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Health promoting factors in public work places

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Abstract

Objectives: The main objective of this study was to explore potential health-promoting work factors and their specific associations with self-rated general and mental health, life satisfaction, and low levels of musculoskeletal pain among women and men employed in the public sector.
Methods: A questionnaire based survey was conducted among 2523 public employees (87% women) in 124 work places. The workplaces were distributed between five occupational sectors: the provincial hospital, schools, home care services, domestic/catering, and administrative services. The response rate was 92%. Analyses of variance were used to compare the mean scores of the groups. Spearman's rank correlation test was used to assess the associations between the work factors and the health measures.
Results: Many of the potential health promoting work factors were associated with the measures of self-rated health. However the correlations differed according to both gender and occupational sector. The main differences between the sectors were the characteristics of decision latitude-influence and learning-development with the best conditions in the administrative services and schools, and the worst in home care services. Men rated higher in decision latitude-influence than women and had significantly better "opportunities to learn new and to develop in the profession". Having enough time to complete the work tasks had the highest overall correlation with good health. In addition good relations with and support of supervisors were crucial for well-being among the employees.
Conclusions: The results highlight the importance of high levels of decision latitude-influence, learning-development, and a fair and impartial attitude among supervisors for the promotion of good health in public work places.

Key words: health promotion, public sector, gender

Introduction

For the successful promotion of healthy workplaces, it is necessary to identify factors that contribute to the improvement of health and to facilitate and strengthen the impact of those factors that are conductive to the health of all staff [1].

The concept of health is complex. There are several different definitions and theories of health [2]. Those can broadly be categorised as being either biomedical or humanistic in nature. Among humanistic definitions, health is seen as much more than the absence of disease. With regards to the promotion of health, the main focus has been on factors that contribute to the maintenance of health. The World Health Organization (WHO) also takes a holistic view of health and clearly advocates health-promoting activities [1]. Individuals are viewed as being responsible of their own health; however, the creation of conditions that enable people to influence their health is also an overriding societal responsibility. Furthermore, it is recognised that good health is fostered where people are gainfully employed [3]. Since the concept of health encompasses many components, it is necessary to apply different measurements in order to cover many health-related dimensions in health promotion research.

One of the most influential models in research on the relationship between work and health is the Job Demand Control model, also known as the job-strain model [4]. The term control, or decision latitude, is often used to illustrate the dimensions of influence and involvement in the workplaces and has been identified as being

hugely important for the promotion of health [4, 5,6]. Recent research has shown that "organisational justice", related to the concept of process control, is an important psychosocial predictor of employee health in working life [7, 8]. Both managers and employees are involved in promoting healthy workplaces. Managers are mainly responsible for guaranteeing the fairness of the procedures applied in decision-making processes. A poor perception of organisational justice has been shown to be related to various health risk factors [7,9]. Employee participation in decision-making processes has been found to be very important for well-being [10].

Several studies of working conditions in the public sector have shown a combination of decreasing resources and increasing demands, particularly in the fields of health and home care services, as well as schools [11]. Over the past decade, the number of employees on long-term sick leave has greatly increased [11]. Musculoskeletal pain and related conditions are among the major reasons for sick-leave compensation and disability retirement in Sweden and most western countries [12,13,14]. Women are generally at greater risk of developing problems with their health and musculoskeletal pain in particular, due to "biological risk" factors including genetics and physiology, psychosocial aspects resulting from differences in working conditions, and differences in "health reporting habits" [15,16,17,18]. From a gender perspective, more information on health determinants is necessary in order to obtain information on work-related factors that promote health in different public workplaces.

The aim of this study was to explore potential health-promoting work-related factors in relation to self-rated general and mental health, life satisfaction and levels of musculoskeletal pain among women and men employed in the public sector.

Methods

A cross-sectional study using questionnaire data from a project initiating development processes was conducted in a county in Sweden. The selection of the workplaces was based on inventories by the Social Insurance Office, personnel officers at the Occupational Health Services and the labour unions, in order to obtain a representative selection of public sector workplaces with regards to levels of sick-leave. The comprehensive questionnaire covered various dimensions of health, work environment, lifestyle, reactions to stress and skills relating to issues of change, learning and development. These instruments have often been used and validated in various national surveys [19]. The study was approved by the Ethics Committee of the Faculty of Medicine, Umeå University, Sweden.

