Socioeconomic factors, material inequalities, and perceived control in self-rated health: cross-sectional data from seven post-communist countries

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Abstract

This study examined the association between perceived control and several socioeconomic variables and self-rated health in seven post-communist countries (Russia, Estonia, Lithuania, Latvia, Hungary, Poland, Czech Republic). Questionnaire interviews were used to collect data on self-rated health in the last 12 months, education, marital status, perceived control based on nine questions, and material deprivation based on availability of food, clothing and heating. For each population, two ecological measures of material inequalities were available: an inequality score estimated from the survey data as the distance between the 90th and 10th percentiles of material deprivation, and Gini coefficient from published sources. Data on 5330 men and women aged 20–60 were analysed. Prevalence of poor health (worse than average) varied between 8% in Czechs and 19% in Hungarians. The age–sex-adjusted odds ratio for university vs primary education was 0.36 (0.26–0.49); odds ratios per 1 standard deviation increase in perceived control and in material deprivation were 0.58 (95% CI 0.48–0.69) and 1.51 (1.40–1.63), respectively. The odds ratio for an increase in inequality equivalent to the difference between the most and the least unequal populations was 1.49 (0.88–2.52) using the material inequality score and 1.41 (0.91–2.20) using the Gini coefficient. No indication of an effect of either inequality measure was seen after adjustment for individuals' deprivation or perceived control. The results suggest that, as in western populations, education and material deprivation are strongly related to self-rated health. Perceived control appeared statistically to mediate some of the effects of material deprivation. The non-significant effects of both ecological measures of inequality were eliminated by controlling for individuals' characteristics. © 2000 Elsevier Science Ltd. All rights reserved.

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Introduction

This paper examines the relative contributions of individual deprivation, educational attainment, perceived

control and national economic inequality with respect to self-rated health in seven countries of Central and Eastern Europe (CCEE) in the mid 1990s. During the sudden political changes in the region between 1989 and 1991, there was evidence of sharp economic decline and social disruption in each country (United Nations Children's Fund, 1997). In some countries, economic inequality rose sharply whereas in others the relatively egalitarian distribution of income, found throughout the region during the Soviet era, was largely sustained (United Nations Children's Fund, 1997). Mortality increased, but only marginally and transiently in some countries (e.g. the Czech Republic) whereas the mortality increase was substantial and prolonged in others (e.g. Russia). The pattern of increased mortality by cause and age suggested that the principal determinants were to be found in the socioeconomic and psychosocial environments (Cornia, 1997; Bobak & Marmot, 1996).

Due to difficulties with collecting data in CCEE, research on health during the transition has been limited. In order to understand the contributions to health status, we overcame this problem by taking advantage of a pre-existing series of surveys and adding a small number of key questions about the psychosocial environment and self-rated health. Self-rated health was chosen because it is easy to measure, has been extensively studied in western populations, and has been shown to predict mortality in prospective studies (Idler & Benyamini, 1997). In addition, Carlson (1998) found that an east–west divide exist in self-rated health similar to that in mortality.

There is a rich literature on the influence of socioeconomic status, psychosocial factors and income inequalities on health in western countries. The association between socioeconomic status and health in the former communist countries has been studied less intensively but published reports suggest relatively large educational gradients in mortality and prevalence of risk factors (Kunst, 1997; Shkolnikov, Leon, Adamets, Andreev & Deev, 1998; Bobak, Hertzman, Skodova & Marmot, 1999). Socioeconomic differences in self-rated health in these countries have not been reported. In addition to social status of individuals, recent research suggest certain characteristics of populations, such as income inequality, are important aspects of the national social environment. Income distribution was found to be associated with health outcomes, including self-rated health, in western countries (Wilkinson, 1992; Kawachi, Kennedy, Lochner & Prothrow-Stith, 1997; Kennedy, Kawachi, Glass & Prothrow-Stith, 1998).

Psychosocial factors have been suggested as a possible explanation for the social gradients in health in western countries (Marmot, Bosma, Hemingway, Brunner & Stansfeld, 1997; Lachman & Weaver, 1998).

They may play a similar role in central and eastern Europe. Control at work was found to be strongly related to myocardial infarction in the Czech Republic, and explained about half of the educational gradient in the risk of infarction (Bobak, Hertzman, Skodova & Marmot, 1998a). Given the large psychological literature on perceived control over life more generally (for review, see Skinner, 1996) and its association with well-being and health (Skinner, 1996; Rodin, 1986; Lachman & Weaver, 1998), the extension of the concept of control beyond the working environment is reasonable. For example, Syme (1989) has suggested that the concept of control could integrate many aspects of psychosocial and social environment. Recent research provides some support for this speculation. Carlson, using data from the 1992 World Value Survey, detected an east–west gap in self-rated health analogous to that in mortality, and found that perceived control was related to self-rated health within and between 23 national samples of men and women (Carlson, 1998). Consistent with his results, we have found that perceived control was strongly related to perceived health and physical functioning in Russia (Bobak, Pikhart, Hertzman, Rose & Marmot, 1998b).

