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High mortality, violence and crime in alcohol dependents: 5 years after seeking treatment in a Brazilian underprivileged suburban community

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Abstract

Objective: To investigate the results of alcohol-related consequences in an underprivileged area of São Paulo. *Method:* One hundred and ninety one adult patients who sought alcohol treatment in 2002 were reassessed in 2007 regarding alcohol use and involvement with crime. The interview consisted of demographic questions and questionnaires assessing alcohol dependence and pattern of alcohol use. Risk and protective factors and involvement with crime were further explored. *Results:* High mortality rate (16.9%, n = 41) was found in this sample and 97.4% were identified as being severe alcohol dependents. The sample consisted of a homogeneous group, average age of 42, 81.9% male, 57.5% black, 52.2% unemployed and 100% of low socioeconomic status. Individuals ageing 35 or younger, not engaged in religious activities and with intense alcohol consumption in the last month had 2.7 times more chance on committing crimes (95% CI = [1.22; 5.93] p = 0.014). Subjects who consumed alcohol in the last month also had a 4.1 greater chance of becoming involved in crime (95% CI = [1.2; 14.24] p = 0.024). *Conclusion:* Alcohol dependence within an underprivileged community was associated with high rates of crime and mortality. Religious affiliation was negatively associated with delinquent behavior.

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Alta mortalidade, violência e crime em dependentes de álcool: seguimento após 5 anos de tratamento em periferia brasileira

Resumo

Objetivo: Explorar as consequências relacionadas ao uso de álcool na periferia de São Paulo. *Método:* Pacientes que procuraram tratamento para alcoolismo em 2002 foram convidados para reavaliação em 2007 para estudo de seguimento retrospectivo. A entrevista consistiu de questões sociodemográficas e questionários que avaliaram a dependência alcoólica e o padrão do consumo. Pesquisa adicional sobre fatores de risco e de proteção e envolvimento com crime foi contemplada neste estudo. *Resultados:* A alta taxa de mortalidade (16,9% n = 41) e a dependência grave de álcool foi confirmada em 97,4% da amostra. O grupo se mostrou homogêneo, média de idade (42 anos), sexo masculino (81,9%), raça negra (57,5%), desempregados (52,2%), proveniente de classe social E e D (100%). Indivíduos com até 35 anos sem afiliação religiosa e tendo consumido muito álcool no ultimo mês apresentaram 2,7 mais chances de cometer crimes (95% IC = [1,22; 5,93] p = 0,014). Indivíduos que consumiram álcool no ultimo mês também tiveram suas chances 4,1 vezes maiores de estarem envolvidos com o crime (95% IC = [1,2; 14,24] p = 0,024). *Conclusão:* O consumo alcoólico na periferia foi associado a altas taxas de criminalidade e mortalidade, e a afiliação religiosa foi associada negativamente com comportamento delinquente.

Introduction

Alcoholism is a compelling disorder that raises important public health concerns: 3.8% of all global deaths were attributable to alcohol use, of which 6.2% were accounted for the deaths of males and 1.1% for the deaths of females.[1] Alcohol consumption played a role in the majority of deaths involving injuries and illness such as cancer, cardiovascular disorders and liver cirrhosis.[1] Intentional and unintentional injuries accounted for 42% of all deaths involving alcohol consumption.[1] Moreover, a recent study confirmed a positive relation between years of life and mental health disorders. According to Schmidt et al.,[2] 19% of general mental illness including alcohol dependence, depression and psychosis are correlated to lower quality and years of life.

