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Attention Deficit Hyperactivity Disorder (ADHD) & COVID-19: Do Caregivers and Children Report the Same?

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Abstract

Objective: Our cross-sectional study collects the prevalence of anxiety, depression and sleep problems reported in children with ADHD aged between seven and twelve years.

Methods: The Attention Deficit Hyperactivity Disorder rating scale (ADHD-rs), the Child Behaviour Checklist (CBC), the Sleep Disturbance Scale for Children (SDSC), the Screen for Child Anxiety Related Disorders (SCARED) and the Children's Depression Inventory (CDI) were used.

Results: A disparity was obtained between data referred by caregivers and those referred by children and adolescents with ADHD, with higher record of psychopathological discomfort in those questionnaires answered by the children and adolescents. 70% of ADHD caregivers reported sleep disorders, 54.32% of the respondents indicated anxiety symptoms and 8.97% obtained scores of depressive symptomatology.

Conclusions: High rates of emotional distress with sleep problems, anxious and depressive sphere were referred by children an adolescent with ADHD after the first wave of Covid-19.

Keywords

ADHD; Children; Adolescent; COVID19; Mental health.

Introduction

On December 31, 2019, the Chinese office of the World Health Organization (WHO) reported in Wuhan (China) the first cases of a hitherto unknown pathogen with a high capacity to spread and that caused severe cases of pneumonia [1]. The pathogen was identified as the virus the SARS-Cov2 (Severe Acute Respiratory Syndrome coronavirus 2), which causes the COVID-19 disease [2]. On March 11, 2020, The WHO announced the pandemic situation for SARS [3].

Previous studies analysing epidemic situations such as SARS (2003) or influenza a (HIN1) point out a psychological impact in the population producing a stressful effect [4-7]. Similarly to disaster events, a pandemic situation might increase the risk of Post-Traumatic Stress Disorder, Depression, and Anxiety [8,9]. Traumatic life events at an early age have been shown to have long-term consequences and are associated with detrimental physical and mental health in adulthood that could be mitigated by their early detection and intervention [10].

Most countries have developed policies to contain the coronavirus expansion, working groups have been set up, and multiple health care protocols have been established to respond to the current health emergency. Home confinement and physical distancing measures decreed by several countries created unprecedented challenges in daily lives population. In Spain, one of the most affected countries by COVID-19 disease in Europe, the central government issued a State of emergency that limited mobility and forced the strict confinement of minors between March 15 and April 28 (The Presidency & with the Cortes Democratic Memory, 2020).

Unfortunately preventive strategies of COVID-19 spread, might be followed by profound damages to society, especially in those most vulnerable populations such as children and adolescents [11]. It is essential to highlight the limited socialization and loss of contact with friends [12]. In addition, we have to take into account that the closure of elementary and secondary schools has shifted part of the academic burden to homes, with the inequality in learning opportunities that this entails [13,14]. Most of the parents of these children were forced upon the educational responsibility in addition to handle all the children's emotional and behavioural problems 24/7. In this regard, recent publications conclude that paediatric age confinement causes anxiety, depression, and fear of being infected by the virus.

Among the child and adolescent population, those with a previous mental disorder are more vulnerable [15,16]. Given that Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders in childhood and children affected are characterized by less self-regulation to cope with stressful situations, the study of COVID-19 psychological consequences in these patients is essential. The ADHD worldwide prevalence is around 7-11% despite there is wide variability according to the type of the sample and the criteria used [17-20]. ADHD is a risk factor for the development of other mental health disorders such as behaviour problems, anxiety, depressive symptoms, and sleep disorders since comorbidity studies have found high rates of concurrence [21,22]. These additional disorders can be masked by ADHD symptoms making more difficult the therapeutic process and evolution [23]. Thus, this population is more vulnerable to the stressors that have emerged with the COVID-19 and its preventive strategies, with a higher risk of adaptive disorder with anxiety, depression, and sleep disorders as an initial factor.

