

# Factors Associated with Crack Cocaine Early Initiation: A Brazilian Multicentric Study

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## Research article

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# Abstract

**Background:** Crack cocaine is a serious public health issue, with many psychiatric and psychosocial consequences. The crack cocaine user is usually inserted in a context of great social vulnerability, often associated to violence, unstructured family functioning, antisocial peer factors and easy access to the consumption of alcohol, tobacco and illicit drugs such as crack, since an early age.

**Objective:** To compare whether there was a relative influence of risk and protection factors in several domains on the age of onset of crack use by therapeutic community patients.

**Methods:** This cross-sectional enrolled a consecutive sample of 577 patients admitted to 20 therapeutic communities located in different Brazilian states between September 2012 and September 2013. A detailed structured questionnaire was developed to be used that included investigations into possible pre-use predictive factors, such as parental monitoring in childhood, deviant behaviors and peer pressure, and subsequent factors such as deviant behaviors and involvement with crime. Student t test were performed to assess the association between associated factors and the mean age of onset of crack use.

**Results:** The presence of constant problems in the family relationship ( $p=0.0020$ ), situations of maltreatment ( $p=0.0162$ ), and the presence of deviant behaviors resulted in significant differences in the age at which crack consumption began. Whereas, adolescents who had parental monitoring until the beginning of adolescence started use later ( $p=0.000$ ).

**Conclusions:** The age of onset of crack consumption seems to be influenced by numerous combinations of protective and risk factors, within a system that integrates social environments, relationship groups, individual characteristics and behavior patterns, highlighting these factors will allow the development of prevention strategies, as well as specific control strategies, both based on scientific-based information.

## Background

Crack cocaine use – and other forms of smokable cocaine – is a serious public health problem that affects virtually all American countries and many nations from Central and Eastern Europe<sup>1,2</sup> even considering its prevalence much lower than other psychoactive substances. The crack user tends to develop severe pattern of dependence in very a short period time. The use of crack cocaine is also associated with several psychiatric comorbidities, including depression, antisocial personality disorder and suicide attempts<sup>3</sup>. The high number of sexual partners, sex-for-drug exchange and unprotected sex are regularly observed among these users resulting in elevated rates of infection by HIV and hepatitis B and C viruses, far exceeding those observed in the general population<sup>4</sup>. Evidence indicates elevated mortality rates among crack users well above international standards and homicide as the main cause of death<sup>5,6</sup>.

Since its emergence about 40 years ago, crack cocaine has been used mainly by marginalized and economically disadvantaged populations, such as immigrants, homeless, unemployed and low

educational level people. Such epidemiological profile usually comes from disorganized families with a high prevalence of psychiatric disorders, and high level of alcohol and drug consumption<sup>7,8,9</sup>. Exposure to violence and situations of abuse - inside or outside the family environment - is also recurrent in the history of such users, exacerbating the risk of future development of problems related to drug use, including crack cocaine<sup>4</sup>.

The first experience with crack cocaine usually occurs in the transition to adulthood, often following the exposure to alcohol, tobacco, marijuana and snorted cocaine<sup>10,11</sup>. The age of onset of consumption is influenced by numerous combinations of protective and risk factors, within a system that integrates social environments, relationship groups, individual characteristics and behavioral patterns<sup>11,12</sup>. Longitudinal studies with psychoactive substances have shown that the earlier the age of onset of consumption – beginning with alcohol and tobacco - the greater the likelihood to develop addiction to this substance, more serious consumption patterns and more problematic deviant behaviors<sup>12,13</sup>. Detaching the risk factors related to the age of onset of consumption allows not only environmental assessment for prevention strategies as well as specific control strategies, both of them based on scientifically based information<sup>14</sup>.

Many risk factors are predictors of drug use initiation, inside a complex and multifaceted frame which involve an interplay of genetic, psychological and social factors<sup>15,16,17,18</sup>. Individual and personality factors such as curiosity, impulsivity and sensation seeking are common in adolescence<sup>19,20,21</sup>. In addition, the perception of access is strongly related to the risk of starting the use of legal or illegal psychoactive substances<sup>22</sup>. The parent use of drugs and family conflicts also appear to be associated with future problematic behaviors<sup>14,23,24</sup>, as well as the interaction peer pressure<sup>16</sup>. The Brazilian National Survey of Crack Cocaine Users<sup>25</sup> found that the reasons that led half of the sample of Brazilians to use crack for the first time were curiosity (58.3%) followed by family conflicts (29.2%) and influence of friends (26.7%).

Considering the protective factors, studies with adolescent alcohol users indicate that parents who monitor their children's routine and disapprove drug use function as protective factors during adolescence for both: early onset and binge drinking<sup>18,26,27</sup>. In contrast, parents who drink or are permissive in relation to drug use, leave their children more vulnerable to early onset of substance use<sup>14,15,16,17</sup>.