Participants

A total of 124 public workplaces were included in the study.The questionnaire was distributed to all employees. These were either filled in individually and collected in work group meetings or sent home to those who were absent. The response rate was 92 % (N= 2523).After excluding 36 individuals due to missing data on gender, 2,487 respondents remained in the study group (87% women). 347 women and 27 men worked in the provincial hospital (missing gender data n=7), 561 women and 177 men worked in schools (n=10), 1,024 women and 77 men worked in the home/elderly care sector (n=14), 211 women and 24 men worked in the domestic/catering sector (n=5) and 62 women and 10 men worked in the administrative sector (n=0).There were hardly any differences in the age distribution between the women and men who answered the questionnaire. For the women, the mean age (M) was equal to the median value (Md) of 44 years, while the standard deviation (SD) was 10.8. For the men, the corresponding values were M = 43, Md = 44 and SD = 11.1. There was a high incidence of missing data on age: 180 for the women and 27 for the men.

Health measures

Three items on *self-rated health* were used, all of which had five response alternatives (ranging from bad to very good). The responses were recoded to give 1= bad, 2= good, 3= very good.

1. *General health* was measured by the item 'how do you assess your general health'?
2. *Mental health* was described by the item 'my mental health is'…
3. *Life satisfaction* was defined by the item 'how is your life nowadays'?

Musculoskeletal pain

Three 'pain' variables were compiled to form a scale. The questions covered the frequency and intensity of pain over the past three months in the following areas: 1) the neck/shoulders, 2) back and hips and 3) the extremities (legs, arms, hands, elbows, knees, feet). The participants were asked to rank the intensity and frequency of each complaint on a five-point scale (1= not at all, 2=yes, a little pain now and then, 3=yes, a little pain most of the time, 4=yes, severe pain now and

then and 5=yes, severe pain most of the time).The highest pain value in the three questions was used to classify the respondent's level of pain.The three variables were recoded into three scores and arranged, from high levels of pain to low or no pain: 1= severe pain most of the time to a little pain most of the time, 2= little pain now and then, 3= no pain at all.

Work factors

Thirty-one potential health-promoting items were selected from the questionnaire based on the Ottawa charter [20] and on health promotion treaties [21]. The items were sorted into eight dimensions of working conditions: working hours, decision latitude, learning and development, participation and co-operation, team spirit, relationship with the nearest supervisor, feedback and planning and organisation of the work. The items reflecting each dimension are presented in the Appendix.

Physical exercise was chosen to represent life style.The frequency and intensity were ranked on a four-point scale (1=not at all, 2=exercise now and then, 3=moderate exercise >once a week, 4= intensive exercise >once a week).

The response alternatives were checked against the total material so that extreme alternatives with a frequency of 5% or less were added to the nearest score. Items with many scores were merged in the middle if their frequencies were lower than those of their surrounding neighbours. Thus we ended up with 3, 4 or 5 scores per item (see the Appendix).The work time variables had a yes/no (1-0) scale. Neither indexes nor summarising measures was used in the calculations.

Statistical analyses

Statistical analyses were carried out by using SPSS version 12.0. The normality distribution of the scores was checked by the Kolmogorov-Smirnov test. The mean scores and their 95% confidence intervals (CIs) were calculated for all variables, per gender and per sector.The CIs were used to compare the mean scores and the total mean was kept as a reference. A significant difference for the mean scores was illustrated by CIs not overlapping. To relate the difference between men and women the total (Men-Women)/Total was calculated. Since the item-specific scores varied after merging to form reasonable sets due to alternating ranges in response to options, the percentage of the differences related to the total mean was used. It was considered statistically significant when at least 1% was left after reduction to the closest CI. If the difference left was positive then the men scored higher (better) and women worse; negative values means that the women scored higher. For the sectors, a similar procedure was applied; mean values in the sectors compared to total means were used to rank the scores per item, rank I: the highest/best score, rank II: medium score, rank III: lowest score/worst. The significance of the rank was determined using CI. A sector whose mean value fell within the CI of the mean total was labelled rank II. If the mean was outside the total CI it received either rank I or rank III (observed significant differences from the mean total were printed in bold type in the tables). The range for the sector means was calculated by subtracting the lowest value from the highest; to maintain the comparability, the result was divided by the mean of the total: [(highest-lowest)/total].

The associations between the four health variables and the work factors were calculated using Spearman's rank correlation test. Significant correlations of at least 0.10 were presented at alpha level 0.05.

