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Short Commentary Open Access

Population Drinking and Cardiovascular Mortality in Russia

Razvodovsky YE*

Grodno State Medical University, Belarus, Russia

Corresponding author: Dr. Razvodovsky YE, Grodno State Medical University, 80 Gorky Street, Grodno 230009, Belarus, Russia, Tel: +37501527018 84; E-mail: razvodovsky@tut.by

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Short Commentary

Cardiovascular disease (CVD) is a major public health problem and the leading cause of death in Europe [1]. The burden of CVD mortality in Europe continues to demonstrate large spatial variations [2]. The highest rate of CVD mortality was registered in the Russian Federation, especially in the working age male population [3]. The reasons for this phenomenon are not fully understood, but most probably the driving force is a hazardous drinking pattern [4]. It is well-documented that consumption of large amount of vodka (spirits) in a single drinking occasion (binge drinking) is the predominant drinking pattern among middle-aged men in Russia [5,6]. The most persuative evidence for the association between high CVD mortality in Russia and hazardous drinking comes from population-level data. This paper will summarize the aggregate-level evidence suggesting that unfavorable mixture of higher overall level of alcohol consumption and binge drinking pattern is a major risk factor for cardiovascular mortality in Russia.

Empirical evidence suggests that, in Russia, changes in population drinking were mirrored by the CVD mortality trends. In particular, the substantial reduction in the CVD deaths in the 1980s was mainly attributed to Gorbachev's anti-alcohol campaign, which reduced the availability of alcohol [7,8]. Similarly, Russia has experienced steep decline in CVD mortality rate and a parallel downward trend in the population drinking during the recent decade, driven mainly by a decrease in vodka consumption [9]. There is suggestive evidence that the shift in the structure of consumption from vodka towards beer as a result of alcohol control measures has had a positive impact on bringing down the CVD mortality rate in Russia.

Recent studies addressing the alcohol-CVD mortality relationship at the aggregate level in Russia applied sophisticated statistical modeling technique developed by Box and Jenkins [10] often referred to as ARIMA (autoregressive integrated moving average) time-series analysis. This technique allows to minimize the risk of spurious correlation. In his time series analysis Nemtsov and Razvodovsky found a positive association between alcohol consumption per capita and CVD mortality rates in Russia from 1980-2005 [11]. It was estimated that 21.4% of all CVD deaths in Russia could be attributed to alcohol. In a more recent time-series analysis based on Russian data from 1959-1998 Ramstedt highlights that alcohol consumption has a positive and statistically significant association with both overall and premature male CHD mortality: a 1 litre change in per capita consumption was associated with a 3.6% increase in overall male CHD mortality and a 4.5% increase in the age group of 30-54 years [12].

In another study based on the Russian time series data between 1970 and 2005, Razvodovsky [13] found that alcohol consumption is significantly associated with both male and female CHD mortality rates: a 1 liter increase in alcohol consumption would result in a 3.9% increase in the male IHD mortality rate and in 2.7% increase in female CHD mortality rates. The results of the analysis suggest that 41.1% of all male deaths and 30.7% of female deaths from CHD in Russia could be attributed to alcohol. The estimated alcohol-attributable fraction for men ranged from 24.0% (75+ age group) to 62.0% (15-29 age group) and for women from 20.0% (75+ age group) to 64.0% (30-44 age group) [13]. The proportion of alcohol-attributable deaths varied widely between age groups, indicating the difference in alcohol consumption rate. As expected, young- and middle-age men and women had the largest proportion of alcohol-attributable deaths with more than half of all deaths attributed to alcohol. This reflects the fact that the level of alcohol-related problems among young and middle aged is especially high [14].

Recent research evidence based on aggregate-level data provides support for the hypothesis that alcohol is an important contributor to the high stroke mortality rate in Russian Federation [15]. Estimation the proportion of alcohol-attributable fraction based on aggregate-level data suggests that 26.8% of male deaths and 18.4% of female deaths from stroke in Russia are attributable to alcohol [16]. The estimated alcohol-attributable fraction for men ranged from 16.2% (75+ age group) to 57.5% (30-44 age group) and for women from 21.7% (60-74 age group) and 43.5% (30-44 age group).

There is also evidence that in Russia alcohol is linked to hypertension deaths. In a recent time-series study age-standardized sex-specific hypertension mortality data for the period 1980–2005 and data on overall alcohol consumption were analyzed by means of ARIMA analysis [17]. Alcohol consumption was significantly associated with both male and female hypertension mortality rates: a 1 liter increase in overall alcohol consumption would result in a 6.3% increase in the male hypertension mortality rate and in a 4.9% increase in female hypertension mortality rate. The results of the analysis suggest that 57.5% of all male hypertension deaths and 48.6% of all female hypertension deaths in Russia could be attributed to alcohol [17].

The findings based on aggregate-level data suggest that binge drinking and CVD mortality are positively related phenomena in Russia. Using a pooled cross-sectional analysis, Gmel et al. [18] showed that in countries with favorable drinking pattern (e.g. France and Italy), per capita consumption was negatively associated with CHD mortality whereas a positive link was found in countries with the binge drinking pattern (e.g. Russia). The results from a more recent study based on Russian data for the period from 1956-2005 suggest a positive association between fatal alcohol poisoning (as a proxy for binge drinking) and cardiovascular mortality rate [19]. Similarly, close aggregate level association between fatal alcohol poisoning and CHD mortality rate in Russia has been reported for the period between 1956 and 1998 [12].

Additional support for the hypothesis that unfavorable mixture of higher overall level of alcohol consumption and binge drinking of spirits is a major risk factor for CVD mortality in Russia provides the results of time-series analysis focused on the relation between the sale of different alcoholic beverages and CVD mortality rates. It was reported that vodka consumption as measured by sale was significantly associated with both male and female CVD rate: 1 litre changes in per capita vodka sale was associated with increase in CVD mortality rates by 9.3% for men and by 6% for women [20]. Instead, the consumption of beer and wine were not associated with CVD mortality rates. The estimates of the age specific models for men were positive (except for the 75+ age group) and ranging from 0.069 (60-74 age group) to 0.123 (30-44 age group). The estimates for women were positive for the 15-29 age group (0.08), 30-44 age group (0.096) and 45-59 age group (0.057) [20].

The findings from another study suggest that of the three beverages vodka alone were associated with stroke mortality in Russia [21]. The estimated effects of vodka sales on the stroke mortality rate are clearly statistically significant for both sexes: a 1 liter increase in vodka sales would result in a 3.1% increase in the male stroke mortality rate and in 1.7% increase in female stroke mortality rate. Similarly, vodka consumption as measured by sales was significantly associated with both male and female hypertension mortality rates: a 1 litre increase in vodka sales would result in a 10.8% increase in the male hypertension mortality rate and 9.1% increase in the female rate [22].

Conclusion

In a number of studies using time-series design alcohol consumption has been found to be important risk factor of CVD mortality in Russia. These pieces of evidence provide support for the hypothesis that unfavorable mixture of binge drinking of vodka may be a major reason for the strong association between alcohol consumption and CVD mortality rate in Russia. This finding indicates that a restrictive alcohol policy can be considered as an effective measure of CVD mortality prevention in countries where rates of both alcohol consumption and CVD mortality are high. This evidence have important implications as regards alcohol policy in Russia suggesting that any attempts to reduce overall consumption should also be linked with efforts through differential taxation to shift beverage preference away from spirits.

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