Spatial Variation and Determinants of Alcohol-related Mortality in Belarus and Lithuania: an Ecological Study

Extended Abstract

Pavel Grigoriev¹, Domantas Jasilionis¹, Vladimir M. Shkolnikov¹,², Jacques Vallin³

¹ Max Planck Institute for Demographic Research (MPIDR)
² New Economic School (Russia)
³ Institut National d'Études Démographiques (INED)

SUMMARY

Numerous population- and individual-level studies confirm a strong relationship between excessive alcohol consumption and striking excess male mortality in the countries of the former USSR. Yet the complex interplay between macro- and micro-level factors underlying this relationship has remained underexplored. Our analysis refers to the most recent period, and focuses on the male population aged 20-64. Using the detailed cause-specific mortality at the district level we first explore a spatial distribution of alcohol-related mortality in the two neighboring countries, Belarus and Lithuania. Then, using the simultaneous autoregressive models we assess the strength of association between mortality and its potential determinants. As independent explanatory macro-level variables we consider a set of indicators available from the adjacent population censuses such as unemployment, education, marital status, and ethnicity. The preliminary results show that the districts located at the Belarus-Lithuania border show similar patterns and form large cross-border areas with elevated alcohol-related mortality. Although mortality variation is likely to be largely explained by differences in the contemporary socioeconomic conditions, the observed spatial patterns suggest the relevance of the common socio-cultural context.

DATA AND METHODS

In our analysis we rely on the original data obtained directly from the National Committee of Statistics of Belarus and the Statistics Lithuania. They include the data on causes of death and mid-year population by sex and 5-year age at the district level. In addition to that we use the published data on
socioeconomic indicators as well as the data obtained from the last population censuses conducted in Belarus and Lithuania. The analysis refers to the period 2003-2007 and focuses on male population aged 20-64.

We first had to identify the causes of death attributable to hazardous alcohol consumption. To avoid misinterpretation we selected only those conditions which are unquestionably linked to alcohol. Among them is accidental poisoning by alcohol, cirrhosis of liver, chronic alcoholism, alcoholic cardiomyopathy, and other ‘direct’ conditions.

The availability of detailed data on the number of deaths and population exposure allowed us to compute mortality rates by each attribute. To increase the stability of mortality rates we calculated them for the 5-year period (death counts and exposures for years 2003-2007 were summed up and then divided one on the other). The obtained rates were then standardized using the European population standard.

To produce mortality maps we used shape files for Belarus and Lithuania downloadable for free from the DIVA-GIS website (www.diva-gis.org). These shapes were modified in accordance to the contemporary administrative division, and then re-projected using ArcGIS 9.3 (World Miller Cylindrical projection).

It is known that ignoring spatial effects in modeling of demographic processes might result in biased and inefficient estimates, and as a result, in unreliability of statistical inference. Therefore, in order to reveal factors associated with alcohol-related mortality at the district level we will employ simultaneous autoregressive models (the spatial lag and spatial error models). As dependant variable we will use the standardized mortality rate (from all alcohol-related causes combined and also individual causes of death), and as the independent variable we will consider the set of indicators available from the adjacent population censuses such as unemployment, education, marital status, and ethnicity.
SOME PRELIMINARY RESULTS

The figure below depicts the spatial distribution of male mortality from alcoholic liver cirrhosis. It can be seen that districts located at the Belarus-Lithuania border exhibit similar patterns and form a large cluster of elevated mortality.

Standardized death rate from alcoholic liver cirrhosis; Belarus and Lithuania; males (20-64)
(per 100 000 population)

Source: National Statistical Committee of Belarus and Statistics Lithuania

As the development of liver cirrhosis depends on the type of alcohol consumed, it might occur that the Belarusian and Lithuanian districts neighboring the border share common drinking pattern. If it is the case, then this similarity might originate in the past and can be related to the common socio-cultural and historical context.