

## Alcohol Affordability and Epidemiology of Alcoholism in Belarus

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**Abstract** – *Background:* Since the alcohol abuse has numerous adverse health and social consequences, the consumers' response to changes in alcohol affordability is an important issue of alcohol policy debates. Studies from many countries have shown an inverse relationship between alcohol prices and alcohol consumption in a population. There are, however, suggestions that increasing the price of alcohol by rising taxes may have limited effect on alcohol-related problems, associated with long-term heavy drinking. *Objective:* The aim of the present study was to evaluate the relationship between alcohol affordability and epidemiological parameters of alcoholism (alcohol dependence prevalence rate and the number of patients undergoing treatment for alcohol dependence) in post-Soviet Belarus. *Method:* With this purpose, trends in epidemiological parameters of alcoholism and affordability of vodka between 1980 and 2010 were compared. *Results:* The time series analysis revealed that 1% increase in vodka affordability is associated with an increase in the prevalence of alcohol dependence rate of 0,3%, an increase in the number of patients undergoing treatment for alcohol dependence of 0,31%. *Conclusions:* The major conclusion emerging from this study is that affordability of alcohol is one of the most important predictors of alcohol-related problems in a population. These findings provide additional evidence that decreasing the affordability of alcohol is an effective strategy for reducing alcohol consumption and alcohol-related damage.

**Key words:** alcohol, affordability, alcohol dependence, prevalence, Belarus.

## INTRODUCTION

Since the alcohol abuse has numerous adverse health and social consequences, the consumers' response to changes in alcohol affordability is an important issue of alcohol policy debates.<sup>1-3</sup> Over the past several decades a number of papers were published that examine the impact of the affordability of alcohol on alcohol consumption.<sup>4-13</sup> Studies from many countries have shown an inverse relationship between alcohol prices and alcohol drinking and concluded that affordability of alcohol is one of the most important predictors of alcohol consumption in a population.<sup>14-20</sup>

Several studies evaluated the effects of changes in a price or taxes on various outcomes related to harmful alcohol consumption, including alcohol dependence, known to be specifically attributed to long-term alcohol abuse.<sup>7,15</sup> Accumulated research evidence showed clearly that alcohol prices were significantly and inversely related to alcohol-related morbidity and mortality.<sup>4,6,7</sup> A recent systematic review of studies examining the effects of alcohol prices and taxes on alcohol-related morbidity and mortality yields meta-estimates  $-0.347$  for liver cirrhosis and other alcohol-related outcomes.<sup>19</sup>

There are, however, suggestions that increasing the price of alcohol by rising taxes may have limited effect on alcohol-related problems, associated with long-term heavy drinking.<sup>21</sup> Therefore, additional studies are needed to elucidate the effect of alcohol affordability on liver cirrhosis mortality. Against this background, it would be interesting to evaluate the relationship between vodka affordability and epidemiological parameters of alcoholism (alcohol dependence prevalence rate and the number of patients undergoing treatment for alcohol dependence) in post-Soviet Belarus.

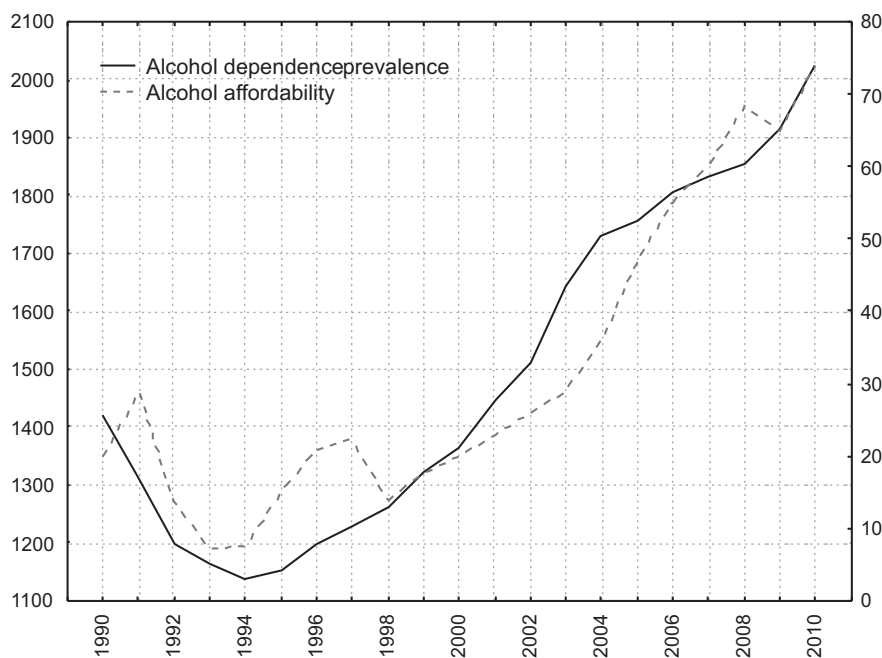
## METHOD

In Belarus, there is a network of specialized medical establishments belonging to the state narcological service of the Health Ministry. Before 1976, narcological treatment was carried out in the framework of medical establishments, specialized in psychiatry. As the level of alcohol-related problems was constantly growing, it was decided to organize a narcological service. Since then, its structure and principles of work have remained unchanged. The main establishment in the network of narcological service is a health center (dispensary), which includes a polyclinic and a hospital and works according to regional principle. Its aim is to prevent and diagnose alcohol and drug dependencies, to provide free treatment, to carry out dynamic moni-

