International comparators and poverty and health in Europe

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Social inequalities in health continue to be a major problem in Britain, as in other countries. Much of the focus has been on health differences among social groups within countries,[1] and rightly so, as the research evidence suggests that governments can do much to reduce these inequalities.[2] Another sort of health inequality, however, also demands attention: inequalities among countries. Concern is expressed, appropriately, about inequalities in health between rich developed countries and poor developing countries. Less attention has been focused on the gap in life expectancy between the countries of eastern and western Europe; by eastern Europe, we mean the former communist countries of central and eastern Europe, including the countries of the former Soviet Union.

We are conducting a programme of research that addresses two types of question: the reasons for health inequalities between the countries of eastern and western Europe and the reasons for inequalities between social groups within these countries.[3] Our starting assumption is that the causes of these two types of inequality may be similar. We contend that expanding research on the social determinants of health beyond one social context helps to understand causal relations. Eastern Europe has experienced much greater social change than western Europe. Such change was occurring in the two decades before the political, economic, and social changes that happened after 1989. Studying the health of societies in transition is a fruitful way to observe how changes in society translate into changes in health and provides an opportunity for understanding. Observing inequalities in health in countries with different forms of social organisation presents the opportunity to understand better why health follows a social gradient. This paper explores both these issues.

Summary points

- In 1970 male life expectancy at age 15 was 56 in countries that now form the European Union; 55 in the communist countries of central and eastern Europe (excluding the Soviet Union); and 52 in the Soviet Union
- In 1997 male life expectancy was 60 in the countries that now form the European Union; 54 in the former communist countries of central and eastern Europe (excluding the former Soviet Union); and 48 in Russia
- The relative disadvantage for women was similar, but the absolute differences were smaller
- Mortality changes after 1989 in eastern Europe were correlated with changes in gross domestic product and changes in income inequalities
- In the 1980s there were inequalities in health within individual countries in eastern Europe; these were wider after 1989
- Inequalities in health within individual countries in eastern Europe were more strongly related to education than to measures of economic wellbeing

A widening gap in life expectancy

Figure 1 shows life expectancy at age 15 for men and women in Europe (infant and childhood mortality does not of course affect life expectancy at age 15).[4] In the mid-1990s there was a life expectancy gap of six years between eastern and western Europe. Of these six years, 0.9 years were due to differences in infant mortality. The biggest contribution to the gap was in middle age. Cardiovascular disease accounted for more than half of the six year gap, and external causes of death accounted for another fifth. It is, therefore, appropriate to focus on mortality differences after childhood.

Figure 1 shows that in 1970 life expectancy was similar in those countries that now form the European Union and in eastern Europe excluding the Soviet Union—a difference of less than 1.5 years. From 1970, life expectancy at age 15 improved continuously in the EU countries but not in eastern Europe. By 1990 there was a four year gap which, by 1997, in men, had widened to six years; moreover, life expectancy at age 15 in men declined between the mid-1970s and the mid-1990s.

The changes in the former Soviet Union countries were more dramatic. In 1970 life expectancy was already four years lower for men and one year lower for women compared with the rest of eastern Europe. In 1997 the gap was more than 10 years for men and more than six years for women. If the reported figures

