

Prevalence of common mental disorders among Brazilian workers: systematic review and meta-analysis

Prevalência de transtornos mentais comuns em trabalhadores brasileiros: revisão sistemática e meta-análise

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Abstract *The aim of the present study was to summarize the prevalence of common mental disorders (CMD) among Brazilian workers through a systematic review and meta-analysis. Searches were conducted in SciELO, LILACS, PubMed, Scopus, and Web of Science. Articles were included if they had; an observational design, a sample of Brazilian workers, used a validated instrument and cut-off to assess CMD, and provided the prevalence value. A random-effect meta-analysis using professional categories as subgroups and a meta-regression were conducted. In total, 89 studies were included, with a total of 56,278 workers from 26 professional categories. The overall pooled prevalence of CMD was 0.30 (95%CI: 0.27-0.34), varying from 0.07 to 0.58. Professional categories that presented higher prevalences of CMD were: Prostitutes 0.58 (95%CI: 0.51-0.65), Social Educators 0.54 (95%CI: 0.50-0.59), Banking Workers 0.45 (95%CI: 0.44-0.47), Raggpickers 0.45 (95%CI: 0.40-0.49), and Teachers 0.40 (95%CI: 0.32-0.48). No other variable in addition to profession was associated with prevalence of CMD in the meta-regression analysis. Workers from the most affected professional categories should be monitored to prevent social, occupational, and health impairment from CMD.*

Key words *Mental health, Occupational exposure, Epidemiology*

Resumo *O objetivo do presente estudo foi descrever a prevalência de transtornos mentais comuns (TMC) em trabalhadores brasileiros por meio de uma revisão sistemática e meta-análise. As buscas foram realizadas no SciELO, LILACS, PubMed, Scopus e Web of Science. Artigos observacionais, com amostra de trabalhadores brasileiros, que utilizaram instrumento e ponto de corte validados e que apresentaram valor de prevalência foram incluídos. Foram realizadas a meta-análise com efeito aleatório utilizando as categorias profissionais como subgrupos e a meta-regressão. Foram incluídos 89 estudos, com um total de 56.278 trabalhadores de 26 categorias profissionais. A prevalência global de TMC foi de 0,30 (IC95%: 0,27-0,34), variando de 0,07 a 0,58. As categorias profissionais que apresentaram maiores valores de TMC foram: prostitutas 0,58 (IC95%: 0,51-0,65), educadores sociais 0,54 (IC95%: 0,50-0,59), bancários 0,45 (IC95%: 0,44-0,47), coletores 0,45 (IC95%: 0,40-0,49) e professores 0,40 (IC95%: 0,32-0,48). Nenhuma outra variável além da profissão se associou ao TMC na meta-regressão. Trabalhadores das categorias profissionais mais afetadas por TMC devem ser monitorados para prevenir os prejuízos sociais, ocupacionais e de saúde associados aos TMC.*

Palavras-chave *Saúde mental, Exposição ocupacional, Epidemiologia*

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Introduction

Common mental disorders are constituted by depressive and anxiety disorders¹. Depression can be characterized as an absence of positive affect, low mood, and emotional, cognitive, physical, and behavioural symptoms². With regard to the anxiety category, this refers to a group of mental disorders with symptoms of negative feelings and anxiety, including phobias, generalized anxiety, panic, social anxiety, and obsessive-compulsive and post-traumatic stress disorders^{1,2}. The pooled prevalence of common mental disorders in the worldwide general population is high, varying from 17.6% at any one time point to 29.2% over a lifetime³. Consequently, a large proportion of the population is exposed to social, occupational, and physical health impairment, in addition to a higher mortality rate².

The etiology of common mental disorders is multifactorial and complex and occupational aspects have received attention in the international literature. Work can have a positive effect on mental health. Unemployed people present a higher prevalence of depression compared to part-time employed or full-time employed individuals, due to income loss and consequent difficulties supporting their families⁴. On the other hand, a poor work environment such as job strain, effort-reward imbalance, low job control, workplace bullying, job insecurity, overload, ambiguity, poor relationship with peers, and poor infrastructure are associated with a higher prevalence of common mental disorders among workers⁵⁻⁷.

