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Depression among physicians working in public healthcare in Belo Horizonte, Brazil

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Abstract

Purpose Prevalence of depressive disorders has been reported among physicians in a number of different settings. The aim of the present study is to assess the prevalence of self-reported depression and its associated factors among physicians working in the public healthcare system of Belo Horizonte, Minas Gerais state, Brazil.

Methods A cross-sectional survey was carried out in 2009 to investigate individual and occupational dimensions of depressive disorders in a group of physicians working at several municipal healthcare units. The percentage of physicians that self-reported a confirmed diagnosis of depression by another physician was used as the prevalence proportion; the Poisson regression univariate and multivariate models were applied to study factors associated with depression.

Results The response rate was 81.2 %, of which 12.0 % reported depression confirmed by another physician. Reports of RSI/WMSD ($p < 0.001$) and passive work ($p < 0.05$) were positively and independently associated with the outcome.

Conclusions Our data bring valuable information that may help guide interventions and health-promoting activities for physicians by indicating concrete measures to change working conditions that affect mental health.

Keywords Depression · Physicians · Healthcare systems · Brazil · Workplace environment

Introduction

Depression is a state characterized by a significantly lowered mood and a loss of interest or pleasure in usually enjoyable activities. Several psychiatric disorders include milder forms of these symptoms. When mild, the condition is named minor depression. There are also cases of individuals that present one or a few symptoms but do not meet the full criteria to establish a diagnosis of depression. Medical findings in such situations do not define a diagnosis because the criteria are not met, even though subjects may experience depressive symptoms (disturbed sleep, for instance) [1].

Research has attempted to understand the cause of depression. According to the biological model, depression results from neurochemical disorders [2]. The psychological model raises the hypothesis of cognitive vulnerability, of how individuals attribute meaning or interpret adverse life events; these cognitive styles then precipitate and affect the progression of depression [3].

The mental health of physicians workers has been a topic of study in recent years [4]. A higher prevalence of depressive disorders and suicide compared to other professional groups has been identified among physicians. Drug abuse is another issue among physicians [5–8].

Physicians with sickness find themselves facing barriers when seeking psychological therapy; studies have shown

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that they may be stigmatized when seeking such care [9]. These professionals face difficulties in career development after declaring having had depression [5].

Physicians consider their work stressful and report discontent with the profession and working conditions [10, 11]. This reality may lead physicians refuse long-term employment in public healthcare, especially in basic healthcare in which bonds with users and local communities are desirable [12, 13].

Associations between occupational stressor and depression have been widely studied in the past decades [8, 14–18]. The results show that the quality of healthcare is compromised when the protagonists of healthcare systems are ill, depressed, or dissatisfied [4, 19–21]. Correlated factors in physicians are work-related fatigue, excessive self-criticism, poor quality of care, and depressed humor [22].

As a whole, such evidence is particularly relevant for Brazilian physicians working in the public healthcare system, given the major changes that sanitary reforms have made on the system and the care of patients. Brazil implemented a universal health system in 1988, the Sistema Único de Saúde (Unified Health System SUS), on the principle that health is a right of citizens and a State responsibility. The SUS aims to provide universal preventive and curative care through decentralized management and delivery of health services [10]. It has changed public healthcare services in Brazil. Full decentralized local healthcare has changed work processes in healthcare and given rise to new labor conditions [13], the effects of which on healthcare professionals have not been sufficiently explored or clarified.

Belo Horizonte is the capital and largest city of the Brazilian state of Minas Gerais, which is located in the southeastern region. According to the 2010 Census, its population is 2,375,440 inhabitants in the urban core; in 2010, it was the sixth most populous Brazilian city [23]. Its percapita income in 2010 was higher than the Brazilian average: 1,493.21 Brazilian reais in Belo Horizonte, compared to 830.35 for Brazil [24].

The purpose of this study was to investigate the prevalence of self-reported depression and its associated factors among physicians working in the public healthcare system of Belo Horizonte, Minas Gerais state, Brazil. Individual conditions and the context of work relative to the outcome were explored.

Methods

A cross-sectional study of physicians working in the public healthcare system of Belo Horizonte (MG) was undertaken in 2009. Physicians working for the city authorities of Belo

Horizonte (1,981) were considered eligible irrespective of the type of contract (long-term or temporary). The random sample was stratified according to the number and proportion of eligible subjects for each sanitary district and level of healthcare (healthcare centers, specialties, emergency care, and district managers). For a specific assessment of depression among Physicians, the sample was estimated considering the following parameters: total of Physicians (1,981), depression prevalence of 12 % and choosing a confidence interval of 95 % and precision of 4 %. In order to calculate the sample size (given a number of physicians equal to 1,981) a precision of 4.0 %, 12.0 % prevalence of depression and 95 % confidence interval were considered. The size of the sample was 225 individuals, with 18.0 % added to cover losses and refusals; therefore, the minimum needed was 266 physicians.

A self-reporting questionnaire was applied to gather information about depression. A report indicating medically confirmed depression was used. The outcome variable resulted from the answer to the question: “have you ever been diagnosed with depression by another physician?”