Alcohol use is associated with risk behavior which includes: drinking and driving, unprotected sex and multiple substance use. Data indicates that alcohol consumption is detrimental to cognitive behavior and emotional development.[3] Social consequences of alcohol abuse impose at least as much of a burden as the alcohol effects on health. Alcohol abuse has a relevant association with violent behaviors.[4] It contributes to increased crime rate, violence and prevalence of injures related to drinking and driving, thus, impacting society in negative and complex ways.[4] A 60-year prospective study on alcohol dependents found alcohol use to be a major risk factor for mortality.[5]

In Latin America, alcohol consumption is considered the leading risk factor for mortality, being accountable for 16% of total disease burden.[1] In Brazil, alcohol is one of the most consumed substances. A Brazilian national study reveals that 52% of the population is actively consuming alcohol, 29% drinks 5 or more doses per occasion and 28% binge drink. It is worthwhile to mention the fact that 38% of the population in the category of 5 drinks or more was composed mainly of males. Additionally, 25% reported to have problems related to alcohol consumption, 3% already meet criteria for alcohol abuse and 9% for alcohol dependence.[6]

In unstable economic countries, in particular Brazil, 90% of reported violence cases due to alcohol use involved young adult black males, ranging in age between 15 and 44 years, lacking basic education, and living in underprivileged suburban areas.[7] Interestingly, general literature confirms that, more than any other demographic group, young adult black males were concerned in alcohol related violence, such as homicides and assaults.[8] Harmful effects of alcohol misuse severely affect underprivileged communities. In these communities, the wide availability of an unrestricted number of outlets selling liquor significantly increase alcohol consumption and, consequently, violence and crime.[9]

The objective of this retrospective observational study was to investigate alcohol consumption-related consequences within an underprivileged violent suburban area of São Paulo, on an attempt to foster the understanding of risk and protective factors associated with subjects' involvement with crime.

Methods

Design

This is a retrospective research conducted in 2007 and 2008 with 303 outpatient subjects who sought alcohol dependence treatment at Jardim Ângela's psychosocial treatment center for alcohol and drug abuse during the year of 2002. Among 303 subjects, 34 did not agree to be part of the study, and 37 were not located. The final sample comprised 232 subjects. All individuals met the criteria for alcohol dependence according to DSM-IV[10] during treatment admission. It is important to mention that patients were evaluated and diagnosed by psychiatrists in charge of the unit. Patients' medical records such as diagnoses, prognoses and treatment progress were obtained in patients' charts and made available for the principal investigator of the present study by Jardim Ângela's treatment center.

Forty one deaths (16.9%) were confirmed by subjects' families. The prime cause of death was due to liver and pancreas disorders (66% n = 27) followed by accidents and/or violence (e.g. homicide) (34% n = 14). One hundred ninety one participants (63%) responded questionnaires by themselves.

The following are criteria for the inclusion of patients in the current study: (1) fulfill criteria for alcohol dependence according to DSM-IV[10] during treatment admission (patients were assessed and diagnosed by psychiatrists in charge of the unit); (2) to be a patient of Jardim Ângela's psychosocial treatment center for alcohol dependence during the year of 2002; and (3) to be 18 years old or older. Exclusion criteria comprised the following: (1) diagnosis of dependence on an additional substance other than alcohol; and (2) individuals younger than 18 years old.

Setting

The study was conducted at Jardim Ângela's specialized treatment center for alcohol and drug abuse. Jardim Ângela is a suburban district located at South São Paulo, Brazil, currently comprising 300,000 inhabitants and encompassing an area of 37.4 Km². It is worth mentioning that besides religious and self-support groups, Jardim Ângela's population mostly relies on this single public treatment center to assist alcohol and drug dependents. The Jardim Ângela community is a conglomerate of slums located in the southern region of São Paulo. According to Laranjeira et al.[9] this area comprised the highest alcohol outlet density reported in literature during 2002. In the late 90s, the United Nations (UN) ranked this area as the most violent neighborhood in the world involving 120 homicides per 100 thousand inhabitants.

Measures

The study was conducted during the years of 2007 and 2008. The first contact with patients and/or families was established by telephone calls and/or home visits. After the first contact, a senior psychologist conducted a 60-minute face-to-face interview with subjects at Jardim Angela's Treatment Center and/or at subjects' residencies.

