants and their families filled out the appropriate scales outlined below. The Schedule for Affective Disorders and Schizophrenia for School-Aged Children – Present and Lifetime Version (K-SADS-PL) adapted into Turkish [13], was used to detect comorbid psychiatric conditions and to exclude diagnoses such as conduct disorder, mood disorders, anxiety disorders, and autism spectrum disorder. Additionally, those with a total IQ score below 70 on the WISC-R [14] test administered during the psychiatric assessment process, as well as individuals with severe internal medical conditions, were not included in the study.

Our research received ethical approval from the Institutional Review Board of Hacettepe University, under registration number GO 19/622, on June 11, 2019. Written informed consent was secured from the participating adolescents and their parents.

The Schedule for Affective Disorders and Schizophrenia for School- Age Children-Present and Lifetime Version, DSM-5-Turkish Adaptation (K-SADS-PL-DSM-5-T).

K-SADS-PL is a semi-structured interview form developed by Kaufman et al. to identify psychopathologies in children and adolescents [15]. It consists of three sections. The first section gathers demographic information, health status, prior psychiatric visits and treatments, family and peer relationships, and school information. The second section assesses specific psychiatric symptoms and evaluation criteria through screening questions; an additional symptom list is used if positive symptoms are identified. The presence and severity of symptoms are determined by integrating the opinions of the child, parents, and clinician. The third section is a general assessment scale used to determine the child's functioning level at the time of evaluation. K-SADS-PL can be used to evaluate mood disorders, psychotic disorders, anxiety disorders, post-traumatic stress disorder, externalizing behaviors, attention deficit hyperactivity disorder, conduct disorder, substance use, eating disorders, tics, and autism spectrum disorders. The Turkish version adapted according to DSM-5 has been validated for reliability and validity by Ünal and colleagues in 2019 [13]. In this study, it was used to identify diagnoses included in the exclusion criteria and to detect psychiatric comorbidities.

Wechsler intelligence scale for children-revised (WISC-R)

The Wechsler Intelligence Scale for Children (WISC) was developed to assess the general cognitive abilities of children aged 5–15 years with adequate speech and language skills. The scale was revised in 1974 and renamed WISC-R, and the age range for administration was adjusted to 6–16 years [14]. The WISC-R consists of a total of 16 subtests, including six verbal (Information, Similarities, Arithmetic, Judgment, Vocabulary, Number Series) and six performance (Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding, Maze) subtests, along with two optional

backup tests. Along with standard scores for these subtests, composite scores are obtained for the Verbal IQ, Performance IQ, and Full-Scale IQ. The mean value for these IQ scores is 100, with a standard deviation of 15. For each subtest, the mean standard score is 10, with a standard deviation of 3. The scale has been validated for Turkish populations [16]. In this study, participants with a total IQ score below 70 were not included.

Childhood anxiety sensitivity index (CASI)

The scale, created by Silverman and colleagues, consists of 18 items and is intended for children aged 6–17 years. It measures children's self-reported fear of physical sensations linked to anxiety. The lowest possible score is 18, while the highest is 54. Higher scores on the scale indicate greater anxiety sensitivity [17]. A Turkish study assessing the scale's validity and reliability reported a high internal consistency (Cronbach's alpha=0.74) and strong test-retest reliability ($r=0.77$, $p<0.001$) [18].

Children's depression inventory (CDI)

This is a self-report questionnaire designed to measure the severity of depression symptoms in children. It evaluates various aspects of depression, including cognitive, emotional, physical, and behavioral components. The 27 items are scored on a scale from 0 to 2, where 0 indicates the symptom is absent, 1 signifies the symptom is present and mild, and 2 indicates the symptom is present and severe. The individual item scores are summed to produce a total depression score, which ranges from 0 to 54. A higher score on the CDI reflects a greater level of depressive symptoms [19]. The scale's validity and reliability have been tested and confirmed in Turkish [20].

Pediatric quality of life inventory (PedsQL)

The scale is designed to assess health-related quality of life in individuals aged 2–18 years. Comprising 23 items, the scoring is performed across three domains. Initially, the overall scale score (TSS) is determined; next, the physical health summary score (TPhHS) is computed; and finally, the psychosocial health summary score (TPsHS), which evaluates emotional, social, and academic functioning based on the individual item scores. Items are rated on a 0 to 100 scale. The overall score is calculated by adding the individual item scores and dividing the total by the number of completed items. A higher total score indicates a better perceived health-related quality of life [21]. The scale's validity and reliability have been confirmed in Turkish [22]. In our study, both the proxy-parent form and the self-report form were utilized.

