

A case–control analysis of socio-economic and marital status differentials in alcohol- and non-alcohol-related mortality among working-age Russian males

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Received 20 May 2009, accepted 1 February 2010

Background: We examined the role of socio-economic status (SES) and marital status in premature mortality among working-age Russian males. Life expectancy among this group dropped sharply following the collapse of the Soviet Union and has yet to recover despite the relative economic and political stability of the last decade.

Methods: We employed individual-level data from a large-scale, population-based, case–control study ($n=3500$). Adjusting for age group, hazardous drinking and smoking status, we estimated mortality odds ratios to determine the impact of SES and marital status on premature mortality due to all, alcohol- and non-alcohol-related causes of death.

Results: Results revealed clear protective effects of SES and marital status against premature mortality. Although the effects for marital status were significant across alcohol- and non-alcohol-related causes of death, the effects of SES were largely limited to non-alcohol-related causes of death. When heavy drinkers were excluded from the analysis, however, SES was found to protect against premature mortality for alcohol-related causes.

Conclusion: While hazardous drinking is known to be a leading cause of premature mortality among working-age Russian males, it is unwise to ignore other factors. Given the substantial social and economic impacts in Russia of the dissolution of the Soviet Union, it is important to examine the health effects of SES and marital status and other social forces in the nation. Our results reveal that while Russia has a very different past in terms of medicine, public health and economic institutions, it currently faces public health threats that follow similar patterns to those found in Western nations.

Keywords: case–control studies, health inequalities, mortality, Russia

Introduction

Alcohol plays an important role in Russian culture, and many researchers consider it to be largely responsible for the wide fluctuations in Russian mortality from the mid-1980s to the late 1990s.¹ There is evidence that hazardous alcohol consumption is implicated in nearly one-third of all Russian deaths² and nearly one-half of premature deaths among working-age Russian males.³ Hazardous drinking appears to play an important role not only in alcohol-related causes of death, but also in death from all causes,³ including violence.⁴ This explains why alcohol has received considerable research attention from academics and public health officials concerned with morbidity and mortality in Russia.

Yet hazardous drinking is not the sole cause of premature mortality among working-age Russian males,⁵ the group most acutely affected by the mortality crisis. It is therefore important to understand better the risk factors associated with negative health outcomes beyond those attributable to alcohol. Furthermore, while the aforementioned Russian mortality crisis began in the 1990s, a fundamental and gradual decline

in health had been progressing since the 1960s, suggesting the long-term trends cannot be solely attributed to alcohol. Examining the impact of socio-economic (SES) and marital status on mortality seems a logical starting point. Despite a flatter income distribution during the Soviet era, research on Russia has revealed social differentials in mortality during that period and in the years immediately following the collapse of the USSR.^{6,7} Recent studies of Russia also suggest that SES and marital status are associated with a range of causes of death and that educational differences in mortality increased during the 1990s in Russia and neighboring post-Soviet nations.^{8–12}

Individual SES may be inversely associated with mortality via a number of mechanisms. Individuals with lower SES are more likely to engage in a number of negative health behaviors—such as smoking, drinking, leading a sedentary lifestyle and having a high-fat diet—that are risk factors for premature mortality. These risk factors specifically are important to Russia because the mortality crisis was due largely to premature mortality among working-age males, and the increases in mortality among this group were dominated by cardiovascular

disease and external causes of death.^{1,8} Health lifestyles alone, however, do not account for the SES-mortality association,¹³ and there are other individual- and structural-level factors that may play a role.^{14,15} Access to preventive and acute medical care, e.g. is especially relevant to 1990s Russia. The collapse of the state and radical economic reforms resulted in increased poverty and a barely functioning social safety net. Those with lower SES faced dramatically reduced access to increasingly scarce resources, including medical care of all sorts.

