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RESEARCH ARTICLE

Examination of symptoms related to cognitive disengagement syndrome in a clinical cohort of school-aged children

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ABSTRACT

Objective: At the intersection of child neuropsychiatry, a distinct focus emerges on the intricate interplay between neurodevelopmental conditions and Cognitive Disengagement Syndrome (CDS). This study delves into the nuanced connection between these domains, aiming to shed light on investigating CDS symptoms and their potential comorbidities in a clinical setting. By exploring this relationship, we contribute to a deeper understanding of the complex landscape of childhood psychiatric disorders and pave the way for more informed clinical interventions.

Method: A total of 413 children aged between 6 and 11 years were included in the study. Initially, parents completed the Barkley Child Attention Scale. Subsequently, in the study's second phase, families of children presenting with CDS symptoms (identified as screen-positive cases) were invited to the clinic. In this phase, skilled clinicians conducted structured diagnostic interviews to assess comorbidities.

Results: Out of the analyzed participants, 138 (33.7%) were identified as screen-positive. The prevalent comorbidities observed in these children included attention deficit hyperactivity disorder (ADHD), particularly of the combined type (33.9%); ADHD, predominantly of the inattentive type (29.5%); anxiety disorders (31.3%); and oppositional defiant disorder and conduct disorder (22.6%).

Conclusion: Considering the study's findings, a notable revelation emerges: CDS symptoms manifest in approximately one out of every three children seeking care within child and adolescent psychiatric clinics. Therefore, it is recommended that clinicians adopt a vigilant stance towards CDS symptoms and incorporate this approach as part of routine outpatient evaluations.

Keywords: Cognitive Disengagement Syndrome, comorbidity, attention deficit hyperactivity disorder, sluggish cognitive tempo

INTRODUCTION

Cognitive disengagement syndrome (CDS) (1) is characterized by a cluster of symptoms, including excessive daydreaming, slow actions, and loss of train of thought (2-8). Although CDS has not yet been included in the Diagnostic and Statistical Manual of Mental Disorders (DSM) classification system, recent

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neuroimaging and genetic studies provide strong evidence suggesting that it should be evaluated as a separate category (9-14). Studies determining its prevalence have reported rates as high as 11% in the general population aged 7-10 years (15), and 20.8% in a clinical sample (16).

CDS may co-occur with several psychiatric conditions. Studies indicate that attention deficit hyperactivity disorder (ADHD) is the most frequently associated disorder with CDS. In Barkley's study, which included 1,800 participants aged 6 to 17, ADHD was diagnosed in 59% of individuals with CDS (8). The available data indicate that psychiatric disorders other than ADHD may also accompany CDS. Becker reported that symptoms of anxiety, depression, and oppositional defiant disorder (ODD) were common in children with high CDS scores (17). In a recent study from Turkiye, Ozalp et al. (2021) (18) demonstrated that anxiety disorders are linked to CDS with a prevalence of 20.3%. In light of this information, it has been stated that, in addition to neurodevelopmental disorders such as ADHD and CDS may be accompanied by symptoms of internalization (18,19).

To the best of our knowledge, only one study has investigated the prevalence of CDS symptoms among children in a clinical population (16). Two other studies (8,20) have evaluated the psychiatric conditions that accompany CDS in a general population sample. However, currently, there is no data for a clinical sample. Against this backdrop, this study aims to screen children in a clinical sample for symptoms of CDS, while also examining comorbidities in children with CDS symptoms. In this study, we hypothesize a higher incidence of CDS within the clinical sample compared to community-based screening studies in the existing literature, and a stronger association of CDS with neurodevelopmental and internalizing disorders. It is also hypothesized that neurodevelopmental problems and issues related to internalization will be exhibited more frequently by these children.

METHOD

Sampling and Participants

This study involved a two-stage cross-sectional cohort. Moreover, it was a single-center study without intervention. Children aged 6-11 years who applied to the Child and Adolescent Psychiatry Clinic for the first time with any psychiatric complaint were eligible for the study. The ethical committee approval required for the study was obtained before the procedure began (date: 09.12.2021, number: 2021-369).