Four sets of independent variables were organized around the following points: (a) social and demographic aspects (sex, age, skin color, marital status, children, educational level), (b) life style (leisure activities, physical exercise, and smoking), and self-assessment quality of life and personal satisfaction; (c) health status (medical diagnosis of repeated strain injury/work-related musculoskeletal disorder (RSI/WMSD), back pain, obesity, diabetes, hypercholesterolemia, arterial hypertension, alcohol abuse, and reported absence of work and/or medical leave in the past year). This independent variable was gathered from the answer to the question: have you been diagnosed with RSI/WMSD by another physician in the last year?; (d) the job (level of healthcare system, time working in public healthcare service, time working at the current healthcare unit, work scheme, weekly number of working hours in the municipality and overall weekly working hours, permanent or stable employment, multiple jobs and income); (e) characteristics of the job: working conditions, quality of physical resources for work, the ratio between required tasks and available resources, domestic overload, whether the physician was an evaluation of job satisfaction and relationships with peers at work, self-assessment ability for the job, adequacy of pay, and whether the physician would again seek the same job or not. In addition, a few variables were used as the basis of four index variables supported by the following theoretical models, as we describe below.

The Effort-Reward Imbalance Scale (ERI Scale) was applied to investigate commitment to work. This scale consists of three parts that evaluate effort, reward, and excessive commitment, and has been translated and validated for Portuguese [25]. The excessive commitment scale

consists of eleven items; answers may range from strongly disagree to strongly agree—corresponding to scores 1–4 [26].

The CAGE is a screening tool for detecting alcohol abuse, and has also been validated for Brazil [27]. The following key words identify four issues: Cut down (C); Annoyed (A); Guilty (G); and Eye-opener (E). The cutoff point for defining suspected cases was two or more positive answers.

The variable domestic overload was measured by taking into account four household tasks: cooking, cleaning, washing, and ironing, as proposed by Tierney and colleagues [28], weighed according to the number of potential beneficiaries of this work (number of persons in the household). Domestic overload was therefore evaluated by adding up the household tasks, weighed according to the number of household dwellers except for the interviewee [29]. For the purposes of our analysis, the domestic overload score was dichotomized based on terciles of the sample distribution: low overload (values equal to or below the second tercile) and high domestic overload (values over the second tercile).

The Job Content Questionnaire (JCQ) was applied to investigate the psychosocial aspects of work. According to the demand–control model, work-related psychological demands and control over work are taken as combinations describing specific conditions of work, which in turn cause different risks for health. The combination of demand and control levels results in four groups defined in the Demand–Control Model: low strain (combination of low demand and high control), passive work (low demand and low control), active work (high demand and high control), and high strain (high demand and low control) [30]. In our analysis, psychological demand and control scores were dichotomized based on the median distribution of each of these variables: values equal to or below the median were categorized as low demand or low control; values above the median were categorized as high demand or high control [31]. Social support was assessed by adding the scores in questions about support from work peers and superiors. The median was used as a cutoff point for measuring support: values equal to or below the median were considered as low support, and those above the median were high support.

The variable ‘working conditions’ expresses the physician’s physical working environment. A scale of 1–3 was used to assess ventilation, temperature, lighting, technical equipment (including chairs and tables) at the work site, as follows: poor (1), reasonable (2), or satisfactory (3); noise at the work site and from outside was classified as negligible (3), reasonable (2), loud and unbearable (1). A specific global score for this study comprised the sum of responses for each item of the physical environment

evaluation; higher scores mean better conditions. For our analysis, this score was categorized according to quartiles into: poor conditions (cutoff on the first quartile), reasonable (cutoff on the second quartile), satisfactory (third quartile), and excellent (last quartile). The categories satisfactory and excellent were, then, added. These questions were based on the perception of the work site assessment questionnaire in a group of salaried French workers [32].

The Poisson regression analysis was applied to assess the factors associated with depression [33]. Since depression is a common outcome (usually >10 %), the odds ratio—a measure resulting from multiple logistic regression analysis—was not appropriate, since it would have overestimated risk associations. Thus, we chose the prevalence ratio as a more conservative estimate of the associations. As a sample is not followed up in cross-sectional studies, time may be adjusted to one for the duration of risk for each individual. This measure makes possible to produce point prevalence estimates. The Poisson regression, however, may overestimate the relative risk in cross-sectional studies [34, 35].

All the associated factors at $p < 0.20$ in the univariate analysis were included in the multivariate model. The following analysis process was used to construct the final model: factors that were significant at $p < 0.20$ in the univariate analysis model were removed if they lost significance in the multivariate analysis at $p < 0.05$. The remaining set of variables was retested and non-significant factors ($p < 0.05$) again were removed. This procedure was repeated until the remaining factors in the model achieved the expected statistical significance ($p < 0.05$). Also, confidence interval for the present analysis was presented at 95 % level. The STATA[®] 10.0 software was used for calculations.

The physicians were informed about the study, the institution, and the voluntary and confidential nature of participation before the interview. Participants signed a free informed consent form to be enrolled. The institutional review board of the Minas Gerais Federal University approved this study (542/07); the ethical principles set out in the Helsinki Declaration were applied.

Results

There were 235 participants that were taken from the sample of 266 physicians randomly chosen after the sample was calculated; 216 filled in the questionnaire for the item depression, i.e., answered the question “have you ever been diagnosed with depression by another physician?” (81.2 % response rate). Of these, 26 (12.0 %) reported a confirmed diagnosis of depression by another physician. Regarding sociodemographic characteristics, the majority of the entire

sample was female (53.7 %); subjects were similarly distributed within the age range, with most in the group 35–46 years (36.0 %); 80.9 % declared themselves as white; 60.6 % reported living with another person; 43.8 % had no children; 71.7 % had taken specialization courses. As to life style aspects, only 13.1 % of physicians reported having no leisure activities, but the figure was higher for some type of physical activity (19.7 %); 7.6 % of physicians reported smoking; most physicians considered their quality of life as good or very good (65.4 %), contrasting with 16.3 % who considered their quality of life poor or very poor. Most declared that they were pleased with themselves (73.4 %), while 11.2 % declared that they were dissatisfied with themselves.

