RESEARCH REPORT

Socioeconomic status, status inconsistency and risk of ischaemic heart disease: a prospective study among members of a statutory health insurance company

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Background: Inconsistency in social status and its impact on health have been a focus of research 30–40 years ago. Yet, there is little recent information on it's association with ischaemic heart disease (IHD) morbidity and IHD is still defined as one of the major health problems in socioeconomically developed societies.
Methods: A secondary analysis of prospective historical data from 68 805 male and female members of a statutory German health insurance company aged 25–65 years was conducted. Data included information on sociodemographic variables, social status indicators (education, occupational grade and income) and hospital admissions because of IHD.
Results: Findings from Cox regression analysis showed an increased risk for IHD in the group with the highest educational level, whereas the lowest occupational and income groups had the highest hazard ratio (HR). Further analysis revealed that after adjustment for income status inconsistency (defined by the combination of higher educational level with lower occupational status) accounts for increased risk of IHD (HR for men, 3.14 and for women, 3.63). An association of similar strength was observed regarding high education/low income in women (HR 3.53). The combination of low education with high income reduced the risk among men (HR 0.29). No respective findings were observed concerning occupational group and income.
Conclusions: Status inconsistency is associated with the risk of IHD as well as single traditional indicators of socioeconomic position. Information on status inconsistency should be measured in addition to single indicators of socioeconomic status to achieve a more appropriate estimation of the risk of IHD.

When there are high unemployment rates in economically developed countries, this can increase pressure exerted on those who are still active in the labour market. Flexible working conditions can become precarious, downsizing and job insecurity increases, as does downward social mobility. This all influences individual career development and also affects health.[1–7] Several studies have shown associations between precarious working conditions and ischaemic heart disease (IHD) morbidity and mortality.[8–12]

Increasing job instability, downward social mobility and flexible job arrangements may increase social status inconsistency in modern societies. Status inconsistency has been defined as inhomogeneity of traditional indicators of socioeconomic status (eg, education, occupational class and income) in one person.[13] One of the most prominent examples of status inconsistency is a doctor who works as a taxi driver. Due to the pressure of the labour market, employees are faced with precarious working conditions and are more likely to accept jobs characterised below their status. Among others, this is one hypothesis why in societies like Germany the prevalence of status inconsistency is expected to increase but status consistency is assumed to be probable within the lowest and the highest social groups only.[14]

One might ask whether status inconsistency is of increasing importance in health and might even replace traditional indicators of socioeconomic position. Although decreasing socioeconomic status (SES) according to these indicators has been shown to be related to increasing coronary morbidity and mortality, little is known about the impact of status inconsistency on health.[15–17] Available studies go back to the 1970s and 1980s and show mixed evidence concerning associations of status inconsistency with the risk of IHD.[18] Only three out of six studies found an increased coronary risk among individuals characterised by status inconsistency. This mixed picture has been attributed to methodological differences between the studies and different concepts of status inconsistency used in these investigations. However, these data are >30 years' old and the importance of status inconsistency for cardiovascular health might have changed substantially meanwhile. Hence, in this study we will investigate whether social status is associated with the risk of IHD, whether social status inconsistency leads to an increase in the risk of IHD and whether specific types of status inconsistency are more likely to increase the risk of IHD than others.

METHODS

Study population

The data for this study were provided by a German statutory health insurance company. They cover a mixed urban and rural region in southern Germany which is characterised by a higher proportion of blue-collar workers and of people with basic education, but a lower proportion of people with higher social status than in the general population.[19] Due to legal regulations only blue-collar workers and unemployed people were allowed to be members of this health insurance company until 31 December 1995. Since 1 January 1996 Germany has had an open enrollment for employed people to any statutory health insurance company. The German health insurance regulations allow spouses who do not hold a paid job and their children who are at school or university to be insured free of charge together with the wage earner. These family members were excluded from our analysis as their social status classification is a matter of debate.[20 21] Thus, only employed people entered our analysis. The data represent an open cohort design indicating that people may enter or leave the cohort within the observation period. The

Abbreviations: ICD, International Classification of Diseases; IHD, ischaemic heart disease; SES, socioeconomic status observation period is defined by the availability of sociodemographic variables and of indicators of social status. The minimum observation for these data is 1 year and the maximum 59 years (mean 35 years). Information on hospital admissions is available for the period from January 1996 to June 2000.