The interview was composed of a sociodemographic questionnaire which included a crime assessment, and four other instruments described below:

a. Directory of client outcome measures for addiction treatment programs.[11] The instrument was used on a crack/cocaine Brazilian follow-up study in 2006.[12] The current study used the instrument developed for the crack/cocaine follow-up and tailored it to investigate alcohol-related variables such as: age at onset, last intake episode, lifetime use, physical complications and client outcome measures for addiction treatment programs.

b. Alcohol dependence data questionnaire (SADD[13]). In this study a Portuguese version of SAAD was used. Jorge et al.[14] (1985)[14] culturally adapted this instrument for the Brazilian population. The Brazilian version of SADD is a 15-item questionnaire which investigates alcohol dependence, categorizing it in 3 distinct levels: mild, moderate and severe.

c. Pattern of alcohol consumption was documented using the interview schedule developed for the WHO/ISBRA Collaborative Study on State and Trait Markers in Alcoholism.[15] The questions addressed the pattern of alcohol consumption, the quantity and frequency of use in the last 30 days as well as the heaviest alcohol-consumption period of life time.

d. Drinker inventory of consequences (DrInC-2L). Instrument was developed by Project MATCH.[16] It is composed by 50 items which evaluates lifetime problems related to alcohol use. A Portuguese version is available for use in Brazil.[17]

Ethical considerations

The current study was approved by the Ethical Institutional Review Board committee 0261\08 of the Universidade Federal de São Paulo. The work done with human subjects reported in this study complies with the guideline policies and principles for experimental procedures of the Helsinki Declaration (2002).[18] Participants were properly advised concerning the study design and signed informed consent forms.

Statistical analysis

Statistical Package for Social Scientists (SPSS) descriptive statistical program for Windows, version 8.0.1 (1997)[19] was used to analyze data. A 5% significance level was adopted for all statistical analysis.

Categorical variables were described as absolute, while relative frequency and numerical variables as mean, minimum and maximum, quartiles and standard deviation. Student t-test for independent samples was used to compare means and Person's chi-square test was employed to perform comparisons between categorical variables distributions. A predictive investigation using logistic regression model was performed to explore the correlation of sociodemographic and alcohol consumption data on crime and violence. Classification tree statistical analyses were conducted to examine relationships between variables and further analyze the possibility of including variables in the logistic regression model.

Classification tree analysis is a tree-building, non-parametric method based on repeated partitioning of a sample into subgroups. Analyses are performed so that the most significant predictor at each step is used to divide the sample into subgroups. This process continues until no significant statistical differences are acknowledged.[20] Exhaustive chi-square automatic interaction detector algorithm was part of the classification tree analysis. Results are presented as classification and/or decisions in order to identify groups expected to experience a given outcome. It is considered a powerful technique that further explores variables relations. Within the context of alcohol-related violence, it may help identify relevant protective factors.

Several studies are conducted to investigate the interrelations between the research variables through Lineal Models as Lineal Regression, Logistics, Analysis of Variances etc. In this study, a classification tree method was adopted to offer objective responses fostering a practical interpretation. It is important to emphasize that these methods demonstrate the relationship between the response variable (categorical or continuous) to other research variables (categorical or numeric explanatory variables). Classification tree methodology present results in different groups of responses related to the variable under investigation.[20]

