



Short Communication

Early life exposure to violence and substance misuse in adulthood—The first Brazilian national survey

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ABSTRACT

Background: Substance misuse has been a major source of health and social problems in developing societies as it has been elsewhere. There is a growing body of evidence from developed nations linking early exposure to violence in childhood with substance misuse in adulthood. The role of depression on this association is not clear. This study estimates the association between early life exposure to violence, alcohol disorders and illegal substance use in adulthood and the role of depression on these associations using a national Brazilian sample.

Methods: The first Brazilian National Alcohol Survey gathered information on early exposure to violence and use of psychoactive substances in 1880 participants aged 20 to 60 years old selected at random from the Brazilian household population. We used weighted logistic regression to calculate adjusted odds ratios for the associations between early exposure to violence and substance misuse. To assess the mediating effect of depression on these associations we used the Sobel–Goodman Mediation Test.

Results: Witnessing violence during childhood or adolescence was reported by nearly 20% of the participants whilst over 8% reported having been victims of at least one form of violence. There was a statistically significant association between early exposure to violence and alcohol abuse and/or dependence and use of illegal substances in adulthood with a dose–response relationship. Depression partially explained the association between early exposure to violence with alcohol dependence (18.77% $p < 0.001$) and did not have a statistically significant mediating effect on the association with illegal substance use (5.83% $p = 0.220$).

Conclusions: Adverse early life events may affect individual's susceptibility to substance misuse which can be partially mediated by depression. Prevalence of substance misuse in adulthood may be in part attributed to the prevalence of adverse childhood experience. While prevention is the ideal goal, detection and intervention with children exposed to violence must be prioritised.

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1. Introduction

Substance misuse is a major source of health and social problems in developing societies as much as it is elsewhere. Brazil is amongst the developing nations with the highest estimated alcohol consump-

tion with an important economic impact on society in terms of lost working days and increased burden in the health system (WHO, 2005). High prevalence of illegal drug consumption has also been widely reported (Dunn, Laranjeira, Da Silveira, Formigoni & Ferri, 1996; Ferri, Gossop & Laranjeira, 2001; Fonseca, Galduroz, Noto & Carlini, 2010).

Violence is also a major public health concern and it has been associated with poor health (Bordin, et al., 2009; Ferri, et al., 2007). Violence against children and adolescents is common in Brazil. A recent study showed that 20% of children and adolescents living in urban areas have been exposed to domestic violence in the past 12 months (Bordin, et al., 2009).

One of the foundational assumptions of developmental psychopathology is that child and adolescent experiences pave the way for adult functioning and adjustment. There is an increasing body of

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evidence showing that adverse early life experiences can predict mental disorders, including depression (Schilling, Aseltine & Gore, 2007; Wise, Zierler, Krieger & Harlow, 2001) and addiction (Dubow, Boxer & Huesmann, 2008; Wiles, et al., 2007). However, it is still unclear whether depression is a mediator on this relationship.

Using the data from the First Brazilian National Alcohol Survey (BNAS) we estimate the association between early exposure to violence and substance misuse in adult life, assessing the potential mediating effect of depression. We also tested the hypothesis that there is a dose–response relationship in the association between exposure to violence during childhood and substance use in adulthood.

2. Material and methods

2.1. Sampling and procedures

A multistage cluster sampling procedure was used to select 3007 individuals aged 14 years and older from the Brazilian household population between November 2005 and April 2006 (response rate = 66.4%). More details on sampling procedures are described elsewhere (Castro-Costa, et al., 2008). Because of the nature of our main outcome (substance misuse in adulthood) and exposure (violence in childhood and adolescence) we restricted these analyses to the 1880 participants aged between 20 and 60 years old.

2.2. Measurements

The Brazilian adapted version of the “HABLAS” questionnaire (Caetano, Vaeth, Ramisetty-Mikler & Rodriguez, 2009) was used.

2.2.1. Substance use assessment

We used the Composite International Diagnostic Interview (CIDI version 2.1) (Quintana, Andreoli, Jorge, Gastal & Miranda, 2004) to establish the DSM-IV diagnosis of alcohol abuse and dependence. A self-report assessment of last 12 months' use of illegal substances was also performed. Age of drinking onset; amount usually consumed and frequency of drinking in the last 12 months were also determined.

2.2.2. Depression assessment

We used the score of 16 of the Brazilian validated version of the 20-item Center for Epidemiological Studies Depression Scale (CES-D) as the cut off point (Batistoni, Neri & Cupertino, 2007).