According to the initial paragraphs, the crack user is inserted in a context of great social vulnerability, often immersed in cultures of violence<sup>28,29,30,31</sup> - within and outside the family scope - with easy access to the consumption of alcohol, tobacco and illicit drugs such as crack, since an early age<sup>32</sup>. This makes it even more important to understand the risk factors related to the age of onset of consumption of this substance, both as a diagnostic plan and as a preventive strategy.

In recent years, some cross-sectional and longitudinal studies have sought to investigate predictors of early initiation in crack users, generally from groups of patients of a single service or users of other

substances or injecting drug users (UDI) that also consumed crack<sup>11,33,34</sup>. In other situations, the study used specific populations - for example, adolescents in street situations<sup>13</sup>. Studies with multicenter population samples interested in this topic include all types of cocaine users<sup>35</sup>. Considering the importance and need of increasing the statistical evidence related to this theme, we designed a multicenter study which included all patients who sought treatment in twenty therapeutic communities (TCs) located in different Brazilian states over the course of a year and who identified crack as the substance that made them seek treatment.

## Methods

### Setting

This is a cross-sectional study which included therapeutic communities (n = 20) affiliated with the Brazilian Federation of Therapeutic Communities (FEBRACT), chosen by convenience according to the following requirements: (1) at least 10 years of existence, (2) having a professionalized and regularly trained health team; (3) being part of FEBRACT's teaching institutions. The geographic distribution of TCs are shown in Fig. 1. For logistic issues – such as internet resources and professional staff training – restricted the study in the south region of Brazil. The period of recruitment was 05 September 2012 to 05 September 2013.

### Subjects

During the period of the study, a total of n = 1,341 individuals presented at one of 20 TCs, considering all kinds of psychoactive substances. Of those, 719 crack users were voluntarily admitted in accordance with the psychiatric report brought by the patients (ICD 10 F14.2) – 25 (3.5%) refused to participate, while another 117 (16.3%) signed the consent form but quit treatment almost immediately, leaving at the end 577 (80.2%) patients capable to participate of the study. Only voluntary admissions were allowed in those facilities; all patients that need intensive medical/psychiatric care were previously not admitted.

### Instruments

A very detailed structured questionnaire was developed to be used in this survey and had been extensively pilot tested beforehand. The questionnaire was constructed based on three sources: the Drug Abuse Treatment Outcomes Study (DATOS)<sup>36</sup>, the Maudsley Addiction Profile (MAP)<sup>37</sup> and the Kenneth Kendler's Life History Calendar Interview, from Stress and Coping Project, Medical College of Virginia<sup>17</sup>.

### Procedures

All the interviewers (n = 41) were health professionals, trained locally by at least one member of the research group (n = 6) and remote surveillances were performed with the interviewers after the application of the questionnaire to elucidate further doubts, before the onset of the survey. In addition, study visits were conducted at all study sites by members of the survey team during the data collection period.

Interviews were administered within the first 15 days following treatment admission, based on an assessment of the participant's condition, such as clinical status, abstinence syndrome, adherence, motivation to be interviewed that time/day, among others. Interviews were conducted in a private room, in front of a computer, side by side with the patient, and take over two consecutive days and each of them lasting about one hour and a half. The structured questionnaire and the adopted scales were incorporated into an electronic research data platform (Sphinx iQ2®) allowing real-time data entry and storage in an online database. In order to monitor the quality of data collection a member of the study team was designated for each Brazilian state of the study and were responsible to verify each new entry, as well as, to visit the TC at least twice during the study period.

