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ORIGINAL ARTICLE

Repercussions of early stress on manifestations of impulsiveness in drug users

Repercussões do estresse precoce nas manifestações de impulsividade em usuários de drogas

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ABSTRACT

Objective: To analyze the relationship between stress and impulsive behavior in individuals with mental disorders related to substance use and abuse. **Method:** Cross-sectional analytical study. Assessments were performed using the Childhood Trauma Questionnaire and the Barratt Impulsiveness Scale. **Results:** Linear regression demonstrated a significant predictability of the total impulsiveness score explained by the total Childhood Trauma Questionnaire, emotional abuse and physical abuse ($p<0.05$). Motor impulsiveness was significantly predicted by total Childhood Trauma Questionnaire, emotional abuse, physical abuse and sexual abuse ($p<0.05$). Positive correlations between emotional and physical abuse and the impulsiveness score were identified. In linear regression models, emotional and physical abuse were the main variables influencing impulsiveness. **Conclusion:** Emotional and physical abuse in drug users influences the manifestations of impulsiveness, so it is pertinent to create strategies aimed at reducing the impacts of impulsiveness and underlying factors.

Descriptors: Substance-Related Disorders; Child Abuse; Impulsive Behavior.

RESUMO

Objetivo: Analisar a relação entre estresse e impulsividade em indivíduos com transtornos mentais relacionados ao uso e abuso de substâncias. **Método:** Pesquisa transversal e analítica. Avaliações foram realizadas pelo *Childhood Trauma Questionnaire* e pela Escala de Impulsividade de Barrat. **Resultados:** A regressão linear demonstrou uma significativa previsibilidade do escore total de Impulsividade explicada pelo *Childhood Trauma Questionnaire* total, abuso emocional e abuso físico ($p<0,05$). Impulsividade motora foi significativamente prevista pelo *Childhood Trauma Questionnaire* total, abuso emocional, abuso físico e abuso sexual ($p<0,05$). Foram identificadas correlações positivas entre abuso emocional e físico com o escore de impulsividade. Nos modelos de regressão linear os abusos emocional e físico foram as principais variáveis influenciadoras da impulsividade. **Conclusão:** O abuso emocional e físico em usuários de drogas influencia as manifestações de impulsividade, por isso é pertinente criar estratégias que visem diminuir os impactos da impulsividade e dos fatores subjacentes.

Descritores: Transtornos Relacionados ao Uso de Substâncias; Maus-Tratos Infantis; Comportamento Impulsivo.

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INTRODUCTION

In Brazil, two million three hundred thousand Brazilians showed alcohol dependence behavior and nearly five million used some illicit drug in the last 12 months, with a higher percentage among young people aged 18 to 24 years, making it a serious public health problem in the country[1]. Stress is one of the main risk factors for the development of drug addiction and a strong predictor of maintenance, high desire and relapse in drug use. Individuals who depend on psychoactive substances, whether legal or illegal, report experiences of stressful events before they sought or relapsed into drugs[2]. Given the prevalence of individuals who abuse substances such as alcohol and crack, the consumption of legal and illegal drugs deserves attention.

In this sense, scientific research that contributes to understand the etiology and consequences of substance use disorders is necessary, considering that addiction is related to a complex interaction between genetic and environmental risk factors[3]. Environmental issues related to early life experiences, such as trauma or maternal mental health trigger a process that produces lasting changes in the function of the biological system with future consequences for the development, behavior and health of these children. This biological process is called epigenetics and consists of dynamic molecular changes deposited in the nucleus of a cell[4].

Brain cell changes caused by the first social experiences in early life are known to contribute to individual differences in susceptibility and resilience to a range of physical and mental health outcomes. In this sense, it is widely hypothesized that drug-induced epigenetic alterations contribute to the aberrant cell function that drives the pathogenesis of drug dependence[5].

Scientific literature has documented the importance of early life experiences for mental health and the influence of these experiences on the etiology of substance use disorder, especially stressful experiences caused by abuse or neglect in childhood[6]. In this sense, early stress is defined as a multifaceted phenomenon characterized as an initial tension resulting from a variety of traumatic experiences experienced in childhood[7].

