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SPECIAL THEME: CARDIOVASCULAR DISEASE

Socioeconomic position in childhood and cardiovascular risk factors in older Spanish people

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Objective To investigate the association between childhood social class and the prevalence of cardiovascular risk factors in the elderly.

Methods Cross-sectional study of 4009 subjects representative of the Spanish non-institutionalized population aged ⩾60 years, for whom information was available on father's occupation. We estimated the prevalence of hypertension, obesity, diabetes mellitus, physical inactivity, smoking, and alcohol intake.

Results Belonging to a working social class in childhood is associated with increased hypertension, having ever smoked, and heavy alcohol intake, independent of adult social class in men. No association was found between social class in childhood and the other cardiovascular risk factors in men. Belonging to a working social class in childhood is associated with increased general obesity, abdominal obesity, diabetes mellitus, and physical inactivity in women, but the size of the association for abdominal obesity and diabetes mellitus decreases and the statistical significance disappears after adjusting for adult social class. The highest smoking prevalence was observed in women who were in social class I in childhood and the lowest in women who were in social class IV.

Conclusions The results of this study show increased prevalence of some cardiovascular risk factors in men who belong to a working social class in childhood, but they do not support the existing evidence about an association between adverse social circumstances in childhood and increased prevalence of cardiovascular risk factors in later life in women.

Keywords Life course, social class, older people, cardiovascular risk factors

A number of studies have looked at the relation between socioeconomic circumstances throughout life and the occurrence of cardiovascular diseases. Most of these studies have found that adverse socioeconomic circumstances in childhood are associated with an increased risk of ischaemic heart disease as an adult, regardless of adult socioeconomic position.[1–4] Although the mechanisms for this association are unclear, several studies have found that adverse socioeconomic circumstances in childhood are associated with a higher prevalence of various cardiovascular risk factors, such as obesity, high blood pressure, dyslipidaemia, insulin resistance, and smoking.[3,5–7]

In Spain, only two studies have looked at the relation between socioeconomic circumstances in childhood and the emergence of cardiovascular diseases in adulthood.[8,9] These studies did not find a greater risk of ischaemic heart disease in people with adverse socioeconomic circumstances in childhood. The lack of consistency between these findings and the results of other studies may be due to the lack of validity in the variable used to reflect socioeconomic circumstances in childhood: both studies used the provincial infant mortality rate around the time of birth of the research subjects as an indicator of material deprivation in childhood.

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However, it is also possible that the risk of ischaemic heart disease in the Spanish population is not related to socioeconomic circumstances in childhood. In order to test this hypothesis, we assessed the association between childhood social class and a wide range of cardiovascular disease risk factors in a sample of older Spanish people.

Methods

Sample

The study was carried out on a sample of men and women representative of the Spanish non-institutionalized population aged ⩾60 years. Study subjects were selected through probabilistic multistage cluster sampling. Census sections were selected at random, followed by individual households where information was then obtained from residents. A total of 4009 subjects (76% of those invited) participated, and baseline data were collected between October 2000 and February 2001. There were no important differences between responders and non-responders in age (mean age 71.9 and 72.5, respectively), sex (56.6% and 59% female, respectively), and educational level (percentage with primary studies or less, 92% and 93%, respectively). The age and sex distribution in the sample is similar to that of the general population in Spain, as is the distribution by educational level (87% of the older Spanish population has primary level or less education). The information was collected by personal interview using a structured questionnaire, followed by a physical examination to measure blood pressure and anthropometric characteristics.[10]

Measures

Socioeconomic circumstances in childhood were based on the father's occupation. Adult social class, as defined by current or most recent occupation of the person interviewed, was also included in the analysis as a confounder variable. For women who had never worked, this was measured by their husband's occupation. We used an occupational classification made up of 16 categories based on 2 criteria: capital assets, with reference to employment (employer, self-employed, or employed) and skill, and credential assets. Since father's occupation in 47% of subjects belonged to two categories—self-employed farmers and paid farm workers—father's occupation and current or most recent occupation of the participants were ascribed to one of the following four categories of social class: professionals, managers, proprietors, and clerical workers (I), self-employed farmers (II), skilled and unskilled manual workers (III), and paid farm workers (IV). To increase statistical power it was decided to combine clerical workers in the same category as professionals, managers, and proprietors. Classes I and II were considered non-manual social class and self-employed farmers, while classes III and IV were considered to be working social class.

