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Job insecurity and incident coronary heart disease: The Whitehall II prospective cohort study☆

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ABSTRACT

Objective: This study uses a prospective design to examine the association between self-reported job insecurity and incident coronary heart disease; an association which has been little investigated previously.
Methods: Participants were 4174 British civil servants (1236 women and 2938 men), aged 42 to 56 with self-reported data on job insecurity and free from coronary heart disease at baseline (1995–6). These participants were followed until 2002–4, an average of 8.6 years, for incident fatal coronary heart disease, clinically verified incident non-fatal myocardial infarction, or definite angina (a total of 168 events).
Results: Cox proportional hazard models adjusted for socio-demographic characteristics showed job insecurity to be associated with a 1.42-fold (95% CI, 1.05–1.93) risk of incident coronary heart disease compared with secure employment. Adjustment for physiological and behavioral cardiovascular risk factors had little effect on this estimate; 1.38 (1.01–1.88).
Conclusion: This study suggests that job insecurity may adversely affect coronary health.

1. Introduction

In the UK the government plans to cut 880,000 public sector jobs by 2017 [1]. Economic crises across Europe in the wake of the banking crisis and ongoing high levels of job insecurity and unemployment in the US indicate that this is not a problem limited to the UK. With knock on effects on local economies and further job losses in those sections of the private sector dependent on public sector money, many workers are experiencing a high degree of job insecurity.

Evidence strongly suggests that unemployment is associated with increased physical and psychological morbidity and increased mortality [2,3]. However, evidence of a link between job insecurity, or the threat of unemployment, and health outcomes, with the exception of psychological well-being and some self-reported health outcomes [4–8], remains very limited. Given that self-reported job insecurity is a strong psychosocial stressor [9], surprising little work has examined its association with coronary heart disease (CHD), the classic objective health outcome in much stress-related research [10].

The three population studies to date have produced mixed findings. A study in men provided no evidence of an association between self-reported job insecurity and ischemic heart disease after adjustment for somatic and behavioral coronary risk factors [11]. After similar adjustment, a study in 36,910 women did show an association between self-reported job insecurity and non-fatal myocardial infarction (MI), but no association with total CHD or fatal CHD over a 2-year follow-up, or with any outcome after 4 years [12]. Lastly, an association between self-reported job insecurity and cardiovascular disease observed in analyses adjusted for age, race and randomization among 22,086 women in an aspirin and Vitamin E placebo-controlled trial was attenuated on adjustment for education and income [13]. To address this equivocal evidence we undertook a prospective analysis of self-reported job insecurity and incident CHD in a cohort of white-collar workers, approximately two-thirds men.

Abbreviations: BP, blood pressure; CI, confidence interval; CHD, coronary heart disease; HR, hazard ratio; MI, myocardial infarction.

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2. Methods

2.1. Study population

The target population for the Whitehall II study was all London-based office staff aged 35–55 in 20 civil service departments in 1985. Of these, 10,308 enrolled; a response rate of 73%. Data collection at enrollment, Phase 1 (1985–1988) involved a clinical examination, which obtained physiological measures, and a self-administered questionnaire covering socio-economic factors, health, work and lifestyle. Subsequent data collection phases have alternated between a questionnaire (even-numbered phases), and questionnaire plus clinical examination (odd-numbered phases) [14]. This study uses data from Phase 4 (1995–1996) when participants were aged 42–56 and self-reported job insecurity was included for the first time.

2.2. Exposure, outcome and covariates

Self-reported job insecurity was measured using the question 'How secure is your present job?' Response categories 'Very insecure' and 'Insecure' were collapsed to form the 'insecure' exposure group and 'Very secure' and 'Secure' to form the reference group. Follow-up of incident fatal CHD, clinically verified incident non-fatal myocardial infarction, or definite angina until Phase 7 (2002–2004) provided a mean follow-up for CHD events of 8.6 years (S.D. 1.9). Incident CHD comprised coronary death, first non-fatal MI, or first definite angina. The British National Health Service Central Registry provided information regarding the date and cause of all deaths. These deaths were classified as coronary either if International Classification of Diseases Ninth Revision (ICD9) codes 410 to 414, or ICD10 codes I20 to I25, were cited on the death certificate. Non-fatal MI was defined using the WHO MONICA Project criteria [15] and ascertained using data from Whitehall II study resting electrocardiograms (ECGs) recorded every 5 years; and ECGs and cardiac enzyme levels obtained from records during hospitalization for acute myocardial infarction. Definite angina was defined by clinical records, abnormalities on ECG or coronary angiogram, and nitrate medication use, but excluded self-reports not clinically verified [16]. Two trained experts classified cardiac events and reached agreement on inconsistencies. Covariates included age, sex, marital status, occupational grade level, and prevalent diabetes (measured at Phase 4); systolic and diastolic blood pressure, cholesterol and body mass index (BMI), smoking, alcohol consumption, daily fruit and vegetable use, hours/week of moderate or vigorous exercise (measured at Phase 3, 1991–1994) [14]. The role of mental health in the association between job insecurity and CHD was examined using the SF-36 mental health score (a 5-item scale assessing psychological well-being) [17].

