



Childhood socioeconomic deprivation and later adulthood health

Childhood socioeconomic deprivation

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Abstract

Purpose – Although the link between socioeconomic deprivation and health status has been identified by many researchers, not much attention has been paid to the intergenerational effect of poverty on physical and psychological health status. The purpose of this paper is to investigate the effects of childhood deprivation on health at the later stages of the working age.

Design/methodology/approach – Data for individuals aged between 50 and 65 in six European countries are collected using purpose build questionnaires. The dataset provides information on issues such as physical and mental health status, past working experiences, socioeconomic and occupational background, incidence of diseases and sense of well-being. Ordinary least squares (OLS) and ordered logit models are utilised to estimate the effect of childhood deprivation on health status indices. Logit models are also used to investigate the effects of childhood deprivation on the likelihood of an individual suffering from specific disease.

Findings – There is a consistent and significant negative effect of childhood deprivation on the overall health profile at later adulthood. For instance, for each additional unit of the childhood deprivation index, the index of the mobility status and physical health status in later adulthood decrease by 0.19 and 0.28, respectively, the index of the psychological health decrease by almost 0.41 and the odds of exhibiting better self-assessed health decrease by a factor of 0.86 (all p -values are <0.01). Similar negative effects of childhood deprivation on the likelihood of an individual suffering from a specific medical condition are unearthed.

Originality/value – It is shown that childhood socioeconomic deprivation has long lasting detrimental effects on the health of individuals that are observable at the later ages of working life. Hence, the relationship between childhood socioeconomic deprivation and adult health should be an important factor in social policy and health care planning in an era of aging populations.

Keywords Children (age groups), Public health, Poverty

Paper type Research paper



JEL classification – I00, I12

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I. Introduction

Childhood economic deprivation is a fundamental issue of human rights, and of great political and social importance. It concerns the well-being of approximately one billion children, who are growing up below poverty lines, mainly, in the world's poorest, but also in the wealthiest, countries (UNICEF, 2005a, b). Furthermore, childhood economic and social deprivation has important repercussions for future overall health status, which in turn shapes social and health policies. The link between socioeconomic deprivation and health status has been identified by many researchers (Wilkinson, 2006; Skalli *et al.*, 2006). However, not much attention has been paid to the intergenerational effect of poverty on physical and psychological health status. It is clear that such an effect would have consequences for a number of important social issues like labour market participation and retirement decisions. Moreover, the intergenerational health effects of poverty are basic factors for the future demand for health care. These issues clearly have important policy implications for national social security and health systems in an era of aging populations. Thus, the study of the effects of childhood economic deprivation can contribute to strategic planning and to the better development of health and social policies for the wellbeing of the overall population.

This paper investigates the effects of childhood deprivation on the health of individuals at the later stages of their working life. The empirical analysis of the paper is carried out using some newly collected data from six European countries. The dataset contains information on the physical and mental health status of older labour force participants, their past working experiences, incidence of diseases, individuals' sense of well-being and their socioeconomic and occupational background. It also includes information concerning childhood environment that could potentially capture early-life deprivation effects on current health status.

The paper starts with a brief literature review which provides an overview of available evidence related to relationship between socioeconomic status (SES), childhood SES and their effect on overall health. The next section presents a discussion of the data, of the empirical analysis and of the empirical results. Section IV summarises the main findings of the study and the final section concludes.

II. Literature review

A. SES and health

Research on the influence of social and economic factors on health "[...] concerns the interaction, [...] between a health production function and a health demand function and has been a highly distinctive research area within health economics" (Culyer and Newhouse, 2003). The term "social factors" or "social determinants" is a generic term and it may include a number of parameters including for example, income, wealth, class, education, occupation and employment. There are several studies which report a strong link between social factors and physical and psychological health (for a general review see Marmot and Wilkinson, 2006). One of these studies, the Black report, provides evidence on marked inequalities in health among the social classes in Britain. The report found that in early 1970s the death rate for adult men in unskilled workers was nearly twice that of professional workers (Townsend and Davidson, 1992). More recent studies indicate the persistence of this link. For instance, people living in the most deprived districts of Glasgow have a life expectancy 7.5 years shorter than those living in the most affluent districts (General Register Office for Scotland, 2007). In general, British statistics