2.2.3. Early life violence assessment

Exposure to violence during childhood or adolescence was assessed in two different levels: witnessing violence between parents or being a victim of violence. For the witnessing assessment respondents were asked: “During your childhood or adolescence, how frequent you saw your parents physically harming each other or others?” with answers ranging within four categories (never to very often). For the “violence as a victim” assessment participants answered four yes/no questions: “During your childhood or adolescence, did your parents or the people who raised you ever 1) Hurt you with an object? 2) Burned you or threw boiling water on you? 3) Threatened you with a knife or a gun? 4) Shot you with a gun or attacked you with a knife?”. In this category the answers were combined to indicate the number of forms of violence experienced.

2.3. Statistical analysis

All analyses were conducted using STATA 10.1 and weighted to take into account different selection probabilities at each sampling stage using the survey data analysis commands. We used logistic regression analyses to estimate the crude and adjusted (age, gender,

marital status and education) odds ratio (OR) with 95% confidence interval for the association between different levels of exposures to violence and substance use disorder outcomes. We also estimated the effect of early exposure to violence on age of alcohol use onset and duration of alcohol consumption using multilinear regression adjusting for age, gender, marital status, education and depression.

Mediation of the effect of early exposure to violence (main exposure) upon substance misuse (outcome), by depression was assessed according to the following criteria: a) the exposure was associated with the mediator, b) the exposure was associated with the outcome in the absence of the mediator, c) the mediator had a significant unique effect on the outcome, and d) the effect of the exposure on the outcome was attenuated upon the addition of the mediator to the model. Sobel–Goodman tests were used to quantify the degree of mediation and to test for statistical significance (MacKinnon, Lockwood, Hoffman, West & Sheets, 2002).

2.4. Ethics

All respondents granted their informed consent. This study was approved by the Ethics Committee of the Federal University of Sao Paulo.

3. Results

3.1. Sample characteristics

One out of ten participants reported having witnessed violence and over 8% of the participants reported they had been victims of at least one form of violence. The prevalence of alcohol abuse and/or dependence was 12.1%. The mean age of drinking onset was 21.5 (SD = 6.3) years old and the mean duration of alcohol consumption was 14.1 years (SD = 9.9). Use of illegal substances in the last 12 months was reported by 4% of the sample. Depression was identified in nearly one third of the sample and was more prevalent among participants with alcohol abuse/dependence (41.3%) than among non-problem drinkers (26.0%) (Table 1).

3.2. Early exposure to violence and alcohol abuse and/or dependence

The odds of having alcohol abuse and/or dependence was nearly three times higher (adjusted OR: 2.72, 95% CI: 1.57–4.70) among those who often or very often witnessed violence between parents compared with those who never did. Participants who reported being a victim of two or more forms of violence during childhood were more likely to have abuse and/or alcohol dependence (OR: 3.56, 95% CI: 1.72–7.36). When we restricted the analysis to subjects who were alcohol dependent the associations were even stronger. The higher the frequency of violence witnessed and the greater the variety of violence experienced as a victim the stronger were the associations. Early exposure to violence was not associated with age of drinking onset ($\beta = 0.32$; 95% CI, -0.87 to $+1.52$) nor with duration of alcohol consumption ($\beta = -0.32$ 95% CI: -1.51 to $+0.87$) (Table 2).

3.3. Early exposure to violence and illegal substance use

Witnessing violence in childhood or adolescence was associated with use of illegal substances (OR: 3.31, 95% CI: 1.27–8.62) and the odds of using illegal substances was near four times higher for those who experienced two or more forms of violence as a victim (OR: 3.83 95% CI: 1.29–11.30) compared with those who did not experience violence (Table 2).

Table 1
Description of social-demographics characteristics, exposure to violence and mental health.

