RESEARCH REPORT

Job control, job demands, or social class? The impact of working conditions on the relation between social class and health

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Background: The aim of the study was to investigate (1) how much of the association between health and social class is accounted by psychosocial working conditions, and (2) whether health is related to working conditions after controlling for social class.

Methods: The data derive from the surveys of the Helsinki health study, collected in 2000, 2001, and 2002 from 40–60 year old employees working for the City of Helsinki (n = 8970, response rate 67%). The study measured occupation based social class and Karasek's demand-control model. The health outcomes were self rated health as less than good and limiting longstanding illness. Age adjusted prevalence percentages and fitted logistic regression models were calculated.

Results: The individual effects of social class and psychosocial working conditions on self rated health and limiting longstanding illness were strong among both men and women. The relation between social class and both health outcomes considerably attenuated when job control was controlled for, but was reinforced when controlling for job demands. Controlling for both job control and job demands attenuated the relation between social class and self rated health and limiting longstanding illness among women, however, was reinforced among men.

Conclusions: A substantial part of the relation between social class and health could be attributed to job control, however, job demands reinforced the relation. Although the effect of social class is mediated by psychosocial working conditions, both social class and working conditions were related to health after mutual adjustments.

Numerous studies have shown that those with higher social class have better health.[1 2] Likewise, adverse physical and psychosocial working conditions have been found to be associated with health.[3 4] The poorer the working conditions the poorer the health. Furthermore, social class is related to psychosocial working conditions, to job control, and job demands. High job demands are more frequent in the higher social classes and low job control is more frequent in lower social classes.[5–7] However, the simultaneous impact of social class and psychosocial working conditions on health have seldom been studied. Some studies have found that a substantial part of occupational social class differences in health could be statistically accounted for by differential distribution of low job control.[5 8 9]

There are several theoretical and conceptual models interpreting the relation between psychosocial working conditions and health. One of the most well known is the job demand-control model or the Karasek model for short.[10 11] The demand-control model comprises two basic dimensions, job control and job demands. Job control and job demands have been shown to predict several health problems of the working environment. Studies have reported that high strain jobs—that is, low control and high demands—are associated with ill health.[3 7 11–14] The Karasek model has been applied in middle aged manual workers and with psychiatric disorders and cardiovascular disease. Less evidence is available on other domains of health, such as self rated health and limiting longstanding illness, and in both manual and non-manual workers. In contrast, in the health inequality research self rated health and limiting longstanding illness are commonly used outcome measures and the whole range of social classes is studied.[15 16]

The general aim of this study was to investigate the impact of working conditions and social class on self rated health and limiting longstanding illness among currently employed women and men. The more specific research questions were (1) how much of the association between health and social class can be accounted by psychosocial working conditions, and (2) whether health is related to working conditions after controlling for social class.

METHODS

Study population

This study is a part of the Helsinki health study of women and men employed by the City of Helsinki. The City of Helsinki has altogether about 40 000 employees. The main branches, in addition to general administration, include health care, social welfare, culture and education, public transport, technical and construction branches. The data for this study derive from the postal surveys of the Helsinki health study, collected in 2000, 2001, and 2002 from 40, 45, 50, 55, and 60 year old employees by the City of Helsinki. The total number of respondents was 8970, of whom 80% were women corresponding to the figure in the sample. The response rate was 67 (http://www.kttl.helsinki.fi/HHS).[17]

Ethical considerations

The study follows Finnish data protection legislation and ethical regulations of the University of Helsinki and the City of Helsinki. Participation to the study is voluntary and all participants have been informed of this. The protocol has been approved by ethical committees at the Department of Public Health, University of Helsinki, and at the City of Helsinki health authorities.

