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ORIGINAL ARTICLE

Work-related stress according to the demand-control model and minor psychic disorders in nursing workers*

ESTRESSE NO TRABALHO SEGUNDO O MODELO DEMANDA-CONTROLE E DISTÚRBIOS PSÍQUICOS MENORES EM TRABALHADORES DE ENFERMAGEM

ESTRÉS LABORAL SEGÚN EL MODELO DEMANDA-CONTROL Y TRASTORNOS PSIQUIÁTRICOS MENORES EN TRABAJADORES DE ENFERMERÍA

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ABSTRACT

This was a cross-sectional study that aimed to assess the association between work-related stress according to the Demand-Control Model, and the occurrence of Minor Psychic Disorder (MPD) in nursing workers. The participants were 335 professionals, out of which 245 were nursing technicians, aged predominantly between 20 and 40 years. Data were collected using the *Job Stress Scale* and the *Self-Reporting Questionnaire-20*. The analysis was performed using descriptive and analytical statistics. The prevalence of suspected MPD was 20.6%. Workers classified in the quadrants *active job* and *high strain* of the Demand-Control Model presented higher potential for developing MPD compared with those classified in the quadrant *low strain*. In conclusion, stress affects the mental health of workers and the aspects related to high psychological demands and high control still require further insight in order to understand their influence on the disease processes of nursing workers.

DESCRIPTORS

Nursing
Stress, psychological
Burnout, professional
Occupational health
Mental disorders

RESUMO

Estudo transversal cujo objetivo foi avaliar a associação entre o estresse no trabalho, segundo o Modelo Demanda-Controle, e a ocorrência de Distúrbio Psíquico Menor (DPM) nos trabalhadores de enfermagem. Participaram 335 profissionais, sendo 245 técnicos de enfermagem, com idade predominante entre 20 e 40 anos. Os dados foram coletados utilizando-se a *Job Stress Scale* e o *Self-Reporting Questionnaire-20*. A análise foi realizada utilizando-se estatística descritiva e analítica. A prevalência de suspeição para DPM encontrada foi de 20,6%. Os trabalhadores nos quadrantes *trabalho ativo* e *alto desgaste*, do Modelo Demanda-Controle, apresentaram chances de desenvolver DPM, quando comparados com os situados no quadrante *baixo desgaste.* Conclui-se que o estresse afeta a saúde mental dos trabalhadores e que os aspectos relacionados a alta demanda psicológica e alto controle ainda necessitam de maiores aprofundamentos para que se entenda sua influência nos processos de adoecimento dos trabalhadores de enfermagem.

DESCRITORES

Enfermagem
Estresse psicológico
Esgotamento profissional
Saúde do trabalhador
Transtornos mentais.

RESUMEN

Estudio transversal cuyo objetivo fue evaluar la asociación entre el estrés laboral, según el Modelo Demanda-Control, y la aparición de Trastorno Psíquico Menor (TPM) en los trabajadores de enfermería. Participaron 335 profesionales, siendo 245 técnicos de enfermería, con edad predominante entre 20 y 40 años. Los datos fueron recolectados utilizándose la Job *Stress Scale* y el *Self-Reporting Questionnaire-20*. El análisis se realizó mediante estadística descriptiva y analítica. La prevalencia de probable TPM encontrada fue del 20,6%. Los trabajadores en los cuadrantes *trabajo activo* y *alto desgaste*, del modelo demanda-control, presentan probabilidades de desarrollar TPM, en comparación con los situados en el cuadrante *bajo desgaste.* Se concluye que el estrés afecta la salud mental de los trabajadores y que los aspectos relacionados con la alta demanda psicológica y alto control todavía necesitan de mayores conocimientos para comprender su influencia en los procesos de enfermedad de los trabajadores de enfermería.

DESCRIPTORES

Enfermería
Estrés psicológico
Agotamiento profesional
Salud laboral
Trastornos mentales

* Extracted from the course conclusion study, "Estresse no trabalho e distúrbios psíquicos menores em trabalhadores de enfermagem em um hospital universitário ", Nursing, Nutrition and Physical Therapy School, Pontifical Catholic University of Rio Grande do Sul, 2011.