Results

Small gender differences were reported in health, with one exception: women reported much higher levels of musculoskeletal pain (Table 1).Those who reported poor general health (80% of the women and 54% of the men) also reported higher levels of musculoskeletal pain.

Musculoskeletal pain: 9% of the women and 20% of the men reported no musculoskeletal pain at all.

General health: 18% of the women and 26% of the men reported very good general health.

Mental health: 22% of the women and 25% of the men reported very good mental health.

Life satisfaction: 22% of the women and 21% of the men reported very high levels of life satisfaction.

Work factors of importance among women and men

A higher proportion of women than men had work rotation schemes, while men tended to work overtime more frequently. Overall, the men recorded more positive scores, primarily on the characteristics of *decision latitude-influence.* Under *learning-development*, the difference between the sexes was most prominent for the item: 'the opportunity to learn new things and develop within the profession', with the women recording more negative scores (Table 1).

There were moderate to high correlations

between all of the health measures. In total, low levels of musculoskeletal pain had the highest levels of correlation with good general health (0.37). The correlations between work factors and health measures were relatively low, but significant (0.10* - 0.30**) (Table 2).

The characteristics in *decision latitude-influence:* mainly correlated with the health measures. 'To have enough time to complete the work tasks' and appeared to be vital to the experience of good mental health (Table 2).

Within learning – development: 'to learn new things and develop within the profession' correlated with good general health, good mental health and with low levels of pain among the men (Table 2).

Team spirit appeared to be important for good health among both women and men; however the items had a stronger correlation with the health measures among the men (Table 2)

The characteristics of *relations with the nearest supervisor:* 'to get along with my supervisor', 'the nearest supervisor treated the staff fairly and equally', and 'divided the work fairly' were the most important characteristics for both sexes (Table 2).

In summary, the men returned much higher scores than the women on the characteristic *decision latitude-influence* and the correlations with the health measures were stronger among the men (Tables 1 and 2). In *relationship with the nearest supervisor,* there was a small difference between the scores of each sex (Table 1); however a larger number of items correlated with the health measures among the men (Table 2).

Work factors of importance within the different sectors

To compare the sectors, health measures and work factors were ranked according to their mean values (Table 3). The rankings I (best) and III (worst) were based on the degree of divergence from the total mean. Every work factor counts towards each of the four health measures.

In the same table, the significant correlations ($p<0.05$) are presented as 1≥0.10 and 2≥0.20 (Table 3).

The administrative service sector scored the highest overall ranking on the work factors and displayed the highest correlations between the work factors and the health measures. There were relatively few employees in the administrative services (n=72) and a majority (56%) occupied leading positions. Their relationships with their nearest supervisors received the highest scores in comparison with the other sectors (Table 3).

Apart from administrative services, the largest differences in the ranking of the work factors were found in the school sector, which had the highest rank (significant values over the reference values of mean total), and the home care service sector, which had the lowest rank (Table 3).

For *decision latitude-influence*, the item 'to have enough time to complete the work tasks' correlated mainly with the health measures, however domestic catering services, despite having the highest rank, only correlated with good mental health. The items 'to have enough time to complete work tasks', along with 'being able to set the pace of one's work', received the lowest ratings in schools. Nevertheless, the characteristics correlated with all health measures (Table 3).

In all sectors *within relationship with the nearest supervisor*, the item 'to get along with my supervisor' correlated with good mental health. In schools 'the nearest supervisor divides the work fairly and impartially' was significant for all health measures (Table 3).

Discussion

In this study of people employed in the Swedish public sector, we found several associations between potential health-promoting work factors and various dimensions of self-rated health. There was significant variety between sectors, with regards to how involvement in decision-making processes and the availability of opportunities to learn new and develop within the profession was rated. Employees within the administrative services, medical care institutions and schools gave these work factors the highest rating while those in the home care services they rated them lowest. The results also showed that more men than women gave positive (good) scores to several work factors. This implied that the men had better conditions in the categories *decision latitude-influence, learning-development and co-operation- participation.* The *relations with the nearest supervisor* were imperative for the maintenance of good health among both women and men. Overall, increased time to complete work tasks emerged as the most important factor for good health.

Self-rated health

Self-rated health is often measured by the single item 'How do you rate your health in general,' a question that has been shown to have good test–retest reliability [22,23]. The various health measures in our study gave a broad picture of the different associations with the selected work factors. The results showed that there was a strong correlation between general health and all the - other measures of health; nevertheless, the health measures correlated differently with the work

Table 1. Health-promoting measures and work factors: mean values with 95% confidence intervals for total, women and men, and the differences in percent [men-women]/ (the sum of the means).

