RELATIONSHIP BETWEEN ATTENTION DEFICIT HYPERACTIVITY DISORDER AND SEVERE SUBSTANCE USE DISORDERIN ADULT INPATIENTS: A CROSS-SECTIONAL STUDY

ABSTRACT

Objectives: To evaluate the frequency of Attention Deficit Hyperactivity Disorder (ADHD)in adults admittedfor treatment of severe chemical dependence in the Therapeutic Community Rios de Água Vivain Coronel Fabriciano, Minas Gerais.
Method: A cross-sectional study with male subjects aged 18 years or older, compared to age-matched men without chemical dependence on a 1:1 ratio. Data collection was performed by applying a questionnaire with the Fifth Edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-5) of American Psychiatric Association criteria for diagnosis of ADHD, also information on demographic profile, smoking and age of onset of psychoactive chemical substance use.
Results: Most patients have high school education (72.7%), are not married (93.2%) and are smokers (86.4%). From 44 patientswith SubstanceUse Disorder who were screened for ADHD symptoms, 22.7% screened positive for the disorder, while only 2.3% of the control group received this diagnosis ($p<0.001$). The most used drug was alcohol (100%), followed by cocaine-crack (47%) and in third place cannabis (4.5%).
Conclusion: Higher frequencies of ADHD symptomswere found among severe chemical dependents interned in Therapeutic Community.

*Keywords:*Attention Deficit Hyperactivity Disorder, Substance Use Disorder, Prevalence, Diagnosis, Therapeutic Community, adult inpatients.

1 - INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder defined in Diagnostic and Statistical Manual of Mental Disorders (DSM-5 – American Psychiatric Association 2013) [1] as a persisting pattern of inattention and hyperactivity/ impulsivity that interferes with functioning or development.

ADHD has developmental onset, typically in childhood, and has a high heritability [2]. The etiology of ADHD is also strongly influenced by environmental interactions [3]. Worldwide, this disorder has a childhood prevalence of 4-7% [4,5,6] and 2.5% in adults [7,8]. Approximately half to two-thirds of cases, childhood ADHD persists into adulthood [9,10,11,12], but ADHD is often underdiagnosed in adults [13,14] and brings harmful consequences for the individual when not treated. Among individuals with ADHD, the co-occurrence of other psychiatric disorders is frequent, in particular, Substance Use Disorder (SUD) [9].

International research revealed a wide variance in the prevalence of ADHD in SUD patients across countries and cultures [15,16,17], according to the main substance used, methodological factors, the setting (e.g. outpatient vs. inpatient) and different sample sizes. The International ADHD in Substance Use Disorders Prevalence(IASP) study estimated an international prevalence of 13.8% of ADHD in SUD patients [18,19].

The comorbidity between drug addiction and ADHD is associated with an earlier onset of substance use and a higher likelihood of use of a variety of substances [22, 23,24,25]. People with ADHD are at increased risk for poorer long-term outcomes,

including social, academic, and occupational functioning, poorer intellectual performance, worse health outcomes, teenage pregnancy, increased criminal convictions and mortality [25, 26, 27].

Impulsivity is a core symptom in ADHD and is associated with an increased risk for SUD, including alcoholism [29,30]. Cognitive impulsiveness (i.e. impulsive decision making) remains prominent in adult ADHD and is associated with a range of clinical consequences, including poor relational or professional stability [25,34]. Impulsive risk-taking activities among early adolescents may include drug and alcohol use, with may put them at higher risk of long-term use. Many studies and reviews show the complex correlation between ADHD and SUD [20,21]. Longitudinal follow up of children in the Multimodal Treatment Study of ADHD found that 64% of adolescents with ADHD were likely to engage in both alcohol and illicit drug use compared with 24% non-ADHD controls [25], making exposure to alcohol/substances one of the most important health-related issues for youth and young adults with ADHD [34]. The relationship is bidirectional: around 40% of adults with ADHD also have SUD [6,32]. It is still a knowledge gap to understand the role of ADHD in the context of patients institutionalized due to chemical dependence.

The treatment of patients with severe chemical dependence is a great challenge. In 1971, the GermanFrench psychiatrist Doctor Claude Olievenstein, specialist in the field of drug addiction, founded the first therapeutic community for treatment of severe chemical dependents in Paris, the Marmottan Center, due to low success rates achieved with other treatment attempts [33]. The importance of this study is to identify the strong association between ADHD and SUD, Thus, the correct identification and treatment of ADHD is an important tool in preventing and combat drug use.

Given the above, the aim of this study was to evaluate the relationship between ADHD and severe substance use disorder in adult inpatient men.

2 - MATERIALS AND METHOD

A cross-sectional study was realized with men aged 18 years or older, institutionalized for treatment of severe substance use disorder at the Therapeutic Community Rios de ÁguaVivain the city of Coronel Fabriciano, Minas Gerais, Brazil from January 01, 2022 to December 01, 2022. Individuals who showed signs of dementia and those who had decompensated psychiatric comorbidities during the period of application of the questionnaire were excluded: psychoses, severe depression, manic episode.