Table 1 Subjects' sociodemographic profile

Variables	N	%
Gender	**188**	**100**
Male	154	81.9
Female	34	18.1
Did not respond	3	
Age	**191**	**100**
≤35 years	48	25.1
36 or older	143	74.9
Marital Status	**191**	**100**
Single	61	31.9
Married	99	51.8
Widow or divorced	31	16.2
Race	**191**	**100**
Caucasian	71	42.5
Black	96	57.5
Did not respond	24	
Educational level	**191**	**100**
Illiterate	6	3.2
Until 8 years basic schooling	175	91.6
High school	10	5.2
SES	**191**	**100**
Class D	39	20.4
Class E	152	79.6
Employment status (last 12 months)	**157**	**100**
Worked	75	47.8
Did not work	82	52.2
Did not respond	34	
Involvement in crime after alcohol and drug treatment discharge	**191**	**100**
Yes	39	20.4
No	152	79.6
Incarceration/felonies after alcohol and drug treatment discharge	**130**	**100**
Yes	20	15.4
No	110	84.6
Did not respond	61	
Judged in Trial Court	**110**	**100**
Yes	2	1.8
No	108	98.2
Not applicable	77	
Did not respond	4	
Income (last 30 days)	**185**	**100**
Employed	92	49.7
Extended family or friends	52	28.1
Government benefit	27	14.6
Others (beggary, crime, drug-trafficking, etc.)	14	7.6
Did not respond	6	
Alcohol and drug consumption (last 30 days)	**191**	**100**
Yes	76	39.8
No	115	60.2
Alcohol and drug consumption (last 12 months)	**191**	**100**
Yes	130	68.1
No	61	31.9
SADD - degree of alcohol intake	**191**	**100**
Low - 0 to 9	3	1.6
Moderate - 10 to 19	2	1.0
Severe - ≥ 20	186	97.4
DrInC-2L	**187**	**100**
Low (1-4)	35	18.7
Moderate (5-6)	100	53.5
High (7-8)	32	17.1
Extremely high (9-10)	20	10.7
Did not respond	4	
Abstinence	**191**	**100**
No	163	85.3
Yes	28	14.7
Did not respond	3	
Currently enrolled in alcohol and drug treatment	**188**	**98.4**
Yes	111	59.0
No	77	41.0
Did not respond	3	
Type of treatment	**111**	**100**
Outpatient	107	96.4
Others	4	3.6
Not applicable	80	

Table 1 continues on next page.

Table 1 Subjects' sociodemographic profile (continuation)

Variables	N	%
Admissions in outpatient programs after treatment discharge	**137**	**100**
≤1	99	72.3
2	26	19.0
≥3	12	8.7
Did not respond	54	
Re-admission in inpatient programs after treatment discharge	**174**	**100**
Yes	54	31.0
No	120	69.0
Did not respond	17	
Visited primary care doctors (last 12 months)	**190**	**100**
Yes	157	82.6
No	33	17.4
Did not respond	1	
Currently medicated	**189**	**100**
Yes	136	72.0
No	53	28.0
Did not respond	2	
Visited emergency room after treatment discharge	**190**	**100**
Yes	120	63.2
No	70	36.8
Did not respond	1	
Exchanged drugs for sexual favors	**188**	**100**
Yes	66	35.1
No	122	64.9
Did not respond	3	
Number of sexual partners	**187**	**100**
≤1	127	67.9
2	27	14.4
3	16	8.6
≥4	17	9.1
Did not respond	4	
Participation in religious group	**188**	**100**
Yes	129	68.6
No	59	31.4
Did not respond	3	

Results

The group demonstrated to be homogeneous with similar sociodemographic characteristics. The average age was 42 (SD = 11years). The majority of subjects were males 81.9% (n = 154), black 57.5% (n = 96), unemployed 52.2% (n = 82), with up to 8 years of basic schooling 91,6% (n=175), and the whole sample (N = 191) were of low socioeconomic status, where 79.6% was from class E (n = 152) and 20.4% from class D (n = 39). About 51.8% (n = 99) were married and/or in a committed relationship and 68.6% (n = 129) were involved with religious groups/activities.

Almost the entire sample (97.4%, n = 186) was identified by SADD as being severe alcohol dependent. Subjects who visited the emergency room after treatment discharge accounted for 63.2% (n = 120) of the sample and 31% (n = 54) was re-admitted in inpatient programs. Moreover, 59% (n = 111) was currently attending alcohol dependence treatment, of which 96.4% (n = 107) in outpatient programs (Table 1).

