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# 12-month prevalence and concomitants of DSM-IV depression and anxiety disorders in two violence- prone cities in Brazil

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## Abstract

**Background—**Estimating 12-month prevalence of depression, anxiety, and comorbid anxiety/depression in noninstitutionalized adults (age 15–75) in two violence-prone cities.

**Methods—**The Composite International Diagnostic Interview v2.1 (Portuguese), administered in population-representative surveys (age 15–75) in São Paulo (N=2536) and Rio de Janeiro (N=1208), yielded 12-month prevalence of violent events experienced, and DSM-IV diagnoses of depression and anxiety, which were classified into mutually exclusive groups: 1) no anxiety/depression; 2) anxiety only; 3) depression only; 4) comorbid anxiety/depression. Weighted analyses estimated 12-month prevalence, multinomial logistic regression compared the demographic characteristics of the diagnosis groups, and association with experienced violence.

**Results—**Twelve-month prevalence of anxiety alone, depression alone, and comorbid anxiety/depression was 12.7% (of whom 24.9% were also depressed), 4.9% (of whom 46.2% had anxiety), and 4.2% respectively for São Paulo; and 12.1% (18.2% of whom were depressed), 4.6% (37.0% with anxiety), and 2.7% respectively for Rio de Janeiro. All conditions were approximately twice as prevalent in women than in men in both cities. In São Paulo, comorbidity was associated with age under 60, depression alone was more prevalent among 30–59 year olds, but in 23–29 year-olds in Rio de Janeiro. Exposure to violence increased the odds of anxiety, depression, and their

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Concept and design: SLB, GGF

Acquisition of subjects and/or data: SLB, IMQ, MFM, RAB, JJM, SBA

Analysis and interpretation of data: GGF, SLB, IMQ, MFM, RAB, JJM, SBA

Preparation of manuscript: SLB and GGF drafted the paper, all authors reviewed and approved the final version of the manuscript.

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comorbidity. With rare exception, marital status, education, and race/ethnicity were not associated with anxiety, depression, or their comorbidity.

**Limitations—**Cross-sectional design.

**Conclusions—**Prevalence rates for all conditions were high, and particularly associated with exposure to violence. Means to ameliorate violence, and its mental health effects, particularly for women, are needed.

### Keywords

depression; anxiety; comorbid anxiety and depression; Brazil; epidemiological survey; community-representative sample

## Introduction

According to the Global Burden of Disease 2016 Study (2016), major depressive disorder and anxiety are, internationally, among the top 10 causes of years lived with disability; in Brazil they held fifth and third place respectively in 2013. Depression and anxiety have been recognized for their association with disability. They have also been associated with increased risk of mortality, development of chronic disease, and with both delayed and increased use of health services (Adams et al., 2016; Almeida Filho et al., 2007; Andrade et al., 2012; Brown et al., 1996; Byers et al., 2010; D'Avanzato et al., 2013; Kessler, 2007; Kessler et al., 2015; Oude et al., 2016; Patten et al., 2008; Pratt et al., 2016; Prina et al., 2011; Scott et al., 2007; Stegenga et al., 2012; Yousaf et al., 2015).

Findings from a number of major surveys, using validated measures that operationalize standard diagnostic criteria are now available (Kessler et al., 2015; Andrade et al., 2003; Hasin et al., 2005; Kessler et al., 2005; Ribeiro et al., 2013). Regardless of setting, they consistently indicate that prevalence of anxiety is greater than that of depression, is more likely to be reported as starting in the early 20s, before depression, and that both conditions are associated with socioeconomic status (Mirza 2004; Silva et al., 2016; von Soest et al., 2012). Prevalence is greater in women than in men, and in urban than in rural areas (Kessler et al., 2015). There may be a U-shaped, or alternatively an inverted U-shaped association with age, but typically there is a lower prevalence of anxiety and depression above age 60 or 65 (Reynolds et al., 2015), although one study suggests an increase in prevalence after age 85 (Byers et al., 2010; Reynolds et al., 2015). Common mental health disorders, which include anxiety and depression, have been found to be up to twice as prevalent among people exposed to violence, even when no longer living in the situation in which violence occurred (Clark et al., 2008; Kadra et al., 2014; Silva et al., 2016; Wilson et al, 2013).

Information on the prevalence of mental health disorders in middle and low income countries is distinctly less than for upper income countries. Among mental health disorders, anxiety and depression affect all ages, and are not only among the most prevalent conditions, but are also consistently under-recognized and under-treated (Kessler, 2007; Thornicroft et al., 2017). In Brazil, studies of anxiety and depression are scarce. Of the limited number of published community studies, several have employed screens, in contrast to fully structured

assessments that operationalize diagnostic criteria (Almeida Filho et al., 2007; Kemp et al., 2015).

