Antisocial behavior in crack-cocaine users

Comportamento antissocial em usuários de cocaína-crack

Fernanda de Almeida Ribeiro, Fernanda Cerutti, Ana Carolina Maciel Cancian
Pontifícia Universidade Católica do Rio Grande do Sul. Av. Ipiranga, 6681, Partenon, 90619-900, Porto Alegre, RS, Brasil. fernandaribeiro66@hotmail.com, fecerutti@hotmail.com, anacancian@gmail.com

André Luiz Moreno
Universidade de São Paulo. Butantã, 03178-200, São Paulo, SP, Brasil. moreno.andreluiz@gmail.com

Irani Iracema de Lima Argimon, Margareth da Silva Oliveira
Pontifícia Universidade Católica do Rio Grande do Sul. Av. Ipiranga, 6681, Partenon, 90619-900, Porto Alegre, RS, Brasil. argimoni@pucrs.br, marga@pucrs.br

Abstract. Comorbidities associated with crack-cocaine use are one of the major challenges for those who provide psychiatric services to this population, however, there are few studies examining these comorbidities fees on users of crack-cocaine. Objective: To compare users of crack-cocaine with the general population in relation in antisocial behavior. Methods: Cross-sectional, quantitative and descriptive study, with a sample of 971 adults 18-59 years, chosen for convenience, divided into two groups – users of crack-cocaine and general population. To assess psychopathological aspects the Adult Self-report (ASR) was used. Results: A statistical analysis association through the chi-square test shows significant relationship between crack-cocaine users and antisocial behavior (p = .001). The binary logistic regression analysis by the backward conditional method has generated conditional adjusted variables for the gravity model for crack-cocaine use: male, adults in their 30s and 39 years, with low education and being in the clinical classification for problems with antisocial personality (OR = 14.466). Conclusions: The results found emphasize the importance of early detection of antisocial behavior associated with crack-cocaine users, which might improve the treatment and get better prognosis.

Keywords: crack-cocaine, antisocial behavior, psychopathology.

Resumo. Comorbidades associadas ao uso de cocaína-*crack* são um desafio para quem trabalha em serviços psiquiátricos com esta população, entretanto poucos estudos analisam o efeito destas comorbidades nos usuários. Objetivo: Comparar usuários de cocaína-*crack* com a população geral em relação ao comportamento antissocial. Método: Estudo transversal, quantitativo e descritivo com uma amostra de 971 adultos de 18-59 anos, escolhidos por conveniência, divididos em dois grupos – usuários de cocaína-*crack* e população geral. Para acessar aspectos psicopatológicos foi utilizado a escala *Adult Self-report* (ASR). Resultados: Uma análise estatística de associação realizada através do teste Qui Quadrado mostra uma relação significativa

Fernanda Ribeiro, Fernanda Cerutti, Ana C. Cancian, André L. Moreno, Irani Argimon, Margareth Oliveira

entre usuários de cocaína-*crack* e comportamento antissocial (p = 0.001). Uma análise de regressão logística binária pelo método *backward* gerou um modelo com características associadas à gravidade do uso de cocaína-*crack*: homens, adultos com idades entre 30 e 39 anos, com baixa escolaridade e classificação clínica para problemas de personalidade antissocial (OR = 14.466). Conclusões: Os resultados encontrados enfatizam a importância da detecção precoce do comportamento antissocial em associação com o uso de cocaína-*crack* para uma possível melhora do tratamento e um melhor prognóstico.

Palavras-chave: cocaína-*crack*, comportamento antissocial, psicopatologia.

Introduction

Crack-cocaine use is known worldwide. In the US, in 2013, 4.1% of the participants of a survey reported use of crack-cocaine (http://www.drugabuse.gov). In Europe, in 2012, severe crack-cocaine consumption led 18% of the users to seek treatment (EMCDDA, 2014) and in Brazil, in 2012, 1.3% of the individuals who participated in a national survey had already used crack-cocaine at least once in their lives (Laranjeira, 2014). This reality is alarming and has other complicating factors associated with the use of this substance.

