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Mental disorders related to work: distribution, data completeness, and temporal trends in Brazil, 2007-2023

Claudio José dos Santos Júnior, Fernanda Ferreira Albuquerque Tenorio, John Victor dos Santos Silva, Mara Cristina Ribeiro, Frida Marina Fischer

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This is a preliminary, unedited version of a manuscript that has been accepted for publication in the Brazilian Journal of Psychiatry. As a service to our readers, we are providing this early version of the manuscript. The manuscript will still undergo copyediting, typesetting, and review of the resulting proof before it is published in final form. The final version may present slight differences in relation to the present version.

Mental disorders related to work: distribution, data completeness, and temporal trends in Brazil, 2007-2023

Running title: Work-related mental disorders in Brazil

Claudio José dos Santos Júnior[1], Fernanda Ferreira Albuquerque Tenorio[1], John Victor dos Santos Silva[2], Mara Cristina Ribeiro[1], Frida Marina Fischer[3]

[1]Alagoas State University of Health Sciences (UNCISAL), Maceió, AL, Brazil.
[2]University of São Paulo (USP), Ribeirão Preto, SP, Brazil.
[3]School of Public Health, University of São Paulo, São Paulo, SP, Brazil.

Corresponding Author:
Claudio José dos Santos Júnior, +55 82 9 8816-6203; E-mail: claudiojunior@alumni.usp.br; Address: R. Dr. Jorge de Lima, 113 - Trapiche da Barra, Maceió - AL, 57010-300

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ABSTRACT

Objective: To characterize the distribution, data completeness, and temporal trends of notifications of Work-Related Mental Disorders (WRMD) in Brazil from 2007 to 2023.

Methods: Cross-sectional and time-series study analyzing 22,378 notifications recorded in the Notifiable Diseases Information System (SINAN). Notifications were characterized according to demographic and clinical variables. Temporal trends were evaluated using the Joinpoint Regression Mode.

Results: WRMD notifications increased from 0.13 per 100,000 employed working-age individuals in 2007 to 3.51 in 2023, with an average annual percent change of 18.24%, and peaks in 2009, 2017, and 2021. Most notifications involved women (64.86%), predominantly aged 35–49 years (49.27%). The Southeast and Northeast accounted for most cases, and anxiety and mood disorders were the most frequent diagnoses. Data completeness was excellent for sex and age group, fair for race/skin color and education, and insufficient for clinical variables related to substance use Temporary disability was reported in 56.38% of cases.

Conclusions: WRMD notifications increased substantially over the study period, particularly after 2021. Notifications predominated among women and workers aged 35–49 years, were concentrated in the Southeast and Northeast, and most frequently involved anxiety, stress-related, and somatoform disorders and mood disorders, with temporary disability reported in over half of cases.

Keywords: Epidemiologic Studies, Occupational Diseases, Regression Analysis, Public Health Surveillance, Health Information Systems.

INTRODUCTION

The transformations observed in the world of work over recent decades have profoundly changed how people live and work and how they experience illness. Shifts in working conditions and workplace organization have reshaped labor markets and, consequently, the profile of work-related diseases and health problems, including mental disorders[1-3].

The association between mental health problems and work began to be discussed more explicitly in the 1950s, during the postwar period. This debate intensified in the 1960s and 1970s amid rapid industrialization, a concurrent increase in reported mental illness, and growing recognition of the impacts of work absence[1].

In Brazil, Work-Related Mental Disorders (WRMD) are currently reported as the third leading cause of work absence, accounting for 9.79% of temporary disability benefits and non-occupational disability retirement grants, and 6.31% of benefits related to occupational accidents[4]. In 2024, there was a 68% increase in the number of medical leaves due to mental disorders, reaching the highest level in the last decade, with more than 470,000 medical leaves approved for anxiety, depression, and related conditions[5].

Estimates of the prevalence of common mental disorders in the Brazilian adult population range from 20% to 56%, with a higher burden among women and workers[6]. The disability burden associated with WRMD has been mainly linked to depressive and anxiety episodes, burnout, and related syndromes. From 2013 to 2019, the prevalence of depression increased by 2.6%, and the proportion of individuals seeking care for depression in the previous 12 months rose by 6.4%[7]. Studies in Brazil have also reported high prevalences of psychological morbidity

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among several occupational groups, including healthcare professionals, community health workers, and teachers[8-10].

Burnout was included in the 11th Revision of the International Classification of Diseases (ICD-11) as an occupational phenomenon[11]. In Brazil, Regulatory Standard No. 1 (NR-1) established occupational risk management as a mandatory component of workplace health and safety, requiring employers to identify, assess, and control psychosocial risks. Within this framework, psychosocial factors such as work overload, low autonomy, job insecurity, and interpersonal conflicts were recognized as relevant occupational hazards directly associated with work-related mental disorders[12,13]. Despite this growing recognition, translating psychosocial risk management into routine workplace assessment and surveillance remains challenging, and under-detection and underreporting of work-related mental disorders persist.

Despite regulatory advances and increasing concern about WRMD, critical gaps remain in the epidemiological characterization of these conditions in Brazil. Monitoring the burden and magnitude of illness, as well as the completeness of WRMD case notifications to epidemiological surveillance services, remains challenging.

In this context, this study is justified by the need to fill gaps in the epidemiological characterization of work-related mental disorders in Brazil, providing nationally representative evidence to support public health policies, improve surveillance strategies, and guide preventive and occupational health interventions.

This study aimed to characterize notifications of WRMD in Brazil from 2007 to 2023 by describing their distribution by geographic region and sociodemographic and clinical variables, assessing data completeness, and analyzing temporal trends in notifications.

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METHODS

This cross-sectional time-series study analyzed the distribution, data completeness, and temporal trends of notifications of Work-Related Mental Disorders in Brazil.

Cases of WRMD were obtained from the Health Information (TABNET) platform of DATASUS, maintained by the Brazilian Unified Health System (SUS), specifically

from the Notifiable Diseases Information System (SINAN), while population denominators were retrieved from the "População Residente – Informações Demográficas e Socioeconômicas" database within the same platform. Population estimates of employed individuals of working age (>14 years) were based on official data produced by the Brazilian Institute of Geography and Statistics (IBGE). In the census year (2010), the denominator corresponded to the observed population count from the national census, whereas for all other years annual figures were derived from IBGE's official intercensal population estimates. This approach follows the standard methodology adopted by the Brazilian Ministry of Health for the calculation and dissemination of official public health indicators.

