Factors Predicting Suicide among Russians in Estonia in Comparison with Estonians: Case-Control Study

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Aim To explore differences between suicide victims among Russian immigrants in Estonia and native Estonians, according to socio-demographic background, substance use pattern, and recent life events to find out immigration-specific factors predicting suicide.

Methods The psychological autopsy study included 427 people who committed suicide in 1999 and 427 randomly selected controls matched by region, gender, age, and nationality.

Results The only variable that differed significantly between Russian and Estonian suicide cases was substance use pattern. Logistic regression models showed that factors associated with suicide for both nationalities were substance dependence and abuse (Russians: odds ratio [OR], 12.9; 95% confidence interval [95% CI], 4.2-39.2; Estonians: OR, 8.1; 95% CI, 3.9-16.4), economical inactivity (Russians: OR 5.5; 95% CI, 1.3-22.9; Estonians: OR, 3.1; 95% CI, 1.3-7.1), and recent family discord (Russians: OR, 3.2; 95% CI, 1.1-9.9; Estonians: OR, 4.5; 95%, CI, 2.1-9.8). The variables that remained significant in the final model were having no partner (Estonians: OR, 3.0; 95% CI, 1.6-5.5), being unemployed (Estonians: OR, 5.5; 95% CI, 2.0-15.4), and being an abstainer (Estonians: OR, 6.7; 95% CI, 2.5-17.6) for Estonians, and somatic illness (Russians: OR, 4.1; 95% CI, 1.4-11.7), separation (Russians: OR, 32.3; 95% CI, 2.9-364.1), and death of a close person (Russians: OR, 0.2; 95% CI, 0.04-0.7) for Russians.

Conclusion Although the predicting factors of suicide were similar among the Estonian Russians and Estonians, there were still some differences in the nature of recent life events. Higher suicide rate among Estonian Russians in 1999 could be at least partly attributable to their higher substance consumption.

Several studies compared suicide rates of immigrant population, native population in the host country, and population in the country of origin. Previous research has shown variance in the suicide rates of immigrant groups with different ethnic background, as well as different suicide rates in their home countries (1-8). Differences between suicide rates of immigrant groups and native population are not quite clear, but most of the immigrant groups have higher suicide rates than the population in their countries of origin. A number of studies found that migrants who had high suicide rates came from countries with high rates and vice versa (1,2,4,9,10).

Reports from England and Wales (3), Canada (5), and Sweden (6,11) showed very high suicide rates among Russian immigrants compared with the rates of the population both in their country of origin and in the host country. Johansson et al (11) found that suicide rate of Russian male immigrants in Sweden was 201.9 per 100000 in comparison with 41.4 in Russian men in Russia and 44.5 in Swedish men in 1986-1989.

Värnik et al (12) compared suicide rates of Russians in Estonia, Estonians in Estonia, and inhabitants of Russia before (1983-1990) and after (1991-1998) Estonia gained independence. Suicide rates of Russian immigrants were lowest in the period before Estonian independence and highest in the period after reestablishing independence. In 1998, Russian and Estonian suicide rates were similar (12), but in the 1991-2001period, mean suicide rates in Estonian Russians were higher than in Estonians (38.2 and 31.9 per 100000, respectively) (13).

There is a lack of studies on specific suicide risk factors for immigrants on the individual level. As far as we know, the only study available was a psychological autopsy study on suicides of Ethiopian immigrants to Israel (14). They found that 67% of suicide victims were dissatisfied with their employment, 50% with their economic status, 44% with their marital relationships, and 53% with their fluency in the host language. However, in this study no controls were used.

Since there were differences in suicide rates between Russian immigrants in Estonia and native Estonians, the purpose of the present study was to explore possible differences between suicide victims of these two main ethnic groups in Estonia according to socio-demographic background, substance use pattern, and recent life events to find out immigration-specific factors predicting suicide on the individual level.