Going back at least to Durkheim,¹⁶ marriage has been recognized as providing social ties and an important sense of one's familial and social role, thereby protecting against certain types of destructive behavior and mortality. Results from a classic study by Gove,¹⁷ and demonstrated repeatedly since, showed that the protective effect of marriage against mortality is heightened for males. This is important to our examination of Russia because increases in premature mortality there have been concentrated among working-age men. In general, marriage is recognized as providing social bonds, integration and capital, which are associated with a lower risk for premature mortality.¹⁸ Furthermore, prior research has found that of the three unmarried categories (never married, divorced and widowed), divorced men are at the highest risk.¹⁹ While this pattern of findings has been shown to hold across several developed nations,^{19,20} there have been relatively few studies of Russia, where there was a short-term increase in the divorce rate following the collapse of the Soviet Union.

Given the sharp increases in social stratification following the collapse of the Soviet Union, it is becoming more important to understand health inequalities in Russia that go beyond those caused by alcohol. It is also important to look at how the effect of social and economic factors may vary across different causes of death. We explore these issues in the present study by examining the impact of SES and marital status on alcohol- and non-alcohol-related causes of death among working-age Russian males. We note that while there are many causes of death associated with alcohol consumption, for ease of presentation we refer to all causes not directly related to alcohol (defined in the following section) as "non-alcohol-related." We hypothesize that Russian males with a higher SES and who are married will be at a lower risk for premature mortality. Although it is likely that SES, marital status and hazardous drinking are all associated to some degree, we expect the protective effects of higher SES and marriage to remain even after controlling for hazardous drinking.

Methods

This study employs data from the Izhevsk Family Study (IFS). The IFS was a population-based case-control study undertaken to examine high levels of premature mortality among Russian men aged 25–54. Izhevsk is a typical, medium-sized, industrial city located in the western Urals. It has a population of ~650 000 and an average life expectancy and distribution of deaths by cause that are similar to Russia as a whole.

Cases were male residents of Izhevsk aged 25–54 who died between October 2003 and 2005 and for whom at least one proxy interview could be obtained. Controls were living males selected at random from a 2002 population register, and were frequency matched by age to the cases in 5-year age bands. Extensive information from proxy interviews and sociodemographic data sources were obtained for 1750 cases and 1750 controls. Methods are described in detail elsewhere.²¹

SES was measured by educational attainment. The education categories included incomplete secondary, professional, complete secondary, specialized secondary, incomplete university and complete university. Marital status categories included

living with partner in a registered marriage, living with partner in a non-registered marriage, divorced/separated, widowed and never married. The questionnaire also included questions on health and health-related behaviours, household composition and demographic information. We collected information about alcohol consumption using standard quantity-frequency questions.²² We also obtained information about several adverse alcohol behaviors that we used to create an indicator of hazardous drinking, which was defined as (i) having at least one episode of *zapoi* (i.e. a period of two or more days of continuous drunkenness together with a withdrawal from normal life),²³ or (ii) twice a week or more occurrence of excessive drunkenness, hangovers, or going to sleep at night clothed because of being drunk, or (iii) consuming non-beverage surrogate alcohols such as colognes, medicinal tinctures and cleaning agents. The reference period for these behaviors was the prior year.

Given our focus on SES, it is important to discuss two measurement items. Firstly, educational attainment has two major advantages over occupational status and income as an indicator of SES here. One is that education can be determined for all individuals, including those who have left or never entered the labor force. Another advantage is that individuals generally complete their schooling by early adulthood and, subsequently, education level tends to be stable for the remainder of the life course. Although current occupation and income may provide more proximate measures of SES, they are susceptible to variation due to changes in health and other individual circumstances. As a result, estimates of the effects of occupation or income on mortality differentials may be complicated by bidirectional relationships.^{24–27}

The second item is the classification of educational attainment in Russia. "Professional school" refers to those who have received 4–5 years of training following 8 years of school. This apprenticeship type preparation is for an occupation as a manual laborer. Those that complete this training may or may not complete secondary education. Those with secondary education have completed high school. They tend to occupy positions such as non-manual workers, high skilled manual laborers and low level management in factories. Finally, those with a "specialized secondary education" receive 2–3 years of training following high school and often work in positions that require some extra form of job-specific education, such as paramedics or teachers.