Subjects were deemed to be hypertensive when their systolic blood pressure was ⩾140 mmHg, their diastolic blood pressure was ⩾90 mmHg, or they were on current antihypertensive drug treatment. The body mass index (BMI) was calculated as the weight (kg) divided by the height (m) squared. A study participant was considered to be obese if he/she had a BMI ⩾30 kg/m^2 and to have abdominal obesity when waist circumference was >102 cm in men and 88 cm in women. One of the study questions asked study participants to show all the medications that they were taking at the time: subjects were considered to have diabetes mellitus if they were on insulin or oral antidiabetic medications. Smoking was categorized as current smoker, if the person was a regular or daily smoker, never smokers, and former smokers. Alcohol intake was measured using a quantity-frequency index. Heavy drinkers were considered to be those with a daily consumption of >50 ml (men) or >30 ml (women) of absolute alcohol. Subjects were asked about the type of physical exercise done in their free time; in the case of unemployed or retired people, exercise at any time was considered. A person whose only reported leisure time activity was completely sedentary (reading, watching television, etc.) was considered to be physically inactive.

Data analysis

Of the 1741 men and 2268 women who participated in the study, the analysis included only those with complete information on social class in childhood and each of the risk factors studied, as well as age and adult social class, which were included as adjustment variables. The analysis of obesity included the fewest subjects—87% of men and 78% of women—while the analysis of smoking and diabetes mellitus included the largest number—95% of men and 88% of women.

We first estimated the prevalence of each risk factor by social class in childhood. We then estimated mean height—an indicator of deprivation in early life—according to social class in childhood. The association of social class in childhood with each risk factor was estimated through the prevalence ratio, calculated using binominal regression. We first estimated the age-adjusted prevalence ratio and then the prevalence ratio adjusted for age and for adult social class. The analyses were made separately for men and women. The trend of the association was tested using binomial regression models, where social class in childhood was analysed as a continuous variable. Finally, because several studies suggest a cumulative effect of socioeconomic factors throughout life on some physiological and metabolic risk factors, we evaluated the prevalence of hypertension, general obesity, abdominal obesity, and diabetes mellitus according to social class in childhood and adulthood, as well as the effect of socioeconomic life course on the simultaneous presence of hypertension, abdominal obesity, and diabetes mellitus in the same subject.

Results

Table 1 shows the prevalence of each risk factor by social class in childhood. In general terms, women who belonged to social class IV had the highest prevalence, while those who belonged to social class I had the lowest, except for smoking where just the opposite occurred. In contrast, the results in men were more heterogeneous. Table 2 shows that the shortest people were those whose fathers belonged to the working social class, whereas the tallest were those whose fathers were in the non-manual social class.

Tables 3 and 4 show the prevalence ratios for men and women adjusted for age and adjusted for both age and adult social class, for each risk factor analysed. The age-adjusted prevalence ratios for hypertension, ever smoked, and heavy alcohol intake were higher among men whose fathers were in the working class compared with non-manual class and self-employed farmers (Table 3). No association was found in men between the

Table 1 Prevalence (percentage) of cardiovascular risk factors in Spanish people aged ⩾60 years according to social class in childhood