	Male N (%)	Female	Total
	756 (47.9)	1124 (52.0)	1880
<i>Socio-demographics</i>			
<i>Age</i>			
20–30	282 (38.2)	366 (33.7)	648 (35.9)
31–40	205 (25.3)	327 (26.6)	532 (26.0)
41–50	158 (21.3)	247 (23.9)	405 (22.6)
51–60	111 (15.1)	184 (15.6)	295 (15.3)
<i>Marital status</i>			
Single/separated/widowed	240 (33.1)	425 (36.3)	665 (34.8)
Living with partner	516 (66.8)	699 (63.5)	1215 (65.1)
<i>Education</i>			
Primary school	274 (32.8)	389 (31.8)	663 (32.3)
Secondary school	253 (34.2)	378 (34.5)	631 (34.3)
College degree or above	229 (32.9)	357 (33.6)	586 (33.3)
<i>Exposure to violence</i>			
<i>Witnessed domestic violence</i>			
Never	627 (40.0)	862 (40.4)	1489 (80.4)
Sometimes	84 (5.5)	138 (6.4)	222 (11.9)
Often/very often	40 (2.3)	122 (5.4)	162 (7.7)
<i>Victim</i>			
None	681 (90.0)	987 (88.0)	1668 (88.9)
1 form of violence	53 (7.3)	105 (9.3)	158 (8.4)
2 or more forms of violence	21 (2.5)	32 (2.6)	53 (2.6)
<i>Mental health</i>			
<i>Alcohol use</i>			
Abuse and/or dependence	152 (19.7)	56 (5.1)	208 (12.1)
Age of onset—mean (SD)	19.0 (11.7)	22.5 (15.0)	21.5 (6.3)
Years of consumption—mean (SD)	15.9 (10.3)	12.4 (9.2)	14.1 (9.9)
<i>Illegal substance use</i>			
Crack/cocaine	15 (2.6)	7 (0.7)	22 (1.6)
Cannabis	26 (4.2)	8 (0.8)	34 (2.4)
Any	37 (5.9)	22 (2.3)	59 (4.0)
Depression (CES-D ≥ 16)	145 (17.5)	433 (37.2)	578 (27.8)

3.4. Mediating effect of depression

All criteria for mediation as described in the [Materials and methods](#) section were met. The Sobel–Goodman Mediation Test showed that the mediating effect of depression on the association between early exposure to violence and alcohol abuse/dependence was significant ($Z = 5.00$; $p < 0.001$) and that depression mediated 18.7% of the total effect. Its mediating effect was only 5.8% on the association with use of illegal substances and was not statistically significant ($Z = 1.25$; $p = 0.220$).

Table 2
Association between exposure to violence in the childhood or adolescence and substance misuse in adulthood.

Outcome	Frequency	Crude (OR)	Adjusted (OR) ^a	Adjusted (OR) ^b
Alcohol abuse/dependence	Witness			
	Never	1.00	1.00	1.00
	Sometimes	1.43 (0.85–2.42)	1.41 (0.83–2.39)	1.24 (0.70–2.19)
	Often/very often	2.19 (1.33–3.56)	3.05 (1.78–5.22)	2.72 (1.57–4.70)
	Victim			
	None	1.00	1.00	1.00
Illegal substance use	1	1.48 (0.83–2.63)	1.54 (0.84–2.84)	1.16 (0.64–2.10)
	2 or more	3.55 (1.86–6.79)	4.04 (1.94–8.39)	3.56 (1.72–7.36)
	Witness			
	Never	1.00	1.00	1.00
	Sometimes	2.07 (0.82–5.24)	1.95 (0.80–4.74)	1.92 (0.77–4.74)
	Often/very often	2.25 (0.95–5.35)	3.62 (1.39–9.41)	3.31 (1.27–8.62)
Victim	None	1.00	1.00	1.00
	1	3.47 (1.38–8.73)	2.99 (1.24–7.18)	2.62 (1.03–6.63)
	2 or more	3.37 (1.01–11.25)	4.27 (1.42–12.84)	3.83 (1.29–11.30)

^a Adjusted by socio-demographic characteristics.^b Adjusted by socio-demographic characteristics and depression.

4. Discussion

We found a high prevalence of severe exposure to violence during childhood among a representative sample of Brazilian adults, with more than one in ten participants reporting having been victims of violence such as being hurt with an object, burned with hot water and threatened and/or attacked with a gun or knife within the household. There was a strong association between early exposure to violence and substance misuse in adulthood with an important dose–response relationship. Depression partially mediated the association with alcohol abuse and/or dependence but did not mediate the association with use of illegal substances.

