

SHORT REPORT

Myocardial infarction in male and female dominated occupations

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Abstract

The aim of the study was to investigate whether workers in jobs dominated by the opposite sex have an increased risk of myocardial infarction (MI). A case-referent study was carried out to estimate the relative risk of first MI in different occupational groups. The study base comprised all men and women in five counties in the middle of Sweden during 1976-84. Cases of MI were identified from both hospital discharge records and death records. Information on occupation was obtained from two consecutive censuses. Primary health related selection was analysed for men with data from the physical examination of conscripts to compulsory military service in 1969-70 combined with data from the censuses of 1970-90 and data on early retirement in 1971-92. Increased risk of MI was found among both women (relative risk (RR) 1.41, 95% confidence interval (95% CI) 1.15 to 1.73) and men (1.21, 1.10 to 1.32) in blue collar jobs where men predominate, and among men with white collar jobs (1.26, 1.09 to 1.45) where women predominate. However, the increased risk among men in white collar jobs was probably due to negative health selection into these occupations. These results do not support the notion that being of the sexual minority in an occupation is in itself an important risk factor for MI.

(*Occup Environ Med* 1998;55:642-644)

Keywords: male dominated; female dominated; myocardial infarction

The risk for myocardial infarction (MI) differs considerably between people with different occupations,¹ and it has been suggested that people of the sexual minority in a workplace are under particular stress in their working life.²

The aim of this study was to examine whether women working in occupational groups where men predominate, and men working in groups where women predominate, run a greater risk of MI than do other gainfully employed women and men, respectively. To elucidate whether such an increased risk could be due to being in the minority in itself, we also

analysed the risk of MI among men with jobs where men predominate and women with jobs where women predominate.

Methods

The study base comprised the population aged 30-74 who resided in five Swedish counties, including Stockholm, between 1976 and 1984. The relation between occupation and MI was examined with a case-referent study base. Incident cases of MI in the study base were identified by combining information from the national register on causes of deaths with information from inpatient hospital records for the five counties. From the inpatient records, all admissions to hospital with a discharge diagnosis of MI (Swedish version of ICD-8 code 410.00 or 410.99) were compiled. From the cause of death register all deaths due to MI within the study base were identified. In all, 46 840 cases of MI were identified within the study base (34 604 men and 12 236 women). For each case, two referents were selected from the study base through random sampling, stratified by sex, age (5-year age groups), and year of infarction of the cases. Referents were selected from registers listing the population of the five counties at the end of each year in 1976-84. In all, 93 680 referents were selected in this way (69 208 men and 24 472 women).

Information about occupation for cases and referents was obtained from the 1970 and 1975 censuses by record linkage, with the Swedish personal identification numbers.

We estimated the relative risk of MI for women with men's jobs compared with other gainfully employed women, and for men with women's jobs compared with other gainfully employed men. Blue collar and white collar workers were analysed separately.

Stratification criteria included age, county of residence, and calendar year. Relative risks (RRs) were approximated by odds ratios according to the Mantel-Haenszel method and 95% confidence intervals (95% CIs) were calculated according to the methods proposed by Robins *et al.*³ Also, the absolute differences in risk were calculated separately for men and women with different occupations, based on estimates of incidence.

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Accepted 24 March 1998

Table 1 Relative risks* (RRs) of myocardial infarction for women and men (aged 30–64) in male and female dominated occupations where the relevant sex make up >80% of the workforce (reference group in each case is other women or other men)

	Men's jobs	Women's jobs
Women:		
All jobs:†		
RR	1.32	0.98
95% CI	1.13 to 1.54	0.88 to 1.09
n	273	1372
Blue collar jobs:		
RR	1.41	0.92
95% CI	1.15 to 1.73	0.79 to 1.07
n	180	951
White collar jobs:		
RR	1.11	0.95
95% CI	0.83 to 1.47	0.80 to 1.11
n	72	417
Men:		
All jobs:†		
RR	1.08	1.07
95% CI	1.02 to 1.14	0.97 to 1.18
n	8739	594
Blue collar jobs:		
RR	1.21	0.91
95% CI	1.10 to 1.32	0.79 to 1.04
n	4591	288
White collar jobs:		
RR	0.99	1.26
95% CI	0.92 to 1.06	1.09 to 1.45
n	3332	290

*Adjusted for age, county of residence, and calendar year.

†Includes blue and white collar workers and self employed people.