A theoretical framework suggests that children and youth exposed to early stress are more prone to develop cognitive preferences for short-term rewards. In this context of early stress, coping mechanisms are scarce and result in little or no reinforcement to delay gratification, generating impulsive behaviors. Impulsiveness is the result of a complex multidimensional construction characterized by different behavioral and cognitive patterns that lead to behavioral attitudes without properly thinking or considering the consequences of these actions[8].

Impulsiveness includes substrates that result in the conception of impulsiveness[9]. The first substrate refers to motor impulsiveness, defined by a behavior of non-inhibition of inconsistent responses with the context in which the person is inserted. The second substrate, attentional impulsiveness, is related to quick decision-making due to reduced sustained attention. Finally, impulsiveness due to lack of planning is the adoption of behaviors oriented to the present to the detriment of long-term consequences of the behavior[9].

Exposure to stress throughout life is related to impulsiveness, drug addiction and may reveal individual differences in decision-making related to impulsiveness that are not apparent in the absence of stress[10]. A study with drug users in a Brazilian context identified a strong association between early stress and impulsiveness, although the study sample included only crack users[11].

Although there is a high vulnerability of early stress to the development of impulsiveness, studies examining the specific role of different types of early stress through exposure to types of abuse and neglect in the different manifestations of impulsiveness in patients with substance use disorder are scarce. In part, this scientific gap occurs because studies with drug-dependent people are focused on impulsiveness as a characteristic of the disorder[12] instead of a neurocognitive adaptation to demands of the environment where one was raised, especially to early stress.

Given the critical role played by impulsiveness in individuals, especially during treatment for drug use, it is important to analyze the experiential mechanisms related to early stress that may underly impulsiveness. This study contributes to clinical practice by using scales that assess both impulsiveness and early stress in people with drug abuse. Thus, it can contribute to the adoption of more adaptive strategies aimed at developing a healthy coping style among addicts.

In this sense, the aim of the present study was to analyze the relationship between stress and impulsiveness in individuals with mental disorders related to substance use and abuse.

METHODS

Cross-sectional analytical study developed at the Psychosocial Care Center for Alcohol and Drugs (Portuguese acronym: CAPSad) in a city in the hinterland of the state of Goiás.

Patients with mental disorders related to substance use and abuse (International Classification of Diseases — ICD 10: F19.2) were recruited from the outpatient unit through non-probabilistic sampling. The approach and invitation were made by researchers themselves on the CAPSad premises before the medical care of all patients aged over 18 years who sought care at the outpatient health unit during the data collection period (from August 2018 to February 2019).

Participants evaluated by psychiatrists of the unit for the diagnosis of mental disorder due to substance use according to criteria of the Diagnostic and Statistical

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Manual of Mental Disorders (DSM-V) and confirmed by the Mini International Neuropsychiatric Interview (MINI) applied by researchers were included. Participants with any neurodevelopmental disorder related to intellectual or learning disabilities that could interfere with data collection were excluded from the sample.

After explaining the study objectives and procedure, participants provided written informed consent in duplicate. This study was reviewed and its protocol was approved by the Research Ethics Committee of the Universidade de Rio Verde (CAAE 49430015.0.0000.5077).

Measures

Demographic and clinical variables

Data regarding sex (male and female), age (in years), education (illiterate, primary, secondary and higher education), marital status (single/widowed/divorced or married), race/skin color (black, mixed race, white), employment (active or inactive), length of treatment (in years), type of chemical addictive substance (alcohol or crack) and age of entry into the first treatment were collected during the interview through a structured questionnaire designed for this study.

Mental disorder

The diagnosis of substance use disorder and exclusion disorders (neurodevelopmental disorder related to intellectual or learning disabilities) were obtained from patients' medical records and confirmed by applying the MINI. This instrument comprises a short standardized diagnostic interview lasting 15 to 30 minutes, is compatible with the DSM-V and ICD-10 criteria and appropriate for research in psychiatry[13].

Early stress

Early stress experiences were assessed using the short version of the Childhood Trauma Questionnaire (CTQ)[7], translated and validated into Brazilian Portuguese with an adult population using psychiatric and gynecological outpatient clinics in a public hospital[14]. It is one of the most used instruments for retrospective assessment of traumas experienced in childhood.

This self-report inventory comprises 28 items that assess five different types of early stress: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. Responses are measured on a five-point Likert-type scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always)[7].

