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Regional Specificity of the Relationship between Alcohol and Suicide in Europe

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Abstract

Background: Alcohol abuse is a risk factor for suicidal behavior. Until now, there are no convincing explanations for the gradient in the suicide rates in Europe.

Objective: To assess the role of alcohol as a potential predictor of the gradient of suicide rates in Europe.

Materials and methods: The analysis was carried out using the indicators of the WHO database selected for the period from 1980 to 2020 (suicide mortality rate, alcohol consumption level, alcohol-related mortality rate).

Results: According to the results of the correlation analysis, the suicide rate correlates with the level of alcohol-related mortality in Western and Eastern European countries. At the same time, the indicators characterizing alcohol consumption at the population level (total alcohol consumption level, consumption of spirits and beer) positively correlate with the suicide rate only in Eastern European countries.

Conclusions: These findings confirm the existing idea that alcohol makes a significant contribution to the burden of mortality due to suicide in the European region.

Keywords: ***Suicide; Alcohol; Gradient; Europe***

1. Introduction

Alcohol abuse is one of the significant factors in the development of suicidal behavior [1-5]. Studies of completed suicides show that 20%-40% of all suicides are committed by people suffering from alcohol dependence [6]. Ethanol is often detected in the blood of suicides. The proportion of cases of ethanol detection in the blood of suicides is 20% - 45% in Western European countries [5,7,8] and 60%-74% in Eastern European countries [4,7]. A number of studies have shown a close relationship at the population level between alcohol consumption and suicides in the countries of the European Union [2,5,8], as well as in the

former Soviet republics [4,7,9]. In addition, it has previously been suggested that alcohol may be a key factor in the gradient of suicide rates between Western and Eastern European countries [1].

The aim of this study was to investigate the dependence of the regional distribution of suicide rates on the level of alcohol-related problems in Europe based on the data presented in the European Health Information Gateway (WHO Health for All database).

The aim of this study was to address the following questions:

1. What potential does the data compiled within the WHO database offer for conducting regional medical and demographic analyses—illustrated through an investigation into the interdependence between indicators related to alcoholism and suicide rates? In addressing this question, consideration will be given to the number of countries submitting health reports to European authorities.
2. What indicators can be considered as universal regional and national indicators the level of alcohol-related problems?
3. What are the methodological possibilities of using these indicators as predictors of regional variations in the suicide rate?

2. Materials and Methods

The analysis was performed using the following indicators from the WHO database, selected for the period from 1980 to 2020: standardized death rate from suicide; annual alcohol consumption (liters of pure alcohol) per capita, for the population aged 15 years and over; annual consumption of strong alcohol (in terms of pure alcohol) per capita, for the population aged 15 years and over; annual wine consumption (in terms of pure alcohol) per capita, for the population aged 15 years and over; annual beer consumption (in terms of pure alcohol) per capita, for the population aged 15 years and over; standardized death rate from acute alcohol poisoning; standardized death rate from causes related to alcohol abuse (including alcoholic psychosis); standardized death rate from individual causes related to alcohol abuse.

Based on the capabilities of the database, the dynamics in the distribution of indicators associated with alcoholism and the dynamics of the suicide rate were assessed separately for the countries of Western and Eastern Europe, and the dependence indicators between these indicators were assessed in the period from 1990 to 2000.

Already at the stage of forming the methodological base and compiling the research array, it was discovered that not all countries belonging to the WHO European Region, in terms of the studied indicators, present adequate statistical reporting. For example, such countries as the Russian Federation and Belarus presented statistics on mortality associated with the alcohol-related problems (mortality from alcohol poisoning) only at the end of the last century. Taking into account such cases, the absence or incompleteness of statistical information, data on 43 countries of the WHO European Region were selected for subsequent analysis.

To conduct a differential analysis of the dynamics of indicators for individual historical regions, the gradation of states into Western European countries (former countries of the capitalist camp) and Eastern European countries (former countries of the socialist camp) was used. In addition, the dynamics of indicators in the group of EU member countries before 2004, countries

that joined the EU after 2004, and Commonwealth of Independent States (CIS) countries were assessed. In order to select significant predictors for the analysis of the spatial distribution of the suicide rate, the method of multiple linear regression with stepwise selection with the exclusion of variables was used. The relationship between suicides and indicators of alcohol-related problems at the population level was assessed using Pearson correlation analysis. Statistical analysis was performed using the software package "Statistica 12. StatSoft".

3. Results

During the period under review, suicide trends varied significantly across the European region. In the European Union, suicide rates showed a downward trend, while in the former Soviet republics, the rate fluctuated significantly (FIG. 1). The suicide rate shows the presence of a stable gradient from the West to the East of Europe, which persisted throughout the period under review. It should be noted that this gradient significantly decreased towards the end of the period under review.

