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Downsizing of staff is associated with lowered medically certified sick leave in female employees

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Aim: To determine whether changes in number of staff in work sites are associated with medically certified sick leave among employees with an increased risk of developing cardiovascular disease.**Methods:** The 5720 employees (aged 18–65) were from the WOLF study of cardiovascular risk factors in working men and women in greater Stockholm during the years 1992–95. From the medical examination a cardiovascular score was calculated for each participant. The WOLF study base was linked to a Statistics Sweden registry of economic and administrative activities. Sick leave spells lasting for at least 15 days during the calendar year following downsizing/expansion were identified for each subject.**Results:** In multiple logistic regression an increased likelihood of having no medically certified sick leave (15 days or more) was found in women during the year following both downsizing and expansion. These analyses were adjusted for age and cardiovascular score. A high cardiovascular risk score reduced the likelihood of having no medically certified sick leave. The inclusion of psychosocial work environment variables did not change the results markedly. Separate analyses of women with and without high cardiovascular score showed that downsizing had a more pronounced effect on reduced long term sick leave among those with high than among those without low cardiovascular score. There were no consistent findings in men.**Conclusions:** There is evidence of a reduction of long term sick leave in women after downsizing and this is particularly evident among those with high cardiovascular score.

In many countries, downsizing of staff has been a common method during the 1990s for financial coping in a globalised and increasingly competitive market. Insufficient attention has been paid to health consequences for employees. Most studies of the unemployed have shown that they have increased health problems.^{1–5} At least among those who remain unemployed for a long period there is increased risk of developing serious illness such as cardiovascular disease.^{6–10} Recently it has been shown that downsizing is associated with increased sickness absence, both short (1–3 days) and long (more than 3 days) spells, among “survivors”—those remaining employed in the work site.^{11,12} There is a growing body of evidence that, due to their vulnerability, non-permanent employees take less sick leave than would be expected from their level of morbidity.¹³ In addition, they are more prone to experience job insecurity, a psychosocial stressor which has been associated with increased morbidity, and decreased sick leave than permanent employees.^{14,15} Another group of vulnerable employees in the context of downsizing are those with pre-existing health problems. It has been shown that those with health problems before downsizing are more likely to lose their jobs and less likely to regain secure employment.¹⁶ Despite this evidence, no work has examined the potential differential effect of downsizing on sickness absence specifically among those with pre-existing health problems, for example increased cardiovascular risk. It is possible that “medically vulnerable” employees in a downsizing situation feel that they have a reduced chance of finding a new job if they become unemployed. They would therefore be more likely than other subjects (who are not in a downsizing situation) with such vulnerability to abstain from using their right to stay away from work when they feel ill. This phenomenon has been labelled “sickness presenteeism” and has been studied in a Swedish epidemiological study which showed that it seemed to be particularly prevalent in the occupations which had a high prevalence of sick leave as well.¹⁷ Thus, sickness

presenteeism and sick leave may exist concomitantly in the same occupations—subjects who go to work even when they feel ill may be more likely than others to develop more serious illness resulting in long spells of sick leave. Such a relationship would be particularly evident in a group with high cardiovascular illness risk, for instance those with several cardiovascular risk factors.

In the present study there was also a possibility to examine possible effects on sick leave of expansion of staff. On the basis of previous research¹⁸ it has been hypothesised that a fluctuating economy inducing periods of reduction and periods of expansion in numbers of staff may create health problems in itself. When orders go down there is a reduction of staff but when the orders increase again, the staff will have difficulties to manage these demands and a need for increased staff will arise. Before new personnel have been employed and before these know their jobs the “survivors” will have to work harder than before. Thus, rapid expansion could also create health problems for the staff and even increase mortality.^{19–21}

Using the epidemiological cardiovascular WOLF (work, lipids, fibrinogen) database from Stockholm, associations between downsizing or expansion on the one hand and sickness absence in the presence or absence of increased cardiovascular risk on the other hand were examined in women and men.

The WOLF data allowed us to explore an additional question which could be formulated in the following way. If there is a relationship between downsizing and/or expansion and sickness presenteeism in subjects with cardiovascular risk, could this be predicted by psychosocial work environmental factors? The reason why subjects react in a certain way during downsizing or expansion periods could be that such

Abbreviations: DCQ, demand-control-support questionnaire; WOLF, work lipids, fibrinogen

periods are characterised by certain psychosocial working conditions. These conditions could be the real reason for the sickness absence behaviour and if so, the change in number of staff is of limited importance.