have shown that health follows a social gradient: the higher the social position, the better the health (Marmot and Wilkinson, 2006). The same trend is shown to be prevalent for many European countries (Skalli *et al.*, 2006). Similarly, Navarro (1990) shows that wealth and income inequalities are linked to great disparities in health both in terms of mortality and morbidity even if the effects of race are netted out. This in turn is vitally connected with Kunst's and Mackenbach's (1994) empirical finding for many countries, that differences between countries in levels of inequality in mortality may be partially explained by the countries' different levels of egalitarian social and economic policies.

Etienne *et al.* (2007) study the association between income inequality and individual health and report that "the income inequality is systematically, negatively and significantly correlated with individual health, regardless of their position in the income distribution". Kington and Smith (1997) use the Health and Retirement Survey (HRS) to uncover the existence of a strong positive relationship between levels of household income or wealth and health status. HRS respondents in excellent health have 2.5 times as much household income and five times as much household wealth as respondents in poor health. Social gradients were also found to be associated with mental health problems such as schizophrenia, depression and antisocial behaviour in other studies conducted by Dohrenwend *et al.* (1992).

Socioeconomic gradients like early-life deprivation, poverty, income and education influence disease indirectly (Siegrist and Marmot, 2004). The effect of SES on specific health problems like heart disease is observed in many studies. For instance, London-based civil servants of lower SES status are found to be more exposed to coronary heart disease (CHD) risk (Marmot *et al.*, 1991; Steptoe *et al.*, 2004). In a study of young black men, Kapuku *et al.* (2002) report that SES is associated with diastolic blood pressure. Marmot *et al.* (1997) and Marmot and Wilkinson (2006) show that decreasing SES status implies greater physical and mental ill health and mortality. Finally, SES also appears to have a direct casual effect on mental health and degenerative conditions: Lorant *et al.* (2003) report that low SES is generally associated with high psychiatric morbidity, disability and poor access to health care.

Importantly, there are indications of a vicious circle. For instance, Adda *et al.* (2003) find growing evidence that low socioeconomic status causes poor health and poor health causes low SES. This clearly indicates that the inequalities in health and death are of concern to all countries and therefore one of the big challenges in the conduct of government social policy (Townsend and Davidson, 1992).

B. SES and childhood health

The relationship between SES and physical and mental health also holds for the childhood period. There is evidence that socioeconomic deprivation during childhood is related to overall mortality rates and to mortality due to cardiovascular disease, lung and stomach cancer (Galobardes *et al.*, 2004). Similarly, Power *et al.* (2007) report that social class in childhood is associated with high blood pressure, High-density lipoprotein cholesterol, triglycerides, fibrinogen, hearing threshold, depressive symptoms and with a general trend in deteriorating health. Laaksonen *et al.* (2007) also show that low childhood SES and current economic status are strongly associated with common mental disorders among men and women in both Helsinki and London.

Bosma *et al.* (1999) find similar results regarding the direct association between low socioeconomic conditions in childhood and adverse health outcomes in adulthood.

Lynch *et al.* (1997) uncover an association of social class in childhood and its effect on psychological attributes at adulthood. Their study revealed that poor health behaviour and psychosocial problems cluster in low socioeconomic groups. In particular, their results show that many adulthood behaviour and psychosocial dispositions detrimental to health are consistently related to poor childhood conditions, low levels of education and blue collar employment. In addition, poor adult health and psychosocial characteristics are more prevalent among men whose parents were poor.

Many studies also find that childhood socioeconomic conditions are inversely associated with overall cardiovascular disease mortality. In their study of the natural history of atherosclerosis, Holman *et al.* (1958) and Berenson *et al.* (1987) find that even though CHD manifests itself in adulthood, atherosclerosis, an important underlying process leading to the disease, begins at much earlier age. Moreover, McCarron and Smith (2003) show the presence of risk factors during childhood or adolescence is associated with an increased risk of developing CHD. Importantly, Beebe-Dimmer *et al.* (2004) provide empirical evidence that low childhood socioeconomic position is associated with an increased mortality due to cardiovascular disease. In similar vein, Brunner *et al.* (1999) show that the SES driven accumulation of health capital and cardiovascular risk begins in childhood and continues, according to socioeconomic position, during adulthood.