Despite some emerging studies, there is little knowledge focused on the effect of COVID-19-related stressors on children and adolescents affected by ADHD. Previous bibliography indicates a worsening of ADHD symptoms as well as a children's negative mood state [24]. Our study collects the prevalence of anxiety and depression form and the sleep problems reported in a clinical sample of children with ADHD aged between seven and twelve years old after the first wave of COVID-19 infections in the area of Barcelona. As a secondary objective and to identify those patients with higher psychopathological risk, we analysed the existence of differences between children and adolescents with ADHD who had a pharmacological treatment versus those who did not have a pharmacological regimen.

Methods

This is a cross-sectional study part of the Kids Corona, an umbrella of different research projects that aim at providing answers to questions associated with the COVID-19 pandemic, including the mental well-being of children and adolescents.

Participants

We aimed to include youth aged between 7 and 12 years old, with a diagnosis of ADHD and with medical follow-up either at the Sant Joan de Déu Hospital or at the community-based Adolescent Mental Health Services (CHAMS), which provide services in the same areas of Barcelona, in Spain. Sample selection was conducted by automatically extracting information from the ADHD diagnostic codes identified in the digital medical history that had been visited during 2020.

ADHD diagnosis required a score higher than 1.5 standard deviations from the norm by age and sex in the ADHD IV parent version questionnaire [25]. The presence of comorbidities (oppositional defiant disorder, behavioural disorders, anxiety disorders, or depressive disorders) was accepted. Those patients with mental retardation (IQ<70), psychosis, or autism spectrum disorder were excluded.

This selection provided a phone number for each of the patients selected. An invitation was sent, via SMS, to the user's contact phone number with an http link leading to the survey from the Research Electronic Data Capture system, RED Cap [26]. The phone numbers corresponded to the youth's parents or caregivers. After completing the questionnaires, recommendations for dealing with stress based on the obtained score responses were sent to the caregivers' personal email obtained via the survey. Survey invitations, and thus participants' recruitment was conducted between the 20th and 30th July 2020, a period of progressive relaxation of restrictions.

Ethical considerations

The study was approved by the Ethics and Clinical Research Committee of Sant Joan de Déu Hospital in Barcelona and complies with the principles outlined in the Helsinki Declaration [27]. Caregivers were asked to sign the informed consent prior to initiating the survey. When the adolescent was 12 years old or older, caregivers were asked to obtain consent from the adolescent.

Instruments

The first block of questions assessed sociodemographic and clinical characteristics, including comorbidities, type of treatment, type of pharmacological treatments, and changes in the pharmacological guideline. A second part of the survey consisted of questionnaires evaluating ADHD symptoms and other questionnaires evaluating regular ADHD comorbid mental issues such as behaviour problems, anxiety, depressive symptoms, and sleep disorders. Some of the questionnaires were completed by caregivers while others were answered by identified patients. In those completed by the ADHD children or adolescent, the possibility of receiving help from parents/caregivers was specified, with reading support.

To assess the nuclear symptomatology of ADHD, parents/caregivers responded the ADHD Rating scale parent version was administered [28]. This questionnaire should be completed considering the symptoms presented in the last 6 months. It is a scale composed of 18 items corresponding to each of the 18 symptoms listed in the DSM-IV-TR for ADHD. This is a Likert-type scale in which each item is scored from 0 to 3 points (0=never/rarely, 1=sometimes, 2=frequently and 3=very often). The total score is obtained from the sum of the scores recorded for each item. Additionally, two sub-scores results from the sum of the items corresponding to inattention and those corresponding to hyperactivity-impulsivity. These direct scores become T scores when moved to a standardized profile sheet for age and sex. The internal consistency of the test is 0.94. The reliability between the test and the retest is 0.89 for the inattention subscale, 0.93 for the Hyperactivity/Impulsivity subscale, and 0.92 for the Total score.