2.3. Sample selection

Out of the 5411 participants still employed by the Civil Service at Phase 4, 4922 responded to the question on self-reported job insecurity. Of these, 4316 had complete data for the covariates. Removal of 142 participants with prevalent CHD left 4174 participants in the analyses.

2.4. Statistical analysis

Associations between self-reported job insecurity and baseline characteristics were examined using a chi-squared test for heterogeneity. For continuous measures, differences between insecure and secure groups were assessed using univariate analysis of variance. After confirmation that the proportional hazards assumption were met (time-dependent interaction term between job insecurity and log of the follow-up period for CHD was non-significant $p = 0.49$), Cox proportional hazard models with follow-up period as the time scale were used to examine the association between job insecurity and incident CHD. Secure employees formed the reference category used to calculate hazard ratios and their 95% confidence intervals. Models were serially adjusted for covariates to examine whether they affected the association. As there was no interaction between sex and job insecurity in relation to CHD ($p = 0.17$), women and men were combined.

3. Results

Forty percent of participants reported that their job was insecure. Table 1 presents the distribution of baseline covariates by self-reported job security. Insecure participants were slightly younger than secure participants, *more likely* to be lower in the occupational hierarchy and have a higher BMI, and *less likely* to eat fruit and vegetables daily. Otherwise, self-reported job security was evenly

Table 1
Characteristics of the participants by self-reported job insecurity at baseline.

Characteristics	All ($n = 4174$)	Job insecurity at baseline		
		Secure ($n = 2506$)	Insecure (1668)	p-Value[a]
Age (years), Mean (S.D.)	50.3 (4.9)	50.5 (5.1)	50.1 (4.7)	0.009
Sex, (n%)				0.10
Men	2938 (70)	1788 (71)	1150 (69)	
Women	1236 (30)	718 (29)	518 (31)	
Marital status, (n%)				0.27
Married/cohabiting	3254 (79)	1968 (79)	1286 (77)	
Non-married/ cohabiting	920 (21)	538 (21)	382 (23)	
Occupational grade level, (n%)				<0.001
I highest	789 (19)	514 (21)	275 (16)	
II	924 (22)	597 (24)	327 (20)	
III	591 (14)	345 (14)	246 (15)	
IV	699 (17)	395 (16)	304 (18)	
V	567 (14)	302 (12)	265 (16)	
VI lowest	604 (14)	353 (14)	251 (15)	
Prevalent diabetes, (n%)				0.89
No	4095 (98)	2458 (98)	1637 (98)	
Yes	79 (2)	48 (2)	31 (2)	
Systolic BP[b](mmHg), Mean (S.D.)	119.5 (12.9)	119.6 (12.9)	119.2 (13.0)	0.31
Diastolic BP (mmHg), Mean (S.D.)	79.2 (9.1)	79.3 (9.2)	79.1 (9.1)	0.60
Cholesterol (mmol/L), Mean (S.D.)	6.4 (1.2)	6.4 (1.1)	6.4 (1.2)	0.47
Body mass index (kg/m^2), Mean (S.D.)	25.0 (3.6)	24.9 (3.6)	25.2 (3.7)	0.010
Smoking, (n%)				0.33
Never	2209 (53)	1343 (54)	866 (52)	
Ex	1412 (34)	846 (34)	566 (34)	
Current	553 (13)	317 (13)	236 (14)	
Alcohol use (units/week), (n%)				0.08
0	745 (18)	420 (17)	325 (19)	
0–14 (women)/–21 (men)	2706 (65)	1648 (66)	1058 (63)	
> 14/21	723 (17)	438 (17)	285 (17)	
Daily fruit and vegetable use				0.002
Yes	2566 (61)	1588 (63)	978 (59)	
No	1608 (39)	918 (37)	690 (41)	
Moderate/vigorous exercise (hrs/week)				0.95
<1.5	1359 (33)	815 (33)	544 (33)	
≥1.5	2815 (67)	1691 (67)	1124 (67)	

[a] p-Value for difference in Chi-square test and univariate analysis of variance.
[b] BP = blood pressure.