Occupational stress and self-rated health among nurses

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Objective: To analyze the association between job stress and self-rated health among nurses in public hospital emergency units. Methods: This is a cross-sectional study undertaken through the administration of a self-administered questionnaire in a sample of 134 health professionals, using the brief version of the Job Stress Scale. Descriptive analyses of the socio-demographic, health and work variables were undertaken, as was multivariate analysis through unconditional logistic regression for adjustment of the association between job stress and poor self-rated health, in accordance with potential confounding variables, with a level of significance of 5%. Results: 70% of the interviewees were classified as passive workers or as with high strain. Poor self-rated health was significantly greater among health professionals with high demand and low control, compared to those with low strain, after adjusting for co-variables. Conclusions: Low control, allied with low demand, can serve as a demotivating factor, contributing to the increase in professional dissatisfaction. It is recommended that institutions should adopt a policy of planning and managing human resources so as to encourage the participation of health professionals in decision-making, with a view to reducing job stress among nurses.

Descriptors: Health Status; Burnout, Professional; Occupational Health; Nursing.

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Introduction

Work performs an important role in individuals' social lives, providing the support of a regular income, opportunities and personal growth, social identity and self-esteem, but can have consequences for the worker's health.

Various approaches have been developed for evaluating the impact of workplace stress on health[1-2]. These include the demand/control model, which emphasizes that the imbalance between the psychological demands and the control over the process results in strain and loss of skills and interest, affecting the worker's health[3].

Self-rated health is increasingly-used as an indicator in Brazilian and international epidemiological studies as a proxy for the "real" or "objective" state of health, and consistently predicts the individual's mortality and decline in functional health. Various studies have shown the association between socio-economic condition and the presence of chronic illnesses with self-rated health, but few have considered work conditions in this relationship[4-7]. It is necessary, therefore, to investigate how relationships between staff and staff, and between staff and the work environment influence the health-illness process, incorporating the worker's point of view.

This study's objective is to analyze the association between job stress, using the Job Stress Scale, and self-rating of health among nursing staff in public hospital emergency units.

Methods

This cross-sectional study was carried out in 2010 in the city of Campo Grande, capital of the state of Mato Grosso do Sul. The study's target population was made up of 169 health professionals from the nursing team (registered nurses, nurse technicians, nurse assistants), of both sexes, belonging to the workforce of nine public health units which attend emergency cases 24 hours/day. Employees seconded to other institutions and those on leave of absence for non-health-related or health-related reasons for over six months were excluded. The study's final population was made up of 134 nursing personnel.

A self-administered questionnaire was used, provided in individualized and sealed envelopes. These were filled out during work hours in the workplace, after the signing of the Terms of Free and Informed Consent. They addressed socio-demographic, health and work matters, and included questions about job stress, based on the concept of demand/control found in the brief version of the Job Stress Scale, previously translated and validated for Brazil[4].

The JSS scores were obtained by summing the points attributed to each of the questions in each dimension (5 questions for the 'demand' dimension, and 6 for the 'control' dimension). For defining the 'exposure to stress' quadrant (the exposure variable) according to the four dimensions established by the demand/control model, the median of the scores was used, forming two dimensions for demand, and two for control (high/low demand, and high/low control) in line with the following values:

- Median of the demand dimension: 16, with values between 5 and 16 considered low scores, and 17 to 20 high;
- Median of the control dimension: 17, with values between 6 and 17 considered low scores, and 18 to 24, high;

The classification resulting from the combination of these four dimensions formed the four quadrants which follow: high strain (high demand/low control); active work (high demand/high control); passive work (low control/low demand); and low strain (high control/low demand).

The dependent variable 'self-rated health' was obtained using the question "*In a general way, compared with people your age, how do you consider your own state of health?*" with five response options: very good, good, moderate, poor, or very poor. In the analysis, the responses were grouped in two categories – positive (very good and good) and negative (moderate, poor, very poor).

The co-variables selected for the study were based in a review of the literature concerning the association between job stress and self-rated health, taking into account potential confounding factors, and were grouped according to socio-demographic, health and occupational characteristics. The calculation for the 'social support' score was obtained by summing the six items, which could vary from 6 to 24; the higher the score, the greater the worker's social support in their work environment. The social dimension's median was 17, with scores below that being considered low, and scores equal to or greater than 18, high.