Table 1 Self rated health as below good and limiting longstanding illness by social class and psychosocial working conditions (%)

	Proportion		Self rated health		Limiting longstanding illness	
	Men	Women	Men	Women	Men	Women
Social class						
Manual workers	27	12	38	37	23	24
Routine non-manual workers	10	42	30	30	18	21
Semi-professionals	19	19	31	22	18	17
Managers and professionals	43	27	22	20	13	13
Job control						
1 lowest quintile	20	16	40	40	20	22
2	17	21	36	34	23	17
3	28	30	28	24	16	15
4 highest quintile	35	34	20	18	14	16
Job demands						
1 highest quintile	20	23	36	33	24	27
2	35	34	29	27	17	20
3	26	24	27	23	17	13
4 lowest quintile	19	18	25	22	11	17
Number	1758	7032				

Health measures

We used two health outcome measures. The first measure was self rated health estimated with the question ''In general, would you say your health is excellent, very good, good, fair, or poor.'' In this paper we focus on self rated health as less than good—that is, ''fair'' or ''poor'' health. Less than good self rated health was reported by 29% of men and 27% of women. Self rated health incorporates a variety of physical, emotional, and personal components of health which taken together comprise individual ''healthiness''. As such, self assessed health is a broad indicator of health related wellbeing and represents a global summary measure of health status.[18] In prospective studies, poor self rated health has proved to be a strong predictor of mortality.[19]

Limiting longstanding illness was elicited by asking ''Do you have any longstanding illness, disability or infirmity?'' If the answer was ''yes'', the follow up question was ''Does your illness/disability restrict your work or limit your daily activities (gainful employment, housework, schooling, studying)?''. This measure is a functional one as it directs attention to the consequences of illness in the living environment—that is, whether reported illnesses limit daily activities.[20] The prevalence of limiting longstanding illness was 17% among men and 18% among women. The correlation between health measures were for women 0.41 and for men 0.36.

Measures for social class and psychosocial working conditions

Social class was measured by the respondent's own occupational class categorised into: managers and professionals, semi-professionals, routine non-manual workers, and manual workers. As table 1 shows, the occupational structure in the City of Helsinki and public settings in general between men and women is very different, women work most often (42%) in routine non-manual jobs but men in upper non-manual jobs (managers and professionals) (43%). Age and sex adjusted correlations between health and social class categories varied from 0.35 to 0.40.

A measure combining job decision latitude or job control was based on the Karasek framework.[10 11] Equal weights were given to 19 statements to produce the scores. The measure of job control was a sum of nine items that had moderate internal consistency (Cronbach's α 0.77). The measure of job demands was a sum of 10 items (Cronbach's α 0.76).

Our measure of occupational social class is mainly based on education and income but also of prestige. Differentiating non-manual workers into categories was based on competence requirements and status supervisory status as well as on education. Differentiating manual workers from non-manual workers was based on the division between mental and physical work.[21] However, social class and job control

Table 2 Age adjusted odds ratios (and 95% CIs) for self rated health by social class, job control, and demands among men

	Age adjusted	Social class+job control	Social class+job demands	Social class+control+demands
Social class				
Manual workers	2.42 (1.86 to 3.15)	1.69 (1.24 to 2.30)	3.03 (2.29 to 4.00)	2.06 (1.50 to 2.83)
Routine non-manual workers	1.76 (1.21 to 2.56)	1.42 (0.96 to 2.09)	2.28 (1.54 to 3.38)	1.86 (1.24 to 2.78)
Semi-professionals	1.68 (1.25 to 2.25)	1.44 (1.06 to 1.95)	1.86 (1.38 to 2.51)	1.58 (1.16 to 2.15)
Managers and professionals	1.00	1.00	1.00	1.00
Job control				
1 lowest quintile	2.90 (2.14 to 3.92)	2.15 (1.52 to 3.05)		2.41 (1.69 to 3.45)
2	2.43 (1.77 to 3.34)	2.02 (1.44 to 2.82)		2.08 (1.48 to 2.93)
3	1.72 (1.29 to 2.29)	1.57 (1.17 to 2.10)		1.68 (1.25 to 2.26)
4 highest quintile	1.00	1.00		1.00
Job demands				
1 highest quintile	1.83 (1.30 to 2.58)		2.77 (1.92 to 4.02)	3.05 (2.09 to 4.44)
2	1.23 (0.90 to 1.69)		1.54 (1.11 to 2.14)	1.69 (1.21 to 2.37)
3	1.16 (0.83 to 1.62)		1.30 (0.92 to 1.83)	1.36 (0.96 to 1.92)
4 lowest quintile	1.00		1.00	1.00

