Decision Latitude, Job Strain, and Myocardial Infarction: A Study of Working Men in Stockholm

Töres Theorell, MD, PhD, Akizumi Tsutsumi, MD, PhD, Johan Hallquist, MD, Christina Reuterwall, PhD, Christer Hogstedt, MD, PhD, Peeter Fredlund, MA, Nils Emlund, BM, Jeffrey V. Johnson, PhD, and the SHEEP Study Group

ABSTRACT

Objectives. This study examined the role of decision latitude and job strain in the etiology of a first myocardial infarction.

Methods. Eligible case patients were all full-time working men 45 to 64 years of age who suffered a first myocardial infarction during the period January 1992 to January 1993 in the greater Stockholm region. Referents were selected from the general population. Participation rates were 82% (case patients) and 75% (referents).

Results. Both inferred and self-reported low decision latitude were associated with increased risk of a first myocardial infarction, although this association was weakened after adjustment for social class. A decrease in inferred decision latitude during the 10 years preceding the myocardial infarction was associated with increased risk after all adjustments, including chest pain and social class. The combination of high self-reported demands and low self-reported decision latitude was an independent predictor of risk after all adjustments.

Conclusions. Both negative change in inferred decision latitude and self-reported job strain are important risk indicators in men less than 55 years of age and in blue-collar workers. (*Am J Public Health.* 1998;88:382–388)

Introduction

Since Karasek introduced the demand–control model[1,2] for the theoretical description of work organization, a large number of empirical studies have been performed in order to analyze the relationship between the model and myocardial infarction risk (for reviews, see Schnall et al.[3] and Theorell and Karasek[4]). The majority of these studies have shown a relationship between the combination of high psychological demands and low decision latitude and elevated risk of developing myocardial infarction. There have, however, been several reports of inconsistent or negative findings.[5] These studies indicate that the component that has shown the most consistent statistical significance in the model is decision latitude. A number of methods for measuring this component have been discussed in the literature. Inferred measures, derived from population surveys, have been used since they are not influenced by personality and other individual characteristics. The inferred measures have been used in the construction of working careers, and a prospective study using this methodology has shown that a high average level of job decision latitude for 25 years is protective with regard to cardiovascular mortality.[6] In that study, however, it was not possible to study exposure to different levels of decision latitude during the years immediately preceding the cardiovascular event. This time period may be of particular importance.

Since the average level of job decision latitude over one's career is associated with myocardial infarction risk, an interesting question is the following: Is negative change in decision latitude during the years most proximal to the event a separate risk factor for a first myocardial infarction? The negative change may trigger a period of physiological arousal that increases risk. If such a dynamic relationship were to be established, it could facilitate interpretation of the relationship between decision latitude and myocardial infarction risk.

Although several previous studies have controlled for the possible confounding effects of some of the biomedical risk factors for myocardial infarction, the present study included all of these factors concomitantly. Furthermore, in the present study, adjustment was also made for chest pain preceding the cardiovascular event. The latter symptom may possibly influence the way in which patients adapt to and describe their work situation. This may be of particular importance during the years immediately preceding the myocardial infarction.

When the years preceding a myocardial infarction are studied retrospectively, differential recall bias may be a problem.

Töres Theorell is with the Swedish National Institute for Psychosocial Factors and Health and the Department of Occupational Health, Karolinska Hospital, Stockholm. Akizumi Tsutsumi is with the Kawasaki Town Hospital, Tagawa-gun, Fukuoka, Japan. Johan Hallquist is with the Division of Social Medicine, Department of Public Health Sciences, Karolinska Institutet, Stockholm. Christina Reuterwall and Christer Hogstedt are with the National Institute of Occupational Health and the Department of Occupational Health, Karolinska Hospital. Peeter Fredlund is with the Division of Social Medicine, Karolinska Institutet. Nils Emlund is with the Swedish National Institute for Psychosocial Factors and Health, Stockholm. Jeffrey V. Johnson is with the School of Public Health, Johns Hopkins University, Baltimore, Md. The collaborators in the SHEEP Study Group are listed at the end of this article.

Requests for reprints should be sent to Töres Theorell, MD, PhD, National Institute for Psychosocial Factors and Health, Box 230, S-171 77 Stockholm, Sweden.

This paper was accepted May 6, 1997.