The present analyses extend our work to seven central and eastern European countries: three Central European countries now negotiating membership in the European Union; three Baltic states with a Central European orientation albeit forcibly integrated into the Soviet Union as a consequence of the Second World War; and Russia.

Methods

Populations and subjects

The study was carried out adding questions on self-rated health, perceived control and socioeconomic factors to planned cross-sectional surveys in seven countries between 1996 and 1998. These surveys, part of the New Democracies Barometer (NDB), New Baltic Barometer (NBB), and New Russia Barometer (NRB) were created to find out what people in Central and Eastern Europe were thinking during the period of transition to democracy (Rose, 1996, 1997). They are random sample surveys which began in 1991, and involve face-to-face interviews of adults about economic, political and social attitudes and behaviour. By 1997, 14 countries in the region had been sampled.

The national samples from Russia, Estonia, Lithuania, Latvia, Czech Republic, Hungary and Poland included in the present analyses were selected randomly by multi-stage sampling of households and then of adults (over 18 years) from the households. This report is based on 5330 subjects (2431 men and 2899

Table 1
Description of populations included in the analyses (only subjects aged 35–65 are included)

Country	No. of subjects (% men)	Response rate (%)	Age (%)				Prevalence of poor health (%)	% in serious deprivation[a]	Inequality index[b]	Gini coefficient
			20–30	30–40	40–50	50–60				
Czech R.	647 (45)	61	28	24	21	28	8	3	4	26.0
Poland	753 (43)	59	26	25	31	18	10	4	5	28.1
Hungary	654 (42)	58	25	23	27	24	19	4	5	33.7
Estonia	740 (47)	59	29	26	25	20	12	9	6	39.5
Latvia	665 (53)	57	23	28	25	24	16	10	7	32.5
Lithuania	696 (41)	51	25	30	24	20	13	8	6	34.9
Russia	1175 (48)	66	24	24	29	24	15	25	8	44.6

[a] Serious deprivation: deprivation score ≥ 7 (responder's household in the last 12 months had often to do without either food, heating/electricity or clothes).
[b] Inequality index: difference between 90th and 10th percentile of material deprivation score in each population.

women) in the age group 20–60 years. Response rates varied between 51% in Latvia and 66% in Russia (Table 1); refusal rates were between 16% and 25%, the remaining non-responders were those where nobody was at home after three visits. All samples were representative for the national populations in terms of age, sex and education. Sampling and interviews were conducted by local agencies.

Measurements

Data were collected by structured questionnaires completed during interviews to subjects' homes. In all centres, the questionnaires contained identical questions on the variables of interest, and correct wording was checked by translating questions back into English. Self-rated health was assessed by a standard question "How do you rate your health over the last 12 months?", with answers Very good, Good, Average, Poor and Very poor. For the analyses, the outcome was defined as reporting poor or very poor health ("poor health").

A score of perceived control was based on agreement or disagreement with the following nine statements: (1) At home, I feel I have control over what happens in most situations; (2) I feel that what happens in my life is often determined by factors beyond my control; (3) Over the next 5–10 years I expect to have many more positive than negative experiences; (4) I often have the feeling that I am being treated unfairly; (5) In the past 10 years my life has been full of changes without my knowing what will happen next; (6) I gave up trying to make big improvements or changes in my life a long time ago; (7) Keeping healthy depends on things that I can do; (8) There are certain things I can do for myself to reduce the risk of a heart attack; (9) There are certain things I can do for myself to reduce the risk of getting cancer. These questions were adapted from the Whitehall II Study (Marmot et al., 1991) and the MacArthur Foundation programme on Midlife Development (Lachman & Boone James, 1997), are similar to questions on perceived constraints used by Lachman and Weaver in the US (Lachman & Weaver, 1998). The subjects were asked to what extent they agree/disagree with the statements; the answers were recorded at a six-point scale; Cronbach's alpha was 0.65.

