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SHORT REPORT

Stress perception among employees in a French University Hospital

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Background Nantes University Hospital comprises 20 activity sectors.

Aims To investigate the role of the work environment at the individual level, as well as the workplace level, in explaining the variability in employees' perception of stress.

Methods A self-administered enhanced Karasek Job Content Questionnaire was sent to employees. The main variables were the psychological job demand (PJD) score and the job decision latitude (JDL) score. Univariate and multivariate logistic regression analyses were conducted to estimate crude odds ratio (OR) and adjusted OR.

Results One thousand eight hundred and sixty-eight workers were included. Nursing managers (25.9 ± 3.4), non-specialized nurses (25.6 ± 3.5) and physicians (25.3 ± 3.4) had the highest PJD. Cleaning staff (61.4 ± 11.4) and nurse aides (63.6 ± 8.8) had the lowest JDL. Items correlated with high PJD are: unacceptable work schedule, adjusted OR 2.16 (95% CI = 1.3–3.5); unsatisfactory workstation accessibility, OR 1.92 (95% CI = 1.1–3.2); getting from A to B, OR 1.67 (95% CI = 1.2–2.4); and heavy manual handling, OR 1.62 (95% CI = 1.1–2.3). Sleeping tablet use was linked to high PJD ($P < 0.01$), extra workload ($P < 0.05$) and tiredness ($P < 0.05$). Use of painkillers was correlated with musculoskeletal disorders ($P < 0.05$).

Conclusions Our study highlighted women >40 years old, nurse managers, physicians, permanent and/or full-time workers having a high PJD. Nursing aides, medical secretary and nurses presented with high strain. Better control measures should be implemented for those socioprofessional categories to improve prevention measures. This study should be repeated in the future with a multi-centre approach to determine the generalizability of the findings.

Key words Health care workers; hospital; Karasek; stress.

Introduction

With increasing globalization and rising competition between the private and state sectors, stress has become an increasingly important occupational health problem. In France, the public hospital sector has developed since from 2003 a pricing system linked to the activity of hospital departments. Nantes University Hospital was the first public French health care establishment to develop a business activity organized ~20 activity sectors (ASs), such as anaesthesia and intensive care, dentistry, geriatric care, public health and occupational medicine, etc. Each AS was given the objective to balance its budget. There are currently many reports in France about stress and particularly on the issue of suicide at work in the private sector (France Telecom) but there are no data about stress perception in French University Hospitals. The aim of this study was to investigate the role of the work environment at the individual level, as well as the workplace level, in explaining the variability in employees' perception of stress.

Methods

We conducted an investigation using a self-administered questionnaire across all AS taking into account of previous data [1]. The psychological job demand (PJD) score and the job decision latitude (JDL) score were established

according to Karasek *et al.* [2] and Niedhammer *et al.* [3]. Reliability and internal consistency were validated by Cronbach's alpha coefficient for all sub-scales. A steering committee involving the university hospital management, engineers and public health and occupational medicine staff drew up a self-administrated questionnaire targeting occupational hazards and the main psychological factors encountered. The workplace health and safety committee (WPHSC), in accordance with the French labour law, approved the study protocol.

Data were analysed with ASS/STAT 8.2 and SPSS 13.0 by Spearman rank correlation, odds ratio (OR) and adjusted OR method. Univariate and multivariate analyses were performed on subgroups with high PJD (Table 1) and high JDL (Table 2).

Results

One thousand eight hundred and sixty-eight health care workers (HCWs) (55%) answered the questionnaire, with a 78% response rate among women. Mean age was 39.6 ± 10 years. Mean work seniority at the hospital was 9.3 ± 10.1 years. Permanent/temporary employment ratio was 4.3:1. Full-time/part-time ratio was 2.7:1. JDL, PJD and age represent independent items (Tables 1 and 2). In our study, internal consistency was good; Cronbach's alpha coefficients were 0.771 for JDL, 0.713 PJD and 0.814 for social support scale. The PJD was independent of gender and lower in part-time workers and temporary workers. The JDL was higher in men and not influenced by working hours. Nursing managers,

Table 1. Psychological demand and professional risk factors and univariate and multivariate analyses

