Heavy Drinking and Suicide in Russia

William Alex Pridemore
Indiana University

Abstract

Russian levels of alcohol consumption and suicide are among the highest in the world. While observers have long suspected an association between the two, they were unable to investigate this hypothesis until recently due to past Soviet secrecy and thus a lack of data. This study took advantage of the newly available data during the post-Soviet era to examine the cross-sectional association between heavy drinking and suicide mortality in Russia. Aggregate mortality data for the Russian regions (n = 78) for the year 2000 were used to measure heavy drinking and suicide rates. Government data were used to control for the regional economic situation and strength of social institutions. Ordinary Least Squares regression was employed to estimate the effect of a proxy for heavy drinking on overall and sex-specific age-adjusted suicide rates. The results showed a positive and significant association between the two, and the association held for overall, male and female rates. These results not only confirmed an association between heavy drinking and suicide in Russia, but when compared to findings from previous studies of other countries they led to the hypothesis that a nation's beverage preference may be as important as its wet/dry drinking culture in its sensitivity of suicide rates to alcohol consumption.

Rates of alcohol consumption and suicide in Russia were high before the dissolution of the Soviet Union, rose sharply during the early 1990s, and are currently among the highest in the world. Annual alcohol consumption in Russia is estimated to be nearly 15 liters per person (Nemtsov 2000, Treml 1997) compared to average rates of about 10 and 7 liters per person in the European Union and the United States, respectively (World Advertising Research Center 2002). The age-standardized suicide rate in Russia in 2000 of about 38 per 100,000 persons was second only to Lithuania and was two to three times higher than the European Union average and in the United States. Violent death, including suicide, was also one of the leading causes of the Russian mortality crisis during the 1990s, especially for males (Notzon et al. 1998, Shkolnikov and Meslé 1996).

Rossow (1996) and Skog (1993) noted that alcohol has been largely ignored in studies of suicide rates. While this has begun to change, most studies of alcohol and suicide are still at the individual level, and most aggregate-level studies have been time-series analyses of Western (usually European) nations. Although time-series designs are powerful, Norström and Skog (2001) and Rossow (1995) pointed out that analyses of rates aggregated to the national level may conceal important spatial variation within a country. Further, while the empirical literature is providing increasing evidence of an ecological association between alcohol and suicide rates, most explanations have been reductionist in nature (i.e., employing aggregate data but resorting to individual-level explanations). However, some countries with high levels of drinking do not exhibit high suicide rates, suggesting an important role for cultural and social context beyond that offered by individual-level factors (Norström 1995a). Recent findings led some scholars to assert that wet drinking cultures may be less susceptible to an association between alcohol and suicide than dry cultures (Norström 1995a, Ramstedt 2001). In contrast, the results from some studies lead others to argue that it may not be simply the level of consumption but instead heavy and frequent binge drinking (commonly defined in the alcohol literature as five drinks

for men and four for women in one sitting), especially of distilled spirits (e.g., vodka, rum, whiskey and gin), that is most important in any association with suicide rates (Gruenewald, Ponicki and Mitchell 1995; Razvodovsky 2003; Rossow 2000). Both hypotheses are important for Russia given levels of binge drinking (Bobak et al. 1999) and the preference for distilled spirits (Nemtsov 2000).

Previous Research

Most aggregate-level studies of alcohol and suicide have used time-series designs and examined European nations. For example, Norström (1988) found a positive and significant association over time between alcohol and suicide in Norway (see also Rossow 1993) and Sweden, and Skog (1993) and Skog et al. (1995) found a similar relationship in Denmark and Portugal. In a comparative study, Norström (1995a) revealed a stronger effect of alcohol on suicide rates in Sweden relative to France. He concluded that the influence of alcohol on suicide rates may be stronger in dry relative to wet drinking cultures since heavy drinkers in the former may be more likely to experience weakened family and community bonds because their behavior is viewed as less acceptable (see also Babor et al. 1992, Norström 1988). This idea is consistent with the hypotheses concerning social integration and suicide posed by Durkheim ([1897]1966), who was among the first to examine systematically the association between drinking and suicide at the societal level. A study of 14 European nations by Ramstedt (2001) showed similar results for wet/dry drinking cultures, providing further support for Norström's hypothesis. The few aggregate-level studies in the United States also found a positive association over time (Caces and Harford 1998; Gruenewald, Ponicki and Mitchell 1995).

Recent research has begun to examine alcohol and suicide in Eastern Europe (Mäkinen 2000). Skog and Elekes (1993) used Hungarian time-series data and found a positive association. Wasserman, Värnik and Eklund (1998) used Soviet-era data and found evidence of a positive association in several Soviet countries. Two further studies are key to the present analysis. First, in a time-series analysis of Belarus, Razvodovsky (2003 Belarus, Razvodovsky (2001) found a significant relationship between alcohol and suicide and, more importantly, that this relationship was stronger for consumption of distilled spirits relative to other types of alcohol such as beer and wine. Second, Nemtsov (2003a) found a significant association between drinking and suicide in his time-series analysis of Russian data. In contrast to the conclusions about wet drinking cultures discussed above, both authors concluded that heavy and binge drinking of vodka were responsible for the high suicide rates and the changes in rates over time in Belarus and Russia.

Cross-sectional studies can also be informative when examining the alcohol-suicide link at the aggregate level because most nations are not monolithic in their drinking habits and suicide rates. Within-nation variation of both consumption and suicide may be associated with the spatial distribution of social forces such as economic circumstances, social cohesion, and ethnic and religious groups. Yet there have been few cross-sectional studies that examine this association. The most famous was that by Durkheim more than a century ago. The few recent studies that contained a cross-sectional component (Norström 1995b: Swedish counties, Skog *et al*. 1995: Portuguese regions, Rossow 1995: Norwegian municipal regions) have found support for an association, though effect sizes varied and there were sometimes differential effects for males and females. Given Russia's size and its widely varying levels of heavy drinking and suicide, a cross-sectional examination should provide valuable insights.

