Chapter 4

Job Stress in Victoria, Part II.

Job strain Exposures Versus Stress-Related Workers' Compensation Claims in Victoria: Developing a Public Health Response to Job Stress

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ABSTRACT

Study Objective: To compare patterns of job strain exposure with patterns of stress-related Workers' Compensation (WC) claims on a jurisdictional level.
Design & Setting: Comparison between a cross-sectional population-based sample of Victorian workers and government compiled WC statistics from the same jurisdiction and calendar year.
Setting: The state of Victoria in south-eastern Australia
Participants: Job strain exposures were determined by telephone survey of a random sample of White Pages listings. Quota sampling was conducted to reflect population proportions of upper white collar, lower white collar and blue collar workers (n=1,101 with a 66% response rate). Stress-related WC claims consisted of all accepted claims from Victorian workers in 2003, where the mechanism of injury or disease was classified as 'mental stress' (n=1725).
Main Results: Job strain prevalence was higher among females than males, and was elevated 2-3 fold amongst lower occupational skill levels versus higher for both genders. Amongst females, job strain was also positively associated with being aged 30-40 versus older, being a union member and for service versus manufacturing sector workers. Compared to the overall claims incidence rate for job stress, there were elevated job stress claims in upper occupational skill levels and workers aged 45-54. Both job strain exposure and claims rates were elevated for women and the health and community services sector.
Conclusions: Those most likely to be exposed to and thus adversely affected by job stress are the least likely to receive stress-related WC benefits. WC statistics do not provide an adequate evidence base to guide public health responses to job stress problems.

INTRODUCTION

Occupational stress has been linked to a range of adverse physical and mental health outcomes, including cardio-vascular disease,[1-4] musculoskeletal disorders,[5] depression and anxiety.[3 6-13] Although occupational stress is a significant public health problem, population-level information is lacking regarding the patterns of occupational stress exposures and associated health outcomes in most jurisdictions. Job stress policy and practice responses are primarily driven by stress-related workers' compensation (WC) statistics.

In Australia, according to the National Occupational Health and Safety Commission (NOHSC) the incidence rate for workers' compensation cases where the mechanism of injury or disease was 'mental stress' was 0.9 per 1,000 (7,480 cases) in 2003.[14] However the true number of individuals affected by job stress in Australia is likely to be far higher because many workers are not covered by WC, some groups of workers tend not to file claims for work-related illness (e.g., those who are precariously employed), [15] and because of under-recognition and under-reporting of occupational disease, particularly for multi-factorial disease outcomes such as those associated with job stress. This likely leads to the appearance in WC statistics of only the most severe and persistent cases of job stress-related illness.

WC claims are the result of workers seeking compensation for conditions which have been identified by a medical practitioner as having an occupational causation. When a worker presents to a medical practitioner for a job stress-related condition (whether the worker suspects stress-relatedness or not), the general practitioner or other provider may or may not identify an underlying occupational causation or contribution. Even if job stress is medically recognized as a contributory factor, there is a documented reluctance amongst Australian general practitioners to initiate WC claims for patients presenting with job stress-related conditions.[16 17]

There is also a scarcity of studies looking at patterns of job stress on a population level in the international literature.[13] Similarly, there has been little research on patterns of stress-related WC claims. Leigh and Robbins looked at WC claims for occupational diseases in the USA for the year 1999.[18] They reported a total of 2,272 claims for 'mental stress' (denominator details were not provided), and concluded that in general WC statistics substantially underestimate occupational disease.

To facilitate the development of public health responses to job stress in Victoria (Australia) and to identify aspects of the problem not previously recognised by WC statistics, this study compared patterns of population-based job stress exposures to stress-related WC claims in the same jurisdiction, thus providing a public health evidence base to complement WC statistics as the basis for policy and practice in this area.

METHODS

Data Sources

The Victorian Job Stress Survey (VJSS): The VJSS is a cross sectional study of 1,101 workers (526 men and 575 women) quota-sampled to reflect Australian Bureau of Statistics census proportions of upper white-collar (29%), lower white-collar (30%), and blue-collar workers (41%). Telephone interviews were conducted in November 2003, from a random sample of White Pages listings for the state of Victoria, Australia. In comparison to census data on working Victorians, the VJSS over-represents women (52.2% in sample versus 45.2% in census) but has the same mode and median age and income categories as the census.[19] The protocol for this study was reviewed and approved by the University of Melbourne Human Research Ethics Committee (HREC #030398).