Reports of physician-diagnosed morbidities were as follows, from the most to the least prevalent: back pain (25.1 % of the whole sample), obesity (14.5 %), hypercholesterolemia (13.1 %), and arterial hypertension (12.2 %). RSI/WMSD, alcohol abuse (positive CAGE), diabetes were reported, respectively, by 6.5, 4.5, and 3.4 % of subjects. Just over half of the sample (54.1 %) informed having missed work because of health issues within the past year while 36.4 % reported having had medical leave of work within the same time period.

As to characteristics related to the job, most physicians reported working at basic healthcare units (59.5 %); that they were employed for over 10 years in public healthcare (51.2 %); and worked at the same healthcare unit for less than 5 years (51.7 %). Physicians working more than 20 h a week comprised 56.3 % of the sample; nighttime work was informed by 4.1 % of subjects; 12.3 % were employed in a temporary contract with the city authority; 80.4 % had more than one job; a weekly workload over 50 h was informed by 49.6 % of the sample; 49.8 % had a monthly income over four thousand seven hundred Brazilian Reals (R\$ 4,700.00).

For 56.6 % of physicians, the working conditions were reasonable or satisfactory/excellent; quality of physical resources for work was considered adequate for 85.7 %. However, 56.9 % judged the relation between work demands and available resources as only regular. Domestic overload was found for 5.7 % of physicians. Most interviewees were satisfied with the work in general and with their relationships with work peers and superiors and (respectively, 65.6 and 75.2 %). Most (66.7 %) also considered their ability for the work as good or very good; on the other hand, while 13.9 % considered them as poor or precarious. Most interviewees (80.5 %) considered the salary inadequate, although 92.6 % stated they would apply again for the current job. Finally, 58.9 % was classified as excessive committed to work; most individual were on active work (47.2 %) and 47.3 % had low social support from peers and superiors.

Prevalence proportions (or simply *prevalences*) of depression according to characteristics studied are in Tables 1 and 2. Higher prevalences of depression were found among women as compared to men (15.5 % which corresponds to 18 women with depression among 116 women; for men this number was 8.0 % (8 men with depression among 100 men). Similarly, other findings were: higher prevalences of depression among those above age 46 (15.8 %), non-white (15.0 %) and among those who were not cohabitating (15.3 %) as compared to their counterparts. Those not having leisure activities (25.0 %) and not regularly practicing physical exercise (17.1 %) had higher prevalences as well as compared to those more active. Slightly higher prevalences were found in physicians that smoked (12.5 %) and that had children (12.2 %) as compared to their counterparts (Table 1). Prevalences of depression were higher among all segments of physicians that reported a diagnosis of other diseases by another physician, in particular RSI/WMSD (57.1 %), hypercholesterolemia (28.6 %), and back pain (22.2 %). Lower prevalence was found among those who had positive CAGE (12.0 % as compared to 11.2 % for those with negative CAGE). Among segments that reported absence of work due to health issues (18.8 %) and that were given medical leave within the past 12 months (23.1 %) prevalences were higher as compared to those with no medical problems or no medical leave (Table 1).

Physicians working in ambulatory of specialized care units (17.7 %); with longer careers in public healthcare (>10 years) and at the current unit (>5 years) (16.4 and 14.6 %, respectively); whose working hours in the municipality were more than 20 h (13.3 %); and who worked more than 50 h per week (Table 3) (13.1 %) had higher prevalences as compared to their counterparts. Lower prevalences were found among physicians with less stable contracts (7.7 %) as compared to those whose were hired by competition (12.9 %); with monthly incomes below 4,700.00 R\$ (10.9 versus 13.0 %); working during the day as compared to those who worked at night (12.2 versus 25.0 %) (Table 3).

Those subjects with poor working conditions (15.2 %); inadequate physical resources for work (12.9 %); a poor or inadequate relation between demands and available resources (21.2 %); high rates of domestic overload (18.2 %); had higher prevalences of depression, as compared to their counterparts. who were unsatisfied with the work in general (14.9 %) and with relationships at work (35.0 %); and those who evaluated their ability to work as regular (19.1 %) or poor or very poor (16.7 %) also had higher prevalences of depression compared to their counterparts. However, those who assessed their salaries

Table 1 Frequencies, prevalence proportions of depression, univariate prevalence ratios, 95 % confidence intervals and *p* values, according to sociodemographic, lifestyle, and self-assessment of quality of life and personal satisfaction