First of all, the authors proceeded to the descriptive analysis of the socio-demographic, health and work-related characteristics. Next, the homogeneity of the distribution of the proportions of the co-variables in the quadrants of the demand/control model and self-rating of health was analyzed, using the Chi-squared test. In the multi-variate analysis, variables associated with both exposure and outcome with a significance level of up to 10% and/or because they had been shown to be strongly associated as described in the literature were selected as adjustment variables. The multivariate logistic regression procedure was used for adjusting the association between job stress and negative self-rated health, in accordance with the potential confounding variables. The measurement of association used was the odds ratio and the respective confidence intervals of 95%. The variables were inserted one by one, observing the variation within the measurements of effect following the introduction of each variable and their statistical significance. The statistical package SPSS® version 13.0 (Statistical Package for Social Sciences for Windows – Chicago, IL, USA) was used for analysis of the data.

The study was approved by the National School of Public Health's (ENSP/FIOCRUZ) Research Ethics Committee under protocol n° 16/10 and CAAE 0030.0.031.000-10 and the employees who presented the highest exposure to occupational stress were individually informed of the fact.

Results

The distribution of the 134 participants by professional category revealed that 12 (9.0%) were nurse assistants, 21 (15.7%) were registered nurses and 101 (75.4%) were nurse technicians. In relation to the characteristics of the study population, (Table 1), the majority were female (69.9%), aged below 35 (40.2%), Caucasian (61.2) and had a per capita family income of less than 1.5 minimum salaries (MS) (53.9%). It was observed that the majority of the workers had completed senior high school (71.6%), resulting from the composition of the study population itself, and that among the nurse technicians and nurse assistants, 66.7% had completed university.

Concerning the characteristics related to health, just over half of the workers (55.2%) stated that they had not been medically diagnosed with a chronic illness. Positive self-ratings of health predominated (77.6%) among the interviewees.

Table 1 – Socio-demographic, health- and work-related characteristics among the nurses in the emergency units – Campo Grande, Mato Grosso do Sul, Brazil, 2010

Variable/Category	n	%
Sex		
Female	93	69.9
Male	40	30.1
Age range (years)		
< 35	53	40.2
35 to 44	41	31.1
≥ 45	38	28.8
Race		
White	82	61.2
Mixed/Black	52	38,8
Educational level		
Up to senior high school complete	96	71.6
Completed university	18	13.4
Post-graduate	20	15.0
Per capita income (MS)		
< 1.5	69	53.9
1.5 to 3.4	43	33.6
≥ 3.5	16	12.5
Marital situation		
Married	88	65.7
Single	24	17.9
Divorced/separated/widowed	22	16.4
Diagnosis of chronic illness		
Yes	60	44.8
No	74	55.2
Self-rating of health state		
Positive	104	77.6
Negative	30	22.4
Time in institution		
< 5 years	56	42.7
5 to 10 years	26	19.8
> 10 years	49	37.4
Years doing night shift		
< 5 years	38	30.2
≥ 5 years	88	69.8
Overtime, in on-call shifts/week		
< 12 h	12	9.3
12 to 36 h	100	77.5
>36 h	17	13.2
Job satisfaction		
Satisfied	98	74.8
Not satisfied	33	25.2
Satisfaction with life		
Satisfied	115	88.5
Not satisfied	15	11.5
Social support		
High	65	48.9
Low	68	51.1
Demand score		
High	57	42.5
Low	77	57.5

(continue...)

Table 1 - (continuation)

Variable/Category	n	%
Control score		
High	40	29.9
Low	94	70.1
Stress at work		
Low strain	26	19.4
Active work	14	10.4
Passive work	51	38.1
High strain	43	32.1

The majority of the interviewees had been in their institution for less than five years (42.7%) and nearly all (96.3%) emphasized doing on-call night shifts, 69.8% of whom for a period exceeding five years, making up an additional 12 to 36 hours in on-call shifts per week in 77.5% of the cases. It was seen that the great majority is satisfied with the work (74.8%) and with life (88.5%); however, half mentioned low social support (51.1%). In relation to the characteristics related to the demand and control dimensions, the majority of workers had low demand at work (57.5%) and low control (70.1%), constituting the majority of passive workers (38.1%).

Table 2 shows that passive work predominates among the women (43.0%) and high strain among the men (32.5%). Work with high strain predominates among the younger staff (below 35 years of age) (43.4%), while passive work predominates for the other age ranges (p = 0.005). The combination of low demand and low control was most frequent among workers with a family income of up to 3.4 minimum salaries, educated up to university level, or who had a chronic illness. Work with high strain, on the other hand, occurred among those with higher income, more schooling and who were single, although no statistically-significant differences were perceived in any of the variables cited.