Table 3 Age adjusted odds ratios (and 95% CIs) for self rated health by social class, job control, and job demands among women

	Age adjusted	Social class+job control	Social class+job demands	Social class+control+demands
Social class				
Manual workers	2.23 (1.85 to 2.69)	1.54 (1.26 to 1.89)	2.63 (2.17 to 3.19)	1.82 (1.48 to 2.23)
Routine non-manual workers	1.74 (1.51 to 2.01)	1.31 (1.13 to 1.53)	2.08 (1.79 to 2.41)	1.56 (1.34 to 1.83)
Semi-professionals	1.24 (1.04 to 1.48)	1.14 (0.95 to 1.36)	1.33 (1.11 to 1.59)	1.21 (1.01 to 1.46)
Managers and professionals	1.00	1.00	1.00	1.00
Job control				
1 lowest quintile	2.86 (2.42 to 3.38)	2.45 (2.04 to 2.93)		2.50 (2.09 to 3.00)
2	2.29 (1.96 to 2.68)	2.06 (1.75 to 2.42)		2.05 (1.74 to 2.42)
3	1.44 (1.24 to 1.67)	1.36 (1.16 to 1.58)		1.35 (1.16 to 1.58)
4 highest quintile	1.00	1.00		1.00
Job demands				
1 highest quintile	1.84 (1.54 to 2.19)		2.39 (1.99 to 2.87)	2.42 (2.01 to 2.91)
2	1.31 (1.11 to 1.55)		1.53 (1.29 to 1.82)	1.56 (1.31 to 1.85)
3	1.11 (0.93 to 1.33)		1.22 (1.02 to 1.46)	1.23 (1.02 to 1.47)
4 lowest quintile	1.00		1.00	1.00

and job demands are interrelated. The correlation between social class and job control was 0.43 and with job demands 0.23.

There was no interaction between job control and job demands, p values varied from 0.099 to 0.494 depending on sex and health measure. Thus, we used job control and job demands separately categorising them into quartiles.

Statistical methods

Prevalence percentages of the health outcomes were calculated using direct age standardisation with the entire study population as the standard population. To examine the associations between social class and working conditions with health further analyses used multivariate logistic regression models.[22] Models were fitted using the SAS statistical package. The results of the modelling are presented as odds ratios (OR). Model 1 presents all independent effects when only age is controlled for. Model 2 also included social class and job control, and model 3 included social class and job demands, model 4 is a final model including simultaneously all three ''explanatory'' indicators.

RESULTS

The lower the social class the higher the prevalence of less than good self rated health and limiting longstanding illness (table 1). Thirty eight per cent of male manual workers and 37% of female manual workers reported their health as less than good, while among managers and professionals the corresponding percentages were 21 and 22. Among men there was no difference between routine non-manual workers and semi-professionals. Among women the prevalence of less than good health was similar in the two highest groups. For limiting longstanding illness the prevalence was 23% for male manual workers and 24% for female manual workers and the corresponding percentages for the managers and professionals were 13% for women and men.

Investigating job control and job demands separately, the figures were rather constant. The lower the control, the poorer the health, and the higher the demands, the poorer the health.

The relations between social class, working conditions, and health were next clarified by using logistic regression analysis. We first examined self rated health by each independent variable separately in men and women. These analyses (tables 2 and 3) confirmed the results presented earlier: higher social class and better working conditions were associated with better self rated health.