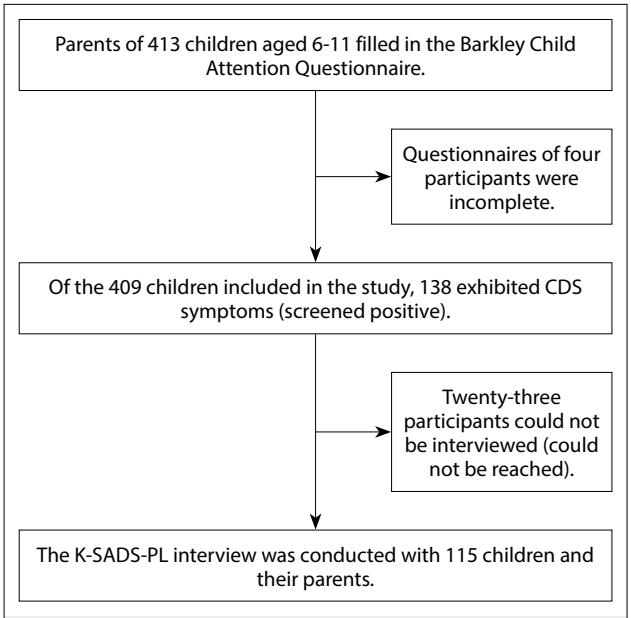

Figure 1. Flowchart of the study.

The study's inclusion criteria encompassed a specific subset of individuals between the ages of 6 and 11 who sought assistance at our clinic due to various psychiatric concerns. This age range was selected based on the recognized prevalence of childhood and early adolescent psychiatric conditions. On the other hand, the exclusion criteria were carefully designed to ensure the validity and integrity of the study's results. Individuals were excluded if the parents or the child declined to participate, acknowledging the importance of voluntary consent for ethical considerations. Moreover, the age range of 6 to 11 was established as a criterion to maintain a homogeneous group of participants and facilitate meaningful comparisons among individuals at similar developmental stages. Additionally, individuals diagnosed with autism spectrum disorder, intellectual disabilities, psychotic disorders and bipolar disorder were excluded to establish a more focused cohort for the study. This decision was guided by the understanding that these particular conditions could potentially introduce confounding factors due to their distinct nature and their potential impact on the study's objectives.

Procedure

In the first phase of the study, the parents of the entire potential sample were informed in detail about the study procedure and their informed consent was obtained. The parents of 413 children who could potentially be included in the study were asked to complete the

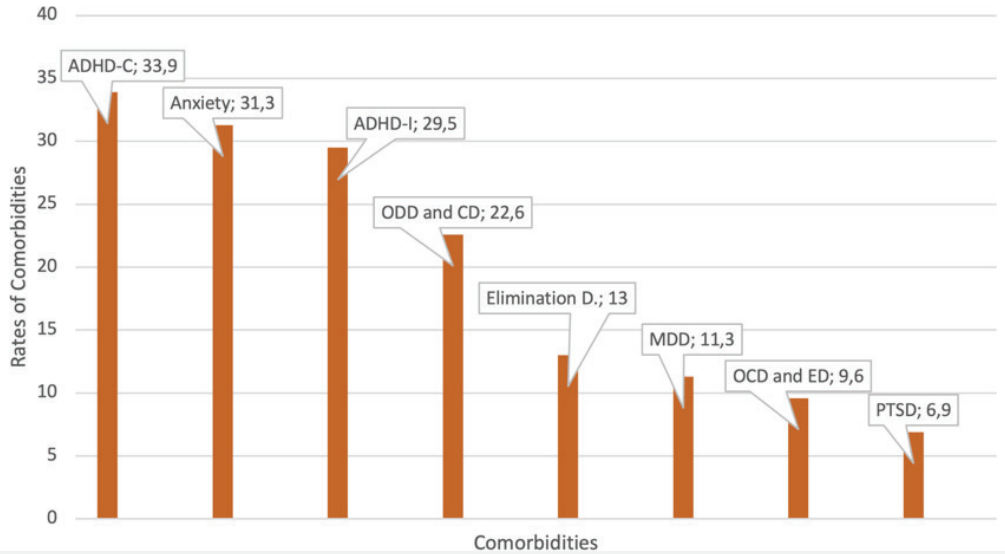

Figure 2. Rates of existing comorbid disorders with CDS.