A case of WRMD was defined according to the Brazilian national surveillance protocol as any notification in SINAN of emotional or behavioral suffering potentially associated with occupational exposure. Eligible cases include diagnoses recorded under ICD-10 codes F00–F99 (mental and behavioral disorders), Y90–Y91 (alcohol-related conditions), Z73.0 (burnout syndrome), R40–R46 (symptoms and signs related to cognition, perception, emotional state, and behavior), Z55–Z65 (persons with potential health risks related to socioeconomic and psychosocial circumstances), Y96 (work-related condition), and X60–X84 (intentional self-harm), provided that work-related factors were identified as causal or contributing elements. The occupational link was established by the notifying health professional based on clinical evaluation and documentation within the national surveillance system[14].

Variables were extracted from the WRMD notification form and grouped as: demographic (sex, age group, race/skin color, and education level) and clinical-occupational (alcohol use, tobacco use, psychoactive substance use, psychotropic medication use, treatment status, diagnosis, case outcome, and issuance of the Work Accident Report [CAT]).

Descriptive statistics (absolute and relative frequencies) were used to summarize indicators, and data completeness was assessed for each variable by calculating the proportion of missing, ignored, or unfilled fields.

The study dataset comprised 22,378 WRMD notifications recorded between 2007 and 2023. The units of analysis were Brazil's administrative regions.

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The annual WRMD notification rate was calculated by dividing the number of newly reported notifications by the employed working-age population, multiplied by 100,000.

Data completeness was evaluated as the percentage of missing information (incompleteness), calculated by grouping fields recorded as blank, ignored, or not filled in the original database. Completeness was classified, in accordance with established criteria in the literature, as: Excellent (<5%), Good (5% to <10%), Fair (10% to <20%), Poor (20% to <50%), and Very poor (≥50%)[15]. The assessment was performed considering the entire study period rather than year by year, aiming to evaluate the overall reliability of each variable included in the analysis.

Subsequently, temporal trends in the notification rate were analyzed using the Joinpoint Regression Model, which assesses whether a segmented line provides a better fit to the data than a straight line or a model with fewer segments[16]. The dependent variable was the WRMD notification rate, and the independent variable was the calendar year.

Model parameters were set as follows: minimum of 0 joinpoints, maximum of 3 joinpoints; model selection by Monte Carlo permutation test (n = 4,499 permutations); autocorrelated errors option based on data; 95% confidence intervals (95% CI); and a 5% significance level. Considering the 17 annual observations, the maximum of three joinpoints was defined in accordance with Joinpoint software recommendations relative to series length and supported by prior inspection of the historical series to reduce the likelihood of overfitting.

Trends were classified as stable, increasing, or decreasing based on the slope of the regression line and statistical significance. Annual Percent Change (APC) and Average Annual Percent Change (AAPC) were calculated. APC and AAPC were considered statistically significant when $p < 0.05$ and the 95% CI did not include zero. Positive and significant APC/AAPC indicated an increasing trend; negative and significant APC/AAPC indicated a decreasing trend; and in the absence of statistical significance, the trend was considered stable, regardless of the APC/AAPC value.

The final model was the best-fitting model, determined by the lowest Weighted Bayesian Information Criterion (WBIC), and the adequacy of the number of joinpoints was assessed using joinpoint adequacy tests and the Bayesian Information Criterion (BIC)[16].

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All analyses were conducted using the Joinpoint Regression Program (version 4.6; National Cancer Institute, Bethesda, MD, USA).

The study was not submitted to a Research Ethics Committee because it used secondary data with free public access.

RESULTS

Of the 22,378 notifications of WRMD, most were concentrated in the Southeast region (46.94%), followed by the Northeast (30.36%) and the South (13.60%). The North (4.21%) and Central-West (4.88%) regions had the lowest proportions of notifications (Figure 1).

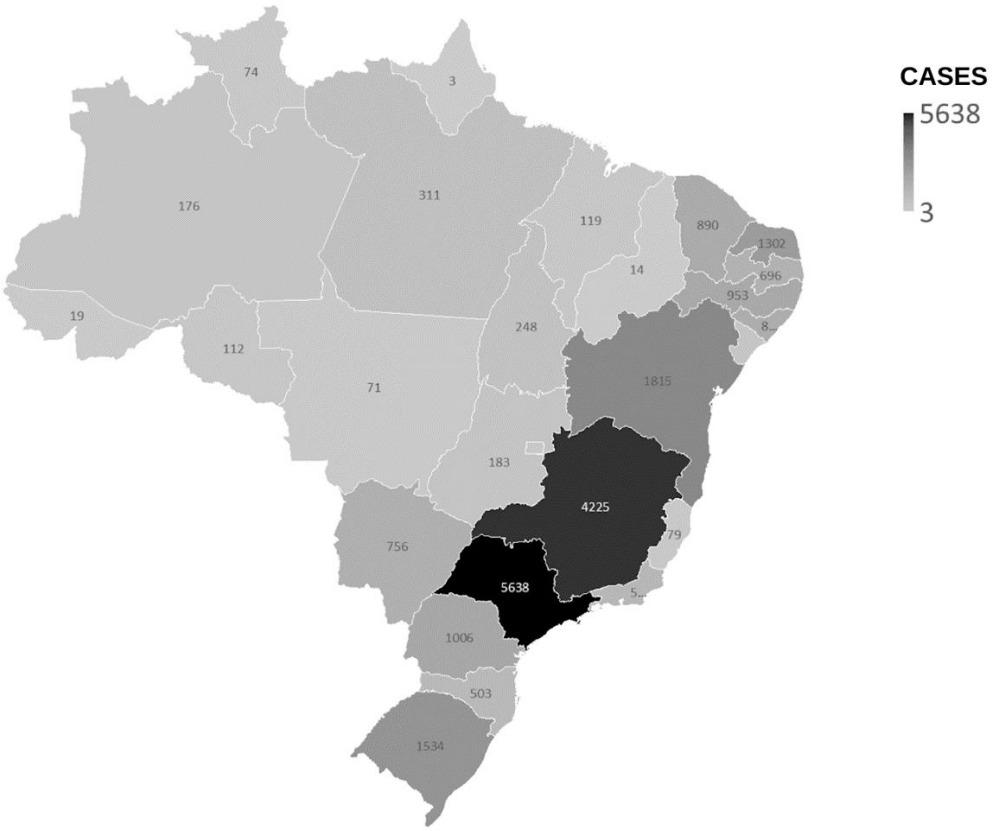


Figure 1. Distribution of Work-Related Mental Disorder notifications by Federative Unit (state). Brazil, 2007–2023.