Data collection was performed by applying a questionnaire with the DSM-5 of American Psychiatric Association criteria in addition to sociodemographic data, smoking and age of onset of psychoactive substance use. This questionnaire had 18 items for evaluating the dimensions of inattention and hyperactivity-impulsivity, without any modification.

Furthermore, we asked other questions about the demographic profile of the inpatients.The definition of ADHD diagnosis was based on self-reported DSM-5 questionnaire, with the appropriate explanations made by the doctor and psychologists. The results for test–retest reliability of DSM-5 criteria was perfect (100%) agreement) for the diagnosis of ADHD [35].

All participants signed the Informed Consent Form.

This study was approved by the Ethics Committee atFaculdade de CiênciasMédicas de Minas Gerais.According to DSM-5 criteria, the diagnosis of ADHD is done in adults

who meet five criteria for inattention plus five criteria for hyperactivity/impulsivity. In addition, the symptoms must have started before age 12 years, occur in more than one location (e.g., home and work), and must interfere with or reduce the quality of social, academic, or professional functioning.

Sample size

The sample size was calculated to test the difference in prevalence of ADHD among men who are or are not in treatment of severe chemical dependence. Considering a significance level of 5%, minimum power of 80%, using prevalence data from previous studies [18,34,39], it was calculated that 44 cases and 44 controls were needed.

Data analysis

For data analyses, exploratory statistic technics were used which allowed a better visualization of the general characteristics of the data.

Data were presented in frequency tables with absolute frequencies and their respective percentages, as well as descriptive measures (mean, standard deviation, median, IQR – interquartile range - percentiles 25% and 75%) a the minimum and maximum values for quantitative data. For comparing categorical data, the Chi-square test was used and, when necessary, the Fisher test. For the comparison of quantitative variables, the ttest was used, due to its normal distribution.In all tests, the significance leveladopted was 5%, therefore comparisons whose p-value was loss than ore qual 5% were considered significant.The software used for the analyses was SPSS version 25.0.

3 – RESULTS

3.1 – Proportion of ADHD

From the 44 SUD patients who were screened for ADHD symptoms, 10 (22.7%) screened positive for the disorder ($p<0.001$), while only one men of the control group (2.3%) met the DSM-5 diagnostic criteria for ADHD.

Patients with chemical dependence have a higher percentage of ADHD (22.7%) compared to those who do not have chemical dependence (2.3%), $p = 0.004$ (Figure 1).

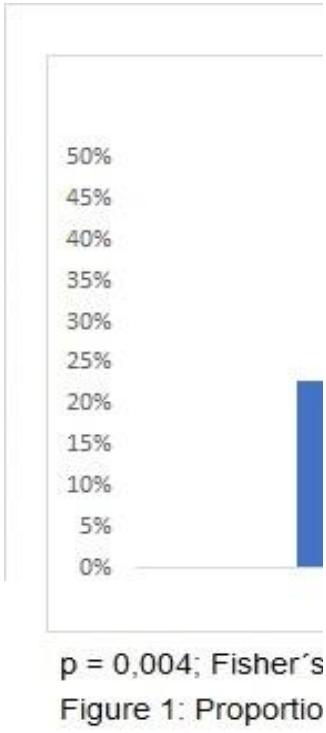

Figure 1: Proportion of ADHD in the evaluated groups

3.2 – Characterization of demographic profile of the patients

The average age was 42.3 years, ranging from 21 to 66 years. Most with high school education (72.7%) and single (72.7%) - Table 1

Table 1 – Characterization of the demographic profile of the interned patients (n=44) and the controls (n=44)

Variables	Mean (SD)
Age	42.32 (11.98)

Variables	Group		P Value
	Patients	Controls	
	n (%)	n (%)	
Marital status			
Married	3 (6.8%)	24 (54.5%)	**<0,001[q]**
Not married	41 (93.2%)	20 (45.5%)	
Schooling			
Iliterate	1 (2.3%)		
Elementary school	10 (22.7%)		
High school	32 (72.7%)		
University Education	1 (2.3%)		

SD: standard deviation; P25: percentile 25; P75: percentile 75

3.3 – Type of substance used by the patients

Table 2 shows the classification of the group of patients with chemical dependency according to the type of the substance used, and the age of onset of substance use. The use of alcohol and cocaine orcrack/were the most frequent: 100%.

Table 2 – Evaluation of the patients with chemical dependence according of the type of substance used and the age of onset (years)

Variables	Mean (DP)	Median (P25 - P75)	Min - Max
Onset of use (in years)	14.2 (3.7)	14 (12 – 15.25)	7 - 28
		n (%)	
Type of substance used			
Alcohol		44 (100%)	
Cocaine/Crack		21 (47.7%)	
Cannabis		2 (4.5%)	

3.4– Age of onset of substance used in patients with and without ADHD

In Table 3we have the evaluation of the age of beginning of substance use and the diagnosis of ADHD. There were no significant statistical differences among patients with severe Chemical dependence, with or without ADHD: the age of onset was similar in both (p = 0.592).