Logistic regression was used to estimate mortality odds ratios (ORs) for all causes of death, as well as for alcohol-related (i.e. alcoholic cardiomyopathy (I42.6 in International Classification of Diseases Codes, Revision 10), alcoholic liver disease (K70.2–K70.4, K70.9), acute alcohol poisoning (X45) and alcoholic psychoses (F10.3–F10.9)) and non-alcohol-related causes, with education and marital status as the main independent variables. ORs were adjusted for age group (in 5-year bands), smoking status and hazardous drinking as defined above. While the latter may seem a rather extreme criteria of alcohol consumption, it is consistent with prior research on Russia, and hazardous drinking of this type has been shown to be the most important known determinant of mortality in this population, responsible for nearly half of all premature deaths among this group independent of the volume of ethanol consumed.³ More generally, it is also important to control for some measure of consumption or hazardous drinking when estimating the models for "non-alcohol-related" causes. This is because our "alcohol-related" category contains only causes due directly to alcohol, but other causes—especially external causes and ischaemic heart disease—have also been shown to be indirectly associated with

alcohol consumption in Russia. All analyses were conducted using STATA, version 10.0.

Results

Table 1 shows the distribution of cases and controls by education, marital status, age group, drinking status and smoking status. In this study our sample included only cases and controls for whom there was complete information on the variables employed in our analyses. This resulted in a loss of only 8.7% of the sample, providing us with a final sample size for our analysis of 3194 (1559 cases and 1635 controls).

The age distribution shown in table 1 reflects the age distribution of deaths among males aged 25–54 in Izhevsk, not the entire male population. Cases were more than 2.5 times less likely than controls to have completed university and more than twice as likely to have an incomplete secondary education. The table shows that cases were substantially more likely to be hazardous drinkers (51% compared to 13% of controls) and to drink surrogate alcohols (40% compared to 7%). About three-quarters of the controls were living together with a spouse in a registered marriage compared to only about half of the cases (at the time of death). A considerably larger proportion of cases than controls were never married, divorced or widowed.

Table 2 provides crude and adjusted ORs for education and marital status for all causes of death, causes due directly to alcohol and non-alcohol-related deaths. Looking first at all causes of death, relative to those with complete higher education, not only do all other educational groups have substantially greater odds of mortality, but the odds show a generally increasing pattern from incomplete higher (OR=2.3, CI: 1.4–3.7) to specialized secondary (OR=2.2, CI: 1.7–2.9) to complete secondary (OR=2.8, CI: 2.2–3.5) to professional (OR=3.9, CI: 3.0–5.0) to incomplete secondary (OR=5.4,

CI: 3.9–7.5). Results for marital status and all cause mortality were similar. Relative to those living with a spouse in a registered marriage, all other marital status categories were at a greater risk of premature mortality. The odds increase steadily from those in unregistered marriages (OR=1.3, CI: 1.0–1.6) to never married (OR=2.6, CI: 1.9–3.6) to divorced/separated (OR=2.9, CI: 2.2–3.8) to widowed (OR=4.9, CI: 2.3–10.5).

When disaggregated into alcohol- and non-alcohol-related causes of death, the results for marital status followed a generally similar pattern. The results for education, however, revealed some differences for these two sets of causes of death. For alcohol-related deaths, only those with a “professional” education displayed higher odds of dying (OR=2.5, CI: 1.3–4.8) compared to men with a completed higher education. For non-alcohol-related causes of death, on the other hand, all educational categories displayed greater odds of death relative to men with a completed higher education.

Table 3 shows the same variables and causes of death as table 2, but the ORs for education and marital status are now mutually adjusted in addition to adjustment for age, hazardous drinking and smoking status. For both educational and marital status, the general patterns and the inferences drawn are similar to table 2.