## Measures and Data

*(I) Family relationships* – the variables were extracted from Kenneth Kendler's Life History Calendar Interview, according two axis: *(I.A) Quality of relationships between the participants and their parents. Considering relationship problems between the participants and their parents*, response options were "yes" or "no" to items regarding whether the participant has been living continuously with his/her "mother" and "father". If a participant endorsed that event, he/she was then asked if there was any "experience [of] serious relationships problems with your [mother] [father] for at least one month". *(I.B) Neglect, maltreatment and violence. Considering patterns of violence between parents*, the participants had to respond "yes" or "no" to the question "From 8 to 18, did you live with your mother or stepmother and your father or stepfather while they were married for at least five years?". For those who endorsed the event, they were asked if their parents or step-parents use to "Never", "Rarely / sometimes" or "Often" "yell at" or "physically assaulted" each other. *Considering exposure to violence among parents*, response options were "yes" or "no" to items regarding whether the participant "have witnessed fights with physical aggression between parents or caregivers" ("Once / Rarely" or "At least once a month"). *Considering the presence of alcohol problems among parents*, the participants had to respond "yes" or "no" to the question "Did your [mother] [father] have trouble related to alcohol consumption?". *Considering neglect, maltreatment and domestic violence*, the participants had to respond "yes" or "no" to two questions: "During childhood or adolescence, have you ever felt yourself extremely mistreated – without food, shelter, medical care and deprived of your basic physical and emotional needs?" and "During childhood or adolescence, have you ever run away from home during the night?". *(II) Parent or caregiver monitoring* – response options were "No / A little" or "Very well" to four questions regarding parent monitoring: "Does your parents / caregivers really know" (1) "Who your friends were?", (2) "How you did spend your money?", (3) "Where you use to go in your spare time?", (4) "Were you use to go in your night walks?", considering three period of the participants' lives: 8–11, 12–14 and 15–18 years old. To help to put place the participant in the specific time, at the beginning of each period, the interviewer established the range of dates corresponding the age of the participant and encourage them to remember the name of his/her school name, three best friends, favorite TV show, favorite song and pastime. The participants were also encouraged to describe their home and bedroom and to tell a life story that was really remarkable for them by that time for about five minutes. *(III) Accessibility and permissivity for consumption among family members and peers* – questions were extracted from the Drug Abuse Treatment Outcomes Study

(DATOS) questionnaire<sup>37</sup>. *Considering the self-perception of accessibility*, response options “Very easy | Easy” or “Hard | Very hard” were used to define “From 15–17, how easily did you get”: “cigarettes”, “alcohol beverages”, “marijuana”, “snorted cocaine” and “crack cocaine”. *Considering parents permissivity*, response options “Yes | Partially” or “No” were used to describe if the parents “find normal” the participants “to get drunk” or to consume “cigarettes”, “marijuana” or “cocaine”, during adolescence. *Considering the influence of parents’ alcohol and drug consumption*, response options “Almost everyday”, “Weekly”, “Monthly or less” and “Never” were used to define how often parents/caregivers “Smoke cigarettes”, “Drink alcoholic beverages”, “Get drunk”, “Smoke marijuana”, “Snorted cocaine”. *Considering peer pressure*, response options “Nobody | A few | Some of them”, “Majority | Everybody” were used to define how regular was the contact of the participants with peers involved in “cigarette”, “alcohol”, “marijuana” and “crack-cocaine” consumption and problems related to it. (IV) *Deviance behavior – until 15*, response options were “yes” or “no” to items regarding whether the participant “have ever threatened someone with a gun”, “have ever hurt an animal on purpose – out of hunting” and “did you use to tell many lies”. Also, *Considering involvement in illegal activities until 18*, response options were “yes” or “no” to items regarding whether the participant “have you been in a youth detention center” and “have you been in a youth detention center for at least 3 months?”

## Statistical analyses

All analyses were conducted using the STATA 13.1 SE software. The normality of the variables was assessed using the Shapiro-Wilk test. Comparisons between groups were performed using Student *t* test. All statistical analyses assumed an alpha of 0.05.

## Results

Sociodemographic data of this study were published in detail elsewhere<sup>38</sup> the subjects of the study were composed mainly by men (n = 517, 89.6%), living alone (single, divorced or widow) (n = 448, 78.4%), with and average age of 30.8 years (SD = 7.7) – 73.9% were 34 years old or younger. They had a medium of 11.8 school years (SD = 4.4). Aspects related to religiosity have also already been published<sup>39</sup>. Average age of first use of crack-cocaine was 21.5 years (SD = 7.0 years).

### Family relationships

## Time spent with the parents, quality of the relationships and alcohol consumption

The majority of patients (71.9%) lived with their mother until the age of 17, apparently without interfering with the age of onset of crack consumption (p = 0.0616), even when she had problems with alcohol (p = 0.4911) (Table 1). The presence of constant problems of relationship with the mother favored the early onset of crack use (p = 0.0020). The absence of the father (p = 0.0003) and recurrent relationship problems related to him (p = 0.0013) resulted in significant differences in the age of onset of crack

consumption by the patients in the study. Problems with alcohol consumption by the father produced similar differences ( $p = 0.0009$ ) (Table 1).

