SHORT REPORT

Determinants of health inequalities by income from the 1980s to the 1990s in Finland

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Recent studies have reported an inverse relation between income and health.[1 2] However, it is unclear whether this is mainly attributable to poverty and material hardship. The interpretation of this relation is made difficult by lack of knowledge on what determines income and what are the health benefits of high income. Furthermore, little is known about the changes of the relation between income and health over time and whether economic shocks have an impact on the relation.

To clarify these issues this study investigated (1) whether employment status, educational attainment, and occupational class—that is factors that are likely to causally precede income—had a similar impact on the relation between income and health in Finland; and (2) whether the relation between income and health remained similar, attenuated or strengthened from 1986 to 1994. This is particularly interesting to examine in Finland because during the mid-1980s, the Finnish economy flourished and in 1986 the unemployment rate

Table 1 Logistic regression analysis of below good perceived health by net household disposable income differences among men and women

	Model 1 age	Model 2 age+employment status+social class	Model 3 age+employment status+social class +education
Men			
1986			
Net household disposable income			
1 Highest quintile	1.00	1.00	1.00
2 Quintile	1.48 (1.17 to 1.89)	1.36 (1.07 to 1.72)	1.07 (0.83 to 1.38)
3 Quintile	1.53 (1.21 to 1.95)	1.33 (1.05 to 1.70)	0.97 (0.75 to 1.26)
4 Quintile	2.01 (1.58 to 2.55)	1.58 (1.24 to 2.02)	1.09 (0.83 to 1.42)
5 Lowest quintile	2.39 (1.88 to 3.04)	1.81 (1.42 to 2.33)	1.14 (0.86 to 1.51)
p	0.0001	0.0001	0.7462
1994			
Net household disposable income			
1 Highest quintile	1.00	1.00	1.00
2 Quintile	1.89 (1.43 to 2.49)	1.76 (1.33 to 2.33)	1.44 (1.08 to 1.92)
3 Quintile	2.18 (1.65 to 2.88)	1.91 (1.44 to 2.54)	1.47 (1.10 to 1.98)
4 Quintile	2.20 (1.66 to 2.92)	1.89 (1.42 to 2.53)	1.41 (1.05 to 1.92)
5 Lowest quintile	2.49 (1.87 to 3.33)	2.04 (1.52 to 2.75)	1.56 (1.14 to 2.14)
p	0.0001	0.0001	0.0389
year*income interaction			
p	0.2087	0.3055	0.2665
Women			
1986			
Net household disposable income			
1 Highest quintile	1.00	1.00	1.00
2 Quintile	1.28 (1.01 to 1.62)	1.24 (0.98 to 1.56)	1.01 (0.79 to 1.29)
3 Quintile	1.57 (1.24 to 1.98)	1.50 (1.19 to 1.90)	1.13 (0.88 to 1.44)
4 Quintile	2.42 (1.91 to 3.06)	2.23 (1.76 to 2.84)	1.53 (1.19 to 1.98)
5 Lowest quintile	2.46 (1.94 to 3.12)	2.17 (1.70 to 2.77)	1.24 (0.94 to 1.63)
p	0.0001	0.0001	0.0037
1994			
Net household disposable income			
1 Highest quinrile	1.00	1.00	1.00
2 Quintile	1.50 (1.14 to 1.98)	1.45 (1.10 to 1.92)	1.17 (0.87 to 1.55)
3 Quintile	1.87 (1.41 to 2.47)	1.73 (1.30 to 2.30)	1.30 (0.96 to 1.75)
4 Quintile	2.29 (1.73 to 3.05)	2.00 (1.49 to 2.67)	1.39 (1.02 to 1.90)
5 Lowest quintile	2.07 (1.53 to 2.78)	1.74 (1.28 to 2.37)	1.26 (0.91 to 1.76)
p	0.0001	0.0001	0.2820
year*income interaction			
p	0.3683	0.3928	0.6256

was 5%. However, in the early 1990s Finland experienced a rapid and deep economic recession. The unemployment rate rose to 18% in 1994.[3]

METHODS AND RESULTS

The data derive from two nationally representative "Surveys on Living Conditions" from 1986 and 1994 including people aged 15 or over. The number of interviewed respondents was 12 057 in 1986 and 8650 in 1994, and the response rate was 87 and 73, respectively. The analyses were restricted to 25–64 year old men and women because health inequalities by education, employment status, occupation, and income can be meaningfully studied only among working age population who have completed their education and have not yet retired.

The health outcome was "less than good" perceived health. Income was equivalised for household composition to yield "net household disposable income" using the OECD formula. The first adult receives the weight 1.0, second adult 0.7, and children below 18 years 0.5.[4] Income data were obtained by linkage of the survey data with official tax registry. The cut off points for income quintiles were calculated separately for both years. The interpretation of the relation between income and health is hampered by other preceding indicators of socioeconomic status and pre-existing ill health. Therefore, we included education, employment status, and social class in the logistic regression analyses.

Net household disposable income and less than good self perceived health among men and women in 1986 and 1994 showed a linear relation when only age was adjusted for (table 1, model 1). The interaction between year and income was statistically non-significant showing that the relation remained similar over time both among men and women. When employment status was adjusted for the relation between income and health weakened (table 1, model 2). Adjusting also for education and social class the relation disappeared in 1986 but remained in 1994. Among women, the relation also weakened after adjustment. The interaction effects were statistically non-significant in all models showing that the relation remained similar over time.

COMMENT

The relation between income and health is strongly attenuated when employment status, education, and social class are adjusted for. Adjustments had similar effects on the relation over time. No statistically significant changes in the relation between income and health from 1986 to 1994 could be found. During the recession social benefit levels were lowered, new fees for health and social services were introduced, and eligibility was restricted.[3] However, basic welfare structures remained unchanged in Finland and these are likely to have buffered against sudden adverse effects of the recession. For example, income inequalities remained at a low level in the early 1990s. In addition to socioeconomic factors other factors affect health inequalities as well, including lifestyles, living conditions, and cohort effects.

Overall our results are in accordance with a previous study on the relation between income and mortality in Finland.[5] These results indicate that a large part of income inequalities in health are associated with employment status and other preceding indicators of social status rather than factors directly related to poverty and material hardship. Therefore it is unlikely that social inequalities in health can be fully eradicated by redistribution of income. However, it remains an open question whether changes in the relation between income and health are likely to emerge only over a longer period of time, especially as income inequalities in Finland have widened after the mid-1990s.

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