toring of patients under registration. Statistical data of narcological service reports turned out to be a unique source of information regarding magnitude of alcohol-related problems in the society. In this study we will examine the link between affordability of vodka and prevalence of alcohol dependence in Belarus. Here we specified the number of registered alcohol dependent persons per 100.000 as prevalence of alcohol dependence. We also adopted the number of liters of vodka the average salary could buy, as the affordability of alcohol. To examine the relation between alcohol affordability and epidemiological parameters of alcoholism regression analysis was performed using the statistical package »Statistica«.

## RESULTS

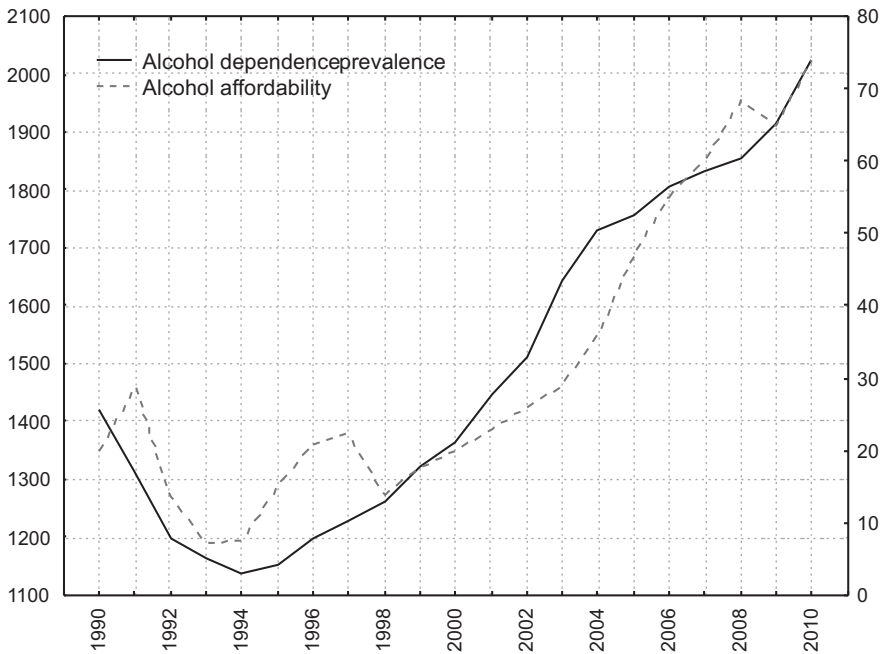
In the period from 1990 to 2010 the prevalence of alcohol dependence in Belarus increased by 42,7% (from 1419,1 to 2024,4 per 10.000 of the population). As can be seen from Figure 1, trends in the affordability of alcohol and in the prevalence of alcohol dependence follow each other across the 1990–2010 time series. A Spearman cor-



**Figure 1.** Trends in vodka affordability and alcohol dependence prevalence in Belarus between 1990 and 2010.

relation analysis suggest the high degree of co-variation between the two variables ( $r=0.92;p<0.000$ ). Therefore, a linear regression model was applied in the further analysis. The relationship between the affordability of alcohol and the prevalence of alcohol dependence is described by the linear regression equation  $y = 1046,4 + 13,4*x$ . The linear regression model describes 88% of the total dispersion of the dependent variable and is characterized by its high validity ( $p<0.000$ ). Consequently, we should expect that the increase in alcohol affordability would result in the growth in the prevalence of alcohol dependence rate. This case can be described by the elasticity coefficient which derived from the following equation:  $E = B_1 \bar{x}/\bar{y}=0.30$  (which means a 0.3% increase in the prevalence of alcohol dependence rate following a 1% increase in affordability of alcohol).

According to official statistics, the number of patients undergoing treatment for alcohol dependence increased 1.7 times (from 246.1 to 423.4 per 100.000 of the population) in Belarus from 1990 to 2010. The graphical evidence suggests that the pattern for vodka affordability and the number of patients undergoing treatment for alcohol dependence in Belarus has been rather similar over time (Figure 2). A Spearman cor-



**Figure 2.** Trends in alcohol affordability and the number of patients undergoing treatment for alcohol dependence in Belarus between 1990 and 2010.

relation analysis suggests a rather strong association between the two variables ( $r=0.92$ ;  $p<0.000$ ). The relationship between the affordability of alcohol and the number of patients undergoing treatment for alcohol dependence is described by the linear regression equation  $y = 209.9 + 2.8*x$ . The linear regression model describes 89% of the total dispersion of the dependent variable and is characterized by its high validity ( $p<0.000$ ). The elasticity coefficient is 0.31 which means a 0.31% increase in the number of patients undergoing treatment for alcohol dependence following a 1% increase in affordability of alcohol.