Ramsay *et al.* (2007) examine the extent to which childhood socioeconomic circumstances are related to the risk of CHD in older British men by retrospective assessment of childhood socioeconomic circumstances (father's occupation and childhood household amenities). The combined exposure to adverse childhood and adult social circumstances turns out to be associated with the most unfavourable life style behaviour and CHD risk. Evans (2003) reports that the physical aspects (crowding, noise and housing quality) and psychosocial (child/separation, turmoil and violence) of the home environment and personal characteristics (poverty, single parenthood and maternal high school dropout status) elevate the cumulative risk associated with heightened cardiovascular and neuroendocrine parameters, increased deposition of body fat and a higher summary index of total allostatic load.

Lawlor *et al.* (2004) study on the association between childhood socioeconomic position and adult function in older adulthood shows that childhood poverty is associated with poorer lung function for women aged 60-79. Bosma *et al.* (1999) report that low social class in childhood relates to poor general health in adulthood and people who grew up in lower socioeconomic conditions exhibit more negative personality profiles and adverse coping styles in adulthood compared to individuals who grew up in more affluent households. Finally, Kestila *et al.* (2006) report that parental education and problems in childhood are related to psychological distress. They find that childhood living conditions and adversities are strongly associated with psychological distress in early adulthood even after controlling for the respondent's own education. This is confirmed by Makinen *et al.* (2006) who find an association of childhood circumstances with physical and mental functioning in adulthood and an inverse association between parental education and adult mental functioning.

III. The data

The empirical analysis in this paper is carried out using some newly collected data as part of a European Commission funded project Socio-economic and occupational effects

on the health inequality of the older workforce (SOCIOLD) conducted in six European countries (UK, France, Finland, Denmark, The Netherlands and Greece). The focus of the project is the investigation of the effects of socioeconomic and occupational status on the health of the older workforce[1]. The data collection targeted individuals aged between 50 and 65. The surveys were conducted in the summer-autumn of 2004 through internet although face-to-face interviews took place in Greece where internet penetration at the time was limited especially with regard to the sample population). The questionnaires aimed to collect information on issues such as physical and mental health status, past working experiences, incidence of diseases, sense of well-being and socioeconomic and occupational background of older participants of the labour force. In this study, childhood circumstances at the age of 14 are asked retrospectively[2].

Some studies report that methodological problems can arise when individual report self-assessment of health (Ward *et al.*, 2002). It is argued that people from low socioeconomic groups might have lower health expectations and this can bias any inference based on this information (Grundy and Holt, 2000). In view of this, in addition to a self-assessed health, three alternative measurements of physical and mental health are utilised in this study. They are relatively objective as they do not rely on self-assessment of the health status but they refer to specific medical or mobility conditions. Thus, first a mobility score variable is constructed using the individuals' evaluation on how difficult it is to perform various everyday physical tasks, second, a physical score variable is derived by utilising the individuals' response on whether they have suffered a medical condition are used as measures of physical health status. Finally, based on a series of questions on psychological well-being, a score index variable is derived to reflect individuals' mental health status. A more detailed description of how these health indicators are constructed can be found in Appendix. A detailed description of the variables used in the paper, with summary statistics, is provided in Appendix Table AI. The sample size is 5,080 observations, comprising of 1,016 respondents from the UK, 1,001 from Greece, 1,003 from France, 1,000 from The Netherlands, 1,015 from Denmark and 474 from Finland.

IV. The effect of childhood deprivation on health at the later stages of working life. The evidence

In view of the literature reviewed above, this study examines the effect of childhood deprivation on psychological and physical health at the later stages of working life. The individual's health status at the age between 50 and 65 is always the variable to be explained. The medical literature suggests that overall health is also determined by the individual's genetic traits (Inoue and Lupski, 2003; Jackson, 2004). Hence, in all regressions, in order to control for the individual's genetic traits, a variable capturing the medical condition history of the individual's parents is included. It has to be noted that heteroskedasticity corrected estimates are reported throughout the paper.