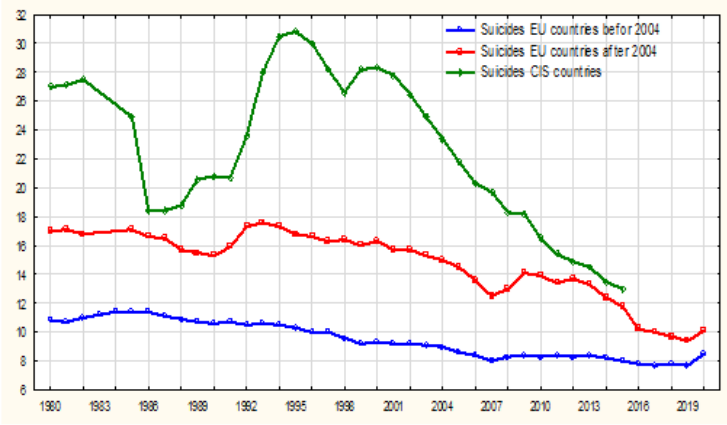

FIG. 1. **Trends in the suicides rate in the European region between 1980 and 2020.**

According to the results of the correlation analysis, the suicide rate correlates with the level of alcohol-related mortality in Western and Eastern European countries (TABLES 1-2). At the same time, the indicators characterizing alcohol consumption at the population level (total alcohol consumption, consumption of spirits and beer) positively correlate with the suicide rate only in Eastern European countries.

TABLE 1. **Correlations between suicides and alcohol-related problems rates in Western European Countries.**

	1990	2000	2010	2020	1990-2020
Alcohol consumption	n.s.	n.s.	n.s.	n.s.	n.s.
Consumption of spirits	n.s.	n.s.	n.s.	n.s.	n.s.
Consumption of wine	n.s.	n.s.	n.s.	n.s.	n.s.
Consumption of beer	n.s.	n.s.	,44*	n.s.	n.s.
Fatal alcohol poisonings	,55*	n.s.	,52*	,51*	0,53*
Mortality from alcohol dependence	,46*	,68**	.77**	,81**	n.s.
Alcohol-related mortality	,61**	,58**	n.s.	n.s.	0,59**

**. Correlation is significant at the level 0.01; *. Correlation is significant at the level 0.05

TABLE 2. **Correlations between suicides and alcohol-related problems rates in Eastern European Countries.**

	1990	2000	2010	2020	1990-2020
Alcohol consumption	,61**	,48*	,65**	0,68**	0,66**
Consumption of spirits	n.s.	,49*	n.s.	,44*	0,53*
Consumption of wine	n.s.	n.s.	n.s.	n.s.	n.s.
Consumption of beer	,44*	n.s.	.56**	0,44*	0,48*
Fatal alcohol poisonings	n.s.	,63**	,57**	,51*	0,55**
Mortality from alcohol dependence	,60**	,78**	,63**	,66*	n.s.
Alcohol-related mortality	,57**	,58**	,53**	,52*	0,63**

4. Discussion

The decline in suicide rates in Europe over the past decades has not been convincingly explained. It is assumed that the reasons for this trend may be the general improvement in the health of the population, as well as the implementation of national suicide prevention programs [1]. Significant fluctuations in suicide rates in the CIS countries were due to dramatic socio-economic changes. The significant decrease in the suicide rate in the former Soviet republics in the mid-1980s is associated with the sharp restriction of alcohol sales during the anti-alcohol campaign [11]. Against the background of the downward trend in the suicide rate in the EU countries, a sharp increase in this indicator was observed in the former Soviet republics in the first half of the 1990s, probably due to the increased availability of alcohol during the socio-economic crisis of the transition period [7,9]. Some increase in the suicide mortality rate in the CIS countries in the early 2000s is associated with the banking crisis in Russia in 1998 [1].

The significant decrease in the suicide rate in the CIS countries observed in subsequent years may be associated with the adoption of a number of measures aimed at reducing the availability of alcohol [10]. The improvement of the socio-economic situation during this period could also have had an effect on the dynamics of the suicide rate in this region [1]. This decrease practically leveled out the regional differences in the level of this indicator that existed in the 1990s. It is worth noting a slight increase in the suicide rate in Eastern European countries against the backdrop of the economic crisis of 2008.

Regional differences in the relationship between indicators of alcohol consumption and suicides may be due to differences in the structure and pattern of alcohol consumption. Previous studies have shown that the predominance of strong alcohol in the structure of alcohol consumption, as well as the binge drinking pattern of consumption, is an important determinant of the high level of suicides in the former Soviet republics [4,7,9].

5. Conclusions

These findings support the idea that alcohol makes a significant contribution to the burden of suicide mortality in the European region. Regional differences in the relationship between suicide and alcohol-related problem indicators were identified, which may be due to differences in alcohol consumption patterns. The use of the WHO data portal is limited, as not all countries report mortality rates from alcohol-related problems in an adequate and harmonized manner.

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