Association between workplace bullying and common mental disorders in civil servants from a middle-income country

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Abstract: Workplace bullying (WB) is associated with Common mental disorders (CMD) in high-income countries, but there is a lack of evidence relating to this subject in low- and middle-income countries. Therefore, this study aimed to investigate the association between bullying and CMD in Brazil. A cross-sectional study with 907 judicial civil servants from Porto Alegre, southern Brazil, was carried out. WB was measured by the Negative Acts Questionnaire (NAQ-r) and CMD by the Self-Reporting Questionnaire (SRQ-20). Logistic regression was used to analyse data and test hypotheses. The overall prevalence of CMD was 32.8%, while the overall prevalence of bullying was 18.3%. WB was strongly associated with CMD, even after controlling for confounders. After adjustment for sociodemographic, personality and occupational confounders, weekly and daily exposures to negative acts increased 4.32 (95% CI: 2.00–9.33) and 6.80 (95% CI: 3.42–13.51) times the risk of CMD, respectively. Considering the operational definition, bullied workers had a 3.45 (95% CI: 2.26–5.25) higher risk of CMD. The results are consistent with studies from high-income countries. Different ways of categorising exposure to WB and testing association with CMD are suggested. Interventions to prevent bullying, focusing on work processes and psychosocial factors at work, could reduce the risk of mental health problems.

Key words: Workplace bullying, Common mental disorders, Occupational health, Epidemiology, Psychosocial factors at work

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Introduction

Common mental disorders (CMD) – which include depression, anxiety and other stress-related disorders[1] – have a high prevalence worldwide, affecting approximately 30.0% of the world population during lifetime and 18.0% during the last year[2]. In Brazil, the estimated prevalence of CMD varies according to city, from 14.9% in Florianópolis[3], to 29.6% in São Paulo[4]. The prevalence also varies according to different occupational groups, from 16.0% among primary health care professionals[5], up to 42.0% in other health professionals[6], and 55.0% among public teachers[7]. Also, in the ELSA-Brazil, a current cohort study following more than 15,000 civil servants, the baseline prevalence of CMD was 26.8%[8], which was similar to the prevalence in UK civil servants from the Whitehall II study (from 20.6% in men, to 33.8% in women)[9].

CMD increase absenteeism, disability, morbidity and demands for health care, with high social and economic impact[10], being the leading cause of years living with disability (YLD) and accounting for more than one-sixth of the global burden of disease[11]. In high-income countries, mental disorders overlapped musculoskeletal disorders as the main cause of sick leave and disability[12], which also occurs with some groups of Brazilian civil servants[13]. For these reasons, CMD have been identified as a major problem for public health and occupational health1[10, 11].

Some psychosocial and organisational factors at work, such as organisational change, job insecurity, temporary employment status, lack of procedural justice, problems in work design, atypical working hours, occupational stress, lack of social support and workplace conflicts are associated with CMD[14]. Workplace bullying is also one of these risks[15–17], with several consequences in workers' health. Workplace bullying (also called "mobbing") means harassing, offending, socially excluding someone or negatively affecting someone's work. In order for the label bullying to be applied to a particular process, interaction or activity, it needs to occur repeatedly and regularly (e.g., weekly) and over a period of time (e.g., around six months). During its occurrence, the person may end up in an inferior position, becoming a target of negative behaviours, in an escalating process characterized by systematic negative social actions. An interpersonal conflict cannot be classified as bullying if the incident is a unique event or if two individuals have similar 'strength' in the situation[18].

According to recent systematic reviews, bullying at work can increase 1.68 (95%, CI 1.35–2.09) times the risk of mental health problems[17], 2.8 (95%, CI 2.21–3.59) times

the risk of depression[19], and can explain more than one-quarter of the CMD variability[16]. Longitudinal findings from high-income countries – such as Denmark[15], Norway[20] and Finland[21] – also indicate an important causal relationship between bullying and CMD. Nevertheless, most of the data about workplace bullying and its association with mental health problems are from high-income countries. Studies concerning this subject are scarce in low- and middle-income countries such as Latin American countries and were found only in the grey literature. Considering the inequalities between low- and middle-income countries and high-income nations in relation to socioeconomic context and adverse working conditions, as well as the existence of substantial cultural differences between Latin American and North American/European countries[22], we hypothesized that the magnitude of effect of the association between bullying and CMD is higher in Latin and South America, particularly in Brazil.

Also, most of the studies that investigated the association between bullying and CMD did not measure possible confounders, such as other occupational characteristics and psychosocial factors at work which can be antecedents of this particular type of violence. Therefore, this study aimed to investigate the association between workplace bullying and CMD in a group of civil servants from the Federal Judiciary of Porto Alegre, southern Brazil, analysing sociodemographic and occupational factors involved in this relationship.