Material and methods

Data collection

Suicides. A preliminary list of completed suicides was obtained from the police and the bureau of forensic medicine and it was verified by the data of the Estonian Statistical Office. In 1999, a total of 469 suicide cases (code E950-E959 by ICD-9) were registered. A psychological autopsy study (15) was carried out in 427 suicide cases (91% of total, representative in terms of region, gender, and age) by means of face-to-face interviews with relatives and intimates of suicide victims, conducted by psychiatrists trained for the study. The questionnaire used for the semi-structured interviews was created in Finland (16). Additional information was compiled from the medical records in hospital archives. The approval for the study was obtained from the Karolinska Institute Research Ethics Committee North.

Control group. Persons (n=427) with the same parameters (gender, age, nationality) as suicide victims were randomly selected from the lists of general practitioners (GPs) for the years 2002-2003. GP lists are compiled from population registers and contain the names of all local residents, regardless of whether they had consulted a doctor for their health problems. Controls were paired with suicide cases by region, gender, age (±2 years), and nationality. Interviews with the control group were carried out by GPs trained for the study, using semi-structured question-

naires similar to those used for the psychological autopsy. The controls' response rate was 96%.

Description of subjects

A total of 57.1% of people who committed suicide were Estonians and 42.9% non-Estonians. Ninety-four percent of non-Estonian suicide victims were of Slavic origin – Russian (88%), Ukrainian (7%), Belarusian (5%), and Polish (2%) – with homogeneous cultural and linguistic backgrounds, and are subsumed under the term "Russians" in the present study. Other 8 (4%) non-Estonian suicide victims were excluded from the study.

Instrument

The instrument applied was based on the questionnaire elaborated for the National Suicide Prevention Project in Finland (16). The semi-structured interview included everyday life, life event, and substance use questionnaires. Life event questionnaire was based on the Recent Life Change Questionnaire formulated by Rahe (17) with modifications from the list of Paykel et al (18). Life event categories analyzed in the study are described in more detail elsewhere (19).

Alcohol and drug diagnoses

One author-interviewer (AV) coded alcohol and drug use in all suicide and control cases, by blind method, using the psychological autopsy data and medical documentation, according to hierarchical DSM-IV principles (20,21). Pattern of substance use was classified as follows: 1) substance dependence or abuse, 2) abstinence (including former use), 3) indistinct, and 4) moderate use of alcohol. Alcohol users not assigned to categories 1-3 were considered "moderate."

Background of Russian immigrants in Estonia

The population of Estonia was ethnically rather homogenous until the Second World War. According to the population census from 1934, Estonians constituted 88.1% of the total population and Russians constituted the largest ethnic minority group (8.2%) (22).

In the post-war period, due to the geopolitical change related to the incorporation of Estonia into the Soviet Union, the Russian population grew to approximately 30% in 1989 (22). In 1993-1996 period, a remigration of Russians, mainly military forces, took place. According to the 2000 census the Estonian population consisted of 67.9% Estonians, 25.6% Russians, and 6.5% other nationalities (23).

Statistical analysis

The statistical analyses were performed with the Statistical Package for the Social Sciences, version 11.5 (SPSS Inc., Chicago, IL, USA) and StatsDirect version 2.3.7 (StatsDirect Ltd, Altrincham, UK). To estimate the association between matched pairs in terms of potential risk factors, the odds ratio (OR) was calculated using conditional logistic regression with 95% confidence intervals (95% CI). The binomial test was used when a specific factor was not observed in a comparison subject, since the OR could not be computed in such cases. To estimate the differences between suicides in nationality groups, gender, and age adjusted OR and 95% CI were calculated. To estimate the independent contribution of different risk factors predicting suicide among Estonians and Russians, conditional logistic regression models were performed. Backward selection of variables was carried out to identify those variables to be retained in the final model. The level of statistical significance was set at $\alpha = 0.05$.

Drop-out

In the substance use analysis, 12 pairs in which sufficient data on either the suicide cases or the controls were not available to make research diagnoses were classified as indistinct and excluded. Four people who committed suicide were prevented from using substances in their last 12 months by being in prison or a nursing home. These pairs, too, were excluded from the statis-

tical analysis. Thus, ten pairs of Russians (5.7%) and six pairs of Estonians (2.5%) were excluded from the analysis.