The first three columns of Table I present the OLS estimates of the effect of childhood deprivation on the three health status indices. The results show that higher values in the childhood deprivation index are associated with increasing frailty of health for the mobility, physical health and psychological health indices at latter adulthood[3]. The results are consistent with the literature (Lynch *et al.*, 1997; Bosma *et al.*, 1999; Galobardes *et al.*, 2004; Laaksonen *et al.*, 2007). Thus, for each additional unit of the childhood deprivation index, there is deterioration in health as reflected by the increase

Table I.
The effect of childhood
deprivation on health
indicators

Variable	Mobility status Coefficient (SE)	Physical health Coefficient (SE)	Psychological status Coefficient (SE)	Self-assessed health Coefficient (SE)
Age	0.0632***	0.0333***	-0.00254	-0.0255***
Male	-0.752***	-0.0524	0.516***	-0.0254
Genetic loading	0.703***	0.381***	-0.815***	-0.334***
Deprivation_14	0.277***	0.342***	-0.493***	-0.212***
Constant	7.575***	-2.248***	30.10***	-5.094***
Constant2		0.169	0.697	-3.726***
Constant3				-2.521***
Constant4				-0.767***
R ²	0.025	0.113	0.024	
Observations	5,392	5,508	5,080	5,508

Note: Robust SEs: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$

of by the mobility index by almost 0.28 and by the physical health index by 0.34. Similarly, for each additional unit of the childhood deprivation index, the psychological health status index improves by 0.49. The fourth column of Table I reports the ordered logit estimates for the self-assessed health. It is shown that the effects of childhood deprivation are detrimental to self-assessed health status at the stage of middle age (the odds of exhibiting better health decrease by a factor of 0.80)[4].

In the spirit of the earlier cited literature, the individual's genetic traits turn out to be an important determinant of the individual's health indicating that if the individual's parents have suffered from serious medical conditions, the individual exhibits frailer health than the remainder. Finally, in line with the literature, older individuals appear to have frailer health (Kind *et al.*, 1998).

However, the literature indicates that health at latter adulthood is affected by important variables such as education and wealth (Lynch *et al.*, 1997; Bosma *et al.*, 1999; Brunner *et al.*, 1999; Marmot and Wilkinson, 2006). It is therefore important to examine whether the above results are robust to the inclusion of these factors in the regressions (Marikainen *et al.*, 2003). Two complementary variables approximating the individual's wealth are included. First, the paper uses three dummy variables indicating the level of the individual's household wealth at the time of the survey and three dummy variables indicating the value of the household residence. Second, there are five dummy variables indicating the highest qualification obtained by the individual respondent.

Table II reports the results of the augmented regressions. The results reported in Table I are robust to the inclusion of the above variables. Higher values in the childhood deprivation index are associated with increasing frailty of health at middle age for the mobility, physical health and psychological health indices. The inclusion of the control variables does not substantially affect the effect of childhood deprivation on current health. Thus, for each additional unit of the childhood deprivation index, the index of the mobility status and physical status increase by 0.19 and 0.28, respectively; this reflects an equivalent decline for the individual's health. In addition, for each additional unit of the childhood deprivation index, for each additional unit of the childhood deprivation index, the index of the psychological health decrease by almost 0.41. The ordered logit estimates in the last column in Table II also show that the effects of childhood deprivation are detrimental to self-assessed health status at middle age (the odds of exhibiting better health decrease by a factor of 0.86).

The effect of the control variables is reported throughout for consistency, but it is not discussed in detail although some comments may be in order. In particular, current wealth is significantly, independently and positively associated with current health. Marikainen *et al.* (2003) who studied the effect of income and wealth on general health questionnaire (GHQ) depression and health in white collar women, suggested that the associations between income, particularly personal income, and morbidity can be largely accounted for by pre-existing health and other measures of social position and that the strong independent association between household wealth and morbidity are likely to be related to a set of early and current material and psychological benefits. This is in line with other studies (Kington and Smith, 1997). Hence, one should expect that estimates may be affected by the endogeneity in the wealth-health relationship and this is an issue of importance. Furthermore, the results show that higher education is associated with better physical health but it is associated with frailer health in the case of mobility, psychological and self-assessed health status. This surprising result