Alcohol Consumption and Suicide Rates in Russia

Repeated political and economic crises in 1990s Russia resulted in uncertainty and diminished hope for the future at a time when a paradigmatic shift of social, cultural, economic and political

norms were creating anomic conditions (Durkheim [1897]1966). It is generally accepted that the social and individual stress resulting from the reforms were the main causes of increased demand for alcohol at this time (Leon and Shkolnikov 1998). This demand was met by several factors that increased supply. Gorbachev's anti-alcohol campaign in 1985, for example, had created a large market for illegally produced alcohol. Further, when the state monopoly on legal alcohol was repealed in 1992, local and international companies quickly began to exploit the new markets (Jernigan 1997, Reitan 2000). The increased supply, together with poor tax collection by the Russian government, meant that alcohol prices rose at a fraction of food and other staples. Leon and Shkolnikov (1998) argued that alcohol played a central role in the mortality crisis of the 1990s, Notzon et al. (1998) showed that about 12 percent of the decline in life expectancy between 1990 and 1994 was directly due to alcohol-related mortality, and Walberg et al. (1998) found an association between regional levels of alcohol consumption and decline in life expectancy.

The problems associated with heavy drinking in Russia, however, are not new to the transition (McKee 1999, White 1996). Three distinctive traits of Russian consumption have been the preference for distilled spirits, binge drinking and socio-cultural tolerance for heavy drinking and concomitant behavior. Vodka represents about 75 percent of the alcohol consumed in the country (Nemtsov 2000, Treml 1997), and survey data showed that about one-third of Russian males admitted to binge drinking vodka at least once per month (Bobak et al. 1999). Heavy episodic drinking and consumption of distilled spirits have been shown to be significantly related to suicide (Gruenewald, Ponicki and Mitchell 1995; Razvodovsky 2003) and other violent behavior (Norström 1998a, Pridemore 2002). Further, acute intoxication may act as a disinhibitor (Norström 1995a) in people predisposed to suicide for other reasons, especially among those facing the anomic conditions of massive social change and dire economic circumstances.

Also important for this study is the cross-sectional variation of heavy drinking and suicide in Russia. This is an enormous nation that is far from homogeneous in levels of consumption (Bobak et al. 1999, Pridemore and Kim 2006a). For example, regional age-standardized death rates per 100,000 persons due to alcohol poisoning (see discussion of this proxy below) in 2000 varied widely (regional mean = 28.8, s.d. = 17.5). Similarly, the choropleth map provided by Pridemore and Spivak (2003:142) demonstrated the wide range and geographic patterning of regional suicide rates in Russia, with rates generally increasing from south and west to north and east. Regional age-standardized suicide mortality rates in 2000 ranged from a low of 7 to a high of 93 per 100,000 in the Dagestan and Altai Republics, respectively (regional mean = 42.1, s.d. = 17.1). The mean regional suicide rate for males was 77 per 100,000, ranging from 11 in Dagestan to 159 in the Altai Republic. The task of the present study was to determine if the spatial distribution of suicide rates covaried with the distribution of heavy drinking, and if any relationship held for both men and women.

Data and Method

The unit of analysis in this study was the Russian region (N = 89). Data from nine of these regions (i.e., the "autonomous okrugs") were covered by the larger region within which each was embedded. The Chechen and Ingush Republics were discarded because of the ongoing war in and the perennially unreliable data from these contiguous regions. This left 78 cases for analysis. Unless otherwise noted, all data were from 2000.

The dependent variables were the regional overall and sex-specific age-adjusted suicide rates. Given former Soviet secrecy surrounding these data, as well as large swings in mortality rates in Russia over the past 20 years, Russian mortality data have been closely scrutinized and several scholars have concluded that the Russian overall and violent mortality data are valid

(Anderson, Katus and Silver 1994; Anderson and Silver 1997; Leon et al. 1997; Wasserman and Värnik 1998). The Russian suicide data employed here were prepared for the author using data from the State Committee for Statistics (Russian Mortality Database 2003).

Estimating heavy drinking in Russia is difficult. Commonly used areal measures of consumption such as production, retail sales and tax receipts are unreliable in Russia (Treml 1997).[1] For example, illegally produced homemade alcohol (samogon) may account for nearly half the alcohol consumed in the country and the proportion varies from region to region. Sales and tax receipts are also suspect because (1) of sales of samogon and (2) businesses often keep two sets of books in order to avoid high taxes. Individual-level estimates of consumption have been undertaken via surveys such as the Russian Longitudinal Monitoring Survey (see Bobak, McKee, Rose and Marmot 1999), but this survey does not employ a large enough sample size from each of the Russian regions to produce a reliable estimate of consumption or heavy drinking at the regional level. Further, not only have the estimates of consumption from this survey been highly criticized (Nemtsov 2003b), but research in Russia comparing biological markers of consumption with survey responses showed the latter to be highly unreliable (Laatikainen, Alho, Vartiainen, Jousilahti, Sillanaukee and Puska 2002).

Another approach common to aggregate-level studies has been to use the death rate from liver cirrhosis as a proxy (Nemtsov 1998, Norström 1998b, Smart and Mann 1998). Russian registration habits, however, commonly classify deaths caused by the long-term effects of drinking in the more proximate "alcohol poisoning" category (Shkolnikov and Meslé 1996), which makes up about 80 percent of all deaths directly related to alcohol in Russia (Blum and Monnier 1989; Shkolnikov, Meslé and Vallin 1996; Treml 1997). Further, the combination of binge drinking vodka and the consumption of alcohol substitutes and of illegally produced alcohol of unregulated quality in Russia (see McKee et al. 2005) results in an abnormally high rate of deaths due to true poisoning in the country. These facts have made it common to employ the age-adjusted death rate due to alcohol poisoning as a proxy for heavy drinking in Russia (Chenet et al. 2001; Pridemore 2002; Shkolnikov et al. 2002; Shkolnikov, McKee and Leon 2001), and this was the proxy used in this study.

