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Perceived stress, pain and work performance among non-patient working personnel with clinical signs of temporomandibular or neck pain

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SUMMARY The aim of the present study was to assess the associations between different types of perceived stress, pain and work performance among non-patients with clinical signs of muscle pain in the head/neck region. One-fifth (n = 241) of the 1339 media employees who had participated in a previous survey (Ahlberg J. *et al.*, *J Psychosom Res* 2002; 53: 1077–1081) were randomly selected for standardized clinical examinations. Altogether 49% (n = 118) of these subjects had clinical signs of temporomandibular and/or neck muscle pain and were enrolled in the present study. The mean age of the study sample was 46·9 years (s.d. 6·6) and the female to male distribution 2:1. Of the 118 employees 46·5% reported that the pain problem interfered with their ability to work. Perceived ability to work was not significantly associated with age, gender or work positions. According to logistic regression, reduced work performance was significantly positively associated with continuous pain [odds ratio (OR) 4·38; 95% CI 1·21–15·7], level of perceived pain severity (OR 1·30; 95% CI 1·04–1·63), and health stress (OR 2·08; 95% CI 1·22–3·54). The results of this study indicated an association between specific self-reported stress regarding health and work issues, pain and work performance. From a preventive perspective this indicates a need for increased awareness about these associations on not only individual level but also at the organizational level and in health care.

KEYWORDS: neck, pain, questionnaire survey, stress, temporomandibular, work performance

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Introduction

Surveys on stress in the workplace have indicated a spiralling increase in burnout related problems in several countries of the world (1). Population surveys in Finland have found that up to 19% report difficulties in managing their work and daily lives, 16% stress and anxiety and 8% difficulties in managing their daily lives (2). Epidemiological studies have also found that about 12% of the general population may have perceived symptoms and up to half or two-thirds clinical signs of musculoskeletal problems in the head/neck region (3–6). Additionally, although the causal link is controversial, studies have shown that many who report chronic muscle pain problems also report problems with general health, stress and psychosocial factors and *vice versa* (7, 8).

Stress is part of modern life. However, increased or prolonged stress can lead to difficulties in concentrating, tiredness and fatigue, decreased work performance, physical depletion or exhaustion, sleep difficulties, specific somatic and psychosomatic problems (7, 9, 10). It has been shown also that stress-related chronic pain problems can lead to increased

absenteeism from work and increased occupational health care needs and costs (11–16).

A previous study on stress and related factors at the workplace found that pain symptoms in the head and neck region were the most frequently reported physical health problems among a non-patient working population; 15–38% reported the pain as severe (17). Perceived overall stress was also found to be significantly associated with sick leave, regardless of age, gender or work duty (18). Yet, it remained unclear which kind of stress was most detrimental to work performance.

The aim of the present study was to further assess the associations between different types of perceived stress, pain and work performance among a subgroup of non-patients with clinical signs of muscle pain in the head/neck region.

Materials and methods

Materials

The subjects in this study were selected randomly from the previous survey involving all 30–55 year old permanently employed personnel ($n = 1339$) of the Finnish Broadcasting Company (17). One-fifth of the respondents in the survey were randomly selected for clinical examinations ($n = 241$). Altogether 49% ($n = 118$) of these had clinically confirmed signs of temporomandibular and/or neck muscle pain signs (assessed independently using standardized muscle palpation methods by a dentist and a physician). Perceived symptoms, reported by 39% ($n = 93$) of subjects, were assessed in a blind interview by Visual Pain Analogue Scales (VAS) after the clinical examinations. The mean age of the total study sample was 46·9 years (s.d. 6·6) and the gender distribution 2:1 (68·6% females, 31·4% males). The percentage distribution of subjects in different work positions was as follows: manager (11%), journalist (21·2%), production (26·3%), planning (12·7%), service (13·6%), administration (11%) other (4·2%). Ethics clearance was obtained from the University of Helsinki.