Using a validated diagnostic tool, we focus here on the 12-month prevalence of depression, anxiety and their comorbidity, diagnosed using DSM-IV criteria, in two large, population-representative samples of noninstitutionalized adults aged 15–75 years, in two of the most violence-prone cities in Brazil -- São Paulo and Rio de Janeiro. We wish to determine whether there are differences between these two cities in the prevalence and demographic characteristics of these conditions, and the extent to which exposure to violence is associated with these disorders.

## Methods

Our data come from a cross–sectional survey of community-representative residents age 15 to 75 years, carried out in Sao Paulo (June 2007–January 2008) and Rio de Janeiro (October 2007–July 2008). This survey was designed to ascertain the prevalence of traumatic life events; consequent post-traumatic stress disorder, mental health conditions and alcohol abuse; and environmental and personal characteristics that increased susceptibility to traumatic events. Brazil has a high Gini (economic inequality) index, which may affect the prevalence of depression (Andreoli et al., 2007; Chiavegatto Filho et al., 2013; Platt et al., 2016), and both cities are recognized as being the most violent in a country with high violence -- Brazil. Homicide rates are higher in Rio de Janeiro than in Sao Paulo, and in both cities are more than 50% higher than in the rest of the country.

The study design has been fully described previously (Ribeiro et al., 2013; Andreoli et al., 2009). In brief, participants were selected through a multistage sampling procedure. In the first stage areas within each city were ranked according to homicide rates, and categorized into seven homicide-level strata. In the second stage census tracts within each stratum were mapped, and four to 18 census tracts selected inversely proportional to population size (the three strata with the highest homicide rates were oversampled to improve the likelihood of identifying cases of post traumatic disorder). Finally, in the third stage, 43 households per tract (Sao Paulo), and 30 households per tract (Rio de Janeiro) were randomly selected, and one household member 15 to 75 years old was randomly selected using the Kish method (1949). With response rates of 84.5% in Sao Paulo and 80.5% in Rio de Janeiro, the final sample sizes were 2536 (Sao Paulo, 58.1% female), and 1208 (Rio de Janeiro, 56.6% female) (Ribeiro et al., 2013).

All aspects of the study were reviewed and approved by the Ethics Committee of the Federal University of São Paulo for studies in both São Paulo and Rio de Janeiro (Andreoli et al., 2009). Participants 18 years of age and over personally signed letters of informed consent before enrollment, parents and legal guardians signed for those 15–17 years of age.

### Data gathering procedures

Data were gathered in the participants' homes by trained interviewers. Completed questionnaires were reviewed within a week, with supervisors re-interviewing 20% of the participants to establish accuracy.

## Measures

**Psychiatric disorders—**Relevant to the present paper, depressive disorders (major depression, major depressive disorder (single or recurrent episodes), dysthymia), and anxiety (generalized anxiety disorder, panic disorder with or without agoraphobia, agoraphobia without history of panic disorder, specific phobia, social phobia, posttraumatic stress disorder, and acute stress disorder), were identified using the World Health Organization World Mental Health Survey Composite International Diagnostic Interview (WHO WMHS CIDI) version 2.1, validated for Brazil (Quintana et al., 2004; 2007). Evaluation of the Brazilian translation reported sensitivity of 82.5% and specificity of 92.8% for depressive disorders, and 80.6% and 93.5% respectively for phobic-anxiety disorders (Quintana et al., 2007). Inter-rater reliability (preferred over test-retest reliability, since symptoms would remain constant), found kappa = 0.94 for 12-month depressive disorder; information is given for selected specific anxiety disorders, but not for anxiety as a whole (0.92 for phobic anxiety disorder, 0.66 for obsessive-compulsive disorder, and 0.95 for PTSD), values considered to indicate good agreement (for 0.66), and very good for 0.92 and 0.95 (Quintana et al., 2004).

CIDI 2.1 is a standardized and fully structured interview that provides psychiatric diagnoses according to the International Classification of Diseases, 10$^{th}$ edition (ICD-10), and the Diagnostic and Statistical Manual of the American Psychiatric Association, 4$^{th}$ edition (DSM-IV) (APA, 2000; Rubio-Stipec et al., 1991; WHO, 1997). We focus here on the DSM-IV diagnoses. For the purpose of the current study DSM-IV diagnoses of anxiety and depression were classified into four mutually exclusive groups: 1) no anxiety/depression (reference group); 2) anxiety only; 3) depression only; 4) comorbid anxiety/depression.

*Sociodemographic characteristics* included age, education (≤4 years vs ≥5 years), race (White, Afro-descendants, other), sex (male, female), and marital status (married, never married, previously married (widowed, separated, divorced)). In line with previous work, age was categorized as 30–44, 45–59, 60–75, but the youngest age group (15–29) was subdivided into 15–22, and 23–29, since considerable changes occur between age 15 and age 29 in Brazil (age 16 is the voting age, and age 18 is the age of civil responsibility).

*Exposure to violence* in the previous 12 months was assessed using the 11-item traumatic events list included in CIDI 2.1, supplemented by 20 additional items “selected to cover most of the traumatic events experienced by individuals in Brazilian urban centers.” (Ribeiro et al., 2013), but with naturally occurring traumatic events (e.g., natural death of a close family member) excluded.