Job stress measures: Karasek's model of demand and control was used to assess job strain.[20] Job strain—the combination of high job demands and low job control—is the most widely studied measure of job stress,[20] and also has strong evidence linking it predictively to adverse effects on mental and physical health. [3] The model focuses on task-level job characteristics, postulating that psychological strain results from the interaction of job demands and job control, with the combination of low control and high demands producing "job strain."[20 21] Standard methods for computation of measures were used as described previously, with job control and psychological demand dimensions meeting international norms of reliability (Cronbach's alphas of 0.80 and 0.66, respectively). [22]

Covariates: Covariate data were collected for a range of socio-demographics. Workers were asked if they were a member of a union, and if they worked for a government, private sector or not-for profit, religious or community organization and their average weekly working hours. Occupations were collapsed into five Australian Bureau of Statistics (ABS) skill levels (level one lowest to level five highest). Industrial sector information was collected according to 17 ABS categories and then collapsed into manufacturing or service. Hostility was assessed using the sum of three Likert-scaled items[23] with higher scores indicating greater hostility.

Victorian Workers' Compensation Data: The Australian National Occupational Health and Safety Commission (NOHSC) compiles a publicly accessible national WC statistics database [www.nohsc.gov.au/OHSInformation/NOSI/default.asp (Accessed and data downloaded 17/05/2005)].[14] Numbers of cases are derived from compensation claims received from insurance companies, self-insurers and government departments at commonwealth, state and territory level. The denominators which are used by NOHSC were calculated by the ABS using Labour Force Survey and the Survey of Employee Earnings and Hours.[14] The WC database was queried for incidence rates of Victorian job stress claims for the same as year as the VJSS (2003), as identified by mechanism of injury or disease classification of 'mental stress.' Claims incidence rates were filtered by age, gender, ABS classifications for occupational levels and ABS categories for industry.

Statistical Analyses

Job strain exposure data from the VJSS was stratified by industry, age and occupation with proportions calculated by group. Analyses were conducted separately for males and females. Bivariate analyses were performed comparing categorical variables using a χ^2 test, or a Fisher's exact test when appropriate. Four sets of multivariate logistic regression

analyses were performed to identify determinants of job strain, with risk expressed by Odds Ratios (OR) and 95 % confidence intervals. Model fit was assessed using Hosmer-Lemeshow tests; all models presented had acceptable test statistics (> 0.20).

For the Victorian WC data, incidence rates and numbers of cases for "mental stress' claims were stratified by industry, age and occupation. For both the VJSS dataset and the WC claims dataset, we noted where proportions or rates were higher or lower than the overall WC incidence rates (number of occupational disease cases/number of employees x 1,000).[14] Data analysis was performed using STATA 8 (Stata Corporation, College Station, TX).

RESULTS

Socio-demographic and employment characteristics for the VJSS are summarized in Table 1. There were slightly more women than men. Males were older and had a lower educational level than women. Blue collar jobs were most common amongst the males, and there were more middle white-collar workers amongst the females. More males were self-employed, and more females were employed in their main job for <=35 hours/week. Most respondents were employed by private companies or not for profit agencies.

Table 1. Victorian Job Stress Survey Socio-Demographic and Employment Characteristics