Cardiovascular risk factor	No. of people	Childhood social class[a]				*P*-value for trend[b]
		I	II	III	IV	
Men						
Hypertension	1617	64.4	60.4	67.7	68.4	0.082
General obesity	1512	33.8	29.5	29.6	35.6	0.789
Abdominal obesity	1547	49.5	48.7	43.7	55.6	0.411
Diabetes mellitus	1660	12.6	8.3	11.4	8.3	0.214
Physical inactivity	1660	30.2	40.3	33.7	39.7	0.043
Ever smoked	1660	72.7	63.5	78.4	73.7	0.070
Current smoker	1660	25.6	20.0	23.8	16.3	0.101
Heavy alcohol intake	1660	12.6	11.2	15.8	16.5	0.038
Women						
Hypertension	1952	66.3	66.2	68.4	71.1	0.104
General obesity	1773	37.5	40.1	42.1	47.1	0.006
Abdominal obesity	1822	76.0	76.7	78.5	86.1	0.013
Diabetes mellitus	1998	10.6	9.3	12.3	15.2	0.020
Physical inactivity	1987	47.2	49.5	52.5	55.1	0.011
Ever smoked	1995	8.5	3.5	5.8	1.8	<0.001
Current smoker	1995	3.7	1.0	2.1	0.4	0.001
Heavy alcohol intake	1998	2.2	1.9	1.9	2.3	0.992

[a] I Professionals, managers, proprietors, and clerical workers; II Self-employed farmers; III Skilled and unskilled manual workers; IV Paid farm workers.
[b] *P*-value for trend given for test across the four social classes.

Table 2 Age-adjusted mean height of Spanish people aged ⩾60 years according to social class in childhood

Childhood social class	No. of people	Mean height
Men		
I	470	166.8
II	465	164.1
III	405	165.7
IV	320	163.9
P-value for trend		<0.001
Women		
I	547	154.4
II	576	154.0
III	515	153.9
IV	360	152.1
P-value for trend		<0.001

remaining risk factors and social class in childhood. The size of the association between father's social class and the prevalence of hypertension, ever smoked, and alcohol intake did not change after adjusting for adult social class. For hypertension, the increased prevalence among men with fathers in the working class was statistically significant, although the prevalence ratios across the four father's social classes resulted in a non-significant trend.

The age-adjusted prevalence ratios for general obesity, abdominal obesity, diabetes mellitus, and physical inactivity were higher in women whose fathers were in the working class compared with non-manual class and self-employed farmers, with a significant test for trend across father's social class categories (Table 4). After adjusting for social class in adulthood, the association was attenuated for those risk factors; for general obesity, abdominal obesity, and diabetes mellitus the size of the prevalence ratio became non-significant. Prevalence ratios for hypertension were higher in women whose fathers were in the working class but the association was non-significant. Women whose fathers were in social class I had the highest prevalence ratios for ever smoked, current smokers, and heavy alcohol intake, but the association was non-significant. The test for trend was significant for current smokers.

Table 5 shows the effect of working class versus non-manual class and self-employed farmers across both stages of the life course for hypertension, general obesity, abdominal obesity, and diabetes mellitus. Men in working social classes at both stages showed the highest prevalence of hypertension. Women in working social classes at both stages had a higher prevalence of hypertension, general obesity, abdominal obesity, and diabetes mellitus than those who were in a non-manual social class and self-employed farmers in either childhood or adulthood. Women who moved down from childhood to adulthood also showed a higher prevalence of hypertension, abdominal obesity, and diabetes mellitus than women who were in non-manual social classes and self-employed farmers at both stages.