Expressed emotion scale (EES)

The Expressed Emotion Scale (EES) was designed to assess the degree of expressed emotion within the family setting. This 41-item questionnaire is completed by caregivers of patients. It is a self-report tool that includes two dimensions: Criticism/Hostility (C/H) and Emotional Over-Involvement (EOI). The response options are "True" or "False" (with true=1 and false=0). The overall score can vary from 0 to 41, while the Criticism/Hostility (C/H) subscale ranges from 0 to 29, and the Emotional Over-Involvement (EOI) subscale ranges from 0 to 12. As the score obtained from the scale increases, the level of expressed emotion also increases [23].

Conners parent rating Scale-48 (CPRS-48)

The scale used to identify behavioral problems in children consists of five subscales: conduct problem, impulsivity/hyperactivity, learning problem, anxiety, and psychosomatic. Parents are instructed to evaluate their children's behaviors in the family context based on the items, using a four-point Likert scale. A high score indicates that the symptoms are severe [24]. The scale's validity has been established through a study conducted in Turkish [25].

Results

The median age in the ADHD diagnosis group was 149 months (IQR: 40), while the median age in the ADHD+SLD diagnosis group was 143.5 months (IQR: 29). No significant age difference was observed between the two groups ($p=0.739$; $Z=-0.334$). Additionally, there were no significant differences between the groups regarding sex distribution, socioeconomic status of the family, use of medication for ADHD, use of other psychotropic medications, psychiatric comorbidities, or age at reaching developmental milestones (Table 1).

There were no statistically significant differences between the two diagnostic groups in terms of anxiety sensitivity as measured by the CASI, the overall and psychosocial quality of life scores obtained from children's self-reports on the PedsQL, or the total, physical, and psychosocial quality of

Table 1: Sociodemographic and clinical profiles of the ADHD and ADHD+SLD groups.

	ADHD N=15 (%)	ADHD+SLD N=20 (%)	p-Value	Test statistic (χ^2)
Gender				
Female	2 (13.3 %)	4 (20 %)	0.680	0.268
Male	13 (86.7 %)	16 (80 %)		
Socioeconomic status				
Low	1 (6.7 %)	6 (30 %)	0.199	2.917
Medium/High	14 (93.3 %)	14 (70 %)		
Medication for ADHD				
Not using	6 (40 %)	8 (40 %)	1.000	0.000
Using	9 (60 %)	12 (60 %)		
Additional psychotropic medication				
Not using	15 (100 %)	15 (75 %)	0.057	4.375
Using	0 (0 %)	5 (25 %)		
Psychiatric comorbidity				
Absent	12 (80 %)	13 (65 %)	0.458	0.945
Present	3 (20 %)	7 (35 %)		
Developmental milestones				
Normal	14 (93.3 %)	17 (85 %)	0.619	0.588
Abnormal	1 (6.7 %)	3 (15 %)		

The percentages given in the table are column percentages. p-Value was obtained by the chi-square test. ADHD, attention deficit-hyperactivity disorder; SLD, specific learning disorder.

Table 2: Results of the CASI, CDI, PedsQL, EES, and CPRS-48 across the ADHD and ADHD+SLD groups.

	ADHD Median (IQR)	ADHD+SLD Median (IQR)	p-Value	Test statistic (Z)
CASI	27 (10)	30 (9)	0.376	−0.885
CDI	7 (7)	13 (7.75)	0.007*	−2.708
PedsQL-TSS (self-report)	82.06 (14.78)	78.26 (22.17)	0.057	−1.905
PedsQL- TPhHS (self-report)	89.06 (13.09)	78.12 (20.84)	0.007*	−2.686
PedsQL- TPsHS (self-report)	76.66 (15.83)	80 (25.01)	0.520	−0.643
PedsQL-TSS (parent-report)	60.32 (35.28)	64.13 (18.53)	0.663	−0.436
PedsQL- TPhHS (parent-report)	46.87 (59.82)	75 (31.37)	0.786	−0.271
PedsQL- TPsHS (parent-report)	71.66 (22.83)	63 (26.67)	0.268	−1.107
EES	15 (6.50)	15 (5.50)	0.796	−0.258
EES-C/H	8 (6)	7.50 (5.25)	0.776	−0.285
EES-EOI	7 (3.50)	7 (4.25)	0.958	−0.052
CPRS-48	36.50 (38.75)	45 (19)	0.251	−1.148
CPRS-48/conduct problem	8 (11.25)	11 (8)	0.322	−0.991
CPRS-48/impulsivity/hyperactivity	3.50 (4.75)	4 (4)	0.627	−0.486
CPRS-48/learning problem	6.50 (5.25)	10 (5)	0.014*	−2.452
CPRS-48/anxiety	9 (7.50)	10 (5)	0.474	−0.716
CPRS-48/psychosomatic	2.50 (2,25)	3 (5)	0.516	−0.650