To assess the primary behavioural and affective problems in children, parents completed the Child Behaviour Checklist (CBC) [29]. This questionnaire belongs to the ASEBA [30] multiaxial assessment system to evaluate psychopathology in the last six months prior to completion. Through 113 items with three answer options (0=never or almost never, 1=sometimes true, 2=very often true), eight scales result from factor analysis: behaviour problems such as anxiety/depression, somatic complaints, attention problems, and aggressive behaviours, social problems, thinking problems, and breaking rules. Moreover, items can be grouped into three higher dimensions: internalizing scale, externalizing scale, and total score. The direct scores are transformed into typical scores according to scales by sex and age group. Internal consistency is reported for behavioural problems in adolescents, with a Cronbach's alpha value of 0.88, for the internalizing scale of 0.93 and 0.89 for the total score in the Spanish population [31].

To assess childhood sleep disorders, the Sleep Disturbance Scale for Children (SDSC) was used [32]. This scale consists of 26 items rated according to a Likert-type scale which is answered by caregivers and designed to investigate possible sleep disorders in the last six months in six areas: onset and maintenance of sleep, respiratory problems, arousal disorders, wake traffic disturbances -sleep, excessive drowsiness, and sleep hyperhidrosis. Each of the 26 items is given a score of 1 to 5 (highest value at the highest symptom frequency). A score equal to or greater than 39 points in the total of the questionnaire suggests the presence of a sleep disorder. Internal consistency has been high in controls, being 0.79, and remaining at a satisfactory level in subjects with a sleep disorder, 0.71; test/retest reliability is adequate for total (r=0.71) and individual scores.

For anxiety assessment, participants were asked to complete the Screen for Child Anxiety Related Disorders (SCARED) [33]. SCARED is considered a good tool for the early detection of symptoms and anxiety disorders in young children. This self-reported scale consists of 41 items with 3 option answers (0=almost never, 1=sometimes true, 2=very often) and asks for the symptomatology in the last three months. The total score has an internal consistency of 0.83, and those of the scales range from 0.44 to 0.72. Scores remain stable over time, with test-retest correlations ranging from 0.55 to 0.76.

The Children's Depression Inventory (CDI) [34] was used to explore depression symptoms. The CDI is a self-applied scale with 27 items and inquiries about the last two weeks. Each item is answered on a three-point scale, where 0=absence of symptom, 1=moderate symptom, and 2=severe symptom. The total score ranges from 0 to 54. Spanish reviewed version was published in 2004 [35]. In clinical samples, Cronbach's alpha values were found to be between 0.71 and 0.89, and test-retest reliability ranged from 0.54 after six months of follow-up and 0.87 after one week.

All questionnaires used were validated for the Spanish population.

Statistical analysis

The data stored in RED Cap was downloaded, removing those participants with incomplete or duplicate data. Descriptive and statistical analyses were performed using the R 3.6.

All demographic and clinical variables were subjected to statistical analysis. The normality of the variables was examined with the Kolmogorov-Smirnov test. Descriptive statistics of absolute value (n) and percentage (%) were used to analyse the sociodemographic variables.

To evaluate CBC and CDI tests, a direct score was initially obtained and in a second step translated into T scores classified according to age range and sex. Quantitative data were expressed using measures of central tendency and dispersion. The mean (ẍ), standard deviation (SD), median (M), and interquartile range (IQR) were calculated for continuous variables. To assess the presence/absence of psychopathology indicators according to the different questionnaires, the Chi-Squared test was performed. Correlations between the CBC, SDSC, SCARED, and CDI questionnaires were assessed by Pearson r correlation coefficient with 95% confidence intervals.

Welch's t-test was used to assess the statistical differences in the questionnaires 'score comparing participants with pharmacological treatment from those who did not. The statistical significance level was set at 5% (two-tailed) and the differences between variables were considered significant when the degree of significance (p) was less than or equal to 0.05.