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INTRODUTION

Working in healthcare can expose workers to stressful situations, due to its specific characteristics, such as routinely dealing with situations of patients' and families' suffering and, high and urgent care demand. According to the International Labor Organization (ILO), psychosocial factors are globally recognized as associated with changes in health and can affect workers from different areas[1]. Increased flexibility and job insecurity, work intensification and relationship issues in the working environment are some of the factors that have led to an increase in work-related stress[1].

However, the association between stress and health changes is not always easily found, because it should be approached not only through the biological aspects, but also through the specific and individual determinants of health/disease process[2].

In the 1970s, Robert Karasek pioneered the study of work-related stress and its effect on workers' health[3]. In order to assess these aspects, he proposed a two-dimensional model, called the Demand-Control Model (DCM), which related two variables, psychological demand and job control, to the risk of disease[3]. He qualified the demand as psychological pressures at work, both quantitative (related to time and speed in performing work) and qualitative (conflicts and contradictory demands), and control, as in the use of skills and autonomy at work. The Job Stress Scale (JSS), short version of the instrument for data collection of the DCM, has been validated in Portuguese[3].

The intersections of the high and low levels of these two dimensional results in four quadrants, called DCM quadrants. *High strain* consists of high psychological demand and low job control, and represents the highest health risk because it can lead to adverse effects such as fatigue, depression and anxiety. The *passive job* quadrant, with low psychological demand and low job control, can lead to loss of skill and disinterest in work and is considered the second quadrant most related to health issues. The *active job* quadrant, with high psychological demand and high job control, generates less harmful effects, because work is seen as a challenge. And finally, the *low strain* quadrant, with low psychological demand and high job control, is considered the *ideal situation* in which the workers are in a comfort zone to perform their work[3].

Among the diseases that affect the health of workers are the Minor Psychic Disorders (MPD), described as non-psychotic symptoms, such as insomnia, fatigue, irritability, forgetfulness, difficulty in concentrating, and somatic complaints[4].

The World Health Organization (WHO), guided by a concern with the impact of mental health disorders in developed countries, created the Self-Reporting Questionnaire (SRQ 20)[5] to assess the MPD. It is divided into four groups of prevalent symptoms: the anxious-depressive mood group, which assesses issues such as tension, worry and sadness; the somatic symptoms group, which assesses sleep quality, stomach problems, poor digestion and lack of appetite; the lack of vital energy group, which assesses fatigue, dissatisfaction, difficulty with decision making, suffering in performing work and difficulty in thinking clearly; and the depressive thoughts group, which assesses disinterest, feeling worthless and consideration of suicide[5-6].

According to a WHO estimate, MPD affects about 30% of workers[7]. Population studies conducted in the city of Pelotas (1999-2000) found the prevalence of psychological distress in 28.5%[8]. A prevalence of 24.95% MPD has been verified in peripheral areas of São Paulo[9]. Data from the State Center for Health Surveillance of Rio Grande do Sul showed that health workers made up the third largest category of notification of diseases in general (12.2%), and mental disorders that are the second largest cause of illness (9.3%)[10].

...the association between stress and health changes is not always easily found, because it should be approached not only through the biological aspects, but also through the specific and individual determinants of health/disease process.

Regarding nursing, job characteristics are based on actions interdependent of other work processes in health, strongly grounded in interpersonal relationships with other workers and service users and generally developed under high pressure (actions must be developed quickly) and work demand (heavy workload).

Taking these aspects into consideration and the high percentage of workers with MPD evidenced by WHO, it is important to investigate the relationship between work-related stress and psychological distress in nursing work, since

> levels of attention and concentration required to perform the tasks, combined with the level of pressure exerted by the organization of work can generate tension, fatigue and burnout or burnout[7].

The impact of workers' mental health issues brings important consequences for workers, organizations, society and the State, affecting the full working capacity of the individual and his social participation[11].

From these considerations, the following guiding question was designed for this study: – Is there an association between work-related stress and the occurrence of MPD in nursing workers? In order to answer this question, this study aimed to assess the association between work-related stress, according to the DCM, and the occurrence of MPD in nursing workers.

METHOD

This was a cross-sectional study in a hospital in Porto Alegre, with approximately 600 beds. The population consisted of 660 nursing workers from emergency, intensive care and units of the institution. Professionals working in the institution for less than one year (294, 44.5%), pregnant women, managers, professionals on medical or other leave, and on vacation in the last month of collection (due to the need of performing work activities in the last 30 days (SRQ-20)[5] were excluded. Three hundred sixty-six eligible workers remained. Out of those, 335 professionals agreed to participate (55 nurses, 245 technicians and 35 nursing aids). Losses (8.5%) resulted from refusals to participate.