Can we trust the patient's description of working conditions, or is the description flavored by the experience of myocardial infarction? An indirect way of illuminating the potential risk of differential recall bias is to study the relationship between self-report and indirect measures of decision latitude and psychological demand at work. In the present paper, these questions are addressed with data from the Stockholm Heart Epidemiology Program.

Methods

Study Sample

The Stockholm Heart Epidemiology Program[7] is a population-based case–referent study of causes of myocardial infarction. Male patients with a first myocardial infarction were recruited during the period January 13, 1992, to January 12, 1994, and female patients were recruited during the period January 13, 1992, to December 31, 1994. The study base comprised all Swedish citizens resident in the Stockholm county during this time who were free of previous clinically diagnosed myocardial infarction. Through October 1992, the study base comprised individuals 45 to 65 years of age; from November 1, 1992, the age span was 45 to 70 years. Cases were all first events of myocardial infarction, fatal and nonfatal, according to specified diagnostic criteria including information on symptoms, electrocardiogram, blood chemistry, and autopsy findings. Referents (1 per case patient) were chosen randomly from the study base after stratification for sex, age, and hospital catchment area. Patients were included at the time of disease incidence, and referents were chosen at the same time (incidence density sampling). In order to obtain at least one referent per case patient, a new referent was selected when the first one did not participate. This did not affect the calculated participation rate, which is based on the total number of individuals who were invited to participate.

All of the available medical records were scrutinized. In fatal cases, the death certificates were examined. The rationale for the medical scrutinization was to verify the diagnosis and to confirm that there had been no evidence of a previous myocardial infarction. The county had been divided into hospital areas, each hospital having a defined geographical catchment area. Case patients were identified from 3 sources: the cardiology units at the 10 emergency hospitals in the county, the computerized Hospital Discharge Register, and the Causes of Death Register at Statistics Sweden. Referents were identified from the computerized Register of the County Population. All referents were alive (including referents for fatal cases). Since geographical area could have been associated with potential differences in recruitment and data collection routines in the 10 hospitals, it was necessary to adjust for geographical area in the statistical analyses.

The present work is confined to men 45 to 64 years old who had been working mainly full time (more than 35 hours per week) during the previous 5 years. Information about at least some aspect of exposure (questionnaire, interview, or examination) was available for 82% of case patients and 75% of referents in this part of the study base. The total number of cases was 1047 (809 nonfatal cases and 238 fatal cases [the latter involved death within 28 days]).

Information regarding both current exposure and occupational history was collected by means of a questionnaire and a supplementing telephone interview. For fatal cases, the questionnaire was completed by a close relative. In order to decrease nonparticipation, the postal questionnaire was preceded by a mailed introductory letter. At least 4 reminders were made when needed, at least one of them by telephone.

Three-digit occupational titles (according to the Nordic version of the international classification of occupations) for each year of employment during the entire working career were identified by a specially trained rater who used a standardized procedure. Based on descriptions of the job and the work duties performed, a 3-digit occupational code was assigned to every job that respondents held during their career.

A health examination, including a medical physical examination and blood sampling (after overnight fasting), was conducted for nonfatal case patients and their referents not less than 3 months after the onset of the illness. High-density lipoprotein (HDL) cholesterol was measured according to Warnick,[8] and low-density lipoprotein (LDL) cholesterol was measured according to Fridewald's formula.[9] The ratio between LDL and HDL cholesterol was calculated. History of hypertension was defined as positive when the subject reported a history of treatment of hypertension or had a measured systolic blood pressure level of 170 or higher or a measured diastolic blood pressure level of 95 or higher (measured in the supine position after 5 minutes of resting). The mean of the first and second readings was used in the present study.

Self-reported data regarding decision latitude and psychological demands were obtained from a Swedish version of the Karasek demand–control questionnaire. Five questions addressed demands, and 6 questions focused on decision latitude. Each question had 4 frequency response categories ranging from "never" to "almost always."[10] For randomly selected working men in Stockholm, Cronbach alpha values have been reported to be .75 for psychological demands and .76 for decision latitude.[11] Job strain was defined as the ratio between demands and decision latitude. After analysis of separate quartiles, subjects were operationally defined as exposed when they belonged to the lowest quartiles for demands, decision latitude, and job strain, since the myocardial infarction risks in the remaining 3 quartiles were similar. In calculations of risk (unless otherwise specified), subjects in the exposed category were compared with all other subjects. Quartiles were defined according to the distribution of scores in the total male and female referent working populations for the self-reported variables.

