

SUICIDE TRENDS IN THE BALTIC STATES, 1970–1997¹

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Abstract. Three Baltic States – Estonia, Latvia and Lithuania – have besides Russia the highest registered suicide rates in the world. The study period is divided into two subperiods that are, in social terms, fairly disparate: stagnation in the former USSR 1970–84, and political reforms in 1985–97. Overall suicide trends in all three Baltic States are similar. A slight rise in the stagnation period was succeeded by an S-shaped profile, i.e. marked fall-rise-fall, in the reform period. The highest suicide rates (41.0–46.4 per 100,000 inhabitants) in the whole period were recorded in the reform period, in the years 1993–96. Overall linear trends over time differ slightly, however, in the three countries, the weakest being in Estonia and the strongest in Lithuania. Male and female trends are parallel, and the male-female ratio is roughly 4–5:1. Changes in suicide trends coincided with changes in social conditions. The greater fluctuations in suicide rates for male compared with women indicate a possible greater sensitivity among men to factors that affected suicide rates in the Baltic States.

Key words: Suicide, epidemiology, social changes, Baltic States, 1970–97.

Introduction

Sociopolitically and economically, the Baltic States have undergone turbulent changes. Between the two world wars all three Baltic States were independent. In 1940 they were occupied by Soviet forces and incorporated into the USSR. When the country disintegrated in 1991, the Baltic republics declared their independence.

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Epidemiological suicide research was banned in the USSR and did not begin until 1989, when the Soviet leadership of the *glasnost* era ordered the opening-up for researchers of secret archives storing data on, for example, suicide mortality.

The Estonian Medical Association set up a group to study suicide in 1989 and embarked on co-operation with the Swedish National and Stockholm County Council Centre for Suicide Research and Prevention. This co-operation resulted in the establishment of the Estonian-Swedish Institute of Suicidology in Tallinn in 1993. The Institute's aim was to initiate suicide-prevention activities and epidemiological studies in Estonia.

Suicide-mortality analyses for Estonia (Värnik 1991) yielded the hypothesis that the sharp fall in suicide rates in the years 1985–88 could have been caused by reforms introduced by Mikhail Gorbachev. These studies, extended to the Baltic States (Värnik, Wasserman and Eklund 1994) and later to all 15 Soviet republics (see Värnik and Wasserman 1992, Wasserman, Värnik and Eklund 1994, Värnik 1997a, Värnik et al. 1998, 1998a, Wasserman, Värnik and Eklund 1998, Wasserman, Värnik and Dankowicz 1998, Wasserman and Värnik 1998), confirmed a close connection between sociopolitical reforms, including a strict anti-alcohol policy, and suicide mortality.

Aim of this study

The purpose of this study is to describe and compare suicide trends in the three Baltic States and to make an effort to shed light on factors influencing suicide mortality in societies undergoing profound and rapid sociopolitical and economic changes.

Material and methods

The study is based on data published by the statistical offices of the three Baltic States (Department of statistics 1998, 1997, 1997a, 1996, Central Statistical Bureau of Latvia 1996, 1997, Statistical Office of Estonia 1988, 1988a).

Study period

The study period, 1970–97, may be divided into two subperiods that are, in social terms, quite different.

1. Stagnation period, 1970–84

These years were characterised by the Soviet republics' isolation from the rest of the world, strict censorship and curbs on creative freedom, an identity crisis, mistrust and double morality. Low standards of psychiatric treatment and ethics deterred people from seeking help. Individual integrity was overruled by "pan-collectivism". Society's members responded with passive resistance and alcoholism.

2. Reform period, 1985–97

This period began after Gorbachev came to power and started with reforms known worldwide as *perestroika* and *glasnost*. It represents society's complicated liberation from the Soviet system. First came hopeful political reforms, accompanied by a strict anti-alcohol policy (1985–88). Painful economic reforms, calling for a high adaptive capacity, followed in 1989–93 and were succeeded by a certain stabilisation in 1994–97 in the Baltic States, restored their independence in 1990.

Statistics

In the data analysis, mainly descriptive statistics were used: mean values, standard deviation. Some derived indicators – annual ratios – were also used. In order to explain more clearly the disparities in suicide rates between men and women and different countries, a complex time dependence model was calculated. The logistic regression model fits for this purpose if we consider conditionally the annual mean population size as the size of the group of “survivors” as an alternative to suicidents' group. Actually this means the prediction of the suicide rate on logarithmic scale. The analysis is comparative on basis of concrete reference group. Among the countries Estonia is chosen for a reference country and men are considered in comparison with women. Time is considered as a continuous covariate. The interactions of factors were included in the model in order to reveal country-specific and gender-related time-dependent dynamics of suicide rates. From the mathematical point of view an exponential dependence model is derived for the suicide rate in respect of the factors considered. From our point of view it is most important to clarify whether factors are significant on chosen relative basis, paying no attention to the significance of the model as a whole in predicting the suicide rate.