	Males n (%)	**Females n (%)**	**Total N (%)**
Whole Sample	n=526	n=575	N=1101
Age			
• ≥ 51 years	122 (23.2)	117 (20.3)	239 (21.7)
• 41-50 years	122 (23.2)	162 (28.2)	284 (25.8)
• 30-40 years	161 (30.6)	159 (27.7)	320 (29.1)
• < 30 years	121 (23.0)	137 (23.8)	258 (23.4)
Educational level			
• Post-graduate	47 (8.9)	56 (9.7)	103 (9.4)
• Undergraduate	132 (25.1)	217 (37.7)	349 (31.7)
• Vocational	128 (24.3)	76 (13.2)	204 (18.5)
• Completed high school	90 (17.1)	111 (19.3)	201 (18.2)
• Completed primary or some high school	124 (23.5)	112 (19.5)	236 (21.4)
Occupation			
• level five (highest skill level)	115 (21.9)	164 (28.5)	279 (25.3)
• level four	41 (7.8)	47 (8.2)	88 (8.0)
• level three	130 (24.7)	80 (13.9)	210 (19.1)
• level two	119 (22.6)	142 (24.7)	261 (23.7)
• level one (lowest skill level)	121 (23.0)	142 (24.7)	263 (23.9)
Union membership	148 (28.1)	165 (28.7)	313 (28.4)
Industrial sector			
• Manufacturing	339 (64.5)	235 (40.9)	574 (52.1)
• Service	187 (35.5)	339 (59.0)	526 (47.8)
Location			
• Urban	377 (71.7)	417 (72.5)	794 (72.1)
• Rural/regional	149 (28.3)	158 (27.5)	307 (27.9)
Employed by			
• Government	61 (11.6)	175 (30.4)	236 (21.4)
• Private / not for profit agency	462 (87.8)	392 (68.2)	854 (77.6)
Self-employed	121 (23.0)	66 (11.5)	187 (17.0)
Size of workplace			
• >=20	273 (49.2)	306 (53.2)	579 (52.6)
• <20	253 (46.0)	269 (46.8)	522 (47.4)
Average weekly hrs (ABS)			
• <=35 hrs	106 (20.1)	296 (51.5)	402 (36.5)
• 36-49 hrs	250 (47.5)	198 (34.4)	448 (40.7)
• >= 50 hrs	160 (30.4)	65 (11.3)	225 (20.4)

Job Strain

The prevalence of job strain was higher in females than in males (25.4 % versus 18.6% $p<0.05$). Younger males had the highest prevalence of job strain as well as passive jobs (Table 2A). Older males had the lowest prevalence of job strain. There were significant differences according to occupational skill level, with the prevalence of job strain and passive jobs increasing stepwise with decreasing skill level. Being self-employed was highly protective against job strain. Male unionized workers had a similar demand-control profile to non-union members.

For females (Table 2B), job strain prevalence was highest amongst middle-aged women versus those aged >=51. Similar to the pattern for males, the prevalence of job strain and passive jobs was highest in the lowest skill group, but with less of a clear gradient. Self-employed females were also highly protected against job strain. Amongst female union members versus non-members, however, there was a higher prevalence of job strain in combination with a markedly higher prevalence of active jobs and a lower prevalence of passive jobs. As observed in males, females with higher skill level jobs generally had lower levels of job strain and those with lower skill level jobs had higher levels of passive jobs.

Table 2. Victorian Job Stress Survey: Four-way Demand Control Measures

A) MALES (n=501)	low job strain n (row %)	active jobs n (row %)	passive jobs n (row %)	high job strain n (row %)	p-value
Occupation:					
• level five (highest skill level)	41 (37.3)	41 (37.3)	15 (13.6)	13 (11.8)	
• level four	13 (34.2)	11 (28.9)	9 (23.7)	5 (13.2)	
• level three	45 (35.7)	31 (24.6)	28 (22.2)	22 (17.5)	
• level two	19 (17.4)	17 (15.6)	49 (44.9)	24 (22.0)	
• level one (lowest skill level)	22 (18.6)	12 (10.2)	55 (46.6)	29 (25.6)	0.000
Age:					
• <30	22 (18.5)	22 (18.5)	47 (39.5)	28 (23.5)	
• 30-40	52 (33.6)	36 (23.2)	40 (25.8)	27 (17.4)	
• 41-50	30 (26.6)	29 (25.7)	30 (26.6)	24 (21.2)	
• >=51	36 (31.6)	25 (21.9)	39 (34.2)	14 (12.2)	0.044
self employed or employee:					
• self-employed	49 (44.6)	29 (26.4)	21 (19.1)	11 (10.0)	
• employee	91 (23.3)	83 (21.2)	135 (34.5)	82 (21.0)	0.000
Union membership:					
• non union member	103 (28.6)	83 (23.1)	109 (30.3)	65 (18.1)	
• unionized	37 (26.4)	29 (20.7)	46 (32.9)	28(20.0)	0.840
Industrial Sector:					
• manufacturing	101 (31.0)	74 (22.6)	91 (27.8)	61 (18.7)	
• service	39 (22.4)	38 (21.8)	65 (37.4)	32 (18.4)	0.099
Employed by:					
• government	12 (20.0)	18 (30.0)	19 (31.7)	11 (18.3)	
• private/ not for profit	126 (28.8)	94 (21.5)	136 (31.1)	82 (18.7)	0.364
Average weekly hrs (ABS):					
• <=35hrs	26 (25.2)	10 (9.7)	52 (50.5)	15 (14.6)	
• 36-49hrs	67 (27.9)	39 (16.2)	78 (32.5)	56 (23.3)	
• >=50hrs	44 (29.7)	61 (41.2)	22 (14.9)	21 (14.2)	0.000