Results

Differences between Estonian and Russian suicide victims

There was significant difference in the mean age of Estonians and Russians suicide victims ($t=2.96$, $P=0.003$). Differences according to gender between Estonian and Russian suicides and controls were close to significance ($\chi^2=3.32$, $P=0.068$). Estonian and Russian suicide victims did not differ significantly by the key informant ($\chi^2=1.64$, $P=0.649$) (Table 1).

Comparison between Estonian and Russian suicide cases in Estonia by socio-demographic factors and occurrence of recent life events did not show any significant differences. Significant differences by nationality were found only in the substance use pattern (Table 2). Gender and age adjusted OR showed that Russian suicide victims had higher risk of being substance dependent, abusers, and abstainers than Estonian suicide victims, when moderate alcohol users were selected as a referent group.

Table 1. Russian and Estonian suicide victims by gender, age, and key informant

	No. (%) of suicide victims		
Characteristic	Russian	Estonian	total
Gender:			
male	133 (76.0)	203 (83.2)	336 (80.2)
female	42 (24.0)	41 (16.8)	83 (19.8)
Mean age (years)	45.1	50.5	48.3
Key informant:			
parents	39 (22.3)	46 (18.9)	85 (20.3)
spouses or partners	49 (28.0)	69 (28.3)	118 (28.2)
children	28 (16.0)	34 (13.9)	62 (14.8)
other relatives or friends	59 (33.7)	95 (38.9)	154 (36.8)

Table 2. Factors related to suicide in Russian and Estonian suicide victims: gender and age adjusted odds ratio (OR)

	No. (%) of suicide victims			
Factor	Russian	Estonian	adjusted OR (95% CI)	*P*
Sociodemographic				
Family status:				
no partner	94 (54.7)	144 (59.0)	0.8 (0.5-1.2)	0.284
partner	79 (45.1)	100 (41.0)	1.0	
Socio-economic status:				
unemployed	46 (26.3)	47 (19.3)	1.4 (0.8-2.3)	0.222
inactive	61 (34.9)	98 (40.2)	1.0 (0.6-1.7)	0.902
employed	68 (38.9)	99 (40.6)	1.0	
Substance use pattern:				
substance dependence and abuse	114 (69.1)	142 (59.4)	2.4 (1.4-4.1)	0.001
abstinence	25 (15.2)	30 (12.6)	2.3 (1.1-4.9)	0.028
moderate use	26 (15.8)	67 (28.0)	1.0	
Recent life events (last 3 mo)				
Somatic illness:				
present	44 (25.1)	64 (26.4)	1.2 (0.7-2.0)	0.451
absent	131 (74.9)	178 (73.6)	1.0	
Illness in family:				
present	13 (7.4)	10 (4.1)	1.8 (0.7-4.2)	0.192
absent	162 (92.6)	232 (95.9)	1.0	
Death:				
present	9 (5.1)	19 (7.8)	0.6 (0.3-1.5)	0.285
absent	166 (94.9)	223 (92.1)	1.0	
Family discord:				
present	70 (40.0)	82 (33.9)	1.2 (0.8-1.8)	0.455
absent	105 (60.0)	160 (66.1)	1.0	
Separation:				
present	33 (18.9)	34 (14.0)	1.3 (0.8-2.3)	0.301
absent	142 (81.1)	208 (86.0)	1.0	
Financial deterioration:				
present	44 (25.1)	63 (26.0)	0.9 (0.6-1.4)	0.612
absent	131 (74.9)	179 (74.0)	1.0	
Loss of job:				
present	16 (9.1)	20 (8.3)	1.0 (0.5-2.0)	0.982
absent	159 (90.9)	222 (91.7)	1.0	
Change of residence:				
present	20 (11.4)	21 (8.7)	1.4 (0.7-2.7)	0.338
absent	155 (88.6)	221 (91.3)	1.0	

Both Russian male and female suicide victims were more likely to be substance dependent or abusers (male: age adjusted OR, 2.0; 95% CI, 1.1-3.7; female: age adjusted OR 4.6; 95% CI, 1.3-16.7) with more abstainers among Russian women (age adjusted OR, 3.8; 95% CI, 1.1-13.7) in comparison with Estonian suicide victims. Concerning recent life events, Russian female suicide victims had higher risk of somatic illness than Estonian female suicide victims (age adjusted OR = 4.9, 95% CI = 1.5-15.6).