## Statistical analysis

Since initial analyses (see Table 1), indicated that there were statistically significant demographic differences between the two cities, data were analyzed separately for each, and the findings later compared descriptively.

Descriptive statistics (Ns, weighted %) were used to describe and compare the demographic characteristics of the sample, and determine the 12-month prevalence of anxiety alone, depression alone, and comorbid anxiety/depression by city and demographic characteristics.

Diagnostic comparisons across demographic categories and between cities were examined using the Mantel-Haenzsel test, which takes the complex sampling design into account. Weighted multinomial logistic regression was used to examine the association of demographic characteristics, net of each other, with diagnosis (anxiety alone, depression alone, comorbid anxiety/depression), using “no anxiety/no depression” as the reference group. All significance tests were two-sided ($P$ <0.05 accepted as significant). Analyses were carried out using STATA version 13.

## Results

The characteristics of the weighted samples in São Paulo and Rio de Janeiro are given in Table 1. The Rio de Janeiro sample included a higher proportion age 45 and over, more with better education, fewer who were White, and a larger proportion who were Afro-descendants. Exposure to violence was greater in Rio de Janeiro (31.8%) than in São Paulo (19.6%). There were no statistically significant differences in marital status, sex distribution, or overall by diagnostic category: in each city just over 12% received a diagnosis of anxiety alone, over 4.5% a diagnosis of depression alone, but comorbidity was present in 4.2% in São Paulo, and 2.7% in Rio de Janeiro, an association beyond chance. For São Paulo the prevalence rates for any anxiety (i.e., anxiety only plus anxiety comorbid with depression) was 16.9%, and for any depression (depression only plus depression comorbid with anxiety) was 9.1%. Prevalence rates for Rio de Janeiro were 14.8% and 7.3% respectively. These rates are given to facilitate comparison with other studies that do not separate out comorbid anxiety/depression. For São Paulo, 24.9% with anxiety were also depressed, and 46.2% with depression had a diagnosis of anxiety, the rates for Rio de Janeiro were 18.2% and 37.0% respectively. Further categorizing diagnosis by sex (Table 2), indicates that prevalence was significantly higher for each condition in each city for women as compared to men.

Table 3 gives prevalence rates for each city by sex and age category. Supplemental Table S1 provides city-specific, and Tables S2A and S2B provide city- and sex-specific prevalence rates by diagnostic category for each demographic characteristic and by exposure to violence. The prevalence of anxiety only consistently exceeded that of depression only, which in turn exceeded that of comorbid anxiety/depression. In both cities, prevalence for each of the three conditions was greater for women than for men, and higher in São Paulo than in Rio de Janeiro. For São Paulo for anxiety alone frequency in women was 2.28 (1.76) times greater than for men, for depression alone it was 2.67 times greater, and for comorbid anxiety/depression it was 7.03 times greater. For Rio de Janeiro increase in rates were 1.76, 1.78, and 6.58 respectively. The unadjusted association of exposure to violence with diagnosis varied between the two cities. In São Paulo, such exposure had no noticeable effect on anxiety alone, but those exposed were about twice as likely to meet criteria for depression and comorbidity. In Rio de Janeiro, there was little effect on depression alone, but anxiety alone was nearly doubled, as was comorbidity.

Since demographic characteristics are known to be correlated, multinomial multivariable logistic regression was run, with no anxiety/no depression as the reference group, to more accurately ascertain the association of demographic characteristics with each diagnostic category (Table 4). For both São Paulo and Rio de Janeiro, prevalence of all diagnoses was

significantly higher for women than for men. Anxiety alone was not associated with any of the demographic characteristics in either city. Depression only was associated with age: in São Paulo higher for ages 30–59 than for those younger or older, in Rio de Janeiro significantly higher only for age 23–29. In São Paulo depression only was associated with having been married, but otherwise depression only was not associated with any other demographic characteristic in either city. Comorbidity was not associated with any demographic characteristic in either city, except for age 23–59 in São Paulo. With the exception of São Paulo, where exposure to violence was not associated with the presence of anxiety alone, for both cities exposure to violence approximately doubled the prevalence of depression alone, and tripled that of the comorbid condition.

## Discussion

Violence and income inequality have been shown to affect mental health (Silva ret al., 2016). Our focus is the 12-month prevalence of anxiety only, depression only, and comorbid anxiety/depression in São Paulo and Rio de Janeiro, two major cities marked by high violence in Brazil, a middle income country with high income inequality. We are particularly concerned about the effect of exposure to violence, and about comorbid anxiety/depression, because of the additionally severe impact that these condition may have on personal well-being (Pelletier et al., 2017; Adams et al., 2016).