The results thus far suggest that SES may play a nominal role for alcohol-related causes of death when adjusting for hazardous drinking. This is consistent with our hypothesis that hazardous alcohol consumption is certainly an important risk factor for premature mortality among working-age Russian men, but that its impact on alcohol-related mortality is obviously much stronger than on non-alcohol-related mortality, leaving room for other causes to play a greater role in the latter. Whilst this is displayed clearly in tables 2 and 3, we examine this further in table 4. We have excluded from this final analysis cases and controls labeled hazardous drinkers

Table 1 Distribution of variables

	Controls		Cases		Total	
	(n = 1635)	Percentage	(n = 1559)	Percentage	(n = 3194)	Percentage
Education						
Complete higher	339	20.7	124	8.0	463	14.5
Incomplete higher	41	2.5	34	2.2	75	2.4
Specialized secondary	379	23.5	308	19.8	687	21.5
Complete secondary	501	30.6	510	32.7	1011	31.7
Professional school	281	17.2	397	25.5	678	21.2
Incomplete secondary	94	5.8	186	11.9	280	8.8
Marital status						
Married, registered	1285	78.6	871	55.9	2156	67.5
Married, unregistered	163	10.0	188	12.1	351	11.0
Never married	89	5.4	176	11.3	265	8.3
Divorced or separated	89	5.4	272	17.5	361	11.3
Widower	9	0.6	52	3.2	61	1.9
Age group (years)						
25–29	121	7.4	114	7.3	235	7.4
30–34	134	8.2	126	8.1	260	8.1
35–39	131	8.0	117	7.5	248	7.8
40–44	267	16.3	274	17.6	541	16.9
45–49	409	25.0	388	24.9	797	25.0
50–54	573	35.1	540	34.6	1113	34.9
Drinking status						
Abstains	206	12.6	137	8.8	343	10.7
Beverage only (no problem)	1209	73.9	629	40.4	1838	57.6
Beverage only (problem drinker)	101	6.2	171	11.0	272	8.5
Non-beverage drinker (no problem)	28	1.7	103	6.6	131	4.1
Non-beverage drinker (problem)	91	5.6	519	33.3	610	19.1
Smoking status						
Never	355	21.7	122	7.8	477	14.9
Ex-smoker	207	12.7	133	8.5	340	10.6
Current	1073	65.6	1304	83.6	2377	74.4

Table 2 Crude and adjusted ORs for educational and marital status by cause of death (*n* = 3194)

	All causes				Alcohol-related causes				Non-alcohol causes			
	Crude		Adjusted		Crude		Adjusted		Crude		Adjusted	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Education												
Complete higher	1.0		1.0		1.0		1.0		1.5		1.0	
Incomplete higher	2.5	(1.5–4.1)	2.3	(1.4–3.7)	2.5	(0.9–6.6)	1.6	(0.5–5.5)	2.5	(1.4–4.2)	1.8	(1.0–3.2)
Specialized secondary	2.3	(1.8–3.0)	2.2	(1.7–2.9)	2.2	(1.3–3.8)	1.3	(0.7–2.5)	2.3	(1.7–3.0)	1.6	(1.2–2.2)
Complete secondary	2.9	(2.3–3.7)	2.8	(2.2–3.5)	3.6	(2.2–5.9)	1.8	(1.0–3.4)	2.8	(2.1–3.5)	1.7	(1.3–2.2)
Professional school	4.1	(3.1–5.3)	3.9	(3.0–5.0)	5.2	(3.1–8.7)	2.5	(1.3–4.8)	3.8	(2.9–5.1)	2.1	(1.6–2.8)
Incomplete secondary	6.0	(4.3–8.4)	5.4	(3.9–7.5)	6.4	(3.4–11.8)	1.6	(0.7–3.4)	5.9	(4.2–8.4)	2.9	(2.0–4.2)
Marital status												
Married, registered	1.0		1.0		1.0		1.0		1.0		1.0	
Married, unregistered	2.0	(1.5–2.5)	1.3	(1.0–1.6)	2.5	(1.7–3.7)	1.6	(1.0–2.6)	1.9	(1.4–2.4)	1.2	(0.9–1.6)
Never married	3.5	(2.6–4.7)	2.6	(1.9–3.6)	3.1	(1.9–5.2)	2.1	(1.1–4.0)	3.6	(2.7–4.9)	2.7	(1.9–3.7)
Divorced or separated	5.2	(4.0–6.7)	2.9	(2.2–3.8)	7.3	(5.1–10.6)	4.3	(2.7–7.1)	4.7	(3.6–6.2)	2.7	(2.0–3.6)
Widower	6.8	(3.4–13.5)	4.8	(2.3–10.5)	9.9	(4.2–23.4)	5.4	(1.6–17.9)	6.2	(3.1–12.6)	4.9	(2.3–10.4)

Adjusted ORs adjusted for age, hazardous drinking and smoking status.