Data were collected from October 2010 to April 2011. Workers were interviewed in situ and during working hours, through a questionnaire containing sociodemographic variables (gender, age, marital status and level of education), employment variables (job, shift, working hours, other job, and time in the same job), issues related to work stress from the JSS[3], short version of the instrument for data collection DCM by Karasek, and issues related to MPD contained in SRQ 20[5-6].

The Job Stress Scale contains five questions concerning psychological demand, and six regarding job control[3]. After verifying the normal distribution of the scores related to each dimension, the mean score of all participants was used as a cutoff, according to the theoretical framework adopted[3]. For the psychological demand, the mean was 15.22 (± 2.43) points, and 17.51 (± 2.0) points for the control. Scores ≤15 were considered low psychological demand; scores ≥16 were considered high demand; values ≤17 were considered low control and values ≥18 were considered high control.

The DCM quadrants by Karasek were established from the association of the dimensions high and low demand and low control, and classified as: active job (high demand and high control), passive job (low demand and low control), low strain (low demand and high control) and high strain (high demand and low control)[3].

For identification of MPD, the SRQ-20 was used, containing 20 questions regarding symptoms and emotional difficulties related to work and life in general within the last 30 days[5-6]. From the answers *yes* or *no* in the 20 SQR-20 questions, the score of six or more positive responses for men and eight or more for women was considered psychological distress[5-6].

For data analysis, descriptive statistics were used to characterize the workers. Continuous variables were described by measures of central tendency and dispersion (mean and standard deviation) and categorical variables as absolute (n) and relative (%) frequencies. For the association of exposure and outcome, the chi-square test with Monte Carlo simulation was used, since they are categorical variables. For the selection of potential confounders, $p < 0.25$ was adopted for the inclusion in the multivariate analysis.

In order to identify the factors significantly related to the presence of MPD, the binary logistic regression model was used. Workers with activities classified as high strain, active work and passive work were compared with those allocated in the low strain category. The measure of association was expressed as odds ratios (OR) and their respective confidence intervals (95% CI). For the adjusted logistic regression, all variables with a minimum significance level of < 0.250 in bruit logistic regression were used.

The software used for data storage was *Microsoft Excel*, and the *Statistical Package for the Social Sciences* (SPSS, SPSS Inc, Chicago) version 1.17 for Windows was used for statistical analysis. The research project was approved by the Research Ethics Committee of the Pontifical Catholic University of Rio Grande do Sul (OF. CEP. 1132/09) and a consent form was signed by all participants. The questionnaire respected the work dynamics of inpatient units to avoid interference in the work of professionals.

RESULTS

A Workers in this study (n=335) were initially assessed for sociodemographic and labor aspects (Table 1). The aspects that prevailed were female gender, ages between 20 and 40 years (mean 33.64±8.72, median 31 years, with minimum of 20 and maximum of 69 years), married and had completed high school.

Regarding labor characteristics, the inpatient units concentrated more workers (45.7%), out of which 83.6% were technicians/nursing assistants, 70.2% had worked up to seven years in the same position (average 6.7±5.7 years), 54.3% worked on the night shift and 78.2% did not have another job (Table 1).

Table 1 - Sociodemographic and labor aspects of nursing workers - Porto Alegre, RS, October 2010 to April 2011

Variables	n (%)
Gender	
Male	106 (31,6)
Female	229 (68,4)
Age	
20 - 40	266 (79,4)
>41	69 (20,6)
Marital status	
Married or lives in stable union	198 (59,1)
Separated or divorced	40 (11,9)
Widow(er)	5 (1,5)
Single (never married or lived in union)	92 (27,5)
Education	
Completed elementary schoold	4 (1,2)
Incomplete secondary school	260 (77,6)
Higher education	38 (11.3)
Lato sensu graduation	30 (9,0)
Stricto sensu graduation	3 (0,9)

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Variables	n (%)
Sector	
Emergency units	61 (18,2)
Intensive care units	121 (36,1)
Units	153 (45,7)
Role	
Nurse	55 (16,4)
Nursing technician	245 (73,1)
Nursing assistant	35 (10,5)
Time in the job	
< 7 years	235 (70,2)
8 - 14 years	57 (17,0)
>15 years	43 (12,8)
Shift	
Day	153 (45,7)
Night	182 (54,3)
Other job	
No	262 (78,2)
Yes	73 (21.8)

Table 2 shows that similar percentages among workers with high and low psychological demands and high and low job control. Regarding the quadrants, there was a slight predominance of active jobs (30.4%), while for others the distribution was close, between 21 and 25%, approximately.