Discussion

The results regarding height show that father's social class reflects social circumstances in childhood in our study participants. Socioeconomic position in childhood has been

Table 3 Prevalence ratio (95% CI) for cardiovascular risk factors in Spanish men aged ⩾60 years according to social class in childhood

Cardiovascular risk factor and adjustment factors	Childhood social class				*P*-value for trend[a]	Working class versus non-manual and self-employed farmers
	I	II	III	IV		
Hypertension						
Age	1.00	0.94 (0.85, 1.04)	1.06 (0.96, 1.16)	1.06 (0.96, 1.17)	0.085	1.09 (1.01, 1.17)
Age and adult social class	1.00	0.94 (0.85, 1.04)	1.04 (0.95, 1.15)	1.05 (0.94, 1.16)	0.165	1.08 (1.00, 1.16)
General obesity						
Age	1.00	0.88 (0.72, 1.07)	0.85 (0.69, 1.04)	1.06 (0.87, 1.29)	0.867	1.00(0.86, 1.16)
Age and adult social class	1.00	0.88(0.72, 1.07)	0.84 (0.68, 1.04)	1.05 (0.85, 1.29)	0.921	0.99(0.85, 1.16)
Abdominal obesity						
Age	1.00	0.99(0.86, 1.13)	0.87 (0.75, 1.01)	1.12 (0.98, 1.29)	0.475	0.99 (0.89, 1.09)
Age and adult social class	1.00	0.98 (0.86, 1.13)	0.86 (0.74, 1.00)	1.11 (0.96, 1.27)	0.625	0.97 (0.87, 1.08)
Diabetes mellitus						
Age	1.00	0.66 (0.45, 0.96)	0.91 (0.64, 1.31)	0.69 (0.45, 1.05)	0.210	0.98 (0.74, 1.30)
Age and adult social class	1.00	0.67 (0.46, 0.98)	0.99 (0.68, 1.44)	0.75 (0.48, 1.16)	0.421	0.78 (0.58, 1.05)
Physical inactivity						
Age	1.00	1.33 (1.12, 1.59)	1.14 (0.94, 1.38)	1.29 (1.07, 1.56)	0.047	1.04 (0.91, 1.18)
Age and adult social class	1.00	1.33 (1.12, 1.59)	1.13 (0.93, 1.37)	1.28 (1.05, 1.55)	0.061	1.03 (0.90, 1.17)
Ever smoked						
Age	1.00	0.87 (0.80, 0.95)	1.08 (1.00, 1.16)	1.01 (0.93, 1.10)	0.068	1.12 (1.05, 1.18)
Age and adult social class	1.00	0.87 (0.80, 0.95)	1.07 (0.98, 1.15)	1.00 (0.91, 1.90)	0.203	1.11 (1.04, 1.18)
Current smoker						
Age	1.00	0.76 (0.59, 0.98)	0.98 (0.77, 1.24)	0.70 (0.52, 0.95)	0.112	0.98 (0.81, 1.18)
Age and adult social class	1.00	0.76 (0.59, 0.98)	0.97 (0.75, 1.24)	0.69 (0.51, 0.94)	0.090	0.97(0.80, 1.19)
Heavy alcohol intake						
Age	1.00	0.90 (0.64, 3.14)	1.23 (0.89, 6.97)	1.32 (0.94, 8.34)	0.007	1.31 (1.03, 9.77)
Age and adult social class	1.00	0.88 (0.62, 2.93)	1.19 (0.85, 6.24)	1.27 (0.89, 7.27)	0.014	1.31 (1.02, 9.61)

[a] *P*-value for trend given for test across the four social classes.

seen to exert a specific influence on hypertension, smoking, and heavy alcohol intake in men: belonging to a working social class in childhood is associated with increased hypertension, ever smoking, and heavy alcohol intake, independent of adult social class. Belonging to a working social class in childhood is associated with increased general obesity, abdominal obesity, diabetes mellitus, and physical inactivity in women, but the size of the association for general obesity, abdominal obesity, and diabetes mellitus decreases and the statistical significance disappears after adjusting for adult social class. The lack of an association between social class in childhood and hypertension, general obesity, abdominal obesity, and diabetes mellitus and the clustering of these factors in women has also been observed when looking at the effect of socioeconomic position during the life course: women who belong to a working social class in adulthood have the highest prevalence of these risk factors, both when the childhood social class was non-manual class and self-employed farmers and when it was working class. The direction of the association between smoking and social class in childhood among women was opposite to that for men: after adjusting for social class in adulthood, the highest smoking prevalence was observed in women who were in social class I and the lowest in those who were in social class IV.