Table 3. Factors related to suicide, Russian and Estonian suicide victims in comparison with controls odds ratio (OR), using conditional logistic regression

	Suicide victims			
	Russians		Estonians	
Factors	OR (95% CI)	*P*	OR (95% CI)	*P*
Sociodemographic				
Family status:				
no partner	1.8 (1.1-2.8)	0.018	3.2 (2.1-5.0)	<0.001
partner	1.0		1.0	
Socio-economic status:				
unemployed	4.6 (2.1-9.8)	<0.001	7.3 (3.3-16.1)	<0.001
inactive	2.9 (1.3-6.5)	0.009	3.7 (2.0-6.9)	<0.001
employed	1.0		1.0	
Substance use pattern:				
substance dependence and abuse	12.3 (5.8-26.1)	<0.001	10.8 (5.7-20.4)	<0.001
abstinence	3.2 (1.4-7.3)	0.006	4.9 (2.2-10.9)	<0.001
moderate use	1.0		1.0	
Recent life events (last 3 mo)				
Somatic illness:				
present	4.3 (2.1-8.9)	<0.001	2.5 (1.6-4.0)	<0.001
absent	1.0		1.0	
Illness in family:				
present	0.7 (0.4-1.5)	0.371	0.7 (0.3-1.5)	0.321
absent	1.0		1.0	
Death:				
present	0.2 (0.1-0.6)	0.001	0.9 (0.4-1.6)	0.622
absent	1.0		1.0	
Family discord:				
present	7.5 (3.6-15.7)	<0.001	5.5 (3.1-9.7)	<0.001
absent	1.0		1.0	
Separation:				
present	11.0 (3.4-35.9)	<0.001	4.1 (1.9-8.9)	<0.001
absent	1.0		1.0	
Financial deterioration:				
present	1.4 (0.8-2.4)	0.260	1.6 (1.0-2.5)	0.039
absent	1.0		1.0	
Loss of job:				
present	4.0 (1.3-2.0)	0.013	Not calculable	<0.001
absent	1.0			
Change of residence:				
present	0.9 (0.5-1.8)	0.866	0.5 (0.3-0.9)	0.022
absent	1.0		1.0	

Differences between suicide victims and controls

Estonian and Russian suicide victims were more likely not to have a partner (single, widowed, divorced, or separated) and to be unemployed and inactive (not employed nor unemployed, eg, schoolchildren, disabled, retired people) than their controls (Table 3). For both nationalities, substance use pattern differed significantly between suicide victims and their controls – people who committed suicide had a higher risk of being substance dependent, abusers, or abstainers than their controls. Somatic illness, family discord, separation, and loss of job during the last three months were more frequent among suicide victims than among controls, in both nationalities. Only Estonian suicide victims had a significantly higher risk of financial deterioration than controls. Russian suicide victims experienced a death of a relative or friend considerably less often than controls, while Estonian suicide victims were less likely to have a change of residence than controls.

Risk and protective factors of Estonian and Russian male suicide victims were similar to the total results, with exception of the status of "being inactive" which did not reach significance in Russian men. Also, female suicide cases differed significantly from their controls by substance use pattern. Both Estonian and Russian female suicide victims were significantly more likely abstainers, but only Russian female suicide victims were more likely substance dependent or abusers. Female suicide victims of both nationalities had a higher risk of family discord in comparison with controls. Russian female suicide victims were more likely to have somatic illness and Estonian female suicide victims were more often socio-economically inactive than controls. Death of close relatives or friends proved to be less frequent among Russian female suicide victims than among controls.