Sociological studies of suicide (Baller and Richardson 2002; Kowalski, Faupel and Starr 1987; Norström 1995) usually control for a common set of structural covariates based upon economic conditions and social cohesion. In this study, poverty, inequality and unemployment were used as measures of economic conditions. Measures of social cohesion included the strength of institutions such as the family, education and polity, as well as the relative size of the urban population. Poverty was measured as the proportion of the regional population living below the poverty line (2000 data unavailable, 1999 data used), inequality as the ratio of the income of the top 20 percent of wage earners to the bottom 20 percent of wage earners, and unemployment as the proportion of the active labor force that was unemployed. Family strength was measured as the proportion of households with only one adult and at least one child under the age of 18 (2000 data unavailable, data from the 1994 micro-census were employed[2]), education as the number of persons enrolled in college per 1,000 residents, and polity as the proportion of registered voters who voted in the 2000 Presidential election. Urbanism was measured as the proportion of the regional population living in cities with more than 100,000

---

[1]Although it is true that many of the general limitations of the Russian alcohol data on production, sales and taxes are also present in Western countries, in most cases the problems with the Russian data are more serious by several orders of magnitude.

[2]The most recent year for this measure was 1994 because of the micro-census carried out in Russia that year. Updated information for this measure will soon be available from the full Russian census undertaken in 2002, but these data would be inappropriate here since the dependent variable was measured in 2000. To test the sensitivity of the model and of the alcohol-suicide link to this control, an alternative model was estimated using the divorce rate from 2000. It should be noted that, for reasons beyond the scope of this discussion, this measure is likely less reliable and presents problems of its own. Nevertheless, the inferences drawn relative to the association between heavy drinking and suicide remained the same when this alternative measure was employed.

residents. Each measure was obtained from the State Committee for Statistics (Goskomstat 2001), with the exception of the voting data, which were taken from Orttung (2000). Finally, a dummy variable indicating those regions located in the Northern Caucasus was included in the models to control for the significantly lower suicide rates in this area compared to the rest of the nation.[3] As is common with highly aggregated data, several of these variables (poverty, inequality, unemployment, urban) had positive skews and were therefore logged in order to approximate a more normal distribution.[4]

Ordinary Least Squares regression was employed to estimate the effect of regional levels of heavy drinking on regional suicide rates. Because Russian male suicide rates are much higher and vary more widely than females and past studies of other countries have shown differential effects of alcohol consumption on male and female suicide rates, models were estimated separately for overall and sex-specific suicide rates. Regression diagnostics were used to test the sensitivity of the results. Scatterplots of the independent variables with the dependent variables showed no obvious departures from linearity; a scatterplot of the residuals with the predicted Y-values suggested that the assumption of homoscedasticity holds (and there were also no more residuals with scores above 1.96 than expected in a sample of this size); similarly, a histogram of the residuals showed that their distributions did not depart substantially from normality; neither the correlations between the independent variables nor the variance inflation factors showed signs of multicollinearity, nor did the inferences drawn change when certain variables were excluded from the model alone and in concert with others; finally, leverage values and DFBETAS showed that extreme values did not appear to present a problem and that there were no outlying cases that had an undue influence on the regression line.

Results

The bottom two rows of Table 1 show the descriptive statistics for the dependent and independent variables. The regional mean for the overall suicide rate in 2000 was 42 per 100,000 persons. Table 1 also shows the correlation matrix. As expected, regional suicide rates were correlated with the proxy for heavy drinking, with overall, male, and female correlations of .48, .42 and .61, respectively.

Table 2 provides the results for model estimation when overall and sex-specific suicide rates were regressed on alcohol poisonings and control variables. Controlling for the Northern Caucasus added considerable explanatory power while not changing the inferences related to alcohol consumption. Therefore, the discussion here focuses on Models 2, 4 and 6 (overall, male, and female suicide rates, respectively). As expected, the proxy for heavy drinking was positively and significantly associated with regional suicide rates net of the other variables in the model ($\beta = .26$, $p = .01$ for overall rates). The proxy was also significantly associated with the cross-sectional variation of both male ($\beta = .21$, $p = .04$) and female ($\beta = .43$, $p = .001$) suicide rates.

The unemployment rate was positively and significantly associated with regional overall ($\beta = .35$, $p = .002$), male ($\beta = .31$, $p = .006$), and female ($\beta = .33$, $p = .001$) suicide rates.[5] Suicide

[3]Not only were suicide rates significantly lower in the Northern Caucasus, but other factors also make it important to employ this as a control. For example, a higher proportion of Muslims in these regions result in a different cultural context in the Northern Caucasus relative to the rest of Russia, not to mention religious differences and the Islamic strictures against suicide. Further, the intersection of these cultural factors with social institutions meant that several of the measures included here as controls were confounded with location in this area. Alcohol consumption was also lower in these regions and, perhaps more importantly for the new hypothesis provided later in this paper, wine products are more often consumed here than in the rest of the country, meaning that the preference for vodka is not as strong as elsewhere in Russia. Using a dummy variable for these regions should help to control for any unobserved heterogeneity due to these and other factors.
[4]Four of the regions had no cities with more than 100,000 people. Because the natural logarithm of 0 is undefined, 1 was added to each score before taking the log.

rates were also significantly higher in regions with a larger rural population, which is consistent with prior research both in the West and in former Soviet nations (Rancans, Renberg and Jacobsson 2001). None of the indicators of the strength of social institutions appeared to be related to the spatial distribution of Russian suicide rates, which may be partially explained by the findings of Kowalski, Faupel and Starr (1987), who found that measures of social structure may only be helpful in explaining suicide rates in metropolitan areas, not in rural settings. Levels of poverty were not associated with overall or female suicide rates. However, while the p-value (p = .077) did not allow for strong conclusions, the results did suggest that male suicide rates may be associated with poverty. Given the response of male mortality to the social, political and economic changes during the Russian transition, it may be that male suicide rates were more sensitive to socioeconomic change and its effects on social deregulation (Durkheim [1897]1966) instead of simply to poverty (Brainerd 2001;Whitley, Gunnell, Dorling and Smith 1999). Finally, after controlling for other variables, suicide rates in the Northern Caucasus remained significantly lower than in the rest of Russia. Not only did this control add significant explanatory power, but several of the independent variables were confounded with regional location (see footnote 3 and the correlations with the Northern Caucasus dummy in Table 2), making its inclusion important.