Table II.
The effect of childhood deprivation on health indicators: an extended model

Variable	Mobility status Coefficient (SE)	Physical health Coefficient (SE)	Psychological status Coefficient (SE)	Self-assessed health Coefficient (SE)
Age	0.0537***	0.0299***	0.00802	-0.0208***
Male	-0.630***	-0.0436	0.413***	-0.0980**
Genetic loading	0.816***	0.401***	-0.932***	-0.406***
Deprivation_14	0.189***	0.275***	-0.408***	-0.153***
Wealth: \$1,000-55,000	-0.055***	-0.417***	0.0207	0.145***
Wealth: more than \$55,000	-0.508***	-0.385***	0.129	0.238***
House value: \$10,000-200,000	-0.477***	-0.138***	0.678***	0.395***
House value: more than \$200,000	-0.695***	-0.100***	1.024***	0.677***
No education	3.145***	-0.0343	-1.189***	-0.804***
Up to lower secondary	0.825***	-0.0605	-1.158*	-0.480***
Upper secondary	0.181	-0.141***	-0.0618	-0.118
Post-secondary, non-tertiary	0.517***	0.365***	-0.764***	-0.506***
Constant	8.192	-1.678***	29.45***	-4.776***
Constant2	5,392	5,508	5,080	-3.361***
Constant3				-2.094***
Constant4				-0.277
R^2	0.054	0.163	0.054	
Observations	5,392	5,508	5,080	5,508

Note: Robust SEs: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$

may be an outcome of the endogeneity in the current health education relationship or of the expected multicollinearity between current wealth and education or both. Indeed, Hallqvist *et al.* (2004), Hertzman *et al.* (2001) and Laaksonen *et al.* (2007) suggest that own education may mediate the effects of childhood circumstances in adult functioning. Overall, the data used in this study are not well suited to investigate the above issues. Yet, in this study, the above are not of major concern since wealth and education are used only as control variables and given that the focus of the study is the childhood deprivation-adult health relationship.

To investigate further the effect of childhood deprivation on health, a number of logit regressions are estimated where the dependent variable captures a specific medical condition. The dependent variables are a number of binary variables that take the value one if the individual has ever suffered from a particular medical condition and zero otherwise. The medical conditions are high blood pressure, diabetes, benign growth, malignant growth, endocrine hormone problem, genitourinary, gastrointestinal, musculoskeletal, respiratory, cerebrovascular or cardiovascular/heart diseases[5]. The results are reported in Table III. In line with the literature, the results demonstrate the paramount importance of childhood deprivation on the likelihood of someone suffering from some medical condition at the later stages of their working lives (Brunner *et al.*, 1999). The deprivation index is consistently statistically significant for every single medical condition used in this study. Thus, for each unit increase of the childhood deprivation index at the age of 14 the odds of suffering increase by 1.49 for blood pressure, 1.30 for heart disease, 1.38 for diabetes, 1.48 for benign growth and 1.25 for malignant growth, 1.37 for genitourinary condition, 1.50 for Gastrointestinal condition, 1.71 for musculoskeletal condition, 1.41 for endocrine condition, 1.50 for respiratory and 1.57 for cerebrovascular diseases.

V. Conclusions

In the spirit of the Nobel laureate Sen (1998) who argues that that the quality of life depends on various physical and social conditions, such as the epidemiological environment in which a person lives, this study shows a social gradient in health status which is associated with childhood deprivation. The novel aspects of this study are the European wide survey (six countries) and the construction of indices which concentrate exclusively on childhood-adult socioeconomic effects of health. The results indicate that there is an effect of childhood socioeconomic conditions on later adulthood health profile as measured first by a mobility index, a physical health index and a self-assessed health indicator and second by the likelihood of suffering from a number of medical conditions. The risk of frail health is higher among adult respondents of the age between 50 and 65 who grew up in unfavourable socioeconomic circumstances, after controlling for their genetic risk traits, their current educational and wealth status.