Logistic regression models

To estimate the independent contribution of possible factors predicting suicide for Estonians and Russians in Estonia, conditional logistic regression models were performed. Backward selection of variables was carried out to identify which

variables would be retained in the final model, separately for both nationalities. Conditional logistic regression models showed that factors associated with suicide for both nationalities were substance dependence and abuse, socio-economical inactivity, and family discord during the last three months. In the final model variables that remained significant were having no partner, being unemployed, and being an abstainer for Estonians, and somatic illness, separation, and death of a close person for Russians (Table 4).

Table 4. Conditional logistic regression models predicting suicide among Russians and Estonians

Nationality	OR (95% CI)	P
Russians		
Socio-economic status:		
unemployed	2.5 (0.8-7.9)	0.107
inactive	5.5 (1.3-22.9)	0.020
employed	1.0	
Substance use pattern:		
substance dependence and abuse	12.9 (4.2-39.2)	<0.001
abstinence	2.9 (0.9-9.8)	0.087
moderate use	1.0	
Recent life events (last 3 mo)		
Family discord:		
present	3.2 (1.1-9.9)	0.038
absent	1.0	
Somatic illness:		
present	4.1 (1.4-11.7)	0.009
absent	1.0	
Death:		
present	0.2 (0.04-0.7)	0.017
absent	1.0	
Separation:		
present	32.3 (2.9-364.1)	0.005
absent	1.0	
Estonians		
Family status:		
no partner	3.0 (1.6-5.5)	0.005
partner	1.0	
Socio-economic status:		
unemployed	5.5 (2.0-15.4)	0.001
inactive	3.1 (1.3-7.1)	0.009
employed	1.0	
Substance use pattern:		
substance dependence and abuse	8.1 (3.9-16.4)	<0.001
abstinence	6.7 (2.5-17.6)	<0.001
moderate use	1.0	
Recent life events (last 3 mo)		
Family discord:		
present	4.5 (2.1-9.8)	<0.001
absent	1.0	

Discussion

The present study showed that the only variable differing significantly between Russians and Estonians suicide victims, both men and women, was substance use pattern. Russians had significantly higher risk of being substance dependent, abuser, or abstainer than Estonians.

Previous studies on aggregate level showed high suicide rates in migrants, especially in Russian immigrants (3,5,6,11). However, the Estonian study (12) comparing suicide rates of Russians in Estonia, Estonians in Estonia, and inhabitants of Russia before (1983-1990) and after (1991-1998) Estonia gained independence showed that Russians in Estonia had the lowest suicide rates before and the highest suicide rates after Estonia gained independence. High suicide rates among Estonian Russians during the transition period after gaining independence may have been caused by the drastic changes in their status – from a privileged position to the immigrant status. The demand for integration and acculturation, many years after immigration, could have caused stress-reaction in this population of immigrants (12).

Leinsalu et al (24) compared the mortality of Estonians and Russians in Estonia and showed that between 1989 and 2000 the mortality from alcohol poisoning, alcoholic liver cirrhosis, homicide, and suicide increased among both Estonians and Russians, but the increase was considerably higher among Russians. The results of their study suggested that, in the period 1989-2000, increasing alcohol consumption contributed first to the high mortality rates in Estonia in the 1990s and second to the widening mortality gap between Estonians and Russians.

Wasserman-Värnik group (25,26), studying the changes in alcohol consumption and suicides before, during, and after the major anti-alcohol campaign in the former USSR, found a strong correlation between alcohol consumption and male suicide rates in the Slavic and Baltic republics during the period 1984-1990. Approximately 60% of male and 26% of female suicides in the Baltic republics (Estonia, Latvia, and Lithuania), and 70% and 24% in the Slavic republics (Russia, Ukraine, and Belarus), respectively, were attributable to alcohol (25,26).

Hence, we can only assume that the higher suicide rate among Russians in Estonia during the 1990s, after the strict alcohol restrictions during *Perestroika,* could be attributed to higher substance consumption. Still, heavier substance abuse among Russians in Estonia may have the same roots as their higher suicide rate; both may be caused by the changed status of Russians in Estonia. However, according to Nemtsov (27), the rate of alcohol-related suicides is very high and alcohol consumption plays a considerable role in suicide rates in Russia.