Due to the detrimental effects of work conditions on mental health, in Brazil a large number of studies have been conducted aiming to analyze the prevalence and factors associated with common mental disorders among a variety of occupational groups. In general, data indicate high variations in prevalence, since some studies indicate prevalences of common mental disorders exceeding 50%⁸⁻¹⁸ while others report prevalences lower than 15%¹⁹⁻²⁸. To our knowledge, no systematic reviews have been conducted aiming to describe the prevalence of common mental disorders among Brazilian workers. The absence of a pooled analysis limits the overview of methodological information regarding the published studies, as well as identification of professional groups for which investigation of the occurrence of common mental disorders has not been prioritized by the scientific community in Brazil. Moreover, this lack of information

prevents understanding of which occupational categories present a higher risk for common mental disorders, with consequent difficulties creating specific public policies and guidelines to promote mental health in high-risk workers. In view of this, the aim of the present study was to conduct a systematic review and meta-analysis of the prevalence of common mental disorders among Brazilian workers.

Methods

Background

This is a systematic review and meta-analysis of studies published until May 2020. In the present study the outcome was the prevalence of any common mental disorder, assessed by instruments able to provide results on the suspicion of a common mental disorder, without discriminating which one (depression or anxiety disorders). The guideline of Preferred Reporting Items for Systematic Reviews and Meta-Analyses²⁹ was adopted (Appendix 1 - available from: <https://doi.org/10.48331/scielodata.RFVHDY>).

Eligibility criteria

The question that guided the present systematic review was: What is the prevalence of common mental disorders among Brazilian workers? According to the PICOS model, the following eligibility criteria were adopted: Participants (P): Adult Brazilian workers; Intervention (I): Not applicable; Comparison (C): Not applicable; Outcome (O): Prevalence of common mental disorders assessed by a validated questionnaire and cut-off; Study (S): Cross-sectional or cohort (baseline data). The exclusion criteria were studies that do not report prevalence values or presented a pooled prevalence of common mental disorders of various work categories, samples with a group of participants that presented any diagnosed health disorder, absence of cutoff description and results from studies that used the same data set as a previous study (same year of data collection, sample size, and prevalence).

Information sources and search strategies

The search was conducted until May 2020 in the Scientific Electronic Library Online (SciELO), Latin American and Caribbean Center on Health Sciences Information (LILACS), MEDLINE (via

PubMed), Scopus, and Web of Science databases. No restrictions for date and language were adopted. Manual searches were performed in specialized journals and in the reference list of included studies. The descriptors used were: “transtornos ment* comu*” OR “common mental disorders” OR “distúrbios psíquicos” OR “psychological distress” OR “distúrbios psíquicos menores” OR “transtornos psíquicos menores” OR “minor psychiatric disorders” OR “Minor psychic disorders” OR “transtornos psiquiátricos” OR “transtornos mentais menores” OR “minor mental disorders” AND prevalência OR prevalence OR frequência OR frequency OR levantamento OR survey AND Brasil OR Brazil. Searches were adapted according to each search mechanism (Appendix 2 - available from: <https://doi.org/10.48331/scielodata.RFVHDY>). In PubMed and Web of Science, the search was conducted using only descriptors in the English language.

Study selection and data extraction

Two independent reviewers (DHCC and TAA) identified duplicated results manually using a specific spreadsheet. After excluding the duplicates, the next step of manuscript selection was based on titles and abstracts, following the pre-defined inclusion and exclusion criteria. The remaining studies were assessed by reading the full text. When the results of the same study were found published in different papers (same sample, prevalence, and procedure information), the first published manuscript was included. In studies that informed an initial sample size for the whole study, however with a lower sample size for common mental disorders due to missing values, the sample size for common mental disorders was considered. Author, year of study, region, professional category, instrument and cut-off, sample, cases, and prevalence were extracted using a specific form. Disagreement regarding any information was resolved through consensus.

Risk of bias assessment

The risk of bias assessment was performed by two researchers (DHCC and PFF), both with experience in conducting research and assessing manuscripts on an epidemiological subject. Disagreements were decided through consensus. The instrument used was proposed by Hoy et al.³⁰, a 10-item checklist that contains dichotomous questions (0 = low risk or 1 = high risk) related to:

national representativeness of sample; sampling procedures; non-response bias; data collection procedures; pre-defined case definition; validity and reliability of instruments; mode of data collection for all subjects; appropriate length of prevalence period; appropriate numerators and denominators for parameters. The score of the scale ranged from 0 to 10 and the cut-off values adopted to rate the risk of bias of included studies were: low (0-3), moderate (4-6), and high (7-10).