Discussion

The results presented here show a positive and significant cross-sectional association between the proxy for heavy drinking and suicide mortality for overall, male and female rates in Russia. [6] These cross-sectional findings are generally consistent with the conclusions drawn from Nemtsov's (2003a) time-series analysis of alcohol and suicide in Russia.[7]

While several studies of alcohol and suicide employing aggregate data have shown them to be associated, these same studies have provided conflicting results for men and women (Caces and Harford 1998). For example, Skog et al. (1995) and Rossow (1993) found stronger effects of drinking on male suicide rates relative to females. On the other hand, Rossow (1995) and Brainerd (2001) found that relative to males, female suicide mortality appeared to be more sensitive to levels of consumption. In his time-series analysis, Nemtsov's (2003a:166) results led him to conclude "that the alcohol-suicide relationship is nearly exclusively a male problem" in Russia. The findings presented here show that both male and female suicide rates were positively and significantly associated with heavy drinking. One possible explanation for the discrepancy between these and Nemtsov's results is methodological artifact. While there is considerable *cross-sectional* variation in female suicide mortality in Russia, there was little *temporal* variation in female rates over the past 40 years (Pridemore and Spivak 2003). Such a small amount of variation would make it difficult to find a significant association. A possible substantive explanation is that female suicide rates are sensitive not only to female but also to male drinking patterns. For example, alcohol use by the husband has been shown to have significant effects on wife abuse in Russia (Cubbins and Vannoy 2005), both of which may be related to female suicide rates.

Several scholars have discussed the impact of socioeconomic change and the resulting stress on levels of male mortality in transitional Russia (Leon and Shkolnikov 1998, Walberg et al.

---

[5]See Caces and Harford (1998) for a discussion of the importance of controlling for unemployment in aggregate studies of alcohol and suicide.

[6]One important issue to point out here is the potential that age is confounding the association between heavy drinking and suicide. For example, the age distribution of overall, external, alcohol-related and suicide mortality show similarities, including marked peaks in middle-aged males. When models were re-estimated including a control for males in this age group, however, it was not significant and the inferences did not change for any of the other associations (including the alcohol-suicide link). Similar results for heavy drinking, age and homicide in Russia have been reported elsewhere (see Table 2 in Pridemore 2002).

[7]In that study, Nemtsov also reported that estimates of BAC-positive suicides in Russia were much higher than in other nations from which such estimates are available.

1998). Further, Pridemore and Kim (2006b) found that socioeconomic change was significantly related to the change in Russian homicide rates during the 1990s, and Brainerd (2001:1007) showed that male suicide rates were "highly sensitive" and female suicide rates "insensitive to the state of the macroeconomy" in her study of several former Soviet transitional countries. With recent evidence suggesting Russian males are more likely than females to drink heavily in the context of stress control (Koposov et al. 2002), research should be undertaken to examine the effects of socioeconomic change on suicide, both directly and indirectly via alcohol consumption. It should be noted, however, that the cross-sectional association between alcohol and suicide was apparent well before the dissolution of the Soviet Union, and thus is not a period effect due solely to the conditions of the Russian transition.

Dry/Wet Drinking Cultures vs. Alcohol Preference

In their summary of several studies of alcohol and mortality, Norström and Skog (2001:S16) concluded that "the aggregate link between alcohol and suicide...is quite marked in northern Europe, but weak or non-existent in south and central Europe." Norström (1995) contended that differences in sensitivity of suicide rates to alcohol consumption may be due to the level of integration of alcohol into the national culture. His main idea was that heavy drinking and accompanying behavior are more accepted in wet drinking cultures, while similar behavior in dry cultures is more likely to be perceived as abnormal. Heavy drinkers in dry cultures are therefore more likely to be marginalized, to have weaker social and familial bonds, and thus to be at higher risk for suicide. This hypothesis has received general support from studies of several European countries, especially when comparing the strength of association between alcohol and suicide in the wet drinking cultures of southern and central Europe to the dry drinking cultures of northern Europe (Norström 1995, Ramstedt 2001, Skog et al. 1995).

The positive association between alcohol and suicide in Russia found in this study appears to be at odds with Norström's hypothesis. Russia is a definitively wet drinking culture – not due simply to high levels of alcohol consumption, but to the long history of alcohol's integration into Russian culture and daily routines – with a high social tolerance for heavy drinking (White 1996). Further, the conclusions drawn from the present study coincide with those of Nemtsov (2003a), who also pointed out the inconsistencies between his results and Norström's theory. An alternative hypothesis that is consistent with the present findings *and* in accord with the findings from the studies cited above, however, is the potential connection between beverage preference and suicide rates. Southern and central Europe are considered beer and wine countries, whereas distilled spirits are more prevalent in Scandinavia and Russia. This beverage-specific hypothesis is consistent with studies that have shown an association between spirits and suicide but not between overall or beer/wine consumption and suicide (Gruenewald et al. 1998, Razvodovsky 2003). This potential beverage-specific association with violence directed at the self is also a theme in a Norström (1998a) study of violence directed at others, and Pridemore (2002) argued that what (i.e., vodka) and how (i.e., binge) Russians drink may be responsible for the robust association between alcohol and homicide in the country. The results from Russia are also consistent with conclusions drawn by Mäkelä (1996) specifically and more generally by Rossow's (2000) literature review, both of whom stated that the relationship between alcohol and suicide was stronger among those who drank more frequently and to a deeper intoxication (see also Norström and Skog 2001).[8]

---

[8]Further, the quicker and deeper intoxication resulting from heavy consumption of spirits may act as disinhibitor against self-harm and/ or a catalyst for (or intensifier of) emotional distress. Further, the ill effects on health and on the economic conditions of heavy spirits drinkers (especially in the face of the collapse of the social safety net during marketization) could serve to exacerbate any existing suicidal ideation in those already at risk.