Most notifications were among women (64.86%). By age group, individuals aged 35–49 years accounted for 49.27% of notifications, followed by those aged 20–34 years (33.06%). For race/ethnicity, most notifications were recorded among White individuals (43.90%), followed by Brown individuals (29.19%) and Black individuals (6.99%); Yellow (0.94%) and Indigenous (0.26%) categories were less frequent, and race/ethnicity was missing or not recorded in 18.72% of notifications. Regarding education, most notifications involved individuals with high school education (36.38%) or higher education (29.28%), while education was missing or not recorded in 18.68% (Table 1).

Table 1. Demographic characteristics of Work-Related Mental Disorders notifications by region. Brazil, 2007–2023.

Variables	North		Northeast		Southeast		South		Center-West		Brazil	
	N	%	N	%	N	%	N	%	N	%	N	%
Sex												
Male	313	33.19	2826	41.59	3672	34.95	795	26.13	257	23.53	7863	35.14
Female	630	66.81	3968	58.40	6833	65.05	2248	73.87	835	76.47	14514	64.86
N/A	0	0.00	1	0.01	0	0.00	0	0.00	0	0.00	1	0.00
Age Group (years)												
≤ 19	25	2.65	104	1.53	144	1.37	75	2.46	19	1.74	367	1.64
20-34	321	34.04	1123	16.53	3287	31.29	1130	37.13	346	31.68	7399	33.06
35-49	430	45.60	1989	29.27	5430	51.69	1292	42.46	547	50.09	11025	49.27
50-64	158	16.76	578	8.51	1605	15.28	526	17.29	170	15.57	3479	15.55
≥ 65	9	0.95	14	0.21	39	0.37	20	0.66	10	0.92	108	0.48
Race/Ethnicity												
White	182	19.30	1674	24.64	5269	50.16	2205	72.46	495	45.33	9825	43.90
Black	53	5.62	498	7.33	794	7.56	163	5.36	56	5.13	1564	6.99
Brown	523	55.46	2922	43.00	2415	22.99	274	9.00	398	36.45	6532	29.19
Indigenous	7	0.74	12	0.18	19	0.18	5	0.16	15	1.37	58	0.26
Yellow	13	1.38	98	1.44	74	0.70	8	0.26	17	1.56	210	0.94
N/A	165	17.50	1591	23.41	1934	18.41	388	12.75	111	10.16	4189	18.72
Education												
Illiterate	10	1.06	17	0.25	19	0.18	4	0.13	12	1.10	65	0.29
Incomplete elementary	75	7.95	394	5.80	607	5.78	214	7.03	91	8.33	1394	6.23
Elementary	50	5.30	518	7.62	840	8.00	432	14.20	80	7.33	1930	8.62
High School	286	30.33	2371	34.89	3944	37.54	1124	36.94	372	34.07	8141	36.38
Higher Education	343	36.37	1943	28.59	3274	31.17	597	19.62	350	32.05	6553	29.28
Not applied	7	0.74	51	0.75	45	0.43	8	0.26	4	0.37	115	0.51
N/A	172	18.25	1385	20.38	1776	16.91	664	21.82	183	16.75	4180	18.69
Total	943	100	6795	100	10505	100	3043	100	1092	100	22378	100

N/A: not answer

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Among notifications with available information, 6.40% indicated alcohol use, 5.17% tobacco use, 7.39% psychoactive substance use, and 33.24% psychotropic medication use. Most notifications reported outpatient treatment (83.70%), while 4.16% reported hospital treatment. Temporary disability was noted in 56.38% of notifications. Neurotic, stress-related, and somatoform disorders (ICD-10 codes F40–F48) were the most frequent diagnoses (49.73%), followed by mood disorders (ICD-10 codes F30–F39) (22.40%). Only 34.44% of notifications resulted in the issuance of a Work Accident Report (Table 2).

Table 2. Clinical and occupational characteristics of Work-Related Mental Disorders notifications. Brazil, 2007–2023.

Variables	North		Northeast		Southeast		South		Center-West		Brazil	
	N	%	N	%	N	%	N	%	N	%	N	%
Alcohol use												
Yes	72	7.64	576	8.48	538	5.12	1321	43.41	92	8.42	1432	6.40
No	505	53.55	3934	57.90	5809	55.30	644	21.16	754	69.05	12813	57.26
N/A	366	38.81	2285	33.63	4158	39.58	1078	35.43	246	22.53	8133	36.34
Tobacco use												
Yes	55	5.83	252	3.71	560	5.33	214	7.03	75	6.87	1156	5.17
No	515	54.61	4200	61.81	5425	51.64	1641	53.93	768	70.33	12549	56.08
N/A	373	39.55	2343	34.48	4520	43.03	1188	39.04	249	22.80	8673	38.76
Psychoactive substance use												
Yes	63	6.68	952	14.01	471	4.48	100	3.29	68	6.23	1654	7.39
No	492	52.17	3430	50.48	5750	54.74	1846	60.66	743	68.04	12261	54.79
N/A	388	41.15	2413	35.51	4284	40.78	1097	36.05	281	25.73	8463	37.82
Psychotropic medication use												
Yes	260	27.57	2915	42.90	2895	27.56	940	30.89	428	39.19	7438	33.24
No	311	32.98	2048	30.14	3695	35.17	1048	34.44	427	39.10	7529	33.64
N/A	372	39.45	1832	26.96	3915	37.27	1055	34.67	237	21.70	7411	33.12
Treatment type												
Hospital	43	4.56	299	4.40	413	3.93	119	3.91	56	5.13	930	4.16
Ambulatory	705	74.76	5716	84.12	8970	85.39	2427	79.76	913	83.61	18731	83.70
N/A	195	20.68	780	11.48	1122	10.68	497	16.33	123	11.26	2717	12.14
Patient progress												
Cure	65	6.89	148	2.18	362	3.45	189	6.21	48	4.40	812	3.63
Non-confirmed cure	130	13.79	338	4.97	776	7.39	557	18.30	85	7.78	1886	8.43
Temporary disability	382	40.51	4630	68.14	6005	57.16	1066	35.03	534	48.90	12617	56.38
Partial permanent disability	39	4.14	264	3.89	201	1.91	39	1.28	51	4.67	594	2.65
Total permanent disability	20	2.12	40	0.59	44	0.42	9	0.30	18	1.65	131	0.59