Data synthesis and analysis

The unadjusted prevalence was calculated for each included study. When only prevalence value and sample size were provided, the number of cases was calculated. For meta-analysis purposes, overall estimates were presented using the prevalence and 95% confidence intervals (95%CI). Single studies were included in a random-effect meta-analysis to pool the prevalence of all included studies. The comparison of prevalence according to each professional category was performed using subgroup analysis. Heterogeneity between studies was assessed using Cochran's Q (significance level at $P < 0.10$), I-squared statistics (I^2), and Tau-squared (τ^2). I^2 is the percentage of variability in the estimates which is attributable to heterogeneity between studies rather than to sampling error and τ^2 describes the underlying between-study variability, measured in the same unit of measure as the outcome. Publication bias was assessed using visual inspection of the funnel plot of log-prevalence (x-axis) and sample size (y-axis). Sources of heterogeneity were assessed by random-effects meta-regressions, using the restricted maximum likelihood (REML) and Knapp-Hartung methods for estimation. Coefficients and 95%CI are presented. For meta-regression purposes, due to the high number of professional categories, they were clustered into four groups according to prevalence values (Group 1 = 0.40 to 0.58; Group 2 = 0.30 to 0.38; Group 3 = 0.20 to 0.28; Group 4 = 0.07 to 0.18). Statistical procedures were conducted using the commands “*metaprop*” and “*metareg*” in Stata version 14.

Results

Study selection

The flow diagram of study selection is summarized in Figure 1. A total of 2,745 articles were

found through searches in five databases and two additional records from other sources. After duplicates had been removed, 1,482 references were analyzed and 1,330 were excluded after title and abstract screening. Subsequently, 152 full-texts were assessed for eligibility and reasons for additional exclusions were: studies that analyzed samples of more than one category of workers and did not provide stratified prevalence ($n = 20$); the use of the same data set ($n = 13$); did not describe cut-off of the instrument used (11); absence of prevalence ($n = 7$); sample composed of sick workers ($n = 3$); longitudinal design ($n = 3$); and

other reasons such as common mental disorders assessed through medical records and a sample composed of non-workers ($n = 6$), Appendix 3 (available from: <https://doi.org/10.48331/scielodata.RFVHDY>). All studies included in the systematic review were also included in the meta-analysis ($n = 89$).

Study characteristics

The characteristics of the included studies are summarized in Table 1 (available from: <https://doi.org/10.48331/scielodata.RFVHDY>). In some