Ischaemic heart disease

The beginning and end date of each inpatient treatment as a result of IHD diagnosis (International Classification of Diseases (ICD)-9 or ICD-10) was derived from health insurance routine data. Up to three diagnoses per patient and hospital-stay period were available. The diagnosis of IHD (410–414 according to ICD-9, I21–I25 according to ICD-10) was counted once per hospital period. Thus, during any one hospital visit only one IHD diagnosis is considered, even if there are more than one. This was to avoid problems concerning differences between the first and last diagnosis during one hospital period so as to achieve conservative risk estimations. However, in almost all patients IHD was diagnosed only once during one hospital period. We entered into the statistical analysis only the first period at hospital due to IHD per person during the observation period. This does not completely rule out the existence of previous ischaemic events not documented in our data because they were not diagnosed in hospital or because patients died before reaching hospital. As can be seen from table 1, 481 (78.8% men, 21.2% women) patients had new IHD. The IHD rate is lower in women than in men.

Indicators of social status

Information on education and training was available according to the classification of the German Labour Authority.[22] This classification combines information on education, vocational training and university degree (table 1).

Occupational group membership was determined using an official three-digit classification issued by the German Labour Authority.[22] These collapsed into five groups: unskilled and semiskilled positions including white-collar and blue-collar jobs, skilled manual, skilled non-manual, intermediate and professional. For people with IHD we selected the highest occupational group they were in before the IHD event for the analysis. In the remaining healthy group, we used the highest occupational position before the end of observation or before leaving the cohort.

Income (owing to employment) is sent by the employer to the insurance company once a year as it is the basis for calculating insurance fees. Accordingly, yearly individual income was available for the analysis. Only the income of people with at least 70 days' of employment was included to avoid possible bias through short-time employment and bonus. The yearly income of people not working for a whole year was calculated by estimating the income on the basis of the available daily income for the year. Inflation was considered by adding inflation rates to the yearly income. The individual average income before IHD diagnosis and before the end of observation among the healthy comparison group was used in this analysis. This income was collapsed into quintiles.

Social status may change over time. This is likely for occupational position and for income, but not for education and training in Germany.[23] Regarding the occupational position we computed upward and downward mobility scores by comparing the above-described five categories during different insurance periods. Different insurance periods correspond to different jobs. This calculation was done for the last job change before IHD diagnosis or for the last job change before the end of

Table 1 Description of the study population.* Sociodemographic variables and new ischaemic heart disease (IHD) during the observation period

	Men (n = 36 869)		Women (n = 31 936)	
	number	Mean (SD) %	number	Mean (SD) %
Age (years)	36 869	38.9 (10.4)	31 936	38.8 (9.8)
Education and training				
University degree	5203	14.1	2717	8.5
College degree	794	2.2	501	1.6
> 1 years with vocational training	565	1.5	859	2.7
> 12 years without vocational training	219	0.6	219	0.7
⩽ 10 years with vocational training	17 954	48.7	15 156	47.5
⩽ 10 years without vocational training	5834	15.8	7119	22.3
Missed information	6300	17.1	5365	16.8
Occupational grade				
Professional	73	0.2	50	0.2
Intermediate position	1096	3.1	839	2.7
Non-manual	4506	12.6	13 638	43.5
Skilled manual	12 528	35.1	1689	5.4
Unskilled and semiskilled occupation	17 489	49.0	15 170	48.3
Missed information	1177	3.2	1389	4.3
Income				
Upper two quintiles	24 252	65.8	6199	19.4
Medium quintile	7306	19.8	6369	19.9
Lower two quintiles	5021	13.6	16 080	50.4
Missed information	28	0.08	3268	10.3
Social status inconsistency (yes)	16 233	51.6	4786	17.7
Missed information	4513	12.2	4971	15.6
Social mobility				
Upward	1831	5.0	1205	3.8
Downward	1431	3.9	1140	3.6
IHD (ICD 9-410 – 414)	379	1.0	102	0.3
Acute myocardial infarction (ICD 9-410)	145	0.4	27	0.1
Acute/subacute IHD (ICD 9-411)	24	0.1	7	0.02
Angina pectoris (ICD 9-413)	124	0.3	42	0.1
Chronic IHD (ICD 9-414)	142	0.4	36	0.1

ICD, International Classification of Diseases.
*Employed people aged 25–65 years.

observation or before leaving the cohort among the remaining healthy group. Concerning income, the average earnings and inflation weighting were used to consider changes over time.