STUDY POPULATION AND METHODS

WOLF is a study of cardiovascular risk factors in the working population of Stockholm.²² Participants were employees in almost 40 companies served by 20 occupational health service units. The response rate was 76%.

The study group consisted of 5720 employees aged 18–65 in the greater Stockholm area. Several different branches of industry were represented, such as the pharmaceutical industry, transportation, public administration, telecommunications, sales work, teaching, heavy mechanical industry, construction, and banking.

The examination, which included a questionnaire and a medical examination with a blood sample, took place in the years 1992 to 1995, a period in Sweden during which marked downsizing took place both in the private and the public sector. For instance, in hospitals the average decrease in staff amounted to 20%.

The WOLF database was linked to a register of financial activities in Swedish companies and agencies created by Statistics Sweden. Using this register which is administered by Statistics Sweden, participants were divided into those who had been working in companies/agencies which had downsized (at least 8% decrease), expanded (at least 8% increase in number of employees), or remained stable (remaining work sites) for a 12 month period after the examination. The recording period in the register for changes in number of staff was from 1 November during the calendar year of the WOLF examination to 31 October the next year.

Sick leave was recorded during the calendar year following the 12 month period during which the change in change in number of staff was recorded. Data on sick leave were provided by the public insurance register which covers all Swedish citizens and is administered by The National Board of Public Insurance. Sick leave was dichotomised into no recorded medically certified sick leave or early retirement (“no sick leave”) and “sick leave”. Medically uncertified spells below 15 days were excluded.

A cardiovascular score based on the medical examination was calculated for every individual. This included serum cholesterol, triglycerides, HDL cholesterol, glucose, and orosomucoid (an indicator of inflammatory activity) as well as plasma fibrinogen, systolic blood pressure, body mass index, and cigarette smoking (yes/no). One risk point was assigned to an individual if he/she smoked or belonged to the worst quintile for the other eight variables. The cardiovascular score accordingly ranged from 0 to 9. The scoring was done separately for men and women. Subjects with a total score of at least 5 were operationally defined as high cardiovascular score subjects.

Psychosocial work environment variables were selected according to the demand–control–support model. The Swedish short version of the demand–control–support questionnaire (DCQ) was used^{23,24} with modifications. Psychological quantitative demands are identical to the psychological demands dimension, with one modification—a question regarding conflicting demands has been excluded due to low loading in factor analysis. The resulting index consists of four questions which all deal with tempo and load. Authority over decisions is represented by two questions about influence over “what” and “how” to perform work. Intellectual discretion is represented by four questions dealing with possibilities to learn new things at work and variation. Both of these dimensions are identical to the DCQ dimension authority over decisions and intellectual discretion. Social support finally is represented by four of six questions in the DCQ. They deal with

workmate atmosphere, cohesion, and communication climate. All the psychosocial dimensions were dichotomised. The quartile with the worst scores was operationally defined as “exposed”. The same cut offs were used for men and women.

Social class was based on the Nordic version of the International Classification of Occupations, and the study population was divided into white collar and blue collar occupations.

Multiple logistic regression was used, with no sick leave episode exceeding 14 days (below this will be labelled no long sick leave) as outcome. All analyses were done separately for men and women. In the first step, age, cardiovascular score, and expansion/downsizing were used as explanatory variables. In the second step, separate analysis according to step 1 was done for white collar and blue collar workers. In the third step, the four psychosocial work environment factors were added as potential explanatory variables to the model used in step 1.

The fourth step comprised analyses of the probability of having no sick leave among those in the downsizing situation, compared to the stable group, performed separately for those with and without a high cardiovascular score. Similarly, we compared workers in the expansion situation with those in the stable group, also stratifying on the cardiovascular score. In the fifth step this analysis was performed again, but with social class (white collar/blue collar) as confounder. Analyses in the fourth and fifth steps were performed in the same way also for expansion.

RESULTS

A total of 2742 men and 2161 women aged 15–64 (mean 39) with complete data were included in the present study; 418 men (15%) and 277 (13%) women belonged to the high cardiovascular score group. Ninety three per cent of the men with low cardiovascular score and 88% of the men with high cardiovascular score had no medically certified sick leave (exceeding 14 days) during the study period. The corresponding percentages of subjects with no long sick leave periods for women were 88% (low risk) and 79% (high risk) respectively. Of the men, 484 (18%) had downsizing and 654 (24%) expansion going on at their workplaces. Of the women, 349 (16%) had downsizing and 664 (31%) expansion going on at their workplaces.

