

## Short Communication

# Affordability of Alcohol and Alcohol-Related Outcomes in Russia

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**Abstract**

**Background:** Studies from many countries have shown an inverse relationship between alcohol prices and alcohol drinking and concluded that economic availability (affordability) of alcohol is one of the most important predictors of alcohol-related harm.

**Objective:** The aim of the present study was to estimate the relationship between the affordability of vodka and alcohol-related outcomes in post-Soviet Russia.

**Methods:** Trends in the affordability of vodka and mortality from external causes (violent mortality), fatal alcohol poisonings and incidence of alcoholic psychoses between 1991 and 2015 were compared.

**Results:** A Spearman correlation analysis suggests a statistically significant negative association between the affordability of vodka and violent mortality ( $r = 0.51$ ;  $p < 0.009$ ), including fatal alcohol poisonings ( $r = 0.49$ ;  $p < 0.015$ ). The association between vodka affordability and alcoholic psychoses incidence rates was also negative; but, statistically not significant ( $r = 0.03$ ;  $p < 0.895$ ).

**Conclusions:** The results from this study suggest an inverse aggregate-level relationship between vodka affordability and alcohol-related outcomes in Russia. These findings point to the complex relationship between alcohol affordability and alcohol-related outcomes. The major conclusion emerging from this study is that the estimation of the relationship between alcohol affordability and alcohol-related harm needs to take into account multiple confounding variables.

**Keywords**

- Affordability
- Vodka
- Alcohol-related outcomes
- Russia

## INTRODUCTION

Alcohol is the biggest killer in Russia, accounting for about half of deaths among working-age men [1]. Harmful drinking is considered by many public health experts to be a national disaster in this country [2-6]. The high level of alcohol consumption, together with a pattern of occasional excessive intake of vodka (binge drinking), is associated with tremendous effect on public health [1]. Many commentators believe that binge drinking of vodka is a major cause of strikingly higher mortality from external causes and cardiovascular diseases in the Russian Federation [6-8]. Previous studies have documented significant contemporaneous effects of changes in vodka consumption per capita and mortality rates in Russia [9-11].

Available evidence suggests that low price is one of the major drivers of alcohol consumption and alcohol-related harm [12]. The majority of aggregate econometric studies indicate that higher taxes and real prices on alcohol reduce the alcohol consumption and alcohol-related outcomes [13,14]. It was suggested that reducing the affordability of alcohol is one of the most effective interventions for reducing the harm caused by alcohol [15].

There is some evidence from Eastern Europe suggesting that alcohol-related morbidity and mortality responds to the changes in the economic availability of alcohol [16,17]. Most experts agree that the affordability of vodka is one of the most important predictors of the dramatic fluctuations in Russian mortality during the last decades [18]. In particular, the increase in heavy drinking in Russia during transition, which triggered the dramatic rise in alcohol-related mortality, resulted from an increase in the affordability of vodka [19].

Russian historical perspective also provides evidence that decreasing in vodka affordability by rising taxes is the effective strategy for reducing alcohol-related harm. Using historical data from tsarist Russia Norström and Stickley reported that changes in vodka taxes were significantly associated with alcohol consumption and alcohol-related mortality [20]. Against this background, it would be interesting to evaluate the relationship between affordability of vodka and alcohol-related outcomes in post-Soviet Russia. In relation to this, trends in the affordability of vodka and mortality from external causes, fatal alcohol poisonings and incidence of alcoholic psychoses between 1991 and 2015, were compared.

## METHODS

The data on violent mortality and alcohol psychoses incidence rates (per 100.000 of the population), average salary and price of vodka are taken from the Russian State Statistical Committee (Rosstat) reports (<http://www.gks.ru/>). Here we specified the number of alcohol dependent patients with alcoholic psychoses admitted to the hospital for the first time as the incidence of alcoholic psychoses and the number of liters of vodka that an average monthly salary could buy as the affordability of vodka. To examine the relation between vodka affordability and alcohol-related outcomes a Spearman correlation analysis was performed using the statistical package "Statistica 12. StatSoft."

## RESULTS

The affordability of vodka in Russia has increased significantly since the early 1990s: the average salary in 1992 could buy 12.0 liters of vodka compared with 91.2 liters in 2011. The affordability of vodka decreased substantially in 1992; and then, began rising again. Between 1999 and 2005, the affordability of vodka increased dramatically (mostly because of the rapid growth of disposable incomes as the economy recovered), and then the affordability trend turned down (Figure 1).