Methods

The subjects were asked to complete a set of questionnaires. The methods for this study included the following assessments:

Pain variables. Duration of pain, severity of pain assessed by VAS scores and pain type, i.e whether they had continuos pain symptoms or other types of pain.

Stress variables. Perceived severity of stress with 5-point Likert type scale, where 0, none; 1, mild; 3, moderate; 4, major; 5, severe; in relation to home, work, financial, social life and health stress.

Perceived impact on work performance. Subjects were asked to rate whether their pain affected their ability to perform work duties.

Statistics

Chi-square test was used to analyse categorical variables and *t*-test to compare group means. A logistic regression model was fitted to analyse the effects of stress and pain variables on the probability of perceived impact on work performance (categorised as yes = 1 or no = 0). Variables from the questionnaire data were used in the multivariate analysis as follows: pain duration in years, pain severity (VAS scores), pain type (continuous = 1, other = 0) and perceived stress severity scores regarding home, work, financial, social life and health issues (1–5 scale). The forced entry method was used, i.e. the independent variables were entered in the model in a single step. All analyses were performed with SPSS statistical software (version 10.1, 2000).

Results

Of the 118 studied employees with clinical signs of head/neck muscle pain, 46·5% reported that this problem interfered with their ability to perform work. The work performance was not significantly associated with age, gender or work position.

Those with a perceived impact on work performance reported more severe pain (mean VAS 5·8, s.d. 1·9) when compared with those reporting no impact on work (mean VAS 4·1, s.d. 2·2) ($P < 0·001$). The duration of pain was not significantly different ($P = 0·05$) in the two groups (mean duration 13·0 years, s.d. 9·1 in the work impact group; 9·8 years, s.d. 7·6 in the no impact group). There were more subjects (16·1%) in the work impact group with continuous pain when compared with the no work impact group (4·2%) ($P < 0·001$).

Those who reported that their pain had an impact on work performance had significantly more stress with regard to work ($P < 0{\cdot}01$) and health ($P < 0{\cdot}001$) issues (Table 1). The frequency distribution of major or severe stress categories indicated a similar tendency.

According to logistic regression, the reduced work performance was significantly positively associated with continuous pain ($P < 0{\cdot}05$), pain severity ($P < 0{\cdot}05$), and health stress perceptions ($P < 0{\cdot}05$) (Table 2). Work stress was only slightly positively associated ($P = 0{\cdot}07$). An increment of one category of perceived health stress had a twofold effect on the probability of reduced work performance while the effects of the other studied independent variables were simultaneously controlled.

Discussion

Studies have shown that between 6 and 10% of patients with chronic pain are work disabled (19, 20). Almost half of those non-patient employees in the present study that had clinical signs of muscle pain (one-fourth of the whole sample) felt that this pain interfered and affected their ability to perform work. This indicated that a certain proportion of employees with what could be considered 'subclinical signs' of chronic muscle pain may also have some disability to perform their work.

The subjects in this study were working non-pain-patients among a multiprofessional media personnel with relatively low levels of environmental stressors at work, but an assumed high psychosocial loading. A representative sample of participants in a previous survey were screened for muscle pain in the head/neck region, as these are commonly associated with stress in similar working populations (14, 21). The occurrence of disturbing neck pain in the present study was in line with the figures for perceived severe neck pain in the previous survey comprising a larger sample of employees (17).