The analysis of the work variables showed that high strain was greater among those who had been in their institution for less time. On the other hand, among those who mentioned more time doing on-call night shifts and extra weekly on-call hours, irrespective of hours worked, there was a significant association with passive work. Dissatisfaction with the work and low social support were associated with high strain at work, but significant differences among the categories of occupational stress were not observed relating to satisfaction with life.

Table 2 – Socio-demographic health- and work-related characteristics of the nursing personnel in the emergency units according to quadrants of Karasek Job Stress Scale – Campo Grande, Mato Grosso do Sul, Brazil, 2010

Variables/Categories	Low strain		Active work		Passive work		High strain		p
	n	%	n	%	n	%	n	%	
Sex									
Female	18	19.4	6	6.5	40	43.0	29	31.2	0.084
Male	8	20.0	8	20.0	11	27.5	13	32.5	
Age range (years)									
< 35	10	18.9	6	11.3	14	26.4	23	43.4	0.005
35 to 44	9	22.0	8	19.5	14	34.1	10	24.4	
≥ 45	7	18.4	0	0.0	23	60.5	8	21.1	
Race									
White	19	23.2	7	8.5	30	36.6	26	31.7	0.491
Mixed/black	7	13.5	7	13.5	21	40.4	17	32.7	
Educational level									
Senior high school	17	17.7	8	8.3	41	42.7	30	31.3	
Completed university	4	22.2	1	5.6	7	38.9	6	33.3	0.182
Post-graduate	5	25.0	5	25.0	3	15.0	7	35.0	
Per capita income (MS)									
< 1.5	13	18.8	8	11.6	27	39.1	21	30.4	
1.5 to 3.4	6	14.0	4	9.3	21	48.8	12	27.9	0.267
≥ 3.5	3	18.8	2	12.5	2	12.5	9	56.3	
Marital situation									
Married	18	20.5	11	12.5	39	44.3	20	22.7	
Single	4	16.7	1	4.2	6	25.0	13	54.2	0.077
Divorced/separated/ widowed	4	18.2	2	9.1	6	27.3	10	45.5	
Diagnosis of chronic illness									

(continue...)

Table 2 - (continuation)

Variables/Categories	Low strain		Active work		Passive work		High strain		p
	n	%	n	%	n	%	n	%	
No	18	24.3	12	16.2	19	25.7	25	33.8	0.003
Yes	8	13.3	2	3.3	32	53.3	18	30.0	
Time in the institution									
<5 years	13	23.2	10	17.9	16	28.6	17	30.4	
5 to 10 years	4	15.4	3	11.5	10	38.5	9	34.6	0.136
>10 years	9	18.4	1	2.0	24	49.0	15	30.6	
Years doing on-call night shifts									
< 5 years	10	26.3	7	18.4	9	23.7	12	31.6	0.044
≥ 5 years	16	18.2	5	5.6	38	43.2	29	33.0	
Extra hours, on-call/week									
<12h	4	33.3	2	16.7	4	33.3	2	16.7	
12 to 36 h	18	18.0	11	11.0	37	37.0	34	34.0	0.783
>36 h	4	23.5	1	5.9	6	35.3	6	35.3	
Satisfaction with work									
Satisfied	23	23.5	11	11.2	37	37.8	27	27.6	0.029
Not satisfied	1	3.0	3	9.1	13	39.4	16	48.5	
Satisfaction with life									
Satisfied	21	18.3	13	11.3	47	40.9	34	29.6	0.129
Not satisfied	2	13.3	1	6.7	3	20.0	9	60.0	
Social support									
High	18	27.7	6	9.2	27	41.5	14	21.5	0.022
Low	8	11.8	8	11.8	23	33.8	29	42.6	

Table 3 shows that statistically-significant differences were not observed between the socio-demographic variables and self-rating of health. However, this is worse among those with a chronic illness. (p=0.000). In relation to the work variables, the behavior was fairly similar between the various categories, whether time in the institution, years doing on-call night shifts or extra hours doing on-call shifts per week, with a positive self-rating of health predominating. However, the workers who were satisfied with work and health, and who mentioned high social support, presented significantly better evaluations of their own health.

The variables 'diagnosis of chronic illness', 'satisfaction with work' and 'social support' were associated as much with exposure (job stress) as with the outcome (self-rated health) with significance of less than 10% in the bivariate analysis, and were selected for the adjustment of the multivariate model. The variable 'age' was included, even though it did not present statistical significance, due to its relationship with both self-rated health and job stress, as described in the literature.