Status inconsistency

We used individual measures of social status to define status inconsistency. Each category of a social status indicator was assigned a specific weight ranging from 1 to 5 points (see appendix A). Different types of status inconsistency were calculated by subtracting weights for one indicator from weights for another (for details see appendix B). Accordingly, type and direction of status inconsistency can be specified. If the difference between two social status indicators is ⩾2 points this is defined as status inconsistency. The direction of status inconsistency (eg, whether education exceeds the occupational position or vice versa) is defined by a positive or negative sign. Accordingly, more than half of the male and about 18% of the female study population were characterised by status inconsistency (appendix B). A substantial part of this inconsistency is produced by the combination of low educational years (⩽10 years) and low occupational position (unskilled/semiskilled) with high income due to extra earnings (see appendix B).

Statistical analysis

Due to small numbers the single indicators of SES were collapsed into three categories for bivariate and multivariate analyses of associations with IHD (see tables 2 and 3). Analytical categories of status inconsistency are presented in appendix B. Bivariate analyses were performed with the help of the SPSS V.12.1 statistical package. Multiple variable analysis was based on the Cox proportional hazard model.[24] Cox regression is appropriate because it depicts a time process, whereas it is assumed that certain events (in our analysis hospital admissions) will occur as a function of time having elapsed. If covariates are introduced (indicators of SES and of social mobility in our study), for every covariate it will be estimated to what extent the time process in question is altered. This refers to the question of whether the risk for hospital admission due to IHD increases or decreases in specific socioeconomic groups. Accordingly, for each subject we analysed the number of days from the beginning of observation to the event or to the end of observation for healthy individuals. This period was calculated based on the age at entry to the cohort, and on the age at hospital admission or end of observation, respectively. Hazard ratios (HRs) and 95% CIs are displayed in respective tables. All analyses were stratified by gender because men and women differ with regard to both social status and IHD. Multiple Cox regression analysis was calculated using the STATA V.6. statistical package.

RESULTS

Table 1 describes the study population in terms of sociodemographic characteristics and the onset of new IHD. The population consisted of 36 869 (53.6%) men and 31 936 (46.3%) women aged 25–65 years. Lower educational and occupational groups are overrepresented. Clear gender differences can be observed concerning all indicators of SES. The high proportion of men belonging to the highest income groups is—to a large extent—explained by extra paid work (ie, piece wage, shift work and bonus money). The high proportion of missing data concerning income among women is due to the large number of women employed in short-term jobs and low-wage jobs which do not require health insurance. In our data, no social status information are available for such jobs. Social mobility applies to 3.5–5% of our study population and is more likely among men than women. In-depth analysis of people with missing information on the socioeconomic variables revealed that this group is somewhat younger (41.4 vs 42. years; $p<0.01$) and characterised by a slightly lower proportion of cases with IHD (0.4% vs 0.5%; $p<0.001$).

Table 2 shows the frequency and HRs of new IHD in men by indicators of SES. The risk of a new IHD is highest among those with a university degree (reference group; model 1). This applies to all IHD diagnoses (ICD-9 410–414), chronic IHD, angina pectoris and, partly, acute myocardial infarction. Low occupational position (model 2) is significantly associated with either ischaemic outcome. In addition, downward mobility is related to total IHD and angina. A social gradient can be observed with regard to income (model 3) in relation to total IHD and myocardial infarction. With regard to chronic IHD, significant effects are found for the lowest income group, whereas belonging to the medium-income quintile is associated with an increased risk for acute IHD. The findings for income and angina are adjusted for mobility, showing a significantly increased relative risk (RR) for subjects characterised by downward mobility.

Respective findings for women (table 3) show, in general, the same trends as those for men concerning education and training and occupational group. Concerning income, a significant association can only be observed for the lowest group with total IHD. However, some effects fail to reach significance and CIs of significant associations are rather wide, mainly caused by the small number of women with diseases. No influence of social mobility on the risk of IHD can be documented among women.