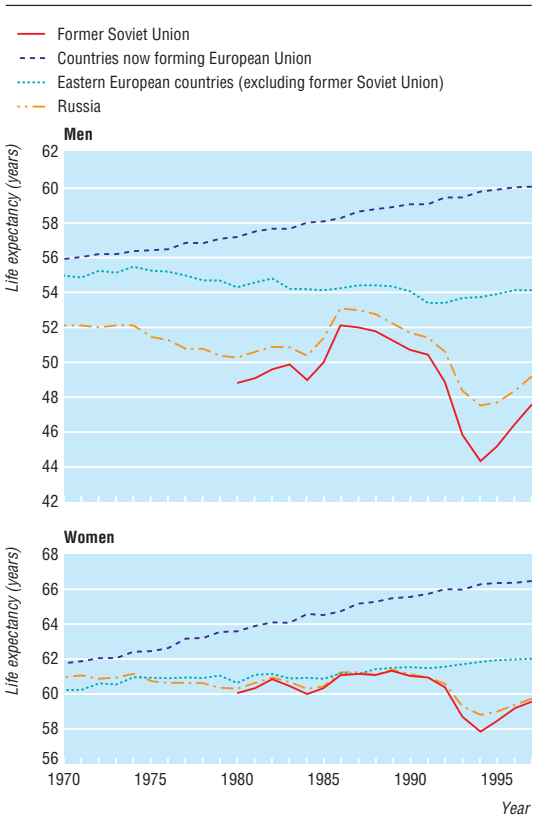

Fig 1 Life expectancy at age 15 years 1970-97. Adapted from *Health for All*[4]

are correct, life expectancy in the former Soviet Union declined by about five years over an eight year period from 1989.

Missing men

Although men and women in eastern Europe showed a similar relative disadvantage compared with western Europe, the absolute disadvantage for men was greater: in eastern Europe (excluding the former Soviet Union) men had six years' shorter life expectancy and women had four; in the former Soviet Union men had 10 years' shorter life expectancy and women had six (1997 figures). The extraordinary nature of the mortality changes in the former Soviet Union raised doubts about the validity of mortality statistics. Careful mortality analyses provide support for the reported data.[5]

Another way of checking the validity is to use census data to count the men and women in the population. The population figures for 1995 for selected countries are shown in figure 2 as the ratio of men to women in the age group 45-64. There is a striking difference between eastern and western Europe. In the United Kingdom, for example, there are 98 men for every 100 women in this age group; in Russia there are 84 men for every 100 women. Among the whole range of European countries there was little overlap between east and west. These data provide indirect support for the validity of high mortality in the former Soviet Union, although factors other than "current" mortality in middle aged people will affect the sex ratio.

The ratio of men to women is correlated with gross national product per head of population ($r=0.72$), although among eastern European countries there is considerable spread around the regression line.

Amartya Sen, in describing the high mortality among women in certain countries, used this simple population technique to describe the phenomenon of missing women.[6] What we have in eastern Europe is missing men—missing because of the high toll of premature mortality from cardiovascular disease and external causes of death.

Homogeneity before 1989; heterogeneity after

Figure 1 shows that the Soviet Union had a worse life expectancy record than the rest of eastern Europe. Not shown is the remarkable consistency among eastern European countries in trends in mortality. Between 1970 and 1989, Czechoslovakia, Poland, Hungary, East Germany, Romania, and Bulgaria all showed a widening gap from western Europe. After 1989 there was more divergence in the mortality record of these countries.

This divergence of mortality and consequently of life expectancy may be related to economic fortunes. These economic changes have been substantial and varied. The gross domestic product increased by 5% in Poland and decreased in all other eastern European countries. The decrease ranged from 3% in the Czech Republic, 13% in Hungary, 42% in Lithuania and Russia, and 60% in Ukraine. Changes in mortality of middle aged men after 1989 correlate with changes in gross domestic product.[7]

Income inequalities also increased as measured by the Gini coefficient. Figure 3 shows that changes in distribution of income—increases in the Gini coefficient—are correlated with changes in life expectancy ($r=-0.63$). This fits with Wilkinson's analyses.[8] In poor countries income and mortality are clearly associated.[9] In richer countries this relation weakens and mortality is more strongly associated with income inequality. Eastern Europe, after 1989, has most likely been witness to both an increase in poverty and an increase in inequality. Both may contribute to changing health patterns.

