Educational differences in self assessed health in 18 European countries: the role of smoking and overweight

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Background.
Smoking and body mass index (BMI, including overweight and obesity) have been shown to make important contributions to inequalities in overall mortality or disease-specific outcomes, such as heart disease and diabetes prevalence. However, it is uncertain to what extent inequalities in smoking and BMI contribute to inequalities in general health as perceived by the people themselves. Large inequalities in self assessed health (SAH) have been observed in many European studies. Smoking and BMI are likely to contribute to these inequalities, but many other factors (e.g. material living conditions and psychosocial factors) can play an additional role, and perhaps a much greater role. The relative contribution of smoking and BMI is likely to vary greatly according to gender and country, among others because of the large variations between European countries in the development of the smoking and obesity epidemics.

Objective.
This study aims to determine the contribution of smoking and BMI to socioeconomic inequalities in SAH among men and women in 18 European countries.

Data.
Micro-level data were obtained from national health interview surveys of 18 countries. In each survey, information was available on SAH, smoking and BMI by educational level. Data available for a 19th country, Norway, had to be excluded because of lack of detailed data on smoking. SAH was measured with five answer categories: “very good” to “very poor” in 12 countries, but deviating categories in 6 countries. The two lowest answer categories were combined. The 4 remaining answer categories were quantified with reference to a measure of “disease weighted” SAH, with scores 1, 1.85, 1.85^2 and 1.85$^{3.}$ (see other paper of Kunst *et al* on SAH). Smoking was measured by current status (never, ex, current smoker) and amount of cigarettes currently smoked (continuous measure). BMI was measured with self reports on height and weight, and classified into 8 classes. Educational level was classified in three hierarchical levels corresponding to the ISCED.

Methods.
The magnitude of educational differences in SAH with was assessed by means of the Relative Index of Inequality (RII), with control for age as the first step and with additional control for smoking or BMI as the second and third step. Analyses were carried out per country, and average RII’s were calculated across all countries.

Results.
1. For all countries together, educational inequalities in SAH were slightly larger for women than for (RII = 1.42 and 1.38). These values imply a 42% and 38% higher of “disease weighted” SAH score among the lowest educational groups as compared to the highest groups.
2. Among men, control for smoking explains about 10% of the inequalities in SAH (change from 38% to 34% excess). In the western part of Europe, there is a nearly perfect north-south gradient in this contribution, which is largest in Finland (25.3%) and smallest in Portugal (0.3%). A similar range of values, but without a clear geographic pattern, is observed in the eastern part of Europe.
3. Among women, control for smoking explains only about 4% of the inequalities in SAH (change from 42% to 40% excess). The geographical pattern is similar to that for men, now with small opposite contributions in the southern Europe.

4. Control for BMI explains about 4% of the residual inequalities among men, but 10% of the residual inequalities among women. Among men, the geographical pattern is similar to that for smoking, with a maximum of about 12% for Denmark, England and the Netherlands. Among women, the highest values are observed not only in northern Europe, but also in southern Europe, with a maximum of about 20% for France and Spain.
5. There are important variations between countries in the magnitude of inequalities in SAH, also among the 12 countries with identical SAH questions. Control for smoking or BMI can explain the larger inequalities in SAH in Nordic countries as compared to southern European countries. However, it cannot explain large inequalities in individual countries such as Portugal and Hungary.

Conclusion

Among men, smoking does not only substantially contribute to inequalities in mortality and disease specific outcomes, but also to inequalities in general health. The true contribution is likely to be underestimated in this study, due to lack of detailed data on smoking. Among women, BMI is much more important than smoking in contributing to inequalities in SAH. International variations in the share of smoking and BMI partly reflect differences between European countries in staging or control of the tobacco and obesity epidemics.

Policy implications

1. This analysis emphasizes the large potential benefits of policies to tackle inequalities in smoking (especially among men) and BMI (especially among women). Such policies would not only reduce inequalities in terms of mortality, but also in terms of general health.
2. The large variations between countries in the relative contribution of these factors, which are in part related to the broad diffusion of tobacco and obesity epidemics, underline the potential for mutual learning between countries.
3. The large inequalities in SAH in some countries, including Portugal, England and CEE countries, cannot be attributed to smoking or BMI. This underlines the need to explore and tackle the role of other factors, especially through in-depth study of these countries.