Limitations

There are a few main limitations that must be considered when interpreting these results. The first is the measurement of alcohol consumption in Russia. As discussed earlier, the different ways of creating area estimates of consumption used elsewhere would result in invalid estimates in Russia. Nemtsov has in several publications created estimates of per capita consumption using various methods and has also examined BAC-positive suicides, but these estimates were either for the country as a whole or for a small number of regions, and thus were not available for all the regions employed in this analysis. In light of this situation, Shkolnikov, McKee and Leon (2001:917) stated that "changes in acute alcohol poisoning can be regarded as a good estimation of changes in the frequency of excessive drinking" in Russia, and it has become common to employ this cause-of-death category as a proxy for heavy drinking until valid estimates from more direct indicators can be created.

Another potential limitation concerns the Russian mortality data, which in the past were falsified by the Soviet government[9] and which have reported dramatic changes over the past 15 years. The validity of the Soviet and Russian overall and external cause mortality data has been examined closely. Anderson, Katus and Silver (1994),Anderson and Silver (1997),Leon et al. (1997), and Wasserman and Värnik (1998) all concluded that the data are valid, though subject to the same sources of error in measuring suicide as in other nations. However, during the 1990s the number of all violent deaths placed in the "violent death, cause unspecified" category (number 175 in the Soviet classification that was used before Russia switched to ICD-10 in 1999) increased disproportionately. Many of these were undoubtedly suicides (Pridemore 2003a,Shkolnikov and Chervyakov 2000), and this phenomenon deserves further research.

Finally, it may be argued that the association between heavy drinking and suicide rates is spurious. The most plausible explanation in this situation is that heavy drinking and suicide are both caused by some other variable such as the anomic conditions of the Russian transition.

Conclusion

Nemtsov (2002:1424) revealed the "incredible rate of alcohol-related mortality in Russia" and the relationship over time between alcohol and suicide rates in the country (Nemtsov 2003a). The results from the present study showed a positive cross-sectional association between heavy drinking and regional suicide rates after controlling for social structural factors. This association held for both males and females.

This study is unique in several respects. First, Norström and Skog (2001) called for more country-specific analyses of the aggregate-level alcohol-suicide link. Similarly, though some have noted similarities in drinking and suicide trends or shown an association between drinking and overall and external cause mortality in Russia (Chenet et al. 1998, Gavrilova et al. 2000, Leon and Shkolnikov 1998, Nemtsov 1998, Reitan 2000), very few studies have directly tested the association between alcohol and suicide (Nemtsov 2003a). This research is thus one of the few to study heavy drinking and suicide in Russia and is the first of its kind to examine their cross-sectional covariation. This is important given (1) past Soviet secrecy that restricted valid

---

[9]These vital statistics data were inaccessible until recently. For most of the Soviet era, mortality data were provided only to government statisticians for creating classified reports (Shkolnikov and Meslé 1996). From 1965 to 1987, suicides were among a group of ideologically sensitive causes of death that were extracted from the original statistical tables and put into a secret table called "5B" (Andreev et al. 1995). There was no pressure to falsify the initial cause of death decision, however, and thus the underlying data still contained valid estimates of homicide and suicide deaths. Nevertheless, this count remained classified and the deaths in Table 5B were publicly reported in the "other and unknown causes" category. This secrecy ended in the late 1980s and today suicide data are released annually in various publications available from the Russian State Committee for Statistics and the Russian Ministry of Health.

studies, (2) the very high rates of heavy drinking and suicide in the country, and (3) the considerable variation in drinking and suicide rates throughout the vast nation.

A second unique contribution is the beverage-specific hypothesis that may tie together seemingly disparate findings. The results presented here appear to run counter to Norström's (1995a) notion that the alcohol-suicide association is weak or absent in wet drinking cultures, but are consistent with research that has shown that the type of alcohol consumed plays an important role. However, while the beverage-specific hypothesis is *theoretically* different, it is consistent with the *empirical* findings of Norström and others concerning wet/dry drinking cultures and work on the relationship between beverage-specific effects on suicide and other types of violence (Gruenewald et al. 1995, Nemtsov 2003a, Norström 1998a, Ramstedt 2001, Razvodovksy 2003). In other words, at least in terms of the alcohol-suicide link, the beverage of choice may be just as important as the drinking culture itself. Of course one may reasonably argue that Russia is unique, and that this hypothesis is tenuous. Nevertheless, this evidence offers a new hypothesis to be tested, and this new hypothesis draws in large part from the results of studies of beverage-specific effects on violence and suicide in other nations such as the United States, Sweden and Belarus. Finally, these findings invite further study of the effects of heavy drinking on sex-specific rates of suicide mortality in Russia and on how drinking patterns in the country (e.g., binge drinking and the preference for distilled spirits), not just alcohol consumption in general, may influence suicide rates and other forms of violent mortality.

References

Anderson, Barbara A.; Katus, Kalev; Silver, Brian D. "Developments and Prospects for Population Statistics in Countries of the Former Soviet Union.". Population Index 1994;60:4–20. [PubMed: 12287682]

Anderson, Barbara A., and Brian D. Silver. 1997. "Issues of Data Quality in Assessing Mortality Trends and Levels in the New Independent States." Pp. 120–55. Premature Death in the New Independent States. J.L. Bobadilla, C.C. Costello and F. Mitchell, editors. National Academy Press.