A National Epidemiologic Survey in United States about epidemiology of DSM5 drug use disorder and other psychiatric comorbidity revealed significant associations between 12-month drug use disorder and antisocial personality disorder (OR, 1.4; 95% CI, 1.11-1.75) (Grant *et al.*, 2016). In Germany, a study that investigated comorbidities of substance use disorders with other mental disorders, showed that 62% of a sample of 150 female prisoners had substance use disorders, 90% had at least one other mental disorder and 49% had borderline or antisocial personality disorders (Mir *et al.*, 2015). In Spain, a study conducted by Vergara-Moragues *et al.* (2013) aimed to analyze the psychopathological profile of crack-cocaine users and found out that antisocial personality disorder (21.1%) was the most prevalent associated diagnosis.

In Brazil, data from a study on the occurrence of other psychiatric diseases in comorbidity with severe drug use showed a prevalence of 83.9% of a comorbid psychiatric disorder with severe drug use, and antisocial personality disorder was one of the most frequent diagnosis (Silva *et al.*, 2009). Another study conducted in Brazil indicated that antisocial personality disorder was the most prevalent comorbidity for crack-cocaine

users. This study revealed a greater predominance (24.8%, p = .013) of antisocial personality disorder in crack-cocaine users. These individuals also had more occupational diseases and social and legal problems than users of other psychoactive drugs. They were also more involved in illegal activities, such as theft and robbery and threats or burglaries (Kessler *et al.*, 2012).

The association between crack-cocaine use and antisocial personality disorder is also found in individuals seeking treatment. In a sample of 465 users of psychoactive substances undergoing treatment, 60.6% of the patients who had substance dependence had a current psychiatric comorbidity, and more than 30% had at least two psychiatric disorders. The most common diagnosis for Axis II Disorders was antisocial and borderline personality disorders, and male individuals showed a more significant rate for diagnosis. However, there are few studies on the rates of psychiatric comorbidities among hospitalized patients (Chen *et al.*, 2011).

In a sample of 110 individuals who sought outpatient services to treat cocaine use the prevalence of psychopathological comorbidity was 61.8%, and 20% showed antisocial personality disorder (Araos *et al.*, 2014). In an integrative review aimed to identify the most common psychiatric comorbidities in crack-cocaine users, the most frequently reported personality disorder was antisocial personality disorder. It was concluded that there is a high prevalence of psychiatric disorders among crack-cocaine users and that these co-occurring conditions interfere with successful treatment (Vasconcelos *et al.*, 2014).

Because of its high prevalence associated with the use of drugs, antisocial personality disorder has been investigated as a predictor of treatment success. Individuals with antisocial personality disorder have low frustration

tolerance, which interferes directly with the skills used to persevere in goals in adverse situations and is associated with deficient interpersonal skills and poor prognosis in substance abuse treatment (Sargeant *et al.*, 2011). Another aspect that may influence prognosis in the treatment of crack-cocaine users with antisocial personality disorder as a comorbid psychiatric disorder is the fact that these individuals exhibit more aggressive and impulsive behaviors compared to users without this psychiatric comorbidity (Moeller *et al.*, 2002).

In addition, according to decree no 7.179, of May 20, 2010, which established the integrated plan for coping with crack and other drugs, further studies and assessments are necessary for obtaining more information to support public policies for the prevention of use, treatment and social rehabilitation of drug users and for coping with crack and other illicit drugs trafficking (Decree No. 7.179, 2010).

These aspects reveal the importance of studying crack-cocaine use associated to antisocial personality disorder, since a better understanding of this profile of users may assist the elaboration of strategies and interventions targeted at this situation. Therefore, the present study aimed to compare crack-cocaine users and the general population regarding antisocial behavior.

Method

Participants

The sample was composed of 971 participants aged 18-59 years, with 63.2% male, 49.2% with higher education and average age of 31.13 (*SD* = 11.18). The discrepancy between the percentages is commonly found in this subject (Bastos and Bertoni, 2014; Sher *et al.*, 2015). Therefore, this difference was considered and controlled using the conditional method to guarantee homogeneity between groups. The pairing method was not used because we aimed to find as many drug effects that the drug users' group was exposed to as possible (Cepeda *et al.*, 2003; Medronho, 2003). The participants were selected from a convenience sample and were divided into two groups.