Comparison with other studies and possible explanations

Our results do not agree with those obtained in most British studies.[3,5–7] A possible explanation for the lack of consistency could be the fact that the participants in the British studies were between 35 and 64 years of age when the measurements were made, whereas the participants in our study were aged ⩾60. Given the higher mortality in people with cardiovascular risk factors, those who survive to age ⩾60 may have better health in any socioeconomic group; therefore, the probability of finding a difference in the prevalence of cardiovascular risk factors by father's occupation is relatively small. The results of a cross-sectional study in British women aged 60–79 years does not support this health selection hypothesis, since that study showed an association between poorer childhood social class and general obesity and insulin resistance independent of adult social class.[7] A separate analysis of the 60–79 year age group did not change the results of our study (data not shown).

The clustering of different cardiovascular risk factors such as obesity, hypertension, dyslipidaemia, and alterations in glucose metabolism in the same person is usually known as metabolic syndrome, and is associated with an increased risk of morbidity and mortality from cardiovascular diseases.[11,12] Some studies

Table 4 Prevalence ratio (95% CI) for cardiovascular risk factors in Spanish women aged ≥60 years according to social class in childhood

Cardiovascular risk factor and adjustment factors	Childhood social class				*P*-value for trend[a]	Working class versus non-manual and self-employed farmers
	I	II	III	IV		
Hypertension						
Age	1.00	1.00 (0.92, 1.09)	1.03 (0.95, 1.12)	1.07 (0.98, 1.17)	0.089	1.05 (0.99, 1.12)
Age and adult social class	1.00	0.99 (0.91, 1.08)	1.02 (0.93, 1.11)	1.04 (0.95, 1.14)	0.328	1.03 (0.97, 1.10)
General obesity						
Age	1.00	1.08 (0.92, 1.26)	1.11 (0.95, 1.29)	1.24 (1.06, 1.46)	0.011	1.12 (1.00, 1.25)
Age and adult social class	1.00	1.07 (0.92, 1.25)	1.08 (0.92, 1.26)	1.20 (1.01, 1.41)	0.047	1.09 (0.97, 1.22)
Abdominal obesity						
Age	1.00	1.02 (0.95, 1.09)	1.03 (0.96, 1.10)	1.09 (1.02, 1.16)	0.019	1.05 (1.00, 1.10)
Age and adult social class	1.00	1.01 (0.94, 1.08)	1.00 (0.93, 1.07)	1.05 (0.98, 1.13)	0.210	1.02 (0.97, 1.07)
Diabetes mellitus						
Age	1.00	0.88 (0.62, 1.25)	1.17 (0.84, 1.63)	1.44 (1.02, 2.03)	0.017	1.37 (1.07, 1.74)
Age and adult social class	1.00	0.85 (0.60, 1.21)	1.05 (0.75, 1.47)	1.23 (0.86, 1.75)	0.169	1.22 (0.95, 1.57)
Physical inactivity						
Age	1.00	1.02 (0.91, 1.15)	1.14 (1.01, 1.28)	1.17 (1.03, 1.32)	0.004	1.14 (1.05, 1.24)
Age and adult social class	1.00	1.02 (0.90, 1.15)	1.12 (1.00, 1.27)	1.15 (1.01, 1.31)	0.014	1.12 (1.03, 1.23)
Ever smoked						
Age	1.00	0.40 (0.24, 0.38)	0.63 (0.41, 0.99)	0.20 (0.09, 0.45)	0.001	0.66 (0.44, 0.97)
Age and adult social class	1.00	0.42 (0.25, 0.70)	0.71 (0.45, 1.12)	0.24 (0.10, 0.54)	0.001	0.76 (0.51, 1.14)
Current smoker						
Age	1.00	0.29 (0.12, 0.71)	0.52 (0.25, 1.08)	0.10 (0.02, 0.54)	0.002	0.55 (0.28, 1.07)
Age and adult social class	1.00	0.29 (0.12, 0.72)	0.53 (0.25, 1.13)	0.10 (0.02, 0.57)	0.003	0.57 (0.28, 1.16)
Heavy alcohol intake						
Age	1.00	0.89 (0.40, 1.94)	0.81 (0.35, 1.61)	1.01 (0.42, 2.29)	0.303	0.95 (0.51, 2.59)
Age and adult social class	1.00	0.97 (0.39, 1.85)	0.74 (0.31, 1.36)	0.88 (0.36, 1.77)	0.361	0.86 (0.45, 2.09)