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Variables	North		Northeast		Southeast		South		Center-West		Brazil	
	N	%	N	%	N	%	N	%	N	%	N	%
Death due to work-related disease	0	0.00	5	0.07	2	0.02	6	0.20	1	0.09	14	0.06
Death due to another cause	2	0.21	2	0.03	3	0.03	2	0.07	0	0.00	9	0.04
Others	71	7.53	384	5.65	970	9.23	515	16.92	127	11.63	2067	9.24
N/A	234	24.81	984	14.48	2142	20.39	660	21.69	228	20.88	4248	18.98
Specific diagnosis												
F00-F09	4	0.42	31	0.46	70	0.67	17	0.56	5	0.46	127	0.57
F10-F19	13	1.38	37	0.54	39	0.37	25	0.82	7	0.64	121	0.54
F20-F29	11	1.17	131	1.93	61	0.58	11	0.36	11	1.01	225	1.01
F30-F39	152	16.12	1572	23.13	2371	22.57	615	20.21	303	27.75	5013	22.40
F40-F48	392	41.57	3716	54.69	5276	50.22	1353	44.46	391	35.81	11128	49.73
F50-F59	3	0.32	17	0.25	48	0.46	6	0.20	2	0.18	76	0.34
F60-F69	3	0.32	13	0.19	22	0.21	5	0.16	7	0.64	50	0.22
F70-F79	0	0.00	6	0.09	4	0.04	0	0.00	0	0.00	10	0.04
F80-F89	0	0.00	2	0.03	4	0.04	0	0.00	0	0.00	6	0.03
F90-F98	0	0.00	6	0.09	8	0.08	1	0.03	0	0.00	15	0.07
F99	42	4.45	198	2.91	226	2.15	118	3.88	67	6.14	651	2.91
R40-R46	8	0.85	13	0.19	161	1.53	39	1.28	1	0.09	222	0.99
X60-X84	1	0.11	5	0.07	4	0.04	11	0.36	1	0.09	22	0.10
Z55-Z65	13	1.38	52	0.77	284	2.70	127	4.17	13	1.19	489	2.19
Y90	0	0.00	1	0.01	0	0.00	0	0.00	0	0.00	1	0.00
Y91	0	0.00	0	0.00	0	0.00	1	0.03	0	0.00	1	0.00
Y96	3	0.32	19	0.28	30	0.29	17	0.56	44	4.03	113	0.50
Z73.0	23	2.44	309	4.55	616	5.86	124	4.07	32	2.93	1104	4.93
ICD not listed	23	2.44	138	2.03	172	1.64	101	3.32	14	1.28	448	2.00
ICD not filled in	252	26.72	529	7.79	1109	10.56	472	15.51	194	17.77	2556	11.42
Issuance of the CAT												
Yes	255	27.04	1861	27.39	4828	45.96	673	22.12	89	8.15	7706	34.44
No	395	41.89	3132	46.09	3227	30.72	1304	42.85	521	47.71	8579	38.34
Not applicable	130	13.79	587	8.64	441	4.20	284	9.33	181	16.58	1623	7.25
N/A	163	17.29	1215	17.88	2009	19.12	782	25.70	301	27.56	4470	19.97
Total	943	100	6795	100	10505	100	3043	100	1092	100	22378	100

F00–F09: Organic mental disorders; F10–F19: Mental and behavioral disorders due to psychoactive substance use; F20–F29: Schizophrenia, schizotypal and delusional disorders; F30–F39: Mood disorders; F40–F48: Neurotic, stress-related and somatoform disorders; F50–F59: Behavioral syndromes associated with physiological disturbances and physical factors; F60–F69: Disorders of adult personality and behavior; F70–F79: Mental retardation; F80–F89: Disorders of psychological development; F90–F98: Behavioral and emotional disorders with onset usually occurring in childhood and adolescence; F99–F99: Unspecified mental disorder; R40–R46: Symptoms and signs involving cognition, perception, emotional state and behavior; X60–X84: Intentional self-harm; Z55–Z65: Persons with potential health hazards related to socioeconomic and psychosocial circumstances; Y90: Evidence of alcohol involvement determined by blood alcohol level; Y91: Evidence of alcohol involvement determined by level of intoxication; Y96: Work-related condition; Z73.0: Burnout syndrome.

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Regarding data completeness, gender and age group showed incompleteness lower than 5% (classified as excellent). Race/skin color, education level, case outcome, and CAT issuance exhibited incompleteness of 10% to 20% (classified as fair). Treatment type and ICD-10 specific diagnosis also showed fair completeness (incompleteness of 12.14% and 11.42%, respectively). In contrast, variables related to substance use (alcohol, tobacco, and psychoactive substances) showed incompleteness between 33% and 38%, corresponding to poor completeness (Tables 1 and 2).

In 2007, the notification rate of WRMD notifications was 0.13 per 100,000 employed working-age individuals. Over the study period, a gradual increase was observed, with peaks in 2009, 2017, and 2021, reaching 3.51 notifications per 100,000 employed working-age individuals in 2023 (Figure 2).