B) FEMALES (n=550)	low job strain n (row %)	active jobs n (row %)	passive jobs n (row %)	high job strain n (row %)	p-value
Occupation:					
• level five (highest skill level)	36 (22.6)	75 (47.2)	19 (11.9)	29 (18.2)	
• level four	9 (20.0)	6 (13.3)	16 (35.6)	14 (31.1)	
• level three	15 (20.0)	15 (20.0)	25 (33.3)	20 (26.7)	
• level two	33 (24.4)	19 (14.1)	52 (38.5)	31 (23.0)	
• level one (lowest skill level)	10 (7.4)	8 (5.9)	72 (52.9)	46 (33.8)	0.000
Age:					
• <30	22 (16.5)	18 (13.5)	57 (42.9)	36 (27.1)	
• 30-40	29 (18.7)	35 (22.6)	46 (29.7)	45 (29.0)	
• 41-50	27 (17.8)	38 (25.0)	46 (30.3)	41 (27.0)	
• >=51	25 (22.7)	32 (29.1)	35 (31.8)	18 (16.4)	0.035
Self employed or employee:					
• self-employed	21 (35.6)	15 (25.4)	18 (30.5)	5 (8.5)	
• employee	82 (16.7)	108 (22.0)	166 (33.8)	135 (27.5)	0.000
Union membership:					
• non union member	83 (21.3)	69 (17.7)	154 (39.5)	84 (21.5)	
• unionized	20 (12.5)	54 (33.8)	30 (18.8)	56 (35.0)	0.000
Industrial Sector:					
• manufacturing	52 (22.8)	59 (25.9)	72 (31.6)	45 (19.7)	
• service	51 (16.0)	64 (19.9)	111 (34.6)	95 (29.6)	0.012
Employed by:					
• government	35 (20.6)	52 (30.6)	39 (22.9)	44 (25.9)	
• private/ not for profit	67 (17.9)	68 (18.2)	143 (38.2)	96 (25.7)	0.001
Average weekly hrs (ABS):					
• <=35hrs	56 (19.6)	47 (16.4)	109 (38.1)	74 (25.9)	
• 36-49hrs	33 (17.7)	42 (22.6)	63(33.9)	48(25.8)	
• >=50hrs	10 (16.1)	29 (46.8)	9 (14.5)	14 (22.6)	0.000

Logistic Regression Modeling of Job Strain

In bivariate analyses for males (first column, Table 3A) before adjustment for educational level, young age, being an employee (versus self-employed), and working longer hours were associated with higher odds of experiencing job strain. Multivariate modelling was then conducted to assess the relative contributions of the examined set o potential job strain determinants. Several covariates were not significant and dropped from Models 1 & 2 (Table 3A). Although negative personality (hostility) may represent both a predisposition to and a consequence of job strain, we present models with and without adjustment for hostility (Models 1 & 2) to be conservative. Hostility is significantly associated with job strain, but with a very small magnitude in comparison to other identified determinants. The final models (3 & 4) show that the risk of job strain is elevated among young males, males in lower skill-level jobs, and males working longer hours. Effect size estimates (adjusted ORs) for these job strain determinants remained fairly stable with varying combinations of covariates modelled, and were little affected by adjustment for hostility. Workplace size, public versus private organisation, urban versus regional location, and being an employee versus self-employed were not associated with job strain in men.

Bivariate analyses for females (first column, Table 3B) showed a wider range of job strain determinants than for males: lowest occupational skill, working in the service compared to the manufacturing sector, being an employee versus self-employed, all age groups compared to the oldest, and for union members compared to non-members. Based on the results of Models 1 & 2 (Table 3B), a similar set of non-significant covariates as for men was dropped. Hostility was not associated with job strain in women. The final models (3 & 4) show that the risk of job strain is elevated among middle-aged women, among women in low and middle skill-level jobs, and—in contrast to males—among employees versus self-employeds, among union members versus non, and among women working in the service versus manufacturing sector. The association between job strain and female union members may be related to highly unionized industries such as health and community services also having a high percentage of female workers (n=35 females and n=6 males in VJSS as well as an increased risk of job strain. Effect size estimates (adjusted ORs) for these job strain determinants remained stable with varying combinations of covariates modelled.