Total effects

Table 1 shows the results of multivariate analyses of downsizing, expansion, age, and dichotomised cardiovascular score. In women, both downsizing (odds ratio (OR) = 2.18, 95% confidence interval (CI) 1.45 to 3.28) and expansion (OR 1.51, 95% CI 1.13 to 2.02) were associated with increased likelihood of no long sick leave, while high cardiovascular score tended to decrease this likelihood (OR 0.52, 95% CI 0.37 to 0.73). In men there were no statistically significant effects of cardiovascular score, downsizing, or expansion in the multivariate analyses. High cardiovascular score decreases the likelihood of having no long sick leave in men (OR = 0.69, 95% CI 0.49 to 0.97). As expected, increasing age was associated with decreased likelihood of no medically certified sick leave, both in men and women.

The same analyses were also performed separately for female and male white collar and female and male blue collar workers. There were only 346 female blue collar workers. Due to relatively small numbers, particularly in some of the subcells, the estimates were considered unreliable for this group and none of the statistical associations reached significance.

For female white collar workers (n = 1568) the findings for downsizing and expansion were similar to those for the total group, albeit attenuated and statistically non-significant.

Table 1 Downsizing, expansion, and cardiovascular risk factor index in relation to no long sick leave; multiple logistic regression with no long sick leave as dependent variable

Variable	Wald	p	OR	95% CI	Direction
Women (n=2161)					
Age (continuous, 10 years effect)	1.81	0.192	0.90	(0.79 to 1.04)	–
Downsizing/expansion	17.85	0.000			
Downsizing	13.84	0.000	2.18	(1.45 to 3.28)	+
Expansion	7.71	0.005	1.51	(1.13 to 2.02)	+
High cardiovascular score	14.60	0.000	0.52	(0.37 to 0.73)	–
Men (n=2742)					
Age (continuous 10 years effect)	16.58	0.000	0.69	(0.60 to 0.85)	–
Downsizing/expansion	0.67	0.716			
Downsizing	0.58	0.447	1.16	(0.80 to 1.68)	+
Expansion	0.23	0.634	1.09	(0.77 to 1.54)	+
High cardiovascular score	4.57	0.032	0.69	(0.49 to 0.97)	–

For male white collar workers (n = 1428), the separate analysis was quite different from the analysis of the total group. All of the associations were far from significant. Both of the effects of downsizing and expansion showed a direction that was opposite to the one observed in the total analysis.

The results of the separate analysis of male blue collar workers (n = 942), on the other hand, were similar to the analysis of the total male group. The effects of downsizing and expansion were stronger than in the total group analysis, but they were far from reaching statistical significance.

Effects of the psychosocial work environment

Table 2 shows the results of the addition of four psychosocial work environment variables to the multiple logistic regression models in table 1. For women the results are relatively similar to those in table 1. Thus the addition of the work environment variables has small effects of the relationships between downsizing, expansion, and cardiovascular risk on the one hand and likelihood of having no long sick leave on the other hand. A low level of intellectual discretion is associated with a decreased probability of having no long sick leave (OR = 0.70, 95% CI 0.52 to 0.95).

The results for men are also similar to those in table 1. The work environment variables therefore make little difference. With regard to women, a low level of intellectual discretion decreases the likelihood of having no medically certified sick

leave during follow up (OR = 0.56, 95% CI 0.41 to 0.77) independently of other factors. There is a similar finding for decision authority (OR = 0.55, 95% CI 0.40 to 0.75).

Separate analyses of high/low cardiovascular risk groups
Table 3 shows the results of the analyses of relative likelihood of having no long sick leave among those in the downsizing and expansion situation respectively. Separate analyses are presented for those with and without high cardiovascular score. The reference group is the stable group. The relative age standardised likelihood in women with cardiovascular risk of no long sick leave after downsizing was 3.96 (95% CI 1.29 to 8.92) compared to women in the stable group with a high cardiovascular score. The corresponding likelihood in women with low cardiovascular score in the downsizing situation was 1.86 (1.02 to 2.45).