Results

231 participants started the survey. We excluded participants that did not meet inclusion criteria (i.e. age range) and duplicates. In a second step, 152 valid questionnaires were obtained with informed consent, contact email, and meeting the inclusion criteria required and these were included in the research study.

Sociodemographic and clinical characteristics

60% of the participants were between 10 and 12 years old, with an average age of 10.04 ± 1.44 years. 74.34% (n=113) were male.

According to the presentation of ADHD, 34.68% (n=60) presented a Combined ADHD, 29.48% (n=51) reported an unspecified ADHD, 21.97% (n=38) reported a hyperactive-impulsive presentation and 13.87% (n=24) an inattentive predominant presentation. 12.51% of the sample showed comorbidity (conduct disorder (3.95%), anxiety (1.32%), or depression (0.66%)).

As type of intervention plan, 46.05% (n=70) of the sample habitually received pedagogical re-education, 34.21% (n=52) individual psychotherapy, 1.97% (n=3) group psychotherapy, and 56.58% pharmacological treatment. Among those who have prescribed any drug, note that 48.68% (n=74) used methylphenidate in one of their formulations. 11.18% were prescribed an antipsychotic, commonly used as a complementary treatment to psychostimulants to reduce the emotional dysregulation that characterizes ADHD or comorbid behavioural disorders.

Modifications to the prescribed pharmacological treatment during the month prior to completing the forms were gathered.

52.87% had not changed the pharmacological pattern. 18.39% had had an upward adjustment in their treatment plan as directed by the referring psychiatrist. In 12.64%, the referring clinician had indicated a dose reduction, and in a significant 14.94% of cases, the caregiver of the ADHD minor had decided to reduce or stop the prescribed pharmacological treatment without consulting his clinical referent (Table 1).

Table 1: Sociodemographic and clinical characteristics (N: Number, %: Percentage).

	N	%
Sex		
Female	39	25.66
Male	113	74.34
Age		
7 years	3	1.97
8 years	25	16.45
9 years	29	19.08
10 years	33	21.71
11 years	30	19.74
12 years	32	21.05
ADHD presentation		
Combined	60	34.68
Predominantly Inattentive	24	13.87
Hyperactive-Impulsive	38	21.97
ADHD not specified	51	29.48
Presence of comorbidities	19	12.51
Type of treatment		
Psycho-pedagogical intervention	70	46.05
Individual therapy	52	34.21
Group Therapy	3	1.97
Pharmacological treatment	86	56.58
Pharmacological treatment		
Methylphenidate, immediate release	18	11.84
Methylphenidate, intermediate release	25	16.45
Methylphenidate, extended release	31	20.39
Atomoxetine	4	2.63
Lisdexamfetamine	6	3.95
Guanfacine	4	2.63
Antipsychotic (risperidone, aripiprazole, olanzapine, quetiapine)	17	11.18

ADHD results

The scores obtained through ADHD-RS indicated significant levels of core ADHD symptoms, both for the total score and for its

subscales. Table 2 shows directed scores and corresponding percentile by sex and age range (Table 2).

Table 2: Descriptive data obtained from the ADHD-RS, CBC, SDCS, SCARED & CDI (ẍ: Mean, SD: Standard Deviation, Q1: 1rst interquartile range, median, Ẍ: Median, Q3: 3rd interquartile range).