Methods

Study design and participants

This is a cross-sectional study. Data were collected between July and October 2018. The target population was judicial federal civil servants from Porto Alegre, the capital of Rio Grande do Sul, a state in southern Brazil. Inclusion criteria were being a civil servant in the Federal Judiciary for at least six months and working during the period of data collection. Exclusion criteria were being either a trainee, temporary or outsourced worker. All workers who met the inclusion criteria were contacted by e-mail and were invited to answer the self-reported questionnaire, which could be accessed online through a link available in the personal institutional e-mail.

Measurement of main outcome and main exposure

The Self-Reporting Questionnaire (SRQ-20) was used to evaluate Common Mental Disorders. This inventory is compounded by 20 binary (yes/no) questions related to

mental health, and the cut-off points suggested by the Brazilian validation study were 6 or more positive answers for men and 8 or more positive answers for women[23]. The Negative Acts Questionnaire - Revised (NAQ-r)[24] was used to measure workplace bullying. The NAQ-r is compounded by 22 questions (with answers on a Likert scale), asking about the frequency (never, now and then, monthly, weekly, and daily) of the individual's exposure to negative acts, perpetrated by others in the workplace, in the last six months. Subjects who reported at least one negative act on a weekly basis were classified as 'bullied'. This operational definition of bullying was the most commonly described in the literature[25]. To test the association between bullying and CMD, we also analysed the exposure to bullying in two additional ways: as a polytomous variable, considering the five frequencies of the Likert scale in the NAQ-r (at least one negative act in the last six months in any of the following frequencies: never, now and then, monthly, weekly, and daily); and as a score, using the cut-off points (<33, not bullied; 33–45, occasionally bullied; >45, victims of severe workplace bullying) proposed by Notalaers and Einarsen (2012)[26].

Measurement of covariates

The general questionnaire also included information on sociodemographic and other occupational characteristics. The validated Brazilian versions[27, 28] of the Job Stress Scale[29] (JSS) and the Effort-Reward Imbalance (ERI) Scale[30] were used to evaluate occupational stress, using the job strain and effort-reward imbalance models, respectively. The JSS included five questions to evaluate psychological demands and six questions to evaluate control, with answers on a four-point Likert scale ("frequently", "sometimes", "rarely", and "never or almost never"). Scores ranged from 5 to 20 (demands) and 6 to 24 (control), and were dichotomised in two categories (low and high), with the median as a cut-off point. Based on this, the exposure to job strain was divided in four categories: low strain (high control and low demand); active job (high control and high demand); passive job (low control and low demand); and high strain (low control and high demand). The ERI Scale comprised six items to evaluate effort and 11 items to evaluate reward, also with answers on a Likert scale and scored from 1 to 4 ("strongly disagree", "disagree", "agree", "strongly agree"). Total scores ranged from 6 to 24 points (effort) and 11 to 44 points (reward). Higher scores indicated higher effort and higher reward. ERI was calculated by the effort-reward ratio, according to the formula $e/(r \times c)$, which is defined by the sum of the effort score ("e"), divid-

ed by the sum of the reward score ("r"), and multiplied by the correction factor ("c") that accounts for the unequal number of items[31]. Ratio values were categorised in tertiles, defining three categories of exposure (low, moderate and high ERI).

A translated version of the PSC–12 Scale[32] was used to evaluate psychosocial safety climate. The PSC-12 is a 12-item questionnaire encompassing four sub-scales, evaluating management commitment, management priority, organisational communication, and organisational participation. Each sub-scale consists of three questions with responses scored on a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Total scores for the scale can range from 12 to 60. Cut-off scores were classified as low risk ($\geq$41), moderate risk (>37 and <41), and high risk ($\leq$37)[33].

Furthermore, a Brazilian adapted version[34] of the Big Five Inventory-10 (BFI-10)[35] was used to evaluate personality traits, including extroversion, agreeableness, conscientiousness, neuroticism and openness to experience. Each trait was evaluated by two different questions, with answers on a Likert scale. Answers scored from 1 to 5, and, for each trait, one of the questions was on a reverse scale. All scales and measurements are described in more details in previous publications[27–35].

Statistical Analyses

The studied population was described in absolute and relative frequencies. Logistic regression was used to evaluate associations of all independent variables with the main exposure (bullying) and outcome (CMD). Logistic regression was also used to test the association between bullying and common mental disorders. Fourteen covariates were considered possible confounders (sex and age in the first model; skin colour, educational level, years of work, and personality traits (5 variables) in the second model; and job strain, effort-reward imbalance and psychosocial safety climate in the third model). Previous knowledge supported our theoretical model, which guided modelling strategies. In model 1, only the "forced" variables were included; in model 2, all potential confounders (variables clearly not on the causal pathway) were included; and in model 3, a full model, adding other psychosocial factors at work (possible mediators of the association between bullying and CMD), were tested. Collinearity between variables was tested by the verification of variance inflation factors (VIF) and changes in regression coefficients. The criterion to keep variables in the model was VIF <3. Pearson correlation test was used to examine correlation between variables.