One group consisted of 407 crack-cocaine users with an average age of 31.55 (SD = 9.60), with secondary education (42.3%) and most were male individuals (87.5%). This prevalence of male crack-cocaine users is also reported in the literature (Bastos and Bertoni, 2014). The

participants were hospitalized in public and private specialized services for patients residing in the capital of Porto Alegre and in the metropolitan region. Inclusion criteria were participation during the 7th – 15th day period after cessation of use of psychoactive substances, and because of the cognitive abilities involved, a minimum of five years of formal education completed. Users of multiple drugs were allowed to participate in the study as long as they reported that the use of crack motivated their hospitalization. Patients who were taking medicines were also included in the study because the use of psychoactive drugs is common in psychiatric hospitalization.

The other group consisted of 564 participants from the general population with an average of 30.84 (SD = 12.19), higher education (62.6%) and most were female individuals (54.3%). All of them lived in the state of Rio Grande do Sul, mostly in the metropolitan region of Porto Alegre. The participants were men and women aged 18-59 years with a minimum of five years of schooling. Only individuals who were not undergoing any kind of psychological or psychiatric treatment and who were not diagnosed with mental disorders (including not being crack-cocaine users) participated in the study.

Instrument

A standardized questionnaire was developed and pre-tested specifically for this study, assessing socio-demographic data, including Brazil Economic Classification criteria (*Associação Brasileira de Empresas de Pesquisa* [ABEP], 2008), and the questionnaire also assessed history of substance use (such as age of onset, frequency and intensity of use in the last year and withdrawal).

The Adult Self-Report (ASR) was used to assess aspects of adaptive and psychopathological functioning in adults aged 18-59 years. The instrument contains 126 different items subdivided into four scales for major areas of assessment (Achenbach and Rescorla, 2003).

The first area of assessment is called scales that assess syndromes (internalizing, externalizing and intrusive behaviors). The second area of assessment is called scales that assess the adaptive functioning (family, work, marriage, friendships, education and general adaptive average) and the third area of assessment corresponds to scales that assess substance use (tobacco, alcohol, drugs and

Fernanda Ribeiro, Fernanda Cerutti, Ana C. Cancian, André L. Moreno, Irani Argimon, Margareth Oliveira

Table 1. Socio-demographic data related to the groups of crack-cocaine users and the general population.

Variable General Population* % (*n*)		Group		$p\chi^2$
		General Population* % (*n*)	Crack-Cocaine users** % (*n*)	
Gender	Male	45.7 (258)	87.5 (356)	<.001
	Female	54.3 (306)	12.5 (51)	
Education	Primary education	8.2 (46)	25.6 (104)	<.001
	Secondary education	23.6 (133)	42.3 (172)	
	Higher education	62.5 (353)	30.6 (125)	
	Postgraduate degree	5.7 (32)	1.5 (6)	
Age Range	18 to 29 years	61.0 (344)	49.2 (200)	<.001
	30 to 39 years	12.6 (71)	31.9 (130)	
	40 to 59 years	26.4 (149)	18.9 (77)	
Antisocial Personality Disorder	Normal	91.5 (515)	45.4 (184)	<.001
	Borderline	5.3 (30)	15.3 (62)	
	Clinical	3.2 (18)	39.3 (159)	

Notes: (*) ($N = 971$) Percentages obtained based on the total sample. (**) ($n = 407$) Percentages obtained based on the total values for each category of the variables. χ^2 – Pearson's Chi Square test; *n* – participants' number; % – Participants' percentages.

average of substance use). The last area of assessment is called Diagnostic and Statistical Manual of Mental Disorders – DSM – oriented scales (Clinical Disorders and Personality Disorders) (Achenbach and Rescorla, 2003).

There are specific cut-off points for each scale assessed for classification of the scores obtained within the normal, borderline or clinical range (Achenbach and Rescorla, 2003). A study on the evidence of the validity of the ASR was conducted with a sample of 1,444 individuals aged 18-59 years and who had completed at least five years of formal schooling. This sample comprised the general population, individuals addicted to drugs and individuals with clinical or emotional problems, for adaptation to the Brazilian reality. The formal consistency indexes found between the scales ranged from $\alpha = 0.70$ to $\alpha = 0.86$ (Lucena-Santos *et al.*, 2014).

Procedures

The research was approved by the local Research Ethics Committee (no 09/04941). The participants were informed on the objectives of the study and confidentiality and anonymity were ensured to them. The assessment was only performed after the participants expressed their acceptance and signed the Free Informed Consent.