Standard questionnaires were used in the present study. However, inaccuracies may always occur when gathering data with questionnaires: the reporting may depend on several things, e.g. on subjects' motivation,

Table 1. Mean scores of the 5-scale stress variables and percentage distribution of categorised stress variables (none and mild, 1–2; moderate, 3; major and severe, 4–5) according to impact on work performance (n - 118)

	Impact on work performance [mean (s.d.)]		Impact on work performance (%)					
			No			Yes		
Perceived stress scores	No	Yes	1–2	3	4–5	1–2	3	4–5
Home	2·5 (1·3)	2·8 (1·3)	58·8	17·5	23·8	45·5	18·2	36·4
Work*	2·8 (1·0)	3·2 (0·8)	36·5	41·3	22·2	16·3	49·1	34·6
Finances	2·0 (1·3)	2·0 (1·0)	74·1	11·3	14·6	75·4	17·0	7·6
Social life	1·9 (1·1)	2·2 (1·3)	74·2	16·1	9·7	67·3	16·4	16·4
Health†	1·8 (0·9)	2·6 (1·1)	77·8	20·6	1·6	45·5	36·4	18·1

*$P = 0{\cdot}007$; †$P < 0{\cdot}001$.

Table 2. The logistic regression coefficients (B) of the studied background variables

	B	s.e.	P-value	Odds Ratio	95% CI for OR
Constant	−4·59	1·19			
Variables					
Pain duration	0·02	0·03	0·41	1·02	0·97–1·08
Continuous pain	1·48	0·65	0·02	4·38	1·21–15·7
Pain severity (average VAS)	0·27	0·11	0·02	1·30	1·04–1·63
Perceived stress					
Home	0·18	0·22	0·43	1·19	0·77–1·85
Work	0·50	0·28	0·07	1·65	0·96–2·84
Finances	−0·36	0·24	0·14	0·70	0·44–1·12
Social life	−0·11	0·25	0·65	0·90	0·55–1·45
Health	0·73	0·27	0·01	2·08	1·22–3·54

The probability of perceived impact on work performance.

and comparing data of different studies may include bias due to cultural or societal differences. Nevertheless, reporting of pain symptoms may also be influenced by negative affectivity and individuals with subjective distress may be more likely to perceive, over-react to and complain about their sensations (22).

There is general consensus that chronic pain problems in the head/neck region affect at least 12% of the general population (12). Some studies, like in the present study, indicate that the prevalence may be even higher, at least in terms of neck pain (23). It is also commonly agreed that there is a weak association between objective signs of pain and the subjective levels of pain and that the causal as well as consequential factors of chronic pain can be many (8, 24). Studies have indicated that while some individuals continue to lead productive lives, others become more and more disabled and less able to cope with not only the pain problem but also with the demands of their work and daily lives (7, 9).

As pain and also stress have a subjective nature, we aimed with this study to explore those factors that the employees themselves saw as important in terms of their ability to work. Using logistic regression enabled us to evaluate how the various pain variables and various stress variables were associated with what the employees themselves saw as impacting on their ability to work. We found that those employees who felt stressed about work issues and health issues were more likely to report decreased work performance. Additionally, those who felt continuous pain or severe pain were more likely to report difficulties in performing their work. The results therefore confirm that there is a need for more awareness about associations between perceived stress as well as health issues and that these can be linked with decreased productivity as well as increased sick leave (18).

While an association was found in a study population, it is less clear how pain and stress are linked in each individual employee. Further studies are needed to investigate the longitudinal aspects, i.e. which employees, and why, are more vulnerable to becoming unable to perform their work effectively and eventually to develop more somatic or psychosomatic problems.

Previous studies indicate that both organizational and personal factors have relevance in terms of decreased work performance (7, 9). Overall, it is appreciated that stress problems are multifactorial and usually, depending on individual coping resources, a process where the individual gradually progresses from imbalance to exhaustion (25, 26). There is also general consensus that both stress and pain problems are multidimensional, i.e. that many factors are involved such as coping, psychosocial support, organizational support, as well as the availability of effective and biopsychosocially oriented health care (8, 9, 24, 27). These factors have been found important in terms of preventing pain and/or stress problems becoming chronic and disabling as well as avoiding the consequential costs on a personal as well as organizational, work and societal levels.

In conclusion, the results of this study indicated an association between work performance and self-reported stress related to health, and pain. From a preventive perspective this indicates a need for increased awareness about these associations in non-patient as well as patient populations, both on individual and organizational levels.

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