For inferred scoring of job characteristics, psychosocial exposure categories were assigned by linking each subject's occupational history This was done with a work organization exposure matrix for every year of paid work in the subject's life; in the present report, the 10 years preceding inclusion in the Stockholm Heart Epidemiology Program were the focus. The work organization matrix was developed from a large random sample of the entire Swedish workforce (n = 12 084).[12,13] The items used in the matrix were similar[14] or identical[15,16] to those used in earlier studies of the effects of psychological job demands and decision latitude in Sweden. Their psychometric properties have been reported elsewhere.[12,13] The work organization matrix has been applied in several studies, the most extensive being that of Johnson et al.,[6] published in 1996. Mean scores were derived for decision latitude and psychological demands by sex, age, and duration of employment in each of 262 occupations. By linking the 3-digit job history records of each case patient and referent with the matrix sex-, age-, and duration-specific mean scores, subgroup scores were assigned to each year of employment in each occupation held during the previous 10 years. Exposure to low inferred decision latitude was operationally defined as belonging to the lowest degree quartile (of the total group of male case patients and referents) of inferred decision latitude during the year preceding the study. Degree of change in decision latitude was calculated as change in inferred decision latitude from the 10th year preceding the myocardial infarction to the year preceding the event (i.e., subtracting the 10th year's from the previous year's score). Exposure to negative change in decision latitude was operationally defined as belonging to the lowest (most negative) quartile in the total male study group (case patients and referents).

Neither self-report data nor inferred measures can be claimed to represent the "truth." The inferred information, however, was based on job title, age, and duration of exposure only and hence was not sensitive to the influence of individual characteristics such as case status, which may have created differential misclassification. Therefore, this information was used as the standard in comparisons between self-reports and inferred data.

Working conditions were also explored with regard to shift work (constant change in work hours according to a fixed schedule [yes/no], frequent overtime work [yes/no] and night work (substantial portion of working hours scheduled at night [yes/no]). Subjects were also asked whether they served as supervisors.

Statistical Analysis

Data were analyzed by means of logistic regression. All of the logistic regression models at each stage of the analysis controlled for age category (5-year groups) and hospital catchment area. It was necessary to control for geographical area since both case patients and referents were recruited at hospitals with different geographically defined catchment areas. These hospitals gathered the information from case spatients and referents. Odds ratios (ORs) were calculated. In this situation, the odds ratio was an estimate of relative risk. Five variables were taken into consideration as covariates: smoking (current smoker, ex-smoker, and never smoker), LDL–HDL ratio (continuous), history of hypertension (yes/no), history of chest pain preceding myocardial infarction (yes/no), and social class (blue-collar/white-collar according to the Swedish socioeconomic index classification).

In general, differences in risk were observed between the "worst" exposure quartile and the 3 other quartiles; no significant differences were observed between the 3 "best" quartiles. Accordingly, the 3 "best" quartiles were regarded as homogeneous with regard to risk and were collapsed in the analyses. Thus, the worst quartile was regarded as the exposed group, and the remaining 3 quartiles were regarded as the unexposed groups in all analyses of myocardial infarction risk.

TABLE 1—Odds Ratios and 95% Confidence Intervals of Inferred Decision Latitude (IDL),Negative Change of Inferred Decision Latitude (NCIDL), Self-Reported Decision Latitude (SDL), and Self-Reported Job Strain (SJS): 45- to 64-Year-Old Swedish Men.

	IDL	NCIDL	SDL	SJS
Adjustment 1[a]				
Odds ratio	1.7	1.3	1.3	1.4
Confidence interval	1.3, 2.2	1.0, 1.7	1.0, 1.6	1.1, 1.8
No.	1279	1260	1455	1440
Adjustment 2[b]				
Odds ratio	1.4	1.4	1.2	1.4
Confidence interval	1.0, 2.0	1.0, 1.9	0.9, 1.7	1.1, 1.9
No.	1084	1073	1219	1208
Adjustment 3[c]				
Odds ratio	1.2	1.4	1.3	1.3
Confidence interval	0.8, 2.0	1.0, 2.0	0.9, 1.8	1.0, 1.8
No.	937	927	954	945

Note. Numbers of subjects include the sum of case patients and referents in each analysis.
[a]Adjustment for age and hospital catchment area.
[b]Adjustment for age, hospital catchment area, smoking, LDL–HDL ratio, history of hypertension, and history of chest pain.
[c]Adjustment for age, hospital catchment area, smoking, LDL–HDL ratio, history of hypertension, history of chest pain, and social class.