Tables 4 and 5 present the findings concerning status inconsistency. In view of the relatively small proportion of men and women with IHD, we performed respective analysis by combining all subgroups of the disease. Three types of status inconsistency have been analysed separately in different Cox regression models (models 1–3). Social mobility was not associated with status inconsistency or with IHD. Thus this variable is not included in the Cox regression models.

Men (table 4) characterised by an education and training level which is higher than the average in their occupational group (model 1) have a 3.14-times increased risk of IHD. Men whose income is above the average in their educational group (model 2) have a significantly decreased risk of IHD (RR = 0.29). No significant effects are found with regard to status inconsistency concerning occupational position and income (model 3).

Women (table 5) characterised by an education and training level which is higher than the median in their occupational group have a more than threefold increased risk of developing IHD than status-consistent women (model 1). This also applies to women whose income is below their educational levels (model 2, RR 3.53). No association of status inconsistency regarding occupational position and income with IHD is found.

DISCUSSION

Earlier studies on social status inconsistency and IHD showed mixed evidence which has been attributed to methodological differences between the studies and differences concerning the concept of status inconsistency used in the different investigations.[18] More recent studies on stressful working conditions and their influence on cardiovascular health include aspects of status inconsistency. (for an overview see Peter and Siegrist[9], and van Vegchel *et al*[25]). In these studies self-reported measures of status inconsistency as a part of validated scales of work–stress significantly contribute to increased cardiovascular risk. Yet, the separate effect of status inconsistency on the outcome is not evaluated in these investigations. However, these findings underline the importance of status inconsistency for an increased risk of IHD. In contrast to these investigations, we used objective measures of social status inconsistency in our study, and thereby were able to avoid possible recall bias.

We have found a higher risk of IHD among groups with more educational years. This observation might be caused by patients with low education not reaching the hospital before dying. Higher rates of mortality due to coronary heart disease among

Table 2 Cox regression analysis: indicators of socioeconomic status and risk of ischaemic heart disease (IHD)

	IHD (ICD-9 410–414)		Acute myocardial infarction (ICD-9 410)		Acute/subacute IHD (ICD-9 411)		Angina pectoris (ICD-9 413)		Chronic IHD (ICD-9 414)	
Men*	n (%) diseased	HR (95% CI)	n (%) diseased	HR (95% CI)	n (%) diseased	HR (95%-CI)	n (%) diseased	HR (95% CI)	n (%) diseased	HR (95% CI)
Model 1										
Education and training										
⩽10 years without vocational training	38 (0.5)	0.60 (0.46 to 0.78)	11 (0.2)	0.70 (0.47 to 1.04)	3 (0.05%)	0.99 (0.38 to 2.62)	10 (0.2)	0.60 (0.37 to 0.98)	14 (0.2%)	0.51 (0.33 to 0.78)
⩽10 years with vocational training	105 (0.4)	0.30 (0.25 to 0.37)	33 (0.2)	0.26 (0.19 to 0.37)	8 (0.04%)	0.48 (0.21 to 1.07)	46 (0.3)	0.43 (0.30 to 0.61)	31 (0.2%)	0.23 (0.16 to 0.32)
>12 years, college/university degree	153 (1.8)	1.0	63 (0.9)	1.0	8 (0.1%)	1.0	39 (0.6)	1.0	63 (0.8%)	1.0
Model 2										
Occupational position										
Unskilled, semiskilled positions	159 (0.9)	2.44 (1.43 to 4.16)	53 (0.4)	2.93 (1.86 to 4.63)	11 (0.06%)	3.41 (1.14 to 10.21)	47 (0.8)	3.59 (1.35 to 9.56)	48 (0.3%)	1.72 (1.18 to 2.52)
Skilled manual	105 (0.8)	0.73 (0.41 to 1.28)	36 (0.2)	1.62 (1.00 to 2.63)	5 (0.04%)	1.30 (0.38 to 4.44)	29 (0.2)	0.43 (0.17 to 1.15)	35 (0.2%)	0.94 (0.62 to 1.42)
Non-manual, intermediate position, professional	65 (1.1)	1.0	18 (0.1)	1.0	3 (0.05%)	1.0	19 (0.2%)	1.0	25 (0.4%)	1.0
Social mobility (ref. No mobility)		1.00		–		–		1.0		–
Upward	5 (0.3)	0.80 (0.33 to 1.96)		–		–	3 (0.2)	1.67 (0.41 to 6.77)		–
Downward	12 (0.8)	2.39 (1.28 to 4.48)		–		–	8 (0.6)	7.16 (2.54 to 20.20)		–
Model 3										
Income										
Lower two quintiles	34 (0.7)	3.46 (2.37 to 5.06)	12 (0.2)	4.36 (2.39 to 7.97)	2 (0.03%)	3.68 (0.78 to 17.35)	8 (0.2)	1.21 (0.28 to 5.25)	12 (0.3%)	3.65 (1.97 to 6.77)
Medium quintile	60 (0.8)	1.91 (1.44 to 2.55)	24 (0.3)	2.44 (1.55 to 3.82)	6 (0.08%)	3.68 (1.35 to 10.03)	12 (0.2)	1.31 (0.49 to 3.52)	18 (0.3%)	1.59 (0.96 to 2.62)
Upper two quintiles	235 (0.9)	1.0	71 (0.3)	1.0	11 (0.04%)	1.0	75 (0.3)	1.0	78 (0.3%)	1.0
Social mobility (ref. No mobility)		–		–		–		1.0		–
Upward		–		–		–	3 (0.2)	1.15 (0.34 to 33.93)		–
Downward		–		–		–	8 (0.6)	3.59 (1.56 to 8.26)		–