Results

In total, women with men's jobs had a 32% greater risk of MI than women with other gainful employment (table). This increased risk was found primarily among women with blue collar jobs. These had a 41% greater risk. There was, however, no substantially increased risk among women with men's white collar jobs. Corresponding risk analysis for men with men's jobs showed a similar pattern: there was a 21% increased risk for men with blue collar jobs and no increased risk for men with white collar jobs. On comparison of age standardised incidence, the increased risk for female blue collar workers corresponds in absolute numbers to five extra cases per 10 000 person-years (incidence=0.0014 cases/person-year). The increased risk for male blue collar workers corresponds in absolute numbers to an age standardised difference of 15 cases/10 000 person-years (incidence=0.015 cases/person-year).

Among men with women's jobs, all categories, we found no substantially increased risk of MI compared with other gainfully employed men. Nor was there any increased risk among the men with blue collar women's jobs. On the other hand, male white collar workers with women's jobs seemed to be at greater risk of MI than were other male white collar workers (RR 1.26). No such increased risks were found among female blue and white collar workers with corresponding jobs.

Among men with white collar women's jobs, nearly all worked as secretaries. Of the 290 cases among the men aged 30 to 64 in this group, 277 were employed in secretarial positions, primarily in the public service sector and in insurance.

We were able to use information from the study on military conscripts to examine the health status at enlistment of the young men

who were employed as secretaries 10 years later. The relative risk of being forced into early retirement from a secretarial position within 20 years of enlistment was also calculated. At enlistment, men who later became secretaries reported more often than men who later held other types of white collar jobs, that they often had headaches, were often nervous, had taken medication for nervous complaints, and often felt insecure in company. The men who later became secretaries had lower scores in the working capacity and in the hand grip test, suggesting subaverage physical strength. Among male secretaries we also noted an increased risk of early retirement both for all causes (RR 2.55, 95% CI 1.44 to 4.53) and specifically for psychiatric reasons (RR 2.35, 95% CI 1.48–3.74).

Discussion

The study was based on information from register records and the results could have been affected by misclassification of exposure or of disease. Because the information on occupation was gathered before the observation period, it is safe to assume that any misclassification of occupation is unrelated to the onset of cardiac disease. There is no reason to suspect that the disease had been classified as dependent of exposure in this study. The studied exposure (to be a woman in a man's job or to be a man in a woman's job) is not likely to selectively influence a diagnosis such as MI. On the whole, in this study, misclassification of disease would thus mainly weaken statistical associations. Thus, the observed increased risks for blue collar women workers with men's jobs and for male white collar workers with women's jobs are unlikely to be due to errors of disease misclassification. On the other hand, misclassification of exposure or of disease may have led to a failure to identify increased risks in other occupational groups.

An increased risk of MI within certain occupational groups could, in principle, be due to disproportionate recruitment to these jobs on the basis of health. For women who choose physically demanding blue collar jobs this explanation is unlikely. For men who choose women's white collar jobs, on the other hand, this negative health related selection may well explain the increased risk of MI.⁴ Other Swedish studies of, for example, sick leave, confirm that male secretaries have an increased risk of illness.⁵

It is not possible, on the basis of this study, to determine the cause of the increased risk of MI among workers with male dominated blue collar jobs. The increased risk, among both women and men, might be due to conditions in the work environment or lifestyle factors related to these occupations. That women with men's blue collar jobs are at increased risk of MI may be partly related to high demands of the work in combination with low decision latitude.^{6,7}

The increased risk of MI among women with male dominated blue collar jobs can probably not be explained on the basis of the women's minority status alone, as men with the same

jobs run at least the same risk, measured in absolute terms. Rather, the results suggest that the risk factors of MI, inherent in those blue collar jobs in which men make up most of the workforce, influence workers of both sexes. However, we cannot exclude that women's minority status in men's blue collar jobs contributes to their increased risk of MI. There is an urgent need to identify and take measures against the risk factors that affect both women and men with these jobs.

This study was supported by grants from the Swedish Council for Social Research.

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Examples of common forms of references are:

- 1 International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomed journals. *JAMA* 1993;269:2282-6.
- 2 Soter NA, Wasserman SI, Austen KF. Cold urticaria: release into the circulation of histamine and eosinophil chemotactic factor of anaphylaxis during cold challenge. *N Engl J Med* 1976;294:687-90.
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