Table 1  
Family relationships (n = 577)

Characteristic	N (%)	Average age of first crack use	SD (CI 95%)	P- value
Lived continuously with his/her mother until 17 years old (n = 541)	389 (71.9)	21.9 20.6	6.86 (19.5– 21.7)	0.0616
Yes	152 (28.1)		6.98 (21.2– 22.6)	
No				
Until the age of 17, did you experience serious relationships problems with your mother for at least one month? (n = 387)	143 (36.9)	20.5 22.7	6.36 (19.4– 21.5)	<b>0.0020</b>
Yes	244 (63.1)		7.22 (21.8– 23.6)	
No				
Lived continuously with his/her father until 17 years old (n = 544)	292 (53.6)	22.5 20.3	7.06 (21.7– 23.3)	<b>0.0003</b>
Yes	252 (46.4)		6.38 (19.6– 21.1)	
No				
Until the age of 17, did you experience serious relationships problems with your father for at least one month? (n = 291)	123 (42.1)	20.9 23.6	5.73 (19.9– 21.7)	<b>0.0013</b>
Yes	168 (67.9)		7.73 (22.4– 24.8)	
No				
From 8 to 18, how often did your parents or stepparents yell at each other? (n = 415)	298 (71.8)	22.2 21.8	6.91 (20.8– 23.6)	0.6918
Never / rarely / sometimes	117 (28.2)		6.54 (20.6– 23.0)	
Often				
From 8 to 18, how often did your parents or stepparents physically assaulted each other? (n = 417)	272 (89.2)	22.1 21.9	6.97 (21.3– 23.0)	0.8243
Never / rarely / sometimes	45 (10.8)		6.89 (19.8– 24.0)	
Often				

Characteristic	N (%)	Average age of first crack use	SD (CI 95%)	P-value
You have witnessed fights with physical aggression between parents or caregivers? (n = 539)	236 (43.8)	20.8	6.32 (20.0-21.6)	<b>0.0381</b>
Yes	303 (56.2)	22.1	7.39 (21.2-22.9)	
Did your father have trouble related to alcohol consumption? (n = 555)	297 (53.5)	20.6	6.47 (19.9-21.3)	<b>0.0009</b>
Yes	258 (46.5)	22.6	7.48 (21.7-23.5)	
Did your mother have trouble related to alcohol consumption? (n = 546)	82 (15)	21.1	7.22 (19.5-22.7)	0.4911
Yes	464 (85)	21.7	7.03 (21.1-22.4)	
During childhood or adolescence, have you ever felt yourself extremely mistreated – without food, shelter, medical care and deprived of your basic physical and emotional needs? (n = 570)	106 (18.5)	20.1	6.52 (18.9-21.4)	<b>0.0162</b>
Yes	464 (81.5)	21.9	7.08 (21.3-22.6)	
During childhood or adolescence, have you ever run away from home during the night? (n = 569)	213 (37.4)	20.4	6.87 (19.5-21.3)	<b>0.0018</b>
Yes	464 (62.6)	22.3	7.00 (21.6-23.0)	

## Neglect, maltreatment and violence

The presence of an extremely severe maltreatment episode during childhood or adolescence or scaping home at night during the same period. Both situations of violence were related to the early use of crack (p = 0.0162; p = 0.0018).

Knowing that during childhood or adolescence the parents screamed at each other or physically assaulted each other did not produce differences in the age of onset of consumption. In turn, having

witnessed physical aggression among them, yes ( $p = 0.0381$ ).

## Parent or caregiver monitoring

The study patients whose parents knew their friends ( $p = 0.0081$ ) and knew how they spent their free time ( $p = 0.0006$ ) during the late period of childhood (8–11 years) started crack consumption later (Table 2). Both parental monitoring actions, added to the control of personal expenses, continued related to the increase in the age of onset of crack consumption, when applied in early adolescence (12–14 years) ( $p = 0,000$ , for all). However, parental monitoring is no longer a factor related to the increase in the age of onset of consumption from 15 years of age (Table 2).

Table 2  
Parent monitoring through late childhood and adolescence

Do your parents / caregivers really know:	8–11 years (n = 542)			12–14 years (n = 526)			15–17 years (n = 483)		
	No   A little	Very well	P-value	No   A little	Very well	P-value	No   A little	Very well	P-value
Who your friends were? N (%)	282 (52)	260 (48)	<b>0.0081</b>	355 (67.4)	171 (32.6)	<b>0.0000</b>	379 (79.5)	98 (20.5)	0.371
Average age (SD)	20.9 (6.42)	22.5 (7.44)		20.6 (6.12)	23.6 (7.76)		21.7 (7.13)	21.0 (6.18)	
CI 95%	20.1– 21.6	21.6– 23.4		20.0– 21.2	22.4– 24.7		21.0– 22.4	19.7– 22.2	
How you did spend your money? <sup>1</sup> N (%)	157 (43.1)	207 (56.8)	0.1137	309 (58.7)	163 (30.9)	<b>0.0000</b>	394 (83.4)	79 (26.6)	0.4441
Average age (SD)	22.4 (7.78)	21.2 (6.39)		20.3 (6.12)	23.1 (7.16)		21.7 (7.22)	21.1 (6.13)	
CI 95%	21.2– 23.7	20.4– 22.1		19.6– 21.0	22.0– 24.2		21.0– 22.4	19.7– 22.4	
Where you use to go in your spare time? N (%)	250 (46.2)	291 (43.8)	<b>0.0006</b>	370 (70)	158 (30)	<b>0.0000</b>	402 (83.4)	80 (26.6)	0.0599
Average age (SD)	20.6 (6.38)	22.6 (7.39)		20.5 (6.12)	24.2 (7.97)		21.9 (7.16)	20.2 (6.08)	
CI 95%	19.8– 21.3	21.8– 23.5		19.9– 21.2	23.0– 25.5		21.2– 22.6	18.9– 21.6	