Table 2 - Frequency in the dimensions and in the quadrants of the Job Demand-Control Stress Scale - Porto Alegre, RS, October 2010 to April 2011

Variables	n (%)
Psychological demand	
High	175 (52,2)
Low	160 (47.8)
Job Control	
High	178 (53,1)
Low	157 (46,9)
Demand-Control Quadrants	
Low Strain	76 (22,7)
Passive Job	84 (25,1)
Active Job	102 (30,4)
High Strain	73 (21.8)

Table 3 provides an overview of the answers to SRQ 20. Psychological distress prevailed in 20.6% of the workers. In the individual analysis of each question, there was a predominance of affirmative answers to the question *feels nervous, tense or worried*, related to depressive-anxious mood, followed by questions *sleeps badly* and *often has headaches*, related to somatic symptoms.

Table 3 - Frequency of answers to SQR20 questions of nursing workers - Porto Alegre, RS, October 2010 to April 2011

SRQ 20 Factors	NO	YES
Lack of energy		
Is easily tired	252 (75,2)	83 (24,8)
Finds it difficult to make decisions	299 (89,3)	36 (10,7)
Feels tired all the time	242 (72,2)	93 (27,8)

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SRQ 20 Factors	NO	YES
Lack of energy		
Finds it difficult to enjoy daily activities	243 (72,5)	92 (27,5)
Has trouble thinking clearly	287 (85,7)	48 (14,3)
Daily work is suffering	298 (89,0)	37 (11,0)
Somatic symptoms		
Has uncomfortable feelings in the stomach	226 (67,5)	109(35,5)
Often has headaches	183 (54,6)	152(46,4)
Sleeps badly	174 (51,9)	161(48,1)
Poor digestion	245 (73,1)	90 (26,9)
Hands shake	291 (86,9)	44 (13,1)
Has poor apetite	317 (94,6)	18 (5,4)
Depressive/anxious humor		
Feels nervous, tense or worried	150 (44,8)	185(55,2)
Is easily frightened	283 (84,5)	52 (15,5)
Has felt unhappy lately	235 (70,1)	100(29,9)
Has cried more than usual	290 (86,6)	45 (13,4)
Depressive thoughts		
Has lost interest in things	276 (82,4)	59 (17,6)
Is unable to play a useful part in life	325 (97,0)	10 (3,0)
Feels worthless	331 (98,8)	4 (1,2)
Has had the thought of ending own life	319 (95,2)	16 (4,8)
MPD presence	266 (79,4)	69 (20,6)

The sociodemographic variables were not associated with the occurrence of MPD. As for the labor variables, the labor sector was associated with MPD, evidencing significant difference among the groups (p=0.006 and p=0.003, respectively). When the demand-control quadrants were analyzed, workers classified as high strain and active job, there was an association with psychological distress (p <0.001) (Table 4).

Table 4 - Association of sociodemographic variables, labor and the Demand-Control Quadrants, with DPM - Porto Alegre, RS, October 2010 to April 2011

Variables	Without MPD	With MPD	*P*
Gender			
Male	85 (80,2)	21 (19,8)	0,740*
Female	180 (78,6)	49 (21,4)	
Age			
20 - 40 years	209 (78,6)	57 (21,4)	0,638*
>41 years	56 (81,2)	13 (18,8)	
Education			
No higher education	208 (78,8)	56(21,2)	0,783*
Higher education/ Graduation	57 (80,3)	14 (19,7)	
Sector			
Emergency units	49 (80,3)	12 (19,7)	
Intensive units	106 (87,6)	15 (12,4)	0,006*
Units	110 (71,9)	43 (28,1)	
Job			
Nurse	45 (81,8)	10 (18,2)	
Technician/Nursing assistant	220 (78,6)	60 (21,4)	0,588*