[a] *P*-value for trend given for test across the four social classes.

Table 5 Prevalence ratio (95% CI) for hypertension, obesity, diabetes mellitus and clustering of these risk factors in Spanish people aged ≥60 years according to social class in adulthood and social class in childhood

Cardiovascular risk factor	Non-manual class and self-employed farmer in childhood		Working social class in childhood	
	Non-manual class and self-employed farm worker in adulthood	Working class in adulthood	Non-manual class and self-employed farmer in adulthood	Working class in adulthood
Men				
Hypertension	1.00	0.99 (0.89, 1.10)	1.01 (0.90, 1.14)	1.11 (1.02, 1.21)
General obesity	1.00	1.00 (0.82, 1.22)	0.96 (0.76, 1.22)	1.01 (0.84, 1.21)
Abdominal obesity	1.00	1.01 (0.88, 1.16)	0.91 (0.76, 1.08)	1.02 (0.90, 1.16)
Diabetes	1.00	0.84 (0.57, 1.24)	1.15 (0.76, 1.74)	0.82 (0.57, 1.16)
Clustering of risk factors[a]	1.00	0.63 (0.36, 1.27)	1.33 (0.75, 2.35)	0.97 (0.59, 1.58)
Women				
Hypertension	1.00	1.08 (1.00, 1.17)	1.04 (0.94, 1.15)	1.10 (1.02, 1.19)
General obesity	1.00	1.07 (0.92, 1.26)	1.02 (0.85, 1.23)	1.21 (1.06, 1.38)
Abdominal obesity	1.00	1.10 (1.03, 1.18)	1.05 (0.97, 1.14)	1.11 (1.04, 1.18)
Diabetes	1.00	1.54 (1.08, 2.19)	1.22 (0.79, 1.88)	1.88 (1.37, 2.58)
Clustering of risk factors[a]	1.00	1.93 (1.36, 2.75)	1.22 (0.77, 1.92)	2.02 (1.45, 2.81)

[a] Simultaneous presence of hypertension, abdominal obesity, and diabetes mellitus.

have shown that certain cardiovascular risk factors cluster in childhood and that this clustering continues throughout life.[13,14] The clustering could occur to a greater degree in those who live in less favourable socioeconomic conditions, which would explain both the association found in some British studies between adverse socioeconomic circumstances in early life and obesity, high blood pressure, dyslipidaemia, and insulin resistance in adulthood,[3,5–7] and the association between adverse socioeconomic circumstances in childhood and cardiovascular diseases in adulthood which has been seen in other studies.[1–4] It has been noted that poor nutrition in childhood may be one mechanism by which poor social circumstances in childhood lead to increased metabolic syndrome, which persists into adulthood.[7]

Our study does not support the idea that poor social circumstances in childhood leads to metabolic syndrome and to an increased risk of cardiovascular disease in later life. Our findings support the results of studies carried out in Spain which did not find an association between infant mortality around the time of birth—taken as an index of deprivation in childhood—and increased mortality from cardiovascular disease in later life.[8,9] Likewise, the findings in regard to diabetes mellitus support the results of one of these Spanish studies which also failed to find an association between deprivation in childhood and mortality from diabetes mellitus.[9]