Results

Table 1 shows the odds ratios associated with a first myocardial infarction for 3 aspects of decision latitude (worst quartile, according to hypothesis, vs all others): inferred decision latitude during the year preceding the myocardial infarction, negative change of inferred decision latitude during the 10 years preceding the myocardial infarction, and self-reported decision latitude and job strain at the time of the myocardial infarction. The table shows 3 different adjustments: (1) adjustments for age and geographical area only; (2) adjustments for age, geographical area, and categories (described earlier) of smoking, LDL–HDL ratio, history of hypertension, and history of chest pain preceding the myocardial infarction; and (3) all of the previous adjustments with the addition of social class.

Analyses are shown only for nonfatal cases. Inferred data analyses were performed with nonfatal case patients and their referents separately and for the total study groups (including fatal cases) separately. Data for the fatal cases are not described; however, the odds ratio for inferred decision latitude was 1.6 (95% confidence interval [CI] = 1.3, 2.0; n = 1573), and the odds ratio for negative change of decision latitude was 1.2 (95% CI = 1.0, 1.5; n = 1546), before adjustment for biomedical factors and social class.

Inferred decision latitude during the year preceding the myocardial infarction was strongly associated with myocardial infarction risk when adjustment was made for age and geographical area only. The association became somewhat weaker after adjustment for biomedical risk factors and chest pain, although it was still statistically significant. It was further weakened after the additional adjustment of social class, the lower confidence interval clearly being below 1.0. Self-reported decision latitude for the year preceding the myocardial infarction was a weaker risk factor than the inferred measure when adjustment was made only for age and geographical area, but it was still significant. This risk factor was relatively unaffected by the successive adjustments.

After adjustment for biomedical factors and social class, the point estimate was the same as in the first step, although the confidence intervals were slightly wider. Negative change in inferred decision latitude over the preceding 10 years was found to be significantly associated with myocardial infarction risk (OR = 1.4; 95% CI = 1.0, 2.0), even after all adjustments. Self-reported job strain was also found to be significantly associated with myocardial infarction risk after all adjustments (OR = 1.3; 95% CI = 1.0, 1.8). The adjustments had only marginal effects on point estimates and confidence intervals.