–, not calculable due to low numbers; ICD, International Classification of Diseases.
*Employed only, aged 25–65 years.
†Main effects of education and training, occupational position and income.

Table 3 Cox regression analysis: indicators of socioeconomic status and risk of ischaemic heart disease (IHD)

Women*	IHD (ICD-9 410–414)		Acute myocardial infarction (ICD-9 410)		Acute/subacute IHD (ICD-9 411)		Angina pectoris (ICD-9 413)		Chronic IHD (ICD-9 414)	
	n (%) diseased	HR (95%CI)	n (%) diseased	HR (95%CI)	n (%) diseased	HR (95%CI)	n (%) diseased	HR (95%CI)	n (%) diseased	HR (95%CI)
Model 1										
Education and training										
≤10 years without vocational training	33 (0.5)	0.62 (0.41 to 0.92)	9 (0.1)	0.48 (0.23 to 1.00)	1 (0.01)	0.29 (0.03 to 3.21)	12 (0.2)	0.58 (0.30 to 1.11)	11 (0.1)	1.01 (0.51 to 2.00)
≤10 years with vocational training	18 (0.1)	0.25 (0.16 to 0.39)	2 (0.01)	0.13 (0.02 to 0.35)	3 (0.02)	0.72 (0.13 to 3.93)	9 (0.05)	0.32 (0.16 to 0.64)	4 (0.03)	0.24 (0.10 to 0.58)
>12 years, college/university degree	30 (0.6)	1.0	10 (0.2)	1.0	2 (0.05)	1.0	12 (0.3)	1.0	6 (0.1)	1.0
Model 2:										
Occupational position									15	
Unskilled semiskilled positions	51 (0.3)	2.64 (1.74 to 4.01)	17 (0.1)	5.29 (1.82 to 15.31)	3 (0.02)	3.01 (0.31 to 29.02)	23 (0.2)	2.11 (1.15 to 3.91)	8 (0.1)	2.93 (1.44 to 5.98)
Skilled manuals	4 (0.2)	1.62 (0.67 to 3.90)	1 (0.05)	3.87 (0.71 to 21.17)	2 (0.1)	25.35 (2.63 to 243.97)	1 (0.06)	1.66 (0.48 to 5.73)	0 (0)	—
Non-manuals, intermediate positions, professionals	19 (0.1)	1.0	3 (0.02)	1.0	1 (0.01)	1.0	9 (0.1)	1.0	6 (0.04)	1.0
Model 3:										
Income										
Lower two quintiles	51 (0.3)	2.09 (1.16 to 3.76)	15 (0.1)	3.00 (0.87 to 10.32)	2 (0.03)	0.51 (0.07 to 3.64)	21 (0.3)	1.73 (0.74 to 4.04)	13 (0.2)	3.18 (0.93 to 10.87)
Medium quintile	15 (0.2)	1.29 (0.63 to 2.65)	3 (0.1)	1.90 (0.45 to 7.97)	2 (0.03)	1.07 (0.15 to 7.57)	5 (0.1)	0.81 (0.25 to 2.54)	5 (0.1)	1.90 (0.45 to 7.96)
Upper two quintiles	15 (0.2)	1.0	3 (0.04)	1.0	2 (0.01)	1.0	7 (0.04)	1.0	3 (0.02)	1.0