In additional analyses, social class (white collar/blue collar) was added as a confounder. This resulted in slightly attenuated but still significant relationships. For women the odds ratios for downsizing in high and low risk were 3.23 (95% CI 1.18 to 8.88) and 1.84 (95% CI 1.15 to 2.96) respectively. In the high cardiovascular score group, blue collar female workers had a lower likelihood than white female collar workers to have no long sick leave (OR = 0.44, 95% CI 0.20 to 0.97), but this association was not significant in the corresponding comparison for women without a high cardiovascular score (OR = 0.72, 95% CI 0.46 to 1.12).

Table 2 Addition of four psychosocial work environment variables to the analyses presented in table 1

Variable	Wald	p	OR	95% CI	Direction
Women (n=2054)					
Age (continuous, 10 years effect)	2.19	0.139	0.90	(0.77 to 1.03)	–
Downsizing/expansion	14.11	0.001			
Downsizing	11.27	0.001	2.05	(1.34 to 3.12)	+
Expansion	5.81	0.016	1.45	(1.07 to 1.96)	+
High cardiovascular score	10.63	0.001	0.56	(0.39 to 0.79)	–
Social support (low)	0.76	0.384	0.88	(0.67 to 1.17)	–
Decision authority (low)	0.19	0.666	0.94	(0.71 to 1.25)	–
Quant. demands (high)	0.01	0.924	0.99	(0.73 to 1.34)	–
Intellectual discr. (low)	5.56	0.018	0.70	(0.52 to 0.95)	–
Men (n=2651)					
Age (continuous, 10 years effect)	22.43	0.000	0.66	(0.47 to 0.80)	–
Downsizing/expansion	0.51	0.774			
Downsizing	0.20	0.657	1.09	(0.74 to 1.62)	+
Expansion	0.19	0.665	0.92	(0.65 to 1.32)	–
High cardiovascular score	3.27	0.070	0.72	(0.51 to 1.03)	–
Social support (low)	0.27	0.599	0.92	(0.68 to 1.25)	–
Decision authority (low)	14.45	0.000	0.55	(0.40 to 0.75)	–
Quant. demands (high)	0.02	0.899	1.02	(0.71 to 1.47)	+
Intellectual discr. (low)	13.00	0.000	0.56	(0.41 to 0.77)	–

Table 3 Likelihood (and 95% CI) of having no long sick leave after downsizing in four subgroups: women and men with high and low cardiovascular score

	Women high		Women low		Men high		Men low	
	Downsized	Stable	Downsized	Stable	Downsized	Stable	Downsized	Stable
No certified sick leave (n)	52	104	277	800	79	212	381	1203
Long term sick leave (n)	5	40	25	130	16	28	23	103
Odds ratio	3.96		1.86		0.65		1.49	
95% CI	(1.47 to 10.66)		(1.19 to 2.92)		(0.34 to 1.27)		(0.93 to 2.38)	

"Expansion subjects" excluded. Odds ratios are adjusted for age. Referents are those in the stable group (neither downsizing nor expansion).

For men there were no significant relationships between downsizing and long sick leave, either with or without social class included as a potential confounder.

Corresponding analyses of statistical effects of expansion were also performed with exclusion of subjects in the downsizing group. There was no statistical association between long sick leave and expansion in the high cardiovascular score group, neither in men nor in women. In women—but not in men—with low cardiovascular score there was, however, an increased likelihood of having no certified long term sick leave in the expansion group with an odds ratio of 1.48 (1.08–2.02) without social class included as a potential confounder. With social class included in the analysis this odds ratio increased slightly to 1.60 (1.14–2.23). Accordingly there was an increased likelihood in women with low cardiovascular risk score to have no long sick leave in expanding workplaces.

DISCUSSION

Both expansion and downsizing reduced the incidence of medically certified sick leave in women but not in men. Among male white collar workers there was no such finding. Male blue collar workers tended, however, to have lowered medically certified sick leave both in downsizing and expansion. Thus, a difference was observed between social strata. Traditionally, blue collar workers are at higher risk of unemployment.

Calculations of the effects on downsizing in subjects with and without cardiovascular risk showed a stronger reduction of long sick leave in women with a high cardiovascular risk score than in women without a high cardiovascular risk score.

Among women with low cardiovascular score there was also a reduction of sick leave after expansion. Expansion could be a sign of prosperous and healthy activity which may promote health.