A recent study in Korea—a country which, like Spain, has a low rate of coronary disease—likewise failed to find a relation between height and coronary disease,[15] which suggests that in these countries social circumstances in early life may not have any effect on coronary disease in adulthood. The association between socioeconomic circumstances in childhood and cardiovascular risk factors in adulthood may, therefore, vary from one place to another depending on particular historic and cultural circumstances. Obesity plays a fundamental role in the development of metabolic syndrome, since the risk factors that make up the syndrome disappear or are reduced with weight loss.[16] It has been observed that the highest risk of metabolic syndrome is found in people who have been obese since adolescence.[12,17] It has also been seen that the associations between poor nutrition in early life and coronary heart disease, high blood pressure, and diabetes mellitus are stronger or are only observed in subjects who became obese in adulthood.[18–20] However, excessive food intake and, consequently, a positive energy balance, is subject to the availability of food. In our study, 85% of subjects were born between 1920 and 1940; thus, they were adolescents and young adults during a period of major rationing of basic food products due to Spain's economic stagnation between the Civil War in 1936–1939 and the end of the 1950s.[21] In fact, one indicator of nutrition in this period—the height of young Spanish men beginning their military service—showed less variation than that observed in previous or successive years.[22] When food availability again increased, beginning in the 1960s,[23] the metabolic pattern of energy intake and expenditure in people in the age cohorts studied was probably already established. This may explain the lack of association between socioeconomic circumstances in childhood and several cardiovascular risk factors that make up the metabolic syndrome. This would also explain the lack of association between deprivation in childhood and increased mortality from cardiovascular disease in Spanish men, despite the fact that men who belong to a manual social class in childhood present the highest prevalence of hypertension and ever smoking.

Beginning in the 1950s, Spain underwent a period of economic growth, together with considerable internal migration from rural to urban areas; this is reflected in the fact that only 20% of those interviewed worked in agriculture as compared with 47% of their fathers. However, whereas living conditions were difficult in the cities of many countries during the period of industrialization in the 19th century, industrialization in Spain beginning in the mid-20th century was characterized by major improvements in material wellbeing in urban areas.[24] This improved quality of life for people who migrated to cities may have cushioned the effect of adverse material conditions in childhood on some cardiovascular risk factors.

Likewise, particular cultural circumstances may give rise to a different 'epidemiologic time' with regard to lifestyles. Smoking in women is an example of this hypothesis. Most studies have found a higher prevalence of smoking in women who belonged to the working social class in childhood, yet the result of the present study is just the opposite. Likewise, a study in different European countries of differences in smoking by educational level—a socioeconomic indicator related to socioeconomic circumstances in childhood—found a clear north-south pattern around 1990 for women aged 45–74 years, with a strong negative gradient in northern European countries and a reverse gradient in southern European countries, including Spain. The authors concluded that these results were due to the fact that southern European countries are in an earlier phase of the smoking epidemic than those in the north of Europe.[25]

No relation was observed in women between heavy alcohol intake and social class in childhood, whereas men who belonged to a working social class in childhood have the highest prevalence of heavy alcohol intake. These findings may explain why there is an association between hypertension and social class in childhood in men but not in women, since alcohol intake is a risk factor for hypertension.

Limitations of the study

Our results are based on subjects who had complete data on social class in both childhood and adulthood. Many women were excluded due to lack of information on social class in adulthood. Nevertheless, the estimates were similar when the analysis was made including women with missing information on social class in adulthood as a separate category. On the other hand, the information about diabetes mellitus is based on information provided by participants and not on an objective test of glycaemia or oral glucose overload. However, it has been observed that self-reported diabetes is reliable as a measure of diagnosed diabetes.[26] In fact, the results in men and women show a pattern similar to those obtained by the two measures of obesity based on objective measurements. Finally, another limitation could be a possible bias in the classification of father's occupation, since it is based on individual recall, and thus would underestimate the association between this variable and cardiovascular risk factors. In any case, the probability of this bias is small since father's occupation was grouped into broad categories.