Characteristics	Total		Prevalence of depression		Prevalence ratio (PR)	95 % CI	<i>p</i> value
	<i>N</i>	%	<i>n</i>	%			
	216	100.0	26	12.0	–	–	–
Sex							
Male	100	46.3	8	8.0	1.00	0.88–4.28	0.101
Female	116	53.7	18	15.5	1.94		
Age (years)							
<35	71	33.2	5	7.0	1.00	0.58–4.73	0.343
35–46	77	36.0	9	11.7	1.66	0.96–6.95	0.060
>46	66	30.8	12	15.8	2.58		
Skin color							
White	169	80.9	20	11.8	1.00	0.54–2.96	0.583
Non-white	40	19.1	6	15.0	1.27		
Marital status							
Cohabiting	131	60.6	13	9.3	1.00	0.75–3.17	0.239
Not cohabiting	85	39.4	13	15.3	1.54		
Children							
No	92	42.8	11	12.0	1.00	0.49–2.12	0.958
Yes	123	57.2	15	12.2	1.02		
Schooling							
Undegraduate degree	45	20.8	2	4.4	1.00		
Specialization	155	71.8	23	14.8	3.34	0.82–13.7	0.094
Masters/Doctorate degree	16	7.4	1	6.3	1.41	1.41–14.6	0.775
Leisure activities							
Yes	186	86.9	19	10.2	1.00	1.13–5.30	0.023*
No	28	13.1	7	25.0	2.45		
Physical activities							
Yes	152	81.3	13	8.6	1.00	0.82–4.92	0.129
No	35	18.7	6	17.1	2.00		
Current smoker							
No	196	92.4	23	11.7	1.00	0.27–4.13	0.927
Yes	16	7.6	2	12.5	1.07		
Assessment of quality of life							
Good or very good	140	65.4	10	7.1	1.00	1.02–6.18	0.045*
Indifferent	39	18.3	7	18.0	2.51	1.36–7.52	0.008**
Poor or very poor	35	16.3	8	22.9	3.20		
Assessment of personal satisfaction							
Satisfied	157	73.4	16	10.2	1.00	0.42–3.34	0.742
Indifferent	33	15.4	4	12.1	1.19	1.06–5.66	0.035*
Unsatisfied	24	11.2	6	25.0	2.45		

* *p* < 0.05** *p* < 0.01*** *p* < 0.001^a Totals may be different due to missing values

as adequate had higher prevalences of depression as compared to the other group (14.3 versus 11.6 %) (Table 4).

Physicians that were excessively committed to work (18.2 %), whose job was passive (30.8 %); with low social support from peers and superiors (14.8 %) also had higher prevalences of depression as compared to their counterparts (Table 4).

The following *life style, quality of life and health-related* variables were positively associated with the depression at a 5 % confidence level in the univariate analysis: not participating in leisure activities (PR = 2.45 %, *p* < 0.05); self-reported quality if life other than good or very good (PR > 2.50, *p* < 0.05), and poor self-reported personal satisfaction (PR = 2.45, *p* < 0.05); back pain; hypercholesterolemia, RSI/WMSD; absence from work; medical

Table 2 Frequencies, prevalence proportions of depression, univariate prevalence ratios, 95 % confidence intervals and *p* values, according to health-related characteristics

Health-related characteristics	Total		Prevalence of depression		Prevalence ratio (PR)	95 % CI	<i>p</i> value
	<i>N</i>	%	<i>n</i>	%			
Musculoskeletal disorders^a							
No	201	93.5	17	8.5	1.00		
Yes	14	6.5	8	57.1	6.76	3.55–12.9	<0.001***
Back pain^a							
No	161	74.9	13	8.1	1.00		
Yes	54	25.1	12	22.2	2.75	1.34–5.67	0.006**
Obesity^a							
No	182	85.6	19	10.4	1.00		
Yes	31	14.5	5	16.1	1.54	0.62–3.84	0.349
Diabetes^a							
No	205	96.7	23	11.2	1.00		
Yes	7	3.3	1	14.3	1.27	0.20–8.17	0.799
Hypercholesterolemia^a							
No	186	86.9	17	9.1	1.00		
Yes	28	13.2	8	28.6	3.13	1.49–6.57	0.003**
Arterial hypertension							
No	187	87.8	20	10.7	1.00		
Yes	26	12.2	4	15.4	1.44	0.53–3.89	0.474
CAGE							
Negative	192	95.5	23	12.0	1.00		
Positive	9	4.5	1	11.1	0.93	0.14–6.15	0.938
Missed work for the past 12 months for health problems							
No					1.00		
Yes	99	45.9	4	4.0	4.65	1.66–13.1	0.004**
Medical leave of work within the past 12 months							
No	136	63.6	8	5.9	1.00		
Yes	78	36.4	18	23.1	3.92	1.79–8.62	0.001**

Health-related characteristics diagnosed by Physician

* *p* < 0.05

** *p* < 0.01

*** *p* < 0.001

^a Totals may be different due to missing values

leave within the past year (PR > 2.74, *p* < 0.05). The work-related aspects positively associated with the outcome were: dissatisfaction with relationships, excessive commitment to work, and passive work (RP > 2.28, *p* < 0.05) (Tables 1–4).

The following variables remained significantly and positively associated with reported depression (Table 5): RSI/WMSD (RP = 7.37, *p* < 0.001) and passive work (RP = 4.52, *p* = 0.017).

Discussion

The prevalence of a diagnosis of depression among physicians working in the municipal public healthcare sector was 12.0 %. Published values have ranged from 3 to 28 % in different studies among the physicians [7]. The prevalence of

depression in a Brazilian population survey was 10.4 % [36] which is considerably high. In fact, the disease load is currently considered as one of the highest [37].

However, a heterogeneous focus (medical residents, physicians in activity, only female physicians, physicians working with specific types of care, physicians working in the public and private sectors) and the methods employed to study depression (self-reports, depression diagnostic scales, or measurement approaches to depressive systems) make comparisons among different studies a difficult task.

