Research paper

Occupational factors associated with major depressive disorder: A Brazilian population-based study

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ABSTRACT

Background: There have been very few studies exploring the occupational risk factors for major depressive disorder (MDD) in the working populations in Latin America. The aim of this study was to explore the associations between a large set of occupational factors and MDD in the Brazilian working population.
Methods: The study was based on the cross-sectional data from the Brazilian National Health Survey, 2013. 60,202 people were interviewed (response rate: 91.9%). Among them, 36,442 were working, 19,450 men and 16,992 women. MDD was measured using the diagnostic algorithm (DSM-IV criteria) of the PHQ-9. Occupational factors included job characteristics, working time factors, psychosocial work stressors and physico-chemical exposures. Logistic regression models were performed and adjusted for sociodemographic factors. All analyses were conducted using weighted and stratified data by gender.
Results: The following occupational factors were associated with a higher risk of MDD: working part time (≤ 20 h a week) and stress at work for both genders, workplace violence, intense physical activity, exposure to noise and chemicals among women, and prolonged exposure to sun among men. Associations of stress and violence at work with MDD were particularly strong.
Limitations: Cross-sectional study design, healthy worker effect and reporting bias may have impacted the results.
Conclusions: This study, one of the first studies among the Brazilian working population, showed that psychosocial work stressors were the strongest risk factors for MDD. Physico-chemical exposures deserve more attention in association with MDD. Prevention policies oriented toward the work environment may help to prevent depression at the workplace.

1. Introduction

Major depressive disorder (MDD) is one of the most common mental disorders, one of the leading causes of disability and identified as a crucial public health issue because of its high social and economic costs (Greenberg et al., 2015; Kleine-Budde et al., 2013; Stewart et al., 2003). MDD also has serious consequences at the workplace through absenteeism, presenteeism, turn-over and reduced performance and productivity (Wang et al., 2006; Stewart et al., 2003). The identification of risk factors, including occupational risk factors, for MDD is thus important to better understand the disease and implement prevention policies.

Work factors, mainly psychosocial work factors, have been found to play a major role in depressive symptoms or disorders as underlined within the last decade by several reviews (Madsen et al., 2017; Rugulies et al., 2017; Verkuil et al., 2015; Theorell et al., 2015; Siegrist, 2008; Bonde, 2008; Netterstrom et al., 2008; Stansfeld and Candy, 2006).

Meta-analyses have summarized the literature on the associations between psychosocial work stressors and depression or depressive symptoms, and have highlighted the role of Karasek's stressors (Karasek et al., 1998), i.e. low decision latitude, high psychological demands, low social support, and job strain (combination of high psychological demands and low decision latitude) (Madsen et al., 2017; Theorell et al., 2015; Stansfeld and Candy, 2006), job insecurity

(Stansfeld and Candy, 2006), effort-reward imbalance (Rugulies et al., 2017; Siegrist, 2008; Stansfeld and Candy, 2006), and workplace violence or bullying (Theorell et al., 2015; Verkuil et al., 2015). However, as reported by other authors (Bonde, 2008; Netterstrom et al., 2008), most studies did not use diagnostic instruments to measure MDD but used symptom scales for the measurement of depressive symptoms and there is a need for more studies using diagnostic criteria. Furthermore, the literature has mainly focused on psychosocial work stressors, and other occupational exposures have been neglected and there is also a need for more studies on the associations between physical and chemical exposures at work and depression (Theorell et al., 2015).

In addition, most of the studies exploring the association of occupational factors with depression were performed in Europe, North America, Australia, Japan, etc. i.e. in the more economically developed countries (MEDCs), and the studies are missing for the rest of the world, in the less economically developed countries (LEDCs) or in emerging countries, including Latin America. Thus, it may be difficult to say whether the results obtained for the MEDCs can be valid for the LEDCs. There are indeed strong differences in the working populations between LEDCs and MEDCs, for example regarding economic activities, informal work, etc. There are also large differences in occupational health prevention policies between LEDCs and MEDCs (Dias et al., 2011). However, very little is known about the prevalence of exposure to occupational factors in LEDCs and even less about the associations with MDD. Consequently, our study provides information about the prevalence of various occupational exposures in Brazil, but also and above all, information about the associations between these occupational factors and MDD, something that has not been published before.

Our study has thus the objective to fill the gap in providing information on the associations between a large set of occupational factors and MDD measured using diagnostic criteria in Brazil, one of the largest countries in Latin America.