High psychological demand score	*n* (%)	*P*	Crude OR	CI	Adjusted OR	CI
Gender						
Female	823 (67)	NS	1		1	
Male	231 (64)		0.89	0.69–1.14	0.82	0.52–1.28
Age (years)						
≤40	542 (64)	NS	1		1	
>40	490 (68)		1.20	0.97–1.49	0.90	0.63–1.29
Employment contract						
Permanent	866 (70)	***	1		1	
Temporary	167 (54)		0.51	0.39–0.66	0.50	0.32–0.78
Employment type						
Full-time	688 (69)	**	1		1	
Part-time	222 (62)		0.71	0.55–0.92	0.61	0.41–0.89
Socioprofessional group						
Nursing aide	180 (62)	***	1		1	
Administrative	147 (67)		1.24	0.84–1.81	2.72	1.30–5.69
Care management	101 (80)		2.51	1.49–4.27	3.18	1.39–7.26
Nurse	349 (76)		2.01	1.44–2.80	1.88	1.20–2.93
Physician	147 (72)		1.60	1.07–2.41	3.45	1.65–7.22
Technical–medical personnel	46 (40)		0.41	0.26–0.65	0.38	0.20–0.72
Technical staff	46 (50)		1.40	0.82–2.38	0.70	0.34–1.47
Other caregiver	71 (58)		1.91	1.18–3.11	1.58	0.75–3.31
Ambient temperature						
Acceptable	614 (64)	**	1		1	
Unacceptable	469 (70)		1.35	1.08–1.67	1.43	1.01–2.01
Workstation accessibility						
Satisfactory	854 (64)	***	1		1	
Unsatisfactory	223 (81)		2.50	1.79–3.51	1.92	1.14–3.24
Manual handling						
Easy	377 (60)	***	1		1	
Difficult	417 (73)		1.82	1.42–2.35	1.62	1.12–2.34
Getting from A to B						
Not painful	570 (63)	***	1		1	
Painful	373 (76)		1.85	1.44–2.39	1.67	1.15–2.41
Care equipment availability						
Available	513 (62)	***	1		1	
Unavailable	512 (72)		1.58	1.27–1.97	1.52	1.08–2.15
Work rate						
Acceptable	827 (62)	***	1		1	
Unacceptable	253 (86)		3.86	2.68–5.58	2.16	1.33–3.51

NS, non-significant.

*** $P < 0.01$, ** $P < 0.05$.

Table 2. Decisional latitude and professional risk factor influence and univariate and multivariate analyses

High decisional latitude score	*n* (%)	*P*	Crude OR	CI	Adjusted	CI
Gender						
Female	432 (35)	***	1		1	
Male	174 (49)		1.78	1.39–2.27	1.21	0.85–1.70
Age (years)						
≤40	302 (35)	**	1		1	
>40	301 (42)		1.32	1.07–1.63	1.2	0.91–1.58
Employment contract						
Permanent	466 (37)	NS	1		1	
Temporary	129 (42)		1.23	0.95–1.60	1.2	0.84–1.72
Employment type						
Full-time	400 (40)	NS	1		1	
Part-time	135 (37)		0.88	0.68–1.14	0.91	0.67–1.23
Socioprofessional group						
Nursing aide	46 (16)	***	1		1	
Administrative	73 (33)		2.62	1.69–4.09	2.3	1.38–3.83
Care management	82 (64)		9.61	5.80–15.99	7.79	4.32–14.08
Nurse	144 (31)		2.4	1.63–3.53	2.65	1.68–4.16
Physician	142 (70)		12.55	7.95–19.88	10.29	5.88–18.01
Technical–medical personnel	28 (25)		1.76	1.00–3.08	1.71	0.93–3.15
Technical staff	36 (40)		3.53	2.02–6.17	2.53	1.32–4.87
Other caregiver	80 (62)		8.63	5.24–14.26	10.28	5.57–18.98
Postural comfort						
Satisfactory	446 (43)	***	1		1	
Unsatisfactory	175 (30)		0.56	0.45–0.70	0.69	0.52–0.92
Work rate						
Acceptable	539 (40)	***	1		1	
Not acceptable	85 (29)		0.6	0.45–0.79	0.7	0.49–1.02
Continuing education						
Yes	504 (43)	***	1		1	
No	110 (27)		0.5	0.39–0.65	0.54	0.39–0.75

NS, non-significant.