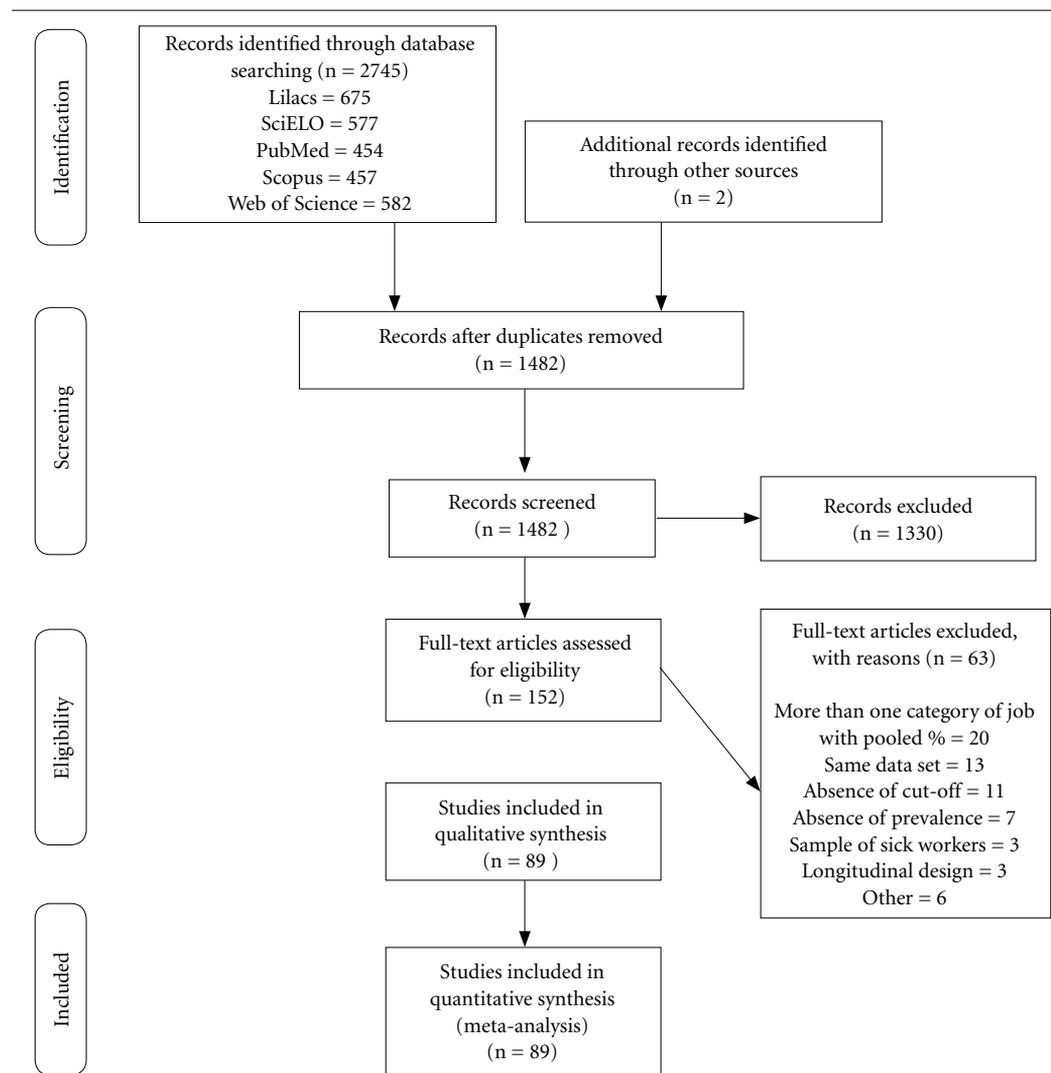


Figure 1. Flow chart of search and selection of studies.

studies, data were presented stratified by two or more work categories. In these cases, the study was included in more than one category of work and consequently, for some variables (professional category and sample size), the frequency is higher than the number of included studies ($n = 89$). The included studies described common mental disorders in 26 work categories: teachers and professors ($n = 21$)^{6-15,31-43}, nursing staff ($n = 20$)^{7,8,19,20,28,44-58}, physicians ($n=9$)^{7,19,21,28,46,59-62}, community health agents ($n = 8$)^{7,19,28,63-67}, drivers and collectors ($n = 4$)^{22,23,68,69}, police officers ($n = 5$)⁷⁰⁻⁷⁴, rural workers ($n = 4$)^{24,75-77}, administrative technicians ($n = 4$)^{19,28,78,79}, prison agents ($n = 3$)⁸⁰⁻⁸², banking workers ($n = 2$)^{83,84}, dentists ($n = 2$)^{19,46}, social educators ($n = 2$)^{16,17}, cleaning staff ($n = 2$)^{85,86}, and military personnel ($n = 2$)^{87,88}. One study was included for each of the professional categories: civil aviation pilots²⁵, civil aviation flight attendants⁸⁹, fitness workers²⁶, salespeople⁹⁰, nutritionists⁹¹, maritime workers²⁷, prostitutes¹⁸, ragpickers⁹², electricians⁹³, poultry production workers⁹⁴, managers⁹⁵, and military firefighters⁹⁶. With regard to period of data collection, 29 (32.6%) studies were conducted between 1995 and 2008, 34 (38.2%) between 2009 and 2012, 21 (23.6%) after 2013, and 5 (5.6%) did not describe this information. Studies were conducted mainly in the southeast 39 (43.8%), south 25 (28.1%), and northeast 21 (23.6%). One study was conducted in the north, one had a national sample, and two included samples from two or more regions of Brazil. The self-report questionnaire (SRQ) was used by 77 (86.5%) studies and 12 (13.5%) used the Global Health Questionnaire (GHQ). The SRQ cut-off ≥ 7 was the most frequently adopted in 40 studies (44.9%); ≥ 8 in 11 (12.4%), and ≥ 8 for female and ≥ 6 for male in 14 (15.7%). Other cut-offs, including those for GHQ were used in 24 (27.0%) studies. The distribution of studies according to sample size was: $n \leq 299$: 49 (47.1%); $n = 300$ to 599: 26 (25.0%); and $n \geq 600$: 25 (24.0%) studies.