Table 1. Number of respondents and distribution by educational level [a]

Country		Total number of respondents		% by education – men			% by education - women		
		Men	Women	Lowest	Mid	Highest	Lowest	Mid	Highest
Finland	[b]	7916	9047	28.1	50.6	19.6	22.0	52.9	23.4
Sweden		5702	5786	17.1	50.7	32.1	14.2	49.9	35.9
Norway		2435	2346	11.3	58.0	29.3	12.4	52.3	33.7
Denmark		4720	5803	18.0	60.2	20.8	20.4	56.3	22.5
England/W		3803	3940	24.5	36.1	36.9	27.6	40.1	26.6
Ireland		4706	4863	59.4	22.7	17.7	51.6	32.1	16.0
Netherlands	[b]	5376	5609	26.8	42.8	29.7	36.9	38.7	23.8
Belgium		6146	6223	35.1	30.5	31.3	36.3	28.6	31.5
Germany	[b]	2627	2766	38.3	39.0	20.3	38.8	47.0	11.8
France		5831	6050	53.7	14.4	28.5	50.2	17.7	29.9
Italy		54437	56096	56.1	34.8	9.0	57.3	33.8	9.0
Spain		6568	6675	59.4	22.4	17.9	66.7	17.7	15.5
Portugal		11960	13080	83.0	9.2	7.7	82.0	8.1	9.9
Hungary		3322	3896	59.5	24.9	15.4	50.2	33.6	15.7
Slowak R.	[b]	549	643	41.5	35.7	22.4	29.9	48.7	20.1
Czech R.		762	842	55.5	28.1	16.4	48.6	36.7	14.7
Lithuania	[b]	4523	5771	46.2	35.0	17.0	37.3	41.5	20.1
Latvia	[b]	2844	3842	42.2	38.4	18.0	35.2	39.0	25.3
Estonia	[b]	1456	2069	47.0	36.6	15.8	37.4	39.2	22.8

[a] Educational levels are: ISCED 1+2 (low); ISCED 3+4 (mid); and ISCED 5+6 (high).
[b] Limited comparability of the survey question on SAH.

Table 2a. Educational differences in the "disease weighted" self assessed health: the effect of controlling for smoking. Men

Country	Relative Index of Inequality						
	Control for age only (95% CI) [a]			Control for age and smoking status (% decrease) [b]		Control for age, status and amount of smoking (% decrease) [c]	
Finland	1.35	(1.28-	1.43)	1.26	(-25.3)	1.25	(-28.8)
Sweden	1.35	(1.24-	1.46)	1.28	(-20.3)	*[d]*	
Denmark	1.35	(1.26-	1.45)	1.28	(-18.5)	1.27	(-21.6)
England/W	1.51	(1.41-	1.62)	1.42	(-17.3)	1.42	(-17.7)
Ireland	1.59	(1.42-	1.79)	1.52	(-10.6)	1.53	(-10.2)
Netherlands	1.33	(1.25-	1.42)	1.28	(-14.1)	1.27	(-17.6)
Belgium	1.41	(1.32-	1.50)	1.37	(-10.0)	1.36	(-10.7)
Germany	1.21	(1.12-	1.30)	1.19	(-7.2)	1.18	(-10.7)
France	1.28	(1.18-	1.39)	1.26	(-5.2)	1.25	(-7.7)
Italy	1.27	(1.24-	1.30)	1.27	(-1.1)	1.27	(-1.7)
Spain	1.28	(1.20-	1.37)	1.28	(-1.4)	1.28	(-1.6)
Portugal	1.60	(1.49-	1.72)	1.60	(-0.3)	1.59	(-1.0)
Hungary	1.42	(1.32-	1.53)	1.42	(0.7)	1.40	(-5.5)
Slowak R.	1.49	(1.21-	1.85)	1.39	(-20.2)	1.42	(-15.3)
Czech R.	1.46	(1.23-	1.74)	1.42	(-7.9)	1.42	(-9.0)
Lithuania	1.21	(1.12-	1.30)	1.21	(-4.1)	1.20	(-7.7)
Latvia	1.36	(1.12-	1.65)	1.35	(-2.4)	1.35	(-3.6)
Estonia	1.33	(1.19-	1.49)	1.29	(-12.8)	1.34	(1.7)
Average	1.38			1.34	(-10.4)	1.34	(-10.6)

[d] No data available on amount of smoking.

Table 2b. Educational differences in the "disease weighted" self assessed health: the effect of controlling for smoking. Women