Ethical procedures

The study was approved by the Research Ethics Committee from the Federal University of Pelotas and is registered in the Brazilian National Platform for Research (*Plataforma Brasil*) (registration number 86800218.9.0000.5317). The principles from the Declaration of Helsinki were followed. The administration of the Federal Judiciary of Porto Alegre and the trade union (legal representative of the civil servants) signed a formal agreement with the study. The institution and the union supported the research and the data collection, providing the list of e-mails and sending the online questionnaires to all eligible subjects. All respondents included in the study agreed to participate and signed the online informed consent form. Those who did not return the questionnaire providing complete information were considered losses. The deadline to receive the questionnaires was defined by the researchers for logistic reasons.

Results

2,403 workers who met the inclusion criteria were contacted by e-mail and 907 of those (37.7% response rate) returned the questionnaire providing complete information. The participation of female workers was slightly higher (51.7%) and almost half of the participants were aged between 35 and 44 years-old. More than 90.0% of participants were white with a high educational level. Regarding occupational characteristics, approximately 45.0% worked in the Labour Court of Porto Alegre and the same percentage performed administrative activities. The majority were technicians, worked with virtual processes and had a schedule of up to 7 hours a day. More than one-third have worked in the Federal Judiciary of Porto Alegre for more than 20 years (Table 1). The differences between respondents and non-respondents are described in the Appendix Table 2, showing some differences concerning sex, age, educational level and field of expertise.

The prevalence of workplace bullying (based on the 'operational definition') was 18.3% (19.2% among men and 17.5% among women). Initially, risk factors for workplace bullying adjusted for sex and age were analysed. Sex, field of expertise, job position, tenure and work hours were not associated with bullying. However, older age, white skin colour and lower educational level were associated with a lower risk of being bullied. In relation to personality traits, only neuroticism was associated with bullying. Furthermore, occupational factors such as telephone and help desk activities, having worked more than 20 years in the institu-

tion, extra hours, lack of breaks, absence of bonus income, high pressure for goals, high job strain, high effort-reward imbalance, and high-risk psychosocial safety climate were associated with a higher risk of bullying.

The overall prevalence of common mental disorders was 32.8%, and sex and age group were not associated with CMD. The risk of CMD was 66% higher among black, Asian and Indigenous people (*p*<0.001), compared to white workers. Workers with lower educational levels also had a higher risk of CMD. With regard to occupational characteristics, having more than 15 years of work, absence of breaks during the shift, pressure for goals, high job strain, high effort-reward imbalance and high-risk psychosocial safety climate were associated with higher risk of CMD (Table 1). All personality traits were associated with CMD. Higher extroversion, agreeableness, conscientiousness and openness to experiences reduced the risk of CMD, whilst higher neuroticism increased the risk (Table 2).

All regression models showed a positive association between workplace bullying, considering the three categorisations, and common mental disorders. Those exposed to workplace bullying (operational definition) had a 3.32 (95% CI: 2.34–4.72) times higher risk of CMD, compared to those unexposed, after adjustment for sex and age group. In the second model, after controlling for sex, age group, skin colour, educational level, years of work, main role, and personality traits, those exposed to workplace bullying weekly or daily had almost 3 times the risk of CMD, compared to those unexposed (adjusted OR 3.45, 95% CI: 2.26–5,25). In the full model, after adjusting for all covariates from the second model plus occupational stress (job strain and effort-reward imbalance), the association remained strong (adjusted OR 2.31, 95% CI: 1.48-3.61; *p*<0.001) (Table 3).

Considering the exposure to workplace bullying as a polytomous variable (five categories of negative acts, based on frequency), the first model showed that those exposed to daily, weekly, monthly and 'now and then' negative acts had a 7.8, 5.1, 4.7, and 2.1 times higher risk of CMD, respectively, compared to those not bullied (*p*<0.01). In the second model, the risk of CMD among bullied workers on a daily or weekly basis was 6.80 (95% CI 2.00–9.33) and 4.32 (95% CI 3.42–13.51) times higher, compared with non-bullied workers, respectively (Table 3).