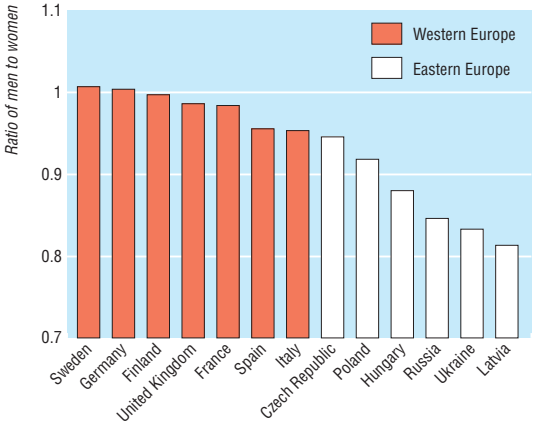

Fig 2 Ratio of men to women in 45-64 year age group from selected eastern and western European countries, 1995

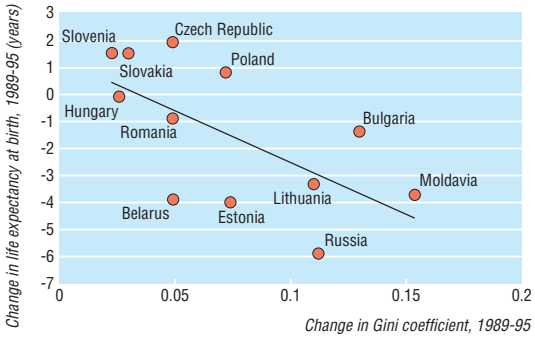

Fig 3 Change in life expectancy in countries of central and eastern Europe by change in Gini coefficient, 1989-95

Increase in inequalities in health in eastern Europe

Figure 4 shows age standardised death rates in the Czech Republic according to the number of years of education.[10] Three points are worth emphasising. Firstly, in 1980-1, under communist rule, there were differences in mortality according to social position (measured here by education). Secondly, these differences follow a social gradient (the higher the place in the social hierarchy, the lower the mortality). This is similar to the gradients that we have been investigating in the Whitehall studies.[11–14] Thirdly, the magnitude of health inequalities expressed as the slope of the gradient has been increasing, as has the absolute gap in mortality between the top and bottom educational groups. Similar findings of an increase in the social gradient in mortality have emerged for the former Soviet Union countries and Hungary.[15 16]

Material and psychosocial explanations of inequalities in health in eastern Europe

Measuring socioeconomic differences

An important issue in research on inequalities in health is the choice of measurement of social position. Given that the usual measures—education, income, and occupation based measure of social class—are all correlated, one approach has been to treat these as interchangeable. Bartley and colleagues have argued that not only is this approach not justified on theoretical grounds, but the different measures may convey different "meaning."[17] Analysis of the relation of different measures to health outcomes may therefore help to explain how social position affects health.

One problem with distinguishing among measures of social position is precisely that they are correlated. Multivariate analysis can be used to try to disaggregate their effects.[17] Alternatively, separate effects can be distinguished by finding situations where the correlation between different socioeconomic measures differs from that seen in western Europe. In the 1980s in Czechoslovakia income inequalities were low.[18] The finding of a social gradient in mortality at a time of narrow income inequalities raises the question of whether factors other than income (and what an income could purchase) were more important in generating inequalities in health.

We conducted a case-control study of acute myocardial infarction in what is now the Czech Republic in the early 1990s, when social and economic conditions still resembled those prevailing up to 1989.[19] We found a clear inverse association between education and risk of myocardial infarction: the higher the education, the lower the risk. An index of material well-being (based on ownership of a summer home and a car), however, was unrelated to risk of myocardial infarction. The strong relation of education to risk may be interpreted as an effect of early childhood,[20] but in the Czech case-control study the risk of infarction was not related to parental social characteristics. Education may therefore be important not because it conveys information about early life but because it is a guide to position in society in adult life which, in turn, is related to the determinants of differentials in health.

A further illustration that education is a more important predictor of health than other socioeconomic measures in the Czech Republic is its relation both to infant mortality[21] and to height of children.[22] The relation of maternal education to height of 5 year old Czech children was stronger than that of any other socioeconomic characteristic.