Anxiety and depression were diagnosed using the Brazilian version (evaluated for reliability and validity, Quintana et al., 2004; 2007), of CIDI v2.1. CIDI v2.1 includes an 11-item traumatic events list, which was supplemented by 20 additional items of particular relevance to adults living in Brazilian urban centers (Ribeiro et al., 2013). We focused on incidents of violence by excluding naturally occurring traumatic events. Thus our rates for the prevalence of violence may differ from that of other studies that look at traumatic events in the current dataset (Ribeiro et al., 2013).

For anxiety, depression, and their comorbidity, prevalence was higher in women than in men. In both cities there was no association of anxiety only with any of the demographic characteristics examined. Inter-city, age-related differences, however, were found for depression only (higher prevalence at middle ages in São Paulo, but at younger ages in Rio de Janeiro), and for comorbid anxiety/depression (associated with ages 23–59 in São Paulo, but no association in Rio de Janeiro).

In the current section, comparison of current findings with those of others has been restricted to surveys that used comparable assessments and time intervals, since rates are sensitive to the type of assessment, the diagnostic criteria, and the time interval considered (Ferrari et al., 2013; Haro et al., 2006). Nevertheless, problems remain. The diagnostic criteria of DSM-III-R and DSM-IV are not the same, and may identify different people. The conditions included under the general heading of “depression” or “affective disorder”, and “anxiety”, differ across studies. Of particular relevance here, rates for comorbid anxiety/depression are rarely given, although studies report that overlap between these conditions is substantial (Alonso et al., 2007). The comparison studies span at least two decades, during which time economic, political, and other conditions associated with depression and anxiety may have changed.

Socioeconomic status is not always taken into account, and may be particularly relevant when there is substantial income inequality, as in Brazil (Chiavegatto Filho et al., 2013).

Regarding Brazil and Latin American countries, our findings on the overall prevalence of any anxiety and any depression are comparable to rates reported by other surveys in São Paulo (lack of relevant studies prevents comparison with Rio de Janeiro) (Andrade et al., 2012), but higher than rates reported for Latin American countries (Medina–Mora et al., 2005; Andrade et al., 2003). Consistent with our findings, the prevalence of anxiety always exceeded that of depression, and women consistently had higher 12-month prevalence of anxiety and depression than did men. None of these studies provided information on the prevalence of co-morbid anxiety/depression.

Our rates for anxiety and mood disorders are also higher than those from the European region, which also report higher rates among women than among men. There, prevalence of depression tended to decline in the oldest age group, but the prevalence of anxiety varied little by age for either women or men (Alonso et al., 2007; Wittchen et al., 2005). The association between mood and anxiety had an odds ratio of 10.2 (95% confidence interval 8.2–12.7), but the proportions with depression who also experienced anxiety (and the reverse situation) were not reported. The WHO WHMS 23 country study found that, on average, prevalence rates for 12-month major depressive disorder in upper income countries were higher than those for middle and lower income countries, with Brazil a high prevalence outlier (Thornicroft et al., 2017). Studies in Japan yielded among the lowest rates for anxiety and depression (Ishikawa et al., 2016).

Comparison with North American (U.S.) studies, indicated that our prevalence rates for both anxiety and depression are higher for anxiety but similar for depression to those in one major population-representative U.S. study (Grant et al., 2004), but lower for anxiety and depression than in another (Kessler et al., 2005).

The majority of the studies found that the prevalence of depression may increase through middle age, declining after age 60 or 65. One study, however, using CIDI65, an age-sensitive version of the CIDI, found 12-month prevalence rates of anxiety ranging from 14.1%-20.8%, and of depression ranging from 11.1%–25.7% for respondents age 65–84 in six major cities in six high income countries (Adams et al., 2016). These rates, particularly for depression, are among the highest found, and are higher than for similar age participants in NESARC (Reynolds et al., 2015).

The differences in prevalence rates across studies may reflect the effect of residence in an urban area (Kessler et al., 2015), high income disparity (Andreoli et al., 2009; Chiavegatto Filho et al., 2013; Platt et al., 2016), a violent environment (Silva et al., 2016; Clark et al., 2008; Kadra et al., 2014; Wilson et al., 2013) or, more likely, the compounding effect of all of these. Several findings are consistent across studies: the prevalence of anxiety is higher than the prevalence of depression; anxiety and depression are frequently comorbid but precise rates are given infrequently; anxiety and depression are more prevalent in women than in men; and the prevalence of depression is lower at older ages. Explanation for such consistent findings seems called for.

Differences in prevalence of anxiety and depression may reflect differences in how their respective diagnoses are determined. A very limited number of categories is included under the diagnostic heading of “depression”–in epidemiological studies these typically include major depressive disorder, and bipolar disorder, and the symptom lists to identify depression in DSM-III-R and DSM-IV are fairly limited, thus restricting the number of people recognized, particularly when dysthymia is not included. Further, depression may manifest itself in men in ways not picked up by current criteria (Zartaloudi, 2011), as indicated by their higher rate of suicide, in particular among men over age 65, when the prevalence of depression is generally lower (US Department of Health and Human Services. n.d.). “Anxiety” covers many specific conditions, including generalized anxiety disorder, phobias, social anxiety disorder, obsessive compulsive disorder, post-traumatic stress disorder, panic disorder, agoraphobia. Thus, “anxiety” may capture a much larger portion of the population than “depression”.