Education was classified into four categories: primary, vocational, completed secondary and completed university. Marital status was categorised into married and unmarried. Material deprivation was calculated as the sum of responses to three questions, covering the frequency of not having all the food, clothing and electricity/heating needed. As the responses were on four-point scale, their sum is between 0 and 9. For each population, an ecological index of material inequality

was calculated as the difference between the 10th and 90th percentile of deprivation score. In addition, Gini coefficients for each country in 1996/97 were taken from UNICEF (United Nations Children's Fund, 1998).

Statistical analysis

Age–sex-adjusted prevalence rates of poor health were standardised by the direct method with the pooled data as the standard. The associations between poor health and socioeconomic factors were estimated by logistic regression. To account for clustering of individuals within states, robust standard errors based on Huber formula were calculated using the "cluster" sub-command in STATA (StataCorp., 1995). This procedure accounts for the violation of independence among individuals within the same country, and can be also used for multi-level models. Perceived control, material deprivation and both inequality indices were measured and analysed as continuous variables. To express their effects in meaningful units, odds ratios were calculated for one standard deviation (in pooled dataset) increase in perceived control and material deprivation, and for an increase in inequality indices equivalent to the difference between the most and the least unequal country.

Results

Table 1 describes the study samples. There were large differences in the prevalence of poor health, with the lowest prevalence in the Czech Republic (8%) and the highest in Hungary (19%). The correlation coeffi-

cient between the age–sex standardised prevalence of self-rated health in the study samples and national mortality rates was 0.94 ($n = 7$). Overall, the prevalence of poor health was higher than in western countries, where typically less than 10% report health worse than average. The proportion of responders reporting material deprivation increased from 3% among Czechs to 25% in Russia. Both material inequality index and the Gini coefficient were lowest in the Czech Republic and highest in Russia, and the correlation coefficient between these two measures was 0.82 ($n = 7$). Perceived control was strongly inversely related to material deprivation ($r = -0.42$, $n = 5294$), and mean perceived control was considerably and significantly lower in countries with high inequality ($p < 0.001$ for linear trend in mean control score by both inequality measures).

We have first examined whether perceived control and socioeconomic factors are related to self-rated health, first adjusting for age and sex (Table 2, column 2) and then controlling, in addition, for the other variables in the table (Table 2, column 3). The effects of education and material deprivation are highly significant and point in the predicted direction in both models, although the multivariate odds ratio for deprivation was lower.

Perceived control was significantly associated with odds of poor health; an increase in perceived control score by 1 SD was related to an odds ratio of 0.58 (95% CI 0.48–0.69), and the association was independent from other variables. This association was observed in all countries, with odds ratios between 0.34 in Estonia and 0.66 in Russia (Fig. 1).

Both ecological measures of inequality were positively related to odds of poor health (Table 2) but the

Table 2
Odds ratios (95% confidence intervals) of poor health by socioeconomic factors and perceived control in the pooled data

	Adjusted for age and sex	Adjusted for age, sex, education, deprivation, inequality and control
Education		
Primary	1.0	1.0
Vocational	0.61 (0.47–0.79)	0.62 (0.47–0.82)
Secondary	0.50 (0.34–0.73)	0.53 (0.38–0.76)
University	0.36 (0.26–0.49)	0.46 (0.33–0.65)
Test for linear trend	*p < 0.001*	*p < 0.001*
Marital status		
Married	1.0	1.0
Unmarried	1.13 (0.93–1.38)	1.00 (0.86–1.17)
Material deprivation (per 1 SD increase)	1.51 (1.40–1.63)	1.32 (1.20–1.45)
Perceived control (per 1 SD increase)	0.58 (0.48–0.69)	0.62 (0.54–0.72)
Inequality index (ecological)[a]	1.49 (0.88–2.52)	0.75 (0.40–1.39)
Gini coefficient (ecological)[a]	1.41 (0.91–2.20)	0.71 (0.41–1.19)

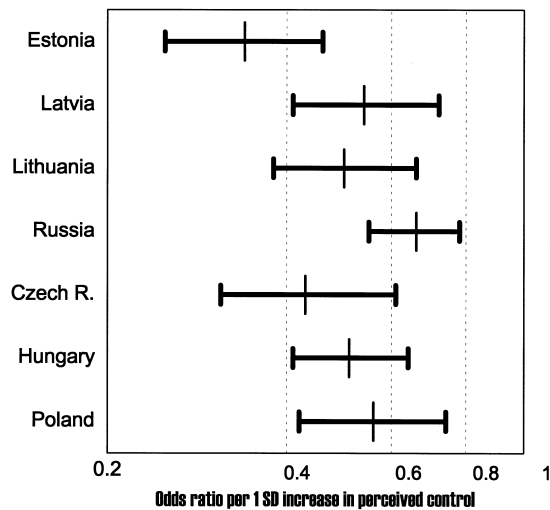[a] Equivalent to the difference between the most vs least unequal population.