The questionnaire assesses the five trauma subtypes that affect childhood: emotional abuse; physical abuse; sexual abuse; emotional neglect; physical neglect. Each subtype is scored between 5 and 25 points and the sum of points of each subtype results in the total score for the instrument, which can vary between 25 and 125 points. Patients are classified according to the score of each subtype of early stress by severity as follows: none to minimal; mild to moderate; moderate to severe; and severe to extreme. Patients classified as moderate to severe and severe to extreme were categorized as presence of the early stress subtype[7]. Cronbach's alpha in the sample of the present study was 0.80 in relation to the total CTQ score.

Impulsiveness

Impulsiveness was measured using the Barratt Impulsiveness Scale (BIS), version 10. This is one of the most commonly used measures in research and clinical practice. The BIS was translated and adapted to the Brazilian culture for application in adults[15].

The instrument consists of 30 items with answers on a four-point Likert-type scale (1 = rarely or never; 2 = occasionally; 3 = frequently; 4 = almost always/always), evaluating impulsiveness in three areas: motor impulsiveness, attentional impulsiveness, nonplanning impulsiveness. The result is the sum of items ranging from 30 to 120 points and high scores indicate the presence of impulsive behavior. There is no specific cutoff point for the instrument, which considers the higher the score the greater the impulsiveness[9]. In the current sample, Cronbach's alpha was 0.81, indicating the reliability of the instrument.

Statistical analysis

The results of categorical variables related to the sociodemographic profile of the sample are presented in frequency and percentage. Dependent variables are the impulsiveness subscales (BIS) and independent variables are the stress subscales (CTQ). The different types of trauma were categorized according to the score reported in the description of the CTQ instrument to compare the means of manifestations of impulsiveness according to exposure or not to trauma. Statistical analyzes were performed using the Statistical Package for the Social Sciences (SPSS, v. 27). The graph production was performed using the corr package of the R statistical program (v. 4.1.0).

Data distribution was assessed using the Shapiro-Wilk test, with a p-value <0.05 (Figure 1). After checking the distribution pattern of quantitative data, analyzes of means, standard deviation, and of the difference between means were performed using the t test for parametric data; the Levene test was used to assess the equality of variances (BIS) and the Mann-Whitney for non-parametric data (CTQ).

The scores of the different traumas resulting from the CTQ were used as quantitative variables and non-linear distribution to perform the Spearman correlation in order to check the association between variables related to early stress and impulsiveness variables. Correlations between variables were classified as "weak" (0.10–0.39), "moderate" (0.40–0.69) or "strong" (0.70–0.89).