Nevertheless, it is clear that these conditions have a high rate of comorbidity. Specific information on the rate of comorbidity is needed in order to identify groups in greatest need, and for planning appropriate interventions. Although there are exceptions (Hasin et al., 2005; Kessler et al., 1999), information is not always available. The supplement reporting “statistically significant comorbidities between major depression events and all the anxiety disorders assessed in the ICPE surveys” is no longer accessible (Andrade et al., 2003) (www.hcp.med.harvard.edu/icpe; access attempted 24 July, 2017). When presented, association may be given for specific anxiety disorders, or for specific depressive disorders, but not for any anxiety, or any depression.

A substantial number of different theoretical approaches, including evolutionary theory (Sloman, 2008), and cognitive vulnerability — transactional stress theory (Hankin & Abramson, 2001), have explored the development of anxiety and depression. Sex differences suggest that biological factors may be involved, possibly starting around puberty (Altemus et al., 2014). There are indications that sex hormones may affect neural functions and the limbic system, in particular the function of estrogen receptors in response to stressors (Bangasser & Wicks, 2017; Marrocco & McEwen, 2016; McEwen & Milner, 2017; Parker & Brotchie, 2004). Genetic factors may also be involved in both anxiety and depression (McLean & Anderson, 2009), and for both, socialization to what is considered appropriate male or female behavior, may play a rôle. Boys are encouraged to ignore pain and to be courageous, which could result in reduced anxiety because of additional experiences obtained, and to disregard, or not acknowledge symptoms of depression. Girls are more likely to be warned about the dangers in the world (so possibly increasing later anxiety), to be sensitive to the needs of others, and are more aware of health-associated changes (Mclean & Anderson, 2009; Zartaloudi, 2011). Increasing participation in the work force, greater responsibilities outside the home, and higher levels of science-associated education (which tend to result in better paying employment), may reduce the prevalence of anxiety and depression in women, and hence sex discrepancies in the prevalence of these conditions.

While association between socio-demographic characteristics and anxiety and depression has been well examined, little information is available from population-representative studies on the impact of exposure of violence, although violence is known to have an

adverse effect on mental and physical health (Clark et al., 2008; Kadra et al., 2014; Silva et al., 2016; Wilson et al, 2013). In agreement with these reports, we found that in both cities examined, experienced violence doubled the prevalence of depression in São Paulo, depression and anxiety in Rio de Janeiro, and in both tripled the prevalence of comorbid anxiety/depression. The difference between the two cities (absence of increase in anxiety alone in São Paulo) in reaction to violence may reflect the higher prevalence of experienced violence in Rio de Janeiro.

In summary, in common with previous reports for São Paulo and Brazil (which was often represented by São Paulo), and reports from upper income countries, our data indicate a high prevalence of anxiety, depression and comorbid anxiety/depression. The underlying reason for this probably reflects conditions in the area: an urban setting, substantial economic inequality, and a high rate of violence. With the exception of experienced violence, our data do not permit examination of the effects of urbanicity or income inequality. The associated demographic characteristics are similar to those generally reported: that anxiety is more prevalent than depression; substantial comorbidity of these disorders; women at greater risk than men; and, for anxiety only and depression only, lower prevalence over age 60. There are also differences between the two cities. Violence was associated with anxiety in one city, but with depression in the other. The impact on health and well-being of the presence of comorbidity in this setting remains to be determined.

Mental disorders are recognized as creating an increasing social and health problem, exacerbated by stigma, fear of disclosing an affliction because a job may be lost, or simply because health and social support services are not available (Adams et al., 2016; Brown et al., 1996; D'Avanzato et al., 2013; Patten et al., 2008; Pratt et al., 2016; Scott et al., 2007; Yousaf et al., 2015; Pelletier et al.., 2017; Alonso et al., 2008; World Bank, 2016).

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Highlights

- Age 15–75, 12-month prevalence of anxiety, depression, and their comorbidity
- São Paulo: Anxiety alone: 12.7%, depression alone: 4.9%; comorbid: 4.2%
- Rio de Janeiro: Anxiety alone: 12.1%, depression alone 4.6%; comorbid: 2.7%
- Exposure to violence doubled prevalence of all conditions
- All conditions more prevalent in women, rarely associated with marital status, education, race/ethnicity