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Variables	Without MPD	With MPD	*P*
Time in the job			
< 7 years	180 (76,6)	55 (23,4)	
8 - 14 years	49 (86,0)	8 (14,0)	0,215*
> 15 years	36 (83,7)	7 (16,3)	
Shift			
Day	117 (76,5)	36 (23,5)	0,277*
Night	148 (81,3)	34 (18,7)	
Other job			
No	208 (79.4)	54 (20.6)	0.808*
Yes	57 (78.1)	16 (21.9)	
Demand-Control Quadrants			
Low Strain	69 (90,8)	7 (9,2)	
Passive Job	76 (90,5)	8 (9,5)	0,000*
Active Job	74 (72,5)	28 (27,5)	
High Strain	46 (63,0)	27 (37,0)	

* Pearson's Chi-quare

Table 5 presents the results of the adjusted analysis among the quadrants of the MDC and DCM. Workers allocated in the quadrants active job and high strain presented 3.5 and 4.7 chances higher for the development of MPD, respectively, when compared to the ones classified in the quadrant low strain, even after adjustments for the potential confounding factors (job sector and time in the job).

Table 5 - Multivariate analysis of demand-control quadrants and MPD - Porto Alegre, RS, October 2010 to April 2011

Study variables	MPD		
	OR	IC – 95%	*p*
Quadrants D-C			
Low Strain*	1,0	.....	
Passive Job	1,020	0,345 – 3,017	0.972
Active Job	3,528	1,431 - 8,697	0.006
High Strain	4,778	1,888 - 12,091	0.001
Job sector			
Emergency Unit*	1,0	.....	
Intensive Unit	0,704	0,296 - 1,674	0.427
Unit	1,641	0,770 - 3,497	0.200
Time in the job			
< 7 years*	1,0	.....	
8 - 14 years	0.647	0.276 - 1.513	0.315
> 15 years	0.740	0.292 - 1.877	0.526

* Reference categories. Adjusted regression for the sector and time in the job.

DISCUSSION

The results of this study evidenced a prevalence of 20.6% of MPD in nursing workers and positive association between MPD (SRQ20) and job stress (DCM).

In a study performed with basic health workers in Botucatu, the prevalence of MPD was 42.6%[12]. It was even higher in an investigation conducted with public school teachers in Bahia (55.9%)[13]. Other studies with nursing staff, one in Rio Grande do Sul and one in Bahia, found MPD prevalence of 18.7%[14] and 33.3% [15], respectively.

Regarding the SRQ 20 questions, the depressive-anxious mood category (especially *feels nervous, tense or worried*) and somatic symptoms (*sleeps badly* and *often has headaches*) were the most prevalent in the option *yes*. Questions related to depressive thoughts had the lowest prevalence. Another study also found similar results[13].

In the lack of energy group, the percentages related to each question did not surpass 27%, and the specific question related to suffering at work was between the SRQ 20 lowest percentages. In a study with nursing workers, it was found that the coping strategies created by the workers characterized the survival relationship of the individual in unfavorable situations of work, representing an important protective factor for the health of nursing professionals within the context of the work studied[16].

The aspect above, in this and in that study, may portray versatility of the worker seeking strategies to cope with possible situations of suffering/stress[17] such as "creative suffering", reinforcing the focus on caring for patients and their families, which may contribute to the higher prevalence in almost all questions of the somatic symptoms group.

However, aspects prevalent in this study, like those in the categories of depressive-anxious mood and somatic symptoms, must be problematized and their consequences discussed in the process of daily work of professionals. Headaches and poor sleep can impair attention required in the care process and contribute to the occurrence of incidents that compromise patient and worker safety. Moreover, due to the relational nature of nursing work, they can produce irritability and generate conflicts and interpersonal difficulties with other team members, managers, users and their families. These aspects are undervalued daily and in assessments of adverse events that frequently occur in nursing care.

As for job stress, nursing workers are predominantly in active and passive jobs. In two other studies with nursing workers that aspect was also assessed. In the first[14], there was a prevalence in the passive job quadrant (29.9%), followed by active job (28.5%), and lower prevalence in high strain (21.2%). In the second study[18], a higher prevalence of workers in passive jobs (35.6%) was found, followed by low strain (26.5%), and also higher prevalence of the quadrant high strain, around 21%.