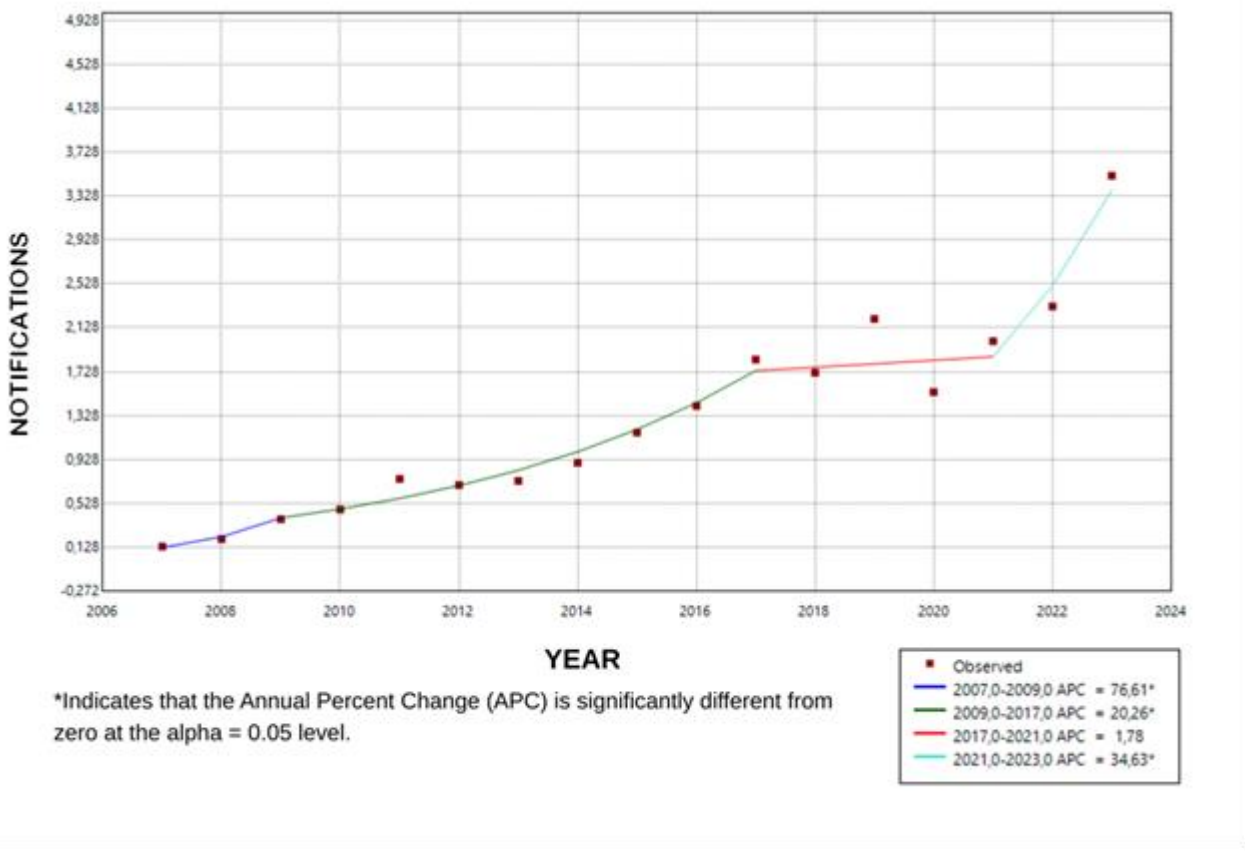


Figure 2: Time series of the Work-Related Mental Disorders notification rate. Brazil, 2007–2023.

Between 2007 and 2023, the AAPC was 18.24% (95% CI: 14.58–21.93; p < 0.001), indicating an increasing trend. This increase was particularly notable between 2007 and 2009, when the APC was 76.61% (95% CI: 41.85–119.33; p < 0.001), and from 2009 to 2017 (APC = 20.26%, 95% CI: 5.14–26.84; p = 0.013). Between 2017 and 2021, a stationary trend was observed (APC = 1.78%, 95% CI: −11.96 to 33.97; p = 0.849). From 2021 to 2023, the APC was 34.63% (95% CI: 4.88–62.06; p = 0.009), indicating a significant increasing trend and suggesting a renewed rise in WRMD notifications. The selected model included three joinpoints and had a WBIC of −2,709, an adequacy test p-value of 0.204, and a BIC of −3,087.

DISCUSSION

The temporal trend analysis showed a sustained increase in WRMD notification rate in Brazil over the study period, with an overall AAPC of 18.24%, indicating a consistent upward trajectory despite marked variations across subperiods.

The joinpoint regression identified distinct phases, with a very steep increase between 2007 and 2009 (APC = 76.61%), followed by a continued but less pronounced growth from 2009 to 2017 (APC = 20.26%). This was followed by a stationary period between 2017 and 2021 (APC = 1.78%, not statistically significant), and a renewed and significant increase from 2021 to 2023 (APC = 34.63%), characterizing a recent acceleration in WRMD notifications.

The sharp rise observed between 2007 and 2009 likely corresponds to the initial consolidation of WRMD reporting within the national surveillance system, a period characterized by increased awareness among health professionals and the gradual incorporation of work-related mental health events into routine notification practices.

From 2009 to 2017, the persistence of an increasing trend, albeit at a lower pace, suggests a phase of relative stabilization in case identification, coexisting with structural limitations in surveillance, underreporting, and heterogeneity in local capacities to investigate and record work-related mental disorders.

Between 2017 and 2021, the absence of a statistically significant change in notification points to a period of stagnation in notifications, which may reflect constraints in surveillance activities, reduced prioritization of worker health agendas, or barriers in the recognition of the causal link between work and mental illness.

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The increase observed from 2021 to 2023 may suggest a possible potentially reflecting a gradual reactivation of surveillance processes and, to some extent, an accumulation of unmet mental health needs among workers, within a context of ongoing transformations in work organization and psychosocial demands in the post-2021 period.

Multiple factors may have contributed to the pattern observed. Strengthening Worker Health Surveillance actions, partly influenced by the National Policy on Occupational Health and Safety (PNSTT), may be associated with expanded capacity to identify and register work-related illnesses, including WRMD. The PNSTT supported broader coverage of Workers' Health Reference Centers (CEREST), increased workplace inspections, and progressive qualification of Workers' Health Surveillance (VISAT) actions, supported by regulatory and operational initiatives such as Ordinance No. 1206/2013 and monitoring of service performance[17,18].

The expansion and qualification of services, combined with active case finding, professional training, and the use of monitoring tools, likely increased the sensitivity of the system, suggesting that part of the observed increase reflects improved case detection rather than a true rise in occurrence[17,18].

In addition, conceptual advances such as the adoption of systemic models of accident and illness analysis, including approaches based on the James Reason model, and the shift from an individual blame perspective to a multifactorial understanding of work-related illness, may have strengthened recognition of the link between work and illness, increasing the visibility of previously underreported cases.

Although beyond the study period, recent regulatory updates such as the revision of the List of Work-Related Diseases (LDRT) in 2023 and the inclusion of WRMD in the National List of Notifiable Diseases in 2024 are relevant for contextualizing current surveillance, as they are expected to further enhance standardization and reporting practices in Brazil.

A previous study provided global evidence of an increase in WRMD notifications using the Prais–Winsten method and suggested that this may partly reflect improvements in surveillance within the National Network for Comprehensive Worker Health Care (RENAST)[19].

In addition, the Coronavirus Disease 2019 (COVID-19) pandemic substantially affected health systems and working conditions. During 2020 and 2021, disruptions

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such as service overload and reduced access to non-emergency care occurred, while work-related stressors intensified due to increased workload, job insecurity, and social isolation[20,21]. Changes in work organization, including expanded remote work and new psychosocial stressors, may be associated with changes in workers' mental health and may partially explain the increase in WRMD notifications observed after 2021. Several studies have reported a higher burden of mental health problems in the post-pandemic period[9,22,23], which may be related to prolonged emotional and psychological impacts.

The implementation of the Social Security Epidemiological Technical Nexus (NTEP) in 2007 may be associated with changes in WRMD records, possibly through greater recognition of these conditions as occupational diseases among formally employed workers, even in the absence of a Work Accident Report issued by employers[24]. When the relationship between illness and work is recognized, notification to SINAN is required, which may contribute to increases in the number of recorded notifications over time.

Unlike the downward trend reported for occupational accidents overall[25,26], WRMD have not shown a declining pattern. A study focusing on Social Security beneficiaries also reported a significant increase in WRMD indicators during the 2003–2019 period[27]. National studies have similarly suggested growth in WRMD notifications, even when temporal trends were not formally assessed[28,29]. International evidence also supports increasing reporting or burden of work-related mental health outcomes in multiple contexts[30-32].