Also, when considering the score levels of the NAQ-r, all associations remained strong and positive. In the first model, scores 33–45 and >45 were associated with 3.57 (95% CI 2.47–5.15) and 4.86 (95% CI 2.28–10.36) times higher risk of CMD, respectively, compared to scores lower than

Table 1. Sociodemographic and occupational characteristics of judicial civil servants from Porto Alegre, Rio Grande do Sul, Brazil, and risk factors for common mental disorders (adjusted for sex and age), 2018 (n=907)

Variables	Respondents	CMD	POR		p-value
	n (%)	n (%)	POR	CI 95%	
Sex					
Male	438 (48.3)	151 (34.5)	1.00	-	
Female	469 (51.7)	146 (31.1)	0.85	0.64–1.13	0.267
Age (categories)					0.134#
<35	136 (15.0)	47 (34.6)	1.00	-	
35–44	296 (47.6)	105 (35.5)	1.05	0.69–1.62	
45–54	329 (36.3)	109 (33.1)	0.96	0.63–1.46	
>=55	146 (16.1)	36 (24.7)	0.62	0.37–1.05	
Skin Colour					
White	834 (92.0)	265 (31.8)	1.00	-	
Black, Brown, Asian, Indigenous	73 (8.0)	32 (43.8)	1.66	1.02–2.71	0.043
Educational level					
Postgraduate, MSc, PhD	532 (58.6)	159 (29.9)	1.00	-	
Graduate	301 (33.2)	110 (36.5)	1.40	1.03–1.90	
High School	74 (8.2)	28 (37.8)	1.47	0.88–2.46	0.027*
Court					0.890#
Regional Federal Court (2nd Court)	176 (19.4)	58 (32.9)	1.00	-	
Federal Court (1st Court)	125 (13.8)	40 (32.0)	0.90	0.55–1.49	
Electoral Court	201 (22.2)	62 (30.9)	0.90	0.58–1.39	
Labour Court	405 (44.6)	137 (33.8)	1.01	0.69–1.48	
Field of expertise					0.348#
Administrative (1st court)	126 (13.9)	34 (27.0)	1.00	-	
Administrative (2nd court)	278 (30.6)	88 (31.7)	1.25	0.78–2.00	
Judicial (1st court)	233 (25.7)	78 (33.5)	1.35	0.83–2.18	
Judicial (2nd court)	270 (29.8)	97 (35.9)	1.52	0.95–2.43	
Job position					
Analyst	306 (33.7)	98 (32.0)	1.00	-	
Technician	601 (66.3)	199 (33.1)	1.05	0.78–1.42	0.731
Tenure					0.976#
Administrative (office work)	481 (53.0)	155 (32.2)	1.00	-	
Judicial (office work)	330 (36.4)	110 (33.3)	1.06	0.79–1.44	
IT (office work)	67 (7.4)	23 (34.3)	0.99	0.56–1.72	
Security and Judicial Officer	29 (3.2)	9 (31.0)	0.94	0.41–2.15	
Main role/activity					0.499#
Virtual Process	479 (52.1)	155 (32.4)	1.00	-	
Paper Process	48 (5.3)	16 (33.3)	1.13	0.60–2.13	
Non judiciary activity	237 (26.1)	82 (34.6)	1.09	0.78–1.52	
Telephone/help desk	33 (3.6)	14 (42.4)	1.63	0.79–3.37	
Other	110 (12.1)	30 (27.3)	0.80	0.50–1.28	

Table 1. Continued

Variables	Respondents	CMD	POR		p-value
	n (%)	n (%)	POR	CI 95%	
Years of work					
<10	250 (27.6)	74 (29.6)	1.00	-	
10–14	231 (25.5)	75 (32.5)	1.40	0.91–2.15	
15–19	111 (12.2)	48 (43.2)	2.30	1.36–3.89	
>=20	315 (34.7)	100 (31.8)	1.74	1.04–2.92	0.019*
Work hours (per day)	n=904				0.713#
Up to 6	375 (41.5)	127 (33.9)	1.00	-	
7	363 (40.1)	114 (31.4)	0.89	0.65–1.21	
8 or more	166 (18.4)	56 (33.7)	1.02	0.69–1.50	
Work hours (continuous)		-	0.99	0.87–1.14	0.942
Extra hours	n=904				
No	560 (61.9)	177 (31.6)	1.00	-	
Yes	344 (38.1)	120 (34.9)	1.17	0.88–1.56	0.282
Extra hours (days per month)	n=904				0.338#
None	559 (61.8)	176 (31.5)	1.00		
1 to 4	97 (10.7)	39 (40.2)	1.48	0.94–2.32	
5 to 9	101 (11.2)	37 (36.6)	1.25	0.80–1.95	
10 to 14	46 (5.1)	16 (34.8)	1.21	0.64–2.29	
15 or more	101 (11.2)	29 (28.7)	0.88	0.55–1.41	
Breaks (not including lunch)	n=904				
None	202 (22.3)	84 (41.6)	1.00	-	
1 to 2	485 (53.7)	161 (33.2)	0.71	0.50–0.99	
3 or more	217 (24.0)	52 (24.0)	0.43	0.28–0.66	<0.001*
Bonus income					
No	289 (31.9)	101 (35.0)	1.00	-	
Yes	618 (68.1)	196 (31.7)	0.84	0.62–1.14	0.257
Pressure for goals	n=904				
No	459 (50.8)	123 (26.8)	1.00	-	
Low or adequate	255 (28.2)	87 (34.1)	1.47	1.05–2.05	
High or very high	190 (21.0)	87 (45.8)	2.30	1.61–3.28	<0.001*
Demand-Control Model	n=906				
Low Strain	262 (28.9)	48 (18.3)	1.00	-	
Passive Job	248 (27.4)	78 (31.5)	2.05	1.36–3.10	
Active Job	211 (23.3)	81 (38.9)	2.81	1.84–4.28	
Job Strain (High Strain)	185 (20.4)	90 (48.7)	4.36	2.84–6.70	<0.001*
Effort-Reward Imbalance	n=906				
Low	325 (35.9)	71 (21.9)	1.00	-	
Moderate	300 (33.1)	82 (27.3)	1.33	0.92–1.92	
High	281 (31.0)	144 (51.3)	3.90	2.73–5.57	<0.001*