Andreev, Evgueni, Sergei Scherbov and Frans Willekens. 1995. Sources of Information on the Population of Russia. University of Groningen Press.

Babor, Thomas F., A. Wolfson, D. Boivin, S. Radouco-Thomas and W. Clark. 1992. "Alcoholism, Culture, and Psychopathology: A Comparative Study of French, French Canadian, and American Alcoholics." Pp. 182–97. Alcoholism in Europe, North American, and Asia. J.E. Helzer and G.J. Canino, editors. Oxford University Press.

Baller, Robert D.; Richardson, Kelly. "Social Integration, Imitation, and the Geographic Patterning of Suicide.". American Sociological Review 2002;67:873–88.

Blum, Alain; Monnier, Alain. "Recent Mortality Trends in the USSR: New Evidence.". Population Studies 1989;43:211–41.

Bobak, Martin; McKee, Martin; Rose, Richard; Marmot, Michael. "Alcohol Consumption in a National Sample of the Russian Population.". Addiction 1999;94:857–66. [PubMed: 10665075]

Elizabeth, Brainerd. "Economic Reform and Mortality in the Former Soviet Union: A study of the Suicide Epidemic in the 1990s.". European Economic Review 2001;45:1007–19.

Caces, Fe; Harford, Thomas C. "Time series Analysis of Alcohol Consumption and Suicide Mortality in the United States, 1934–1987.". Journal of Studies on Alcohol 1998;59:455–61. [PubMed: 9647428]

Chenet, Laurent; McKee, Martin; Leon, David A.; Shkolnikov, Vladimir M.; Vassin, Sergei. "Alcohol and Cardiovascular Mortality in Moscow: New Evidence of a Causal Association.". Journal of Epidemiology and Community Health 1998;52:772–74. [PubMed: 10396517]

Cubbins, Lisa A.; Vannoy, Dana. "Socioeconomic Resources, Gender Traditionalism, and Wife Abuse in Urban Russian Couples.". Journal of Marriage and Family 2005;67:37–52.

Durkheim, Emile. [1897] 1966. Suicide: A Study in Sociology. John A. Spaulding and George Simpson, translators. Free Press.

Gavrilova, Natalia S.; Semyonova, Victoria G.; Evdokushkina, Galina N.; Gavrilov, Leonid A. "The Response of Violent Mortality to Economic Crisis in Russia.". Population Research and Policy Review 2000;19:397–419.

Goskomstat. 2001. Rossiiskoi Statisticheskii Ezhegodnik [Russian statistical yearbook].

Gruenewald, Paul J.; Ponicki, William R.; Mitchell, Patrick R. "Suicide Rates and Alcohol Consumption in the United States, 1970–1989.". Addiction 1995;90:1063–75. [PubMed: 7549775]

Jernigan, David. 1997. Thirsting for Markets: The Global Impact of Corporate Alcohol. San Rafael, CA: The Marin Institute for the Prevention of Alcohol and Other Drug Problems.

Koposov, Roman A.; Ruchkin, Vladislav V.; Eisemann, Martin; Sidorov, Pavel I. "Alcohol Use in Adolescents from Northern Russia: The Role of Social Context.". Alcohol and Alcoholism 2002;37:297–303. [PubMed: 12003922]

Kowalski, Gregory S.; Faupel, Charles E.; Starr, Paul. "Urbanism and Suicide: A Study of American Counties.". Social Forces 1987;66:85–101.

Laatikainen, Tiina; Alho, Hannu; Vartiainen, Erkki; Jousilahti, Pekka; Sillanaukee, Pekka; Puska, Pekka. "Self-Reported Alcohol Consumption and Association to Carbohydrate-Deficient Transferrin and Gamma-Glutamyltransferase in a Random Sample of the General Population in the Republic of Karelia, Russia and in North Karelia, Finland.". Alcohol and Alcoholism 2002;37:282–88. [PubMed: 12003919]

Leon, David A.; Chenet, Laurent; Shkolnikov, Vladimir M.; Zakharov, Sergei; Shapiro, Judith; Rakhmanova, Galina; Vassin, Sergei; McKee, Martin. "Huge Variation in Russian Mortality Rates, 1984–94: Artefact, Alcohol, or What?". Lancet 1997;350:383–88. [PubMed: 9259651]

Leon, David A.; Vladimir M, Shkolnikov. "Social Stress and the Russian Mortality Crisis.". JAMA 1998;279:790–91. [PubMed: 9508158]

Mäkelä, Pia. "Alcohol Consumption and Suicide Mortality by Age Among Finnish Men, 1950–1991.". Addiction 1996;91:101–12. [PubMed: 8822018]

Mäkinen, Ilkka H. "Eastern European Transition and Suicide Mortality.". Social Science & Medicine 2000;51:1405–20. [PubMed: 11037226]

McKee, Martin. "Alcohol in Russia.". Alcohol and Alcoholism 1999;34:824–29. [PubMed: 10659717]

McKee, Martin; Süzcs, Sándor; Sárváry, Attila; Ádany, Roza; Kiryanov, Nikolay; Saburova, Ludmila; Tomkins, Susannah; Andreev, Evgueni; Leon, David A. "The Composition of Surrogate Alcohols Consumed in Russia.". Alcoholism: Clinical and Experimental Research 2005;29:1884–88.

Nemtsov, Alexander V. Drug and Alcohol Dependence 2003a "Suicides and Alcohol Consumption in Russia 1965–1999";71:161–68. [PubMed: 12927654]

_____. 2003b"Alcohol Consumption Level in Russia: A viewpoint on Monitoring Health Conditions in the Russian Federation (RLMS)." 98. 36970

_____. 2002"Alcohol-Related Human Losses in Russia in the 1980s and 1990s.". Addiction97141325 [PubMed: 12410782]

_____. 2000"Estimation of Total Alcohol Consumption in Russia, 1980–1994. Drug and Alcohol Dependence58133142 [PubMed: 10669064]

_____. 1998"Alcohol-Related Harm and Alcohol Consumption in Moscow Before, During, and After a Major Alcohol Campaign.". Addiction93150110 [PubMed: 9926554]

Norström, Thor. "Effects on Criminal Violence of Different Beverage Types and Private and Public Drinking.". Addiction 1998a;93:689–99.