Table 3. Logistic Regression Modelling of Job Strain in the Victorian Job Stress Survey: Adjusted Odds Ratios (aOR) and 95 % Confidence Intervals (95 % CI)

A) Males (n=501)	Bivariate OR (95%CI)	Model 1* aOR (95%CI)	Model 2* aOR (95%CI)	Model 3* aOR (95%CI)	Model 4* aOR (95%CI)
Occupation:					
• Reference: level five					
• level four	1.5 (0.6-3.9)	1.0 (0.3-3.1)	1.0 (0.3-3.2)	1.0 (0.3-3.3)	1.1 (0.3-3.4)
• level three	1.3 (0.5-3.3)	1.7 (0.7-4.1)	1.8 (0.8-4.4)	1.6 (0.7-3.8)	1.8 (0.7-4.1)
• level two	1.6 (0.6-4.4)	2.1 (0.9-5.0)	2.3 (1.0-5.4)	2.1 (0.9-4.8)	2.3 (1.0-5.3)
• level one	1.9 (0.7-4.9)	2.5 (1.0-6.0)	2.5 (1.0-6.2)	2.4 (1.0-5.6)	2.5 (1.0-6.0)
Age:					
• Reference: >=51					
• 41-50	1.9 (0.9-3.4)	1.7 (0.8-3.7)	1.6 (0.8-3.5)	1.7 (0.8-3.7)	1.7 (0.8-3.5)
• 30-40	1.5 (0.8-3.0)	1.4 (0.7-2.9)	1.3 (0.6-2.8)	1.4 (0.7-3.0)	1.4 (0.7-2.9)
• <30	2.2 (1.1-4.4)	1.9 (0.9-4.2)	1.8 (0.8-4.0)	2.1 (1.0-4.4)	1.9 (0.9-4.1)
Employee versus self employed	2.4 (1.2-4.7)	1.4 (0.6-3.1)	1.4 (0.6-3.1)	--	--
Union membership	1.1 (0.7-1.8)	0.9 (0.5-1.6)	1.0 (0.5-1.7)	--	--
Sector: (service v manufact)	1.0 (0.6-1.6)	0.8 (0.5-1.4)	0.8 (0.5-1.4)	--	--
Workplace size: (>=20 v <20)	0.7 (0.4-1.1)	0.8 (0.4-1.3)	0.8 (0.5-1.4)	--	--
Location: (urban versus rural/regional)	0.8 (0.5-1.3)	0.8 (0.5-1.4)	0.8 (0.5-1.4)	--	--
Private versus government	1.0 (0.5-2.0)	1.0 (0.4-2.1)	0.9 (0.4-2.1)	--	--
Average weekly hrs (ABS)					
• Reference <=35hrs					
• 36-49hrs	1.8 (1.0-3.3)	1.9 (1.0-3.8)	1.9 (0.9-3.8)	2.1 (1.1-4.1)	2.1 (1.1-4.1)
• >=50hrs	1.0 (0.5-2.0)	1.3 (0.6-3.0)	1.4 (0.6-3.1)	1.3 (0.6-2.3)	1.4 (0.6-3.1)
Hostility	1.1 (1.0-1.2)	--	1.1 (1.0-1.2)	--	1.1 (1.0-1.2)
		n=482	n=482	n=483	n=483