Table 1. Continued

Variables	Respondents	CMD	POR		p-value
	n (%)	n (%)	POR	CI 95%	
Psychosocial Safety Climate	n=906				
Low Risk	228 (25.2)	35 (15.4)	1.00	-	
Moderate Risk	80 (8.8)	25 (31.3)	2.51	1.38–4.56	
High Risk	598 (66.0)	237 (39.6)	3.66	2.46–5.45	<0.001*

POR=Prevalence Odds Ratio; *p-value for trend; #p-value for heterogeneity;

Table 2. Mean scores of BFI Scale among judicial civil servants from Porto Alegre, Rio Grande do Sul, Brazil, and the association between common mental disorders and personality traits (adjusted for sex and age), 2018 (n=907)

Personality Traits	Mean Score	Standard Deviation	POR	CI 95%	p-value
Extroversion	5.84	2.19	0.85	0.80–0.91	<0.001
Agreeableness	6.82	1.73	0.62	0.56–0.68	<0.001
Conscientiousness	7.93	1.65	0.74	0.67–0.81	<0.001
Neuroticism	5.45	2.18	1.52	1.41–1.64	<0.001
Openness to experience	7.29	2.02	0.90	0.84–0.96	0.002

Table 3. Association between Workplace Bullying and Common Mental Disorders among civil servants from the Federal Judiciary of Porto Alegre, southern Brazil, 2018 (n=907)

	Prevalence of CMD	OR (Model 1)[£]	p-value	OR (Model 2)[#]	p-value	OR (Model 3)[§]	p-value
Workplace Bullying (Operational definition)			<0.001		<0.001		<0.001
No	204 (27.5%)	1		1		1	
Weekly	93 (56.0%)	3.32 (2.34–4.72)		3.45 (2.26–5.25)		2.31 (1.48–3.61)	
Workplace Bullying (Frequency of Negative Acts)			<0.001*		<0.001*		<0.001*
No	23 (15.7%)	1		1		1	
Now and then	148 (28.2%)	2.10 (1.29–3.41)		1.63 (0.95–2.80)		1.13 (0.63–2.02)	
Monthly	33 (47.1%)	4.72 (2.47–9.04)		3.82 (1.84–7.94)		1.87 (0.84–4.17)	
Weekly	29 (50.0%)	5.13 (2.59–10.15)		4.32 (2.00–9.33)		2.47 (1.08–5.65)	
Daily	64 (59.3%)	7.83 (4.34–14.12)		6.80 (3.42–13.51)		3.03 (1.41–6.49)	
Workplace Bullying (Scores)			<0.001*		<0.001*		<0.001*
Not bullied	194 (26.7%)	1		1		1	
Occasionally bullied	83 (55.7%)	3.57 (2.47–5.15)		3.07 (1.99–4.73)		2.09 (1.32–3.30)	
Severely bullied	20 (64.5%)	4.86 (2.28–10.36)		6.91 (2.73–17.53)		4.04 (1.53–10.63)	
Total	297 (32.8%)						

£ Model 1: adjusted for sex and age; #Model 2: adjusted for sex, age, skin colour, educational level, years of work, main role, and personality traits (extroversion, agreeableness, conscientiousness, neuroticism, and openness); §Model 3: adjusted for all variables in model 2 + job strain, effort-reward imbalance, and psychosocial safety climate; *:p-value for linear trend.