Results may have underestimated the outcome since depression was self-reported within a group that traditionally responds poorly to surveys the physicians. Published studies have suggested that physicians fear retaliation or stigma when declaring depressive symptoms or depression [7, 9, 19, 38, 39]. Nevertheless, we were able to attain a high response rate, which probably indicates the

Table 3 Frequencies, prevalence proportions of depression, univariate prevalence ratios, 95 % confidence intervals and *p* values, according to employment characteristics

Characteristics	Total		Prevalence of depression		Prevalence ratio (PR)	95 % CI	<i>p</i> value
	<i>N</i>	(%)	<i>n</i>	%			
Level of the healthcare system in which the professional acts							
Basic health unit	128	59.5	16	12.5	1.00	0.60–3.34	0.432
Ambulatory of specialized care	34	15.8	6	17.7	1.41	0.17–1.87	0.355
Emergency care units	42	19.6	3	7.1	0.57	0.11–5.00	0.746
District administration	11	5.1	1	9.1	0.73		
Time working in public service (years)							
≤10	105	48.8	8	7.6	1.00	0.97–4.73	0.058
>10	110	51.2	18	16.4	2.15		
Time working at the current health unit (years)							
<5	110	51.6	11	10.0	1.00	0.70–3.03	0.314
≥5	103	48.4	15	14.6	1.46		
Work scheme							
Daytime	188	95.9	23	12.2	1.00	0.58–7.23	0.267
Nighttime	8	4.1	2	25.0	2.04		
Weekly working hours in the municipality							
≤20	93	43.7	10	10.8	1.00	0.60–2.61	0.571
>20	120	56.3	16	13.3	1.24		
Employment contract							
Contract by competition	186	87.7	24	12.9	1.00	0.15–2.38	0.465
Other	26	12.3	2	7.7	0.60		
Other job							
No	38	19.6	4	10.5	1.00	0.45–3.45	0.667
Yes	156	80.4	24	13.2	1.25		
Overall weekly working hours							
≤50	109	50.4	12	11.0	1.00	0.58–2.45	0.641
>50	107	49.6	14	13.1	1.19		
Gross income from work (in R\$)							
Less than 4,700	101	50.2	11	10.9	1.00	0.56–2.54	0.646
4,700 or more	100	49.8	13	13.0	1.19		

* *p* < 0.05** *p* < 0.01*** *p* < 0.001^a Totals may be different due to missing values

readiness of physicians to speak about working conditions, which is a starting point into recognizing and solving the problem.

Frank and Dingle [40] used self-reports, as the present study did, and encountered a 19.5 % prevalence of depression among female physicians. These authors found associations with job dissatisfaction, poor control over tasks, high levels of occupational stress, and long working hours. There was an increased risk of self-reported depression in the group of female physicians with no children, obese, with a history of alcohol abuse, and with other psychiatric diagnoses, corroborating univariate findings from the present study. We also found higher prevalences of depression among women and in the group that reported a confirmed diagnosis of obesity, although this result was not significant.

The importance of job characteristics and their correlations with depressive disorders has been highlighted in

studies of physicians on night duty at emergency units [21, 41]. A higher prevalence of depressive disorders was associated with work stressors [40]. These results, however, do not converge with our findings.

Higher prevalences of depression have been found among recently graduated physicians in Japan who were working excessively [39]. In the present study, overcommitment to work was significant in the univariate analysis. However, after psychosocial variables were introduced (effort-reward and social support), the association lost significance indicating that other variables mediated the relationship between depression and overcommitment in this population.

An 11.3 % rate of depression has been reported among physicians in the United States, which was associated significantly with long weekly working periods and multiple jobs. The authors warn about this kind of excessive work (working more hours and having many jobs), as the

Table 4 Frequencies, prevalence proportions of depression, univariate prevalence ratios, 95 % confidence intervals and *p* values, according to Job characteristics

Characteristics	Total		Prevalence of depression		Prevalence ratio (PR)	95 % CI	<i>p</i> value
	<i>N</i>	(%)	<i>n</i>	%			
Working conditions (based on scale)							
Adequate	60	28.3	6	10.0	1.00	0.34–2.93	1.000
Regular	60	28.3	6	10.0	1.00	0.62–3.75	0.361
Inadequate	92	43.4	14	15.2	1.52		
Quality of physical resources for work							
Adequate	185	85.7	22	11.9	1.00	0.40–2.94	0.873
Inadequate	31	14.3	4	12.9	1.08		
Relation between tasks and resources available for its completion							
Adequate	38	19.9	3	7.3	1.00	0.39–4.51	0.643
Regular	111	56.9	12	9.8	1.33	0.86–9.71	0.086
Inadequate	41	24.1	11	21.2	2.89		
Domestic overload							
Low	182	94.3	22	12.1	1.00	0.40–5.61	0.543
High	11	5.7	2	18.2	1.50		
Satisfied with job?							
No	74	34.4	11	14.9	1.00	0.34–1.48	0.346
Yes	141	65.6	15	10.6	0.72		
Satisfied with personal relationships at work?							
Satisfied	161	75.2	17	10.6	1.00	0.14–2.37	0.443
Indifferent	33	15.5	2	6.1	0.57	1.57–7.01	0.002**
Unsatisfied	20	9.3	7	35.0	3.31		
Assessment of ability to work							
Good or very good	144	66.7	13	9.0	1.00	0.94–4.76	0.072
Regular	42	19.4	8	19.1	2.11	0.71–4.80	0.209
Poor or very poor	30	13.9	5	16.7	1.85		
Assessment of salary							
Adequate	42	19.5	6	14.3	1.00	0.35–1.89	0.625
Inadequate	173	80.5	20	11.6	0.81		
Would apply to current job again?							
No	16	7.4	23	11.6	1.00	0.54–4.84	0.385
Yes	199	92.6	3	18.8	1.62		
Overcommitment to work (ERI scale)							
Yes	126	58.9	10	7.9	1.00	1.09–4.82	0.029*
No	88	41.1	16	18.2	2.29		
Job strain (JCQ)							
Low strain job	46	22.1	4	8.7	1.00	1.02–12.3	0.047*
Passive job	13	6.3	4	30.8	3.54	0.25–2.67	0.744
Active job	98	47.2	7	7.1	0.82	0.67–6.16	0.212
High strain job	51	24.4	9	17.7	2.03		
Social support from peers and superior (JCQ)							
High	108	52.7	16	9.3	1.00		
Low	97	47.3	9	14.8	0.63	0.30–1.35	0.234