Country	Relative Index of Inequality						
	Control for age only (95% CI)			Control for age and smoking status (% decrease)		Control for age, status and amount of smoking (% decrease)	
Finland	1.36	(1.28-	1.44)	1.32	(-12.2)	1.31	(-13.7)
Sweden	1.33	(1.22-	1.44)	1.29	(-13.3)	*[d]*	
Denmark	1.52	(1.42-	1.63)	1.45	(-13.2)	1.44	(-14.6)
England/W	1.59	(1.48-	1.70)	1.55	(-7.1)	1.54	(-8.8)
Ireland	1.44	(1.28-	1.62)	1.40	(-10.1)	1.40	(-9.4)
Netherlands	1.32	(1.24-	1.40)	1.30	(-7.4)	1.29	(-9.6)
Belgium	1.41	(1.32-	1.50)	1.39	(-5.5)	1.38	(-7.8)
Germany	1.18	(1.09-	1.29)	1.18	(2.7)	1.18	(-2.1)
France	1.34	(1.24-	1.45)	1.35	(2.6)	1.35	(1.9)
Italy	1.25	(1.21-	1.28)	1.26	(2.0)	1.25	(1.9)
Spain	1.33	(1.24-	1.42)	1.34	(2.5)	1.34	(2.1)
Portugal	1.58	(1.49-	1.67)	1.55	(-5.2)	1.55	(-4.9)
Hungary	1.52	(1.43-	1.62)	1.52	(0.2)	1.53	(2.0)
Slowak R.	1.64	(1.33-	2.02)	1.63	(-1.7)	1.61	(-4.4)
Czech R.	1.63	(1.40-	1.89)	1.63	(-0.2)	1.63	(-0.6)
Lithuania	1.33	(1.25-	1.41)	1.33	(-0.8)	1.33	(-0.2)
Latvia	1.40	(1.20-	1.62)	1.37	(-7.6)	1.36	(-10.0)
Estonia	1.33	(1.20-	1.47)	1.32	(-3.1)	1.31	(-6.2)
Average	1.42			1.40	(-4.3)	1.40	(-4.0)

[a] No data available on amount of smoking.

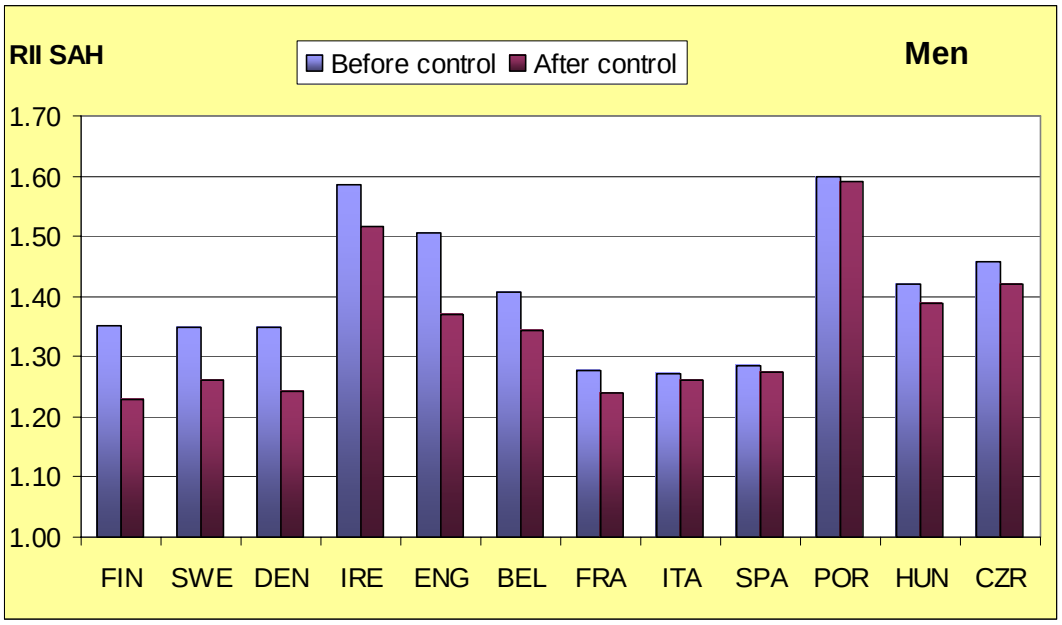
Table 3a Educational differences in the "disease weighted" self assessed health: the additional effect of controlling for body mass index. Men