	ẍ (SD)	Q1	M	Q3	% significative
ADHD-RS					
Inattention subscale	14.49 (5.11)	11	15	18	68.52
Hyperactivity Impulsivity	13.64 (6.81)	8.5	12	19	57.94
Total score	28.27 (10.52)	20	28	38	73.08
Child Behaviour Checklist		n.s.	10.9 ± 1.4	10.7 ± 1.2	n.s.
Anxiety-depression	51.69 (9.08)	43.2	51.2	57.66	2.56
Inhibition	48.84 (9.33)	42	46.56	53.44	3.42
Somatic	52.13 (9.62)	44.38	50.31	56.56	5.98
Social problems	49.61 (9.17)	42.56	49.53	56.59	2.56
Thought problems	51.38 (9.76)	45.58	48.09	56.6	7.69
Attention	55.42 (9.19)	49.77	56.25	61.96	5.13
Antinormative conduct	42.94 (5.28)	39.33	41.56	46	--------
Aggression	46.52 (8.84)	39.41	45.44	52.35	-------
Externalizing conduct	44.84 (7.77)	38.25	44.33	50.17	-------
Internalizing conduct	51.56 (9.11)	44.48	49.69	59.06	1.71
Total score	49.41 (8.74)	43.18	49.01	54.67	0.88
Sleep Disturbance Scale for Children		n.s.	10.9 ± 1.4	10.7 ± 1.2	n.s.
Initiating sleep	15.81 (5.64)	11	15	19	85.45
Arousal	4.08 (1.64)	3	4	4	51.35
Sleep-breathing disorders	4.1 (1.72)	3	3	5	43.24
Sleep-wake transition	11.46 (5.03)	7	10	15	61.26
Somnolence	7.86 (2.92)	5.5	7	9	43.24
Hyperhidrosis	4.03 (2.71)	2	2	6	49.55
Total score	47.33 (13.63)	37	43.5	54	70
Screen for Child Anxiety Related Disorders		n.s.	10.9 ± 1.4	10.7 ± 1.2	n.s.
Panic disorder	6.17 (4.69)	3	5	9	40.74
Generalized anxiety disorder	8.14 (3.85)	5	8	11	41.98
Separation anxiety	6.96 (3.56)	5	6	9	77.78
Social phobia	5.88 (3.58)	3	6	9	37.04
School phobia	1.26 (1.34)	0	1	2	16.05
Total score	28.41 (12.74)	19	27	37	54.32
Children's Depression Inventory		n.s.	10.9 ± 1.4	10.7 ± 1.2	n.s.
Dysphoria	62.12 (10.07)	55.47	60.97	68.66	18.75
Anhedonia	45.77 (8.32)	39.62	44.67	50.54	1.22
Total score	55.72 (10.29)	49.35	54.39	60.03	8.97

CBC results

From the direct score of the questionnaire reported by the parents, we calculated the typified score according to the scales by age range and sex in the Spanish population. Listed below in descending frequency are the mismatched behaviours reported by parents according to this questionnaire: Thinking problems (7.69%), somatizations (5.98%), attentional components (5.13%), reserved/inhibited behaviour (3.42%), and at the same frequency social and depressive problems (2.56%).

SDSC results

Almost three quarters (70%) of caregivers reported risk of sleep disorders in children affected by ADHD according to the total score of the questionnaire. 85.45% reported significant problems with sleep conciliation, including problems with sleep duration, sleep latency, going to bed reluctantly, difficulty falling asleep, anxiety about falling asleep, waking up at night, and difficulties in going back to sleep after waking up. 43.24% reported sleep problems, including breathing problems, sleep apnea, and snoring. 51.35% referred activation disorder and nightmares, where they have a place and include waking up night terrors and nightmares. 61.26% reported problems in the transition from waking to sleeping, which include: sleep disturbances, rhythmic movement disorder, hypnagogic hallucinations, nocturnal hyperkinesia, somnolence, and bruxism. According to the responses issued 43.24% reported significant symptoms of drowsiness including difficulty waking up, tiredness on waking, sleep paralysis, daytime drowsiness, sleep attacks, and enuresis. Finally, 49.55% had rates of sleep hyperhidrosis, which means excessive sweating during sleep. (See Table 2)

SCARED results

According to the total score of the SCARED questionnaire, more than half (54.32%) of the respondents presented symptoms suggestive of clinical significance for anxiety. According to the five domains of the questionnaire, we found that 40.74% reported clinical levels of Panic Disorder, 41.98% indicated symptoms suggestive of Generalized Anxiety Disorder, 77.78% separation anxiety, 37.04% social anxiety and 16.05% school phobia. (See Table 2)

CDI results

8.97% of participants obtained scores suggestive of depressive symptomatology. By subscales, 18.75% had symptoms of dysphoria, understood as an unpleasant or annoying emotion, such as sadness, anxiety, irritability, or restlessness. Only 1.22% offered answers that were compatible with the anhedonia subscale. (See Table 2).