Fig. 1. Age and sex adjusted odds ratios and 95% confidence intervals of poor health per 1 SD increase in perceived control in seven post-communist countries.

associations did not reach statistical significance (p values 0.13 and 0.14). With only seven populations, this is not surprising. In multivariate analyses with all individuals' characteristics included in the model, the associations were eliminated.

We have further explored the changes in odds ratios for material deprivation and inequality after including other variables in the model (Table 3). After adjustment for education and marital status, odds ratios for both inequality indicates increased and became statistically significant. Inclusion of deprivation removed the effects of both inequality indices, as did the adjustment for perceived control, which also reduced the odds ratio for material deprivation. The effects of perceived control remained virtually unchanged after controlling for deprivation and inequality (not shown).

Discussion

Our results reveal several important aspects of self-rated health in post-communist populations. First, consistently with mortality rates, the prevalence of poor self-rated health is high, particularly in the former Soviet Union and Hungary. Second, education and material deprivation are important predictors of self-rated health, and the socioeconomic gradients are large. Third, ecological measures of inequalities were not significantly related to self-rated health, and any potential effects were removed by controlling for individuals' material deprivation. Finally, perceived control was strongly associated with self-rated health, and appeared to mediate the effects of deprivation and inequality.

The main limitation of our data is their cross-sectional nature which could introduce two types of bias: selection and reporting bias. Health selection bias, when worse socioeconomic circumstances result from poor health, rather than cause it, may have occurred. Education and marital status are relatively stable indicators, but material deprivation may be sensitive to such bias. Although this bias cannot be excluded, previous research from elsewhere suggests that it is not a major component of social gradients in health (Davey Smith, Blane & Bartley, 1994). We are more concerned about reporting bias. Self-rated health is a subjective measure, perception of which can be influenced by other factors, including social circumstances. Similarly, the measures of perceived control may be influenced by perceived health status (reverse causation). This type of bias would overestimate the effects of deprivation and control, but could only be excluded in prospective data. However, excluding the three health questions from the perceived control score did not attenuate the association with poor health. The response rates were relatively low but similar in the seven countries. Response bias would occur if there were systematic differences in reasons for non-response between countries. We think that this is unlikely.

The high frequency of poor self-rated health in central and eastern Europe is unlikely to be an artifact. Low response rates would, if anything, underestimate the prevalence of poor health, as it is those with worse

Table 3
Odds ratios (95% confidence intervals) of poor health by material deprivation and inequality indices in different models

Model specification	Material deprivation[a]	Inequality index[b]	Gini coefficient[b]
(1) Adjusted for age, sex, education and marital status	1.50 (1.39–1.63)	1.81 (1.15–2.81)	1.69 (1.07–2.66)
(2) as (1) + deprivation/inequality	1.49 (1.36–1.63)	1.06 (0.81–1.38)	1.02 (0.62–1.72)
(3) as (1) + perceived control	1.28 (1.19–1.37)	1.01 (0.60–1.70)	0.91 (0.57–1.46)
(4) as (1) + deprivation/inequality + perceived control	1.32 (1.20–1.45)	0.75 (0.57–0.99)	0.71 (0.41–1.19)

[a] Equivalent to 1 SD increase.
[b] Equivalent to most vs least unequal population.

health status who are less likely to participate in population studies. Our estimates are consistent with international data on self-rated health in the World Value Survey (Carlson, 1998). Moreover, Carlson found a marked correlation between self-rated health and mortality when national mortality was regressed against prevalence of self-rated health (Carlson, 1998), and this was also apparent among our seven countries. This further supports the validity of self-rated health as a measure of health status found in individual based studies (Idler & Benyamini, 1997).