Suicide risk and protective factors for Russians in Estonia and Estonians

In the present study, comparison between people who committed suicide and controls showed that substance use pattern, family, and socio-economic status, and recent life events predict suicide for both Russians in Estonia and native Estonians. However, there were some differences, especially in the nature of recent life events. Final logistic regression model showed that family discord only was a significant risk factor for Estonians, whereas Russians were more vulnerable to family discord, separation, and somatic illness.

Studies showed that suicide is a complex phenomenon with several risk and protective factors (28,29). For example, financial strain can increase alcohol consumption and marital discord, which in turn can enhance suicide risk (30). Despite considerable differences in suicide rates and risk groups, similar risk factors seem to motivate people in different countries to commit suicide. Even suicide risk factors in West and East do not differ greatly (31-33). A study analyzing suicide risk factors in developing countries found that there were some differences between developed and developing countries, but substance abuse, low socio-economic status, and previous suicide attempts were universal. Beside these, recent stressful life events played an important role in both developing and developed countries (34). However, comparison of life events predicting suicide in Tallinn and Frankfurt am Main showed that people in Tallinn were more vulnerable to economical and financial events and family discord (19). These differences could be explained by the different positions on the survival/self-expression dimensions recorded by the World Value Survey (35). People in Estonia, like in other ex-communist countries tend to emphasize economic and physical security above all other goals, and feel threatened by changes in society. Emphasis on economic and physical security makes people also particularly vulnerable to unwanted and unexpected changes in intimate relationships.

Death of a close person (spouse, close relative, or close friend) was not found to increase suicide risk, but rather prevent it and it was a significant protective factor in Russians. Waern et al (36) found similar pattern in a study among the elderly. The reason may be that the death of a close person reduces the symbolic significance of suicide, especially among immigrants – they have nobody to whom they could convey the message that their meaningless and unbearable life cannot be continued (37). The protective effect for Russians could be explained by differences in the mourning ceremonies between Estonians and Russians in Estonia; traditional mourning ceremonies of Russians are socially more integrative and more conservative (38,39).

Statistical analysis of substance use pattern showed that not only substance abuse and dependence, but also abstinence can be a suicide risk factor, compared with moderate use as a reference category, especially for Estonians. In this study, we defined "abstainers" as persons not using any substances during the previous 12-month period. The group included former users and long-term abstainers, whose motives of behavior should be investigated further. In a large cohort study in the USA, Thun et al (40) found that overall mortality was highest among abstainers and lowest among moderate alcohol consumers. Still, they did not find any differences between

abstainers, moderate, and light drinkers in external causes of death, which was highest among heavy drinkers.

Similarly to previous studies, which showed gender differences in risk factors for suicide (41) and attempted suicide (42), the present study found that the risk and protective factors for both men and women of both nationalities differed.

Methodological considerations

Methodological limitations of psychological autopsy as a method include the possibility of incomplete and biased information (36,43). Data on suicide cases, collected retrospectively from indirect sources, such as survivors, may introduce reporter bias due to their possible partiality and personal perception of the victims. In the present study, there was no significant difference between Estonian and Russian suicide cases by the key informant.

In suicide case-control studies, the control groups' composition is an important issue. There have been several studies using living controls and deriving information either from their relatives (33,44) or by direct interviews with the individuals themselves (36,45).

In the present study, direct personal interviews with living controls matched by region, gender, age, and nationality were used. One of the limitations was the time lag of some three to four years between the interviews with the relatives of suicide victims (1999) and with controls (2002-2003). The potential effect of this fact is probably minor, since matched controls were used. In comparison to other studies (46,47) the response rate of the present study was high for both controls (96%) and suicide cases (91%).

One limitation of the statistical analysis was the low number of individuals in some subgroups (women and men by age groups), which was reflected in the wide confidence intervals.

The psychosocial factors are reflected in health behavior (48) and psychiatric disorders, the latter have been found to be suicide risk factors (49), especially among immigrants (50,51). Therefore the role of psychiatric disorders in the suicides of Russians in Estonia needs further study.

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