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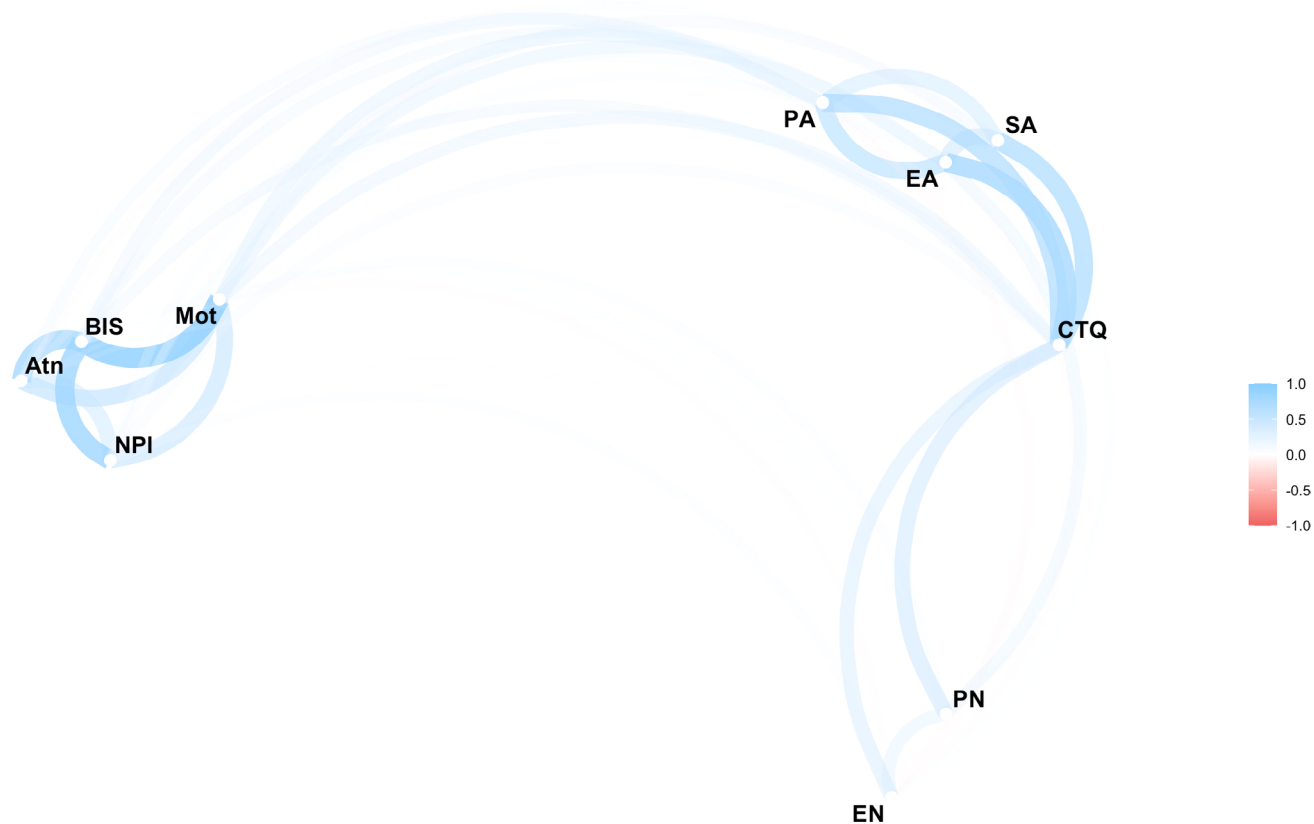
BIS: Barratt Impulsiveness Scale; Mot: motor impulsiveness; Atn: attentional impulsiveness; NPI: nonplanning impulsiveness; CTQ: Childhood Trauma Questionnaire; EA: emotional abuse; PA: physical abuse; SA: sexual abuse; EN: emotional neglect; PN: physical neglect.
*The blue color indicates positive correlation and the color intensity indicates the strength of the Spearman correlation ranging from +1 to -1. The proximity of the variables to one another represents the general magnitude of their correlations thus, we can visualize groups (clusters) of variables. **significant correlation at p<0.05

Figure 1. Spearman's correlation between early stress and impulsiveness variables. Brazil, 2019 (n=105).

Linear regression models were performed to assess if independent variables related to childhood trauma can predict dependent variables associated with impulsiveness. Before the performance of these analyzes, the Durbin-Watson test was used to confirm the non-existence of a high correlation between residuals, and the results ranged between 1.83 and 2.01. The absence of multicollinearity was evaluated using Variance Inflation Factor (VIF) values and data were ≤ 2.065. The standardized residuals were evaluated and the analyzes showed a percentage ≤ 2.85% of cases with values above 2, fulfilling the assumption of absence of outliers. The homoscedasticity was evaluated by normal probability plot of residuals and the assumption was reached. The evaluation of adjustment of the models was performed using ANOVA.

The R^2 of the regression analysis was described to represent how much variation of the dependent variables is explained by the independent variables inserted in the models.

First, simple linear regression analysis was performed in order to identify how each predictor variable (childhood trauma) predicted the different response variables (impulsiveness) in isolation.

Then, hierarchical models were built to perform multiple linear regression designed to examine the unique and cumulative contribution of patients' demographic variables (age and sex) and severity of drug dependence (SDS score) as stage 1 and scores of trauma in childhood total and subtypes in stage 2 associated with total impulsiveness as a dependent variable.

Variables related to childhood trauma were entered all at the same time and the forced insertion method of all variables in the model at different stages was used. The definition of the hierarchical regression model was guided by a theoretical framework demonstrating the influence of age, sex and severity of drug dependence on levels of impulsiveness in patients with alcohol use disorder[16].

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In the linear regressions performed, the value of the B coefficient and the standard error were reported, as well as the F statistics for analysis of the models and the p value. The statistical significance of the analyzes performed was considered in a two-tailed test when p<0.05.