B) Females (n=550)	Bivariate OR (95%CI)	Model 1* aOR (95%CI)	Model 2* aOR (95%CI)	Model 3* aOR (95%CI)	Model 4* aOR (95%CI)
Occupation:					
• Reference: level five					
• level four	2.0 (0.9-4.2)	2.9 (1.2-7.0)	2.9 (1.2-7.0)	2.6 (1.2-6.0)	2.6 (1.2-6.0)
• level three	1.6 (0.9-3.1)	2.7 (1.2-5.8)	2.7 (1.2-5.8)	2.4 (1.1-5.1)	2.4 (1.1-5.2)
• level two	1.3 (0.7-2.3)	1.7 (0.9-3.3)	1.7 (0.9-3.4)	1.6 (0.9-3.1)	1.7 (0.9-3.2)
• level one	2.3 (1.3-3.9)	3.2 (1.6-6.6)	3.2 (1.6-6.6)	3.1 (1.6-6.0)	3.1 (1.9-6.1)
Age:					
• Reference: >=51					
• 41-50	1.9 (1.0-3.5)	1.8 (0.9-3.6)	1.8 (0.9-3.5)	1.6 (0.8-3.1)	1.6 (0.8-3.1)
• 30-40	2.1 (1.1-3.9)	2.1 (1.1-4.2)	2.1 (1.1-4.1)	1.9 (1.0-3.7)	1.9 (1.0-3.6)
• <30	1.9 (1.0-3.6)	1.4 (0.7-2.9)	1.4 (0.7-2.8)	1.4 (0.7-2.7)	1.3 (0.7-2.7)
Employee versus self employed	4.1 (1.6-10.4)	3.5 (1.3-9.8)	3.5 (1.3-9.7)	3.5 (1.3-9.1)	3.5 (1.3-9.1)
Union membership	2.0 (1.3-2.9)	2.6 (1.6-4.4)	2.7 (1.6-4.4)	2.5 (1.9-4.0)	2.5 (1.6-4.0)
Sector:(service v manufac)	1.7 (1.1-2.6)	1.7 (1.0-2.6)	1.7 (1.0-2.6)	1.7 (1.1-2.6)	1.7 (1.1-2.6)
Workplace size:(>=20 v <20)	0.8 (0.6-1.2)	1.1 (0.7-1.7)		--	--
Location:(urban versus rural/regional)	1.1 (0.7-1.7)	1.2 (0.7-1.9)	1.1 (0.7-1.8)	--	--
Private versus government	1.0 (0.6-1.5)	1.2 (0.7-2.0)	1.2 (0.7-2.0)	--	--
Average weekly hrs (ABS)					
• Reference <=35hrs					
• 36-49hrs	1.0 (0.6-1.5)	1.1 (0.7-1.8)	1.1 (0.7-1.8)	--	--
• >=50hrs	0.8 (0.4-1.6)	1.3 (0.6-2.6)	1.2 (0.6-2.6)	--	--
Hostility	1.0 (1.0-1.1)	--	1.0 (0.9-1.1)	--	1.0 (0.9-1.1)
		n=525	n=525	n=546	n=546

*Model adjusted for educational level and all the variables included

Job Stress-Related WC Claims Versus Job Strain Exposure

Table 4 presents Victorian 'mental stress' WC claims patterns by occupation and age. Similar to the VJSS, the incidence of claims was higher amongst females than males (0.9 per 1,000 versus 0.7 per 1,000). However, there were also many differences between the patterns emerging from the two sources. Claims data show the highest rates among workers employed in higher skill level jobs, and for the 45-59 age range for both males and females. This contrasts with job strain patterns in the VJSS, where the highest prevalence of job strain was amongst lower skill levels and the youngest age group in males and 30-40 year olds in females.

Table 4. Victorian Workers' Compensation Data for 2003- Case numbers and incidence rates for mental health stress claims (per 1,000 workers)

	males cases (IR)*		**females cases (IR)***		**Total cases (IR)***	
Occupation: (9 categories)						
• Managers and administrators (skill level five)	60	(0.6)	46	(1.7)	106	(0.9)
• Professionals (skill level five)	128	(0.6)	266	(1.2)	394	(0.9)
• Associate professionals (skill level four)	208	(1.5)	133	(1.3)	341	(1.4)
• Tradespersons and related workers (skill level three)	61	(0.3)	25	(1.1)	86	(0.4)
• Advanced clerical and service workers (skill level three)	14	(1.2)	62	(0.8)	76	(0.9)
• Intermediate clerical, sales and service workers (skill level two)	74	(0.8)	236	(0.8)	310	(0.8)
• Intermediate production and transport workers (skill level two)	146	(0.8)	22	(0.8)	168	(0.8)
• Elementary clerical, sales and service workers (skill level one)	44	(0.5)	93	(0.5)	137	(0.5)
• Laborers and related workers (skill level one)	55	(0.5)	51	(0.7)	106	(0.6)
Age: (11 categories)						
• <20	np[#]	(0.1)	8	(0.1)	13	(0.1)
• 20-24	26	(0.2)	48	(0.4)	74	(0.3)
• 25-29	44	(0.3)	94	(0.7)	138	(0.5)
• 30-34	84	(0.6)	123	(1.0)	207	(0.8)
• 35-39	120	(0.9)	121	(1.1)	241	(1.0)
• 40-44	148	(1.1)	148	(1.2)	296	(1.1)
• 45-49	138	(1.1)	165	(1.4)	303	(1.3)
• 50-54	109	(1.0)	157	(1.6)	266	(1.3)
• 55-59	85	(1.1)	55	(0.9)	140	(1.0)
• 60-64	31	(0.8)	14	(0.7)	45	(0.8)
• 65+	np[#]	(0.3)	0	(0.0)	np[#]	(0.2)
TOTAL	792	(0.7)	933	(0.9)	1725	(0.8)

