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Research paper

Prevalence and correlates of depressive symptoms among adults living in the Amazon, Brazil: A population-based study

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ABSTRACT

Background: Depression is an affective disorder and one of the main contributors to the burden of disease worldwide. Our purpose is to estimate the prevalence of depressive symptoms and associated factors in the population of the Manaus Metropolitan Region.

Methods: We conducted a population-based, cross-sectional study with a probabilistic three-phase sampling in 2015, based on a previously calculated sample size. Adults living in Manaus and seven inner cities of the metropolitan region were surveyed for depressive symptoms using the Patient Health Questionnaire (PHQ-9) and a cutoff score of ≥ 9. We performed a Poisson regression with robust variance using a hierarchical approach to calculate the prevalence ratio (PR) of depression and 95% confidence intervals (CIs).

Results: Among 4001 participants (response rate 76%), the prevalence of current depressive symptoms was 7% (95% CI: 6–8%). Depressive symptoms were more frequent in inhabitants of Manaus than in those from the countryside (PR = 6.13, 95% CI: 2.91–12.91); in women than in men (PR = 2.55, 95% CI: 1.96–3.33); in indigenous than in white people (PR = 2.56, 95% CI: 1.24–5.30); and in those with hypertension (PR = 1.47, 95% CI: 1.13–1.92), cardiac disease (PR = 1.62, 95% CI: 1.12–2.33), and poor health status (fair: PR = 5.10, 95% CI: 2.50–10.37; bad: PR = 10.27, 95% CI: 4.92–21.44 very bad: PR = 21.14, CI 95%: 10.16–43.99). High school education (PR = 0.55, 95% CI: 0.32–0.95) and middle class economic status (PR = 0.33, 95% CI: 0.12–0.89) were protective factors.

Limitations: Limitations include the lack of measurement of physical activity, religious beliefs, leisure time, and use of alcohol and other drugs since these factors can affect depression and health status.

Conclusion: Seven out of every 100 adults from the Manaus Metropolitan Region have depressive symptoms. This rate is higher in women, individuals living in Manaus, indigenous people, people with hypertension or chronic cardiac disease, and those with a poor health status.

1. Background

Depression is an affective disturbance with nonspecific and variable signs and symptoms. Depressive symptoms include a lack of interest and pleasure in daily activities, significant involuntary weight loss or gain, insomnia or excessive sleeping, lack of energy, inability to concentrate, feelings of worthlessness or excessive guilt and recurrent thoughts of death or suicide (American Psychological Association, 2016). Core depressive symptoms are a persistent depressed mood for at least two weeks and a markedly diminished interest in or pleasure from activities (World Health Organization, 2016b). Depressive symptoms can include periods of remission and recurrence, but manifestations vary widely from person to person (O'Connor et al., 2016). They occur due to a complex interaction of social, psychological and biological factors. Individuals who have experienced adverse life events (unemployment, bereavement, psychological trauma) are more likely to develop symptoms of depression (World Health Organization, 2016a).

Depressive symptoms have direct and indirect repercussions, such

List of abbreviations: WHO, World Health Organization; PHQ-9, Patient Health Questionnaire; BRL, Brazilian real; USD, US dollars; PR, prevalence ratio; CI, confidence interval

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as disability, reduced quality of life, increase costs related to overuse of health care services, impaired work performance, diminished social life, and suicide. Furthermore, they have been associated with a greater risk of cardiovascular events and stroke and higher rates of mortality in medical patients (Martin-Subero et al., 2016; Pan et al., 2011). Moderate to severe depressive symptoms have been associated an increase in hospital admissions compared with patients without depressive symptoms (Bhatt et al., 2016). Risk factors for depression include a personal or family history of depression, major life changes, trauma, stress and certain physical illnesses and medications (National Institute of Mental Health, 2016). According to the World Health Organization (WHO), depression is the third leading contributor to the global burden of disease, representing eighth place in low-income countries and first place in middle- and high-income countries (World Health Organization, 2008). The estimated cost of depressive symptoms increases with severity and the use of antidepressants, with impacts productivity and capital losses (Birnbaum et al., 2010).

In Brazil, the 2013 National Health Research estimated that 8% of Brazilians adults have received a medical diagnosis of depression (Instituto Brasileiro de Geografia e Estatística, 2014). More than half of people with depression use antidepressants, and a quarter receive psychotherapy (Instituto Brasileiro de Geografia e Estatística, 2014). According to a systematic review, the 1-year prevalence of major depressive disorder among Brazilian adults is 8%, and that of depressive symptoms is 14% (Silva et al., 2014). Few studies have addressed depression and its risk factors in the Amazon region, assessing restricted groups (Ribeiro dos Santos et al., 2016; Scazufca et al., 2016). Representative estimates for the region are not available.