ICD, International Classification of Diseases
*Employed people only, aged 25–65 years.
†Main effects of education and training, occupational position and income.

groups with fewer educational years are well documented.[26] We cannot check possible bias due to such selection as no death certificates are available in our data. Yet, we argue that respective bias is unlikely for two reasons. First, we repeated our analysis and excluded all subjects who died, from any cause, later during the observation period. Findings, not presented in detail here, did not differ from the results displayed in tables 4 and 5. Second, there is broad evidence that lower occupational groups are at an increased risk for mortality due to IHD.[16] Accordingly, these groups should be under-represented in our study and we could have expected to find the same direction of association between occupational class and risk of IHD as we did regarding education. This was not the case. Social-unequal access to healthcare is another possible explanation for our findings. Lower SES was reported to be associated with less-frequent invasive procedures like coronary artery bypass graft or percutaneous transluminal coronary angioplasty.[27 28] These associations might be responsible for both lower hospital admission rates and higher mortality rates due to IHD among lower socioeconomic groups.[29] However, the findings concerning education differ from the results reported earlier, which were based on a population from the same health insurance company but from a different region.[17] These regional differences particularly concern education. We saw a higher proportion of people with a university degree in our population (11% vs 2.3%), perhaps employed in particular jobs with increased risk of IHD. Clearly, the results on education need further exploration in future studies.

IHD occurring before entering the cohort may have influenced our results in terms of reversed causality due to downward mobility caused by earlier IHD. We were unable to exclude those subjects with earlier IHD because no information before 1996 is available. Yet, we adjusted for social mobility in Cox regression when it turned out to be a confounder. Moreover, for >95% of our population social status did not change over time. Accordingly, reversed causality is unlikely.

Risk estimations for acute and subacute IHD showed relatively wide CIs, particularly among women (table 3). This finding is due to the low number of respective diagnosis in our study population because many people with acute and subacute IHD and those with angina pectoris are not hospitalised. This might cause an underestimation of associations between SES and these diagnoses in hospitalised patients. Moreover, people with IHD who died before reaching hospital are not included in our data. Again, underestimation of the presented associations is likely.

We have lots of missing data regarding indicators of SES (table 1). The lower proportion of older people and of people with IHD among those with missing data might have let to an overestimation of the HRs presented here. Yet, rather small differences between the groups with and without socioeconomic information point to the weak influence of potential selection. χ^2-based and t value-based significance of such differences in large samples should be interpreted with caution.

The generalisability of our results to the general German work force is restricted. Owing to special arrangements of the statutory health insurance system, the study population consists, to a larger extent, of blue-collar workers with lower number of educational and training years who may earn a lot of extra money. These population characteristics might result in an overestimation of risk.[30] Yet, this specific type of status inconsistency was not related to an increased risk of IHD in our analysis. Moreover, people on social welfare—that is, the lowest socioeconomic group, and the highest 10% of the income distribution in Germany are also absent from our data. Most members of the latter group are customers of private health insurance companies. Therefore, overestimation and underestimation of the associations are of equal probability. These arguments weaken the assumption that our findings may be

Table 4 Cox regression analysis: different types of social status inconsistency and risk of ischaemic heart disease (IHD) among employed men aged 25–65 years

Status inconsistency indicator	n exposed (n/% IHD)	HR (95% CI)
Model 1*		
ET-OP		
ET equivalent to OP (reference group)	30 210 (154/0.5)	1.00
Status inconsistency (ET<OP)	848 (5/0.6)	1.31 (0.53 to 3.18)
Status inconsistency (ET>OP)	5783 (133/2.3)	3.14 (2.49 to 3.98)
Model 2		
ET–I		
ET equivalent to I (reference group)	12 834 (146/1.1)	1.00
Status inconsistency (ET<I)	21 369 (113/0.5)	0.29 (0.23 to 0.37)
Status inconsistency (ET>I)	2638 (33/1.3)	1.14 (0.79 to 1.66)
Model 3		
OP– I		
OP equivalent to I (reference group)	11 089 (67/0.6)	1.00
Status inconsistency (OP<I)	25 012 (222/0.9)	0.54 (0.41 to 0.71)
Status inconsistency (OP>I)	740 (3/0.4)	1.48 (0.46 to 4.70)

ET, education and training; I, income; OP, occupational position.
*HRs are adjusted for income.