*IR=Incidence rate data where the mechanism of the injury of disease was 'mental stress'. Data available from NOSI excludes self-employed individuals from the denominator.

[#] np=data not published by NOHSC due to confidentiality restrictions

Table 5 presents Victorian job stress WC claims and VJSS job strain prevalence stratified by the 17 ABS industrial sector categories. The slight discrepancies between the WC claims data reported in tables 4 and 5 are a result of cells with small numbers being masked by NOHSC to protect confidentiality. Sectors exceeding the overall rates have been noted. Sectors with higher rates have been noted. Both claims rates and job strain prevalence were elevated in the health and community services sector for males and females. For males, the education and transport and storage sectors had high claims as well as job strain prevalence, as was the case for females in personal and other services, and finance and

insurance sectors. However there were a number of industries where the elevated prevalence of job strain was not reflected in claims patterns. These included manufacturing, construction, and wholesale trade for men, and retail for women. Most notably, job strain prevalence was elevated for accommodation, cafes and restaurants for both males and females, but claims were not.

Table 5: Victorian Stress-Related Workers' Compensation Claims[#] Versus Job Strain Prevalence by Industrial Sector

	Males		Females		Total	
	WCC n (IR)	**Job strain n (%)**	**WCC n (IR)**	**Job strain n (%)**	**WCC n (IR)**	**Job strain n (%)**
Industrial sector: (17 categories)						
• Agriculture, forestry & fishing	9 (0.4)	4 (11.4)	np* (0.6)	5 (25.0)	14 (0.4)	9 (16.4)
• Mining	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
• Manufacturing	105 (0.4)	21 22.6) ♣	43 (0.5)	6 (16.7)	148 (0.5)	27 (20.9)
• Electricity, gas & water supply	np* (0.2)	1 (12.5)	np* (0.2)	0 (0.0)	np (0.2)	1 (11.1)
• Construction	19 (0.2)	15 24.6) ♣	np* (0.3)	1 (12.5)	23 (0.2)	16(23.2) ♣
• Wholesale trade	35 (0.5)	4 19.1) ♣	26 (0.7)	2 (25.0)	61 (0.5)	6 (20.7)
• Retail trade	50 (0.3)	7 (16.3)	106 (0.6)	22(28.9) ♣	156 (0.5)	29(24.4) ♣
• Accommodation, cafes & restaurants	np* (0.1)	4 (20.0) ♣	17 (0.3)	13(41.9) ♣	22 (0.2)	17(33.3) ♣
• Transport & storage	113 (1.8) ♣	7 (25.0) ♣	23 (1.1) ♣	3 (23.1)	136(1.6) ♣	10 (24.2)
• Communication services	np* (0.3)	4 (21.1) ♣	6 (0.6)	2 (25.0)	11 (0.4)	6 (22.2)
• Finance & insurance	19 (0.5)	1 (9.1)	56 1.1) ♣	8 (38.1) ♣	75 (0.9) ♣	9 (28.1) ♣
• Property & Business services	59 (0.4)	5 (8.5)	88 (0.7)	10 (22.2)	147 (0.5)	15 (14.4)
• Government administration & defence	25 (0.8) ♣	1 (7.1)	21 (0.6)	5 (21.7)	46 (0.7)	6 (16.22)
• Education	82 (1.6) ♣	7 (28.0) ♣	173 1.5) ♣	15 (18.3)	255(1.5) ♣	22 (20.6)
• Health & community services	75 (1.5) ♣	6 (24.0) ♣	263 (1.5) ♣	35(28.9) ♣	338(1.5) ♣	41(28.1) ♣
• Cultural & recreational services	15 (0.6)	1 (11.1)	34 1.1) ♣	1 (9.1)	49 (0.9) ♣	2 (10.0)
• Personal & other services	169 4.6)♣	5 (8.5)	68 (1.8) ♣	12(26.7) ♣	237(3.2) ♣	17 23.9) ♣
TOTAL	788 (0.7)	93 (18.6)	935 (0.9)	140 (25.5)	1723 (0.8)	233 (22.2)