Variables	Total Mean	95% CI	Women M	Women 95% CI	Men M	Men 95% CI	M-W/ Total %
Health measures							
Levels of musculoskeletal pain	1.55	1.53-1.58	**1.52**	**1.49-1.58**	**1.81**	**1.73-1.90**	**19**
General health	1.87	1.84-1.90	1.85	1.82-1.88	1.96	1.88-2.05	6
Mental health	2.00	1.97-2.03	2.00	1.97-2.02	2.02	1.94-2.09	1
Life satisfaction	2.07	2.04-2.09	2.07	2.05-2.10	2.02	1.94-2.09	- 3
Physical exercise	2.67	2.64-2.70	2.66	2.63-2.70	2.73	2.63-2.83	3
Work factors							
Working mostly days	0.75	0.73-0.76	0.74	0.72-0.76	0.80	0.76-0.85	8
Working mostly nights	0.11	0.10-0.13	0.12	0.10-0.13	0.08	0.05-0.11	-37
Work rotation scheme	0.22	0.20-0.24	**0.23**	**0.21-0.25**	**0.15**	**0.11-0.19**	**-37**
Less overtime	2.65	0.62-0.69	**2.69**	**2.65-2.73**	**2.39**	**2.28-2.51**	**-11**
Decision latitude -Influence							
Able to set pace of work	2.79	2.75-2.83	**2.77**	**2.73-2.81**	**2.96**	**2.84-3.07**	**7**
Time to complete tasks	2.77	2.74-2.81	2.77	2.73-2.81	2.77	2.66-2.88	0
Freedom to decide how	2.21	2.18-2.24	**2.19**	**2.16-2.22**	**2.37**	**2.30-2.44**	**8**
Freedom to decide what	2.80	2.76-2.84	**2.77**	**2.73-2.81**	**3.02**	**2.92-3.11**	**9**
Choice of methods	3.29	3.24-3.33	**3.25**	**3.20-3.29**	**3.56**	**3.44-3.67**	**9**
Able to influence decisions	2.98	2.94-3.02	**2.95**	**2.90-2.99**	**3.23**	**3.12-3.33**	**9**
Learning – Development							
Opportunities to learn new skills	2.87	2.84-2.90	2.85	2.82-2.89	2.99	2.90-3.08	5
Opportunities for development	1.84	1.81-1.87	**1.80**	**1.77-1.84**	**2.08**	**1.99-2.18**	**15**
Staff able to influence	2.48	2.45-2.52	2.47	2.43-2.50	2.60	2.51-2.69	5
Encouraged to reflect on problems	1.74	1.71-1.77	1.72	1.69-1.76	1.82	1.73-1.90	5
Review existing problems	2.33	2.30-2.36	2.33	2.30-2.36	2.34	2.25-2.43	0
Customers influence development	2.47	2.44-2.50	2.47	2.44-2.51	2.47	2.37-2.56	0
Co-operation – Participation							
Good management-union relationship	2.16	2.12-2.19	**2.13**	**2.09-2.16**	**2.35**	**2.26-2.44**	**10**
Participation in decisions about capacity	2.02	1.98-2.05	2.00	1.96-2.04	2.16	2.05-2.26	8
Continuous exchange of information	2.33	2.30-2-37	2.32	2.28-2.36	2.41	2.31-2.56	4
Team spirit							
Able to influence decisions in workgroup	2.05	2.03-2.08	**2.03**	**2.00-2.06**	**2.20**	**2.13-2.28**	**8**
Work team listens to my suggestions	2.18	2.16-2.21	2.18	2.15-2.20	2.23	2.16-2.30	3
My co-workers support me	2.43	2.40-2.45	2.43	2.40-2.45	2.41	2.34-2.48	-1
Relationship with nearest supervisor							
Get along with supervisor	2.42	2.40-2.44	2.42	2.40-2.45	2.39	2.32-2.46	-1
Encourages participation in important events	2.75	2.70-2.80	2.75	2.69-2.80	2.79	2.65-2.93	2
Encourages staff to speak up…	2.59	2.54-2.65	2.59	2.54-2.65	2.61	2.47-2.76	1
Supports staff in developing skills	2.35	2.30-2.39	2.35	2.30-2.40	2.34	2.22-2.46	0
Divides the work fairly	3.42	3.36-3.46	3.40	3.34-3.46	3.52	3.39-3.66	4
Treats the staff fairly and equally	2.90	2.86-2.95	2.90	2.85-2.94	2.96	2.85-3.08	2
Feedback							
Says when a good job has been done	2.65	2.61-2.69	2.65	2.60-2.69	2.69	2.58-2.80	2
Says when the task has been poorly executed	2.45	2.41-2.49	2.43	2.39-2.48	2.54	2.43-2.64	4

Note: Significant values are printed in bold type. The difference of 7% was found to be statistically significant. M- Wo/total because men scored better on almost every item. Health measures: scores 1= bad, 2= good, 3= very good. Work factors: see Appendix for scores. The scores are arranged from low to high (bad to very good).

Table 2. Significant correlations: of ≥0.10 (p<0.05) between the health measures and work factors in total and among women and men.

Variables	Total				Women				Men			
Health measures	1.	2.	3.	4.	1.	2.	3.	4.	1.	2.	3.	4.
1.Levels of musculoskeletal pain		0.37	0.20	0.18		0.39	0.21	0.20		0.26	0.14	
2.General health	0.37		0.54	0.49	0.39		0.52	0.48	0.26		0.66	0.58
3.Mental health	0.20	0.54		0.63	0.21	0.52		0.62	0.14	0.66		0.71
4.Life satisfaction	0.18	0.49	0.63		0.20	0.48	0.62			0.58	0.71	
Physical exercise		0.15				0.15	0.10	0.11	0.13	0.15		
Work factors												
Working mostly days											-0.14	
Working rotation scheme	-0.10				-0.10							
Decision latitude -Influence												
Able to set pace of work		0.12	0.14	0.10		0.11	0.13	0.10		0.21	0.16	0.14
Time to complete tasks		0.19	0.21	0.14		0.18	0.21	0.14		0.23	0.21	0.14
Freedom to decide how			0.10					0.10				
Freedom to decide what							0.10					
Choice of methods			0.10	0.14				0.10		0.11	0.18	0.12
Able to influence decisions and affect the work		0.10	0.13	0.14			0.12	0.13		0.12	0.20	0.20
Learning-Development												
Opportunities to learn new things	0.10	0.12			0.10	0.11					0.13	
Opportunities for development	0.10	0.12				0.11			0.17	0.15	0.17	
Review existing problems											0.10	
Co-operation-Participation												
Good management-union relationship										0.15	0.16	0.22
Participation in decisions about											0.22	0.22
Exchange of information			0.11				0.11			0.12	0.12	0.13
Team spirit												
Able to influence decisions in work group	0.11	0.12	0.15	0.14	0.10	0.12	0.14	0.13	0.12		0.18	0.18
Work team listens to my suggestions	0.11	0.13	0.15	0.16	0.11	0.13	0.14	0.14		0.17	0.21	0.26
My co-workers support me		0.11	0.17	0.15		0.10	0.17	0.14		0. 16	0.16	0.21
Relationship with nearest supervisor												
Get along with supervisor		0.12	0.19	0.18		0.11	0.19	0.17		0.17	0.19	0.18
Encourages participation in											0.16	0.14
Encourages staff to speak up			0.10							0.13	0.20	0.14
Supports staff in developing skills			0.10	0.18						0.21	0.23	0.17
Divides the work fairly		0.10	0.13	0.11		0.10	0.12	0.10	0.19	0.15	0.15	0.15
Treats the staff fairly and equally		0.11	0.16	0.12		0.11	0.16	0.12	0.12	0.12	0.20	0.16
Feed back												
Says when a good job has been done		0.11	0.13	0.13		0.10	0.13	0.10		0.19	0.15	0.16

Note: Only significant correlations are presented. See Table 1 for all items. Health measures: scores 1= bad, 2= good, 3= very good. Work factors: see Appendix for scores. The scores are arranged from low to high (bad to very good).

factors in the various sectors, and among the women and men.

Musculoskeletal pain

The level of musculoskeletal pain was chosen as a specific measure of 'physical health' since musculoskeletal disorders are an immense public health problem and are probably due to a multitude of factors [24,25,26]. In comparison to the men, the women seldom reported experiencing either no or low musculoskeletal

pain in the study. This corresponds with the well-established fact that musculoskeletal disorders are more common among women [16,27,28]. Estimated poor general health is a strong predictor of the onset of musculoskeletal pain and the risk is higher for women [29,30]. Our results confirm this association: those with poor general health also estimated musculoskeletal pain to a greater extent. This was particularly evident amongst the women.

The estimated low levels of musculoskeletal pain appeared to correspond with some of the studied work dimensions. Risk factors for musculoskeletal disorders have been discussed in several studies [31]. High levels of physical workload and adverse psychosocial work factors are highly associated with musculoskeletal pain [32]. This study contained positively-oriented work dimensions with inspiration from the Ottawa charter [20]. We chose not to apply items constructed for traditional inverse risk assessments, but rather to concentrate on health-promoting aspects of work conditions.

Noticeably, there were correlations between estimated low levels of musculoskeletal pain and characteristics of *learning-development* and *relations to the nearest supervisor.* The *team spirit* characteristic: 'the opportunity to influence decisions in the workgroup' was also deemed to be vital to the estimates of low pain and good general health among women and men. These conditions were taken to indicate satisfaction with the work situation. The concept of job satisfaction is extensive, but includes the opportunity to learn new skills and develop within the profession, the need to be in control, the perception of fair treatment from the supervisor, the fostering of the individual's curiosity and interests, and his/her sense of participation and justice. In some studies [31,33] an association has been found between job dissatisfaction and pains in the lower back and neck/shoulder area. Theories linking stress and musculoskeletal pain could inversely support the findings, since emotions and cognitive functioning have been found to be significant risk factors for back and neck pain [34].

Decision latitude-influence

The characteristic of *decision latitude-influence* scored highly, implying that there were sufficient opportunities to exert influence in the administrative services, school sector and domestic catering services. School employees rated assigned low ratings to time characteristics (bad), while employees in the domestic catering services gave them high marks (good). Moreover, *decision latitude-influence* had a higher degree of correlation with the health measures in schools than in the domestic catering services. These somewhat odd findings were interpreted to mean that school employees perceived themselves to have insufficient time to organise their work tasks. However, once they had been given adequate time to perform their work; they perceived this to have a positive effect on their health. Staff in the domestic catering services felt that they had enough time in which to accomplish their work tasks, but this did not contribute much to the overall perceived good health.

In general, the men had much better working conditions in the category *decision latitude-influence* and much better opportunities to learn and develop at work. These are important indicators of the differences between the working conditions of each sex. The main differences between the sectors were demonstrated in the decision-making processes. The home care services, which were largely female-dominated (93%), received low (bad) scores on almost all work characteristics, which says much about their working conditions. This also indicates the inequality between the sexes with respect to authority and career opportunities and illustrates the hierarchical gender-segregation [35].

Some measures of decision latitude–influence were chosen from the Job Demand–Control instrument [36]. Elements such as managing work time and the ability to organise work activities were necessary components for having influence over decision-making processes. The concept of work-related decision latitude often referred from the job strain model developed by Karasek and Theorell [4] has been found to moderate the detrimental effects of work-related psychological stressors on health. Our findings correspond well with this theory: having enough time to complete work tasks and being able to influence decisions correlated with good mental health and high life satisfaction.

Relations with the nearest supervisor

The fairness and impartiality of the nearest supervisor was strongly associated with employee health. This corresponds with findings in studies which indicate that relation-oriented managers who also are good at structuring work tasks are more likely to have healthy workers [37]. Moreover, studies have shown that successful measures for improving health at work involved the improvement of supervisor support and feedback, and increased participation in decision-making processes [38]. Studies [7,9] on the concept of 'organisational justice' have shown that it is important for establishing a healthy working environment. In our study, the results of the social

Table 3. Ranks of work factors with the highest difference between the sectors:(I) the highest (best) value over total mean and (III) the lowest (worst) value under total mean: (means (high-low)/total gives the difference in %). (Total mean from Table 1).The significant correlations in levels: 1 ≥0.10* and 2 ≥0.20 (p<0.05) with the health measures low pain are presented.**