Analysis of the possible interdependence between the different questionnaires

The relationship between the different questionnaires was evaluated. In all cases a robust significant positive correlation was found. The correlations obtained were as follows: between the CBC and SCARED questionnaire r: 0.60 (p<0.001), the CBC and the CDI r: 0.53 (p<0.001), the CBC and SDSC r: 0.64 (p<0.001), CDI and SDSC r: 0.43 (p<0.001), the CDI and the SCARED r: 0.68 (p<0.001), and the SCARED and the SDSC r: 0.59 (p<0.001).

In the second phase of data exploitation, we compared the results of the different questionnaires between the group of participants who had been prescribed a pharmacological treatment and those who had not, without discrimination according to the active principle. The group of participants affected by ADHD who had prescribed a pharmacological treatment had higher depressive symptoms, antinormative behaviour, aggressive behaviour, and outsourcing behaviour according to the CBC. Regarding sleep problems, a positive SDSC was found in 74.60% of patients with a pharmacological treatment versus 63.83% in the ADHD without pharmacological treatment, being statistically insignificant differences (p=0.22). By subareas of the questionnaire, the group of patients with drug treatment presented more difficulties in falling asleep. Regarding the scores of the anxiety sphere obtained through the SCARED questionnaire, the ADHD patients receiving pharmacological treatment presented higher levels of panic disorder, generalized anxiety, and separation anxiety (Table 3).

Table 3: Comparative analysis of the results from the CBC, SDSC, and SCARED, between the group with treatment and the group without (t-Welch's test; ẍ: Mean; SD: Standard Deviation).

	With pharmacological treatment	Without pharmacological treatment	p	t-Welch
	ẍ(SD)	ẍ(SD)		
CBCL anxiety-depression	49.92 (8.66)	53.06 (9.22)	0.06	-1.89
CBCL antinormative conduct	41.71 (4.85)	43.89 (5.44)	0.02	-2.29
CBCL aggressive conduct	44.72 (8.21)	47.90 (9.12)	0.05	-1.98
CBCL externalizing conduct	43.14 (7.07)	46.15 (8.07)	0.03	-2.15
SDSC sleep-wake transition	10.46 (4.14)	12.22 (5.53)	0.05	-1.92
SCARED total	24.18 (10.91)	32.54 (13.16)	<0.01	-3.11
SCARED panic	4.67 (3.25)	7.63 (5.41)	<0.01	-3
SCARED GAD	7.15 (4.04)	9.10 (6.45)	0.02	-2.33
SCARED separation anxiety	5.88 (3.30)	8.02 (3.52)	<0.01	-2.83

Discussion

According to data obtained from our study and in line with previous studies, it is plausible that changes in routine, structure, and social contact associated with health restrictions due to COVID-19 may exacerbate ADHD symptoms and associated problems [36]. In our study, the nuclear symptomatology of ADHD reported through ADHD-RS is worryingly high and it most likely interferes with the development of activities whatever they were. Previous studies, found that children's negative mood state produce a higher severity of ADHD behaviours [37]. Comorbid to ADHD, as predominant symptoms caregivers identified sleep disorders in 70% of the sample.

Analysing questionnaires answered by children or adolescents (CDI and SCARED questionnaires), high rates of emotional distress with symptomatology mainly from the anxious (54%) and depressive sphere (9%) were referred. It is relevant to note the positive correlation obtained between the different questionnaires, indicating that anxiety-depressive suffering, behavioural problems, and sleep disorders were closely linked. Some authors indicate that the lower emotion regulation of people with ADHD mediates the association with ADHD and depressive symptoms and this would explain the greater vulnerability of this group [38]. Also, sleep problems have been found predicting later comorbid externalizing behaviours and depression symptoms in youth with ADHD [39].