It could be argued that measures of material circumstances fail to predict ill health because they are poor measures. It would then be argued that education

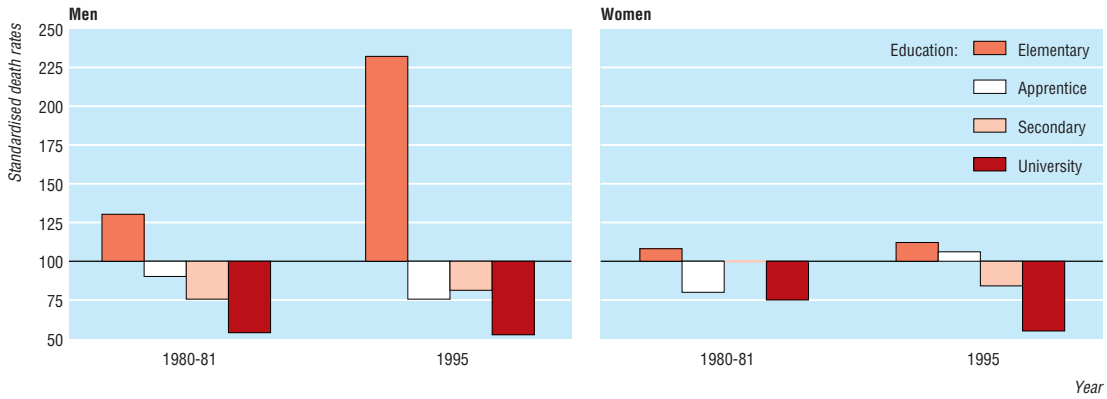

Fig 4 Death rates by type of education in Czechoslovakia (1980-1) and Czech Republic (1995). Elementary education is the shortest, university the longest. Adapted from Blazek et al[10]

is predictive not because it is correlated with psychosocial factors but because it is an indicator of material circumstances. We have direct evidence for the role of psychosocial factors.

Psychosocial factors and other causes of inequalities in health in eastern Europe

Several hypotheses have been proposed to explain the inequalities in health between eastern and western European countries: differences in medical care, differences in smoking and diet, and binge drinking in the former Soviet Union. We are at the early stages of a programme of research that attempts to quantify the role of these factors and do not offer here a judgment on the role that each might have.

We hypothesised that psychosocial factors may have an important role.[3] As stated above, our starting assumption is that they may be important in determining both the differences in health among countries and the social gradient in health seen within countries. The starting point for this hypothesis is twofold. Firstly, research from western countries shows the importance of psychosocial factors—for example, in relation to cardiovascular disease.[23] Secondly, the profound economic, political, and social changes that have affected eastern Europe have very likely greatly affected people's lives. The increase in income inequalities suggests that the effect is different for different groups of people.

On the basis of the gradient in mortality and morbidity observed in the Whitehall studies, we have argued that it is important to distinguish between poverty and inequality as causes of ill health.[24] A gradient in mortality among civil servants who are not poor argues for the importance of psychosocial factors linked to position in the hierarchy. A similar argument may apply to the gradient in morbidity and mortality observed in eastern Europe.

We have data that potentially take the argument beyond a theoretical position to the point of empirical test. One important clue to the importance of psychosocial factors is the difference in mortality between married and unmarried people. Numerous studies have shown that married men have lower mortality than single, widowed, or divorced men. The data are less consistent for women—although generally married women are favoured.[25] In several eastern European countries the mortality disadvantage of unmarried men increased.[26] In analyses of this type, one must always consider the possibility that unhealthy people were less likely to be married. It is not clear why such "selection" should have increased. More plausibly, this is a psychosocial effect acting either through unhealthy behaviours among unmarried men or through direct psychosocial pathways affecting, for example, the neuroendocrine system.