	Means		Administration	School	Medical care	Domestic care	Home care
	High-Low	%	Rank 1. 2. 3. 4.	Rank 1. 2. 3. 4.	Rank 1. 2. 3. 4.	Rank 1. 2. 3. 4.	Rank 1. 2. 3. 4.
Health measures							
1. Levels of musculoskeletal pain	1.68-1.49	14	I 2 2 2	**I** 2 2 1	III 2 1	III 2 2 2	III 2 2 2
2. General health	1.99-1.83	9	I 2 2 2	II 2 2 2	I 2 2 2	III 2 2 2	II 2 2 2
3. Mental health	2.06-1.94	6	II 2 2 2	III 2 2 2	I 1 2 2	I 2 2 2	II 2 2 2
4. Life satisfaction	2.11-2.03	4	I 2 2 2	III 1 2 2	III 2 2	I 2 2 2	II 2 2 2
Physical exercise	2.81-2.59	8	I	**I** 1 1	II 2 2 1	II 1 1 2	**III** 1 1
Work factors							
Working mostly days	0.96-0.56		I -2	**I**	**III**	**I**	**III**
Working mostly nights	0.19-0.00		**III**	**III**	**I**	**III**	**I**
Work rotation scheme	0.36-0.00		**III**	**III**	I -1	**III**	**I** -1
Less overtime	3.23-2.41	31	III	**III** 1 1	**III**	**I**	**I**
Decision latitude-Influence							
Able to set pace of work	3.25-2.62	23	**I** 2 2 2	**III** 1 2 2 1	III	**I**	II
Time to complete tasks	3.14-2.49	23	III 2 2 2	**III** 1 2 2 1	I 1 2 1	**I** 1	I 1 1 1 1
Freedom to decide how	2.51-2.00	23	**I** 2	**I** 1 1	**III**	**I** 1	**III** 1 1
Freedom to decide what	3.16-2.54	22	**I**	**I** 1 1 1	**III**	I 1 1	**III**
Able to choose between methods	3.76-2.93	25	**I**	**I** 1 1 1	**III**	I 1	**III** 1 1
Able to influence decisions that affect the work	3.29-2.79	17	**I** 2 2	**I** 1 1 1	III 1 1 1	I 1 1 1	**III** 1 1
Learning-Development							
Able to learn new skills	3.36-2.69	26	**I**	**I** 1 1 1	**I**	**III** 1	**III** 1 1
Opportunities for development	2.30-1.48	45	**I** 2 2	**I** 1	**I**	**III** 1	**III** 1 1
Staff able to influence	2.81-2.32	20	**I** 2 2 2	**I** 1 1	II	**III**	**III**
Able to reflect on problems	1.94-1.61	19	I 2 2 2	**I**	II	III	**III** 1 1 1
Review existing problems	2.47-2.18	12	I	**I**	II 1 1	**III**	III
Customers influence development	2.59-2.35	10	I 2	I 1	**III**	III	II
Co-operation-Participation							
Good management-union relationship	2.64-1.98	31	**I**	I	I 1	**III** 1 1	**III** 1
Participate in decisions about capacity	2.47-1.88	29	**I** 2 2 2	I	I	III 1	III 1
Continuous exchange of information	2.69-2.22	20	**I** 2 2	I 1	**I** 1	III	**III** 1 1
Team spirit							
Influence decisions in my work group	2.32-1.92	20	**I** 2 2	**I** 1 1	**III** 1 1 1	I 1 2	**III** 1 1 1
Work team listens to my suggestions	2.07-2.37	14	I 2	**I** 1 2 2	**III** 1 1 1	II 1 1 1 2	**III** 1 1 1
My co-workers support me	2.38-2.50	5	I	**I** 1 2 1	III 1	I 1 1 1	III 1 1 1
Relationship with nearest supervisor							
Get along with supervisor	2.52-2.40	5	I 2	II 1 2 1	I 1	II 1	II 1 2 1
Encourages participation in important	3.35-2.54	30	**I**	I	**I** 1	**III**	**III** 1
Encourages staff to speak up	3.16-2.49	26	**I** 2 2 2 2	II 1	I	II 2 1	III
Supports staff in developing skills	2.89-2.26	27	**I** 2 2	II 1 1	I	I	III
Divides the work fairly	3.64-3.39	7	I 2 2	II 1 1 1 1	II 1	I	II 1 1
Treats the staff fairly and equally	3.13-2.84	10	I 2 2	III 1 1 1	II 1	**I**	II 1 1 1
Feed back							
Says when a good job has been done	2.92-2.59	12	I 2 2 2	III 1 2 1	I 1	**I**	III 1 1 1
Says when the job has been poorly executed.	2.57-2.30	11	**III**	**III**	II 1	III	**I**

interface between the managers and the employees showed this important relationship.