* *p* < 0.05

** *p* < 0.01

*** *p* < 0.001

^a Totals may be different due to missing values

expected performance would not be assured. In fact, it would signal an “escapist” behavior where physicians, in the author’s words, “are burying themselves in work” [19, 20].

A higher income was associated with the outcome. These results do not concur with other published findings and are not consistent, as unemployed workers in temporary jobs according to another study have a higher chance

Table 5 Multivariate prevalence ratios, 95 % confidence intervals and *p* values

Characteristics	Prevalence ratio (PR)	95 % CI	<i>p</i> value
Physician-diagnosed of RSI/WMSD			
Yes	1.00	3.25–16.7	<0.001***
No	7.37		
Job strain (JCQ)			
Low strain job	1.00	1.30–15.7	0.017*
Passive job	4.52	0.26–2.37	0.677
Active job	0.79	0.44–4.07	0.615
High strain job	1.33		

* *p* < 0.05** *p* < 0.01*** *p* < 0.001

of presenting depressive symptoms compared to workers with stable jobs [42]. Unemployed workers or those working informally have a high prevalence of psychiatric morbidities [43]. Population surveys in São Paulo [43] and Pelotas [44] found an inverse relationship between income and mental disorders. Individual abilities to deal with stressors are related to general life conditions, for which income is essential to provide access to the necessary conditions for protecting health. The risks of mental disorders are related with indicators of poverty, including lack of education, poor household conditions, living in unsafe contexts, despair, social changes, exposure to violence, and physical health issues [45].

Physicians in Belo Horizonte do not lack job offers (temporary/permanent or stable/unstable). Would the effects of underemployment or precarious work be minimized with the possibility of finding jobs? The answer is complex. It is reasonable to assume that occupational dimensions negatively affect the health of physicians formally employed in public healthcare. Would it be excessive to assume that physicians with temporary jobs would be protected from the specific effects of work environments because they would not be permanently exposed to the same occupational stressors found in healthcare units? It is possible that a higher income may be the result of working in many jobs (two or three jobs), which is clearly related with poorer health [46].

The two main results in our sample were the significant and positive associations between a medical diagnosis of RSI/WMSD and depression, and between passive work (according to Karasek's model) and depression. It is clear that multiple factors, including psychosocial issues (such as dissatisfaction) and psychiatric conditions are involved in work-related muscular and skeletal diseases (RSI/WMSD), by giving rise to these conditions and worsening chronic musculoskeletal pain [47].

Among the psychosocial variables in our study, there was a significant association only with passive work. Indeed, psychosocial factors have been directly associated with a diagnosis of depression among physicians [4, 8].

Surprisingly, low social support was not associated with the outcome. Social support at work has been shown to modify the strain that might lead to increased risk for development of depression [48]. It is possible that the control–demand and social support model may not quite capture quantitative and conflicting demands.

Medical work is considered active work (high demand and high control, according to the demand–control model) [29, 30], which in theory suggests satisfactory occupational conditions. A positive association was found between passive work (low demand and low control) and reported depression in our study sample.

The Job Strain Model uses two main dimensions: demands and decision latitude. Psychologist job demands are defined as psychological stressors present in the work. The term job decision latitude has been described as the worker's ability to control his own activities and skill usage. The combination of both low demands and low decision latitude is termed “passive”. It is possible that loss of control in the context of the new changes in the structure of healthcare organizations [49, 50] may have given rise to a perception of less control (*low control*) over the work such as over treatment plans and general medical approaches for dealing with cases and referrals. There seems to be a feeling of loss in medical practice, of a more precarious relationship between physicians and patients (*low demand*), at a time when protocols have become widespread, additional institutional processes for implementing new procedures are required, administrative tasks take up more time, and expectations of citizens and their representatives are increasing [48]. Such tensions at work may be expressed as increased or decreased job satisfaction, which may be translated into stressing events. The hypothesis of cognitive vulnerability suggests that stressful events may precipitate depression [3]. Changes in the healthcare model may affect the self-esteem and social recognition of physicians. Furthermore, working in teams under local managerial control may give rise to conflicts with medical training based on a direct relationship between physicians and patients [10–12, 50].