The main policy implication of this study is the intergenerational effect of poverty. Importantly, it appears that childhood deprivation has long lasting detrimental effects on the health of individuals that are visible at the later ages of working life. The significance of this effect cannot be underestimated as it has serious repercussions on the individual's propensity for labour market participation at the later stages of their working life, since health is a major determinant of the retirement decision. Hence, the relationship between childhood deprivation and adult health is taking an increasingly important policy role in an era of aging populations given that child poverty puts higher

Table III.
Logit estimation; the effect of childhood deprivation on health; specific illnesses

Variable	Blood pressure	Heart	Diabetes	Benign growth	Malignant growth	Genitourinary
Age	0.0737***	0.0772***	0.0702***	0.0122	0.0616***	0.0429***
Male	0.0718	0.466***	0.164	-0.244*	0.17	0.167
Genetic loading	0.952***	0.822***	0.811***	0.135	0.345***	0.414***
Deprivation_14	0.396***	0.260***	0.323***	0.211	0.818***	0.15
Wealth: \$1,000-55,000	-0.543***	0.458***	0.046	0.388***	0.225***	0.318***
Wealth: more than \$55,000	-0.482***	-0.129	0.162	0.0582	-0.489	-0.807
House value: \$10,000-200,000	-0.295***	-0.0732	0.249	-0.926***	-0.317	-0.710
House value: more than \$200,000	0.113	-0.0732	0.202	-0.148	0.265	0.19
No education	0.116	-0.604***	-0.625***	0.287	-0.126	0.0616
Up to lower secondary	0.326	-0.0608	0.405	-1.068	0.511	-0.0357
Upper secondary	-0.0294	-0.279**	0.133	-0.137	-0.471**	-0.191
Post-secondary, non-tertiary	0.0064	-0.303*	0.223	-0.212	-0.135	-0.378**
Constant	0.469***	0.014	0.170	0.391**	0.358	-0.0974
Observations	-7.688	-8.258	0.58	-4.923	-7.998	-6.064
	5,508	5,508	5,508	5,508	5,508	5,508
<i>Variable</i>	<i>Gastrointestinal</i>	<i>Musculoskeletal</i>	<i>Endocrine</i>	<i>Respiratory</i>	<i>Cerebrovascular</i>	
Age	0.0220***	0.0415***	-0.044***	0.0127	0.0832***	0.0205
Male	-0.0577	-0.158**	1.041***	0.154	-0.0513	0.255
Genetic loading	0.606***	0.486***	0.823***	0.23	0.506***	0.337
Deprivation_14	0.408***	0.535***	0.343***	0.0591	0.448***	0.116
Wealth: \$1,000-55,000	-0.687***	-0.820***	-0.511***	0.404***	-0.701***	0.358
Wealth: more than \$55,000	-0.481***	-0.850***	-0.843***	0.198	-0.134	-0.339
House value: \$10,000-200,000	-0.218*	-0.234**	-0.0185	-0.699***	0.427	0.283
House value: more than \$200,000	0.141	-0.154	0.349**	-0.245*	-0.327	0.370
No education	-1.162***	-0.646*	0.790***	0.131	-0.592	0.370
Up to lower secondary	-0.348**	0.313***	-0.489***	0.121	0.321	0.316
Upper secondary	-0.604***	-0.211	0.0972	-0.194*	-0.251	-0.439
Post-secondary, non-tertiary	0.438***	0.757***	0.136	0.301**	-0.419	0.350
Constant	-4.793	-5.828	0.107	0.290***	0.00526	1.399
Observations	5,508	5,508	0.433	-4.320	-10.41***	5,508
	5,508	5,508	5,508	5,508	5,508	5,508

Note: Robust SEs: * $p < 0.1$, ** $p < 0.05$, and *** $p < 0.01$

demand on the health care systems in the future. Understanding the relationship between health and childhood deprivation can indicate avenues of improving the health status of the population by influencing the SES of the young rather than focusing on and possibly limiting health care services as a way of controlling increasing health care costs in the future. This clearly shows that inequalities in health and death are of major concern and one of the biggest possible challenges in the conduct of governments' social policies (Townsend and Davidson, 1992; Kunst and Mackenbach, 1994).