Table 3 – Socio-demographic, health- and work-related characteristics of the nursing personnel of the emergency units, according to self-rated health – Campo Grande, Mato Grosso do Sul, Brazil, 2010

Variables/Categories	Self-rated health				p
	Positive		Negative		
	n	%	n	%	
Sex					
Female	72	77.4	21	22.6	0.741
Male	32	80.0	8	20.0	
Age range (years)					
< 35	41	77.4	12	22.6	
35 to 44	34	82.9	7	17.1	0.604
≥ 45	28	73.7	10	26.3	

Table 3 - (continuation)

Variables/Categories	Self-rated health				p
	Positive		Negative		
	n	%	n	%	
Race					
White	68	82.9	14	17.1	0.063
Mixed/black	36	69.2	16	30.8	
Educational level					
Senior high school	73	76.0	23	24.0	
Completed university	14	77.8	4	22.2	0.682
Post-graduate	17	85.0	3	15.0	
Per capita income (MS)					
< 1.5	55	79.7	14	20.3	
1.5 to 3.4	31	72.1	12	27.9	0.643
≥ 3.5	12	75.0	4	25.0	
Marital situation					
Married	70	79.5	18	20.5	
Single	16	66.7	8	33.3	0.355
Divorced/separated/widowed	18	81.8	4	18.2	
Diagnosis of chronic illness					
No	82	86.3	13	13.7	0.000
Yes	22	57.9	16	42.1	
Time in institution					
< 5 years	43	76.8	13	23.2	0.934
5 to 10 years	20	76.9	6	23.1	
>10 years	39	79.6	10	20.4	
Years spent doing on-call night shifts					
< 5 years	30	78.9	8	21.1	0.730
≥ 5 years	67	76.1	21	23.9	
Overtime in on-call shifts/week					
<12 h	8	66.7	4	33.3	0.622
12 to 36 h	79	79.0	21	21.0	
> 36 h	13	76.5	4	23.5	
Satisfaction with work					
Satisfied	80	81.6	18	18.4	0.033
Not satisfied	21	63.6	12	36.4	
Satisfaction with life					
Satisfied	94	81.7	21	18.3	0.002
Not satisfied	7	46.7	8	53.3	
Social support					
High	57	87.7	8	12.3	0.009
Low	47	69.1	21	30.9	

In the various multivariate models analyzed, not adjusted and controlling for the confounding variables, it was observed, systematically, that the workers submitted to all types of job stress, when compared with those with low strain or "relaxed", had higher chances of poor self-rated health (Table 4). Despite the strength of the positive association found between outcome and exposure in the four models analyzed, only those workers submitted to high strain showed significantly different values. Although a reduction in the strength of the association is observed with the introduction of the control variables, it remained significant until the variable 'satisfaction at work' was introduced (Model 3). Workers submitted to work with high demand and low control presented a chance 5.3 times higher of negative self-rated health when compared to those classified with work with high control and low demand. Analysis controlled by the variable 'social support', reduced the strength of the association for all of the categories of exposure, and, despite maintaining a strong association (OR=4.303) with work with high strain, lost statistical significance.

Table 4 – Association between negative self-rated health and job stress, among nursing personnel in the emergency units – Campo Grande, Mato Grosso do Sul, Brazil, 2010

Model	Demand-control quadrants	OR	CI 95%
Model 1 – Not adjusted	Low strain	1	-
	Active work	2.000	0.250 – 15.991
	Passive work	2.571	0.513 – 12.892
	High strain	7.846	1.638 – 37.589
Model 2 = Model 1 + Age + Chronic illness	Low strain	1	-
	Active work	2.366	0.286 – 19.584
	Passive work	2.038	0.391 – 10.630
	High strain	7.119	1.439 – 35.213
Model 3 = Model 2 + Satisfaction with work	Low strain	1	-
	Active work	2.034	0.241 – 17.192
	Passive work	1.517	0.279 – 8.232
	High strain	5.297	1.028 – 27.299
Model 4 = Model 3 + Social Support	Low strain	1	-
	Active work	1.713	0.199 – 14.772
	Passive work	1.271	0.225 – 7.177
	High strain	4.303	0.814 – 22.734

Discussion

The influence on health of psycho-social factors and of the organization of work has increasingly been the object of study, given the recognition of its relationships with workers' well-being and quality of life. Studies with distinct methodological approaches and among widely differing occupations have consistently revealed the association of the worst conditions of work with physical and emotional symptoms and health in general[8-11].