A comparative analysis investigation was conducted considering the sociodemographic variables of subjects who were involved in crime versus subjects who did not commit any sort of transgression through the chi-squared test (x^2). Results show that individuals under the age of 35 (35.4%, n = 17) were more likely to commit crimes and be involved in violence (p = 0.004) when compared to subjects 36 years old or older (15.4% n = 22). On the other hand, individuals engaged in religious activities (84.5% n = 109) reported less involvement in crime (p = 0.017). Worth of mention is the fact

that, on average, subjects involved with criminal practices increased alcohol intake at age 24 (SD = 5.2), when compared to those not implicated in crime (p = 0.008).

The initial independent variables involving crime regression entering into the model were: gender, age, marital status, race, SES, employment status, alcohol consumption within the last month as well as 12 months prior, total and sub-scale scores of DrInC-2L scale, treatment, and engagement in religious activities – a total of 20 independent variables. Variables entered a backward regression until reaching significant correlation coefficient (p = 0.05). Hosmer et al.[21] test for goodness-of-fit was calculated to determine model adequacy. The test indicated the regression model demonstrated a good fit (p = 0.920) (Table 2).

Treatment program subjects entered classification tree analysis. The following independent variables were controlled to conduct analysis on delinquent behavior: gender, age, marital status, race, SES, employment status, alcohol consumption within the last month as well as 12 months prior, total and sub-scale scores of DrInC-2L, treatment, and engagement in religious activities. Figure 1 illustrates the results from classification analysis comprising the classification variable and the cutoff point of each division. Each node encompassed the proportion of participants who were being treated for alcohol and drug-related problems. Root node - or node 0 - was based on whether participants were involved in crime and/or violence after entering alcohol and drug treatment. Thirty nine participants (20.4%) were involved in crime after alcohol and drug treatment. The first node split related to individuals' religious group participation. Among those who were involved in religious