_____. 1998b"Estimating Changes in Unrecorded Alcohol Consumption in Norway Using Indicators of Harm.". Addiction93153138

_____. 1995a"Alcohol and Suicide: A Comparative Analysis of France and Sweden.". Addiction90146369

_____. 1995bThe Impact of Alcohol, Divorce, and Unemployment on Suicide: A Multilevel Analysis.". Social Forces74293314

_____. 1988"Alcohol and Suicide in Scandinavia.". British Journal of Addiction8355359 [PubMed: 3382813]

Norström, Thor; Skog, Ole-Jorgen. "Alcohol and Mortality: Methodological and Analytical Issues in Aggregate Analyses.". Addiction 2001;96(Supplement 1):S5–S17. [PubMed: 11228078]

Notzon, Francis C.; Komarov, Yuri M.; Ermakov, Sergei P.; Sempos, Christopher T.; Marks, James S.; Sempos, Elena. "Causes of Declining Life Expectancy in Russia.". JAMA 1998;279:793–800. [PubMed: 9508159]

Orttung, Robert W., editor. 2000. The Republics and Regions of the Russian Federation: A Guide to Politics, Policies, and Leaders. M.E. Sharpe.

Pridemore, William A. "Measuring Homicide in Russia: A Comparison of Estimates from the Crime and Vital Statistics Reporting Systems.". Social Science and Medicine 2003a;57:1343–54. [PubMed: 12927465]

_____. 2002"Vodka and Violence: Alcohol Consumption and Homicide Rates in Russia.". American Journal of Public Health92192130 [PubMed: 12453810]

Pridemore, William A.; Kim, Sang-Weon. "Patterns of Alcohol-Related Mortality in Russia.". Journal of Drug Issues 2006a;36:229–48. [PubMed: 16900263]

Pridemore, William A., and Sang-Weon Kim. 2006b. "Negative Socioeconomic Change and Crime in a Transitional Society." Forthcoming. The Sociological Quarterly.

Pridemore, William A.; Spivak, Andrew L. "Patterns of Suicide Mortality in Russia.". Suicide and Life-Threatening Behavior 2003;33:132–50. [PubMed: 12882415]

Ramstedt, Mats. "Alcohol and Suicide in 14 European Countries.". Addiction 2001;96(Supplement 1):S59–S76. [PubMed: 11228079]

Rancans E, Renberg E Salander, Jacobsson L. "Major Demographic, Social and Economic Factors Associated to Suicide Rates in Latvia, 1980–1998.". Acta Psychiatrica Scandinavica 2001;103:275–81. [PubMed: 11328241]

Razvodovsky, Yury E. "Association Between Distilled Spirits Consumption and Violent Mortality Rate.". Drugs: Education, Prevention, and Policy 2003;10:235–50.

_____. 2001"Association Between the Level of Alcohol Consumption Per Capita and Suicide Rate: Results of Time-Series Analysis.". Alcoholism: Journal on Alcoholism and Related Addictions373543

Reitan, Therese C. "Does Alcohol Matter? Public Health in Russia and the Baltic Countries Before, During, and After the Transition.". Contemporary Drug Problems 2000;27:511–60.

Rossow, Ingeborg. "Suicide, Violence, and Child Abuse: Review of the Impact of Alcohol Consumption on Social Problems.". Contemporary Drug Problems 2000;27:397–434.

_____. 1996"Alcohol and Suicide - Beyond the Link at the Individual Level.". Addiction91141316 [PubMed: 8917923]

_____. 1995"Regional Analyses of Alcohol and Suicide in Norway: Some Empirical Considerations.". Suicide and Life-Threatening Behavior254019 [PubMed: 8553421]

_____. 1993"Suicide, Alcohol and Divorce: Aspects of Gender and Family Integration.". Addiction88165965 [PubMed: 8130705]

Russian Mortality Database. 2003. Provided to author by Dr. Evgueni Andreev and Nina Andrianova, excerpted from Russian State Committee for Statistics data and standardized according to European Population Standard.

Shkolnikov, Vladimir M., and Valeriy V. Chervyakov, editors. 2000. Policies for the Control of the Transition's Mortality Crisis. United Nations Development Programme.

Shkolnikov, Vladimir M.; McKee, Martin; Chervyakov, Valeriy V.; Kirianov, Nikolay A. "Is the Link Between Alcohol and Cardiovascular Death Among Young Russian Men Due to Misclassification of Acute Alcohol Intoxication? Evidence from the City of Izhevsk.". Journal of Epidemiology and Community Health 2002;56:171–74. [PubMed: 11854335]

Shkolnikov, Vladimir M.; McKee, Martin; Leon, David A. "Changes in Life Expectancy in Russia in the mid-1990s.". Lancet 2001;357:917–21. [PubMed: 11289348]

Shkolnikov, Vladimir M., and France Meslé. 1996. "The Russian Epidemiological Crisis as Mirrored by Mortality Trends." Pp. 113-62. Russia's Demographic "Crisis." Julie DaVanzo, editor. Rand.

Shkolnikov, Vladimir M.; Meslé, France; Vallin, Jacques. "Health Crisis in Russia II. Changes in Causes of Death: A Comparison with France and England and Wales (1970 to 1993).". Population: An English Section 1996;8:155–89.

Skog, Ole-Jorgen. "Alcohol and Suicide in Denmark 1911–1924 – Experiences from a Natural Experiment.". Addiction 1993;88:1189–93. [PubMed: 8241918]

Skog, Ole-Jorgen; Elekes, Zsuzsanna. "Alcohol and the 1950–1990 Suicide Trend – Is There a Causal Connection?". Acta Sociologica 1993;36:33–46.