RESULTS

The sample consisted of 105 patients diagnosed with substance use disorder. Sociodemographic characteristics of the sample show that most drug addicts were male (69.5%), young adults with a mean age of 39.49 (SD 11.96), black (47.6%), without a steady partner (71.4%), low educational level (57.1%) and that at the time of assessment, most patients did not exercise any work activity (70.5%). Regarding clinical variables, the type of drug use disorder, treatment time, age when starting treatment for the first time and early stress and impulsiveness scores are described in Table 1.

When comparing participants with or without experience of childhood trauma, the mean score of the BIS instrument showed statistically significant differences in the total score and in different impulsiveness aspects (Table 2).

Participants who suffered emotional abuse (49.5%) had significantly higher total (t(103)=-2.82; p=0.006) and motor (t(103)=-3.72; p<0.001) impulsiveness scores compared to patients without exposure to this abuse. The group that

Table 1. Sociodemographic, clinical and dimensional characteristics of patients with substance use disorder. Brazil, 2019 (n=105).

Variable	n	%	M (SD)	Variation
Sex				
Male	73	69.5		
Female	32	30.5		
Age group				
21–29 years	24	22.9		
30–49 years	58	55.2		
50 years or more	23	21.9		
Skin color				
Black	50	47.6		
Mixed race	33	31.4		
White	22	21		
Marital status				
Single/widowed/divorced	75	71.4		
Married	30	28.6		
Schooling				
Illiterate	16	15.2		
Primary school	60	57.1		
Secondary school	25	23.8		
Higher education	4	3.8		
Employment status				
Active	31	29.5		
Inactive	74	70.5		
Substance use disorder				
Alcohol	53	50.5		
Crack	52	49.5		
Treatment time			26.84 (46.17)	1–170
Age (years)			39.49 (11.96)	21–71
Age (years) when started treatment			32.77 (13.21)	11–68

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Table 2. Description of internal consistency (α) and mean of variables measured on the trauma (Childhood Trauma Questionnaire) and impulsiveness (Barratt Impulsiveness Scale) scales. Brazil, 2019 (n=105).

Scale variables	α	M (SD)	Variation
Total trauma	0.80	62.65 (16.43)	34–118
Emotional abuse	0.75	13.04 (5.49)	5–25
Physical abuse	0.88	10.58 (5.86)	5–25
Sexual abuse	0.90	8.58 (5.62)	5–25
Emotional neglect	0.66	15.48 (5.47)	5–25
Physical neglect	0.35	14.97 (3.96)	5–25
Total impulsiveness	0.81	70.06 (13.20)	36–103
Motor impulsiveness	0.51	24.52 (6.42)	11–38
Attentional impulsiveness	0.36	19.53 (4.02)	11–29
Nonplanning impulsiveness	0.70	26 (5.36)	12–38

α: Cronbach's Alpha; M: mean; SD: standard deviation.

Table 3. Comparison of trauma according to degrees of impulsiveness from the mean scores for the different dimensions of the Barratt Impulsiveness Scale and the subtypes of early stress. Brazil, 2019 (n=105).

Variable	N (%) 105 (100%)	Total impulsiveness M (SD)	Motor impulsiveness M (SD)	Attentional impulsiveness M (SD)	Nonplanning impulsiveness M (SD)
Emotional abuse		p=0.006*	p<0.001*	p=0.223	p=0.110
Absent	53 (50.5)	66.57 (11.01)	22.34 (5.66)	19.06 (3.59)	25.17 (4.98)
Present	52 (49.5)	73.62 (14.35)	26.75 (6.44)	20.02 (4.41)	26.85 (5.65)
Physical abuse		p<0.001*	p<0.001*	p=0.006*	p=0.033*
Absent	59 (56.2)	66.05 (12.20)	22.44 (6.12)	18.59 (3.61)	25.02 (5.29)
Present	46 (43.8)	75.20 (12.75)	27.20 (5.84)	20.74 (4.25)	27.26 (5.24)
Sexual abuse		p=0.587	p=0.136	p=0.698	p=0.881
Absent	66 (62.9)	69.53 (21.51)	23.80 (6.08)	19.65 (3.95)	26.06 (5.25)
Present	39 (37.1)	70.97 (14.41)	25.74 (6.88)	19.33 (4.20)	25.90 (6.62)
Emotional neglect		p=0.485	p=0.772	p=0.564	p=0.110
Absent	17 (16.2)	68 (12.32)	24.94 (6.17)	19 (4.12)	24.06 (5.25)
Present	88 (83.8)	70.54 (13.39)	24.44 (6.50)	19.64 (4.02)	26.38 (5.33)
Physical neglect		p=0.249	p=0.502	p=0.286	p=0.219
Absent	8 (7.6)	75.25 (13.57)	26 (6.14)	21 (3.25)	28.25 (6.92)
Present	97 (92.4)	69.63 (13.15)	24.40 (6.46)	19.41 (4.07)	25.81 (5.21)