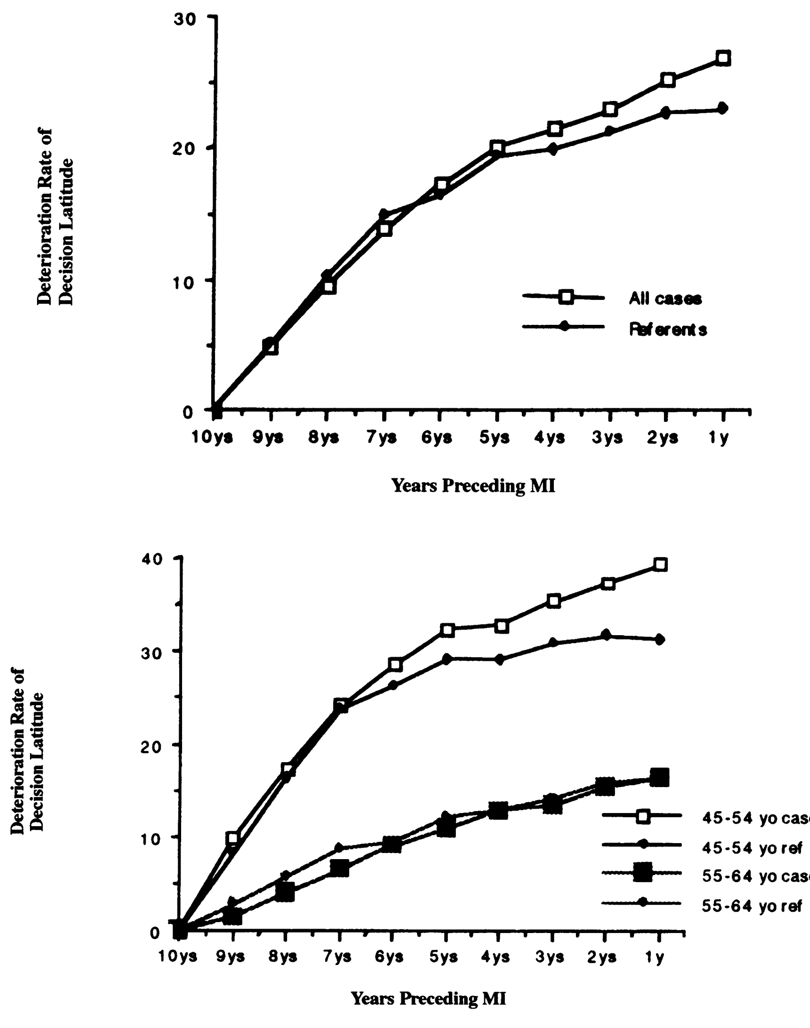
Analyses of psychological demands showed that, when adjusted for age and geographical area only, high inferred psychological demands were negatively associated with myocardial infarction risk (OR = 0.8, 95% CI = 0.6, 1.1, n = 1278, in the nonfatal group, and OR = 0.9, 95% CI = 0.7, 1.1, n = 1572, in the total group). High self-reported psychological demands, on the other hand, were positively associated with risk (OR = 1.1, 95% CI = 0.9, 1.4, in the nonfatal group, n = 1449), as would have been theoretically expected. These findings remained after adjustment for biomedical risk factors and history of chest pain. After adjustment for social class as well, however, inferred psychological demands were found to be negatively associated with risk (OR = 0.7, 95% CI = 0.5, 1.0, n = 937) in the nonfatal group, whereas self-reported psychological demands tended to be positively associated with risk (OR = 1.1, 95% CI = 0.8, 1.5, n = 950).

Table 2 shows the "sensitivity" and "specificity" results for demands and decision latitude. Because the inferred measures could not be affected by individual perception, they were chosen as standards. The same operational definitions of exposure—high demand and low decision latitude—were used as in the analyses of risk. Accordingly, nonexposed subjects were those belonging to the remaining quartiles. The analyses of sensitivity and specificity showed poorer results for psychological demands than for decision latitude. The sensitivity was poor for both, 53% and 46% for nonfatal cases and referents, respectively, with regard to decision latitude, and 28% and 31%, respectively, with regard to psychological demands. The specificity was better, 84%, for both nonfatal cases and referents with regard to decision latitude; with regard to psychological demands, the rates were 83% and 82% for nonfatal cases and referents, respectively. The findings were similar for case patients and referents.

The left panel of Figure 1 shows the percentage of case patients and referents who had their decision latitude score decreased by a level corresponding at least to the worst 25th percentile of the distribution of changes in scores. The curves for the 2 groups describe progressive increases in the proportion of subjects reaching this level year after year during the 10 years preceding myocardial infarction. All levels have been related to the level 10 years before myocardial infarction (labeled 0 in the diagram). In the end, the 2 groups reach the mean level of 25% (as expected), but the diagram clearly shows that the difference between the groups becomes clear during the last 4 years preceding myocardial infarction. The right panel of Figure 1 divides subjects into 2 age groups (45 to 54 years and 55 to 64 years). The difference is clearer for the younger age group, particularly during the 3 years preceding myocardial infarction. On the other hand, there is no difference between the older age groups. The odds ratio for myocardial infarction associated

TABLE 2—Sensitivity and Specificity in the Comparison between Inferred and Self-Reported Assessments of Decision Latitude and Psychological Demands, Arbitrarily Using Inferred Data as the Standard

	Sensitivity for Lowest Quartile		Specificity for Lowest Quartile	
	Surviving Case Patients	Referents	Surviving Case Patients	Referents
Decision latitude	53.0	46.0	83.6	84.0
Psychological demands	27.5	31.0	83.1	81.9



Note. In the upper panel, all subjects in the 2 groups are displayed together. In the lower panel, subjects are divided according to age group (45 to 54 and 55 to 64 years).

FIGURE 1—Percentage of subjects who reached the "worst" quartile with regard to change in inferred decision latitude for each of the 10 years preceding myocardial infarction (MI): 45- to 64-year-old case patients and referents working full time.

with decreased inferred decision latitude in the 45- to 54-year age group was 1.8 (95% CI = 1.1, C1=3.0, n = 431) after adjustment for all of the relevant confounders, including social class (as in Table 1).