p-Value was obtained using the Whitney U test. *p<0.05. ADHD, attention deficit-hyperactivity disorder; SLD, specific learning disorder; CASI, childhood anxiety sensitivity index; CDI, children's depression inventory; PedsQL-TSS, pediatric quality of life inventory-total scale score; PedsQL-TPhHS, pediatric quality of life inventory-physical health summary score; PedsQL-TPsHS, pediatric quality of life inventory-psychosocial health summary score; EES, expressed emotion scale; EES-C/H, expressed emotion scale-criticism/hostility; EES-EOI, expressed emotion scale-emotional over-involvement; CPRS-48, conners parent rating scale-48.

life scores from parent reports on the PedsQL. Additionally, no significant differences were found in criticism/hostility attitudes, emotional over-involvement attitudes, and overall expressed emotion scores assessed by the EES, as well as in the conduct problems, impulsivity/hyperactivity, anxiety, psychosomatic subscales, and the total score of the CPRS-48, which evaluates ADHD-related behavioral issues (p>0.05) (Table 2).

The CDI score, which assesses the intensity of depression symptoms in children, was found to be significantly higher with a moderate effect size in the group diagnosed with both ADHD and SLD compared to the group with only ADHD (p<0.05; Z=−2.708; r=−0.486). This suggests that depression symptoms tend to be more severe in the ADHD+SLD group. Similarly, according to children's self-reports, the physical health component of the PedsQL also showed a statistically significant decrease with a medium effect size in the group diagnosed with both ADHD and SLD. This means that adolescents in the group with ADHD and SLD reported lower levels of quality of life regarding physical health compared to adolescents with only ADHD (p<0.05; Z=−2.686; r=−0.498). Additionally, the learning problem subscale score of the CPRS-48 was found to be significantly higher with a medium effect size in the group diagnosed with ADHD and SLD. Therefore, the extent of learning challenges was determined to be greater in the ADHD+SLD group compared to the group with only ADHD (p<0.05; Z=−2.452; r=−0.455) (Table 2).

Discussion

In this research, we examined how comorbid SLD influences both quality of life and expressed emotion in individuals with ADHD. Previous studies indicate that children and adolescents with ADHD face more pronounced challenges in all aspects of quality of life compared to their typically developing counterparts, with psychosocial aspects being more

adversely affected than physical ones [6]. Research has also indicated that parents of children with ADHD frequently perceive their child's quality of life more negatively than the children report, although some studies suggest that children with ADHD describe their quality of life as comparable to that of their typically developing peers [5, 26]. It has been demonstrated that children with SLD experience a decline in quality of life across all aspects [7]. Furthermore, another study found that children diagnosed with both ADHD and SLD tend to have better profiles regarding both physical and psychosocial health-related quality of life compared to children with only SLD [4]. In some studies, children diagnosed with SLD do not show differences in physical quality of life compared to typically developing children, but they exhibit lower levels of quality of life in the psychosocial-emotional domain [27, 28]. According to these studies, the perception of quality of life among children with SLD appears to vary depending on whether they also have a diagnosis of ADHD.

In our research, adolescents with both ADHD and SLD reported notably lower levels of quality of life related to physical health compared to adolescents diagnosed solely with ADHD. However, parental assessments indicated no significant difference between the two groups regarding quality of life. This finding may be related to adolescents with SLD perceiving themselves as having poorer physical health. It is known that developmental coordination disorder frequently occurs as a comorbidity in individuals diagnosed with SLD [29], and there tends to be a notable history of delays in motor skills [30]. Based on this finding, it is essential to assess whether adolescents with SLD have a DSM-5 diagnosis, such as developmental coordination disorder, or objective difficulties in motor skills. Since quality of life is an individual's personal perception of their health, it is important to assess the consistency of these evaluations in clinical practice and to implement suitable interventions when necessary.