Risk of bias

All the included studies presented either a low risk of bias, score 0 to 3 ($n = 73$, 82.0%), or a moderate risk of bias, score 4 to 6 ($n = 16$, 18.0%). The classification of each study is presented in Table 1 and Appendix 4 (available from: <https://data.scielo.org/dataset.xhtml?persistentId=doi:10.48331/scielodata.RFVHDY>).

The most common characteristics regarding risk of bias were: the study's target population was not a close representation of the national

population $n = 88$ (98.9%), non-response bias $n = 60$ (67.4%), did not use a random or census procedure for sample selection $n = 29$ (32.6%), and sampling framework is not a true or close representation of the target population $n = 17$ (19.1%).

Synthesis of results

The results of the meta-analysis are presented in Table 2 (available from: <https://doi.org/10.48331/scielodata.RFVHDY>). The overall prevalence was 0.30 (95%CI: 0.27-0.34) with high heterogeneity presented by the included studies ($I^2 = 98.67\%$, $\tau^2 = 0.11$, $P < 0.01$). The pooled prevalence, in decreasing order according to each professional category subgroup was: prostitutes 0.58 (95%CI: 0.51-0.65); social educators 0.54 (95%CI: 0.50-0.59); banking workers 0.45 (95%CI: 0.44-0.47); ragpickers 0.45 (95%CI: 0.40-0.49); teachers and professors 0.40 (95%CI: 0.32-0.48); nutritionists 0.38 (95%CI: 0.32-0.44); military personnel 0.34 (95%CI: 0.30-0.38); rural workers 0.34 (95%CI: 0.15-0.53); community health agents 0.34 (95%CI: 0.25-0.43); salespeople 0.31 (95%CI: 0.22-0.42); civil aviation flight attendants 0.30 (95%CI: 0.26-0.34); police officers 0.30 (95%CI: 0.23-0.36); cleaning staff 0.28 (95%CI: 0.22-0.34); nursing staff 0.27 (95%CI: 0.22-0.33); administrative technicians 0.26 (95%CI: 0.18-0.33); prison agents 0.26 (95%CI: 0.20-0.31); poultry production workers 0.24 (95%CI: 0.22-0.27); managers 0.24 (95%CI: 0.15-0.36); electricians 0.20 (95%CI: 0.14-0.27); physicians 0.18 (95%CI: 0.14-0.22); drivers and collectors 0.18 (95%CI: 0.06-0.29); dentists 0.16 (95%CI: 0.07-0.25); military firefighters 0.16 (95%CI: 0.13-0.19); maritime workers 0.14 (95%CI: 0.11-0.19); fitness workers 0.08 (95%CI: 0.05-0.10); and civil aviation pilots 0.07 (95%CI: 0.05-0.09). High variability attributed to heterogeneity was found in all work subgroups where it was possible to estimate this index ($n > 3$ studies), values of $I^2 > 82\%$, $P < 0.01$. Between study variability revealed that the variance in the true effect sizes varied from $\tau^2 = 0.02$ to 0.19, with higher values presented by studies with samples composed of teachers (0.14) and rural workers (0.19).

Publication bias

The funnel plot assessment revealed low asymmetry of CMD prevalence according to sample size, which indicates low probability of publication bias (Appendix 5 - available from:

<https://data.scielo.org/dataset.xhtml?persistentId=doi:10.48331/scielodata.RFVHDY>).

Additional analyses

Sensitivity analysis was conducted to assess the effect of small ($n < 100$) and large ($n > 1,500$) studies on pooled prevalence estimates in each subgroup of professionals (Appendix 6 - available from: <https://data.scielo.org/dataset.xhtml?persistentId=doi:10.48331/scielodata.RFVHDY>). No relevant effect of small or large studies on overall prevalence was found (0.30, 95%CI: 0.27-0.34, 0.32, 95%CI: 0.28-0.35 and 0.30, 95%CI: 0.26-0.33) and heterogeneity remained stable across the analysis. In the subgroup analysis, an effect of larger studies was found only among banking workers and rural workers with an increase in pooled prevalence of 0.5 and 0.6 (Appendix 6).

