Individual employment histories and subsequent cause specific hospital admissions and mortality: a prospective study of a cohort of male and female workers with 21 years follow up

C Metcalfe, G Davey Smith, J A C Sterne, P Heslop, J Macleod, C Hart

Department of Social Medicine, University of Bristol, Bristol, UK
C Metcalfe
G Davey Smith
J A C Sterne
P Heslop

Department of Primary Care and General Practice, University of Birmingham, Birmingham, UK
J Macleod

Department of Public Health, University of Glasgow, Glasgow, UK
C Hart

Correspondence to:
Mr Metcalfe, MRC Biostatistics Unit, Institute of Public Health, University Forvie Site, Robinson Way, Cambridge CB2 2SR, UK
(chris.metcalfe@mrc-bsu.cam.ac.uk)

Accepted for publication
8 March 2001

It is a widely held view that the labour market is demanding increased levels of flexibility, and that this is causing greater psychosocial stress among employees.[1] Such stress may affect health, either through neuroendocrine pathways, or through increases in behaviours linked with poor health.[2] Previously we presented evidence linking an unstable employment history, as measured by a greater number of job changes and shorter duration of current job, with a greater prevalence of smoking and greater alcohol consumption, in male and female workers.[3 4] Despite this, we did not observe clear detrimental effects of such instability on health related physiological measures (body mass index, diastolic blood pressure, cholesterol, and lung function), nor on current cardiovascular health (electrocardiogram determined ischaemia and reported symptoms of angina).

Finding work is easier for healthy persons, and those persons who need to find work repeatedly will be particularly likely to drop out of the workforce if their health deteriorates. Consequently, an occupational cohort, upon which our previous work was based, is least likely to include people of poor health with an unstable work history. If such people are underrepresented, attempts to determine the association between health and individual work histories will mislead. This study links the same cohort to information on the hospitalisations

Table 1 Relations between job stability measures and cause specific death and hospital admission for men (M) and women (F). Hazard ratios (HR) are for a one category increase in the job stability measure (either number of job changes or time since a job change, both determined at baseline). A series of models are fitted with accumulating control for age, three measures of social class, and, where appropriate, behavioural measures taken at baseline

		Men (n=5399)		*Women (n=945)*	
		Number of job changes	*Time since a job change*	*Number of job changes*	*Time since a job change*
Cause and outcome	*Controlling for*	*HR (95% CI)*	*HR (95% CI)*	*HR (95% CI)*	*HR (95% CI)*
All cause mortality					
(M=1534, F=160)	Age	1.07 (1.03, 1.10)	0.95 (0.92, 0.98)	1.06 (0.95, 1.19)	0.96 (0.87, 1.04)
	+ father's social class, own first social class, own baseline social class	1.02 (0.98, 1.05)	0.98 (0.95, 1.01)	1.06 (0.94, 1.20)	0.95 (0.87, 1.04)
	+ smoking, alcohol consumption, physical exercise	0.99 (0.96, 1.03)	1.00 (0.96, 1.03)	1.02 (0.90, 1.15)	0.97 (0.88, 1.06)
Cardiovascular disease (ICD-9: 390–459)					
Death	Age	1.04 (0.99, 1.09)	0.98 (0.94, 1.02)	1.14 (0.95, 1.37)	0.94 (0.82, 1.08)
(M=790, F=65)	+ father's social class, own first social class, own baseline social class	0.98 (0.94, 1.03)	1.01 (0.96, 1.05)	1.14 (0.95, 1.37)	0.94 (0.81, 1.08)
	+ smoking, alcohol consumption, physical exercise	0.96 (0.91, 1.01)	1.02 (0.98, 1.07)	1.11 (0.93, 1.34)	0.94 (0.81, 1.09)
Death / hospital	Age	1.05 (1.02, 1.08)	0.97 (0.95, 1.00)	1.10 (1.00, 1.22)	0.96 (0.89, 1.04)
(M=1858, F=209)	+ father's social class, own first social class, own baseline social class	1.00 (0.97, 1.04)	1.01 (0.98, 1.04)	1.09 (0.98, 1.21)	0.97 (0.89, 1.04)
	+ smoking, alcohol consumption, physical exercise	0.99 (0.96, 1.02)	1.02 (0.99, 1.05)	1.07 (0.97, 1.20)	0.98 (0.91, 1.06)
Smoking related cancers (ICD-9: 140, 141, 143–150, 157, 160–163, 188, 189)					
Death	Age	1.10 (1.02, 1.19)	0.88 (0.83, 0.95)	1.03 (0.76, 1.40)	0.98 (0.77, 1.24)
(M=269, F=22)	+ father's social class, own first social class, own baseline social class	1.02 (0.94, 1.12)	0.91 (0.85, 0.98)	1.08 (0.78, 1.49)	0.96 (0.75, 1.22)
	+ smoking	0.99 (0.91, 1.08)	0.93 (0.87, 1.01)	0.99 (0.71, 1.37)	1.02 (0.80, 1.30)
Death/hospital/registration	Age	1.14 (1.07, 1.21)	0.89 (0.84, 0.94)	0.94 (0.73, 1.21)	0.99 (0.81, 1.20)
(M=429, F=34)	+ father's social class, own first social class, own baseline social class	1.06 (0.99, 1.14)	0.92 (0.87, 0.97)	0.97 (0.74, 1.25)	0.97 (0.80, 1.18)
	+ smoking	1.04 (0.97, 1.11)	0.94 (0.88, 0.99)	0.90 (0.69, 1.17)	1.02 (0.83, 1.24)
Other cancer (ICD-9: 140–209, excluding smoking related cancers)					
Death	Age	1.10 (1.01, 1.20)	0.98 (0.91, 1.06)	0.89 (0.70, 1.12)	1.02 (0.85, 1.22)
(M=220, F=40)	+ father's social class, own first social class, own baseline social class	1.09 (0.99, 1.20)	1.00 (0.92, 1.09)	0.91 (0.71, 1.16)	1.00 (0.83, 1.19)
Death/hospital/registration	Age	1.05 (0.99, 1.11)	0.99 (0.95, 1.04)	1.02 (0.88, 1.17)	0.97 (0.87, 1.08)
(M=510, F=106)	+ father's social class, own first social class, own baseline social class	1.04 (0.98, 1.11)	1.00 (0.95, 1.06)	1.05 (0.91, 1.21)	0.95 (0.86, 1.07)
Alcohol related illness (ICD-9: 291, 303, 571)					
Death / hospital	Age	1.13 (1.01, 1.27)	0.89 (0.80, 0.98)	1.05 (0.69, 1.58)	0.89 (0.64, 1.24)
(M=126, F=12)	+ father's social class, own first social class, own baseline social class	1.06 (0.94, 1.20)	0.93 (0.83, 1.04)	0.97 (0.62, 1.52)	0.92 (0.65, 1.29)
	+ alcohol consumption	0.97 (0.86, 1.10)	0.98 (0.87, 1.10)	0.97 (0.61, 1.55)	0.87 (0.60, 1.26)
All psychiatric hospital admissions					
(M=147, F=27)	Age	1.12 (1.01, 1.24)	0.90 (0.82, 0.99)	1.13 (0.86, 1.49)	1.05 (0.85, 1.31)
	+ father's social class, own first social class, own baseline social class	1.09 (0.97, 1.23)	0.93 (0.84, 1.03)	1.16 (0.87, 1.53)	1.05 (0.84, 1.31)