Table 3– Assessment of the age at onset of substance use in patients with and without ADHD

Variable	**ADHD**						**P (**v)
	No (n=34)			**Yes (n=10)**			
	Mean (SD)	Median (IQR)	Min - Max	Mean (SD)	Median (IQR)	Min - Max	
Age of onset (years)	14.38 (3.37)	14.00 (12.00 – 15.75)	10.00 – 28.0	13.50 (4.72)	13.50 (12.00 – 14.00)	7.00 – 24.00	0.592

t Test

3.5– Number of substances used

Most interned patients for treatment of Chemical dependence used more than one substance, as shown on the Table 4.

Table 4- Characterization of profile of the number of substances used by the interned patients for treatment of severe chemical dependence

Variables	n (%)	P(v)
Substance use		
One substance	26 (59.10%)	0.057*-
Two or more substances	18 (40.90%)	

*t Test

4 – DISCUSSION

As the main result of this study, we found that 22.7% of the individuals in the exposegroup have ADHD symptoms, while only 2.3% of the non-exposed group received this diagnosis.

In adults, instruments for self-reported symptoms of ADHD have shown adequate psychometric properties [36,37, 38].

It has been estimated that one quarter of those suffering from SUD have comorbid ADHD [38]. The present study corroborates these findings, since 22.7% of the SUD patients meet the DSM-5 diagnostic criteria for ADHD. The prevalence of ADHD among the control group encountered wasaccording to the international literature findings: 2,3% of the non-SUD versus 2.5% in the literature [7,8].

Although previous studies showed that substance using individuals with ADHD have earlier onset of substance abuse, higher impairment across several domains of daily life, and worse prognosis in treatment compared to non-ADHD abusers [, 40, 41], the difference of age onset of substance use did not appear in our sample. This may be due to the severity of SUD in patients who are referred for treatment in Therapeutic Communities and the small sample of cases.

This study also found a high prevalence of smoking and alcohol use among severe chemical dependents. These findings point to the importance of doing efforts to prevent alcohol and tobacco use among young people.

The prevalence of smoking in the control group was much higher than the median of Brazilian population. According to the National Cancer Institute (INCA, 2022), 9.1% of Brazilian population is a smoker: 11.8% of men and 6,7% of women. We assign this high prevalence of smoking in the control group (47.7%) possibly to the low economic level of most individuals in this group and the small sample size.

According to the Brazilian Institute of Geography and Statistics (IBGE), 21% of Brazilians have a University degree. Among the inpatients, only 2.7% had completed higher education. The Therapeutic Community Rios de Água Viva (TCRAV) serves needy patients at low cost and many patients free of payment. In addition, the average age of the patients is higher than the general population, which helps to explain the finding of only one patient with a university degree. Despite these considerations, further studies are needed to verify whether the prevalence of severe chemical dependence is lower among men who have a university degree.

Among patients with severe chemical dependence, only 6% are married. This data also contrasts with the data of Brazilian population: 47% of adult men are married and 57% declare to have some type of stable union, according to the IBGE. Severe chemical dependence is known to cause separation between couples [41]. Furthermore, being married may also act as a protective factor against substance abuse.

As a strength of this study, we point out the innovation of the investigation the relationship between ADHD and chemical dependence in the context of the patient interned in TC for treatment of severe chemical dependence.

As limitations, we point out the self-reported collection of age at onset of drug use: the memory bias may have altered the final data.

5 – CONCLUSIONS

The aim of this study was to determine association between severe SUD and ADHD. Aside from this, we wanted to explore the relationships between severe SUD and marital status, schooling, smoking and onset of substance use.

We found high prevalence of ADHD symptoms among the patients with severe SUD, low educational level and predominance of not married.

The main substance used by the patients interned for treatment of severe SUD is alcohol, followed by crack/cocaine. Cannabis appears in the third position. This can also be explained by the severity of the substance use disorder presented by patients who need institutionalization.

ADHD may be one of the risk factors for late chemical dependence. From a public health perspective, identifying ADHD in childhood or adolescence and continuous treatment and support would be best to lower risks of SUD, but identification of ADHD in early adulthood may be still relevant for the start of specific ADHD and SUD interventions.

The association between SUD and smoking, low educational status and not being married should be considered for future public policies to combat drug use, aiming for a less violent society, with better mental health.

8 – CONSENT

As per international standard, patients and control group written has been collected and preserved by the authors.

9 – ETHICAL APPROVAL

This study was previously approved by the Ethics Research Committee of Faculdade de CiênciasMédicas de Minas Gerais.
Registration: CAAE 59854722.9.0000.5134

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