A low intellectual discretion decreased the likelihood of having no medically certified sick leave during follow up both in men and women. In addition, low decision authority was associated with decreased likelihood in men, indicating an association with low job control—which is in line with previous research.^{25–26} These associations, however, did not change the observed relationships between downsizing/expansion and cardiovascular risk on the one hand and sick leave on the other hand. In a Finnish study a similar observation was made in the sense that work environment variables do contribute to sick leave patterns, but they do not "explain away" effects of downsizing on the incidence of sick leave.²⁷ This means that the association between downsizing and long spells of sick leave has to be explained by factors other than the psychosocial work environment. It speaks in favour of the hypothesis that it is the labour market factor itself that could be the main explanation—fear of job loss.

Sweden and Stockholm are not necessarily representative of the industrialised world. During the studied period Sweden was going through a major financial crisis which affected the labour force in a pronounced way. This change was more sudden and more profound in Sweden than in most other coun-

tries. Similar findings of an association between job threat and decreased sick leave have been made in Great Britain, however, in state employees during a period of major restructuring of the British labour market.²⁸

It may be surprising that the prevalence of expansion was higher than the prevalence of downsizing—despite the fact that there was increasing unemployment during the study period. Expansion corresponded to centralisation in the public sector. Accordingly a department in the region may have become redundant. Some of those who had been working there became unemployed, whereas others were moved to a department that participated in this study.

Eight per cent was used as a cut off for the definition of downsizing and expansion, respectively. The rationale behind this was that another research group has been using this cut off and we considered it important to allow comparability.

The timing of expansion/downsizing and sick leave episode exceeding 14 days was determined by the data sets available at Statistics Sweden and the Board of Public Insurance respectively; unfortunately it was done by whole years (yes/no), which means that a detailed analysis of timing was not possible. Therefore execution of more sophisticated statistical analyses such as Cox proportional regression was not possible. Accordingly we may have lost sick leave episodes due to imperfect matching of study periods. Since the month of occurrence of downsizing or expansion is unknown, it is not possible to distinguish the workers for which the data correspond to delayed effects of staff change on sick leaves more than one year after such a change (14th to 25th month) from rather short term effects (3rd to 14th month).

The studied indicator of sick leave in the present study was constructed in such a way that it should be insensitive to changes in benefits during the study period. Accordingly a relatively long sick leave period which required a medical certificate was chosen as outcome, and premature retirement due to illness was also included in this outcome. Thus, our findings do not capture short spells of absence. Factors underlying short spells are different from those underlying long spells. Short spells could not be analysed in the present study because temporary changes in benefits took place during the study period and because very short spells are recorded only by the employer.

A puzzling finding was that the cardiovascular risk indicator was related to incidence of sick leave only in women and not in men. In women the expected tendency was found: those with a high cardiovascular risk had a higher incidence of sick leave than other women. We could only speculate about this. However, it has been observed in previous research²⁹ that male middle aged building construction workers who suffer a myocardial infarction are more likely to have had no sick leave during the past year compared to other same aged construction workers.

Why women show more clear patterns of associations than men is not known. We could only speculate about this. Women tend to occupy more precarious labour market positions than men, being more often employed on temporary or part time contracts, and as workers in the secondary labour market.³⁰