AD: Anxiety disorders; ADHD-C: Attention deficit hyperactivity disorder—predominantly combined type; ADHD-I: Attention deficit hyperactivity disorder—predominantly inattentive type; ODD: Oppositional defiant disorder; CD: Conduct disorder; ED: Eating disorder; Elimination D: Elimination disorders; MDD: Major depressive disorder; OCD: Obsessive-compulsive disorder; PTSD: Post-traumatic stress disorder.

Barkley Child Attention Scale (BCSA). Those who scored three or four points on three or more items on the BCSA were considered to have significant CDS symptoms (8) (i.e., they screened positive). In the second phase of the study, the families of children with CDS symptoms were invited to the clinic, and the children were evaluated for additional comorbidities using the Kiddie Chart for School-Age Children's Affective Disorders and Schizophrenia, Current and Lifetime Version (K-SADS-PL). Figure 1 illustrates the workflow of the study.

Measures

The Kiddie-Schedule for Affective Disorders and Schizophrenia for School-Aged Children, Present and Lifetime Version (K-SADS-PL)

The K-SADS-PL is a semi-structured interview form developed by Kaufman et al. (21) in 1997 to screen for psychopathology in children and adolescents aged 6-18, according to the DSM-III-R and DSM-IV diagnostic criteria. More recently, Kaufman et al. updated the interview form in 2016 to reflect the DSM-5 diagnostic criteria (22). The current version of the form reflecting DSM-5 criteria have been translated into several languages, including Turkish (23).

Barkley Child Attention Scale

The Barkley Child Attention Scale (BCSA) was developed by Russell Barkley in 2013 to measure CDS symptoms (8). A study on the validity and reliability of the scale for use in Turkiye was conducted in 2018 (24). The BCSA is a 12-item screening scale, with each item scored between 1 and 4 (1: never or rarely, 2: sometimes, 3: often, 4: very often). Each item evaluates a symptom of CDS. A child is considered to have CDS symptoms when two conditions are met: the first is having symptoms that cause dysfunction in at least two areas of life – home, friendships, school and leisure activities; the second is having at least three symptoms marked as 'often' or 'very often'. The internal consistency (Cronbach's alpha) of the Barkley Child Attention Questionnaire was calculated as 0.984, and the test-retest reliability was calculated as r=0.84.

Statistical Analysis

Statistical analysis was performed using IBM's Statistical Package for the Social Sciences (SPSS) Statistics for Windows, Version 23.0. The results were evaluated at the 95% confidence interval and the $p<0.05$ significance level. The chi-square test was used to evaluate comorbidity differences between genders.

RESULTS

An assessment utilizing the BCSA scale determined that 33.7% of the participants (n=138; girls=55, boys=83) exhibited symptoms indicative of CDS. There were no significant differences in CDS symptoms according to gender (p=0.830).

Table 1: Association between comorbidity and CDS by gender

Comorbidity	Boys		Girls		χ^2 (df=1)	p
	n	%	n	%		
ADHD	48	70.6	27	57.4	1.576	0.146
MDD	5	7.4	9	19.1	2.598	0.107
Elimination disorders	12	17.6	3	6.4	2.195	0.138
OCD and ED	4	5.9	6	12.8	0.905	0.313
PTSD	1	1.5	7	14.9	5.801	**0.008***
ODD and CD	17	25	6	12.8	1.891	0.169
Anxiety disorders	30	44.1	26	55.3	0.983	0.321

ADHD: Attention deficit hyperactivity disorder; CD: Conduct disorder; ED: Eating disorder; MDD: Major depressive disorder; OCD: Obsessive compulsive disorder; ODD: Oppositional defiant disorder; PTSD: Post-traumatic stress disorder; χ^2: chi-square test; *: p<0.05.

Figure 2 presents the results of K-SADS-PL assessments conducted on 115 individuals (83.3%) from the CDS group. Among these patients, the most prevalent co-occurring diagnoses were as follows: attention deficit hyperactivity disorder, primarily the combined type, at a rate of 33.9%; anxiety disorders, at a rate of 31.3%; ADHD, mainly the inattentive type, at a rate of 29.5%; oppositional defiant disorder (ODD) and conduct disorder, at a rate of 22.6%; elimination disorders, at a rate of 13%; major depressive disorder (MDD), affecting 11.3% of the cases; obsessive-compulsive disorder and eating disorders, at a rate of 9.6%; post-traumatic stress disorder (PTSD), at a rate of 6.9%; specific learning disorders, at a rate of 5.2%; communication disorders, present in 3.5%; and tic disorders, at a rate of 0.9%.