Table 5 Cox regression analysis: different types of social status inconsistency and risk of ischaemic heart disease (IHD) among employed women aged 25–65 years

Status inconsistency indicator	n exposed (n/% IHD)	HR (95% CI)
Model 1*		
ET-OP[2]		
ET equivalent to OP (reference group)	24 379 (49/0.2)	1.00
Status inconsistency (ET<OP)	1357 (0/0.0)	—
Status inconsistency (ET>OP)	2932 (27/0.9)	3.63 (2.27 to 5.83)
Model 2		
ET–I		
ET equivalent to I (reference group)	18 977 (34/0,2)	1.00
Status inconsistency (ET<I)	6503 (17/0.3)	0.85 (0.47 to 1.53)
Status inconsistency (ET>I)	3188 (25/0.8)	3.53 (2.11 to 5.88)
Model 3		
OP–I		
OP equivalent to I (reference group)	19 844 (56/0,3)	1.00
Status inconsistency (OP<I)	5264 (17/0.3)	0.67 (0.39 to 1.15)
Status inconsistency (OP>I)	3560 (3/0.1)	0.41 (0.13 to 1.31)

ET, education and training; I, income; OP, occupational position.
*HRs are adjusted for income.

overestimated or underestimated, but they cannot completely rule out restricted external validity.

Despite the discussed limitations of our study, we conclude that information on social status inconsistency should be assessed beside the information on traditional indicators of SES to achieve a more adequate estimation of social inequality and the risk of IHD. Moreover, future studies should carefully check whether the combination of single indicators of SES into indices is appropriate. However, more research is needed to explore the mechanisms of how social inequality—particularly status inconsistency—leads to an increased risk of IHD and to develop preventive activities specifically tailored to populations at risk.

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What is already known

The association of education, occupational position, and income—either as single indicators or as aggregated measures of socioeconomic status—with health outcomes is well documented. Knowledge about the impact of social status inconsistency on health is limited and rather old.

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What this paper adds

Besides the traditional indicators of socioeconomic status, social status inconsistency is associated with the risk of ischaemic heart disease. Information on status inconsistency may help to further improve knowledge about social inequality in health.

Policy implications

Preventive activities particularly focusing the needs of employees characterised by social status inconsistency should be developed.

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Appendix A

Education (years) and completed vocational training*	Occupational group†	Income‡	Weighting factor
⩽10 years without training	Unskilled, semiskilled positions	Lowest quintile	1
⩽10 years with training	Skilled manual	2nd quintile	2
>12 years without training	Skilled non-manual	3rd quintile	3
>12 years with training	Intermediate position	4th quintile	4
>12 years with college/university degree	Professional	Highest quintile	5

*Highest educational level, highest training level.
†Highest occupational grade during observation period.
‡Average individual income during observation period.

Appendix B

Type of inconsistency	Range and frequency†		Remarks
Education/training–occupational position	−4 to −2	2205 (3.4%)	• Negative signs: low number of educational years, high occupational position
	−1 to 1	54 589 (83.3%)	
	2 to 4	8715 (13.3%)	• Positive signs: high number of educational years, low occupational position
Education/ training – income	−4 to −2	31 811 (48.6%)	• Negative signs: low number of educational years, high income
	−1 to 1	27 872 (42.5%)	
	2 to 4	5826 (8.9%)	• Positive signs: high number of educational years, low income
Occupational position – income	−4 to −2	30 933 (47.2%)	• Negative signs: low occupational position, high income
	−1 to 1	30 276 (46.2%)	
	2 to 4	4300 (6.6%)	• Positive signs: high occupational position, low income

Examples:
(1) education/training ⩽10 years without training and intermediate occupational position: 1–4 = −3 points.
(2) education/ training ⩾12 years with university degree and skilled manual: 5−2 = 3 points.
Values ranging from −1 to 1 were defined as status consistency, −2 to −4 and 2 to 4 as status inconsistency; higher numbers indicate more pronounced status inconsistency.