**Table 1**

Demographic characteristics of the sample (raw Ns, weighted percentages)

| | São Paulo (N = 2536) | | Rio de Janeiro (N = 1208) | | |
|---|---|---|---|---|---|
| | **Raw N** | **Weighted % [95% CI]** | **Raw N** | **Weighted % [95% CI]** | **P value** |
| Age (years) | | | | | 0.0004 |
| 15–22 | 398 | 14.39 [12.9, 16.0] | 160 | 13.43 [11.6, 15.5] | |
| 23–29 | 453 | 16.94 [14.8, 19.4] | 161 | 12.84 [10.7, 15.3] | |
| 30–44 | 873 | 32.33 [29.9, 34.9] | 365 | 29.34 [26.7, 32.2] | |
| 45–59 | 545 | 24.33 [22.0, 26.9] | 320 | 26.57 [24.0, 29.3] | |
| ≥60 | 267 | 12.01 [10.5, 13.7] | 202 | 17.82 [15.1, 20.9] | |
| Education (years) | | | | | 0.0103 |
| ≤4 years | 588 | 20.0 [17.4, 22.9] | 173 | 14.6 [12.0, 17.7] | |
| ≥5 years | 1947 | 80.0 [77.1, 82.6] | 1035 | 85.4 [79.3, 83.6] | |
| Marital status | | | | | 0.0957 |
| Married | 1467 | 56.9 [53.4, 60.4] | 633 | 51.89 [48.3, 55.5] | |
| Previously married | 352 | 14.8 [13.1, 16.7] | 200 | 16.75 [14.42, 19.37] | |
| Never Married | 717 | 28.3 [25.4, 31.5] | 375 | 31.36 [28.8, 34.1] | |
| Race/ethnicity | | | | | 0.0052 |
| White | 1118 | 51.0 [47.2, 54.7] | 515 | 43.7 [39.2, 48.4] | |
| Afro-descendents | 350 | 12.5 [10.5, 14.7] | 233 | 18.5 [15.5, 21.9] | |
| Other | 1066 | 36.5 [33.8, 39.4] | 457 | 37.7 [33.9, 41.8] | |
| Sex | | | | | 0.3232 |
| Men | 1096 | 41.9 [40.1, 43.8] | 524 | 43.4 [41.1, 45.7] | |
| Women | 1440 | 58.1 [56.2, 59.9] | 684 | 56.6 [54.3, 58.9] | |
| Exposure to violence | | | | | 0.0000 |
| Exposed | 502 | 19.61 [18.07, 21.24] | 382 | 31.77 [28.14, 35.64] | |
| Not exposed | 2034 | 80.39 [78.76, 81.93] | 826 | 68.23 [64.36, 71.86] | |
| Diagnostic category | | | | | 0.2481 |
| Neither anxiety nor depression | 1984 | 78.2 [76.3, 80.0] | 976 | 80.6 [77.8, 83.2] | |
| Anxiety only | 310 | 12.7 [11.2, 14.3] | 147 | 12.1 [9.9, 14.7] | |
| Depression only | 131 | 4.9 [4.0, 5.9] | 51 | 4.6 [3.4, 6.1] | |

| | São Paulo (N = 2536) | | Rio de Janeiro (N = 1208) | | |
|---|---|---|---|---|---|
| | Raw N | Weighted % [95% CI] | Raw N | Weighted % [95% CI] | P value |
| Comorbid anxiety and depression | 111 | 4.2 [3.3, 5.5] | 34 | 2.7 [1.8, 4.1] | |

**Table 2**

Weighted prevalence of anxiety only, depression only, and comorbid anxiety and depression by gender and city

| | São Paulo (N = 2536) | | | Rio de Janeiro (N = 1208) | | |
|---|---|---|---|---|---|---|
| | Male | Female | P value | Male | Female | P value |
| | Percent [95% CI[1]] | Percent [95% CI] | | Percent [95% CI] | Percent [95% CI] | |
| Anxiety only | 7.25 | 16.54 | 0.0001 | 8.44 | 14.85 | 0.0011 |
| | [5.50, 9.50] | [14.19, 19.19] | | [6.18, 11.43] | [11.83, 18.49] | |
| Depression only | 2.78 | 6.32 | 0.0039 | 3.17 | 5.65 | 0.0456 |
| | [1.62, 4.71] | [5.24,7.78] | | [1.88, 5.29] | [4.03, 7.87] | |
| Comorbid anxiety and depression | 0.95 | 6.68 | 0.0001 | 0.65 | 4.29 | 0.0001 |
| | [0.50, 1.81] | [5.07, 8.74] | | [0.24, 1.77] | [2.72, 6.70] | |