Table 3 shows the results of the combined demand–decision latitude analyses based on self-report data; subjects are divided into white-collar/blue-collar workers and younger (45 to 54 years) and older (55 to 64 years) workers. Only nonfatal cases were included. Adjustments were made for age, geographical area, biomedical factors, history of chest pain (blue collar/white collar analysis), and all of these factors with the addition of social class (age groups). The excess risk observed in the category hypothesized as "worst" was confined mainly to the younger group and to blue-collar workers.

Figure 2 shows the effects of a number of different potential confounders on the association between self-reported job strain and myocardial infarction risk. All analyses were adjusted for age, after which each of a series of potential confounders was added to the adjustment (other working conditions of potential relevance, as well as biomedical factors and history of chest pain). The analysis showed that the introduction of shift work, overtime work, foreman status, and night work did not change the association between job strain and myocardial infarction risk substantially. The introduction of smoking as a confounder seemed to increase the strength of the association somewhat, however. On the contrary, the introduction of chest pain decreased the strength of the association slightly, but the relative risk was still above 1.0.

TABLE 3—Odds Ratios of Self-Reported Job Strain according to Age Category and Social Class

	Age Category, y		Social Class	
	45–54	55–64	Blue Collar	White Collar
Odds ratio	1.8	1.0	1.8	1.2
95% confidence interval	1.1, 2.9	0.6, 1.6	1.0, 3.3	0.8, 1.7
No.	431	514	270	675

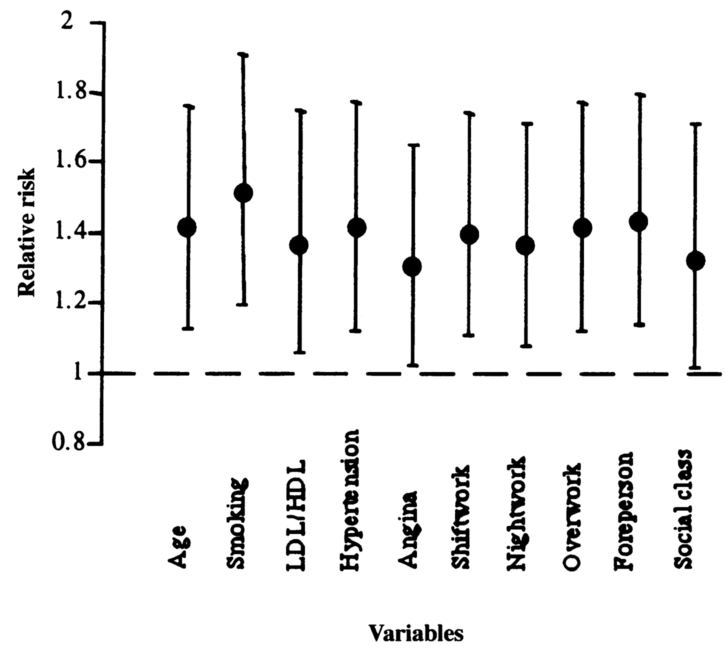


FIGURE 2—Relative risk (odds ratio) estimates for job strain with adjustment for age only and with adjustment for age and each of a number of other potential compounders: full-time working men 45 to 64 years of age.

Discussion

The advantages of the present study are its size and the representativeness of the study base. This is also the main difference between the present study and that of Hlatky et al.[5] who found no association between job strain and different indices of cardiovascular disease in individuals who had been subjected to coronary angiography. The representativeness of the sample examined in the study by Hlatky et al. has been criticized.[17] The design of our study differed markedly from that of the Hlatky et al. study.

Another advantage of the present study was the opportunity to adjust for a number of potential biomedical confounders as well as work conditions other than job strain. In most of the analyses presented, we have used conventional adjustments for potential risk factors so as to make the results comparable to most of the cardiovascular epidemiological literature. It could be, however, that shift work, overtime work, and work in a supervisory position might covary with the psychosocial job variables studied. If this were the case, these other work characteristics might "explain away" the associations reported between myocardial infarction risk and decision latitude and job strain. This was not the case in the present analysis.