Skog, Ole-Jorgen; Teixeira, Zelia; Barrias, Jose; Moreira, Rui. "Alcohol and Suicide – Portuguese Experience.". Addiction 1995;90:1053–61. [PubMed: 7549774]

Smart, Reginald G.; Mann, Robert E. "Treatment, Alcoholics Anonymous, and Alcohol Controls During the Decrease in Problems in Alberta: 1975–1993.". Alcohol and Alcoholism 1998;33:265–72. [PubMed: 9632052]

Treml, Vladimir G. 1997. "Soviet and Russian Statistics on Alcohol Consumption and Abuse." Pp. 220–38. Premature Death in the New Independent States. J.L. Bobadilla, C.A. Costello and F. Mitchell, editors. National Academy Press.

Walberg, Peder; McKee, Martin; Shkolnikov, Vladimir M.; Chenet, Laurent; Leon, David A. "Economic Change, Crime, and Mortality Crisis in Russia: Regional Analysis.". British Medical Journal 1998;317:312–18. [PubMed: 9685275]

Wasserman, Danuta; Värnik, Airi. "Reliability of Statistics on Violent Death and Suicide in the Former USSR, 1970–1990.". Acta Psychiatrica Scandinavica 1998;394(Supplement):34–41.

Wasserman, Danuta; Värnik, Airi; Eklund, Gunnar. "Female Suicides and Alcohol Consumption During Perestroika in the Former USSR.". Acta Psychiatrica Scandinavica 1998;394(Supplement):26–33.

White, Stephen. 1996. Russia Goes Dry: Alcohol, State, and Society. Cambridge University Press.

Whitley, Elise; Gunnell, David; Dorling, Daniel; Smith, George D. "Ecological Study of Social Fragmentation, Poverty, and Suicide.". British Medical Journal 1999;319:1034–37. [PubMed: 10521194]

World Advertising Research Center. 2002. World Drink Trends. Oxfordshire, UK: WARC

Acknowledgements

Table 1

Correlation Matrix and Descriptive Statistics for Dependent and Independent Variables (n = 78)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Suicide	1.00													
2. Male Suicide	.99	1.00												
3. Female Suicide	.91	.87	1.00											
4. Alcohol	.48	.47	.48	1.00										
5. Male Alcohol	.42	.42	.40	.98	1.00									
6. Female Alcohol Proxy	.55	.52	.61	.92	.83	1.00								
7. Poverty	.33	.33	.29	.13	.10	.17	1.00							
8. Inequality	-.19	-.22	-.09	-.25	-.27	-.17	-.37	1.00						
9. Unemployment	.17	.13	.25	-.06	-.12	.10	.37	-.16	1.00					
10. Singles	.19	.17	.31	.22	.18	.31	-.21	.14	-.07	1.00				
11. Education	-.27	-.29	-.18	-.31	-.31	-.26	-.22	.52	-.27	.11	1.00			
12. Polity	-.22	-.20	-.28	-.27	-.27	-.24	.13	-.05	.05	-.45	-.02	1.00		
13. Urban	-.32	-.32	-.39	-.05	-.04	-.07	-.34	.22	-.24	-.15	.39	-.07	1.00	
14. Caucasus	-.47	-.49	-.37	-.41	-.41	-.36	.08	.09	.47	-.30	.08	.28	-.03	1.00
Mean	42.1	77.3	12.0	28.7	46.3	13.1	42.7	6.0	11.8	3.7	27.0	69.3	39.0	BBB
St. Deviation	17.1	30.2	6.1	17.5	27.3	10.1	16.2	2.8	4.2	1.0	13.8	4.6	16.5	—

Notes. Results for poverty, inequality, unemployment and urban are for the logarithmically transformed values.

Table 2

OLS Estimates of Regional Suicide Rates Regressed on Alcohol Proxyand Control Variables

	Overall		Male		Female	
	Model 1 b (β)	Model 2 b (β)	Model 3 b (β)	Model 4 b (β)	Model 5 b (β)	Model 6 b (β)
Intercept	23.10	−.69	37.30	−.33	16.42	7.31
Alcohol	.39 (.40)***	.26 (.26)***	.37 (.33)***	.23 (.21)**	.33 (.54)***	.26 (.43)***
Poverty	9.79 (.22)*	7.56 (.17)*	19.74 (.25)**	15.04 (.19)*	1.79 (.11)	1.37 (.08)
Inequality	2.60 (.04)	4.67 (.07)	3.15 (.03)	6.64 (.06)	1.57 (.07)	2.26 (.10)***
Unemployment	3.71 (.07)	18.07 (.35)***	2.57 (.03)	28.52 (.31)***	2.27 (.12)	6.15 (.33)***
Singles	.49 (.06)	−.45 (−.05)	1.21 (.08)	−.70 (−.05)	.06 (.02)	−.12 (−.04)
Education	−.03 (−.02)	.05 (.04)	−.16 (−.07)	.01 (.00)	.05 (.11)	.07 (.16)
Polity	−.49 (−.13)	−.28 (−.08)	−.77 (−.12)	−.39 (−.06)	−.25 (−.19)**	−.19 (−.14)*
Urban	−4.14 (−.21)*	−4.49 (−.23)**	−6.45 (−.19)	−7.25 (−.21)**	−2.50 (−.358)***	−2.55 (−.36)***
N. Caucasus		−3.65 (−.55)***		−56.23 (−.57)***		−7.60 (−.38)***
Adj. R²	.31	.49	.26	.46	.51	.59

*
 p < .10

**
 p < .05

***
 p < .01

Notes. Parentheses contain standardized coefficients. Logarithmically transformed values were used for poverty, inequality, unemployment, and urban. Results for males in Models 3 and 4 and females in Models 5 and 6 used male- and female-specific alcohol proxy, respectively