Table 3 Mortality ORs mutually adjusted for educational and marital status, by cause of death (*n* = 3194)

	All causes		Alcohol-related causes		Non-alcohol-related causes	
	OR	CI	OR	CI	OR	CI
Education						
Complete higher	1.0		1.0		1.0	
Incomplete higher	1.6	(0.9–2.7)	1.3	(0.4–4.6)	1.6	(0.9–2.9)
Specialized secondary	1.6	(1.5–2.2)	1.2	(0.6–2.4)	1.6	(1.2–2.2)
Complete secondary	1.7	(1.3–2.2)	1.7	(0.9–3.3)	1.6	(1.2–2.1)
Professional school	2.0	(1.5–2.7)	2.2	(1.2–1.3)	1.9	(1.4–2.6)
Incomplete secondary	2.4	(1.7–3.5)	1.2	(0.5–2.7)	2.5	(1.7–3.6)
Marital status						
Married, registered	1.0		1.0		1.0	
Married, unregistered	1.2	(0.9–1.6)	1.6	(1.0–2.6)	1.2	(0.9–1.5)
Never married	2.4	(1.7–3.3)	2.1	(1.1–4.0)	2.4	(1.8–3.4)
Divorced or separated	2.8	(2.1–3.7)	4.3	(2.6–7.0)	2.6	(1.9–3.4)
Widower	4.5	(2.1–9.6)	5.4	(1.6–17.8)	4.5	(2.1–9.8)

ORs adjusted for age, hazardous drinking and smoking status.

Table 4 Mortality ORs, mutually adjusted for educational and marital status by cause of death, excluding hazardous drinkers (*n* = 2312)

	All causes		Alcohol-related causes		Non-alcohol-related causes	
	OR	CI	OR	CI	OR	CI
Education						
Complete higher	1.0		1.0		1.0	
Incomplete higher	1.8	(1.0–3.4)	1.8	(0.2–18.1)	1.8	(1.0–3.4)
Specialized secondary	1.9	(1.4–2.6)	1.8	(0.6–6.0)	1.9	(1.4–2.6)
Complete secondary	1.8	(1.4–2.4)	3.2	(1.1–9.6)	1.8	(1.3–2.4)
Professional school	2.2	(1.6–3.1)	5.2	(1.7–15.4)	2.1	(1.5–2.9)
Incomplete secondary	3.3	(2.2–5.0)	4.4	(1.2–16.5)	3.2	(2.1–4.9)
Marital status						
Married, registered	1.0		1.0		1.0	
Married, unregistered	1.2	(0.9–1.6)	1.5	(0.7–3.2)	1.2	(0.9–1.6)
Never married	2.3	(1.6–3.4)	1.9	(0.7–4.9)	2.4	(1.6–3.4)
Divorced or separated	2.8	(2.0–3.8)	5.5	(2.8–10.6)	2.4	(1.7–3.4)
Widower	5.2	(2.0–13.3)	6.4	(1.0–43.0)	5.3	(2.0–13.7)

ORs adjusted for age and smoking status.

based upon the definition provided above. The results for education and all-cause and non-alcohol-related mortality are similar here to table 3, and the ORs are slightly higher. For alcohol-related mortality, on the other hand, we see an increased role of education. Those men with secondary,

professional or incomplete secondary education had significantly higher odds of death than those with a higher education.

To ensure our results were not sensitive to the use of education as the measure of SES, models were reestimated using

several alternative indicators, including employment (categories: employed, unemployment not due to ill health, unemployment due to ill health, unemployment due to a disability), whether the respondent had heating in their apartment, and whether they owned a car.²¹ Although effect sizes varied slightly, the inferences for education and marital status remained unchanged throughout all models discussed above.