M: mean; SD: standard deviation; *p<0.05.

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suffered physical abuse (43.8%) scored higher in total (t(103)=-3.73; p<0.001), motor (t(103)=-4.02; p<0.001) and attention (t(103)=-2.79; p=0.006) impulsiveness. Among patients who suffered sexual abuse (37.1%) there was no significant difference in the manifestations of impulsiveness (Table 3).

The frequency of exposure to emotional (83.8%) and physical (92.4%) neglect was considerably high in the evaluated sample. However, the scores of patients exposed to these traumas did not show significant differences in relation to total impulsiveness and subtypes compared to the unexposed group (Table 3).

Spearman's correlation coefficient analysis was used to determine the relationship between childhood trauma and manifestations of impulsiveness. Total impulsiveness showed a weak correlation and significantly associated with total score of trauma (r=0.285, p=0.003), emotional abuse (r=0.251, p=0.010) and physical abuse (r=0. 0.273, p=0.005). Motor impulsiveness showed a weak and statistically significant correlation with emotional abuse (r=0.326, p<0.001), a weak and significant correlation with physical abuse (r=0.320, p<0.001), and was significantly related to the total trauma score (r=0.323, p<0.001) (Figure 1).

Linear regression models were performed to assess the influence of the total CTQ score and trauma subtypes on the manifestations of impulsiveness.

Linear regression demonstrated a significant predictability of the total impulsiveness score explained by the total CTQ (F(1.103)=5.895, p=0.017), emotional abuse (F(1.103)=5.233, p=0.024) and physical abuse (F(1.103)=7.777, p=0.006). Motor impulsiveness regression showed that the total trauma score (F(1,103)=9.818, p=0.002), emotional abuse (F(1.103)=10.183, p=0.002), physical abuse (F(1.103)=11.755, p=0.001) and sexual abuse (F(1.103)=4.253, p=0.042) significantly predicted this type of impulsiveness. Regression analyzes of the other trauma variables did not show results that statistically predicted the different manifestations of impulsiveness (Table 4).

Data referring to the adjusted R^2 demonstrate the variation in manifestations of impulsiveness explained by childhood trauma. The model showed that the variation in total impulsiveness was explained by 4.5% of the total CTQ instrument, 3.9% of emotional abuse and 6.1% of the variation was explained by physical abuse. The variation of motor impulsiveness results was explained as follows: 7.8% by the total CTQ; 8.1% by emotional abuse, 9.4% by physical abuse and 3% of the variation in impulsiveness was explained by sexual abuse (Table 4).

Hierarchical multiple linear regression models were constructed (Enter method) with the independent variables related to demographic characteristics (sex and age) and severity of drug dependence at stage 1 and all subtypes of childhood trauma as variables at stage 2. Manifestations of impulsiveness were included separately as dependent variables (Table 5).

The first model explained 16.6% of the variation to total impulsiveness (F(8.96)=3.583, p=0.001). In the second regression model, motor impulsiveness was defined as a dependent variable in which 17.4% (F(8.96)=3.737, p=0.001) of its score variation was explained by the

Table 4. Linear regression between exposure to different types of trauma in childhood with different manifestations of impulsiveness. Brazil, 2019 (n=105).