(1) 178 participants between 8–11 years of age, 53, between 12–14 years of age and 8 between 15–18 years of age reported no access to money at all by that time.

Perceptions related to easiness in accessibility and permissivity for consumption among family members and peers, during adolescence (15–17 years)

# Perception related to easiness in accessibility for consumption

At the end of adolescence (15–17 years-old) the perception related to easiness in accessibility for consumption of alcohol, marijuana, snorted cocaine and crack were all related with earlier crack cocaine initiation. Only the perception related to accessibility to tobacco did not show a statistic difference (**Table 3**).

Table 3: Perceptions related to easiness in accessibility and permissivity for consumption

<b>Between 15-17, how easily did you get:</b>	<b>Very easy   Easy</b>	<b>Hard   Very hard</b>	<b>P-value</b>
<b>Cigarettes (tobacco) (n=564)</b>	557 (98.7)	7 (1.3)	
Average age (SD, CI 95%)	21.5 (6.89, 20.9-22.0)	24.0 (11.61, 11.8-36.1)	0.3824
<b>Alcohol drinks (n=564)</b>	547 (97)	17 (3)	
Average age (SD, CI 95%)	21.4 (6.82, 20.8-22.0)	25.5 (9.80, 20.3-30.7)	<b>0.0204</b>
<b>Marijuana (n= 561)</b>	501 (89.3)	60 (10.7)	
Average age (SD, CI 95%)	20.9 (6.62, 20.3-21.5)	26.8 (7.52, 24.8-28.7)	<b>0.0000</b>
<b>Cocaine ("snorted") (n=560)</b>	388 (69.3)	172 (30.7)	
Average age (SD, CI 95%)	20.1 (6.24, 19.4-20.7)	24.9 (7.36, 23.8-26.0)	<b>0.0000</b>
<b>Crack cocaine (n=559)</b>	221 (39.5)	338 (60.5)	
Average age (SD, CI 95%)	17.1 (4.21, 16.5-17.6)	24.5 (6.87, 23.7-25.2)	<b>0.0000</b>
<b>During childhood and adolescence, do your parents or caregivers find normal an adolescent:</b>	<b>Yes   Partially</b>	<b>No</b>	<b>P-value</b>
<b>To smoke cigarettes (tobacco)? (n=519)</b>			
Average age (SD, CI 95%)	131 (25.2)	388 (74.8)	
	20.9 (7.17, 19.7-22.1)	22.0 (6.81, 21.3-22.7)	0.109
<b>To drink alcoholic beverages? (n=520)</b>			
Average age (SD, CI 95%)	154 (29.5)	366 (70.5)	
	21.4 (6.72, 20.3-22.4)	21.9 (6.96, 22.1-22.6)	0.468
<b>To get drunk? (n=520)</b>	70 (13.4)	450 (86.6)	
Average age (SD, CI 95%)	21.2 (6.95, 19.6-22.9)	21.8 (6.90, 21.2-22.5)	<b>0.0474</b>
<b>To smoke marijuana? (n=521)</b>	18 (3.4)	503 (96.6)	
Average age (SD, CI 95%)	20.7 (7.34, 17.0-24.3)	21.8 (6.89, 21.2-22.4)	0.498
<b>During childhood / adolescence, how often do your parents / caregivers:</b>	<b>Almost everyday  </b>	<b>Monthly   Never</b>	<b>P-value</b>