Discussion

The Russian mortality crisis was driven largely by premature mortality among working-age men, and the important role of alcohol in mortality during this time and within this group is widely recognized.^{1,6} However, a sizeable proportion of premature deaths of Russian men cannot be attributed directly to alcohol, and the long-term decline in Russian health that began in the mid-1960s is not due solely to alcohol. Therefore, it is important to explore other factors that contribute to the burden of premature mortality in Russia. This is especially true since over time the mortality burden of hazardous drinking may diminish as a result of public policy, better medical services, public health campaigns and the proliferation of formal and informal treatment programs.

Our interest in looking at SES and marital status as factors associated with mortality in Russia is influenced by recent empirical work in Russia and Eastern Europe,^{8–12} and more generally by the inequalities in health literature throughout the world. Our results demonstrate that, despite very different historical and recent circumstances, the associations of SES and marital status with premature mortality in Russia are similar to those in Western nations. Specifically, we found evidence of SES- and marital status-mortality gradients.

In terms of education/SES, prior findings from Eastern Europe indicate that while the direction of mortality patterns by educational attainment are similar to those found in the West, both for all-cause mortality and for many specific causes of death, the inequalities in mortality between education levels tend to be even larger in Eastern European nations. In their international comparison of socio-economic differences in mortality, Mackenbach *et al.*²⁸ found that lower-educated males in Hungary, Estonia and the Czech Republic were 50–78% more likely to die prematurely than higher-educated males. Whilst generally consistent with Western findings, these estimates are likely conservative given the researchers' decision to divide their sample into just two broad educational categories. A more recent comparison of mortality rates by education in Estonia, for instance, reported ORs for all adult males of 1.73–2.38,²⁹ which are similar to those found in Slovenia²⁷ and Lithuania.^{26,30}

Our findings are consistent with prior research in terms of the effects of education on mortality. We also found that for alcohol-related causes of death the real benefit of education comes from education beyond high school. For non-alcohol-related deaths, a completed higher education provides added protection even compared to an incomplete higher education or a specialized secondary education. Wealth and income inequality increased substantially in Russia following the collapse of the Soviet Union, and recent evidence reveals that despite a growing economy and an increasing average standard of living, the improvements are not trickling down in terms of mortality.³¹ Thus, SES differentials in mortality may become even more important if current and future public health responses reduce the role of alcohol in mortality in Russia. In fact, we see evidence of this in table 4. When the hazardous drinkers are excluded, we see a slight rise in the SES ORs for non-alcohol-related deaths and a substantial increase in the SES ORs for alcohol-related deaths.

The association between marital status, drinking and mortality is complex. It is likely that men who are hazardous drinkers may find that their marital status changes as a result of their drinking and concomitant behaviour. Thus, marital status itself can be a consequence of drinking, not necessarily the cause of it. This has been discussed in detail elsewhere.¹ It is possible this circularity may diminish if the extreme issues associated with alcohol and mortality in Russia improve over time. Regardless, the protective effect of marriage is difficult to ignore.¹⁸

Our finding of mortality differentials by marital status is consistent with prior research. In general, findings from Central and Eastern Europe are similar to those found in the West, and tend to indicate that relative to married men unmarried men are more likely to die prematurely.^{27,30,32,33} However, previous research reveals some variation among Eastern European nations with regard to relative mortality risks of never married, widowed, and divorced men. For example, Brajczeswki and Rogucka³⁴ found in Poland that only divorced or never married men had mortality rates significantly higher than married men, while mortality differences between married and widowed men were not significant. Widowed men in Slovenia, on the other hand, were found to have the highest mortality rates of any of the marital status categories, nearly twice that of even divorced males.²⁷ Our results more closely match those from Slovenia. These differences highlight the existence of variations between countries and over time in the relationship between marital status and mortality.³⁵