2. Methods

2.1. Study population

A cross-sectional study was carried out using the data from the Brazilian National Health Survey (Pesquisa Nacional de Saúde - PNS, 2013) set up by the Brazilian Institute of Geography and Statistics (IBGE) in partnership with the Ministry of Health (MoH). The PNS was approved by the National Commission of Ethics in Research (CONEP) in June 2013 (no. 328.159). All people who were included in the final sample agreed to participate in the study and signed the informed consent form.

The PNS survey is a national household survey. The target population of the PNS survey was made up of adult residents aged 18 years and over residing in private households throughout the country. The PNS sample is a subsample of the Master Sample of the Integrated Household Survey System (SIPD, IBGE), which is a group of units of areas selected for use by various studies (including PNS), these units being considered as primary sampling units (PSUs). The sample design of the PNS survey was a three-stage cluster sampling with 1) PSU selection by simple random sampling, 2) selection of permanent private households within each PSU selected by simple random sampling and 3) selection of a resident aged 18 or older within each household by simple random sampling. More information can be found elsewhere (Brazilian Institute of Geography and Statistics, 2014; Souza-Júnior et al., 2015).

The survey was divided into three parts. The first part consisted of two questionnaires about the characteristics of the household. The second part (household interview) was composed of 9 questionnaires, answered by the household representative who provided information about all the residents of the household. The third part (individual interview) was composed of 9 additional questionnaires, answered only by the resident selected within the household (Brazilian Institute of

Geography and Statistics, 2014; Souza-Júnior et al., 2015).

The fieldwork was carried out from August 2013 to February 2014 with the help of personal digital assistance (PDA). The data collection was performed by trained interviewers, with the support of supervisors and coordinators. Training and didactic materials were developed in partnership with the MoH (Brazilian Institute of Geography and Statistics, 2014).

At the end of the fieldwork, 6,069 PSUs were selected, 81,167 households were visited, of which 69,994 were occupied, and 64,348 household interviews and 60,202 individual interviews with the resident selected in the household were performed, with a response rate of 91.9% (Brazilian Institute of Geography and Statistics, 2014).

Among the 60,202 people who were interviewed, 34,776 subjects worked during the reference week of the interview, making the sample of the workers included in the study (19,450 men and 16,992 women).

2.2. Major depressive disorder (MDD)

MDD was evaluated using a diagnostic instrument which was the PHQ-9. PHQ-9 is composed of nine items assessing signs and symptoms of depression within the last two weeks and provides a sum score between 0–27 points. PHQ-9 is recognized and validated as a diagnostic tool based on the criteria of the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) (Kroenke et al., 2001). MDD was measured using the PHQ-9 diagnostic algorithm. MDD cases are defined by people who endorsed ≥ 5 of the 9 symptoms as present "more than half the days" (the 9th item counts if endorsed "several days") and one of the first two symptoms (depressed mood or loss of interest) is endorsed (Kroenke et al., 2001).

2.3. Occupational factors

The occupational factors were studied using 15 items selected from the literature and divided into four groups: 1- *Main job characteristics*: work status (domestic worker, public or private employee, self-employed); occupation (coded according to the International Standard Classification of Occupations (ISCO)); economic activities (coded according to the International Standard Industrial Classification of all economic activities (ISIC)); and multiple job-holder. 2- *Working time factors*: night work with and without shift work (2 items providing 3 response categories: no exposure to night work, night work without shift work, and night work with shift work) and working hours (measured on a continuous basis and categorized using statutory working hours a week in the country). 3- *Psychosocial work stressors*: workplace violence (2 items related to location and perpetrator of work-related violence committed by known and unknown people at the workplace) and exposure to stress at work (1 item related to activities that lead to nervousness). 4- *Physical and chemical work exposures*: exposure to intense physical activity, chemical substances, radioactive materials, urban waste, biological materials, marble dust and noise, and long exposure to sun.

2.4. Covariates

The adjustment variables were divided into 4 groups: **1. sociodemographic factors:** age (in 10-year age groups, i.e. < 30, 30–39, 40–49, 50 or more), ethnicity (white versus non-white), marital status (alone versus not alone), participation in associative activities (participation in cultural, political, sport associations, etc.), voluntary work and religious services. The three social factors were based on one item each and composed of six response categories (never, once a year, sometimes a year, 2 to 3 times a month, once a week, more than once a week) and were dichotomized at the median of the total sample. The inclusion of the social factors as covariates had the objective of providing proxies for social support and network, as these variables may play a role in mental health. **2. Health behaviours:** practice of physical