In contrast to self-administered tests, caregivers indicate little presence of behaviour problems, anxiety, or depression. Due to the disparity found between the psychological state referred by caregivers and by child and adolescent with ADHD, lead us to suggest that emotional discomfort could be unnoticed by caregivers and understood as typical ADHD behaviour. It is important to highlight that other studies that pointed a discrepancy between youth and caregiver responses about stressing events, concluded that greater discrepancy was associated with greater child psychopathology [40]. This question is highly worrisome since caregivers represent the main source of information during pandemic context, when face-a-face assistance has decreased, and school information is poorer. All of this could contribute to a delay in detection and intervention. So, with the idea of not underestimating severity, we recommend multiple respondents for the state assessment.

On the other hand, according to our results, those cases in which a pharmacological prescription was included in their intervention plan, which we assumed as the most severe cases, are the ones that register the most behavioural problems. Another indicator that translates into a psychopathological mismatch is the need to increase the prescription in the month prior to the completion of the questionnaires, being present in 18.39% of cases. Additionally, the decrease or suspension of treatment without an indication from a clinician should be taken into consideration as a worrying factor to solve in the clinical setting. The guidance from the European ADHD Guidelines Group: ADHD management during the COVID-19 pandemic indicate to continue with medication as usual because the failure to continue ongoing medication could increase health risks related to COVID-19 inasmuch as behaviour related to ADHD could become more disorganised and poorly controlled at this time [41-44].

There are many questions on how to mitigate the effects of Covid-19 on mental health, especially in more vulnerable populations such as children and adolescents with ADHD. Expanding knowledge of the psychopathological state of ADHD children and adolescents after the first wave of COVID-19 pandemic will allow us to detect those cases with a higher risk of psych emotional suffering as well as the way in which it is expressed. Our results have significant clinical implications in placing the importance of detecting negative mood obtaining information through multiple respondents with the aim to adapt therapeutic options to the pandemic situation.

Limitations

The present study contains some limitations, as its design is based on voluntary participation, so the information obtained is collected through self-administered questionnaires. A clinical evaluation would be required to discriminate those patients who express symptoms without experiencing a disorder from those who do meet diagnostic criteria.

On the other hand, this study describes a cross-sectional analysis, so it would be useful to analyse the situation reported by each caregiver and participant at the longitudinal level, which is the cumulative stress factor of the consequences of the pandemic.

Despite the small representation of our sample, the results of this study strongly show the presence of psych emotional discomfort in children and adolescents with ADHD after the first wave of the pandemic.

Conclusion

The Covid-19 pandemic and its consequences may exacerbate ADHD symptoms and associated problems. Increasing awareness on those populations that show higher emotional suffering as ADHD children and adolescents can help to improve more efficient mental health strategies adapted to the current situation.

Acknowledgment

Conflicts of interest

Xavier Estrada-Part received support from an Alicia Koplowitz Foundation grant. The sponsor played no role in study design, collection, analysis, interpretation of data, writing of the report, or in the decision to submit the paper for publication.

Summary

Preventive policies to contain the COVID-19 pandemic expansion as home confinement, the temporally closure of primary and secondary schools and physical distancing decreed by several countries created unprecedented challenges in daily lives population. High rates of emotional distress with symptomatology mainly from the anxious (54%) and depressive sphere (9%) were referred by ADHD children, while caregivers identified sleep disorders in 70% of the sample. Due to the disparity found between the psychological state referred by caregivers and by child and adolescent with ADHD we recommend multiple respondents for the state assessment.

On the other hand, the need to adjust the drug regime added to the levels of drug regime abandonment without medical indication were highly worrying, and reinforce the idea of the vulnerability of the studied population.

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