Although several prior studies separately examined the role of education and marital status, few have included an analysis of the combined effects of these two variables on mortality differentials in Eastern Europe. Our study is among only a handful to examine these key social and economic factors together. Among those that have, the results have been fairly consistent. Studies have generally found that, within each education level, unmarried individuals are more likely to die prematurely than their married counterparts. Likewise, irrespective of marital status, the least educated individuals are at greater risk of premature mortality than those who have attained higher levels of education.^{9,27,36,37} Previous research has also shown both that the mortality gap between married and unmarried men is the largest for those with the lowest education levels⁹ and that the educational gradient in mortality is most pronounced for individuals who are unmarried.²⁷ In the pattern that emerges from these findings, men who are both married and highly educated tend to have the lowest mortality rates, while men who are the least educated and not married (and particularly divorced) consistently have the highest. This has been found to be the case with regard to all-cause mortality in Poland,^{27,37} suicide and liver cirrhosis (but not lung cancer) in Western Europe,³⁶ and homicide in Russia.⁹

One limitation of our study is that we restricted our definition of alcohol-related mortality solely to deaths in which alcohol was the direct cause. This definition is consistent with prior research on Russia, and is necessary because it is impossible to discover and label all deaths that were due indirectly to alcohol. Nevertheless, one result of this is likely an underestimate of the differences in effect sizes between the alcohol- and non-alcohol-related causes of death. That is, our estimates of the effects of SES on non-alcohol-related causes of death are biased in a conservative direction. This is because the latter contains deaths indirectly caused by alcohol, including actions resulting in one's own death (e.g. accidents, suicides, drowning) and in the death of others (e.g. homicide, accidents). In future research, an alternative approach might be to employ as a reference category those who died from certain cancers.⁹ A second limitation is also definitional in nature. Namely, our control for alcohol consumption in

these models is a relatively extreme set of criteria measuring hazardous drinking. Due to Russian drinking patterns and to crucial prior empirical evidence, we believe this control for hazardous drinking is appropriate. For example, the evidence provided by Leon *et al.*³ reveals the astonishing role of hazardous drinking of this type in premature mortality among Russian men. Specifically, it appears to be responsible for nearly half of all deaths among this group, independent of the volume of ethanol consumed. Still, in future research it would be worthwhile to determine if the size of the SES and marital status effects remain similar when other definitions of risky drinking are applied.

In sum, hazardous alcohol consumption has been demonstrated to be an important determinant of mortality in Russia. It would be unwise, however, to ignore the effects of other social causes such as SES and marital status. If the impact of alcohol on premature mortality in Russia diminishes over time, other mortality determinants may become increasingly important, and whilst a relatively small but high risk proportion of the population may be greatly affected by a strong risk factor like hazardous alcohol consumption, a larger proportion may be affected to a lesser extent by more subtle risk factors. Therefore, addressing lower risk but broader exposures can have a significant impact on reducing premature mortality.

When taken together with the findings from other recent research on Russia, our results show a clear effect of SES on mortality among working-age Russian men. This cannot be understated, as the level of poverty in the nation increased greatly following the collapse of the Soviet Union. The findings presented here reveal that despite a very different past in terms of medicine, public health, economic system, and income distribution, Russia faces public health threats similar to those in Western nations.

Acknowledgements

We thank David A. Leon, Evgeny Andreev, Vladimir Shkolnikov and Jason Schnittker for their helpful comments and critiques on earlier drafts of this paper.

Funding

The data collection for this research was undertaken as part of the Izhevsk Family Study, which was funded by the Wellcome Trust. K.A.P. and K.E. were supported by Grant AA013958 from the National Institutes of Health, National Institute on Alcohol Abuse and Alcoholism. Points of view are those of the authors and do not necessarily represent the official positions of the Wellcome Trust or NIH/NIAAA.

Conflicts of interest: None declared.

Key points

- Prior research on premature mortality in Russia has focused largely on alcohol consumption. While hazardous drinking plays a key role, we believe it is also important to understand better other social forces that contribute to premature mortality in the country.
- Poverty increased and social capital decreased in Russia following the collapse of the Soviet Union. We found SES and marital status to be associated with premature mortality among working-age Russian males.
- These effects hold for both alcohol- and non-alcohol-related causes of death.

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