Meta-regressions were performed to investigate potential sources of heterogeneity (Table 3). Professional categories were clustered into four groups according to prevalence value and the composition of each group is described in Table 4. Considering group four as the reference, the other three groups were positively associated with a higher prevalence of common mental disorders: group three (0.07, 95%CI: 0.01-0.14), group two (0.18, 95%CI: 0.10-0.25), group one (0.24, 95%CI: 0.16-0.32), all $P < 0.05$. Instrument, cut-off, sample size, region, risk of bias, and year of data collection were not associated with prevalence of common mental disorders, all $P > 0.05$.

Discussion

To our knowledge, this is the first study to conduct a systematic review and meta-analysis to investigate the prevalence of common mental disorders among Brazilian workers. The majority of professional categories analyzed presented a high pooled prevalence of common mental disorders ($> 10\%$), and the highest pooled prevalence ($\geq 40\%$) was found for prostitutes, social educators, banking workers, ragpickers, and teachers.

In Brazil, although prostitution is a regulated profession, the routine of this job is surrounded by risks such as physical and sexual violence, alcohol and drug use, abortion, confidentiality, and a high number of clients a week¹⁸, aspects that impose high mental distress on these professionals. Furthermore, these professionals are exposed to social stigma, which can emerge from socio-pow-

er structures, and institutional, community, and individual sources and have a variety of consequences, including decreased mental wellness⁹⁷. Social educators work providing support for individuals who are at risk or socially vulnerable, which in addition to low remuneration, impacts on the physical, moral, and psychological integrity of these workers^{16,17}. Banking workers have a variety of occupational risks associated with common mental disorders, such as perception of negative interference from work in other areas of life, exposure to conflicts, the existence of individualism and professional disputes in the workplace, high demand, stress, low social support, and effort-reward imbalance^{83,84}. Some inherent aspects of ragpicker routines contribute to impairment in mental health, such as working on dumps, riverbanks, and roadsides, a lack of personal protective equipment, the risk of traffic accidents, irregular work shifts, poor living conditions, social isolation, and discrimination⁹². Similarly to prostitutes, these professionals deal with social stigma and are commonly seen as the waste they pick up, things that are discarded and associated with dirt and grime. This is reinforced by characteristics such as old clothes, dirty hands, and skin marked by poverty. In addition, since these individuals pull carts through the streets, their image is often associated with that of an animal, which reflects in their marginal image in society⁹⁸. The effects of work on the mental health of teachers are widely known, and it is notable that in the present review this is the professional category with the highest number of included studies. Problems related to the teaching profession are wide ranging and include a variety of health-related problems, social devaluation, overload, violence, role ambiguity, a low level of social support, low perceived self-efficacy, pressure, poor infrastructure and environment, low creativity and autonomy, and insufficient time for planning^{6,9,35-37}.

One of the challenges related to common mental disorders among workers is to implement intervention and monitoring programs in some informal professions that are invisible to society, such as ragpickers and prostitutes, which could be achieved through implementation of public policies in partnership with specific associations and cooperatives. These organizations have proximity to the workers and databases with their contacts and are commonly consulted for research purposes^{18,92}.

Although the professions cited above presented the highest pooled prevalence of common mental disorders, it is important to state that the

Table 3. Meta-regression analysis of potential sources of heterogeneity.

