The formation of mortality inequalities by education between 1986 and 2005
The Hungarian case

Aims

The aim of the study is to investigate mortality inequalities by education in the period between 1986 and 2005 in Hungary. The paper focuses on differences in speed of growth of inequalities between two periods: till 1992-95 and afterwards. The first period between 1986 and the mid-nineties is the time of economic depression in Hungary which was parallel of growth of overall mortality. From the mid-nineties economy stated to recover and mortality has fallen. It is known from other studies that inequalities in mortality in Hungary, just as like in other new market economies, have grown since 1989. The specific question of the study if large inequalities are the products of the period of economic crises or, in the contrary, they have born during economic growth.

Methods

The study had a cross-sectional design. Annual overall and cause specific mortality figures were taken from the register of the Hungarian Statistical Office. Annual population figures were obtained by estimation between the causes 1980, 1990 and 2001 and by forecasting for the subsequent years. Standardized mortality rates (overall and cause-specific ones for the middle aged population) and life expectancy has been calculated for the different educational groups. Five year-moving averages of life expectancies were used. For the age groups 30-64 cause-specific rates were calculated for the largest groups of causes of death (cardiovascular diseases, cancers, external causes, avoidable causes) and for same groups of causes which are especially important in case of middle aged men or women (ischaemic heart diseases, breast cancers). In order to take into account the changes educational structure by education, decomposition was applied and a large number of inequality indicators have been calculated.

Results

Life expectancy at age 30 was 44 years in 1986-90 for males with tertiary education. By 2000-04 it has grown to 48 years, and the improvement was continuous. The same figures for males with elementary or less education was 36,5 in 1986-1990 and 37 years in 2000-2004, and the improvement started only from the middle of the 1990s after life expectancy suffered form a serious, 1 year loss in the period between 1986 and 1996.

For females, life expectancy at age 30 was 46.5 years (1986-90) and 51.5 years (2000-2004) for those with tertiary education, and 45 years and 46 years correspondingly for those with no more than elementary level of education. There was no decrease but stagnation in life expectancy of poorly educated women in the first part of the period, and a very slow increase in the second part of it. Highly educated women experienced slow improvement of life expectancy in the first part of the period and a much faster improvement in the period between 1992-96 and 2000-05.

Total differences in life expectancy defined as weighted averages of deviance from central life expectancies of the different educational groups have slightly decreased for

the older populations and for middle aged women and remained the same for middle aged men compared 1986-90 and 2000-2004.

For the most vulnerable middle aged population, standardized overall and cause-specific mortality rates have been calculated. For cause-specific analysis only some broad causes of death were selected (cardiovascular and external mortality, cancers) and some smaller groups of diseases known to be leading causes of death among men (ischaemic heart disease) or among women (breast cancer). To evaluate the role of health care in the widening of inequalities, the group of "treatable" diseases were also selected.
For cause-specific analysis of mortality conditions of the middle aged, four-year moving averages were used.

Overall mortality of the middle-aged men has worsened between 1986-89 and 1992-95 and slowly improved after. This is also hold for those men who have maximum elementary level of education, but not for those who have secondary level education (their mortality was unchanged between 1986-89 and 1992-95) and for those who have tertiary level of education (their mortality has been falling already during the period between 1986-89 and 1992-95).

The pattern is the same for cardiovascular diseases, ischaemic heart diseases, "treatable" diseases" and external causes. Cancers show a different pattern: rates of the least educated had been in increase till 2000 and they did not show any signs of decrease later. Men with secondary and tertiary education had a stagnation period in their cancer mortality rate till 1990-93, then their rates started to decline.

In the case of middle aged women a clear gradient in mortality by education was not always possible to establish. From 1990-93, however, overall mortality of women shows a clear gradient. The overall picture is similar of that of men, but the mortality decline among the better-educated women was more pronounced. Mortality due to external causes was in fall during the whole period. In the beginning of the period better-educated women had a higher rate of mortality from cancer than their less educated counterparts, but by 1992-95 the "usual" gradient had emerged. The overall trend of mortality, nevertheless, is stagnation for women during the whole period. Breast cancer still shows a negative gradient, but the disadvantage of the better-educated is in decrease. Breast cancer mortality together, after a long stagnation period, started to decline around 2000. Cardiovascular mortality and mortality from ischaemic heart disease, although are lower among women, but in term of trends and development of inequalities are very similar to those among men.

Considering overall mortality of the middle aged, rate ratios were growing at the same speed during the two distinguished periods for men. For women rate ratios grew slowly during the first, and quickly during the second period. Rate differences were growing dynamically for men in the first and stabilised in the second period. Rate differences grew at the same speed among women during the two periods. Index of dissimilarity showed sharp rise of inequalities among men in both periods, a slow increase during the

first, and a quick one during the second among women. Relative index of inequality provided the same picture.

Development of inequalities among the middle aged by most of the indexes was similar for the examined groups of causes of death: slow increase in the period between 1986-89 and 1992-95 and a dynamic increase between 1992-95 and 2002-05, expect that there was no increase at all during the first part of the period in inequalities in external causes among men and in ischaemic heart disease among women. Despite the similarities in the time trends, the magnitude of inequalities is rather different by causes of death. For middle-aged Hungarian men inequalities are of the same size for cardiovascular diseases and external causes and much smaller for cancers. For women, inequalities in cardiovascular diseases (and in ichaemic heart diseases) are outstandingly large, and modest for cancers and for external causes. Breast cancer in 2002-05 still show a negative gradient, so that it has a modifying effect on inequalities in all causes.