When both social class and job control were included the odds ratios for manual workers attenuated compared with managers and professionals among men by 51% and among women by 56%. The social class gradient remained among men and women. Also the gradient by job control attenuated but remained statistically significant. When both social class and job demands were included in the analysis simultaneously the odds ratios for manual workers increased among male manual workers by 43% and among female manual workers by 33%. The gradient by job demands reinforced considerably. When all variables were included in the final

Table 4 Age adjusted odds ratios (and 95% CIs) for limiting longstanding illness by social class, job control, and job demands among men

	Age adjusted	Social class+job control	Social class+job demands	Social class+control+demands
Social class				
Manual workers	2.27 (1.67 to 3.09)	2.08 (1.45 to 2.97)	3.02 (2.18 to 4.19)	2.62 (1.80 to 3.80)
Routine non-manual workers	1.66 (1.06 to 2.59)	1.55 (0.99 to 2.45)	2.35 (1.48 to 3.75)	2.16 (1.34 to 3.47)
Semi-professionals	1.47 (1.03 to 2.10)	1.39 (0.97 to 2.00)	1.67 (1.16 to 2.39)	1.54 (1.07 to 2.23)
Managers and professionals	1.00	1.00	1.00	1.00
Job control				
1 lowest quintile	1.74 (1.22 to 2.48)	1.13 (0.75 to 1.71)		1.30 (0.86 to 1.98)
2	1.96 (1.37 to 2.81)	1.51 (1.03 to 2.22)		1.57 (1.06 to 2.32)
3	1.31 (0.94 to 1.83)	1.16 (0.82 to 1.63)		1.25 (0.88 to 1.77)
4 highest quintile	1.00	1.00		1.00
Job demands				
1 highest quintile	2.64 (1.71 to 4.05)		4.03 (2.55 to 6.37)	4.09 (2.58 to 6.49)
2	1.70 (1.13 to 2.56)		2.15 (1.41 to 3.28)	2.20 (1.43 to 3.36)
3	1.55 (1.01 to 2.37)		1.75 (1.13 to 2.70)	1.75 (1.13 to 2.71)
4 lowest quintile	1.00		1.00	1.00

Table 5 Age adjusted odds ratios (and 95% CIs) for limiting longstanding illness by social class, job control, and job demands among women

	Age adjusted	Social class+job control	Social class+job demands	Social class+control+demands
Social class				
Manual workers	1.77 (1.42 to 2.19)	1.39 (1.10 to 1.74)	1.98 (1.59 to 2.47)	1.55 (1.23 to 1.96)
Routine non-manual workers	1.66 (1.41 to 1.96)	1.38 (1.16 to 1.64)	1.89 (1.59 to 2.23)	1.56 (1.31 to 1.86)
Semi-professionals	1.38 (1.13 to 1.68)	1.30 (1.06 to 1.59)	1.45 (1.18 to 1.77)	1.36 (1.11 to 1.67)
Managers and professionals	1.00	1.00	1.00	1.00
Job control				
1 lowest quintile	2.06 (1.71 to 2.48)	1.80 (1.47 to 2.21)		1.82 (1.49 to 2.23)
2	1.81 (1.52 to 2.17)	1.65 (1.37 to 1.98)		1.62 (1.35 to 1.96)
3	1.39 (1.17 to 1.64)	1.31 (1.11 to 1.56)		1.30 (1.09 to 1.54)
4 highest quintile	1.00	1.00		1.00
Job demands				
1 highest quintile	1.48 (1.22 to 1.79)		1.79 (1.47 to 2.19)	1.80 (1.47 to 2.20)
2	1.09 (0.91 to 1.32)		1.23 (1.02 to 1.49)	1.24 (1.03 to 1.50)
3	0.91 (0.75 to 1.12)		0.98 (0.80 to 1.20)	0.99 (0.80 to 1.21)
4 highest quintile	1.00		1.00	1.00

analysis simultaneously the odds ratios for manual social class compared with the initial model decreased (25% among men and 33% among women) but remained statistically significant. However, the odds ratios for job control and job demands slightly increased among men.

The pattern for limiting longstanding illness was broadly similar to that for self rated health. The individual effects of social class, job control, and job demands were clear among men (table 4) and women (table 5). However, for women only those with highest job demands differed from the reference category. When both social class and job control were included in the analysis the odds ratios for limiting longstanding illness attenuated by 15% among male manual workers and by 49% among female manual workers. When both social class and job demands were included simultaneously the odds ratios increased by 59% among male manual workers and by 27% among female manual workers. In the final analysis, social class differences among male manual workers increased (28%), but decreased among female manual workers (29%) compared with the initial model.