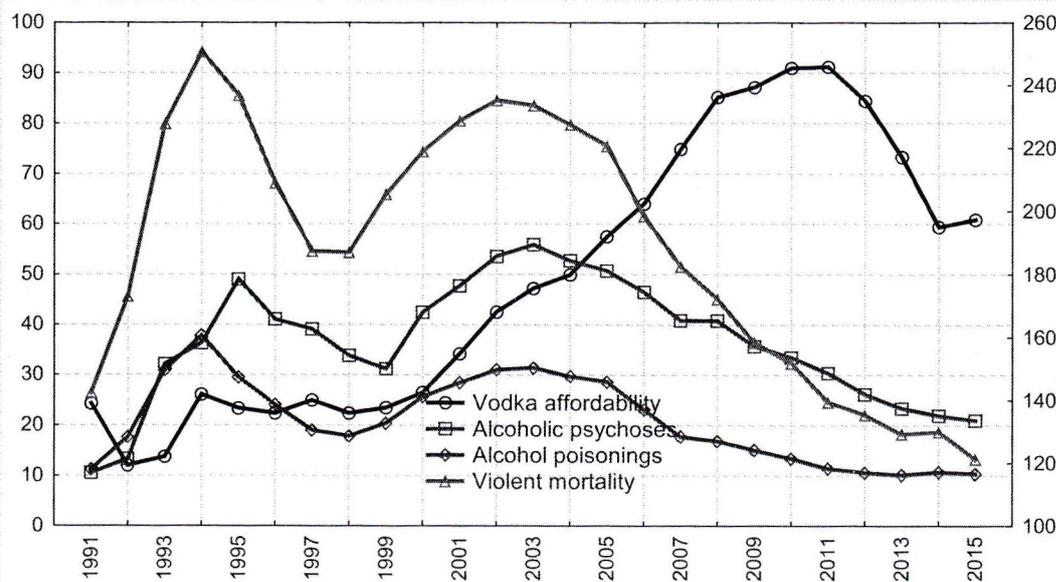
The alcohol-related outcomes fluctuated over the period: increased substantially between 1991 and 1994; from 1995-1998 there was a fall in the rates before they again jumped between 1999 and 2003; and then, started a downward trend (Figure 1). As can be seen from Figure 1, the temporal pattern of affordability of vodka and alcohol-related outcomes differs markedly. A Spearman correlation analysis suggests a statistically significant negative association between the affordability of vodka and violent mortality ( $r = 0.51$ ;  $p < 0.009$ ), including fatal alcohol poisonings ( $r = 0.49$ ;  $p < 0.015$ ). The association between vodka affordability and alcoholic psychoses incidence rates was also negative; but, statistically not significant ( $r = 0.03$ ;  $p < 0.895$ ).

## DISCUSSION

The findings from time series analysis suggest an inverse relationship between vodka affordability and alcohol-related outcomes. These results seem to contradict previous findings indicating that alcohol-related harm is closely related to prices on distilled spirits [19]. Nevertheless, a significant increasing in the affordability of vodka appears to have been a major driver of dramatic increasing in the alcohol-related outcomes rate between 1999 and 2003. Although taxes were periodically adjusted for inflation, the real value of the excise has dropped sharply during these years [18]. After 2003 the alcohol-related outcomes rate was falling, even though the affordability of vodka was increasing. It is clear that the downward trend in the alcohol-related outcomes rate between 2003 and 2011 is not related to the affordability of vodka. It is highly probable that this downward trend might be attributed to the new anti-alcohol laws, introduced by Russian government over the last decades [3].

Anti-alcohol activity in this country began with the adoption of two laws in 2005 [21]. The first one (102-Federal Law), among other issues, introduced new excise stamps from January 1, 2006. There was a significant delay with their printing: first stamps were issued in February 2006 only for 0.5l vodka bottles. This resulted in chaos on the alcohol market and shortages of the legal alcohol [3]. The second law (209-Federal Law) significantly increased nominal capital of alcohol market players since July 1, 2006, so that the market became free from small and average players in favor of large producers [3].

These policy measures were accompanied by both alcohol consumption and alcohol-related outcomes rate decrease in 2006-2007. It seems plausible that this decrease was based not on the direct effects of the laws of 2005, but rather on negligent execution of these laws and subsequent chaos on the alcohol market which caused the decrease of physical availability of



**Figure 1** Trends in vodka affordability (left scale) and alcoholic psychoses (left scale), fatal alcohol poisonings (left scale) and violent mortality (right scale) rates in Russia.

legal vodka [3]. It should be also emphasized that the beginning of the decrease of alcohol-related outcomes rate had preceded the adoption of anti-alcohol legislation of 2005, and this decrease had not been due to any of the government's maneuvers on the alcohol market.

Further, a new set of amendment to the 171 Federal Law was adopted in 2011 [5]. Most importantly, excise tax rates on vodka in Russia have increased 2.7 times (from 34 to 93 rubles per liter of pure alcohol) between 2011 and 2015 [6]. At the same time, facing economic crisis the Russian government reduced minimal price on vodka by 16% from 1 February 2015, which means the increasing in the affordability of vodka [18].

It is important to acknowledge that alcohol affordability is just one factor that may affect alcohol consumption and alcohol-related harm; and, that may be the multiple confounders in this association including social and cultural variables. In relation to this, some experts consider that high alcohol-related mortality in Russia may be attributed to the wide availability of illegal alcohol and non-beverage alcohol surrogates, which often contained toxic substances such as methanol [22,23]. They reasonably argue that unrecorded alcohol poses a risk to human health and undermines alcohol control policy measures introduced in this country over the last decade [22,23].

In conclusion, the results from this study suggest an inverse aggregate-level relationship between vodka affordability and alcohol-related outcomes in Russia. These findings point to the complex relationship between alcohol affordability and acute/long-term alcohol-related outcomes. The major conclusion emerging from this study is that the estimation of the relationship between alcohol affordability and alcohol-related harm needs to take into account multiple confounding variables.

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