Appendix Table 1. Correlation matrix of all the variables used in the regression models

	Bullying	Sex	Age	Skin Colour	Educat. Level	Main Role	Years of work	Extro-version	Agree-ableness	Conscien-tiousness	Neuro-ticism	Openness to exp.	Job Strain	ERI	PSC
Bullying	1.0000														
Sex	−0.0241	1.0000													
Age	−0.0825	0.0460	1.0000												
Skin Colour	0.0943	−0.0261	−0.0954	1.0000											
Educational Level	−0.0641	−0.1280	0.0238	0.0903	1.0000										
Main Role	0.0273	−0.1250	0.1128	0.0677	0.0992	1.0000									
Years of work	0.0011	−0.0007	0.6461	−0.0677	0.0275	0.0289	1.0000								
Extroversion	−0.0173	0.1078	−0.0622	0.0159	−0.0455	−0.0199	−0.0243	1.0000							
Agreeableness	−0.0512	−0.0515	0.1790	−0.0048	−0.0389	0.0206	0.0822	0.1231	1.0000						
Conscientiousness	−0.0336	0.0062	0.2262	−0.0443	−0.0671	0.0443	0.1524	0.0659	0.3627	1.0000					
Neuroticism	0.1199	0.1093	−0.1007	−0.0341	0.0268	−0.0752	−0.0488	−0.0332	−0.5005	−0.2854	1.0000				
Openness to exp.	−0.0018	−0.0385	0.0295	0.0064	−0.0001	0.0010	0.0147	0.1949	0.0897	0.0944	−0.0925	1.0000			
Job Strain	0.2665	0.0660	0.0259	0.0147	−0.0253	−0.0751	0.0392	−0.0277	−0.0891	−0.0483	0.1636	−0.0147	1.0000		
ERI	0.2880	−0.0103	0.0662	0.0384	−0.0374	−0.0136	0.0936	−0.0251	−0.0380	0.0122	0.1047	0.0129	0.5793	1.0000	
PSC	0.1826	0.0638	−0.0017	0.0456	−0.0482	0.0895	−0.0045	−0.0847	−0.1571	−0.1166	0.1795	−0.0230	0.2825	0.2767	1.0000

33. After adjustment for covariates in the second model, ORs were 3.07 (95% CI 1.99–4.73) and 6.91 (95% CI 2.73–17.53) ($p<0.001$), respectively; in the full model (model 3), the risk was 2.09 (95% CI 1.32–3.30) and 4.04 (95% CI 1.53–10.63) times higher among workers who scored 33–45 and >45, compared to those who scored less than 33 (Table 3).

Variables included in the models were weakly correlated. Most correlation coefficients were lower than 0.10 and few reached 0.30 (Appendix Table 1). VIF of all the variables included in the full models were lower than 2.00.

Discussion

The prevalence of common mental disorders found in this group of civil servants (32.8%) was similar to other groups of workers[8, 9, 36]. However, considering the high educational level of these judicial civil servants, the prevalence is higher than the expected for a similar educational and socioeconomic level (10.5% to 19.7%), according to previous population studies in two Brazilian capital cities[3, 37]. Also the prevalence of workplace bullying (18.3%) was high, although similar to the overall prevalence of bullying estimated by a meta-analysis (14.8%), considering a comparable measure of bullying (the "operational definition")[38].

The magnitude of the effect of the association between workplace bullying and common mental disorders was remarkable, higher than in previous studies from high-income countries[15, 16, 19, 21], even after adjustment for other psychosocial factors. A previous metanalysis[17] found a 68% higher risk of mental health problems in bullied workers, compared to those not bullied. Another recent systematic review of longitudinal studies about bullying, its con-

sequences and mechanisms also indicated that workplace bullying may increase mental health problems[39]. However, both reviews did not include studies from low- and middle-income countries. Besides, the most recent review identified that very few papers measured effect sizes of this relationship[39]. Our study measured and identified a much higher effect magnitude compared to the metanalysis, reaching more than 200% higher risk of CMD among bullied workers, and suggesting that the social context in a middle-income country may worsen the effect of bullying on mental health. The dose-response effect of bullying on CMD, when we tested the negative acts as a polytomous variable, reinforces the validity of the association.

Several studies about workplace bullying did not control their analyses for important confounders[17]. Our study tested the association between bullying and CMD in three logistic regression models, including personality traits and several psychosocial factors in the analyses. Our models were in line with the theoretical framework of bullying and its consequences proposed by Einarsen *et al.* in their recent textbook on the theme[18]. Occupational stress – which was analysed through job strain and effort-reward imbalance models – and psychosocial safety climate might be on the causal path between bullying and CMD. However, a bidirectional relationship between stress and bullying is also plausible, as workplace bullying may also degrade the work environment[40, 41]. Workplace bullying was strongly associated with CMD in all models, and, despite the reduction of the magnitude of effect when all psychosocial factors were included in the regression model, our findings indicated an independent effect of bullying on CMD.