DISCUSSION

This study sought to combine two research traditions, research on psychosocial working conditions and research on social class inequalities in health. The aim was to investigate how much of the association between health and social class and two global measures of health could be accounted by psychosocial working conditions, and whether health is related to working conditions after controlling for social class.

In our data of 7171 employed women and 1799 employed men the main findings were (1) the effects of social class and psychosocial working conditions on self rated health and limiting longstanding illness were strong among both women and men. (2) Controlling for job control attenuated the relation between social class and health but controlling for job demands reinforced the relation. (3) The effect of social class is mediated by psychosocial working conditions on health but they were also related to health after mutual adjustments.

In this study taking job control into account attenuated the association between social class and health. This result is in accordance with previous studies from the UK,[8 23] the Netherlands,[5] and Denmark.[6] These studies show that a substantial part of the relation between social class and health can be attributed to a different distribution of job control between the social classes. However, the impact of job demands on social class differences in health has been less investigated. According to two previous studies job demands did not contribute to the explanation of the relation between social class and self rated health.[5 23] In our data, controlling for job demands, in contrast with job control, reinforced the relation between social class and health for men and for women. This is because high job demands were more common in the higher non-manual groups. Sex differences were small. However, in longstanding the social class differences were more pronounced among men and especially the differences by job demands. This may be because our measure on social class may capture the hierarchy of working men better than women.

Psychosocial working conditions were measured by Karasek's job strain model. This model has been criticised because job control and job demands might only by indirect measures or surrogates for social class.[24] Simultaneously controlling for social class, job control, and job demands may result in bias. However, we agree with Theorell[25] that it is relevant to control for social class to clarify the independent effects but accordingly we also need analyses that are both controlled and non-controlled for social class. Our results showed that there were no interactions between the two dimensions, and job controls and job demands were analysed separately. Often job demands have been omitted in studies. However, we suggest that both dimensions of the demand-control model be included, but these dimensions should be studied separately.

It should also be noted that our study included a cross sectional design—that is, social class, working conditions, and health were measured at the same time. We thus cannot

What this paper adds

The paper adds to out knowledge that the impact of psychosocial working conditions on health inequalities is substantial, however, the impact of both working conditions and social class on health are partly independent.

Policy implications

To decrease health inequalities not only working conditions should be emphasised but also other material conditions that are related to social class.

determine the direction of causality. In addition, our data consisted only of employed people working for the City of Helsinki but the health differences were only slightly smaller than those found from a nationally representative sample of Finnish adults including also non-employed people.[26] It should also be acknowledged that only self reported indicators on working conditions and health were used. However, self rated health, for example, has been shown to predict subsequent hospitalisation and mortality.[19] For measures on job control and job demands self reported character should be kept in mind interpreting the results. We have used only one measure for social class—that is, occupational based social class. Other measures for socio-economic position such as income or education[27–29] might show somewhat different results. However, similar results have been found using other measures for socioeconomic position. Recent studies have shown that educational differences in health[30] as well as income differences in health[31] were partly mediated by working conditions. Further studies are needed using several measures of socioeconomic position in the same study.

The advantages of our study included that the data consisted of middle aged employees in a rather homogenous setting, for example, all respondents were working for the same employer, the City of Helsinki, and about 90% of the respondents were employed full time. The study was originally designed to investigate work related health problems and social class. The sample was large, especially for women, and the data included both non-manual and manual occupations. The response rate was satisfactory and the data were fairly representative. However, upper non-manual workers participated slightly more actively than other employees.[32]

In summary, psychosocial working conditions had an impact on the relation between social class and health. Depending on the dimension the working conditions either reinforced or attenuated the relation. Nevertheless, the relation between social class and health could not be entirely explained by job control or job demands. Social class and psychosocial working conditions were related to health after mutual adjustments.

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