	Weekly		
<b>Smoke cigarettes (tobacco) (n=519)</b>	380 (73.2)	139 (26.8)	
Average age (SD, CI 95%)	22.0 (7.17, 21.3-22.8)	20.8 (6.05, 19.8-21.9)	0.0810
<b>Drink alcoholic beverages (n=521)</b>	299 (57.3)	222 (42.7)	
Average age (SD, CI 95%)	21.7 (6.64, 20.9-22.4)	21.8 (7.24, 20.9-22.8)	0.7991
<b>Get drunk (n=519)</b>	187 (36.1)	332 (63.9)	
Average age (SD, CI 95%)	20.9 (6.19, 20.0-21.8)	22.2 (7.22, 21.4-23.0)	<b>0.0474</b>
<b>Smoke marijuana (n=516)</b>	48 (9.2)	468 (90.8)	
Average age (SD, CI 95%)	20.5 (6.52, 18.6-22.4)	21.9 (6.94, 21.2-22.5)	0.198
<b>Snorted cocaine (n=515)</b>	28 (5.4)	487 (94.6)	
Average age (SD, CI 95%)	19.8 (4.99, 17.8-21.7)	21.9 (7.01, 21.2-22.5)	0.122
<b>Between 15-17, how many friends of yours use to:</b>	<b>Nobody   A few   Some</b>	<b>Majority   Everybody</b>	<b>P-value</b>
<b>Smoke cigarettes (tobacco) (n=557)</b>	216 (38.7)	341 (61.3)	
Average age (SD, CI 95%)	22.6 (6.97, 21.7-23.6)	20.7 (6.77, 20.0-21.5)	<b>0.0017</b>
<b>Drink alcohol (n=557)</b>	201 (36)	356 (63)	
Average age (SD, CI 95%)	23.3 (7.57, 22.3-24.4)	20.4 (6.27, 19.8-21.1)	<b>0.0000</b>
<b>Get drunk (n=557)</b>	264 (47)	295 (53)	
Average age (SD, CI 95%)	22.9 (7.27, 22.0-23.8)	20.2 (6.29, 19.4-20.9)	<b>0.0000</b>
<b>Have problems related to alcohol use (n=553)</b>			
Average age (SD, CI 95%)	324 (58.5)	229 (41.5)	
	22.5 (7.32, 21.7-23.4)	20.0 (5.99, 19.3-20.8)	<b>0.0000</b>
<b>Smoke marijuana (n=556)</b>	283 (50.9)	273 (49.1)	
Average age (SD, CI 95%)	23.0 (7.07, 22.2-23.8)	19.9 (6.36, 19.1-20.6)	<b>0.0000</b>
<b>Smoke crack cocaine (n=555)</b>	498 (89.7)	57 (10.3)	

Average age (SD, CI 95%)	22.2 (6.84, 21.6-22.8)	15.4 (3.89, 14.4-16.4)	0.0000
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## Permissiveness of alcohol, tobacco and drug use at home

According to the study results the the fact that parents found "normal" their sons/daughters to use alcoholic beverages, tobacco and marijuana, as well as consuming these substances themselves and snorting cocaine was not a predictive factor for the early initiation of crack use. On the other hand, parents find "normal" for their sons/daughters to be drunk, get drunk themselves were associated with the early onset of crack use ( $p = 0.0474$ , for both cases).

### Peer factors

Considering the substance use among friends, those who had the "majority/everybody" of the friends adhering to the same type of drug (tobacco, alcohol, marijuana and crack cocaine) and pattern of consumption (to get drunk, to have problems related to alcohol use), were more likely to start crack consumption earlier. Apparently, the age of onset of crack use has decreased, as you have moved from tobacco to crack cocaine (**Table 3**).

## Deviance behavior and contact with youth justice system

Among the deviance behaviors committed before 15 years old, threatening someone with a gun ( $p = 0.000$ ), telling many lies ( $p = 0.0086$ ) and assaulting stores, children or the on parents ( $p = 0.001$ ) were all predictors of crack cocaine onset of use, as well as, had been in a detention center independently the amount of time (Table 4).

Table 4: Deviance behavior

Characteristic	N (%)	Average age of first crack use	SD (CI 95%)	P-value
<b>Until 15, have you ever threatened someone with a gun? (n=567)</b>				<b>0.0000</b>
Yes	172 (30.3)	19.4	5.8 (18.5-20.2)	
No	395 (69.7)	22.5	7.3 (21.8-23.3)	
<b>Until 15, have you ever hurt an animal on purpose – out of hunting (n=566)</b>				<b>0.2546</b>
Yes	198 (35)	21.1	6.5 (20.2-22.0)	
No	368 (65)	21.8	7.3 (21.1-22.6)	
<b>Until 15, did you use to tell many lies? (n=566)</b>				<b>0.0086</b>
Yes	406 (71.7)	21.1	6.8 (20.4-21.8)	
No	160 (28.3)	22.8	7.5 (21.6-24.0)	
<b>Until 15, you used to steal things from stores, children or your parents (n=566)</b>				<b>0.0001</b>
Yes	283 (50)	20.5	6.2 (19.7-21.2)	
No	283 (50)	22.7	7.6 (21.8-23.6)	
<b>Until 15, Have you ever assaulted a child to the point of sending him to the hospital? (n=565)</b>				<b>0.2069</b>
Yes	141 (25)	20.9	7.2 (19.7-22.1)	
No	424 (75)	21.8	7.0 (21.1-	

			22.5)	
<b>Until 18, have you been in a youth detention center? (n=571)</b>				
Yes	95 (16.6)	19.0	7.2 (21.5- 22.7)	<b>0.0001</b>
No	476 (83.4)	22.1	6.0 (17.8- 20.3)	
<b>Until 18, have you been in a youth detention center for at least 3 months? (n=570)</b>				
Yes	32 (5.6)	18.2	4.2 (16.7- 19.7)	<b>0.0051</b>
No	538 (94.4)	21.7	7.1 (21.1- 22.3)	

## Discussion

As far as the authors' knowledge goes, this is the first multicenter study that has investigated the risks associated with the initiation of crack use in treatment seeking individuals.