Table 2 Final regression model for involvement in crime

Variables	Odds Ratio	95% Confidence for Odds Ratio	p
Participation in religious group			
Yes	1.16	[0.37 ; 3.65]	0.796
No	1.00	-	-
Alcohol and drug consumption (last 30 days)			
Yes	4.14	[1.2 ; 14.24]	0.024
No	1.00	-	-
Participation in religious group and Alcohol and drug consumption (last 30 days)			
Yes	0.16	[0.03 ; 0.80]	0.026
No	1.00	-	-
Age			
≤35 years	2.69	[1.22 ; 5.93]	0.014
36 or older	1.00	-	-
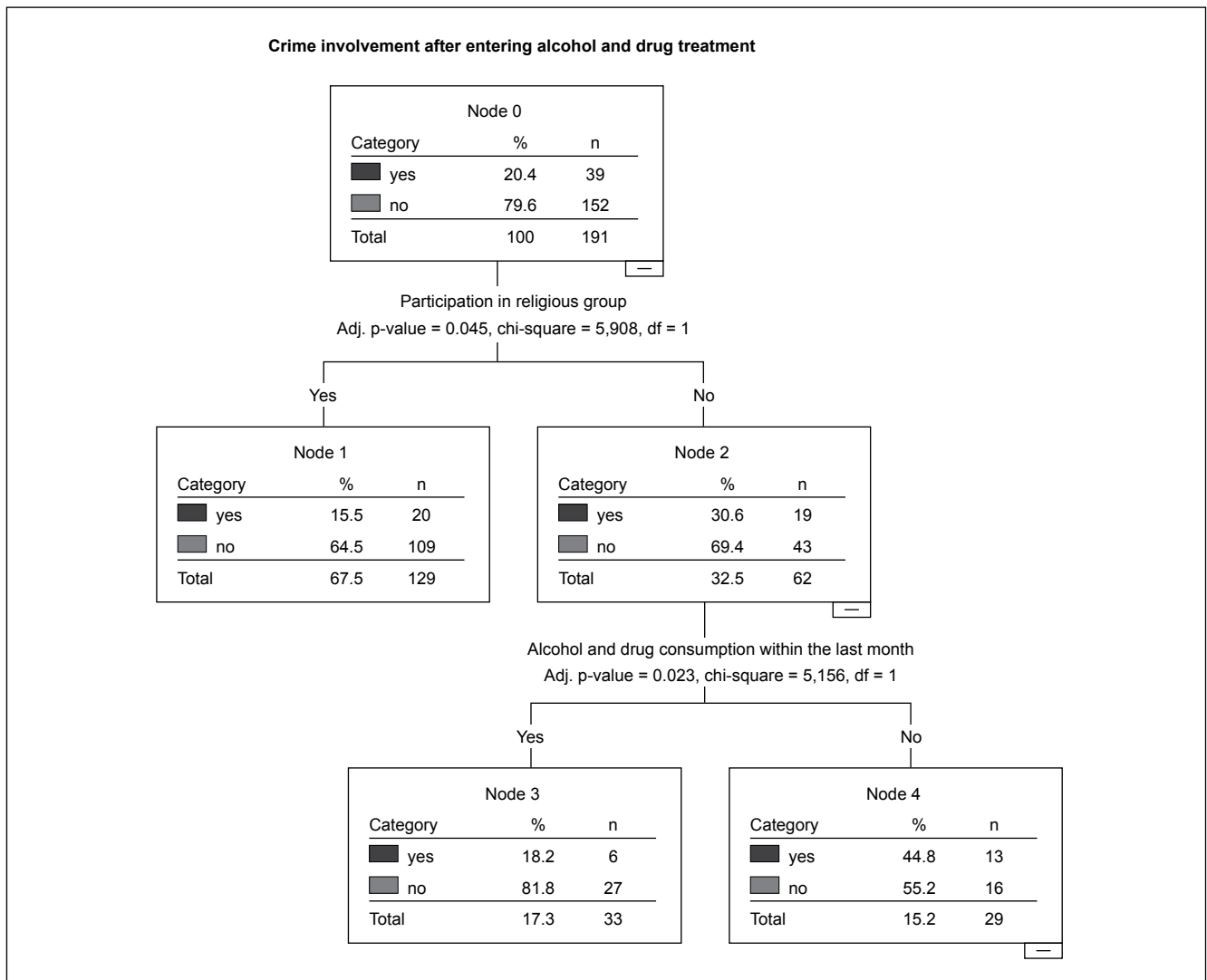
Figure 1 Classification tree analysis regarding involvement in crime.

activities, 15.5% (n = 20) were also implicated in crime, and a meaningful 30.6% (n = 19) were not involved in any sort of transgression (p = 0.045). The second node split included participants involved in religious activities and alcohol consumption within the last month. Among those who were participating in religious groups, 84.5% (n = 109) did not use alcohol during the last month (p = 0.023). Final node split explored the association between individuals not involved with religious activities and alcohol consumption within the last month. Among subjects who used alcohol, 44.8% (n = 13) were also involved with crime, versus 18.2% (n = 6) that did not commit any sort of transgression.

Discussion

Current studies pinpoint an elevated mortality rate (16.9%) among alcohol dependents. Alcohol-related crimes, accidents and violence accounted for 32.5% of deaths in this research. Indirect consequences of alcohol dependence have a great impact in society, demanding urgent reform in Brazilian public policies to reduce alcohol-related harm. Preventive interventions focusing on decreasing the number of alcohol outlets, increasing taxation and banishing media advertisement should be considered by governmental public policymakers.[3,22] Greater availability of specialized alcohol and drug treatment centers should also be considered on an attempt to manage alcohol-related hazards in Brazil.

Alcohol-related crimes have a great impact in several countries including developed nations. In 2001, the United States estimated that 40,933 deaths by injury were associated with excessive use of alcohol.[23] Injured patients in emergency rooms presenting blood alcohol concentrations (BAC) of 0.08 g/dL had three times more chances to present aggressive behaviors and experience violent injuries. Previous studies found that the severity of the crime was directly proportionate to the likelihood of alcohol being involved.[24,25] A significant relationship is observed between alcohol use and violent offences.

