

The Impact of Psychosocial and Physical Work Experience on Mental Health: A Nested Case Control Study

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Introduction

Several studies conducted over the past 20 years have identified job stress as an important risk factor for several adverse mental health outcomes. An overview of the literature identified 14 cohort studies investigating the association between Karasek's demand/control model and mental health outcomes (1-15).

While these studies suggest that some psychosocial work conditions may be risk factors for a range of mental health, they suffered from two limitations. First, mental health outcomes were measured through individual self-report only. Second, exposure data were also obtained by self-reports.

This investigation is a nested case control study based on a large cohort of sawmill workers employed in 14 sawmills in British Columbia (BC) in Western Canada. The purpose of the study was to address these methodological limitations by assessing the association between objectively measured physical and psychosocial work conditions and objectively measured mental health outcomes using a longitudinal study design. As well, we ensured that all cases and controls were free of mental health disease for a five year period prior to commencement of the study.

Methods

Participants

This study is based on a cohort of male sawmill workers for whom we have obtained data on history of unemployment, job mobility, psychosocial work conditions, health outcomes and death records. A cohort of 28,794 male workers was enumerated consisting of eligible cohort members who worked at one of 14 study mills between 1950 and 1998.

Exposure Variables

A shortened version of the Karasek's Job Content Questionnaire (JCQ) 30) was used to measure exposure in terms of control, psychological demand, physical demand and co-worker social support. Retrospective estimates of job control, demands, noise, and social support were obtained from experienced workers and supervisors (16,17).

Estimates from job evaluators for control, psychological demand, physical demand, social support, and noise were then linked to the job history database in the sawmill cohort. In addition, exposure in terms of unemployment experience, and exposure to control, psychological demand, physical demand, social support, and noise, was determined for each year a worker was employed at a study sawmill. Exposures were based on the job title held at a given time by a worker and so was linked to the job history file for each worker on the basis of their job title.

Outcome Variables

The cohort of 28,794 sawmill workers with information about work stress obtained by job evaluators and senior workers was probabilistically linked to the British Columbia Linked Health Database (BCLHDB). Between 1996 and 2001, a total of 2,879 cases with mental health diagnosis and 8,637 controls (3 controls for each case – matched for age) were identified through the BCLHDB.

While there is evidence indicating that an individual's reaction to stressful life events may be mediated by genetic predispositions (18,19), the present work focuses on those mental health outcomes that may be more strongly associated with environmental factors rather than family history of mental health disease. Because evidence indicates that social environment could contribute to the onset of psychotic mental states and may not be the primary cause of such disease (20), we excluded psychotic disorders from the analyses which were instead focused on neurotic disorder, anxiety/depression, acute reactions to stress, adjustment reaction, alcohol and drug related disorders. Cases therefore included all subjects with a first ICD9 diagnostic code of 292, 300, 303, 304, 305, 308, 309, and 311.

In order to ensure that persons with pre-existing mental health outcomes were excluded from analysis all subjects with any mental health diagnosis (recorded in the BCLHDB) in the period Jan 1st 1991 and March 31st, 1996 were eliminated from the potential pool of cases and controls. Thus all cases and controls were selected for the period from April 1st 1996 to March 31st, 2001.

Using STTOCC (survival-time to case-control) on STATA 8.0, 3 controls were selected for each case matched on age. Controls were chosen randomly with replacement from the set at risk, that is, all the members of the cohort who worked in a study sawmill for at least one year. Thus, a control could be anyone at risk who also satisfied the matching criteria and who had not had a mental health diagnosis in the five years prior to April 1996.

Analysis

Statistical analyses were conducted using conditional logistic regression on STATA 8.0. Univariate models were first run with each mental health outcome and exposure variables: duration of employment, occupation, control, psychological demand, physical demand, co-worker social support, and noise. Multivariate models were developed in two steps. In the first step socio-demographic variables (i.e., marital status and ethnicity) were forced into the model and associations with non-physical and non-psychosocial variables (i.e. duration of employment and occupational status at a study sawmill) were tested for. In the second step marital status, ethnicity, duration of employment, and occupational status were forced into the models and associations determined for psychosocial and physical work conditions.

Results

Univariate analysis shows that Sikh workers had significantly higher odds of being diagnosed with neurotic disorder (OR=1.4; 95% CI 1.02-1.86), anxiety/depression (OR=1.3; 95% CI 1.03-1.70) and alcohol dependence (OR=2.4; 95% CI 1.39-4.02). On the other hand, Chinese workers had significantly lower odds of being diagnosed with anxiety/depression (OR=.21; 95% CI .06-.67). Marital status was not significantly associated with any of the mental health outcomes.