The strong social gradient in self-rated health by material deprivation was surprising. The communist regimes declared social equality as a priority, and available data show that officially reported income distribution in these societies was substantially more equal than in the West (United Nations Children's Fund, 1997; World Bank, 1996; Atkinson & Micklewright, 1992). In addition, in a command economy with bureaucratic and party power and personal connections influencing resource allocations, income was often less important in obtaining benefits than in western societies (Rose & McAllister, 1996). Social inequalities in mortality existed during the communist period, but they appeared on the educational axis (Sobotik & Rychtarikova, 1992; Brajczewski & Rogucka, 1993; Shkolnikov et al., 1998; Kunst, 1997). The pronounced effects of material conditions may be related to consequences of the economic reforms after the collapse of communism. In our data, almost one-third of Russians reported serious problems meeting these basic material needs. In such circumstances, material deprivation might have re-appeared as a powerful predictor of health status. At the same time, the effects of material deprivation found in our data may be overestimated for two reasons. First, this can be due to a reporting bias. Second, our measure of material deprivation, based on needs of clothing, food and heating, may, in part, and probably not in the former Soviet Union, indicate relative, rather than absolute, deprivation, and may reflect psychosocial mechanisms. This issue requires more research. The economic situation in the region will change with time, and inequalities in health as well as their components should be monitored. It has already been shown that social variations in mortality, pregnancy outcome and cardiovascular risk factors has increased in Russia and in the Czech Republic (Shkolnikov et al., 1998; Koupilova, Bobak, Holcik, Pikhart & Leon, 1998; Bobak, Skodova, Pisa, Poledne & Marmot, 1997).

Educational differences in self-rated health in our data are apparent, although they are smaller than in western countries where odds ratios (for the lowest vs the highest category) are typically larger than 4 (Kunst, Geurts & van den Berg, 1995). Another social dimension which has previously been shown to predict mortality in central and eastern European populations is marital status (Watson, 1995; Hajdu, McKee & Bojan, 1995). We did not find higher levels of poor health in unmarried subjects, or an interaction with sex, but this can be due to the difference in health outcomes between studies.

Perceived control was strongly related to self-rated health in our data. This is consistent with international and US data. Carlson (1998) found that control was related to self-rated health within each of 23 populations, and it explained a substantial part of the east-west health divide. Lachman and Weaver (1998), using indicators of sense of control similar to ours, found a strong associations of perceived control to self-rated health, depressive symptoms and life satisfaction in three US population samples; their data also suggested that sense of control mediated or buffered the effects of low social class.

This may also be the case in post-communist countries. Material deprivation, related to the broader socioeconomic environment, may lead to direct physical risks such as malnutrition or hypothermia. Above a threshold of absolute poverty, however, deprivation (and other aspects of the social environment) may affect health more subtly, either directly through neuroendocrine pathways (Steptoe, 1997; Brunner, 1997) or by dictating the choice of health behaviours, such as alcohol, smoking or violence (Cockerham, 1997). The data are compatible with our working hypothesis that control may mediate the effects of other socioeconomic factors. Control was inversely related to deprivation, and reduced the association between deprivation and health in multivariate analyses. More objective outcomes or prospective studies will be needed to address the question of a possible reporting bias. It would also be interesting to assess whether perceived control influences the choice of health behaviours.

In addition to material deprivation, we examined the role of two ecological measures of inequality. Ecological indices were used because the concept of income inequality is inherently ecological; inequality is a characteristic of a population, rather than of an individual (Kawachi & Kennedy, 1997a). Recent ecological studies has provided extensive evidence that income distribution is strongly associated with mortality (Wilkinson, 1992, 1997; McIsaac & Wilkinson, 1997; Kennedy, Kawachi & Prothrow-Stith, 1996; Kawachi et al., 1997; Kawachi & Kennedy, 1997b) but there is a debate whether this association is independent from economic circumstances of individuals. The two multilevel studies of inequalities and health published so far, both from the US, reported conflicting results. Fiscella and Franks (1997) found that the association between community income inequality and mortality was explained by individual household income. Kennedy et al. (1998) found that individuals living in states with

the greatest income inequalities were more likely to report fair of poor self-rated health, and this association could not be explained by controlling for personal characteristics and household income.

The small number of countries in our dataset limits the statistical power to study the effects of income inequalities. It is assuring that the inequality index derived from the data agreed well with the nationally measured Gini coefficient. Although the inequality effects were highly significant in ordinary logistic regression without the correction for clustering, the more appropriate robust logistic regression resulted in virtually identical odds ratios but wider confidence intervals and thus statistically non-significant relationship between the inequality measures and self-rated health. Important is, however, the reduction in odds ratios of both inequality measures after controlling for individuals' deprivation; this does not support an existence of strong effects of inequalities that is independent from individuals' characteristics.

The data do not contradict the hypothesis that perceived control could mediate the effects of inequalities. The mean control scores were substantially lower in the more unequal countries, and the odds ratios for inequality were reduced by controlling for control. It is tempting to speculate about a hierarchy of factors influencing health: the broader social environment (e.g. income inequalities) → the intermediate social circumstances (e.g. deprivation) → psychosocial factors (e.g. control) → behaviours? → health (e.g. self-rated health). A similar model was proposed by Dahlegren and Whitehead (1991). Unfortunately, the data do not allow more detailed analyses to test such model.

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