Studies on expressed emotion in ADHD emphasize that parental criticism is strongly associated with ADHD symptoms, as well as accompaying emotional symptoms and conduct problems [10, 31]. Studies indicate that greater maternal warmth promotes prosocial behaviors and decreases antisocial behaviors in children with ADHD [31]. Additionally, maternal criticism has been found to have a more significant correlation with ADHD symptoms and aggressive tendencies than emotional over-involvement [32]. The literature indicates a scarcity of studies examining this topic in children diagnosed with SLD. In these studies, although the variables are not categorized under the term of expressed emotion, concepts indicating parents' negative expressed emotions – such as rejection, refusal, overprotection, and loss of optimism – have been examined. Parents of children diagnosed with SLD exhibit these negative attitudes at high levels. Additionally, most parents perceive the caregiving responsibilities for children with SLD as a physical, personal, social, financial, and emotional burden, and they experience higher parental distress [11, 33]. Opposite to our hypothesis, there was no notable difference in levels of expressed emotion when comparing the ADHD group to the ADHD+SLD group. Possible reasons for this include the limited number of participants in each group, as well as the fact that both ADHD and SLD diagnoses may contribute to negative expressed emotions in parents. It is also considered that if there are differences in ADHD subtypes between the two groups, these may result in varying characteristics of expressed emotion in parents. The lack of further identification of ADHD subtypes in our study is regarded as a limitation. On the other hand, as far as we know, we did not come across any studies in the literature that compare parents of children diagnosed with ADHD and SLD in terms of expressed emotion. Therefore, since there are no existing studies for comparison, future large-scale studies examining expressed emotion in parents of children with ADHD, SLD, and typical development will be informative.

Participants diagnosed with mood and anxiety disorders were excluded from our study, so neither group included adolescents with a formal diagnosis of depression or anxiety. However, when examining depressive symptoms and anxiety sensitivity at the symptom level, no significant difference was observed between the two groups in terms of anxiety sensitivity. Nonetheless, we found that depressive symptoms were significantly more common in adolescents with comorbid ADHD and SLD compared to those with only ADHD. It is well established that internalizing disorders are more frequently observed in children and adolescents with either ADHD or SLD diagnoses [34, 35]. The higher prevalence of depressive symptoms in adolescents with SLD may be related to their typically lower self-esteem. In fact, a study revealed that children diagnosed with SLD often struggle with low self-esteem and a sense of failure stemming from academic challenges from their early school years [36]. Moreover, in cases of ADHD without SLD – especially in the combined subtype that accounts for most clinical cases – externalizing features such as hyperactivity, impulsivity, creativity, and a desire for novelty may play a more significant role in how adolescents with ADHD manage stress [37]. Even if not at a diagnostic level, the findings that adolescents with SLD exhibit more depressive symptoms and have lower levels of physical quality of life indicate that these adolescents require individualized support not only in the academic domain but across all areas of life during their childhood.

This research examined the quality of life of adolescents and their parents' expressed emotion in relation to the presence or absence of SLD within the context of ADHD diagnosis. It aimed to explore other key components that are essential for a comprehensive, holistic approach, rather than assessing these adolescents solely based on symptomatology. Additionally, due to the limited number of studies on quality of life in adolescents diagnosed with SLD and the absence of any research regarding expressed emotion in these patients, our study is considered to make a novel contribution to the literature. Furthermore, the finding that adolescents with SLD report lower physical quality of life levels compared to those with only ADHD is a new observation not documented in the few existing studies on this topic.

Nevertheless, our research has certain limitations. These include the limited sample size and the absence of a control group composed of typically developing individuals. Furthermore, the cross-sectional nature of the study hampers the ability to establish causal relationships, and conducting the research in a tertiary psychiatric clinic limits the extent to which the findings can be generalized. Another limitation is the heterogeneity introduced by including adolescents with ADHD who are receiving medication treatment as well as those who are not.

In conclusion, this study found that adolescents with both ADHD+SLD perceived their quality of life in terms of physical health to be lower compared to adolescents with only an ADHD diagnosis. They also exhibited more depressive symptoms, even though this was not at a diagnostic level. Nevertheless, there was no significant difference observed between the two groups in terms of parental expressed emotion. Based on our results, we recommend that early efforts focused on enhancing the physical health-related quality of life in adolescents with SLD would be beneficial.

Research ethics: Our study, with research number GO 19/622, Institutional Review Board of Hacettepe University received ethical approval from the on 11.06.2019. This study was conducted in accordance with the Declaration of Helsinki.

Informed consent: Informed consent was obtained from all individuals included in this study, or their legal guardians or wards.

Author contributions: All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Use of Large Language Models, AI and Machine Learning Tools: None declared.

Conflict of interest: The author states no conflict of interest.

Research funding: None declared.

Data availability: The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

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