[#] Data for 2003- Case numbers and incidence rates per 1,000 workers (IR), excluding self-employed workers
*np=data not published by NOHSC due to confidentiality restrictions
♣Rate exceeds overall rate

DISCUSSION

This study showed that women were more likely to be exposed to job strain than men, and that job strain was higher in younger employees in lower status jobs. Some job strain exposure patterns are reflected in stress-related claims rates, as some groups that are more likely to be exposed to job strain do receive WC as a result of stress-related ill health, such as more claims amongst women compared to men, and health and community services workers compared to other industries. In other contexts this is not the case. The industrial sector with the highest prevalence of job strain for both males and females—accommodation, cafes, and restaurants—was not elevated in terms of stress claims. Further, relatively few younger people in lower status occupations are compensated, possibly because they have received insufficient OHS education and are unaware of the potential stress-relatedness of their illnesses, because they fear losing their jobs if they seek compensation (especially if precariously employed [24]), because a medical practitioner has been unwilling to initiate a stress-related WC claim,[16 17] because submitted claims are denied, or because of other reasons. These findings demonstrate the shortcomings of insurance-based responses to the public health problem of job stress, and how those shortcomings disproportionately affect groups that are socially or economically disadvantaged.

There are some limitations with this study. Although the VJSS was designed to be representative of the working population, the study sample was taken from publicly available telephone listings, this may disproportionately exclude those workers who are in less secure employment and in lower status groups. Shift workers and those working longer hours may also be underrepresented as participants were contacted on their home telephone numbers. These considerations suggest that the disparities observed are likely to be underestimates. There are also a number of limitations with comparing patterns of job strain exposure prevalence from the VJSS with claims patterns. WC statistics are based on accepted claims; information regarding the numbers of claims submitted is unavailable. Given the adversarial nature of the WC system, it is likely that many workers with stress-related illnesses have their claims rejected, or may be deterred from filing a claim. Another limitation is the classification of 'mental stress' for stress-related claims. This narrow definition may result in an underreporting of stress-related illness; it is possible that with a wider definition more claims might have been included, such as those for stress-related cardio-vascular disease[25] and musculoskeletal disorders. Indeed, interactions between physical and psychosocial stressors in the causation of enduring health outcomes are known,[26] particularly in regard to noise[27] and ergonomic exposures.[28] However, whilst the narrow definition used by WC data and the likely low claims acceptance rates restrict the validity of comparisons, these limitations also highlight the inadequacies of WC data as proxy public health surveillance data.

Some of the observed variance between job strain and claims patterns might be explained by disease latency. The latency period between job strain exposure and the manifestation of job stress-related disease is not fully understood. Current best estimates indicate that exposure to poor psychosocial working conditions (including demand-control model measures) can be linked to adverse mental health outcomes with a one year latency period.[29] Given that mean job tenure among VJSS respondents was 7.5 years with 90% of respondents in their current job for 6 months or longer,[30] it is reasonable to compare claims rates and job strain prevalence from the same year. As the variation in observed age groups

between job strain exposure and claims rates ranged from 10 to 20 years, disease latency could explain only part of the observed variation.

Implications for Policy & Practice

Development of an evidence-based public health response to job stress requires information regarding where the problem is at its worst, and where intervention efforts could most efficiently be directed. These findings suggest that those most likely to be adversely affected by job stress and most in need of compensation for stress-related illness are the least likely to be compensated. WC statistics are an inadequate evidence base data source for guiding public health policy and practice responses to the job stress problem. Population-based job stress exposure data is relatively easy to obtain, provides an essential complement to WC statistics, and contributes to the evidence-base needed to direct public health responses to job stress.

Intervention efforts in health and community services and other sectors with elevated job stress claims should be continued and expanded to integrate primary, secondary, and tertiary interventions in a systems approach. This effort needs to be complemented by similar comprehensive intervention efforts for younger and lower status workers, particularly for women in such groups, where stress-related effects on health could be prevented by reducing job stressors and mitigated by effective compensation for stress-related illness.

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