Table 1 shows the relationship between gender and other co-occurring disorders and CDS symptoms. No comorbidity was detected in only 4.3% of the children with CDS. When differences in comorbidities in patients with CDS were examined between genders, post-traumatic stress disorder (PTSD) was found to be significantly higher in girls (p=0.008). However, there were no significant gender differences in the other comorbidities.

DISCUSSION

The present study was designed to determine the frequency of cognitive disengagement syndrome and comorbid psychiatric disorders in children aged 6-11 years who applied to child and adolescent psychiatry clinic of a university hospital with their parents and screened positive for CDS. One of the most important results of our study was that we found a frequency of 33% of CDS symptoms among children in the clinical sample. We observed that the most common comorbidities accompanying CDS were ADHD (64%), anxiety disorders (31%), oppositional defiant disorder/conduct disorder (ODD/CD) (23%), elimination disorders (13%), and MDD (11%).

The most striking finding from the analysis was that the prevalence of CDS in the clinical sample was 33.7%. To the best of our knowledge, only one study in the literature has been conducted to evaluate the frequency of CDS in a clinical sample. In a study by Camprodon-Rosanas et al. (2016) (16) with 515 patients aged 4-17 years, the prevalence of CDS was found to be 20.8%. There are several possible explanations for the differences in the results between the two studies. In a study on the prevalence of general psychopathology in Turkiye, neurodevelopmental problems (such as ADHD) showed a higher frequency than worldwide values, according to the literature (25). Considering the neurodevelopmental nature of CDS (2,26), the differing results between the studies may be explained by regional genetic predisposition. Additionally, the use of retrospective data in the study by Camprodon-Rosanas et al. (2016) (16), compared to the prospective design of our study, may have contributed to the difference in CDS prevalence. It is important to note that CDS is not yet defined as a disorder in the DSM. Furthermore, due to the possible overlap of this symptom cluster with subtypes of ADHD and the influence of the psychometric properties of assessment scales, proportional discrepancies could arise. Moreover, even though a scale with a cut-off point was employed, it is crucial to emphasize that the study focused on screening CDS symptoms within a clinical sample rather than conducting a prevalence study.

An interesting finding in this study was that no significant differences were found between boys and girls in terms of CDS symptoms. This finding is consistent with Jarrett et al. (2017) (27), who also

reported that CDS symptoms did not differ between genders in college students. However, this finding contradicts those of two previous studies (one with a clinical sample) that suggested CDS symptoms occur more often in boys (16,17). Consequently, there is no consensus in the literature regarding the distribution of CDS symptoms between genders.

A review of the literature reveals that two studies evaluated the frequency of comorbidities in individuals with CDS. In a study by Barkley (2013) with a population sample of children aged 6-17 years, it was found that 27.4% of children with CDS had ADHD, 11.1% had anxiety disorders, 7.4% had depression, 1.52% had ODD, and 3% had CD comorbidities (8). Burns and Becker (2021) conducted a study in a population sample of children aged 4-13, which was similar to ours in terms of age group, as very few participants were aged either 4 or 13 years (20). The study showed that 39% of children with CDS also had ADHD, 21.3% had anxiety disorders, 8.8% had depression, and 6.9% had a combined ODD/CD comorbidity.

It is expected that patients whose psychiatric symptoms are severe enough for them to be admitted to a clinic will have more comorbidities than a general population sample. The lower comorbidity rates observed in Barkley's study (2013) suggest that comorbidities may be less frequent in adolescents with CDS. The potential discrepancies between the findings of Barkley's study (2013) and the current study could indeed be due to several factors that warrant further exploration. One way to reconcile these findings is by acknowledging the complex nature of comorbidities and their interaction with CDS symptoms. While Barkley's study suggests lower comorbidity rates among adolescents with CDS, it is important to recognize that these rates can vary based on several factors, including the specific measures used to assess comorbid conditions, the sample demographics, and the severity of CDS symptoms themselves. Even though comorbidity rates might appear lower in one study, it is possible that this is due to the presence of a range of psychiatric symptoms that might not have been accounted for in the analysis. In other words, the presence of other psychiatric symptoms might influence the perception of comorbidity rates.