In summary, our results may be plausibly interpreted within the context of changes that the identity of physicians has undergone as healthcare services and systems reorganize and innovate. These hypotheses, however, do not allow deeper incursions, given the limitations of the present study that found a high prevalence of depression among physicians working in the public healthcare system of Belo Horizonte. It is possible that reporting a diagnosis of depression may be associated with the variables identified

in our analysis. But it is also possible that these variables are compounding preexisting issues, or that they are more easily noted by individuals with depression and therefore reported more frequently. The results suggest that additional studies on these disorders in the context of medical work are needed to understand in greater depth the associations found in the present study and to support propositions for improving the mental health of physicians.

The omnipresence of psychiatric disorders worldwide has been recognized. Misdiagnosing or not diagnosing depression has been the focus of global initiatives that underline the relevance of prevention [51, 52]. Our data bring valuable information that may help guide interventions and health-promoting activities for physicians by indicating concrete measures to change working conditions that affect mental health.

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References

- Beck AT, Alford BA (2009) *Depression: Causes and Treatments*. Uni of Pennsylvania Press, Philadelphia
- Meyer JH, McMain S, Kennedy SH (2003) Dysfunctional attitudes and 5-HT₂ receptors during depression and self-harm. *Am J Psychiatr* 160(1):90–99
- Alloy LB, Abramson LY, Whitehouse WG et al (1999) Depressogenic cognitive styles: predictive validity, information processing and personality characteristics, and developmental origins. *Behav Res Ther* 37:503–531
- Wang LJ, Chen CK, Hsu SC, Lee SY, Wang CS, Yeh WY (2011) Active job, healthy job? occupational stress and depression among hospital physicians in Taiwan. *Ind Health* 49(2):173–184
- Center C, Davis M, Detre T, Ford DE, Hansbrough W, Hendin H, Laszlo J, Litts DA, Mann J, Mansky PA, Michels R, Miles SH, Proujansky R, Reynolds CF, Silverman MM (2003) Confronting depression and suicide in physicians: a consensus statement. *JAMA* 289(23):3161–3166
- Tyssen R, Røvik JO, Vaglum P, Grønvdold NT, Ekeberg O (2004) Help-seeking for mental health problems among young physicians: is it the most ill that seeks help? A longitudinal and nationwide study. *Soc Psychiatry Psychiatr Epidemiol* 39(12):989–993
- Tyssen R, Vaglum P (2002) Mental health problems among young doctors: an updated review of prospective studies. *Harv Rev Psychiatry* 10(3):154–165
- Wilhelm K, Kovess V, Rios-Seidel C, Finch A (2004) Work and mental health. *Soc Psychiatry Psychiatr Epidemiol* 39(11):866–873
- Givens JL, Tija J (2002) Depressed medical students' use of mental health services and barriers to use. *Acad Med* 77:918–921
- Wada K, Yoshikawa T, Goto T, Hirai A, Matsushima E, Nakashima Y, Akaho R, Kido M, Hosaka T (2010) National survey of the association of depressive symptoms with the number of off duty and on-call, and sleep hours among physicians working in Japanese hospitals: a cross sectional study. *BMC Public Health* 12(10):127
- Smith R (2001) Why are doctors so unhappy? there are probably many causes, some of them deep. *BMJ* 322(7294):1073–1074
- Campos CVA, Malik AM (2008) Satisfação no trabalho e rotatividade dos médicos do programa de saúde da família. *Rev Adm Publica* 42(2):347–368
- Paim J, Travassos C, Almeida C, Bahia L, Macinko J (2011) The Brazilian health system: history, advances, and challenges. *Lancet* 377(9779):1778–1797
- Wang J, Smailes E, Sareen J, Schmitz N, Fick G, Patten S (2012) Three job-related stress models and depression: a population-based study. *Soc Psychiatry Epidemiol* 47(2):185–193
- Kahn JP (2008) Diagnosis and referral of workplace depression. *J Occup Environ Med* 50(4):396–400
- Langlieb AM, DePaulo JR Jr (2008) Etiology of depression and implications on work environment. *J Occup Environ Med* 50(4):391–395
- Tennant C (2001) Work-related stress and depressive disorders. *J Psychosom Res* 51(5):697–704
- Kivimäki M, Hotopf M, Henderson M (2010) Do stressful working conditions cause psychiatric disorders? *Occup Med (Lond)* 60(2):86–87
- Schwenk TL, Gorenflo DW, Leja LM (2008) A survey on the impact of being depressed on the professional status and mental health care of physicians. *J Clin Psychiatry* 69(4):617–620
- Youssef NA (2008) Depression in physicians: hyperfunctioning depression or professional depression? *J Clin Psychiatry* 69(10):1661 Author reply 1661–2
- Wada K, Arimatsu M, Yoshikawa T, Oda S, Taniguchi H, Higashi T, Aizawa Y (2008) Factors on working conditions and prolonged fatigue among physicians in Japan. *Int Arch Occup Environ Health* 82(1):59–66
- Firth-Cozens J, Greenhalgh J (1997) Doctors' perceptions of the links between stress and lowered clinical care. *Soc Sci Med* 44(7):1017–1022
- BRASIL. Ministério do Planejamento, Orçamento e Gestão. Instituto Brasileiro de Geografia e Estatística-IBGE (2010). Estudos e pesquisas informação demográfica e socioeconômica número 28. Indicadores sociais municipais. Uma análise dos resultados do universo do censo demográfico 2010. Rio de Janeiro. http://www.ibge.gov.br/home/estatistica/populacao/censo2010/indicadores_sociais_municipais/indicadores_sociais_municipais.pdf. Accessed 24 June 2013
- Fundação João Pinheiro (2010) Renda per capita dos municípios de Minas Gerais (Censo Demográfico-2010). http://www.fjp.gov.br/index.php/component/docman/doc_download/625-tabelas-sin-tese-de-rpc-municipios-20102. Accessed 24 June 2013
- Chor D, Werneck GL, Faerstein E, Alves MG, Rotenberg L (2008) The Brazilian version of the effort-reward imbalance questionnaire to assess job stress. *Cad Saude Publica* 24(1):219–224
- Silva LS, Barreto SM (2010) Transcultural adaptation into Brazilian portuguese of the effort-reward imbalance scale: a study with bank workers. *Rev Panam Salud Publica* 27(1):32–36
- Masur J, Monteiro MG (1983) Validation of the "CAGE" alcoholism screening test in a Brazilian psychiatric inpatient hospital setting. *Braz J Med Biol Res* 16(3):215–218
- Thierney D, Romito P, Messing K (1990) She ate not the bread of idleness: exhaustion is related to domestic and salaried working conditions among 539 Québec hospital workers. *Women Health* 16:21–42
- Araújo TM, Graça CC, Araújo E (2003) Estresse ocupacional e saúde: contribuições do modelo demanda-controle. *Cien Saude Coletiva* 8(3):285–297
- Karasek RA, Theorell T (1990) *Healthy work-stress, productivity, and the reconstruction of working life*. Basic Books, New York
- Pinho PS, Araujo TM (2012) Association between housework overload and common mental disorders in women. *Rev Bras Epidemiol* 15(3):560–572