## DISCUSSION

In spite of extensive evidence that raising alcohol prices reduces alcohol consumption, the real price of alcoholic beverages is decreasing over the last decades in many countries, resulting in increases in the affordability of alcoholic beverages.<sup>15</sup> The affordability of alcohol in Belarus has increased significantly since the early 1990s: the average salary in 1993 could buy 7.3 liters of vodka compared with 73.9 liters in 2010. The increase in affordability of alcohol was driven mainly by an increase in real disposable income as average income rose faster than nominal alcohol prices and by changes in the relative price of alcohol. In the early 1990s vodka became much more affordable because of a dramatic drop in its relative price, when price liberalization caused most prices to soar, but the nominal price of vodka rose much more slowly. In recent decades the affordability of vodka surged once again, mostly because of the growth of real income as the economy recovered.

It was suggested that there may be variations in the extent to which different population groups respond to changes in alcohol price.<sup>3,18</sup> It is reasonable to assume that heavy drinkers might be particularly sensitive to reduction in affordability of alcohol because: (i) they consume nearly 80% of all alcohol, (ii) they spend a great amount of budget on alcohol, (iii) they usually have a low income.<sup>4,14,16,17</sup> Indeed, the results from present analysis suggest a close aggregate-level link between vodka affordability and alcohol dependence prevalence and support the idea that high affordability of alcohol is associated with increasing binge drinking and that heavy drinkers are sensitive to price changes.

Before concluding, it is necessary to address some potential limitations of the study that may have affected the outcome. In particular, 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. Therefore, additional confounding variables which

may relate to alcohol dependence prevalence (availability of treatment, for example) should be included into analysis.

The results from this study are consistent with previous findings suggesting a significant association between alcohol affordability and alcohol consumption and alcohol-related problems. The major conclusion emerging from this study is that affordability of alcohol is one of the most important predictors of alcohol consumption in a population. These outcomes provide additional evidence that decreasing the affordability of alcohol is an effective strategy for reducing alcohol-related damage. The main reason for the growth of alcohol consumption and alcohol-related problems in Belarus was the liberalization of the alcohol policy and increase in the affordability of alcohol. Hence, to prevent a further increase of alcohol affordability, the increase of alcohol prices seems to be one of the priority options of alcohol control policy in Belarus. It should be emphasized however, that any attempt to decrease of alcohol affordability requires a degree of flexibility to tackle the problem of non-commercial alcohol. Other policy options include the reduction of the density of alcohol outlets, advertising ban that span all types of alcoholic beverages, separating the alcoholic beverages from other goods in retail stores and implementation of brief interventions in primary health care.

## PRISTUPAČNOST CIJENA ALKOHOLA I EPIDEMIOLOGIJA ALKOHOLIZMA U BJELORUSIJI

**Sažetak** – temeljne činjenice: Obzirom da zlouporaba alkohola ima brojne štetne posljedice po zdravlje i socijalni status, reakcija konzumenata na promjene u pristupačnosti cijena predstavlja važno pitanje u raspravama o politici glede alkohola. Istraživanja iz mnogih zemalja su pokazala obrnutu proporcionalnost cijena alkohola i razine konzumacije alkohola u populaciji. Ipak, postoje sugestije da bi dizanje cijena alkohola povećavanjem poreza imalo tek ograničen učinak na probleme povezane s konzumacijom alkohola, povezane s dugotrajnim, teškim pijenjem. Cilj: Cilj ovog istraživanja bio je procijeniti odnos pristupačnosti cijena alkohola i epidemioloških parametara alkoholizma (prevalencija ovisnosti o alkoholu i broja pacijenata koji se podvrgavaju liječenju ovisnosti o alkoholu) u post-sovjetskoj Bjelorusiji. Metoda: S ovim ciljem, uspoređeni su trendovi epidemioloških parametara i pristupačnosti cijena votke između 1980–2010. Rezultati: Analiza vremenskih serija pokazala je da je 1% porast pristupačnosti cijena votke povezan s povećanjem prevalencije ovisnosti o alkoholu od 0.31%. Zaključci: Glavni zaključak koji proizlazi iz ovog istraživanja je da je pristupačnost cijena alkohola jedan od najvažnijih prediktora problema povezanih s alkoholom u populaciji. Ovi nalazi pružaju dodatne dokaze da je smanjivanje pristupačnosti cijena alkohola učinkovita strategija za smanjivanje konzumacije alkohola i štete vezane uz nju.

Ključne riječi: alcohol, pristupačnost cijena, ovisnost o alkoholu, prevalencija, Bjelorusija

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