The aim of this study is to estimate the prevalence of depressive symptoms and associated factors in adults living in Manaus Metropolitan Region.

2. Method

2.1. Study design

A population-based cross-sectional study was conducted between May and August 2015 in North Brazil. We included the cities of Manaus Metropolitan Region, the capital, Manaus, and seven other municipalities (Careiro da Várzea, Iranduba, Itacoatiara, Manacapuru, Novo Airão, Presidente Figueiredo and Rio Preto da Eva). We detailed the full protocol for this research in a descriptive study (Silva and Galvao, 2017).

2.2. Setting

The metropolitan area known as “Greater Manaus” is the biggest in North Brazil; it was funded in 2007 with the objective of improving the organization, public planning and economic development of the region (Estado do Amazonas, 2007). The area is the political, educational and cultural center of the Amazon. According to official estimates, approximately 2.3 million inhabitants live in this region, comprising more than 60% of the Amazon's population (Instituto Brasileiro de Geografia e Estatística, 2010). The capital, Manaus, is located at the confluence of two important rivers, the Negro and Solimoes; its strategic location makes it the most important city in the state and an important industrial hub.

2.3. Sample size, participants and data collection

The sample size was calculated as 4000 individuals to be interviewed to assess the health status and health care utilization of the region (Silva and Galvao, 2017). Adults aged 18 years and older who provided written consent were eligible for the study. We used a probabilistic three-phase cluster sample design stratified by quotas for sex and age. In the first phase, we randomly selected 400 primary and 20 replacement sectors from the 2647 urban sectors of the region. In the second phase, we selected households using systematic sampling; in the third phase, we randomly selected individuals from the residences based on the predefined quotas for sex and age.

We interviewed all participants in their own households using electronic devices (tablets). Specially trained interviewers collected data face-to-face through semi-structured standardized questionnaires whose comprehensiveness was assessed in a pre-test with 150 interviews.

2.4. Outcome

2.4.1. Depressive symptoms

The version of the Patient Health Questionnaire (PHQ-9) validated for the Brazilian population was used to screen for depressive symptoms (Santos et al., 2013). The PHQ-9, a self-report instrument for screening and monitoring depressive symptoms (Kroenke et al., 2001), is based on the Primary Care Evaluation of Mental Disorders established with financial support from Pfizer (Spitzer et al., 1994). The PHQ-9 assesses the presence of nine depression symptoms in the past 2 weeks: loss of interest in daily activities, depressed mood, sleeping problems, lack of energy, appetite change, feelings of guilt or worthlessness, difficulty concentrating on simple activities, motor agitation or retardation and suicidal or self-harm thoughts. The questions are scored from 0 to 3, corresponding to “Not at all”, “Several days”, “More than half the days” and “Nearly every day”. The questionnaire rates the frequency of depressive symptoms and generates a scoring severity index. Total scores range from 0 to 27 and allow for the categorization of depressive symptom severity into five categories: none/minimal (score 0–4), mild (score 5–9), moderate (score 10–14), moderately severe (score 15–19) or severe (score 20–27). Additionally, it defines treatment actions according to medical criteria (Kroenke et al., 2001).

We adopted a cutoff point of $\geq$ 9, the same used in previous Brazilian population-based studies (Munhoz et al., 2013). This cutoff score was assessed as having the highest sensitivity (78%) and specificity (87%) for the Brazilian population (Santos et al., 2013).

2.5. Co-variates

We defined co-variables that affect depressed people, including socio-demographic and economic characteristics, self-reported chronic diseases and self-perceived health, as listed below.

Sex (male and female); age group (18–24, 25–34, 35–44, 45–59 and $\geq$ 60 years old); marital status (single, separated/divorced, widowed and married); self-reported ethnic group (white, black, Asian, brown and indigenous); education level (higher education or above, high school, middle school and elementary school or less); work status (formal, informal, retired and unemployed); geographic area of residence (capital/inner cities); self-reported medical diagnosis of hypertension, diabetes and cardiac disease (yes/no); and self-perception of health (very good, good, fair, bad, very bad). For women, current pregnancy or pregnancy in the previous 12 months (yes/no) was included.

Socio-economic data were collected according to the Brazilian Association of Research Agencies index (Associação Brasileira de Empresas de Pesquisa, 2015). A score system was based on variables that included ownership of household appliances and condition of building, educational attainment of the head of the house, and access to piped water and paved roads. Economic classes varied from A to E, with A representing the wealthiest class, with a monthly household income of 20,273 Brazilian real (BRL) or 6738 US dollars (USD) in 2015, and E representing the poorest class, with an income of BRL 640 or USD 205. We grouped the D and E classes together. The Brazilian household monthly income was converted to USD using the exchange rate of the Central Bank of Brazil (1 USD = 3.1185 BRL, July 1st, 2015).