The subjects from the general population were recruited in public places such as universities, or according to suggestions made by acquaintances. The collection of data from the population of crack-cocaine users was performed, after training, by psychologists and psychology graduate students in outpatient and inpatient facilities specialized in the treatment of drug abuse.

Data analysis

At first, in the analysis of data from the ASR, Assessment Data Manager (ADM) software for computer scoring was used, which is a resource for correcting ASEBA scales (Bolsoni-Silva and Marturano, 2010). Later, the computed data were exported and analyzed using Statistical Package for Social Sciences (SPSS). Descriptive analyzes (frequencies, means and standard deviations), analysis by association

using Pearson's chi-square test were performed, considering adjusted residual analysis. For the detection of potential predictors for the group of crack-cocaine users binary logistic regression analysis using the conditional stepwise backward method was performed.

Results

Investigation of the relationship between crack-cocaine use and the variable antisocial personality disorder showed a statistically significant association between the groups (general population and crack-cocaine users) and antisocial behavior ($p < .001$). The general population group was within the normal range: 91.5% ($n = 515$) regarding antisocial behavior, while the group of crack-cocaine users was classified in the borderline range: 15.3% ($n = 62$) and clinical range: 39.3% ($n = 159$). According to linear-by-linear association, the results indicated that the higher the severity of the scores in antisocial behavior, the greater the probability of belonging to the group of crack-cocaine users ($p < .001$).

Based on this result binary logistic regression analysis was used to predict an explanatory model of severity of use of crack-cocaine and potential predictors of this use. We attempted to control de effects of socio-demographic variables – gender, age range and education – on the study groups, since these variables are also representative in the association with the crack-cocaine group. Through this technique, the dependent variable (group of crack-cocaine users) and the independent variable (Antisocial Personality Disorder, as well as socio-demographic data) were defined in the initial (saturated) model. Table 2 shows a model of severity of use of crack-cocaine adjusted with the variables gender, age range, education and antisocial behavior.

Table 2 shows the crude odds ratios (*OR*), with significant risks estimated for the association with the group of crack-cocaine users in most results. In the comparison of crude *OR* with adjusted *OR* (conditional model) detected in the initial (saturated) model of logistic regression there was a decrease in the magnitude of risks, but not on its effect on the response related to antisocial personality outcome. Thus, the potential adjusted interaction factors were gender, age range and educational level.

Based on these estimates, the new Logistic Regression Analysis model was adjusted for the socio-demographic variables considered (unconditional model) to provide a more reliable response to the real influence of Antisocial Personality Disorder on the group of crack-cocaine users.

According to the results obtained in the adjusted model for the variables gender, age range and education related to the group of crack-cocaine users with antisocial personality disorder characteristics, the individuals classified in the borderline range for antisocial personality disorder were found to be at a risk 6.287 (95% CI: 2.722, 12.118) times higher of belonging to the crack-cocaine group compared to those classified into the normal range, with all the effects of the socio-demographic variables controlled. Also, the group within the clinical range for antisocial personality disorder showed a risk 14.466 (95% CI: 8.622, 18.694) times higher of belonging to the crack-cocaine group compared to those within the normal range, with all the effects of the socio-demographic variables controlled.

Discussion

The present study aimed to compare crack-cocaine users with the general population regarding antisocial behavior. Based on the analysis of socio-demographic data from crack-cocaine users, the profile of this population was characterized as follows: young male adults with low educational level. These findings are consistent with the profile of Brazilian crack-cocaine users characterized in the literature (Bastos and Bertoni, 2014; Ribeiro *et al.*, 2012). Besides, the high prevalence of the male gender is among the risk factors for antisocial personality disorder, a feature associated here to the symptoms of the disorder (APA, 2014). A study that investigated gender differences in the psychiatric comorbidity in people with antisocial personality disorder showed a prevalence of cocaine use disorder in 22% men and 7.3% women ($p = .01$) (Sher *et al.*, 2015).

The association between crack-cocaine use and antisocial behaviors was significant in the present study. Antisocial behaviors were indicated as potential predictors of severe crack-cocaine use. This association was also reported in other studies (Kessler, *et al.*, 2012; Narvaez *et al.*, 2014; Vergara-Moragues *et al.*, 2013).