*** $P < 0.01$, ** $P < 0.05$.

non-specialized nurses and physicians had the highest PJD (25.9 ± 3.4). Cleaning staff and psychologists had the lowest scores (21.5 ± 2.8). Care managers (77.1 ± 8.4) and physicians had the highest JDL, while cleaning staff (61.4 ± 11.4) and nurse aides had the lowest values. We found 'high strain' (combination of high PJD and weak JDL) in medical secretaries, specialized and non-specialized nurses and nursing aides. Physician, care manager and rehabilitation personnel were considered as 'active' (Figure 1, available as Supplementary data at *Occupational Medicine* Online).

The JDL score was low in pharmacy, physiotherapy and occupational therapy and geriatric care AS. PJD was highest for orthopaedics, neuroscience, physiotherapy and occupational therapy. Fifty-two per cent of HCWs reported physical or verbal abuse; 29% complained of high noise levels, 29% inadequate lighting and 40% an uncomfortable room temperature. Sixteen per cent did not know if they were exposed to toxic substances. Alcohol consumption (2%), accounting for 47% of men, was independent of JDL and PJD. Users of sleeping tablets or tranquillizers (9%) were significantly older. This use correlates with high PJD but was independent of JDL. Use of tranquillizers was linked to stress, extra workload and tiredness ($P < 0.05$). Twenty-five per cent of workers had taken painkillers in the previous week, with a higher rate among women (1.5:1). Painkillers use was correlated to musculoskeletal disorder (MSD) ($P < 0.05$).

Discussion

Our study showed that stress perception is influenced not only by organizational parameters but also by environmental factors. We found that full-time and/or permanent work was reportedly more stressful than part-time work and/or temporary work. Other factors relating to a high PJDs were work schedule (alternating night–day, no recovery and replacement), unsatisfactory workstation access, heavy manual handling and unacceptable ambient temperatures.

The study has several strengths, principally, that it assessed a large number of risk factors. We analysed groups

with high PJDs, highlighting females > 40 years and specific socioprofessional groups (administrative staff, health care managers and nurses), permanent employees and full-time work.

We found that Nantes University Hospital employees had lower JDL and higher PJD scores than other public health care sectors in France [4]. However, compared to international studies, Nantes University Hospital nurses have lower PJD scores [5]. Strong demand and low decisional latitude are considered stress generators, with increased risk of MSD and our study supported these findings [6–4]. Other studies have shown an association between reduced absenteeism and social support in workmen in the private and public sectors but we did not find this [5–9].

Another strength of our approach is that it allowed us to elaborate a prevention plan. At Nantes University Hospital, the WPHSC discussed specific action plans to prevent psychosocial risks particularly in the high PJD and low JDL ASs. Currently, the prevention plan takes charge of the geriatric AS in order to prevent MSD and high levels of absenteeism. The strength of our questionnaire, according to other countries management standards for work-related stress, is that demands, control, support and relationship parameters are well analysed.

Our study has a number of limitations. The participation rate was low probably because of a lack of information given to HCWs. The self-administered questionnaire does not take into account the role of HCWs within the organization and the potential for conflicting roles. It would require the participation and the cooperation of the entire medical staff, the care managers and employees to provide a truly accurate picture. It should concern all health care ASs and should not consider only economic or social parameters. It does however provide a means for prioritizing risks and establishing occupation and AS mapping and a comprehensive risk prevention plan. Our model can be summarized by a mathematical formula: HPD = $a \times DL + b \times SoSu + \alpha$ (employment contract) + β (employment type) + κ (work rate) + γ (SPG) + δ (workstation accessibility) + ε (manual handling) + η (distance of the movements) + θ (care equipment availability) + λ (ambient T°), where HDP = high psychological demand, DL = decisional latitude, SoSu = social support, and SPG = socioprofessional group.

Key points

- Stress perception is influenced by organizational parameters and also environmental factors.
- Stress perception investigations highlight differences between socioprofessional categories.
- Quantifying the stress perception helps us to measure the impact of prevention measures.

Conflicts of interest

None declared.

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