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REFERENCES

- 1 **Cook DG**, Cummins MJ, Bartley MJ, *et al*. The health of unemployed middle aged men in Britain. *Lancet* 1982;*i*:1290–4.
- 2 **Darcy C**, Siddique CM. Unemployment and health: an analysis of Canada Health data. *Int J Health Services* 1985;**15**:609–35
- 3 **Mathers CD**, Schofield DJ. The health consequences of unemployment: the evidence. *Med J Aust* 1998;**168**:178–82.
- 4 **Janlert U**. *Work deprivation and health: consequences of job loss and unemployment*. Lulea, Sweden, Karolinska Institutet, Stockholm, 1991.
- 5 **Hammarstrom A**. Health consequences of youth unemployment. *Public Health* 1994;**108**:403–12.
- 6 **Moser KA**, Fox AJ, Jones DR. Unemployment and mortality in the OPCS longitudinal study. *Lancet* 1984;*ii*:1324–9.
- 7 **Morris JK**, Cook DG, Shaper AG. Loss of employment and mortality. *BMJ* 1994;**308**:1135–9.
- 8 **Weber AA**, Lehnert G. Unemployment and cardiovascular disease: a causal relationship? *Int Arch Occup Environ Health* 1997;**70**:153–60.
- 9 **Cook DG**. Can we detect an effect of unemployment on cardiovascular morbidity or mortality? *Postgrad Med J* 1986;**62**:801–4.
- 10 **Crombie IK**, Kenicer MB, Smith WCS, *et al*. Unemployment, socioenvironmental factors and coronary heart disease in Scotland. *Br Heart J* 1989;**61**:172–7.
- 11 **Vahtera J**, Kivimäki M, Pentti J. Effect of organisational downsizing on health of employees. *Lancet* 1997;**350**:1124–8.
- 12 **Kivimäki M**, Vahtera J, Griffiths A, *et al*. Sickness absence and organisational downsizing. In: Burke RJ, Cooper CL, eds. *The organisation in crisis: downsizing, restructuring and privatization*. Oxford: Blackwell, 2000:78–94.
- 13 **Virtanen M**, Kivimäki M, Elovainio M, *et al*. Contingent employment, health and sickness absence. *Scand J Work Environ Health* 2001;**27**:365–72.
- 14 **Beale N**, Nethercott S. Certificated sickness absence in industrial employees threatened with redundancy. *BMJ* 1988;**296**:1508–10.
- 15 **Ferrie JE**, Shipley MS, Marmot MG, *et al*. Job insecurity in white-collar workers: Towards an explanation of associations with health. *J Occup Health Psychol* 2001;**6**:26–42.
- 16 **Ferrie JE**. Labour market status, insecurity and health. *J Health Psychol* 1997;**2**:373–97.
- 17 **Aronsson G**, Gustafsson K, Dallner M. Sick but yet at work. An empirical study of sickness presenteeism. *J Epidemiol Community Health* 2000;**54**:502–9.
- 18 **Brenner MH**. Relation of economic change to Swedish health and social well-being, 1950–1980. *Soc Sci Med* 1987;**25**:183–95.
- 19 **Brenner MH**, Mooney A. Economic change and sex-specific cardiovascular mortality in Britain 1955–1976. *Soc Sci Med* 1982;**16**:431–42.
- 20 **Eyer J**. Prosperity as a cause of death. *Int J Health Serv* 1977;**7**:125–50.
- 21 **Eyer J**. Does unemployment cause the death rate peak in each business cycle? A multifactor model of death rate change. *Int J Health Services* 1977;**7**:125–50.
- 22 **Theorell T**, Alfredsson L, Westerholm P, *et al*. Coping with unfair treatment at work—what is the relationship between coping and hypertension in middle-aged men and women? *Psychother Psychosom* 2000;**69**:86–94.
- 23 **Theorell T**, Perski A, Åkerstedt T, *et al*. Changes in job strain in relation to changes in physiological state—a longitudinal study. *Scand J Work Environ Health* 1988;**14**:189–96.
- 24 **Theorell T**. The demand-control-support model for studying health in relation to the work environment—an interactive model. In: Orth-Gomér K, Schneiderman N, eds. Lawrence Erlbaum Associates, 1996:69–85.
- 25 **North FM**, Syme SL, Feeney A, *et al*. Psychosocial environment and sickness absence among British civil servants: the Whitehall II study. *Am J Public Health* 1996;**86**:332–40.
- 26 **Niedhammer I**, Bugel I, Goldberg M, *et al*. Psychosocial factors at work and sickness absence in the Gazel cohort: a prospective study. *Occup Environ Med* 1998;**55**:735–41.
- 27 **Kivimäki M**, Vahtera J, Pentti J, *et al*. Factors underlying the effect of organisational downsizing on health of employees: longitudinal cohort study. *BMJ* 2000;**320**:971–5.
- 28 **Ferrie JE**, Shipley MJ, Marmot MG, *et al*. Job insecurity in white-collar workers: toward an explanation of associations with health. *J Occup Health Psychol* 2001;**6**:26–42.
- 29 **Theorell T**, Olsson A. Mångårigt betongarbete och hjärtinfarktisk—några synpunkter på ett samband [Concrete work lasting for many years—some viewpoints regarding an association]. *Soc Med Tidskr* 1978;**55**:99–104.
- 30 **Hartley J**, Jacobson D, Klandermans B, *et al*. *Job insecurity: coping with jobs at risk*. London: Sage Publications Ltd, 1991.