The Impact of Psychosocial Work Conditions on Attempted and Completed Suicide among Western Canadian Sawmill Workers

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Introduction

In some nations suicide rates among employed working age populations are increasing[1,2]. In a Japanese study, Amagasa and colleagues[3] concluded that long working hours, heavy workloads, and low social support may cause depression, which can lead to suicide.

Only one prospective cohort study has investigated the relationship between psychosocial work conditions and suicide[4]. In this study, a large US cohort of female nurses (n=94,110) was followed for 14 years and their self-reported stress at work and at home was estimated. After adjustment for confounders relative risks (RR) were elevated among women reporting both severe work stress (RR 1.9, 95% CI 0.8 to 4.7) and high exposure to both home and work stress demonstrated statistically significant positive association with completed suicide (RR=4.9, 95% CI 1.4 to 17.0).

The hypothesis that psychosocial working conditions are a significant determinant of health (including mental health), has been investigated using Robert Karasek's demand-control model [5, 6]. According to this model, people who perform jobs with high psychological demand and low control (high strain jobs) are more likely to develop symptoms of psychological stress than those working in jobs with low demand and high control. As well, according to Karasek's model, workers exposed to low psychological demand and low control (so-called passive jobs) are at particular risk for developing a sense of learned hopelessness, which is one of the strongest predictors of completed suicide [7-9].

The purpose of this investigation was to extend the applications of the demand-control model to a study of the association between psychosocial working conditions in a cohort of Western Canadian sawmill workers in relation to attempted and completed suicide. Specifically, we tested the hypothesis that sawmill workers in jobs with low control and low psychological demand were at the greatest risk for attempted and completed suicide.

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) [8] 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 [9, 10].

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) [8].

In British Columbia, complete hospital discharge records are available through the BCLHDB, including ICD9 codes for each diagnosis. A suicide case was defined as anyone with a hospital discharge or death record coded with ICD9 code 950 to 950.9. We divided suicide cases into two dependent variables; suicide attempts (one or more) and completed suicides. From the hospital discharge database we were able to identify any suicide case (completed and attempted) which occurred between January 1st 1985 and March 31st 2001.

Between 1952 and 1985, 162 cohort members completed suicide and between 1985 and 2001, 127 workers attempted suicide.

Analysis

Cases were identified from the cohort of 28,784 sawmill workers for each completed suicide and each attempted suicide. 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 was comprised of all the members of the cohort who worked in a study sawmill for at least one year.

Statistical analyses were conducted using conditional logistic regression on STATA 8.0. First, we conducted univariate analyses, for each of the two outcomes: attempted and completed suicide. Second, multivariate models were developed controlling for marital status, ethnicity, duration of employment at a study sawmill, and occupational status.

Results

Results

Univariate models show no association between marital status, ethnicity, job mobility, duration of employment, type of occupation, physical demand, noise and attempted suicide. However, duration of employment and occupational category were significantly associated with completed suicide. Results from the multivariate analysis show that after controlling for marital status, ethnicity, duration of employment at a study sawmill, and occupational status, low psychological demand was associated with greater odds for completed suicide and low social support was associated with greater odds for attempted suicide (Table 1).

Table 1: Multivariate results for attempted and completed suicides after controlling for socio-demographic and non-psychosocial work condition variables

Completed Suicide - OR (95%CI) (p-value)	
Marital Status	0.96 (.89, 1.05) (.38)
Sikh	1.29 (.58, 2.87) (.53)
Chinese	.24 (.03, 1.93) (.18)
Tradesman	3.39 (.73, 15.83) (.12)
Skilled	2.42 (.50, 11.68) (.27)
Unskilled	3.24 (.70, 15.04) (.13)
Duration of employment	.98 (.95, 1.02) (.29)
Psychological demand	**.78 (.69, .89) (.00)**
Attempted Suicide - OR (95%CI) (p-value)	
Marital Status	0.99 (.92, 1.06) (.75)
Sikh	1.08 (.53, 2.23) (.83)
Chinese	.79 (.09, 7.35) (.84)
Duration of employment	1.00 (.99, 1.00) (.07)
Psychological demand	.98 (.87, 1.10) (.87)
Control	1.01 (.93, 1.10) (.87)
Social Support	**.73 (.54, .98) (.04)**

Discussion

This study suggests that, after controlling for potential socio-demographic and occupational confounders, low psychological demand was associated with increased odds for completed suicide among this cohort of sawmill workers. As well, low social support was associated with increased odds for attempted suicide. The fact that two different aspects of the psychosocial working conditions are associated with attempted and completed suicide suggests that there may be different risk factors associated with attempted suicide and completed suicide.

Univariate analysis from this study indicated that those workers who experienced more periodic layoffs (i.e., those who were less well attached to the study sawmill workforce) had a greater risk for completed suicide but not for attempted suicide. This result is consistent with the literature where unemployment is consistently found as a risk factor for suicide. It is possible that periodic layoffs (i.e., short but repeated periods of unemployment) may contribute significantly to the 'cumulative burden' among vulnerable individuals, which in conjunction with low psychological demand could lead them to extreme suicidal behaviours such as completed suicide.

The findings of this study and the proposed explanation are in apparent contrast with the emerging literature on karoshi which has raised the possibility that high psychological demands, resulting from lean production methods, may be associated with death from overwork, including suicides, in Japan. However, it can also be hypothesized that both low psychological demand and high psychological demand at the workplace are risk factors for completed suicide. This hypothesis is supported by the study which found a 'U-shaped' association between severe work stress and minimal work stress and suicide among U.S. nurses [28].

The strengths of this investigation include the rigorous longitudinal study design, and the use of objective measures of both the exposure and outcome variables. On the other hand, the results cannot be generalized to a female population, or a population with different demographic and occupational characteristics. An additional limitation arises because of the potential for exposure misclassification from the retrospective and objectively assessed exposures. This latter limitation would likely have attenuated any association between exposure and outcomes so that the results obtained in this investigation may in fact be an under-estimation of the relationship between psychosocial work exposures and these suicide outcomes. As well, the correlation between indirectly assessed and self-reported working conditions is much better for blue collar workers than for white collar workers which may reduce the potential to apply these indirect assessment methods to white collar workforces.

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