Subgroup	Estimate (95%CI)	Adjusted coefficient (95%CI)	P-value
Professional category			
Group 4	0.16 (0.12-0.20)	Reference	
Group 3	0.27 (0.24-0.30)	0.07 (0.01 - 0.14)	0.038
Group 2	0.34 (0.28-0.41)	0.18 (0.10 - 0.25)	< 0.001
Group 1	0.43 (0.36-0.49)	0.24 (0.16 - 0.32)	< 0.001
Instrument			
SRQ	0.29 (0.26-0.33)	Reference	
GHQ	0.38 (0.31-0.44)	-0.09 (-0.20 - 0.03)	0.126
Cut-offs			
SRQ ≥ 7	0.30 (0.25 - 0.35)	Reference	
SRQ ≥ 8	0.34 (0.24 - 0.44)	-0.06 (-0.15 - 0.03)	0.181
SRQ: F ≥ 8 and M ≥ 6	0.25 (0.19 - 0.31)	-0.04 (-0.11 - 0.03)	0.270
Others including GHQ	0.35 (0.30 - 0.39)	0.04 (-0.05 - 0.12)	0.401
Sample			
Up to 299	0.30 (0.23 - 0.36)	Reference	
300 to 599	0.30 (0.24 - 0.35)	-0.01 (-0.04 - 0.07)	0.667
≥ 600	0.33 (0.27 - 0.39)	0.04 (-0.02 - 0.10)	0.207
Region			
South	0.31 (0.24-0.39)	Reference	
Southeast	0.33 (0.29-0.37)	0.06 (-0.01 - 0.13)	0.065
Northeast	0.27 (0.22-0.32)	0.00 (-0.07 - 0.07)	0.950
North	0.50 (0.40-0.59)	0.13 (-0.11 - 0.38)	0.276
≥ two regions	0.19 (0.07-0.32)	-0.06 (-0.18 - 0.05)	0.294
Risk of bias			
Low	0.30 (0.27 - 0.33)	Reference	
Moderate	0.35 (0.22 - 0.48)	0.03 (-0.04 - 0.10)	0.443
Year of data collection			
1995 to 2008	0.31 (0.26 - 0.36)	Reference	
2009 to 2012	0.26 (0.22 - 0.30)	-0.04 (-0.10 - 0.02)	0.191
2013 to 2018	0.37 (0.29 - 0.44)	0.06 (-0.01 - 0.13)	0.105
Not-informed	0.30 (0.20 - 0.40)	-0.03 (-0.16 - 0.11)	0.688

95%CI = 95% confidence intervals; all variables were included in the adjusted model. SRQ = Self-Report Questionnaire; GHQ = Global Health Questionnaire; F: female; M: male; Group 1: prostitutes, social educators, banking workers, ragpickers, teachers and professors. Group 2: nutritionists, military personnel, rural workers, community health agents, salespeople, civil aviation flight attendants and police officers. Group 3: cleaning staff, nursing staff, administrative technicians, prison agents, poultry production workers, managers and electricians. Group 4: physicians, drivers and collectors, dentists, military firefighters, maritime workers, fitness workers and civil aviation pilots.

Source: Authors.

prevalence of the outcome was high in most other professions. Of the 26 included studies, only two presented prevalences lower than 10%, while 19 demonstrated prevalences higher than 20%. Furthermore, curiously, some professional categories that are commonly cited as having a high risk of mental disorders due to work demands were not in the highest risk group. This is the case for police officers, military personnel, nursing staff, and prison agents, a result that partially cor-

roborates a meta-analysis with workers from the United Kingdom⁹⁹. The results of the present study indicate that a variety of other professions have a high prevalence of common mental disorders in addition to those already known. These results suggest that the mental health of the Brazilian workforce should be monitored to prevent or reduce risks related to common mental disorders. In addition, modifications in labor and social security rights should consider health impairment

Table 4. Groups of professional categories in descending order of prevalence of common mental disorders.

Professional categories	Pooled prevalence	95%CI	Group
Prostitutes	0.58	0.51 - 0.65	Group 1
Social educators	0.54	0.50 - 0.59	
Banking workers	0.45	0.44 - 0.47	
Ragpickers	0.45	0.40 - 0.49	
Teachers and professors	0.40	0.32 - 0.48	
Nutritionists	0.38	0.32 - 0.44	Group 2
Military personnel	0.34	0.30 - 0.38	
Rural workers	0.34	0.15 - 0.53	
Community health agents	0.34	0.25 - 0.43	
Salespeople	0.31	0.22 - 0.42	
Civil aviation flight attendants	0.30	0.26 - 0.34	Group 3
Police officers	0.30	0.23 - 0.36	
Cleaning staff	0.28	0.22 - 0.34	
Nursing staff	0.27	0.22 - 0.33	
Administrative technicians	0.26	0.18 - 0.33	
Prison agents	0.26	0.20 - 0.31	Group 4
Poultry production workers	0.24	0.22 - 0.27	
Managers	0.24	0.15 - 0.36	
Electricians	0.20	0.14 - 0.27	
Physicians	0.18	0.14 - 0.22	
Drivers and collectors	0.18	0.06 - 0.29	Group 4
Dentists	0.16	0.07 - 0.25	
Military firefighters	0.16	0.13 - 0.19	
Maritime workers	0.14	0.11 - 0.19	
Fitness workers	0.08	0.05 - 0.10	
Civil aviation pilots	0.07	0.05 - 0.09	

Source: Authors.

of professions, since some reforms, as occurred recently in Brazil, can increase the occupational and health condition of workers¹⁰⁰.