Among nursing personnel in particular, different factors are related to occupational stress, including overloading of work, conflicts in the work environment, ambiguity in carrying out tasks, failure to recognize skills, and experiences of aggression, all of which have direct effects on physical and mental health[12].

Various scales are currently used for evaluating occupational stress, with that based in the demand-control model[1] and the effort-reward model[13] standing out. Although using different approaches, both show a positive association between occupational stress and various health events, particularly among nursing staff[14-15].

In this study, the authors used the demand-control methodology[1], which has as its theoretical assumption that the work undertaken in conditions of low control and high demand (high strain) and low control and low demand (passive work) is prejudicial to health. In agreement with this theory, the present study's results indicated a positive association between highly-demanding work and a worse evaluation of health, even after adjusting for the confounding variables.

A study carried out among nurses in the city of Rio de Janeiro tested the two models for their ability to measure occupational stress, and its results showed that, irrespective of the model used, a strong association was observed between self-rated health and job stress[15]. Similarly, research undertaken with nurses in a large Chinese city showed strong predictive power for both models with high levels of burnout[16].

Exposure to more detrimental levels of stress, with a higher proportion of high strain and passive work, indicates that the majority of professionals investigated were at risk of falling ill as a result of their occupational situation.

In the present study, the variables which were most directly related to work characteristics, such as time in the institution or undertaking on-call shifts, were not associated with job stress, nor with worse self-rating of health – a fact also reported in a study of nurses in Greece[17]. The most important factors in explaining the association of interest were dissatisfaction with work and low social support. The impact of low social support on the triggering of stress at work, along with its repercussions on health, has already been demonstrated in a study of nurses in a hospital in the south of Brazil, indicating the importance of a harmonious working environment in the prevention of occupational stress[18].

Work satisfaction is among the factors indicated as reducing occupational stress, being a determinant for a worker remaining in the job, for lower staff turnover and lower institutional costs, also ensuring better performance of activities[19]. A study on job stress among

nurses in emergency units in a hospital in Spain also observed that the greater the satisfaction with work, the better the perception of one's own health[20].

Among the main motivational factors in the nurse's work, the following stand out: liking what one does, offering quality care, having a good multiprofessional relationship, having the possibility of professional growth, having the power to resolve issues, and the work conditions themselves[21-22]. Thus, in situations of low autonomy and support in the face of decisions made, the impact of stressing factors on health becomes high. Increase of control over work has direct and indirect positive effects on the worker's health, being associated with better evaluation of health and lower levels of stress[23].

The authors believe that the present work contributes by reinforcing the findings of other research previously cited[18-20] on the importance of satisfaction with work and of social support in preventing occupational stress. The results found show that the work management model used in the institutions studied may have a determinant role in the high levels of stress detected, and that these findings may be extrapolated to other public health institutions with the same type of attendance. It therefore becomes necessary to discuss the nursing team's working conditions in the emergency units, so as to implement actions aimed at preventing or minimizing the problems found. The authors believe that effective measures must include not only individual strategies for changing behavior, but also, and principally, organizational changes aimed at permitting greater satisfaction in the work environment. For this reason the authors detect the need for intervention in three distinct areas: professional training, renewal of organizational models, and on-going monitoring of work satisfaction.

Finally, the authors highlight some of this research's limitations. Because it is a cross-sectional study it shows a snapshot both of the exposure and the outcome, which situation is especially relevant in the case of occupational studies, as a result of the Healthy Worker Effect, which may provide an image which is excessively positive in relationship to the reality. It was sought to minimize systematic errors of selection through the inclusion of all the nursing staff working in the emergency units, plus those on leave due to illness for less than six months. Another factor which must be taken into account is that the 'self-rated health' variable may be influenced by memory bias or by socially-acceptable responses. The decision to use a self-administered questionnaire

was taken with the aim of minimizing the effects of the latter. In spite of the limitations imposed by the study's design, the results were shown to be coherent with the literature, showing the importance of work conditions for nursing personnel's health situations.

Conclusions

This study demonstrated the importance of factors related to the working environment as potential sources of job stress among nurses. Individual characteristics were less expressive in explaining the phenomenon. It is concluded that low control, allied with low demand, can be a discouraging factor, contributing to professional dissatisfaction. The development of an effective policy for planning and managing human resources, encouraging the health professionals' participation in decisions, can contribute to reducing stress at work, with an increase in the general effectiveness of the health system and improvement in results - both for those providing the assistance and for the service users.

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