In conclusion, the results of this study show an increased prevalence of some cardiovascular risk factors in men belonging to a working social class in childhood, but they do not support the existing evidence of an association between adverse social circumstances in childhood and increased prevalence of cardiovascular risk factors in later life in women.

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KEY MESSAGES

- Several studies have found that adverse social circumstances in childhood are associated with a higher prevalence of various cardiovascular risk factors, independently of adult social circumstances.
- The majority of these findings are based on British studies, however, the evidence on the association between childhood social circumstances and cardiovascular disease risk factor in other countries is scarce.
- Belonging to a working social class in childhood is associated with increased prevalence of hypertension, smoking, and heavy alcohol intake in older Spanish men, but is not associated with increased prevalence of general obesity, abdominal obesity, diabetes mellitus, or physical inactivity.
- Except for physical inactivity, this study has not found association between adverse social circumstances in childhood and increased prevalence of cardiovascular risk factors in later life in older Spanish women.
- The influence of social circumstances in childhood and the emergence of cardiovascular diseases in adulthood could differ across places depending on particular historic and cultural circumstances.

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Commentary: Urbanization and the life course

David Blane

The paper[1] by Regidor and his colleagues, which is published in the current issue of *International Journal of Epidemiology*, is more or less contemporaneous with broadly similar work from Finland[2] and Norway.[3] These analyses, taken together, have prompted me to examine a largely unnoticed background assumption to life course analysis. Pioneering work on the West of Scotland Collaborative Study[4–6] sparked a widespread interest in the independent and accumulative influence on mortality risk of socioeconomic position at various stages in the life course. Subsequent analyses in other data sets have failed sometimes to replicate these Collaborative Study results. The present commentary examines one possible explanation for these variable results; namely, that the nature of life course socio-economic position can be obscured by the transition from a predominantly rural society of subsistence farmers to an urban society of wage workers.

Victor Hawthorne and Charles Gillis, when they designed in the early 1960s the questionnaire for what became known as the West of Scotland Collaborative Study, included three questions on occupation; occupation of father during the respondent's childhood, the respondent's first significant occupation after starting paid employment, and the respondent's occupation at study screening. These occupations were coded to the UK Registrar General's classification, to give social class during childhood, early adulthood, and middle age. When, some quarter of a century later, Charles Gillis and George Davey Smith laid plans to analyse the mortality follow-up, they were constrained by the ideas then current. As indicated by the study title (*Social status in early life, social mobility, health behaviours and cardiovascular disease mortality risk*), they thought to use the three social class positions to examine social mobility; and were influenced also by David Barker's ideas, which at the time were starting to receive support from individual-level data. With two notable exceptions,[7,8] there was little in the literature to guide George Davey Smith when he used social class position during childhood, early adulthood, and middle age to construct a scale, ranging from 0 to 3, of the number of times a person had occupied a manual social class position. What struck me, when I saw the preliminary results, was that this accumulative measure of the proportion of life spent in manual social class positions predicted not only the subsequent mortality risk but also physiological and clinical status at the time of screening (respectively: systolic and diastolic blood pressure, serum cholesterol concentration, body mass index and forced expiratory volume in one second; and angina and bronchitis).[5]

These relationships have been examined subsequently in other data sets, with, as noted earlier, variable results. Much of this variability could be due to differences in geographical and historical context. The West of Scotland Collaborative Study was conducted in Glasgow and its adjacent urban areas, at a time when the main migration into Glasgow of subsistence farmers from the Scottish Highlands and the countryside of Eire had been completed some 50 years earlier. Its population, consequently, had been urbanized for at least two generations. Urbanization is a more recent phenomenon in many other European countries, including Spain, Finland, and Norway, where the parents of many urban adults are or were rural

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