There were differences in the numbers of subjects included in the different analyses because not all subjects had the necessary medical information and not all could be classified as either blue- or white-collar workers. This explains some of the statistical uncertainty in the different analyses.

Chest pain preceding myocardial infarction was not shown to have a marked effect on the studied relationships. A separate analysis of those who had had no chest pain showed that the odds ratio tended to be higer in this group than among those with chest pain. The proportion of referents with chest pain was small, however.

The present report has focused on men 45 to 64 years of age who had been working mainly full time during the previous 5 years (94% of all men in this age group). The main reason for this focus was that the effect of working conditions can be distinguished from retirement-related exposures. A more strict criterion for full-time work during the most recent year preceding the myocardial infarction would have included a smaller proportion of the total number of working men (72%), but we felt this would have been too limited. The findings for women will be reported in detail in a forthcoming publication. There is no evidence in the present study that the relative risks for myocardial infarction associated with job strain are lower in women than in men.

There are other ways of operationally defining job strain once decision latitude and psychological demands have been measured. The full demand–control model will be analyzed in a forthcoming publication based on the sample described here.

The main findings in the present study are consistent with previous research. The order of magnitude of the association between job strain and myocardial infarction risk was the same as that observed in several studies using inferred measurement techniques, despite the fact that self-reported measures were used in the present study. The strongest association was observed before 55 years of age. This is consistent with most previous research, as is the observation that the association was stronger for blue-collar workers than for white-collar workers, although there have been diverging findings with regard to the latter.

The fact that job strain was clearly associated with excess risk of a first myocardial infarction in this study merits particular interest, since adjustments were made for many potential confounders. The association held even after adjustment for social class and other job factors of potential importance. The observation that the job strain association was much stronger in blue-collar workers than in white-collar workers may represent an interaction effect (i.e., job strain is more dangerous in terms of myocardial infarction risk in blue-collar workers than in white-collar workers). This question will be addressed in a forthcoming publication based on the same sample.

The inferred measure of decision latitude provided us with predictions of the same order of precision as the self-reported measure. This is in general agreement with the findings in the British Whitehall study,[18] in which both self-reported and external assessments of job conditions were used in the prediction of long and short spells of sick leave among civil servants. In that study, external assessments of psychosocial working conditions made by supervisors and self-reported assessments of the same conditions provided predictions of a similar magnitude, although the correlations between the 2 classes of assessments were relatively small. The correlations between expert ratings and self-reports of decision latitude were of the same order of magnitude as in our study (0.3 to 0.4). This similarity in size of correlations was observed even though the methods for measuring the conditions externally were different in our study and in the Whitehall study; in the present study, the inferred measures were capturing average measures in the general working populations for the occupations.

The sensitivity and specificity of subjective measures using the inferred measures as standards were the same among case patients as they were among referents for decision latitude. This speaks against differential recall bias as a problem for decision latitude. For psychological demands, on the other hand, the correlation between the 2 measures was so small that it is more difficult to make any conclusions regarding potential risks of differential recall bias. Still, the sensitivity and specificity measures were very similar in the case patient and referent groups, which may speak against serious differential recall bias in the description of psychological demands as well.

The fact that negative change in decision latitude was a risk factor is of interest from a dynamic perspective. This was the case particularly for men 45 to 54 years of age, an interval when decreased job status could be seen as a major threat. Previous studies in industrialized countries have shown that working men can expect rising levels of decision latitude, especially during the first years of their working career. During the period after 55 years of age, this development is halted, and no further increase in decision latitude may then be expected in most men. When men are approaching retirement age, such a loss of status may not be perceived as equally threatening. Indeed, lowered inferred decision latitude was not observed to be a significant predictor of myocardial infarction risk in the 55- to 64-year age group. It is possible that other psychosocial phenomena may be of greater importance during these later years. It should also be pointed out that a lowered decision latitude—as operationally defined in the present study—mostly entails a change of job title and that, accordingly, many conditions may have changed at work (not only decision latitude).