Regarding the distribution of notifications, the predominance among women and individuals aged 35-49 years may reflect both epidemiological differences and factors related to service access, health literacy, and recognition of work-relatedness. Previous studies corroborate a higher burden of WRMD among women and suggest that this may relate to the dual role many women experience, combining labor market participation with domestic responsibilities such as childcare[33-35]. Occupational task segregation and gender inequalities can result in simultaneous exposure to workplace and domestic stressors, reducing time for leisure and recovery and increasing susceptibility to mental disorders[36].

Most notifications were recorded among individuals who self-identified as White, followed by individuals who self-identified as Brown (pardo) and Black. However,

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race/skin color information was missing in a substantial proportion of notifications, which limits interpretation and may bias comparisons across groups. Regional disparities were also evident: the Southeast accounted for the largest share of notifications, followed by the Northeast, while the North and the Center-West showed considerably lower notification proportions. This pattern may reflect differences in population size and workforce distribution, as well as heterogeneity in access to health services, the availability of specialized surveillance structures, and local capacity to identify, investigate, and report WRMD.

Importantly, higher notification rates may not necessarily indicate a greater underlying burden of disease but may instead reflect more structured and better-resourced surveillance systems. Differences in the coverage of CEREST, the availability of trained professionals, and the degree of integration of worker health surveillance within local health systems may substantially influence the identification and recording of cases. Structural inequalities in infrastructure and human resources may reduce the capacity to diagnose and record work-related conditions, contributing to underreporting in less-resourced regions[37-40].

The Southeast region presents comparatively better structural conditions for CEREST, whereas the North still shows deficiencies in the organization of these services[41]. Historically, pioneering worker health programs were implemented in the Southeast (particularly São Paulo and Minas Gerais) and the Northeast (Bahia), which may have contributed to more consolidated surveillance and reporting practices. These regions also contain larger proportions of the working-age population and a higher number of CEREST. They exhibit stronger union organization, potentially influencing service provision demands and reinforcing the structuring of the RENAST[41].

Although many workers with mental health problems seek care in Psychosocial Care Centers (CAPS) and Primary Health Care services, previous evidence suggests that most WRMD notifications originate from CEREST[42]. This pattern is consistent with an important role of these centers in recognizing the link between illness and work. At the same time, it suggests gaps in reporting by other components of the worker health care network, including primary care units, hospitals, CAPS, and employers, which may inadequately assess work-relatedness and contribute to underreporting[43]. Underreporting suggests failure to identify causal links, lack of

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professional training, absence of clear protocols, and, in some cases, reluctance to notify due to fear of labor or social security implications[44-45].

In addition, the reliance on SINAN data may underestimate the actual burden of WRMD, particularly among workers outside the formal labor market. Evidence suggests that recognition and notification of work-related mental disorders are more frequent among formally employed workers, for whom institutional mechanisms such as CEREST and social security-related procedures are more accessible[42,43].

Informal workers, self-employed individuals, and those with unstable employment relationships face greater barriers to recognition of work-relatedness and access to specialized surveillance services, contributing to underrepresentation in SINAN records. Therefore, the number of notified cases likely reflects only a portion of the existing notification burden of WRMD, reinforcing the need to interpret notification data as a proxy rather than a comprehensive measure of population incidence.

Recognizing work-relatedness is not merely administrative; it is a pathway for access to social and labor rights. For formally employed workers, recognition of the occupational link can ensure protections such as temporary job stability after accident-related benefits and maintenance of employment-related guarantees during the leave period. Therefore, accurate characterization and notification have implications beyond surveillance, affecting workers' access to rights and protections[24,25].

The predominance of neurotic, stress-related, and somatoform disorders (ICD-10 F40–F48), followed by mood disorders (ICD-10 F30–F39), may reflect contemporary work demands and their psychosocial impacts. Findings from Social Security–based analyses indicate that anxiety-related and mood disorders account for a substantial share of work disability related to mental health outcomes in Brazil[27]. These patterns are also consistent with national survey evidence indicating a high prevalence of anxiety and depression, particularly among women[46]. Mood disorders have been identified as frequent reasons for medical leave due to mental disorders and are associated with repeated episodes of work absence[6,36].

The high proportion of temporary disability underscores the impact of WRMD on work capacity and suggests that a substantial proportion of reported cases involve clinically relevant conditions with functional consequences. This finding raises

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concerns about productivity losses and costs for health and social security systems, as well as for employers[35,42,48]. Stressful, high-pressure work environments with multiple psychosocial risk factors require continuous surveillance and preventive actions. Low autonomy, workplace conflicts, job insecurity, and high workload have been consistently associated with psychological distress and adverse mental health outcomes[34,49,50].

Data quality varied across notification fields. Sex and age group showed excellent completeness, while race/skin color, education level, case outcome, and CAT issuance showed fair completeness[16]. Several clinical fields, particularly those related to alcohol use, tobacco use, and psychoactive substance use, showed poor completeness, which may hinder the assessment of risk factors and underestimate the frequency of relevant behaviors among cases. Given that these variables are widely recognized and well-documented risk factors for mental disorders and work disability, their high level of missingness limits more comprehensive analyses of vulnerability profiles and associated conditions. Improving completeness in these fields should be a priority for surveillance services and the mental health care network.

The predominance of notifications among women and workers aged 35–49 years, the concentration of notifications in the Southeast and Northeast regions, the high frequency of anxiety, stress-related, and mood disorders, and the substantial proportion of temporary disability highlight the magnitude of WRMD and their functional and social consequences for the working population.

At the same time, heterogeneity in notification patterns and persistent gaps in clinical information, especially regarding substance use, indicate structural limitations in surveillance and suggest underestimation of the true burden.

These findings reinforce the central role of worker health surveillance and underscore the urgency of strengthening data quality, expanding recognition of psychosocial risks at work, and consolidating preventive and protective policies to reduce illness and protect workers' mental health.

This study has limitations, as it relies on secondary surveillance data subject to underreporting and variability in reporting practices across regions and services. Missing information on key variables, including race/skin color, education, substance use, and diagnostic coding, may bias subgroup comparisons and limit the evaluation

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of associated factors. In addition, notification rates reflect recorded events rather than true population incidence, and the observed trends may therefore be influenced by changes in awareness, reporting practices, surveillance capacity, and institutional incentives, rather than solely by shifts in underlying risk. Furthermore, the broad case definition adopted, encompassing multiple ICD-10 categories (e.g., F00–F99, R40–R46, Z55–Z65, X60–X84), introduces clinical and conceptual heterogeneity, which may limit comparability across studies and requires cautious interpretation of aggregated measures.

Moreover, the denominator used to calculate notification rates included the employed working-age population, encompassing both formal and informal workers. However, institutional mechanisms related to the recognition of work-relatedness, such as the issuance of the Work Accident Report (CAT, Comunicação de Acidente de Trabalho) and the Social Security Epidemiological Technical Nexus (NTEP), primarily operate within the formal labor market. Although SINAN notifications are not restricted to formally employed workers, differential access to surveillance services and recognition processes may lead to disproportionate capture of formal workers, particularly in regions with high levels of labor informality. This discrepancy may influence regional and temporal comparisons, as observed notification rates may reflect variations in labor market structure and institutional capacity rather than differences in underlying risk alone, and may have influenced the patterns identified in this study.

In addition, the use of a general employed population denominator does not account for differences in occupational groups, economic sectors, exposure profiles, or employment conditions, which limits the interpretation of findings within an occupational epidemiology framework. The study also focuses on surveillance outputs rather than direct measures of occupational exposure, and psychosocial risk factors were not analytically modeled. Finally, underreporting may also reflect challenges in recognizing work-relatedness, including gaps in institutional processes, professional training, and coordination between health and labor, and comparisons with Social Security data[4] confirm that SINAN captures only part of the notification burden of WRMD.

In conclusion, SINAN data indicate a sustained increase in recorded WRMD notifications in Brazil from 2007 to 2023, with a recent acceleration after 2021.

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Notifications predominated among women and workers aged 35–49 years and were concentrated in the Southeast and Northeast, with anxiety/stress-related and mood disorders as the most frequent diagnostic groups and a high proportion of temporary disability. These findings reinforce the need to strengthen worker health surveillance, improve the completeness of key clinical fields, and expand preventive actions addressing psychosocial risks at work.

It is important to emphasize that the results reported here describe trends in surveillance notifications and do not necessarily represent changes in the actual population incidence of WRMD, as they may be influenced by variations in reporting practices, surveillance structure, and institutional context.

Author disclosures

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Contributions

CJSJ: Conceptualization; Methodology; Formal analysis; Data curation; Writing – original draft. JVSS, FFAT and MCR: Writing – review & editing. FMF: Conceptualization; Writing – review & editing; Supervision. All authors have read and approved the final version submitted and take public responsibility for all aspects of the work.

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REFERENCES

1. **Lancman S, et al.** Mental health and work: a systematic review of the concept. *Healthcare*. 2024;12(23):2377.
2. **Memish K, et al.** Workplace mental health: an international review of guidelines. *Prev Med*. 2017 Aug 1;101:213-222.
3. **Assunção AÁ, Paula Lima E, Guimarães MDC.** Mental disorders and participation in the labor market: a multicenter national study in Brazil. *Cad*

BJP PRE-PROOF

Saude Publica. 2017 Apr 3;33(3):e00166815.

4. **AEAT.** Brazil. Ministry of Labor and Social Security. *Anuário Estatístico de Acidentes do Trabalho – 2023* [Internet]. Brasília: Ministry of Labor and Social Security; 2024 [cited 2025 Jan 01]. Available at: https://www.gov.br/previdencia/pt-br/assuntos/previdencia-social/arquivos/AEAT-2023/aeat-2023
5. **Casemiro P.** Crise de saúde mental: Brasil tem maior número de afastamentos por ansiedade e depressão em 10 anos. G1 [Internet]. São Paulo; 2025 Mar 10 [cited 2025 Aug 11]. Available from: https://g1.globo.com/trabalho-e-carreira/noticia/2025/03/10/crise-de-saude-mental-brasil-tem-maior-numero-de-afastamentos-por-ansiedade-e-depressao-em-10-anos.ghtml.
6. **Santos ÉG, Siqueira MM.** Prevalência dos transtornos mentais na população adulta brasileira: uma revisão sistemática de 1997 a 2009. *J Bras Psiquiatr*. 2010;59(3):238-246.
7. **Albuquerque Brito VC, et al.** Prevalência de depressão autorreferida no Brasil: Pesquisa Nacional de Saúde 2019 e 2013. *Epidemiol Serv Saude*. 2022 Jul 8;31(Special Issue 1):e2021384.
8. **Campos TC, Véres RM, Araújo TM.** Transtornos mentais comuns em docentes do ensino superior: evidências de aspectos sociodemográficos e do trabalho. *Avaliação (Campinas)*. 2020 Nov 18;25(3):745-768.
9. **Cohen M, et al.** Impact of the COVID-19 pandemic on the mental health of frontline healthcare workers in a highly affected region in Brazil. *BMC Psychiatry*. 2023 Dec 1;23(1).
10. **Coledam DHC, et al.** Prevalence of common mental disorders among Brazilian workers: systematic review and meta-analysis. *Cien Saude Colet*. 2022 Feb 2;27(2):579-591.
11. **World Health Organization (WHO).** ICD-11 for mortality and morbidity statistics [Internet]. [cited 2025 May 12]. Available at: https://icd.who.int/browse/2025-01/mms/pt
12. **Lucca SR, Silva-Junior JS, Bandini M.** Critical analysis of psychosocial factors at work within the Risk Management Program of Regulatory Standard-1. *Rev Bras Med Trab*. 2025;23(1):1-6.

BJP PRE-PROOF

13. **Brazil.** Ordinance GM/MS No. 1,999, of November 27, 2023. Amends Consolidation Ordinance GM/MS No. 5, of September 28, 2017, to update the List of Work-Related Diseases (LDRT). 2023.
14. **Brasil.** Ministério da Saúde. Secretaria de Vigilância em Saúde. Sistema de Informação de Agravos de Notificação (SINAN): ficha de notificação – Transtornos Mentais Relacionados ao Trabalho. Brasília: Ministério da Saúde; 2019. Atualizado em 21 jun 2019
15. **Lucena NNN, et al.** Hospital-based cancer registries in Brazil: distribution and completeness of information on childhood cancer, from 2000 to 2022. *Rev Bras Cancerol*. 2025 Feb 10;71(1):e-144832.
16. **Katherine E Irimata, et al.** Guidance for selecting model options in the National Cancer Institute Joinpoint Regression Software. *Vital Health Stat 1*. 2022;194:1-22.
17. **Ministry of Health (Brazil).** *Relatório de gestão 2024 Renast*. 2024;1.
18. **Ministry of Health (Brazil).** *Relatório da Renast 2016*. 2016;2.
19. **Santos Júnior CJ, Silva-Júnior JS, Fischer FM.** Temporal trends and magnitude of work-related illness notifications in Brazil before and after the implementation of the National Worker Health Policy. *Discover Public Health*. 2025;22(1):753.
20. **Bridi MA, Tropia PV, Vazquez BV.** Telework and health in the context of the COVID-19 pandemic. *Rev Bras Saude Ocup*. 2024 Jan 8;49:edcinq3.
21. **Mattei L, et al.** Impactos da crise da Covid-19 no mercado de trabalho brasileiro. *Braz J Polit Econ*. 2020 Oct 16;40(4):647-668.
22. **Campos JADB, et al.** Symptoms related to mental disorders in healthcare workers during the COVID-19 pandemic in Brazil. *Int Arch Occup Environ Health*. 2021 Jul 1;94(5):1023-1032.
23. **Ghahramani S, et al.** Health care workers' mental health in the face of COVID-19: a systematic review and meta-analysis. *Int J Psychiatry Clin Pract*. 2023;27(2):208-217.
24. **Matos AB, Hostensky EL.** Fator Acidentário de Prevenção (FAP) e Nexo Técnico Epidemiológico Previdenciário (NTEP): indicadores para uma intervenção psicossocial. *Psicol Soc*. 2016;28(1):145-150.
25. **Santos Júnior CJ, et al.** Occupational accident indicators among Social