The sample of crack-cocaine users in this study consisted of hospitalized patients, demonstrating a high prevalence of antisocial behaviors in these settings. Several studies have shown that psychoactive substance dependent

Fernanda Ribeiro, Fernanda Cerutti, Ana C. Cancian, André L. Moreno, Irani Argimon, Margareth Oliveira

Table 2. Initial model (saturated) for binary logistic regression analysis for predicting the drug user group.

Variables	Total Sample* (N = 971) n (%)	Crack-cocaine** (n = 407) n (%)	Crude OR OR [95% CI]	Adjusted OR OR [95% CI]
Gender				
Male	614 (63.2)	356 (58.0)	8.591 [5.911, 11.597]	5.911 [3.939, 8.868]
Female	357 (36.8)	51 (14.3)	1.0 [--]	1.0 [--]
Age				
18-29	544 (56.0)	200 (36.8)	1.125 [0.812, 1.558]	0.879 [0.580, 1.332]
30-39	201 (20.7)	130 (64.7)	3.377 [2.377 – 5.281]	2.611 [1.572, 4.334]
40-59	226 (23.3)	77 (34.1)	1.0 [--]	1.0 [--]
Education				
Primary education	150 (15.4)	104 (69.3)	12.058 [4.717, 30.821]	9.776 [2.968, 32.200]
Secondary education	305 (31.4)	172 (56.4)	6.897 [2.802, 16.979]	7.296 [2.301, 23.141]
Higher education	478 (49.2)	125 (26.2)	1.889 [0.771 – 4.724]	2.210 [0.704, 6.935]
Postgraduate degree	38 (3.9)	6 (15.8)	1.0 [--]	1.0 [--]
Antisocial Personality Disorder				
Normal	699 (72.2)	184 (26.3)	1.0 [--]	1.0 [--]
Borderline	92 (9.5)	62 (67.4)	5.784 [3.625, 9.230]	5.853 [3.354, 10.213]
Clinical	177 (18.3)	159 (89.8)	24.724 [14.763, 41.406]	16.303 [9.345, 28.440]
Adjusted model (gender, age range, education)				
Antisocial Personality Disorder				
Normal	699 (72.2)	184 (26.3)	--	1.0 [--]
Borderline	92 (9.5)	62 (67.4)	--	6.287 [3.722, 12.118]
Clinical	177 (18.3)	159 (89.8)	--	14.466 [8.622, 18.694]

Notes: (*) Percentages based on the total sample – n (%). (**) Percentages based on the total of each category of variables for the regression model; Crude OR (odds ratio): estimates of risks obtained from bivariate analysis to describe the group of crack-cocaine users; Parameters of model 1 (conditional): Pseudo-R2=0.513; "-2 log Likelihood=464,368 (Step 1=465.526); Hosmer and Lemeshow (p=0.928); Pearson's Chi-square (χ^2=464.368; p>0.05). Model adjusted for the variables gender, age range and education. Parameter of model 2: Pseudo-R2=.494; "-2 log Likelihood=872.993 (Step 1=867.888); Hosmer and Lemeshow (p=0.365); Pearson's Chi-square (χ^2=14.694; p>.05). Model adjusted for the variables gender, age range and education.

individuals were mostly treated in inpatient services. An analysis of five cross-sectional studies showed a lifetime prevalence of antisocial personality disorder in users of illegal substances of 22.9%, and this rate was higher for hospitalized users than for those treated on an outpatient basis. In addition, there was a higher prevalence of criminal records among the hospitalized users (Torrens *et al.*, 2011).

The present study highlights the importance of the assessment of comorbidities in crack-cocaine users. The Adult Self-Report scale of the Achenbach System of Empirically Based Assessment (Achenbach and Rescorla, 2003) includes both an aggression and a rule breaking scale, which assess antisocial behaviors. Previous studies also used the ASR to assess antisocial behaviors (Burt and Donellan, 2008; Diamantopoulou *et al.*, 2010). The ASR can provide not only an indication of co-occurrence of antisocial behavior but also a profile of the antisocial problems (more aggressive or

rule breaking behavior subtype), helping to clarify further directions of treatment based on individual characteristics.