Predictors	Total impulsiveness Beta	Motor impulsiveness Beta	Attentional impulsiveness Beta	Nonplanning impulsiveness Beta
Total trauma	0.233*	0.295*	0.071	0.165
R^{2**}	0.045	0.078	-0.005	0.018
Emotional abuse	0.220*	0.300*	0.064	0.133
R^{2**}	0.039	0.081	-0.006	0.008
Physical abuse	0.265*	0.320*	0.168	0.142
R^{2**}	0.061	0.094	0.019	0.011
Sexual abuse	0.102	0.199*	-0.047	0.048
R^{2**}	0.001	0.030	-0.007	-0.007
Emotional neglect	0.030	-0.049	0.013	0.123
R^{2**}	-0.009	-0.007	-0.010	0.006
Physical neglect	0.081	0.119	0.007	0.052
R^{2**}	-0.003	0.005	-0.010	-0.007

Beta: standardized Beta coefficient; *p<0.05; **adjusted R^2.

Table 5. Hierarchical linear regression models with manifestations of impulsiveness as dependent variables. Brazil, 2019 (n=105).

Predictors	Total impulsiveness Beta	Motor impulsiveness Beta	Attentional impulsiveness Beta	Nonplanning impulsiveness Beta
Emotional abuse	0.012	0.041	-0.100	0.055 (0.135)
Physical abuse	0.166	0.161	0.178	0.076 (0.117)
Sexual abuse	-0.075	0.023	-0.187	-0.068 (0.114)
Emotional neglect	0.053	-0.057	0.052	0.156 (0.101)
Physical neglect	0.073	00.132	0.046	-0.017 (0.149)
$R^2_{adjusted}$	0.166	0.174	0.140	0.043

Beta: standardized Beta coefficient.

independent variables. The variation in the attentional impulsiveness score was 14% explained by the variables included in the model ($F_{(8.96)}=3.110$, $p=0.004$). With a lower percentage of explanation, the model with dependent variable related to nonplanning impulsiveness had its variation explained by 4.3% of the independent variables ($F_{(8.96)}=1.585$, $p=0.139$) (Table 5).

The models mentioned above suggest the influence of trauma experienced during childhood on manifestations of impulsiveness in drug addicts when adjusted for sex and age.

DISCUSSION

When analyzing the relationship between stress and impulsiveness in individuals with mental disorders related to substance use and abuse, emotional and physical abuse influenced impulsiveness and in general, the traumas experienced in childhood influenced the impulsive behavior of these individuals. The study results contribute to scientific knowledge as this is one of the first studies in the Brazilian context assessing the influence of early stress on manifestations of impulsive behavior in patients diagnosed with substance use disorder.

Participants were diagnosed with alcohol use disorder, corroborating the national panorama that confirms alcohol as the most used substance in the national context[1]. Another disorder diagnosed was related to the use of crack, a worrying condition given the serious consequences that this substance causes on users, resulting in the need to seek outpatient care[1].

Impulsiveness and exposure to acute stress are two prominent factors that can alter reward-related learning and decision-making. Stress appears to reveal choice tendencies in individuals with a greater impulsiveness trait. From a biological perspective, traumatic childhood experiences are related to high levels of stress in a period of important development of brain architecture. The neuronal regions and activity impacted by early stress have also been associated with impulsive behavior

and traits. Studies assessing the specific influence of different types of early stress on impulsiveness are scarce, and in published studies, results are presented through a unitary view of impulsiveness without distinguishing between patterns of early stress related to impulsive personality traits[17].

From a social perspective, impulsiveness has been considered a factor that anchors response behaviors for coping with or avoiding social stressors and can be positively reinforced through the recurrence and chronicity of stress triggers.

The results demonstrate that the level of total impulsiveness differs significantly among patients who have been exposed to emotional and physical abuse. In motor impulsiveness, a significant difference between patients exposed to emotional and physical abuse was observed. The manifestations of attentional and nonplanning impulsiveness showed significant differences among drug addicts exposed to physical abuse. Physical and emotional abuse were the subtypes of early stress with the greatest influence on scores of manifestations of impulsiveness, in line with prior research[18].

In the present study, higher indices of total and motor impulsiveness demonstrated in patients with emotional victimization, such as emotional abuse, can be justified by the fact that during the process of child development, living in hostile and threatening care environments makes it difficult to learn in ways of positive regulation of emotions. This situation leads to impairment of emotional self-regulation, resulting in a tendency to act rashly to regulate negative emotions[19].

The occurrence of emotional abuse in the period of child development can lead to abnormal paths of maturation of emotional and impulsive regulatory processes that play an important role in influencing impulsiveness. In a recent systematic review and meta-analysis, a positive association between early stress and impulsiveness was found, showing the significant size of the effect of emotional abuse (OR=3.10; 95%CI 2.27–4.23) in this relationship which, according to the authors, is a result of emotional abuse being an inherently chronic phenomenon[20].

