

Influence of changing population composition on mortality dynamics in Central and Eastern Europe

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Introduction

The last century brought the major shifts in population composition by socio-demographic group in all developed countries. Improvements in education, decreasing share of married people, rapid urbanization have influenced mortality dynamics of entire populations.

The vast majority of the studies repeatedly confirm the lower mortality in the married group and increasingly important health disadvantages in the never married, divorced, and widowed groups. International studies point to a notable variation in the trends in mortality inequalities by marital status in different countries. In particular, enormous excess premature mortality in non-married males has been seen as an important factor explaining unfavourable mortality situation in the post-communist countries of Eastern and Central Europe. Despite substantial transformations in the population structure by marital status in these countries, the consequences of such changes on mortality trends in entire populations remains largely unexplored. At the same time, prior findings suggest that transformations in population composition may play an important role. For example, Shkolnikov et al. (2006) show that improvements in population education in Russia and Estonia substantially counterbalanced the overall mortality increases in the 1990s.

The main aim of this paper is to estimate contributions of the changes in population distribution by marital status to the overall changes in standardized death rates of adult populations of Estonia, Lithuania, Russia,

Hungary, and Finland (taken as example of low and decreasing mortality country) between the end of the 1970s and end of the 1990s. The results presented in this paper will supplement earlier findings on effects of improvements in education in Eastern and Central European countries and will shed more light on the role of changing population composition on mortality trends in the region.

Data and method

The study focuses on four countries of Eastern and Central Europe showing some similarities and differences in mortality levels, trends, and patterns. First, Russia shows the highest mortality and worsening trends (with exception of the mid-1980s and 1995-1997). Estonia and Lithuania can also be considered high mortality countries with similar mortality trends as in Russia. However, these two countries show considerable recovery in health situation since the mid-1990s. Finally, Hungary stands for Central European countries with less unfavorable mortality dynamics in the past and significant improvements throughout the 1990s. In addition, Finland is taken as an example of low and decreasing mortality Western countries.

As for the four post-communist countries, census-linked mortality estimates are available for Lithuania, but these data cover only the most recent period (2001-2004). Unlinked estimates of mortality by marital status for Estonia, Lithuania, and Russia for the years around 1979 were calculated using unpublished aggregated tables on age-specific deaths and population census counts (produced by the former Goskomstat of the USSR). Similar tables for 2000 for Estonia were obtained via the online database of the Statistics Estonia. The most recent data for Russia is problematic. From 1999 onwards, the Russian death certificate does not include information on marital status of a deceased. Therefore, this study uses tabulated deaths for 1998 and estimated population structure by marital status for the middle of the same year. The population composition was calculated using interpolation between the micro-census of 1994 and the census of 2002. Aggregated data on deaths and population census for Hungary (1980 and 2001) were obtained from publications and online database of the Central Statistical Office. In Finland, mortality by marital status in 1978-1979 and 1998-2000 was estimated using census-linked data provided by Statistics Finland. In the subsequent analyses the first time point is denote as "1979", whereas "2000" stands for the second period.

Standardized death rates were calculated in four categories: married, never married, divorced, and widowed. Due to data quality problems at older ages, we limited our analyses to the ages 30-69. Changes in the standardized death rates for entire populations were decomposed into contributions of changes in within-category mortality (M effects) and changes in population composition (P effects) using algorithm based on step-wise replacement (for more details see: Andreev, Shkolnikov, Begun, 2002).

Results

Between 1979 and 2000, substantial changes in population composition by marital status took place in all five countries under study: the proportions of married people decreased, whereas the shares of never married, divorced, and widowed increased. Between 1979 and 2000, very significant declines in the percentage of married males were observed in Finland and Estonia (from 78% to 61% and from 83% to 67% respectively). Such decreases were less important in Russia (from 90% to 82%), Hungary (from 86% to 80%), and Lithuania (from 88% to 76%). During the same period, the proportions of never married and divorced males doubled in Estonia, Lithuania, Russia, and Finland. Changes in female composition by marital status were similar but less dramatic.

How these changes in marital status structures of populations influence overall mortality trends?

Table 1 shows that male standardized death rates in Russia, Estonia, and Lithuania increased throughout the period. On the contrary, Finland shows considerable improvements in mortality, whereas only small mortality improvements took place in Hungary. With exception of Russia, female standardized death rates decreased in all countries. The most significant improvement in overall mortality was observed among Hungarian females showing the highest mortality at the beginning of the period.

Outcomes of decomposition analyses show that changing population composition by marital status (P effects) is the key factor explaining worsening mortality trend in entire male populations in Estonia, Lithuania, and Russia. These results support the idea that male mortality would not have been increased if population composition remained unchanged throughout the period. Mortality improvements within marital status groups (M effects) were too small to compensate adverse impacts of the compositional shifts in these countries. Interestingly, the biggest M effects among Russian and Estonian males are attributable to mortality improvements in never married group. Possibly, this is related to the substantial changes in the composition of this group (from very small and highly selective group to more common and diverse group in the 1990s).

In the case of females, contributions of changes in population composition to overall changes in standardized death rates were negligible (Table 1). Mortality decreases in the married and never married groups (M effects) were decisive factors for overall mortality improvements among females in Lithuania and Estonia. In Russia, these effects were outweighed by increasing mortality in divorced and widowed groups (Table 1).

The biggest contributors to the change in overall male and female standardized death rates in Hungary and Finland were mortality improvements in the married and to less extent other marital status groups (M effects).

Conclusions

The study results show that changing distribution of population by marital status contributed negatively to overall mortality changes in all countries. This effect is particularly important for males, whereas such

transformations had negligible impact for female mortality. Decreases in proportion of married males and increases in proportions of never married, divorced, and widowed males were the main contributors to the worsening mortality trends in Russia, Lithuania, and Estonia throughout the eighties and nineties. It seems that such changes in population composition counterbalanced positive impacts of improvements in education in these countries.

References

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Table 1. Contributions of the changes in mortality in four marital status groups (M effects) and of changes in the population structure by marital status (P effects) to the change in total standardized death rates for ages 30-69.

	Standardized death rates (per 1000)			Decomposition of overall changes of SDR				
	about 1979	about 2000	Overall change	Effects of changes in mortality within respective marital status groups				Effects of changes in marital structure of populations
				Married	Never married	Widowed	Divorced	
Males								
Estonia	15.46	16.59	1.13	-0.179	-1.000	0.062	0.512	1.735
Lithuania	13.60	14.92	1.32	-0.403	0.208	-0.185	0.213	1.485
Russia	18.08	19.63	1.55	0.193	-1.333	0.127	0.394	2.169
Hungary	14.14	13.73	-0.40	-1.662	-0.073	0.108	-0.212	1.437
Finland	11.86	7.36	-4.51	-4.116	-0.679	-0.157	-0.576	1.022
Females								
Estonia	5.90	5.73	-0.17	-0.093	-0.328	0.085	0.086	0.074
Lithuania	5.46	4.93	-0.53	-0.513	-0.148	0.113	0.064	-0.049
Russia	6.70	6.94	0.24	-0.326	-0.210	0.562	0.231	-0.013
Hungary	7.00	5.64	-1.36	-1.078	-0.069	-0.226	-0.165	0.174
Finland	4.34	3.01	-1.33	-0.980	-0.112	-0.169	-0.145	0.077