There are few studies focusing on biological mechanisms that explain the association between workplace bullying and mental health[17]. A higher level of salivary corti-

Appendix Table 2. Comparison of respondents and non-respondents, according to sociodemographic and occupational characteristics

	Respondents						Non Respondents				Total Population			
	Labour Court	Federal Court (1st Court)	Regional Federal Court (2nd Court)	Electoral Court	Total	p-value	Labour Court	Federal Court (1st and 2nd)	Electoral Court	Total	Labour Court	Federal Court (1st and 2nd)	Electoral Court	Total
	n=405	n=125	n=176	n=201	n (%)		n=428	n=882	n=186	n (%)	n=833	n=1,183	n=387	n (%)
Response rate	48.6	38.8	20.4	51.9										
Sex						0.047								
Male	191 (47.2)	57 (45.6)	92 (52.3)	98 (48.8)	438 (48.3)		222 (51.9)	453 (51.4)	110 (59.1)	785 (52.5)	413 (49.6)	602 (50.9)	208 (53.8)	1223 (50.9)
Female	214 (52.8)	68 (54.4)	84 (47.7)	103 (51.2)	469 (51.7)		206 (48.1)	429 (48.6)	76 (40.9)	711 (47.5)	420 (50.4)	581 (49.1)	179 (46.2)	1180 (49.1)
Age group						0.001								
<35	77 (19.0)	25 (20.0)	22 (12.5)	12 (6.0)	136 (15.0)		139 (32.5)	249 (28.2)	59 (31.7)	447 (29.9)	216 (25.9)	296 (25.0)	71 (18.4)	583 (24.3)
35–44	130 (32.1)	50 (40.0)	44 (25.0)	72 (35.8)	296 (32.6)		112 (26.2)	352 (39.9)	79 (42.4)	543 (36.3)	242 (29.1)	446 (37.7)	151 (38.9)	839 (34.9)
45–54	138 (34.1)	39 (31.2)	74 (42.1)	78 (38.8)	329 (36.3)		144 (33.6)	246 (27.9)	45 (24.2)	435 (29.1)	282 (33.8)	359 (30.3)	123 (31.9)	764 (31.8)
>=55	60 (14.8)	11 (8.8)	36 (20.4)	39 (19.4)	146 (16.1)		33 (7.7)	35 (4.0)	3 (1.6)	71 (4.7)	93 (11.2)	82 (6.9)	42 (10.8)	217 (9.0)
Skin Colour						0.705								
White	375 (92.6)	114 (91.2)	161 (91.5)	184 (91.5)	834 (91.9)		398 (93.0)	803 (91.0)	168 (90.3)	1,369 (91.5)	773 (92.8)	1,078 (91.1)	352 (90.9)	2,203 (91.7)
Black, Brown, asian, indigenous	30 (7.4)	11 (8.8)	15 (8.5)	17 (8.5)	73 (8.1)		30 (7.0)	79 (9.0)	18 (9.7)	127 (8.5)	60 (7.2)	105 (8.9)	35 (9.1)	200 (8.3)
Educational level						0.001								
Postgraduate, MSc, PhD	235 (58.0)	68 (54.4)	102 (58.0)	127 (63.2)	532 (58.6)		165 (38.5)	530 (60.1)	39 (21.0)	734 (49.1)	400 (48.0)	700 (59.2)	166 (43.0)	1,266 (52.6)
Graduate	141 (34.8)	45 (36.0)	58 (32.9)	57 (28.4)	301 (33.2)		190 (44.4)	278 (31.5)	90 (48.4)	558 (37.3)	331 (39.8)	381 (32.2)	147 (38.1)	859 (35.7)
High School	29 (7.2)	12 (9.6)	16 (9.1)	17 (8.5)	74 (8.2)		73 (17.1)	74 (8.4)	57 (30.6)	204 (13.6)	102 (12.2)	102 (8.6)	74 (18.9)	186 (7.7)
Field of expertise						0.001								
Administrative (1st court)	52 (12.8)	30 (24.0)	-	44 (21.9)	126 (13.9)									
Administrative (2nd court)	92 (22.7)	1 (0.8)	77 (43.7)	108 (53.7)	278 (30.6)									
Administrative					404 (44.5)		103 (24.1)	181 (20.5)	124 (66.7)	408 (27.3)	247 (29.7)	289 (24.4)	276 (71.2)	812 (33.8)
Judicial (1st court)	132 (32.6)	87 (69.6)	-	14 (7.0)	233 (25.7)									
Judicial (2nd court)	129 (31.9)	7 (5.6)	99 (56.3)	35 (17.4)	270 (29.8)									
Judicial					503 (55.5)		325 (75.9)	701 (79.5)	62 (33.3)	1,088 (72.7)	586 (70.3)	894 (75.6)	111 (28.8)	1,591 (66.2)

sol in bullied workers compared to those not bullied was described[42], suggesting that workplace bullying could increase the biological stress, affecting inflammatory response and neurotransmission. Also, stress could generate negative emotions in those exposed to bullying, increasing the risk of health problems. Moreover, individuals who are exposed to bullying could face difficulties in dealing with their emotions, affecting negatively their psychological well-being[43].

