ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #472

1. a. Full Title: The role of major cardiovascular risk factors in the relationship of SES with atherosclerosis
   b. Abbreviated Title: SES & atherosclerosis RFs

2. Writing Group

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3. Timeline:

   First draft of manuscript to be completed by August 1, 1997

4. Rationale:

Social class/socioeconomic status (SES) has long been shown to be inversely related to morbidity and mortality of all causes. For coronary heart disease (CHD), the previous association of higher CHD risk with higher social classes observed in epidemiologic studies during the first half of the century has apparently been reversed, with epidemiologic studies showing increased risk (incidence, prevalence, mortality) for CHD in the lower social classes as compared to higher social classes since the 1960s in the USA. While there has been an overall decrease of CHD (incidence/prevalence) and mortality over the last decades, the downward trend in the CHD and major risk factors for CHD has been greater in the higher than in the lower social classes (Kaplan & Keil, 1993).

There is strong evidence of a differential distribution of the major known risk factors (RF) for CHD (such as hypertension, smoking, obesity, lack of physical exercise, diet (salt intake), fibrinogen between different levels of social class, with higher RF prevalences in the lower social classes. Adjusted analyses of the association between
social class indices and CHD have shown that the inverse association between SES and CHD can in part be explained by the major RF, but there is increasing evidence for a residual effect of SES on CHD which is not accounted for by the known RF. It is yet unknown how exactly SES exerts its effect on CHD (Kaplan & Keil, 1993).

There is little information on the relationship between SES and earlier stages of the disease process which could help to elucidate the causal pathway. A few epidemiologic studies examined the relationship between atherosclerosis, which precedes CHD manifestation, and SES, also taking established risk factors for CHD into account. Preclinical disease nowadays can be assessed by B-mode ultrasound of the carotid arteries, which permits the detection of minimal thickening of the arterial wall (by measuring the intima-media thickness (IMT)) as well as atherosclerotic plaques and stenoses, which indicate progressive disease (The ARIC Investigators, 1989). Increasing IMT has been shown to be positively associated with prevalence of CHD (Burke et al., 1995).

Two recently published studies focused on the association between SES, CHD and atherosclerosis. The Kuopio Ischemic Heart Disease Risk Factor Study discovered a statistically significant, graded, inverse association between SES and IMT, which persisted after adjustment for established CHD RF, although the magnitude of the association was slightly reduced and became insignificant in some subgroup analyses (Lynch et al., 1995). This study supports the hypothesis that SES is an independent RF for preclinical atherosclerosis.

In contrast to this, the Atherosclerosis Risk in Communities (ARIC) Study found an inverse association of SES with atherosclerosis/IMT, which disappeared after adjustment for established RF for CHD (Diez-Roux et al., 1995).

Although the different findings of the two studies may in part be explained by variations in measurement and categorization of the risk factors, they call for a further evaluation of the relationship between individual RF or groups of RF and SES which could provide evidence for a possible causal pathway by which the effect of SES on CHD and preclinical atherosclerosis could be explained.

The objective of the proposed analysis is to describe the risk factor profile among different strata of SES (defined by educational level, occupational status, and income) and IMT, and to examine the relationship between individual and groups of established RF for CHD and SES in relation to atherosclerosis as measured by IMT. The aim is to evaluate which combination of RF contributes most to the association between SES and atherosclerosis (explains best) and thus to improve the understanding of the possible causal pathway for atherosclerosis and CHD genesis.

5. Main Hypotheses:

(1) There is no association between SES (education, family income, occupation) and the CHD risk factors LDL, HDL, and total cholesterol, smoking, systolic and diastolic blood
pressure, hypertension, diabetes mellitus, Keys score, waist:hip ratio, serum fibrinogen, leisure index, and work index.

Note: Some of the relationships have been considered in various ARIC papers. Here we will bring them all together with a focus on the path SES --> RF. Risk factor means or proportions by SES level, adjusted for sex, age, race, and center will be considered.

(2) There is no relationship between IMT and SES after adjusting for the CHD risk factors, individually and in combination of two or more.

Note: Diez-Roux has shown that the SES relationship to IMT vanishes when adjusting for multiple risk factors. Our focus is to learn which RF, singly or in combination, contribute most to this vanishing. The central issue is to further elucidate the complex relationship SES --> RF

\[ \text{IMT} \]

6. Design/Data (variables, time window, source, inclusions/exclusions):

The data analyses will be based on data from the first cross-sectional survey of the ARIC Study in the four US communities--Washington County (Maryland), Minneapolis (Minnesota), Forsyth County (North Carolina), and Jackson (Mississippi)--between 1987 and 1989 which formed the basis for the analysis by Diez-Roux et al. (excluding incomplete B-mode ultrasound measurements of IMT at the start of the data collection).

Variables to be included are: sex, age, race, education, occupation, income, IMT, LDL, HDL, and total cholesterol, cigarette smoking, systolic and diastolic blood pressure, use of antihypertensive medication, diabetes mellitus, waist:hip ratio, Keys score, leisure index, sports index, work index, serum fibrinogen.

Literature:


