Is Socioeconomic Position Related to the Prevalence of Metabolic Syndrome?

Influence of social class across the life course in a population-based study of older men

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OBJECTIVE — To examine whether adult social class and childhood social class are related to metabolic syndrome in later life, independent of adult behavioral factors.

RESEARCH DESIGN AND METHODS — This was a population-based cross-sectional study comprising 2,968 men aged 60–79 years.

RESULTS — Adult social class and childhood social class were both inversely related to metabolic syndrome. Mutual adjustment attenuated the relation of metabolic syndrome with childhood social class, that with adult social class was little affected. However, the relation with adult social class was markedly attenuated by adjustment for smoking status, physical activity, and alcohol consumption. High waist circumference was independently associated with adult social class.

CONCLUSIONS — The association between adult social class and metabolic syndrome was largely explained by behavioral factors. In addition, central adiposity, a component of metabolic syndrome, was associated with adult social class. Focusing on healthier behaviors and obesity, rather than specific efforts to reduce social inequalities surrounding metabolic syndrome, is likely to be particularly important in reducing social inequalities that affect people with coronary disease.
RESULTS — Among 2,968 men aged 60–79 years without prevalent diabetes, 817 men (28%) had metabolic syndrome. Both adult and childhood social class showed an inverse relationship with metabolic syndrome, as lower social classes had greater odds of metabolic syndrome (Table 1). When mutually adjusted, the association of childhood social class with metabolic syndrome was different in adult nonmanual or manual social class (P = 0.17 for interaction).

Of the individual components of the metabolic syndrome, only high waist circumference was associated with adult social class independently of childhood social class and adult behavioral factors (adult social class V vs. I: OR 1.71 [95% CI 1.02–2.88]; P for trend = 0.0006). Childhood social class was not independently associated with the individual components. The association of adult social class with homeostasis model assessment (P for trend = 0.02) was attenuated when adjusted for adult behavioral factors (P for trend = 0.17). There was no evidence of a relationship between childhood social class and insulin resistance.

CONCLUSIONS — Although metabolic syndrome has been proposed as a link between low socioeconomic position and CHD (2), we did not find an independent association between social class (either in adulthood or childhood) and metabolic syndrome in older British men. Adult behavioral factors (physical activity, smoking, and alcohol consumption) were responsible for the relationship between adult social class and metabolic syndrome. There was some increased risk of metabolic syndrome in men of manual social class both in childhood and in adulthood that was to a large extent explained by adult behavioral factors. There was no evidence of an independent association of adult/childhood social class with insulin resistance. Adult social class was strongly related to high waist circumference, a component of metabolic syndrome. It is therefore likely that the role of metabolic syndrome in social inequalities among people with CHD is largely due to behavioral factors and...
central adiposity/obesity, which are important coronary risk factors in their own right (12). Focusing efforts on understanding and reducing levels of behavioral factors and obesity could be particularly important in reducing social inequalities in CHD.

Although these findings are consistent with some previous studies, other studies have reported an independent association between social class (in both adult and childhood) and metabolic syndrome, as well as a stronger relationship of metabolic syndrome with adult risk factors than with early life factors (1,3,4,7). Since childhood social class is related to adult socioeconomic position and behavioral factors (13), the effect of childhood social class could well have been mediated through adult social class and behavioral factors. However, it was not possible to fully disentangle this issue in our study.

This paper indicates the lack of an independent association between social class and metabolic syndrome in a socioeconomically representative sample of British men. The results, however, are not directly generalizable to women, although other studies suggest a stronger association between social class and metabolic syndrome in women than in men (14,15). As with any study group comprising older men, and because prevalent diabetes cases were excluded, the potential for healthy survivor bias exists. However, the high follow-up rate of this cohort population has ensured that such bias is no more marked than would be the case in any other population of surviving older subjects.

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**References**

1. Brunner EJ, Marmot MG, Nanchahal K, Shipley MJ, Stansfeld SA, Juneja M, Alberti KG: Social inequality in coronary risk: central obesity and the metabolic syndrome. Diabetologia 40:1341–1349, 1997
2. Silventoinen K, Pankow J, Jousilahti P, Hu G, Tuomilehto J: Educational inequalities in the metabolic syndrome and coronary heart disease among middle-aged men and women. Int J Epidemiol 34:327–334, 2005
3. Paek KW, Chun KH, Jin KN, Lee KS: Do health behaviors moderate the effect of socioeconomic status on metabolic syndrome? Ann Epidemiol 16:756–762, 2006
4. Parker L, Lamont DW, Unwin N, Pearce MS, Bennett SM, Dickinson HO, White M, Mathers JC, Alberti KG, Craft AW: A life course study of risk for hyperinsulinemia, dyslipidaemia and obesity (the central metabolic syndrome) at age 49–51 years. Diabet Med 20:406–415, 2003
5. Wannamethee SG, Shaper AG, Whincup PH: Modifiable lifestyle factors and the metabolic syndrome in older men: effects of lifestyle changes. J Am Geriatr Soc 54:1909–1914, 2006
6. Kaplan GA, Kiel JE: Socioeconomic factors and cardiovascular disease: a review of the literature. Circulation 88:1973–1998, 1993
7. Langenberg C, Kuh D, Wadsworth ME, Brunner E, Hardy R: Social circumstances and education: life course origins of social inequalities in metabolic risk in a prospective national birth cohort. Am J Public Health 96:2216–2221, 2006
8. Lawlor DA, Ebrahim S, Davey Smith G: Socioeconomic position in childhood and adulthood and insulin resistance: cross sectional survey using data from British women’s heart and health study. BMJ 325:805, 2002
9. Classification of Occupations. London, His Majesty’s Stationery Office, 1931
10. Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). JAMA 285:2486–2497, 2001
11. Matthews DR, Hosker JP, Rudenski AS, Naylor BA, Treacher DF, Turner RC: Homeostasis model assessment: insulin resistance and beta-cell function from fasting plasma glucose and insulin concentrations in man. Diabetologia 28:412–419, 1985
12. Wannamethee SG, Shaper AG, Whincup PH, Walker M: Role of risk factors for major coronary heart disease events with increasing length of follow up. Heart 81:374–379, 1999
13. Power C, Matthews S: Origins of health inequalities in a national population sample. Lancet 340:1584–1589, 1997
14. Lawlor DA, Ebrahim S, Davey Smith G: The metabolic syndrome and coronary heart disease in older women: findings from the British Women’s Heart and Health Study. Diabet Med 21:906–913, 2004
15. Dallongeville J, Cottel D, Ferrières J, Arveiler D, Bingham A, Ruidavets JB, Haas B, Ducimetière P, Amouyel P: Household income is associated with the risk of metabolic syndrome in a sex-specific manner. Diabetes Care 28:409–415, 2005