32. Cail F, Pichene A, Aptel M (1995) Questionnaire d'évaluation du vécu du travail de salariés exposés à des risques de troubles musculosquelettiques. *Doc Med Trav* 12(64):253–267
33. Barros AJ, Hirakata VN (2003) Alternatives for logistic regression in cross-sectional studies: an empirical comparison of models that directly estimate the prevalence ratio. *BMC Med Res Methodol* 3:21
34. Coutinho LMS, Scazufca M, Menezes PR (2008) Métodos para estimar razão de prevalência em estudos de corte transversal. *Rev Saude Publica* 42(6):992–998
35. Vigo A (2006) Modelando desfechos comuns: viés e precisão. *Cad Saude Publica* 22(11):2496–2497
36. Kessler RC et al (2010) Age differences in the prevalence and comorbidity of DSM-IV major depressive episodes: results from the WHO world mental health survey initiative. *Depress Anxiety* 27:351–364
37. Raviola G, Becker AE, Farmer P (2011) A global scope for global health—including mental health. *Lancet* 378(5):1613–1615
38. Middleton JL (2008) Today I'm grieving a physician suicide. *Ann Fam Med* 6(3):267–269
39. Tomioka K, Morita N, Saeki K, Okamoto N, Kurumatani N (2011) Working hours occupational stress and depression among physicians. *Occup Med (Lond)* 61(3):163–170
40. Frank E, Dingle AD (1999) Self-reported depression and suicide attempts among USA women physicians. *Am J Psychiatry* 156(12):1887–1894
41. Erdur B, Ergin A, Turkcuer I, Parlak I, Ergin N, Boz B (2006) A study of depression and anxiety among doctors working in emergency units in Denizli. Turkey. *Emerg Med J* 23(10):759–763
42. Kim SS, Subramanian SV, Sorensen G, Perry MJ, Christiani DC (2012) Association between change in employment status and new-onset depressive symptoms in South Korea—a gender analysis. *Scand J Work Environ Health* 38(6):537–545
43. Marín-Léon L, Oliveira HB, Barros MB, Dalgalarondo P, Botega NJ (2007) Social inequality and common mental disorders. *Rev Bras Psiquiatr* 29(3):250–253
44. Lima MS, Beria J, Tomasi E, Conceição AT, Mari J (1996) Stressful life events and minor psychiatric disorders: an estimate of the population attributable fraction in a Brazilian community-based study. *Int J Psychiatry Med* 26(2):211–222
45. Hermann H, Saxenas S, Moodie R (2005) Promoting mental health: concepts, emerging evidence, practice. World Health Organization, Geneva
46. Idris MA, Dollard MF, Winefield AH (2011) The effect of globalization on employee psychological health and job satisfaction in Malaysian workplaces. *J Occup Health* 53(6):447–454
47. Menzel NN (2007) Psychosocial factors in musculoskeletal disorders. *Crit Care Nurs Clin North Am* 19(2):145–153
48. Netterstrøm B, Conrad N, Bech P, Fink P, Olsen O, Rugulies R, Stansfeld S (2008) The relation between work-related psychosocial factors and the development of depression. *Epidemiol Rev* 30:118–132
49. Mechanic D (2003) Physician discontent: challenges and opportunities. *JAMA* 290(7):941–946
50. Edmond MB (2010) Taylorized medicine. *Ann Intern Med* 153(12):845–846
51. World Health Organization (2005) Mental health policies and programmes in the workplace, Mental health policy and service guidance package, Geneva. http://www.who.int/mental_health/policy/services/13_policies%20programs%20in%20workplace_WEB_07.pdf. Accessed 10 Jul 2013
52. Dietrich S, Deckert S, Ceynowa M, Hegerl U, Stengler K (2012) Depression in the workplace: a systematic review of evidence-based prevention strategies. *Int Arch Occup Environ Health* 85(1):1–11