The present study also provides relevant information regarding the distribution of scientific research across Brazilian regions, professional categories, and instruments used. With respect to the number of studies, a considerable number of studies covering different regions of Brazil was found only for teachers and nursing staff. However, there was a lack of information in the central west and north regions even for these professional categories. Considering some professional categories, a low number of studies are available in the literature; only one study was available for each of 14 of the 26 professions. With regard to macro regions of Brazil, studies were mainly distributed in the southeast, south, and northeast respectively. Only one included study was conducted in the north and no studies were found from the central west. The higher number of research centers and

Universities in some regions could explain these differences. Furthermore, since teachers, nurses, and physicians are involved in health research, their respective professions become interesting for research. The SRQ was the most commonly used instrument followed by the GHQ, which reflects the accuracy of instruments and number of validation studies in the international literature¹⁰¹.

Additional analyses of meta-regressions were conducted to assess potential sources of heterogeneity among the included studies. Only groups of professions with similar prevalence values, as described in table 4, were associated with common mental disorders. Other potential sources of heterogeneity such as instrument, cut-off, region, sample size, date of publication, and risk of bias did not affect prevalence values. The absence of an influence of sample size on prevalence is relevant because there is great variability in the included studies and the effect of this variable on prevalence could be an important bias when an-

alyzing prevalence studies¹⁰².

The interpretation of cut-offs adopted in studies is a methodological aspect that should be mentioned. Two of the most commonly cited validation studies on the SRQ^{103,104} suggest 7/8 positive items as a cut-off with the Structured Clinical Interview as a reference criterion using an ROC curve. It was found that the best sensitivity and specificity (86.3 and 89.3%) was 7.5 points for both sexes¹⁰⁴. For this reason, a cut-off of 7/8 is suggested for both sexes. A problem emerges since the SRQ includes 20 items that can result in any value from 0 to 20 but does not allow decimals in the score. It is not specified whether 7 or 8 points should be adopted as the cut-off, and some studies adopted 7 points^{16,31,65,75,81,83}, some 8 points^{14,17,18,43,60}, and some studies described only that 7/8 was adopted^{6,67}. The same occurred when analyzing the GHQ with the cut-off 3/4, some studies adopted 3^{70,79,87,88,91} and others 4^{9,36,42,84}. The divergence in interpretation of the cut-offs could affect the prevalence values, with more conservative cut-offs resulting in a lower prevalence. Nevertheless, this probably did not affect the present results since a pattern of cut-off use was not evidenced in specific professions and was not associated with common mental disorders in the meta-regression.

Some limitations of the present study should be considered when generalizing the results or planning future studies. Furthermore, studies

that analyzed common mental disorders were considered, but not specific depressive and anxiety disorders. For this reason, key words related to diagnosed psychiatric diseases or other severe conditions were not adopted and, consequently, the results cannot be generalized for specific mental disorders². Since there are only one or two studies for the majority of professional categories, the analysis of factors associated with heterogeneity inside each subgroup was impracticable.

Conclusions

The pooled prevalence of common mental disorders among Brazilian workers of 26 professional categories was high (30%). The professional categories prostitutes, social educators, banking workers, ragpickers, and teachers presented the highest prevalences (40 to 58%) while physicians, drivers and collectors, dentists, military firefighters, maritime workers, fitness workers, and civil aviation pilots presented the lowest prevalences (7 to 18%). The results suggest that workers from the most affected professional categories should be monitored to prevent social, occupational, and health impairment from CMD. Future studies should consider professional categories and regions of Brazil that have received little attention to date.

Collaborations

Coledam DHC worked on the conception and design of the study, searching, data extraction, statistical analysis and interpretation, drafting, critical review and final approval of the manuscript. Aurora TA performed searching, data extraction, interpretation of data, critical review and final approval of the manuscript. Arruda GA performed substantial contribution on interpretation, drafting, critical review and final approval of the manuscript. Ferraiol PH contributed on data analysis and interpretation, drafting, critical review and final approval of the manuscript.

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