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Physical abuse was the subtype of early stress with the greatest influence and greatest correlational power with the total and motor impulsiveness score, unlike other studies that did not observe any influence of this early stress subtype on impulsive behavior[18].

In a study of young people from the community conducted in the USA, was identified a significant relationship between physical abuse in childhood and impulsive attitudes in the search for immediate sensations, characterizing a contributing environmental factor that influences the development of manifestations of impulsiveness[21].

The correlation observed between the total CTQ score, emotional and physical abuse and the final score of the BSI is noteworthy. A statistically significant association between motor impulsiveness and the total early stress score and emotional, physical, and sexual abuse subtypes was also found.

Understanding the aspects related to mechanisms underlying early stress and impulsiveness is significantly relevant to clinical practice because these variables, especially impulsiveness, affect treatment as it increases vulnerability to desire, resulting in a greater risk of relapse to drug consumption[22].

Exposure to early stress explains a considerable part of the variability of total and motor impulsiveness scores in the results found. When analyzed individually, the subtypes with greater influence on total impulsiveness were emotional and physical abuse. Regarding motor impulsiveness, in addition to the total early stress score, emotional, physical and sexual abuse significantly explained the variability of results.

Theoretical models demonstrate that exposure to different types of early stress leads to individual adaptations that reduce emotional self-regulation, thereby increasing the probability of developing impulsive personality traits[19].

By analyzing all types of early stress simultaneously, controlling sex and age- related factors, the variation in impulsiveness data was significantly explained by exposure to early stress subtypes.

Research with a neurobiological approach has shown that exposure to stress alters response systems and impairs neurocognitive functioning, which makes patients who experienced early stress more vulnerable to the development of an impulsive personality[23].

Changes in the neurocognitive and neurobiological systems interfere with the regulation of stress and emotion, and may, for example, increase responsiveness to stress. This increase in responsiveness has harmful consequences in several domains of life, as inhibiting strong emotions is crucial to maintain goal-directed behavior and self-control[24].

Brain systems that function well and respond to stress are essential for healthy development, as the ability to deal with new or potentially threatening situations is essential for survival[25]. This ability to respond to psychological and physical threats is built into specific brain circuits and its development is influenced by experiences beginning in childhood. However, a poorly controlled response to stress can be harmful to health and wellbeing if activated too often or for a long time[25].

The results of this study must be evaluated in light of its limitations. The first major limitation of the current results is the cross-sectional design, as potential causal mechanisms of change should be better studied in longitudinal research to further examine how cumulative stress can impact self-control. Another limitation refers to the relatively small sample size of drug users, which affects the possibility of generalizing the results. Another point is that early stress was assessed through a retrospective measure, which is not free from possible biases.

These findings have important theoretical and clinical implications, as the assessment of the history of early stress, particularly physical and emotional abuse, and their association with manifestations of impulsiveness can contribute to the construction of a therapeutic project and highlight the need for targeted care to this theme. Mental health professionals who assess drug-dependent patients with a history of physical and emotional abuse should analyze if there are manifestations of impulsive behavior that may interfere with the therapeutic process.

CONCLUSIONS

Based on the results of this study, it was possible to assess how facets of early stress influence the different manifestations of impulsiveness. Although exposure to emotional and physical neglect was high in participants of this study, physical and emotional abuse were the subtypes of early stress with the greatest influence on scores of manifestations of impulsiveness, with a more significant relationship for emotional and physical abuse among drug dependent people.

Furthermore, traumas experienced in childhood can influence the manifestations of impulsiveness in young, male drug dependent individuals.

The relevance of a study of this nature lies in the considerable burden exerted by early stress on the health system when individuals become ill due to impulsive behavior and drug addiction. In addition, when observing an intervention perspective, it is important to know which types of early stress exert the greatest impact on impulsivity traits so that priority actions are taken to contribute to self-regulation processes of impulsive behavior.

Understanding how children deal with stress is essential to strengthen the family support network and health services available to these children. Future longitudinal studies should be conducted to assess the effects of stress accumulated throughout life on the regulation of emotions.

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