A supportive family environment with a strong bond to family members and a low level of family conflict predicted a lower risk for illicit drug initiation during adolescence<sup>40</sup>. In this sense, but in an opposite way, relationship problems with both parents – including violence between them – paternal absence and problematic alcohol consumption by the father were predictors for crack use among the participants of this study. A systematic review of prospective studies investigated the causal inferences between parents' and children's alcohol consumption and observed that sometimes only the father and in others only the mother appeared as predictors of alcohol use by their children<sup>23</sup>.

In the present study, the presence of parental monitoring lost efficacy from the late period of childhood until the end of adolescence, when it did not interfere in the age of onset of crack consumption in the participants. Similarly, cohort study followed a group of students (n = 808) for 11 years, interviewing them on seven occasions until they were 21 years old and noticed that parental monitoring was related to the low incidence of initiation to drug use only until the age of 15, when it ceased to function as an independent variable, when peer predictors were added<sup>40</sup>.

Peer pressure is certainly one of the most striking influences, especially when it appears predominantly in the social repertoire of the individual. Its magnitude gains definitive contours from late adolescence (15 years), weakening after adulthood<sup>14,35,40</sup>. In the present study, the predominance of alcohol and drunkenness, marijuana and crack use among the participants' friends was related to the early onset of crack use. According to the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), which interviewed 43,093 residents of the 50 U.S. states (2001–2002) to common address specific risk factors associated with initiation of nicotine, alcohol, cannabis, and cocaine use, the facilitated access to the different substances and peer pressure may both act progression links between substances such as alcohol, marijuana and cocaine<sup>35</sup>.

The behavior of the participants related to the difficulty of framing norms and rules such as assault on stores, threat to armed labor and recurrent use of lies, all before the age of 15, as well as, have spent some time in a youth detention center were related to the early onset of crack use. The relationship between delinquency and increased risk for the initiation of psychoactive substances is relatively established<sup>41,42</sup>. A study of street boys in Canada pointed out that episodes of "early serious delinquency" (ESD) – at aged 12 or younger – such as using a weapon broken into a building or having stolen an expensive object was related to drug initiation<sup>13</sup>. Studies interested in observing predictive factors of the first episode of drug use have noted that deviant behaviors are capable of responding to both parental bond and monitoring, as well as to antisocial behaviors related peer pressure<sup>14,35,40</sup>.

In this sense, considerations about the ability of parental monitoring and parental bond to contain the peer factors effects related to early crack cocaine initiation, stepping from the structuring of specific social programs capable of assisting family conflicts and deviant behaviors, as well as social projects and administrative norms capable of generating a protective environment seem to be potential benefits of this investigation.

## **Strengths and Limitations**

Our article has some potential limitations. It is a cross-sectional study which preclude us to establish causality from the analyzed variables and age at crack cocaine initiation. Besides been a multicentric study, from different Brazilian regions, the participants were selected from a specific setting (treatment), and inside of it from an unique ambient (therapeutic communities), which prevents broad generalizations. The interviews were based on retrospective data recalled by the patients, so the evocations of the facts may have suffered recall bias. However, there is some evidence to suggest that self-reported drug use is a reliable and valid method<sup>43,44,45</sup>, and the research team took specific efforts to help the interviewers to recall the required information. Finally, in addition to the variables investigated, other important and well-established factors in the international literature have not been investigated in depth, such as the presence of genetic factors and psychiatric disorders. In addition, longitudinal studies may elucidate the causality of these variables investigated in the outcome of crack use.

## **Conclusions**

The present study pointed that problems with relationship between crack cocaine users and their parents (bonding), different forms of marital violence – both of them probably mediated by parenting alcohol use, parenting monitoring, peer pressure and deviance behaviors were associated with earlier crack cocaine initiation. All of those should be important targets of preventive efforts, by constructing psychosocial structures capable of reducing exposure and improving the quality of connection with protection networks in order to avoid/delay experimentation.

## Declarations

**Ethics approval and consent to participate:** All the participants were informed about the aims and procedures for this survey and provided written informed consent. The survey was approved by the local Institution Review Board (IRB) of Federal University of Sao Paulo under the registration number CAAE 00559212.1.0000.5505.