This study identifies several relevant findings concerning the effects imposed by alcohol consumption in an underprivileged community of a developing country. The correlation of alcohol consumption and crime was an expected outcome underscored in this investigation.

Worthy of mention is the fact that the current study was conducted at a single treatment center for alcohol and drug problems located in Jardim Ângela, São Paulo. It is anticipated that high rates of alcohol-related crime would be predictable in a deprived and violent neighborhood such as Jardim Ângela.

Regarding sociodemographic profile, the sample was similar: young black males coming from low socioeconomical status. It is important to stress that subjects' alcohol intake was intensified during their yearly 20s. Regression models corroborates with early results presented in this study that individuals aged 35 or younger have a 2.7 times greater chance of committing crimes and getting involved with violence.

Studies on young African American populations reported alcohol use as a main contributor of three leading causes of death in United States: homicide, unintentional injuries (which include car crashes) and suicide.[26] Racial identity was considered a strong predictor of substance seeking behavior among African Americans, which explains the behavior being present in 20% of this population.[27] According to Mäkelä,[28] the poorest people in society are often the most affected by alcohol-related deaths. Moreover, alcohol abuse among blacks was strongly associated with poverty, violence and mortality.[7]

Severe alcohol dependence is associated with a range of health, social and legal problems.[29] Alcohol dependence in its most severe form leads to social disintegration. This in turn affects work and relationships. In this investigation, almost the entire sample (97.4%) was identified as severe alcohol dependent and about 52.2% was unemployed.

Religious group adherence appears to be an important alcohol abuse protector factor, thus preventing delinquent behavior. Classification tree analyses demonstrated that non-religious individuals were more likely to be involved in criminal activities. It seems that crime involvement is inversely related to religious commitment. An epidemiological study with a qualitative focus concluded that religious engagement is significantly associated with a decline in alcohol consumption and increased successful recovery rates.[30]

According to Sullivan[31] people who report no religious preference have higher levels of mortality. The mortality rates can be associated with religious affiliation and socioeconomic status (particularly with years of education and household income), involvement with religious services, or the practice of unhealthy behaviors (e.g. cigarette smoking and alcohol consumption).[31] Several studies suggest a positive relation between religious affiliation and increased levels of life satisfaction, hope, optimism, marriage stability, and decreased rates of anxiety, depression and substance abuse.[32] Individuals involved in religious activities tend to avoid use or abuse of alcohol, tobacco, drugs, and are generally not implicated in crime or delinquent behavior.[33]

In the current study, regression models confirmed that individuals not engaged in religious activities and with intensive alcohol consumption within the last 30 days had a 2.7 times greater chance to be implicated in felonies. Subjects also had a 4.1 times greater chance of being involved in crime than those who did not consume alcohol within the last month.

Participation in religious activities may enhance self-control, build coping strategies and promote self-discipline. Religious communities could be considered an important source of social control which improves individuals' health bonds with society and discourages transgressive behavior. A Brazilian National survey confirmed that religious affiliation did not have a direct relation with black racial identity or the fact of coming from low socioeconomic strata.[34] Rather, the involvement in religious practice was pursued in its majority by females and older people. Results from this current study supports data presented by a Brazilian national survey, since young black males that came from low socioeconomic strata and were not affiliated to religious practices had greater chances of getting involved with crime. Furthermore, a high mortality rate was also observed in this particular population.

Strengths and limitations

An important strength point of the study concerns the fact that this is a 5-year retrospective observational study conducted in an underprivileged violent area based on the follow-up of individuals who sought treatment for alcohol and drug problems. The findings of this study should be read with caution, due to the fact that the data collected in the study comprised a convenient sample assessed in one alcohol and drug treatment center alone. Additional limitations include the fact

that subjects' diagnoses were obtained from hard copies of patients' medical records and charts did not include the history of mental health comorbidities. Interviews also relied on families' reports to confirm subjects' death. Research outcomes should not be generalized to the general population.

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Disclosures

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