[1] CI = Confidence Interval

**Table 3**

Weighted prevalence of anxiety only, depression only, and comorbid anxiety and depression by gender and age group for São Paulo and Rio de Janeiro

| **São Paulo (N = 2536)** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Anxiety only** | | | | **Depression only** | | | | **Both anxiety and depression** | | | |
| | **Male [95% CI[1]]** | **P value[2]** | **Female [95% CI]** | **P value** | **Male [95% CI]** | **P value** | **Female [95% CI]** | **P value** | **Male [95% CI]** | **P value** | **Female [95% CI]** | **P value** |
| Age | | 0.9683 | | 0.2494 | | 0.1507 | | 0.5172 | | 0.0730 | | 0.0478 |
| 15–22 | 6.16 | | 21.34 | | 0.62 | | 3.67 | | 0 | | 3.15 | |
| | [3.17, 11.63] | | [14.76, 29.82] | | [0.16, 2.41] | | [1.7, 7.48] | | | | [1.38, 7.01] | |
| 23–29 | 7.45 | | 18.21 | | 4.17 | | 6.16 | | 0.32 | | 7.51 | |
| | [3.84, 13.98] | | [12.4, 25.02] | | [1.63,10.28] | | [3.94, 9.51] | | [0.04, 2.26] | | [4.47, 12.36] | |
| 30–44 | 7.06 | | 15.30 | | 3.30 | | 7.57 | | 1.03 | | 8.33 | |
| | [4.41, 11.11] | | [11.49, 20.09] | | [1.67, 6.42] | | [5.03, 11.25] | | [0.49, 2.13] | | [5.90, 11.63] | |
| 45–59 | 8.28 | | 17.23 | | 3.55 | | 7.14 | | 2.43 | | 7.96 | |
| | [4.96, 13.52] | | [12.51, 23.25] | | [1.31, 9.25] | | [4.43, 11.33] | | [0.91, 6.38] | | [4.94, 12.59] | |
| ≥60 | 7.01 | | 11.07 | | 0.46 | | 5.14 | | 0 | | 2.68 | |
| | [2.59, 17.63] | | [7.01, 17.06] | | [0.06, 3.25] | | [2.38, 10.71] | | | | [0.96, 7.28] | |
| **Rio de Janeiro (N = 1208)** | | | | | | | | | | | | |
| | **Anxiety only** | | | | **Depression only** | | | | **Both anxiety and depression** | | | |
| | Male [95% CI] | P value | Female [95% CI] | P value | Male [95% CI] | P value | Female [95% CI] | P value | Male [95% CI] | P value | Female [95% CI] | P value |
| Age | | 0.9560 | | 0.3138 | | 0.3444 | | 0.1509 | | 0.8014 | | 0.1866 |
| 15–22 | 7.48 | | 12.78 | | 1.15 | | 1.34 | | 1.15 | | 1.39 | |
| | [3.22, 16.43] | | [7.02, 22.12] | | [0.16, 7.89] | | [0.18, 9.10] | | [0.15, 8.08] | | [0.19, 9.51] | |
| 23–29 | 7.34 | | 21.15 | | 6.11 | | 9.71 | | 0 | | 0.92 | |
| | [3.06, 16.57] | | [11.88, 34.8] | | [1.80, 18.78] | | [4.72, 18.94] | | | | [0.23, 3.66] | |
| 30–44 | 9.16 | | 13.81 | | 4.52 | | 7.27 | | 0.65 | | 5.20 | |
| | [5.47, 14.94] | | [9.68, 19.33] | | [2.11, 9.42] | | [4.47, 11.62] | | [0.09, 4.49] | | [2.77, 9.53] | |
| 45–59 | 7.67 | | 16.87 | | 2.59 | | 3.71 | | 1.06 | | 6.21 | |
| | [3.21, 17.22] | | [11.73, 23.65] | | [0.95, 6.87] | | [1.63, 8.24] | | [0.22,4.94] | | [3.40, 11.07] | |
| ≥60 | 10.32 | | 10.69 | | 1.33 | | 5.69 | | 0 | | 3.98 | |
| | [4.99, 20.13] | | [5.93, 18.52] | | [0.18, 9.22] | | [2.70, 11.61] | | | | [1.30, 11.56] | |

[1] CI = Confidence Interval

[2]Note that the only significant difference found as a function of age, is for women with comorbid disease in São Paulo.

[1]CI = Confidence Interval

[2]Note that the only significant difference found as a function of age, is for women with comorbid disease in São Paulo.

## Table 4

Weighted multinomial logistic regression, examining association of demographic characteristics with diagnostic category separately for São Paulo and Rio de Janeiro. Referent is no anxiety and no depression.