Notes

1. Further information on the project can be found at: www.abdn.ac.uk/sociold/index.hti
2. Studies report that retrospective data on childhood circumstances are likely to be generally reliable (Dube *et al.*, 2004).
3. It will facilitate the interpretation of the findings to note that for the index of physical health and the mobility index higher values imply frailer health, for the psychological health index higher values imply better psychological health and for the self-assessed health measure higher values imply better health.
4. This is the exponent of the estimated coefficient.
5. These conditions are also used to construct the index of physical health used in this study.

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Appendix. Health status and deprivation at the age of 14 indicators

Physical health status index

Self-assessed health

Health over last 12 months:
(very bad = 1, to very good = 5)
Hence higher values imply better health.

Index of physical health

Information on specific medical conditions derived from the question:

Have you ever suffered from?
high blood pressure;
diabetes;
benign growth;
malignant growth;
genitourinary;
gastrointestinal;
musculoskeletal;
endocrine hormone problem;
respiratory;
cerebrovascular; and
cardiovascular/heart disease
(no = 0, yes = 1).

The index is derived from summing up the above responses; hence higher values of the index imply frailer health.

Index of mobility status

The index is derived from the responses to the following questions:

how difficult to bathe or dress yourself;
how difficult to walk a block;

how difficult to walk several blocks;
how difficult to walk more than a mile;
how difficult to bend, kneel or stoop;
how difficult to climb one flight of stairs;
how difficult to lift or carry groceries;
how difficult to do moderate activities;
how difficult to do vigorous activities; and
how difficult to climb several flights of stairs
(not at all difficult = 1 to very difficult = 4).

The mobility index is derived from summing up the above responses. Higher values imply frailer health.

Psychological health status indicators

The index is derived from the responses to the following questions:

Have you feeling recently as if you:
have slowed down;
are tense/wound up;
are having worrying thoughts;
are getting sudden feelings of panic;
are cheerful;
enjoy book/tv/radio;
have trouble sleeping;
easily get bored/irritated; and
having difficulty concentrating are lonely
(much more than usual = 1 to not at all = 4).

The psychological health index is derived from summing up the above responses. Higher values imply better psychological health.

Deprivation index when 14 years old

The index is derived from the responses to the following questions:

When you were at the age of 14, did your family house have the following?

more than two persons per room;
no toilet inside or outside the house;
share a bed, when 14 years old;
no hot running water;
no adequate house heating facilities;
damp walls, floors, etc.;
crime or vandalism in the area; and
your family was not well off (subjective assessment)
(yes = 1, no = 0).

The deprivation index at the age of 14 is derived from summing up the above responses. Higher values imply more severe deprivation.

Variable	Mean	SD
Mobility index	12.108	4.173
Physical health	0.888	1.316
Psychological health	28.127	4.504
Self-assessed health	3.470	1.119
Blood pressure	0.168	0.374
Diabetes	0.046	0.209
Benign growth	0.052	0.223
Malignant growth	0.028	0.164
Genitourinary	0.072	0.258
Gastrointestinal	0.104	0.305
Musculoskeletal	0.168	0.373
Endocrine hormone problem	0.044	0.205
Respiratory	0.119	0.324
Cerebrovascular	0.012	0.108
Cardiovascular/heart	0.077	0.267
Age	55.842	5.490
Male (= 1)	0.488	0.500
Genetic loading: 1 if individual belongs in dangerous group (i.e. if any of their first-degree relatives ever suffered from cardiovascular, malignant growth, diabetes or blood pressure), 0 otherwise	0.808	0.394
Deprivation_14: deprivation index when 14 years old	2.901	1.121
Wealth:\$1,000-55,000	0.212	0.409
Wealth: more than \$55,000	0.203	0.403
House value: \$10,000-200,000	0.268	0.443
House value: more than \$200,000	0.209	0.407
No education	0.016	0.127
Up to lower secondary	0.287	0.452
Upper secondary	0.159	0.366
Post-secondary, non-tertiary	0.169	0.375
Omitted variables		
House value: less than \$10,000	0.522	0.500
Wealth: less than \$1,000	0.584	0.493
Tertiary	0.356	0.479

Table AI.
Means and standard deviations of the variables

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