BJP PRE-PROOF

Security beneficiaries: temporal trend and magnitude in Brazil and its regions, 2009-2019. *Epidemiol Serv Saude*. 2023 Dec 8;32(3):e2023466.

26. **Pinto JM.** Trend in the incidence of accidents and work-related diseases in Brazil: application of the Hodrick-Prescott filter. *Rev Bras Saude Ocup*. 2017 Oct 19;42(0):e10.
27. **Santos Júnior CJ, Fischer FM.** Mental and behavioral disorders related to work in Brazil: temporal trends and the impact of the Social Security Technical Nexus. *Cad Saude Publica*. 2024 Sep 23;40(9):e00031524.
28. **Bailo DW, et al.** Impacto dos Transtornos Mentais Relacionados ao Trabalho no Brasil: Uma Revisão de Dados e Perspectivas Epidemiológicas. *Brazilian Journal of Implantology and Health Sciences*. 2024 Aug 27;6(8):4723-4733.
29. **Filho RAT, et al.** Aspectos epidemiológicos dos transtornos mentais relacionados ao trabalho no Brasil na década de 2011 a 2020. *Debates Psiquiatr*. 2023 Jul 5;13:1-24.
30. **Carder M, et al.** Time trends in the incidence of work-related mental ill-health and musculoskeletal disorders in the UK. *Occup Environ Med*. 2013 May 1;70(5):317-324.
31. **Takala J, et al.** Global, regional and country-level estimates of the work-related burden of diseases and accidents in 2019. *Scand J Work Environ Health*. 2024 Mar 1;50(2):73.
32. **Telle-Lamberton M, et al.** Trends in work-related mental disorders by sector in France. *Occup Med (Lond)*. 2018 Sep 13;68(7):431-437.
33. **Campos FM, et al.** Estresse ocupacional e saúde mental no trabalho em saúde: desigualdades de gênero e raça. *Cad Saúde Colet*. 2020 Dec 16;28(4):579-589.
34. **Carvalho DB, Araújo TM, Bernardes KO.** Transtornos mentais comuns em trabalhadores da Atenção Básica à Saúde. *Rev Bras Saude Ocup*. 2016 Dec 12;41(0):17.
35. **Silva Oliveira Junior N, Silva Jr JS, Dieb Miziara I.** Social security benefits due to depressive episode in Brazil (2008-2019). *Perspect Med Legal Peric Med*. 2023 Jan 1;8(1).
36. **Fernandes MA, et al.** Mental and behavioral disorders in workers: a study on work leave. *Rev Esc Enferm USP*. 2018 Dec 13;52:e03396.

BJP PRE-PROOF

37. **Cobo B, Cruz C, Dick PC.** Gender and racial inequalities in the access to and the use of Brazilian health services. *Cien Saude Colet*. 2021;26(9):4021-4032.
38. **Silva F, et al.** Acesso e utilização dos serviços de saúde e raça/cor/etnia entre mulheres: uma metanálise. *Rev Baiana Saúde Pública*. 2023 Aug 8;47(2):264-282.
39. **Oliveira TS, Pereira AMM.** Expressions of inequalities in access to health services in Latin America: a scoping review. *Cien Saude Colet*. 2024 Jul 1;29:e04932024.
40. **Tomasiello DB, et al.** Desigualdades raciais e de renda no acesso à saúde nas cidades brasileiras. [s.l.: s.n.].
41. **Cardoso MDCB, Araújo TM.** Atenção aos transtornos mentais relacionados ao trabalho nas regiões do Brasil. *Psicol Soc*. 2018 Nov 14;30:e163746.
42. **Cordeiro TMSCE, et al.** Notificações de transtornos mentais relacionados ao trabalho entre trabalhadores na Bahia: estudo descritivo, 2007-2012. *Epidemiol Serv Saude*. 2016 Apr 1;25(2):363-372.
43. **Araújo TM, Palma TDF, Araújo NDC.** Work-related Mental Health Surveillance in Brazil: characteristics, difficulties, and challenges. *Cien Saude Colet*. 2017 Oct 1;22(10):3235-3246.
44. **Rodrigues AB, Santana VS.** Acidentes de trabalho fatais em Palmas, Tocantins, Brasil: oportunidades perdidas de informação. *Rev Bras Saude Ocup*. 2019 Apr 25;44:e8.
45. **Van Der Molen HF, et al.** Work-related psychosocial risk factors for stress-related mental disorders: an updated systematic review and meta-analysis. *BMJ Open*. 2020 Jul 5;10(7).
46. **Associação Brasileira de Saúde Coletiva.** *Inquérito Telefônico de Fatores de Risco para Doenças Crônicas não Transmissíveis em Tempos de Pandemia (Covitel)* [Internet]. [cited 2025 Mar 08]. Available at: https://observatoriosaudepublica.com.br/covitel/
47. **Fernandes MA, et al.** Social security benefits for mental and behavioral disorders among workers in Piaui, Brazil, in 2014. *Rev Bras Med Trab*. 2020;17(1):99-105.
48. **Junior N, Miziara I, Silva-Junior J.** Acidentes de trabalho por depressão no Brasil (2003-2021). *Perspect Med Legal Peric Med*. 2024 Jan 1;9(1).

BJP PRE-PROOF

49. **Harvey SB, et al.** Can work make you mentally ill? A systematic meta-review of work-related risk factors for common mental health problems. *Occup Environ Med*. 2017 Apr 1;74(4):301-310.
50. **Maturino MM, et al.** Dimensions of the COVID-19 pandemic: prevalence of common mental disorders in “invisible” health workers and their association with occupational stressors. *Rev Bras Epidemiol*. 2024;27.

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