In trying to distinguish between the effects of material and psychosocial factors, it is worth making a distinction between material factors that affect health directly—such as infections, malnutrition, inadequate heating, clothing, or shelter, and pollution—and those that affect health through reducing participation in society. In a study by Pikhart in Hungary of the factors responsible for high levels of self reported poor health, we asked people to report on household items that they possessed.[27] The relation of household items to poor health is shown in the table. We categorised these items as basic, socially oriented, and luxury. All three groups are related to self reported poor health: the more items owned, the better the respondents' health. When adjustment is made for a measure of economic hardship, the relation of basic needs to poor health is no longer in evidence, suggesting that this was indeed a measure of material necessity. Socially oriented items and luxury items were both related to health, independent of the measure of economic hardship. This is consistent with the hypothesis that psychosocial pathways are important.

We are especially interested in one particular psychosocial factor—autonomy (the degree of control people have over their lives)—and its relation to health. In the Whitehall II study, for example, we showed that low control in the workplace was related to increased risk of cardiovascular disease[28] and had a role in mediating the social gradient in coronary heart disease.[29] We replicated this finding in the Czech Republic.[30] In a series of cross sectional studies in eastern Europe we showed that a measure of control over life (including but not confined to the workplace) was related to self reported poor health.[31] Such results must be treated with caution because both control and health are self report measures, so reporting bias is possible. Against this, numerous studies show that individuals who

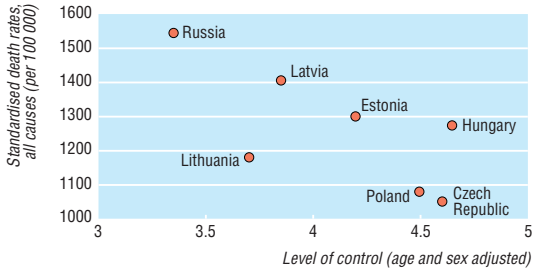

Fig 5 Perceived level of control (the higher the number, the greater the control) and all cause mortality in central and eastern European countries. Adapted from Pikhart[27]

Odds ratios (95% confidence interval) of poor self rated health by three different categories of household items in community survey in Kalocsa, Hungary[26]

Items	Age and sex adjusted odds ratio	Multivariate odds ratio*
Basic†:		
0-3	1	1
4-5	0.63 (0.45 to 0.87)	0.99 (0.69 to 1.42)
Socially oriented‡:		
0-2	1	1
3-5	0.41 (0.29 to 0.57)	0.56 (0.39 to 0.81)
6-7	0.33 (0.17 to 0.62)	0.55 (0.28 to 1.10)
P for linear trend	<0.001	0.005
Luxury§:		
0-1	1	1
2-4	0.51 (0.37 to 0.71)	0.67 (0.47 to 0.96)
5-9	0.17 (0.05 to 0.56)	0.30 (0.09 to 1.04)
P for linear trend	<0.001	0.007

*Adjusted for age, sex, education, marital status, and material deprivation.
†Washing machine, refrigerator, freezer, microwave, telephone.
‡Colour television, radio cassette recorder, stereo system, motorcycle, car, car radio.
§Cable television, satellite, video recorder, video camera, CD player, personal computer, dishwasher, dacha (summer house), garden.

report poor health have a higher risk of subsequent mortality.[32] We have now shown that this relation holds at the population level. Figure 5 shows mean levels of control for seven population samples plotted against all cause mortality for the countries from which these population samples were drawn. These are "ecological" group levels of control predicting population rates of disease.[27] Carlson obtained similar results for a larger number of countries.[33]

Conclusion

Degree of autonomy may be an important factor related to inequalities in health among and within countries. Research from societies in transition may indeed help in understanding how societal factors cause inequalities in health. The massive health changes in eastern Europe also remind us, amid the excitement that surrounds the new research on the genetic basis for disease, that disease rates are powerfully affected by the social environment.

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