Crack-cocaine use is an increasingly prevalent disorder known as being a difficult to treat condition. When its occurrence is associated with antisocial personality disorder, treatment success rates drop even further. Thus, for preventing treatment dropout in this context, Thylstrup and Hesse (2016) investigated the impact of a program to treat the impulsive lifestyle in patient with antisocial traits and drug use behavior. The results demonstrated the implication to interview with the antisocial traits in drug abusers.

Based on the assessment the providers can decide treatment targets and raise the treatment success rates. In a review of the psychological interventions for antisocial personality disorder, researchers indicate that contingency management with standard maintenance, Cognitive Behavior Therapy with standard maintenance and "Driving Whilst Intoxicated program" with incarceration (intervention based on motivational interview) might be effective interventions for improving substance use problems related to antisocial behaviors. The review highlights that there are no significant improvements in outcomes related to antisocial behaviors (Gibbon *et al.*, 2010). However, recent evidence suggest that clozapine can be effective in reducing impulsive behavior and anger, reducing therefore the clinical severity of antisocial personality behavior in hospitalized men (Brown *et al.*, 2014). Some authors hypothesized that prevention programs for substance abuse would also prevent antisocial behavior, from a behavioral-economic standpoint (Strand, 2002). It seems that these conditions are linked together, and the efforts related to prevention for drug use would also work to prevent both conditions.

The drug treatment models currently proposed in Brazil are multidisciplinary, including individual, family and social aspects, targeted to the most serious problems associated to drug users, such as psychiatric, legal and labor issues (Kessler and Pechansky, 2008). However, there are weaknesses in the process of recovery of patients hospitalized for crack-cocaine dependence. In a study involving such patients, these individuals claimed that health professionals give priority to medicinal and disciplinary aspects within the institution, resulting in a gap between the context of hospitalized crack-cocaine users, their needs and aspirations and the type of care provided by health professionals (Magalhães and Silva, 2010). Clearly, there is a need for national studies regarding assessment, treatment and prevention for this complex population.

Conclusions

The findings of the present study show significant relationships between antisocial behaviors and crack-cocaine use, and antisocial behaviors are potential predictive factors for severe use of crack-cocaine. Therefore, it is essential to identify antisocial behaviors in order to provide a more effective treatment for this condition.

One limitation of this study was the use of only one instrument, which limited the interpretations, since the ASR assesses aspects related to the last six months of the patients' lives, allowing only inferences on characteristics that precede drug use. Therefore, it is suggested that further studies use ASR concomitantly with other valid instruments in the assessment of psychopathological and personality aspects, since the DSM 5 indicates that when antisocial behavior is related to a substance use disorder, a diagnosis of antisocial personality disorder only occurs when signs of this condition in the past life of the individual are investigated, that is, from childhood to the present moment (APA, 2014).

The second limitation was the non-use of paired analysis. Since this study aimed to identify the factors that might predict severe crack-cocaine use in an exploratory approach, and it is mostly intended to equalize the confounding variables between cases and control groups, preventing the association between these variables and the outcome (Medronho, 2003), we decided not to use paired analysis. Because of these restrictions, in order to investigate the maximum number of possible effects to which the drug user group could be exposed, paired analysis was not used in this study. Therefore, we used logistic regression, a method traditionally used to establish an association between a binary outcome and a main independent variable, with control by a set of co-variables. We decided to adopt a conditional method that controls the association between confounders and the exposure/outcome of interest to address the lack of homogeneity between the treatment and control groups expected in observational studies (Cepeda *et al.*, 2003).

Fernanda Ribeiro, Fernanda Cerutti, Ana C. Cancian, André L. Moreno, Irani Argimon, Margareth Oliveira

The significant associations between the variables highlight major findings. These results demonstrate the importance of further studies aimed to identify other psychopathological disorders associated to crack-cocaine that may assist in drug prevention and in the delivery of a more appropriate treatment for these patients.

The studies indicate that the crack-cocaine use is a problem that has increased significantly in recent years and is aggravated by comorbidity with other mental disorders. This study found that crack-cocaine users were at a higher risk of developing antisocial behaviors than the general population.

Thus, we stress the importance of early detection of antisocial behavior associated to crack-cocaine use to improve the treatment and obtain a better prognosis. The present study contributes to the production of better strategies to prevent the use of crack-cocaine and the treatment of these users, with early identification of comorbidities that may influence the prognosis of these patients.

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