Regarding the assessment of the association of MPD occurrence with the variables in this study, an association of the work sector (primarily inpatient units) and the demand-control quadrants (mainly from active job)

was found in the initial statistical evaluation. However, when the statistical analysis was enhanced by using logistic regression, only the demand-control quadrants remained associated, demonstrating that the chances of occurrence of MPD are higher in the quadrant high strain, which reinforces the indications of the authors of the DCM model about this quadrant being the highest health risk[3].

Other studies have also conducted this analysis. In a study with health workers, there was an association of the quadrants with MPD occurrence; out of the workers who were in the high strain quadrant, 64.4% had MPD and, of those in the quadrant active job, 43.2% had MPD[12].

Another study with municipal teachers in Santa Vitória da Conquista (Bahia) showed higher prevalence of PMD in teachers classified in the high strain quadrant (77.8%), followed by those classified in active job (62.4%) and passive job (51.8%). The study also evidenced nearly twice as high of a chance of MPD development in teachers allocated in these quadrants when compared to those in the quadrant low strain[13].

Corroborating data from this research, a study with nursing workers who sought to elucidate the aspects above found an association ($p < 0.05$) of the quadrants of high train (OR=4.6, IC=2.45 to 8.82) and active iob (OR=2.78, IC=1.40 to 5.51) with the MPD[15]. Another study with the same population revealed, after logistic regression, that workers in high strain quadrant also had increased chances of developing MPD by 2.76 times (95% IC=1.21 to 6.27) compared to those who were in the low strain quadrant[14].

Active job is considered by the DCM authors as a quadrant with little association with workers' health problems[3]. However, this finding deserves consideration because, given the healthcare demands and strong commitment with care actions, workers allocated in this quadrant have psychological distress, although they consider that they have opportunities for learning, decision making and autonomy among other aspects, characteristic dimension of high job control.

This has been analyzed in the combination of two models of work-related stress (demand-control and effort-reward imbalance) and self-reported health by nursing workers. There were more chances for the health status self-reported as bad when the worker had excessive commitment to work, regardless of age, education, type of employment contract or number of jobs[19].

It must also be considered that the activities of health professionals are strong generators of tension due to long working hours, limited number of professionals and psycho-emotional strain in the tasks performed in a hospital setting. This strain can

> approach psychic suffering, by potentializing the exposure to psychic charge and not by living with the object of work (...), but by the work conditions in which these nursing workers are inserted[20].

The association of the active job quadrant with MPD needs to be analyzed, since workers perceive themselves to have high demands, but also high job control. The findings of this study evidence that high control was not effective in reducing the effects of high psychological demands on workers. This aspect was also noted in another study[15].

The findings of this study, which are also reinforced in similar publications, bring subsidies relevant for discussions and reflections to be performed in order to envision strategies to minimize the occurrence of worker health problems in general and, more specifically, among nursing workers. There is the need to implement programs to support worker health, in order to minimize the effects of stress on the health status of nurses from the identification of signs and symptoms[21]. Exposure to psychic burden impacts psychic and emotional health, harming rationality, social and physical well-being[22], among others.

CONCLUSION

It is considered that, within the limitations intrinsic to the cross-sectional study, which does not allow conclusion about causal relationships, the results observed help reinforce some of the findings of other studies, consolidating the theoretical approach adopted.

It was evidenced that 20.6% of the nursing workers had suspected MPD, and that this is associated with work-related stress. The survey revealed that workers allocated in high strain and active job quadrants are more likely to develop MPD when compared to the low strain quadrant.

It should be noticed that the active job is a quadrant considered to have extensive professional autonomy and beneficial psychological effects. This finding requires more extensive investigations in order to understand other aspects that may interfere with or enhance the effects of psychological demands and worker job control, such as, for example, gravity/patient dependence, staffing levels, styles of leadership, conflicting relationships, among others, expanding the discussion to intrinsic aspects of nursing work that can contribute to the establishment of mental health problems of nursing workers.

Based on the results achieved, although focused on a group of workers at a single institution, the percentage of MPD and its relationship with job stress should be analyzed by professionals and institutional managers, in order to learn, reflect and identify the implications of these results in the performance and job satisfaction, the preservation of patient and worker safety.

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