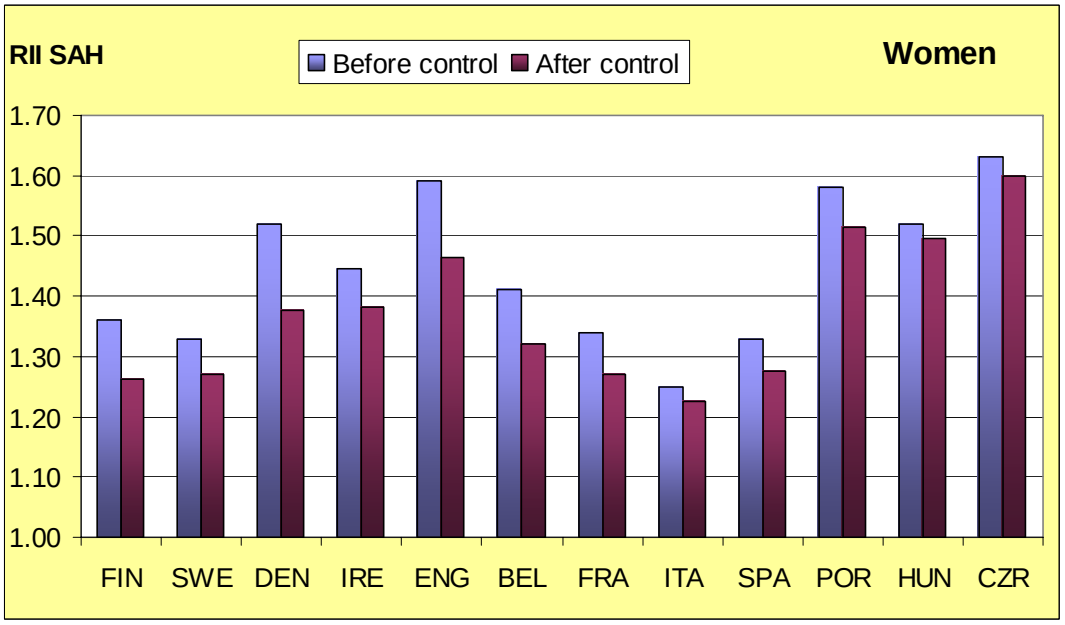
Country	Relative Index of Inequality		
	Control for age and smoking (95% CI) [a]		Plus control for overweight (% decrease) [b]
Finland	1.25	(1.17- 1.33)	1.23 (-8.0)
Sweden	1.28	(1.24- 1.46)	1.26 (-7.1)
Denmark	1.27	(1.18- 1.37)	1.24 (-11.8)
England/W	1.42	(1.32- 1.52)	1.37 (-11.1)
Ireland	1.53	(1.35- 1.72)	1.52 (-1.8)
Netherlands	1.27	(1.19- 1.36)	1.24 (-12.7)
Belgium	1.36	(1.27- 1.46)	1.34 (-5.5)
Germany	1.18	(1.10- 1.28)	1.17 (-6.9)
France	1.25	(1.16- 1.36)	1.24 (-5.7)
Italy	1.27	(1.24- 1.30)	1.26 (-2.6)
Spain	1.28	(1.20- 1.37)	1.28 (-1.6)
Portugal	1.59	(1.48- 1.71)	1.59 (-0.6)
Hungary	1.40	(1.29- 1.52)	1.39 (-2.2)
Slowak R.	1.42	(1.11- 1.81)	1.40 (-5.2)
Czech R.	1.42	(1.18- 1.69)	1.42 (1.0)
Lithuania	1.20	(1.11- 1.29)	1.19 (-2.3)
Latvia	1.35	(1.11- 1.64)	1.32 (-6.9)
Estonia	1.34	(1.18- 1.52)	1.32 (-4.9)
Average	1.34		1.32 (-4.9)

Table 3b Educational differences in the "disease weighted" self assessed health: the additional effect of controlling for body mass index. Women

Country	Relative Index of Inequality		
	Control for age and smoking (95% CI) [a]		Plus control for overweight (% decrease) [b]
Finland	1.31	(1.23- 1.39)	1.26 (-15.0)
Sweden	1.29	(1.18- 1.40)	1.27 (-6.9)
Denmark	1.44	**(1.35- 1.55)**	1.38 (-15.0)
England/W	1.54	(1.43- 1.65)	1.47 (-13.5)
Ireland	1.40	(1.24- 1.58)	1.38 (-5.1)
Netherlands	1.29	(1.21- 1.37)	1.24 (-15.7)
Belgium	1.38	(1.29- 1.47)	1.32 (-14.8)
Germany	1.18	(1.08- 1.28)	1.15 (-17.3)
France	1.35	(1.25- 1.45)	1.27 (-22.0)
Italy	1.25	(1.22- 1.29)	1.23 (-11.4)
Spain	1.34	(1.25- 1.43)	1.28 (-18.3)
Portugal	1.55	(1.46- 1.65)	1.51 (-6.9)
Hungary	1.53	(1.42- 1.65)	1.50 (-6.4)
Slowak R.	1.61	(1.30- 2.00)	1.60 (-2.4)
Czech R.	1.63	(1.40- 1.89)	1.60 (-4.3)
Lithuania	1.33	(1.25- 1.41)	1.31 (-5.4)
Latvia	1.36	(1.16- 1.58)	1.32 (-11.0)
Estonia	1.31	(1.18- 1.46)	1.27 (-14.1)
Average	1.39		1.35 (-10.39)

Figure 1. Comparison between 12 countries with regards to the magnitude of inequalities in "disease weighted" self assessed health: the effect of controlling for smoking and body mass index





[a] For sake of comparability, this comparison is restricted to the 12 countries with nearly identical answer categories on the survey question on self assessed health.