Negative changes in decision latitude should be explored in more detail in future studies. Several factors may create difficulties in interpreting our result. First of all, men with no or very small changes in decision latitude constituted a large proportion of the referent group. In this group, many of the men had a very low level of decision latitude 10 years before the examination. Accordingly, no further deterioration could take place. This may have led to an underestimation of the importance of this finding. Furthermore, many changes could have taken place in the studied men that have not been recorded, since only 2 years (10 years before and the last year) were compared. Accordingly, a more detailed description of the total pattern of changes will be undertaken. With regard to the difference between men less than and more than 55 years of age, possible cohort effects should be studied. In the oldest age group, the education level was, in general, lower than in later generations, and this might influence the pattern of changes in decision latitude during the years preceding retirement. Men with less education have a greater likelihood of premature retirement than others. This is of particular relevance to 55- to 64-year-old men, since prematurely retired men were excluded from this analysis. Such a phenomenon could also contribute to an underestimation of the true association. These methodological questions will be examined in a forthcoming publication.

A result that is different in this study than in the previous study using the inferred measurements[6] is that, in the latter, participants in the upper decision latitude quartile deviated from the other working participants (in having a low risk of cardiovascular death), whereas participants in the remaining quartiles did not differ from one another. In the present study, subjects in the low quartile differed from other subjects, whereas the remaining groups did not differ from one another. This difference in results could be due either to the fact that the years immediately preceding the myocardial infarction were examined in the present study and more distant ones in the previous study or to the fact that accumulated levels were studied in the previous study. Total lifetime occupational careers will be analyzed in a forthcoming study.

The design of the present study is advantageous in analyses of the association between negative changes in decision latitude and risk of myocardial infarction. The impossibility of differential recall bias (information based on job titles only) and adjustment for history of hypertension and other risk factors, as well as chest pain preceding the myocardial infarction, make it unlikely that the association is a secondary phenomenon (negative change of decision latitude being a consequence of coronary heart disease rather than preceding it). Increased decision latitude, operationally defined in a symmetrical way, was not associated with myocardial infarction risk. This speaks against the interpretation that the association with negative change was a nonspecific change effect.

Social class may contribute to prediction of myocardial infarction. The odds ratio of first myocardial infarction associated with blue-collar status after adjustment for age, geographical area, and biomedical risk factors, including chest pain, was 1.4 (95% CI = 1.0, 1.9, n = 960).

When the analyses of job strain and negative change in decision latitude were adjusted for blue- or white-collar status, the risk estimates were unaffected. In the case of self-reported decision latitude, however, the association had a broader confidence interval that included 1.0 after adjustment for this variable. Part of the reason for this was that the number of subjects included was smaller than in the other analyses, since not all subjects could be classified according to white- or blue-collar status. Farmers and self-employed men were excluded, for instance.

The inferred measure of psychological demands did not provide predictions in the expected direction. This measure is the same as the one used in a previous study of Swedes[6] and is based on 2 questions, one on "tempo" (rush) and one on "psychological demand." The first question, used alone as a proxy for inferred psychological demands, has been used in previous studies[19,20] and has resulted in predictions more in accord with the demand–control hypothesis. The second question involves a socially biased response pattern, with highly educated people responding positively. The self-reported measure of psychological demand was based on 5 questions that have been tested in several studies. In the case of decision latitude, the inferred and self-reported measures are more similar, and the inferred measure is methodologically much stronger than the demand indicator. Thus, the comparison between inferred and self-reported measures is methodologically more relevant for decision latitude than it is for psychological demands.

The measures of psychological job demands need to be refined. Analyses in the case of psychological demands should perhaps be made separately in different social classes, since these questions may be perceived differently. Inferred psychological demands are particularly vulnerable to differences in social class. On the other hand, self-reported psychological demands seem to add somewhat to the precision of risk prediction in the expected direction, since self-reported job strain was a clearly significant risk factor even after adjustment for all potential confounders.

In summary, even after addressing several methodological problems, the overall results indicate that psychosocial working conditions are of importance to the risk of developing a myocardial infarction in working men in Sweden. □

Acknowledgments

This study was financially supported by Stockholm County and the Swedish Medical Research Council.

The collaborators for the Stockholm Heart Epidemiology Program (SHEEP) Study Group are Lars Alfredsson, PhD; Ulf de Faire, MD, PhD; Niclas Hammer, DMSc; and Anders Ahlbom, PhD. All are with the Institute for Environmental Medicine, Karolinska Institutet, Stockholm, Sweden.

The collaborative efforts by the staff at the departments of medicine at the Karolinska, Löwenströmska, Norrtälje, Nacka, Sankt Göran, Danderyd, Södertälje, Sabbatsberg, Huddinge, and Söder hospitals are greatly appreciated.

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