There is no consensus about the best way to operationalise workplace bullying[26]. In this paper, we used the 'behavioural experience method' based on the frequencies of each negative act reported on NAQ-r answers[18]. Using three types of negative acts categorisation – as we did in our analyses – can be a tool to better understand the role of workplace bullying on mental health outcomes. Repeated measures of bullying in workplace surveillance (either in longitudinal/follow-up or in repeated measures studies) could also improve the understanding of bullying process, its escalating process, and its consequences for health. The cut-off score ">45" provides a more specific measure for workplace bullying[24] when compared to other types of categorisation. However, a possible deleterious effect of the negative acts on CMD was found even in levels not classified as severe workplace bullying (scores 33 to 45, or "now and then" and "monthly" frequencies). These facts and the positive dose-response in the association between negative acts and CMD may indicate that not only persistent and severe workplace bullying has terrible consequences for workers and organisations, but also negative acts or violent behaviours not characterised as bullying by the scales. These findings are also in line with previous studies[26]. As an escalating process[18], bullying might require interventions in early stages of conflicts, when negative acts might be less frequent. Alternative categorisations to measure the exposure to bullying (such as identifying 5 categories of exposure to negative acts) might be helpful to address these issues and to verify dose-response patterns.

Some limitations of this study should also be discussed. Although the "behavioural experience method" to measure bullying is based on self-report and may have limitations[18], the NAQ-r provides valid and "objective" information on the frequencies of negative acts. Despite the criticism raised on using an operational criterion, this approach is based in solid theoretical assumptions and enables comparisons with most of the previous studies on the theme[25, 39], with measures that are easy to interpret. In order to address a possible problem of not identifying cases of bullying in those experiencing hostile behaviours "monthly" or "now

and then", we also included a five-categories measure of the exposure, what make possible to identify less frequent negative acts and their effects.

The reverse causality of the association between workplace bullying and CMD is minimised by the fact that the recall of negative acts is 6 months, while for CMD is 30 days. However, we could not evaluate the previous mental health status of participants, thus reverse causation cannot be excluded. This study lacks an optimal response rate and found some statistically significant differences between respondents and non-respondents, suggesting a selection bias. However, the response rate in this study is similar to other web surveys[44], and several other occupational health studies. Despite the relevance of workplace bullying, the problem is often neglected in institutions, leading workers to feel embarrassed or even coerced into not answering survey questionnaires. Unrepresentative samples tend to overestimate the prevalence of workplace bullying[38], but associations are less affected by this bias. Also, with the high effect magnitude, the dose-response pattern found in the association between bullying and CMD, as well as the biological plausibility and consistency with the literature, the validity of our findings is reinforced.

The subjects of our study belong to a group of wealthy civil servants, with a stable job in the Brazilian state, in which the likelihood of leaving the job is very low. However, severe cases of mental disorders tend to cause long-term sick-leaves. Indeed, mental health problems are one of the main causes of sick leave among Brazilian civil servants[45]. Therefore, the associations might be underestimated due to the healthy worker effect.

Conclusions

Our study makes an important contribution to understanding the relationship between bullying and common mental disorders, especially in low- and middle-income countries like Brazil, where there is a lack of epidemiological evidence relating to the subject. Our findings reinforce the strong association between bullying at work and common mental disorders, and highlight the necessity of preventing bullying to reduce mental health problems and other health outcomes. We were able to measure and adjust the analysis for several demographic and occupational characteristics – including a range of psychosocial aspects – with validated tools and different logistic regression models – strengthening the validity of our results.

Interventions to prevent workplace bullying and CMD should address work processes and work organisation, re-

ducing the job strain, the imbalance between efforts and rewards, and developing a safe psychosocial environment in the organisation. The administration of the Federal Judiciary of Brazil must provide appropriate capacitation for managers and leaders, developing occupational health actions to reduce the pressure for goals, the number of extra hours, the psychological demands, and to improve the autonomy, the social support and the institutional commitment to safe work environment.

Our findings are valuable for future comparisons with other populations and groups of workers in Brazil and other countries, suggesting different ways of categorising bullying, as well as different ways of modelling the analyses. Researchers should be encouraged to study the effects of bullying on mental health in an epidemiological perspective, including other psychosocial factors at work – such as job strain, effort-reward imbalance and psychosocial safety climate – as possible confounders and/or mediators. Further epidemiological studies to evaluate the effect of bullying on health, particularly those with longitudinal design, are still necessary in low- and middle-income countries, and should also investigate other settings. Future research on bullying and mental health should clarify a possible bidirectional relationship between workplace bullying and mental health problems.

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