| | São Paulo (N=2533) | | Rio de Janeiro (N=1205) | |
|---|---|---|---|---|
| | **Odds Ratio [95% Confidence Interval]** | **P value** | **Odds Ratio [95% Confidence Interval]** | **P value** |
| **Anxiety only** | | | | |
| Sex | | | | |
| Women (vs men) | 3.01 [2.02, 4.47] | 0.001 | 2.34 [1.59, 3.46] | 0.001 |
| Age category (years) | | | | |
| 16–22 | Reference | | Reference | |
| 23–29 | 1.02 [0.57, 1.81] | 0.951 | 1.86 [0.69, 5.03] | 0.216 |
| 30–44 | 0.88 [ 0.46, 1.68] | 0.702 | 1.35 [0.64, 2.82] | 0.422 |
| 45–59 | 1.06 [0.59, 1.89] | 0.851 | 1.58 [0.59, 4.19] | 0.355 |
| ≥60 | 0.62 [0.29, 1.35] | 0.228 | 1.40 [0.41, 4.77] | 0.588 |
| Education (years) | | | | |
| ≥5 (vs ≤4) years | 1.08 [0.75, 1.56] | 0.663 | 1.41 [0.63, 3.13] | 0.397 |
| Marital status | | | | |
| Married | Reference | | Reference | |
| Previously married | 1.10 [0.68, 1.77] | 0.703 | 0.91 [0.57, 1.46] | 0.699 |
| Never Married | 0.93 [0.60, 1.46] | 0.759 | 0.90 [0.46, 1.75] | 0.747 |
| Race/ethnicity | | | | |
| White | Reference | | Reference | |
| Afro-descendents | 1.35 [0.86, 2.11] | 0.184 | 1.03 [0.64, 1.65] | 0.913 |
| Other | 1.37 [0 .78, 1.94] | 0.070 | 1.12 [0.77, 1.62] | 0.544 |
| Exposure to violence | | | | |
| Exposed | 1.33 [0.97, 1.83] | 0.075 | 2.23 [1.44, 3.46] | 0.001 |
| **Depression only** | | | | |
| Sex | | | | |
| Women (vs men) | 3.09 [1.57, 6.05] | 0.001 | 2.39 [1.31, 4.37] | 0.005 |
| Age category (years) | | | | |
| 16–22 | Reference | | Reference | |
| 23–29 | 2.49 [0.98, 6.33] | 0.056 | 7.23 [1.41, 37.13] | 0.019 |
| 30–44 | 2.75 [1.19, 6.37] | 0.019 | 4.77 [ 0.93, 24.42] | 0.060 |
| 45–59 | 2.54 [1.07, 6.02] | 0.034 | 2.46 [0.49, 12.39] | 0.268 |
| ≥60 | 1.11 [0.29, 4.21] | 0.875 | 2.47 [0.44, 13.89] | 0.298 |
| Education (years) | | | | |
| ≥5 (vs ≤4) years | 1.01 [0.56, 1.81] | 0.985 | 0.75 [0.34, 1.65] | 0.468 |
| Marital status | | | | |
| Married | Reference | | Reference | |
| Previous married | 1.83 [1.02, 3.28] | 0.043 | 1.05 [0.42, 2.61] | 0.917 |
| Never Married | 1.03 [0.57, 1.84] | 0.932 | 0.80 [0.34, 1.85] | 0.592 |

| | São Paulo (N=2533) | | Rio de Janeiro (N=1205) | |
|---|---|---|---|---|
| | **Odds Ratio [95% Confidence Interval]** | **P value** | **Odds Ratio [95% Confidence Interval]** | **P value** |
| Race/ethnicity | | | | |
| White | Reference | | Reference | |
| Afro-descendnts | 0.99 [ 0.54, 1.82] | 0.973 | 1.01 [0.44, 2.29] | 0.983 |
| Others | 0.82 [0.53, 1.26] | 0.365 | 0.97 [0.46, 2.05] | 0.940 |
| Exposure to violence | | | | |
| Exposed | 2.67 [1.38, 5.21] | 0.004 | 1.87 [1.14, 3.09] | 0.015 |
| **Comorbid anxiety and depression** | | | | |
| Sex | | | | |
| Women (vs men) | 9.86 [4.55, 21.37] | 0.001 | 8.05 [2.56, 25.31] | 0.001 |
| Age category (years) | | | | |
| 16–22 | Reference | | Reference | |
| 23–29 | 3.08 [1.11, 8.58] | 0.032 | 0.48 [0.06, 3.95] | 0.486 |
| 30–44 | 3.94 [1.52, 10.17] | 0.005 | 2.37 [0.39,14.32] | 0.339 |
| 45–59 | 4.49 [1.58, 12.78] | 0.005 | 2.29 [0.37,14.04] | 0.365 |
| ≥60 | 1.16 [0.29, 4.65] | 0.828 | 1.26 [0.16, 9.99] | 0.825 |
| Education (years) | | | | |
| ≥5 (vs ≤4) years | 1.38 [0.62, 3.05] | 0.427 | 0.60 [0.16, 2.28] | 0.452 |
| Marital status | | | | |
| Married | Reference | | Reference | |
| Previous married | 1.00 [0.49, 2.02] | 0.998 | 2.75 [0.96, 7.92] | 0.060 |
| Never Married | 1.08 [0.66, 1.75] | 0.765 | 0.99 [0.33, 2.97] | 0.990 |
| Race/ethnicity | | | | |
| White | Reference | | Reference | |
| Afro-descendents | 0.93 [0.44, 1.93] | 0.834 | 1.49 [0.53, 4.17] | 0.437 |
| Other | 0.91 [0.52, 1.58] | 0.726 | 0.99 [0.40, 2.42] | 0.980 |
| Exposure to violence | | | | |
| Exposed | 3.10 [1.81, 5.30] | 0.001 | 3.74 [1.54, 9.05] | 0.004 |