To provide further clarification, it might be beneficial to emphasize that the relationship between CDS and comorbidities is intricate and can be influenced by multiple variables. Additionally, acknowledging the limitations of each study's methodology and the potential differences in the characteristics of the study samples could contribute to a more comprehensive understanding of the observed trends in comorbidity rates. In this context, future studies are required to explain the variations in comorbidity rates accompanying CDS in relation to age groups.

Another finding of the current study was that the frequency of psychiatric disorders in individuals with CDS who applied to the clinic was higher than in studies conducted with general clinical samples (28,29). Altay et al. (2019) (29) evaluated 2,066 patients for comorbidities who had applied to child and adolescent psychiatry clinics and found that the most common diagnosis was ADHD, with a rate of 39.1%. Based on these studies, it can be concluded that ADHD, the most common diagnosis in child psychiatry clinic admissions, is seen more frequently than expected in individuals with CDS. Other accompanying psychopathologies, as shown in Altay et al.'s study (2019) (29), include conduct disorder at 7.2%, ODD at 6.9%, anxiety disorders at 6.5%, depressive disorders at 3.1%, and elimination disorders at 2.5%. A possible explanation for the lower rates of comorbidities compared to the current study might be the presence of several psychiatric symptoms in individuals with CDS. The results of this study indicate that comorbidity with post-traumatic stress disorder was higher in girls with CDS, but there was no difference between the genders in terms of other comorbidities. There is no study in the literature that compares CDS comorbidities across genders with which we can compare our data. Due to the relatively small sample size of the current study, these data need to be re-evaluated in future studies.

This study has several limitations. One of the main limitations is that we used only a parent-reported scale to assess CDS symptoms. Relying on information from a single source may have led to false positives or negatives. In future studies, information for the detection of CDS symptoms could be obtained from various sources, including family, teachers, and caregivers. Secondly, it is not possible to generalize these data, as the data from this study reflect only individuals who applied to a university hospital. Multicenter studies involving individuals with different genetic and biological characteristics are necessary to obtain more concrete data. Finally, the exclusion of intellectual disability and autism through clinical assessment and the lack of intelligence tests and standardized structured interviews to exclude these diagnoses represent a significant limitation and maybe a subject for future study. The inclusion and exclusion criteria could have been more standardized to enhance the methodological robustness, contributing to a more rigorous study design.

CONCLUSION

Considering the study's findings, a notable revelation emerges: CDS symptoms manifest in approximately one out of every three children seeking care in child and adolescent psychiatric clinics. This prevalence underscores the significance of recognizing CDS symptoms as a potential marker for concurrent psychopathologies. Identifying these symptoms upon patient intake could serve as an invaluable early warning signal for clinicians to consider the presence of comorbid conditions. Consequently, integrating a thorough inquiry into this symptom cluster for every incoming patient has the potential to substantially enhance health service delivery. By facilitating timely intervention not only for CDS but also for any accompanying comorbidities, this approach stands to improve overall patient outcomes. Therefore, it is recommended that clinicians adopt a vigilant stance towards CDS symptoms and incorporate their assessment as a routine part of child and adolescent psychiatric evaluations. It is important to clarify that the current investigation centered around the screening of CDS symptoms, rather than aiming to establish CDS prevalence.

Contribution Categories		Author Initials
Category 1	Concept/Design	S.Y., S.C.B., Z.T.
	Literature review	S.Y., Z.T.
	Data analysis/Interpretation	S.Y., B.T., S.C.B.
Category 2	Drafting manuscript	S.Y., B.T.
	Critical revision of manuscript	S.Y., B.T.
Category 3	Final approval and accountability	S.Y., B.T., S.C.B., Z.T.
Other	Technical or Material Support	S.Y., Z.T.
	Supervision	B.T., S.C.B.

Ethical Approval: The Karadeniz Technical University Clinical Research Ethics Committee granted approval for this study (date: 09.12.2021, number: 2021-369).

Informed Consent: Informed consent was obtained from all participants and their parents.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors declare that they have no conflict of interest.

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