Smoking categories: never, ex and current smokers, with the latter divided into those smoking 1–14, 15–24, and 25+ cigarettes per day. Alcohol consumption categories: 0, 1–7, 8–14, 15–21, 22–34, and 35+ units of alcohol per week. Physical exercise categories: 0, 0–3.5, 3.5–7, 7–14, and 14+ hours per week outside work.

and deaths experienced over a 21 year follow up period. While those people whose health deteriorated before the enrolment of this cohort must remain poorly represented, these prospective data permit unbiased observation of those cases who experienced ill health subsequently, whether or not this resulted in an exit from the workforce. We hypothesise that an employment history characterised by frequent job changes, whatever the motivation for those changes, will require the person to be more focused on work, and less focused on maintaining personal health, with consequent poorer health for such people.

Methods

Male and female employees of 27 workplaces in the west of Scotland completed a self report questionnaire and underwent a physical examination between 1970 and 1973. The workplaces were chosen so that the combined workforce would adequately represent workers of all socioeconomic groups. This analysis is based on 5399 men and 945 women, aged between 35 years and retirement age, who provided full information on the measures used.

The principal explanatory variables are: (1) the number of job changes since leaving school. This variable is categorised as 0, 1–2, 3, 4–5, 6–8, and 9 or more changes; (2) the length of time in the job held at baseline. This variable is categorised into 0–4, 5–9, 10–14, 15–19, 20–29, and 30 or more years. Linkage to the Scottish Morbidity Records, and to the National Health Service central register, allowed follow up of hospital admissions, cancer registration, and deaths over a 21 year period. To examine the relation between job stability and cause specific hospital admission, cancer registration, or death, proportional hazards models are fitted for men and women separately. A first model controls confounding by age, by its use as the time scale for the analysis. A second model controls additionally for confounding by social class at three time points (father's social class, and own social class on joining the labour force, and at baseline). A third model quantifies the mediating influences of, as appropriate, smoking, alcohol consumption and physical exercise, by controlling their influence.

Results and Discussion

While the estimated associations between job stability and subsequent health are similar for men and women, the smaller cohort of women does not provide convincing evidence of such effects (see table 1). For men, few associations between the measures of job stability and health outcomes are still apparent once confounding by social class is controlled. Evidence remains of a greater duration of a man's current job at baseline being associated with a lower risk of death (p=0.02), and a lower risk of death, hospital admission, or cancer registration (p=0.005) attributable to a smoking related cancer. These associations must be interpreted cautiously as they are largely independent of smoking behaviour, the expected mediating mechanism.

A recent review[3] has indicated good evidence of an association between poor health and specific aspects of employment, for example, where employees are insecure about their future. However, evidence presented in that review is consistent with this study in failing to make a convincing case for an association between an unstable employment history in itself and subsequent major illness or death.

Charles Gillis and Victor Hawthorne conducted the original health screenings that provided the risk factor exposure data. David Walsh and David Murphy gave a great deal of assistance with the use of the SMR1 data base.

Contributors

CM and JACS conducted the data analysis and assisted with its interpretation. GDS formulated the hypothesis and assisted with the interpretation of the analysis. PH, JM and CH assisted with the interpretation of the analysis. All authors contributed to writing the paper.

Funding: a grant from the Phase 2 of the Economic and Social Research Council's Health Variations Programme.

Conflicts of interest: none.

1 Hutton W. *The state we're in.* London: Vintage, 1996.
2 Steptoe A. The links between stress and illness. *J Psychosomatic Res* 1991;**35**:633–44.
3 Metcalfe C, Davey Smith G, Sterne J, *et al*. The health consequences of frequent job changes. *J Epidemiol Community Health* 2000;**54**:791–2.
4 Ferrie JE. Health consequences of job insecurity. In: Ferrie JE, Marmot MG, Griffiths J, *et al. Labour market changes and job insecurity: a challenge for social welfare and health promotion.* Copenhagen: WHO Regional Publications, European Series no 81, 1999.