### Availability of data and materials

The datasets generated and/or analyzed during the current study are available in the Open Science Framework repository, <https://osf.io>. Type of data that will be shared: Sample questionnaire and database.

**Competing interests:** The authors declare that they have no competing interests.

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### Authors' contributions

MR and RL conceived and designed the study. MR and LOP performed the data collection. MR and LOP were in charge of analysis and interpretation, and LOP performed the statistical analysis. LOP and MR wrote the article, which was critically revised by MR and RL. All authors read and approved the final version. LOP and MR are publicly responsible for the content.

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## Figures

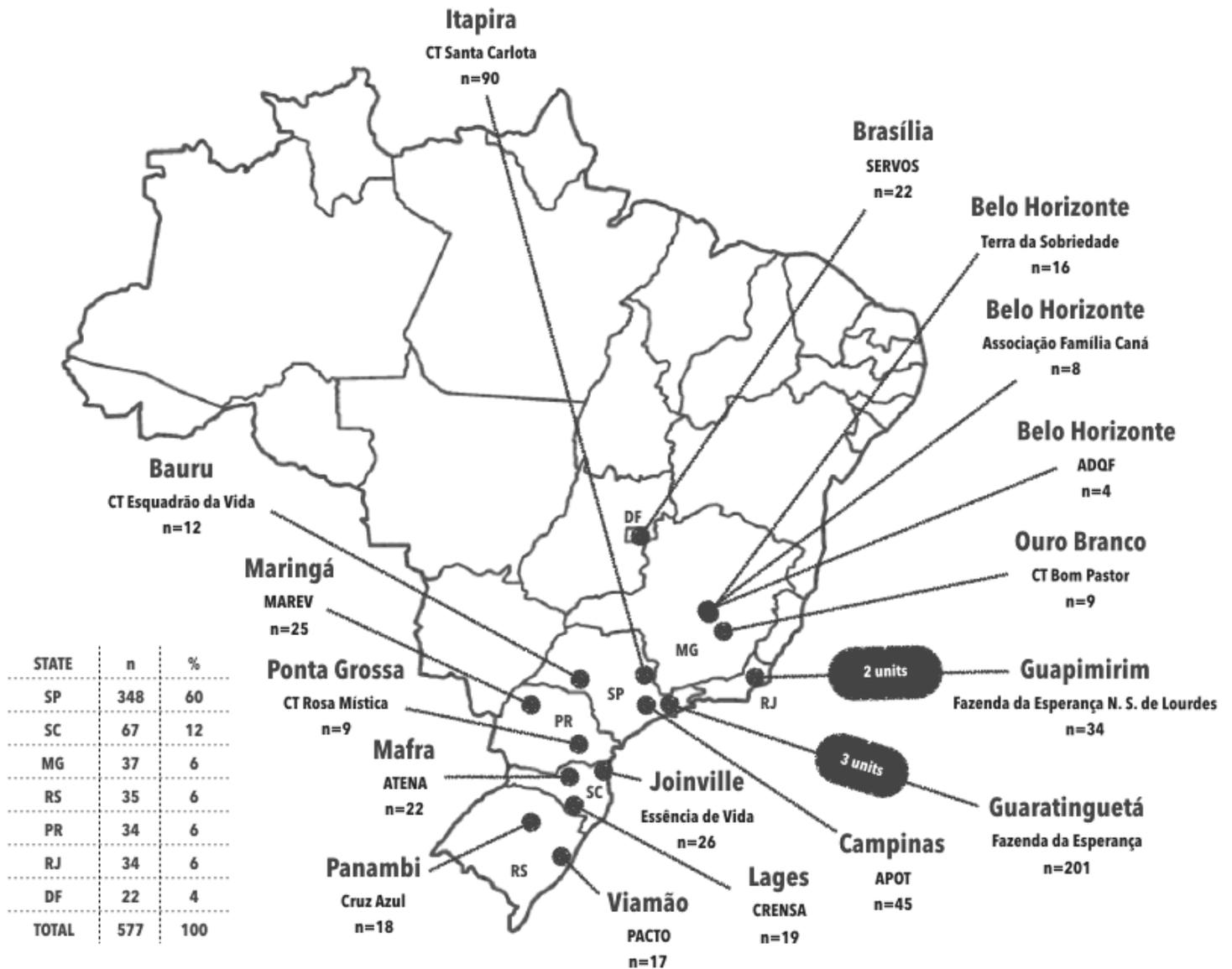


Figure 1

: Brazilian political map showing where the 20 therapeutic communities involved in the current study are located.

## Supplementary Files

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- [STROBEchecklistcrosssectional.doc](#)