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Socioeconomic factors in coronary artery disease – Results from the SPIRR-CAD study

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ABSTRACT

Low socio-economic status (SES) has been associated with an increased coronary risk in Western countries. All stress experiences are more pronounced in low SES patients with stress emanating from problems with family, job, or money.

The SPIRR-CAD study offered an excellent opportunity to examine these risk factors in German speaking mildly and medium depressed patients. In the SPIRR CAD study, a German multi centre randomized clinical trial of 450 male and 120 female coronary patients, we examined the standard and psychosocial risk factor profiles in relation to SES, as assessed by educational level. All differences in risk factors between low and high SES were in the inverse direction. Of standard risk factors, only smoking was socially graded and more common in low SES. Of psychosocial factors and emotions, exhaustion showed the strongest and most consistent inverse social gradient, but also anger, anxiety and depression were socially graded. The findings suggest that in German patients, as in other national groups, social gradients in CHD risk are considerable. They can be ascribed to both psychosocial and to standard risk factors. In the present two years follow-up, the prospective significance of psychological and social risk factors was analyzed showing that emotional factors played an important role, in that low and high SES patients differed in the expected direction. However, the differences were not statistically significant and therefore firm conclusions from follow up were not possible.

Trial registration: ISRCTN 76240576; NCT00705965

1. Introduction

Low socio-economic status is associated with an increased risk of coronary disease in Western countries [1–5]. The inverse socio-economic gradients found in the early White Hall studies in London were clear and convincing. Coronary heart disease was more frequent in low SES with a similar dose response gradient across all social strata [6]. Such gradients have been reconfirmed in many studies in various populations from the UK, the US, the Netherlands, and Scandinavian countries [7–9].

However, these gradients have been less intensively studied in German speaking countries. It has been pointed out that the proportion of students who graduate from secondary school and thereby are allowed to pursue academic studies is low within the German educational system. It has even been claimed that the difference between the very rich and the very poor is larger in Germany than anywhere else except

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the USA [11]. It has been argued that if it was possible to raise the general educational level of the entire population, one might also improve the coronary health status by providing education on a broader basis.

In this secondary analysis within a randomized controlled trial, the aim of our post hoc study was to examine the impact of social, clinical, and psychological factors regarding the social gradient in German CAD patients. The research questions were not pre-specified. They were based on previous experience [1].

Although it has been found that socio-economic characteristics were predictive of health events in Germany as described for other countries [11] little is known about the process that leads to the socio-economic differences and the mechanisms of the SES health gradients. To shed light on this issue we separately examined how standard risk factors, medical prognostic markers, and negative emotions are related to the social gradient in depressed CAD patients from a German multicentre trial.

2. Material and Methods

The SPIRR-CAD trial is a randomised, controlled, two-parallel-arm, superiority trial comparing a stepwise psychotherapy intervention with one individual information session complementing usual care [12,13]. It was designed to evaluate the intervention on measures of depression. After 18 months depressive symptoms significantly decreased in both intervention and control groups.

2.1. Patients

The trial offered an excellent opportunity to examine this issue as patients from ten different German university centres were included. Patients were recruited through standard procedures. Inclusion criteria were: documented CAD and a recent coronary angiogram, mild to moderate depression (HADS > 7), consent to join an RCT on psychotherapy vs. usual care for depressive symptoms. Exclusion criteria were: Inability to speak German, severe heart failure (New York Heart Association Class IV), scheduled cardiac surgery within the next 3 months, severe depressive episodes according to the Structured Clinical Interview for DSM-IV other severe or life-threatening physical or mental illness.

As shown previously [13], a total of 18,542 patients had to be screened in order to randomise the target of 570 patients into the trial.

2.2. Socio-economic classification

Education is the most basic SES component since it shapes future occupational opportunities and earning potential. It also provides knowledge and life skills that allow better educated persons to gain more ready access to information and resources to promote health [14].

In order to characterise SES three factors are usually considered: educational level, occupational level, and income [14].

Of those factors the educational level is the most frequently used. In the SPIRR-CAD study the baseline examination included detailed information on educational socio-economic features, including types of schools visited and highest examinations passed as well as specific occupational training completed. These items were classified into three SES groups as follows:

1. low SES – mandatory education or less and without qualified specific vocational training.
2. middle SES – pre-academic education, more than mandatory education but less than academic, including qualified occupational training.
3. high SES – academic education, (abitur/baccalaureat) and university education or occupational training.(thirteen or more years of schooling).

Table 1
Baseline measures educational level and socio-economic indicators (sex, income, education years, financial stress).

	Low SES (n = 42)	Middle SES (n = 354)	High SES (n = 127)	P
	N (%)/M	N (%)/M	N (%)/M	
Age	58.0 ± 10.3	58.6 ± 9.5	61.0 ± 9.0	0.033
Female sex	17 (41%)	69 (20%)	20 (16%)	0.002
Low income < 1500 €/mo (n = 493)	25 (66%)	123 (37%)	23 (19%)	0.001
Length of education ≤ 9 years (n = 504)	33 (81%)	201 (59%)	2 (2%)	0.001
Severe financial stress (n = 491)	16 (42%)	103 (31%)	21 (18%)	0.004

We used educational level as a proxy measure for SES as it is a measure consistently applied in national and international surveys [15]. Data on occupational level were not available in all SPIRR-CAD patients, but income levels were ascertained. Low income was defined as family income of < 1500,- Euros per month. Educational level was compared with monthly income levels. We expected that low income would be most common in the low and least common in the high SES groups, which was confirmed (see Table 1). The low SES group patients had only mandatory education and they had not completed professional training. Although small in numbers, the low SES group (n = 42) represents an important sociological group in the German society. We recognise that the high standard risk and the psychosocial risk in all three groups was decisive for their participation in the study, and it may have decreased the willingness and motivation in the low SES group to participate in the screening procedure and the RCT.

The number of middle SES subjects is so high because it is a very heterogeneous group including men and women who have not gone to university but been well educated in occupational schools and intensely trained for an occupation. Outside the university there are several ways to obtain an excellent occupational training (Second Occupational Pathway).

In a systematic literature review of techniques used to measure influences of confounding matching was introduced. We controlled in this way for age and gender.

2.3. Psychosocial and clinical measures

Psychosocial measures used in SPIRR-CAD have been previously described [13]. The following psychological questionnaires were used for the present analyses:

- The Hospital Anxiety and Depression Scale (HADS ([16]). The cut-off of 8 and above was used to provide caseness of depression.
- The Hamilton Depression Scale [17],
- Structured Clinical Interview for DSM-IV (SCID: [18]),
- The Freiburg Coping Inventory (FCI; [19]), a comprehensive measure of coping styles,
- The Maastricht Questionnaire for Vital Exhaustion [20],
- The ENRICHD Social Support Instrument (ESSI; [21]),
- The 6-item General Self-efficacy Scale [22],
- The MMPI cynicism scale [23],
- The Interheart stress items: Stress at work, in family, and financial stress [24–26].

In addition, nutritional and exercise habits were ascertained by adhoc items. Clinical variables were obtained from standardised patient interviews and medical records.