Due to methodological differences comparisons between studies in this area require caution. Nevertheless, our findings are consistent with previous studies carried out in developed nations showing that early adverse experiences may contribute to permanent emotional and biological changes leading to an enhanced vulnerability to psychopathology (Danese, et al., 2009; Wise, et al., 2001) and to substance misuse in particular (Clark, De Bellis, Lynch, Cornelius & Martin, 2003; Dube, et al., 2003; Dubow, et al., 2008). The dose–response relationship between early exposure to violence and alcohol abuse/dependence and/or use of illegal substances has been shown in previous studies (Douglas, et al., 2010; Pilowsky, Keyes & Hasin, 2009; Schilling, et al., 2007).

Studies on the association between exposure to childhood adverse experiences and early age of drinking onset are somehow conflicting (Clark, et al., 2003; Hayatbakhsh, et al., 2008; Rothman, Edwards, Heeren & Hingson, 2008), and they seem to depend largely on the nature of the adverse experience and on how the age of drinking onset was determined. In our study, age of drinking onset was assessed by asking the age participants started consuming beverages *excluding* when they ‘tried one or two sips’. This might explain why the mean age of drinking onset was higher in our study (21.5 years old) compared with others (Clark, et al., 2003; Hayatbakhsh, et al., 2008). A positive association between exposure to violence and early age of drinking onset could be restricted to ‘first drinking experience’.

Few studies attempted to clarify the mediating role of depression on the association between early adverse life experience and substance misuse in adulthood. A case–control study conducted in the United States suggests that the development of mood and anxiety disorders precedes the onset of substance dependence among people who experienced adverse childhood events (Douglas, et al., 2010). However the authors failed to distinguish dependence on alcohol from other substances. Our study supports the importance of this distinction as depression partially explained the association of early

exposure to violence with alcohol abuse/dependence, but not with use of illegal substances. The findings of a recent case–control study from Brazil looking at the influence of depression and early adverse experiences on illicit drug dependence, support our findings by suggesting that illicit drug dependence precedes depression (Ferigolo, Stein, Fuchs & Barros, 2009).

Experimental research has shown that stressful events in early life exert profound and long-lasting effects on a variety of biochemical, hormonal and behavioural responses in adulthood. Most studies have focused on two main systems: the dopaminergic system and the hypothalamic–pituitary–adrenal (HPA) axis and its influence on brain maturation. It seems that victims of severe life stressors show long-term dysregulation of the HPA axis, similar to that seen in depressed patients (Heim, et al., 2000). Early stressful experiences can also alter the development of the mesolimbic dopaminergic system, which not only plays a role in mood regulation but also is the brain's "reward system", associated with the development of addictive behaviours in adult life (Cicchetti & Lynch, 1993; Kaufman, Plotsky, Nemeroff & Charney, 2000; Marquardt, Ortiz-Lemos, Lucion & Barros, 2004). This evidence provides a solid biological foundation for the potential mechanisms underlying the relationship between early exposure to violence and depression and with substance misuse in adulthood.

4.1. Limitations

This study analyzes data from a nationally representative community-based survey and uses reliable and validated measures of alcohol abuse/dependence and depression. Nevertheless, there are few limitations that must be highlighted. Its cross-sectional nature precludes establishing temporality between exposure and outcome. Response rate was relatively low (66.4%), however this is a common constraint in surveys involving alcohol and drug use assessment. Self-reported substance use could have led to under-reporting. However it has been shown that drug users tend to provide reliable reports concerning their drug use habits (Barrett, Gross, Garand & Pihl, 2005). Participants with depression and/or alcohol disorders might be more likely to report having suffered violence during their childhood (recall bias)—nevertheless, some studies suggest that the report of early adverse experiences is not influenced by measures of psychiatric adjustment (Fergusson, Horwood & J., 2000; Maughan, Pickles & Quinton, 1995).

5. Conclusions

Our results replicate and strengthen several previous studies investigating the long-term impact of early adverse experiences. We provide relevant data associating early exposure to violence with alcohol disorders and illegal substance use in adulthood and contribute by bringing further insights concerning the role of depression on this association. Further research is still needed in this area, to better understand the role of depression using cohort studies and exploring the influence of other potential mediators. Whereas prevention of child abuse is the ideal goal, detection and intervention must be considered a priority in the clinical setting and social care system.

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Contributors

Ronaldo Laranjeira and Raul Caetano designed the survey; Ronaldo Laranjeira, Ilana Pinsky and Marcos Zaleski managed the data collection and data entry. Clarice S Madruga and Cleusa P Ferri performed the statistical analyses and wrote the manuscript. All authors participated in the study concept and design, revised and approved the final version of the manuscript.

Conflict of Interest

None.

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