Team spirit

Team spirit was measured through three items, two of which are often used to measure levels of social support.To be able to influence decisions in the work group was associated with all health measures. The main types of supportive social interactions have been described as emotional, informational and instrumental [39,40]. In our study, attention from the co-workers could be interpreted as informational support, since work teams that listen to suggestions from their co-workers involve the provision of information used to guide or advice.The support of co-workers may involve the provision of either physical assistance or emotional support.

Physical exercise

Physical exercise is not specific for work but reflects a lifestyle which influences well-being, as suggested from other studies [41,42].

Methodological considerations

The strength of this study is the very high response rate and the large number of participating workplaces. The study population was not a random sample of the general population, however, the data represented large occupational groups and can be regarded as representative of the public sector, at least in Sweden and similar countries. Due to the gender segregation of the labour market [43,24,44] the study population was largely female.

Another limitation is the cross-sectional study design, which is why the associations cannot be

interpreted as measures of causal associations and the correlation analysis is also not able to consider the multivariate genesis of the findings, so that methods of multivariate analysis are needed, but-according to the nature of the data- difficult to apply. In addition, some internal data was also missing, such as in the items describing relationships with the nearest supervisor and the manager's relationship with the unions. These items had the highest amount of internal missing

Appendix A

Work factors

The range of the scores is shown in brackets.

Decision latitude- Influence

1. Are you able to work at your own pace? (1-4)
2. Do you have enough time to complete your work tasks? (1-4)
3. Are you free to decide how your work will be conducted? (1-4)
4. Are you free to decide what should be done in your work? (1-4)
5. Are you able to choose between different methods of conducting your work? (1-5)
6. Are you able to influence decisions that affect your work? (1-5)

Learning - Development

1. Do you get to learn new things in your work? (1-4)
2. Does your work present opportunities for you to learn new things and develop within the profession? (1-3)
3. At my workplace, members of staff who have direct contact with customers (clients/students/patients) are able to influence the development of the business. (1-4)
4. At my workplace, we are able, and are encouraged to reflect upon problems and methods of improving the work processes. (1-3)
5. We question and review existing routines. (1-4)
6. Customers (clients/students/patients) influence the development of the business. (1-4)

Co-operation - Participation

1. There is a very good relationship between management and the union at my workplace.(1-4)
2. As a rule, I participate in the decision-making process in my capacity as an employee when important decisions that concern me and my co-workers are being made. (1-4)
3. There is a continuous exchange of information and feedback between members of staff and their nearest supervisor.(1-4)

Team spirit

1. I am able to influence decisions in my work group. (1-3)
2. The members of my work team listen to my suggestions. (1-3)
3. My co-workers are supportive.(1-3)

Relationship with nearest supervisor

1. I get along with my supervisors. (1-3)
2. Does your nearest supervisor encourage you to participate in the making of important decisions? (1-5)
3. Does your nearest supervisor encourage you to speak up when you disagree with him/her? (1-5)
4. Does your nearest supervisor provide support for you to develop your skills? (1-4)
5. Does your nearest supervisor divide the work in a fair and impartial manner? (1-5)
6. Does your nearest supervisor treat the staff fairly and equally?(1-4)

Feedback

1. Are you told when you have done a good job? (1-4)
2. Are you told when you have done a terrible job? (1-4)

This item was not analysed because of the high internal missing.

Planning and organisation of the work

Is the work at your workplace organised in such a manner that people with different career specialisations or functions work together...

1. in the actual execution of tasks?
2. in planning the work?
3. when working on the development of the business?

data, about 10%. In the work characteristic 'planning and organisation of the work together with people with different specialisations and functions', data was frequently missing in the medical care and domestic catering services. We took this to mean that these questions were of low relevance for this kind of work. It was therefore excluded from the statistical analyses.

The values of the correlations were relatively low but significant and thus indicated associations between the potential health-promoting factors and the proposed preventative measures.

The items of musculoskeletal pain and other health measures covered a period of three months and thus a recall bias must be considered. However, with reference to the studies of self-reported data the validity can be regarded as acceptable [45,46]. The results may also have been influenced by personal characteristics which could not be allowed for in the analyses, such as styles of coping, locus of control, poor self esteem, unrealistic expectations about work and co-workers, and other lifestyle factors. These conditions may have influenced the reporting of work factors as well the perceptions of the state of health.

Conclusions

The results highlight the importance of high levels of decision latitude, room for learning and development and the fairness and impartiality of supervisors for the promotion of health in public workplaces. The results could be used as a guide for the implementation of measures to improve the health of employees in the public sector, and of women in particular.

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