For adjustment reaction the elevated odds noted for workers in the unskilled jobs were statistically significant (OR=1.6; 95% CI 1.19-2.05) and for tradesmen the reduced odds were also statistically significant (OR=.56; 95% CI .40-.80). For alcohol dependence increased odds were observed for skilled workers (OR=1.6; 95% CI 1.06-2.34) and for drug psychosis reduced odds were observed for tradesmen (OR=.16; 95% CI .03-.73).

Workers with lower duration of employment in a study mill showed statistically significant associations for adjustment reaction (OR=.97; 95% CI .95-.99). Downward job mobility was associated with increased odds of diagnosis for alcohol dependence (OR=1.4; 95% CI 1.03-1.84) and decreased odds for drug psychoses (OR=.39; 95% CI .0.16-0.92).

In terms of psychosocial work conditions, low control was significantly associated with elevated odds for drug dependence (OR=.94; 95% CI .89-.99); high psychological demand was significantly associated with elevated odds for neurotic disorder (OR=1.04; 95% CI 1.01-1.08).

In the final model (Table 1), after controlling for socio-demographic and non-physical/non-psychosocial work condition variables, high psychological demand was associated with increased odds for neurotic disorder (OR=1.05; 95% CI 1.01-1.09)

Table 1
Odds Ratios for fully controlled multivariate model for neurotic disorder for the period 1996 through 2001 among sawmill workers

Neurotic Disorders	
Duration (years) of job at sawmill	.99 (.98,1.00) *
Sikh	1.30 (.95,1.78)
Chinese	.75 (.34,1.64)
Marital Status	.98 (.95,1.02)
Tradesman	1.01 (.67,1.52)
Skilled	1.23 (.81,1.88)
Unskilled	1.10 (.73,1.64)
Psychological demand	1.05 (1.01,1.09)

* Numbers in parentheses are 95 % Confidence Intervals.

Discussion

There are four main results to this investigation. First, Sikh workers had elevated odds for all the mental health outcomes investigated. It should be noted that in the final fully controlled model for neurotic disorder, while Sikh ethnic status was not statistically significant the odds of neurotic disorder among this sub-population of workers was still 30 percent greater than among Caucasians. For alcohol dependence, Sikh workers had approximately twice the odds observed for Caucasian workers and these results were statistically significant. For anxiety/depression and neurotic disorder, they were from 30 to 40 percent greater than the odds for Caucasian workers and also statistically significant.

The literature on mental health disorders of South Asians is not conclusive. Most studies have been conducted in Britain. Some studies have reported lower rates of alcohol consumption and related mental health problems among adult Sikhs (21) than among other ethnic minorities and Caucasian adults. Other studies, however, have reported higher alcohol consumption and alcohol related mental health problems in the Sikh population that among other South Asians or among Caucasians (22-24).

The results from our study, using objectively measured mental health outcomes are for Sikh sawmill workers living in Western Canada. This study population is unique consisting mainly of sawmill workers who are exposed to difficult often monotonous working conditions. The results may not be generalizable to the male Sikh population in Western Canada. Nonetheless, these results indicate that Sikh workers in primary industries in Western Canada may be at higher risk for some mental health problems than Caucasians.

Second, after controlling for marital and ethnic status, workers with low duration of employment at a study sawmill had statistically significant and elevated odds for adjustment reaction and acute reaction to stress. Third, in terms of psychosocial work conditions, after controlling for socio-demographic and non-physical/non-psychosocial work condition confounders high psychological demand was associated with elevated odds for neurotic disorder. Fourth, associations between physical and psychosocial work conditions were found for two of the eight mental health outcomes (neurotic disorders and drug dependence) but not for others.

A major strength of this study was its rigorous longitudinal study design which included the use of objective measures of both the exposure and outcome variables and ensuring that cases and controls were free of any mental health diagnosis in the five year period prior to selection. As well, as noted in our methods section, we selected only those mental health outcomes which were most likely to be environmental as opposed to endogenous in origin.

There are two major limitations of this study. First, there is a potential for misclassification of exposure arising from objective and retrospective methods used. The combination of design rigour and any bias caused by exposure misclassification could have attenuated or masked associations between psychosocial and physical work conditions and the mental health outcomes under investigation. Second, we have no information on non-work environmental factors which may have affected the mental health outcomes of cohort members.

In summary, the results from the present study indicate that psychosocial working conditions may be important risk factors contributing to adverse mental health outcomes among workers.

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