Results

The overall trend of suicide rates in the whole period, 1970–97 is upward, with varying steepness and shape. Table 1 demonstrates changes in the three Baltic countries' overall suicide rates. The two periods selected appear to be separated by a socially significant milestone in 1985.

In 1970–84 the suicide rate rose slowly and steadily, with standard deviations of 1.7 for Estonia, 2.0 for Latvia and 3.5 for Lithuania. The overall suicide rates in this period rose by 4.4% in Estonia, 20.5% in Latvia and 44.6% in Lithuania. The three countries' general linear trends over time in this period vary, the weakest being in Estonia and the strongest in Lithuania. The slopes of the linear curve (showing the mean annual change in the suicide rate) are 0.07, 0.38 and 0.75 respectively. All these annual changes are positive, i.e. indicate rising suicide rates. The coefficients of determination (percentage variance in suicide rates

explained by time) of these linear models indicate the absence of a time trend in Estonia (approximately 3%), while covariation of time and rate is intermediate in Latvia (66%) and high in Lithuania (87%).

Table 1

Dynamics of suicide rates (deaths per 100,000 inhabitants) in the three Baltic countries

Year	Estonia	Latvia	Lithuania
1970	31.5	28.3	25.1
1971	32.6	29.2	24.8
1972	33.2	28.3	27.0
1973	30.7	31.0	27.9
1974	32.9	33.0	30.9
1975	37.2	33.9	30.6
1976	34.2	32.0	32.2
1977	35.0	32.8	31.8
1978	33.9	31.8	31.1
1979	34.1	34.4	33.8
1980	33.7	32.8	35.3
1981	36.6	33.5	33.6
1982	32.1	34.3	33.9
1983	32.1	33.5	33.9
1984	32.9	34.1	36.3
1985	30.7	29.4	34.1
1986	27.6	25.3	25.5
1987	25.5	23.3	29.1
1988	24.5	23.1	26.6
1989	25.6	25.7	27.1
1990	27.1	26.0	26.0
1991	27.0	28.5	30.5
1992	32.2	34.9	34.6
1993	38.2	42.5	42.1
1994	41.0	40.5	45.8
1995	40.1	40.7	45.6
1996	37.5	36.9	46.4
1997	36.0	35.6	44.0
Mean, 1970–84	33.5	32.2	31.2
Standard deviation, 1970–84	1.7	2.0	3.5
Mean, 1985–97	31.8	31.4	35.2
Standard deviation, 1985–97	5.8	7.0	8.1

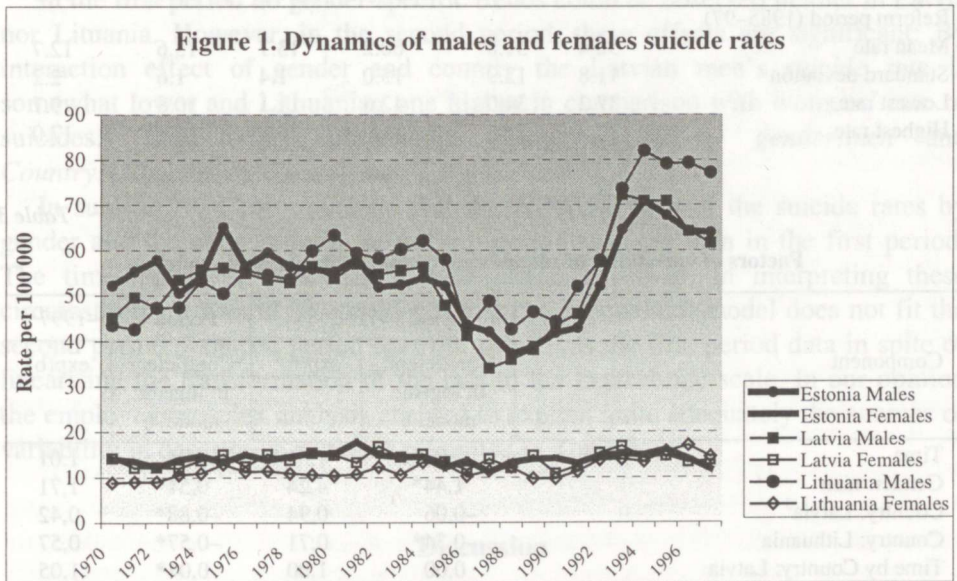
Since 1985, there has been an S-shaped profile (fall-rise-fall), with the highest rates for the whole period. In 1984–97, the suicide rate varied more dynamically than during the first period: in Estonia between 24.5 and 41.0, in Latvia between 23.1 and 42.5 and in Lithuania between 25.5 and 46.4. These results should be

considered carefully because the observation period is short. Additionally, the mean values are weak location parameters for the period of the S-shaped profile.

If the linear model is used for the period 1970–84 to predict the suicide rate for the last period, the error is not big. For example, the relative error of the forecast for 1996 does not exceed 10%. The cyclic run of the suicide rate curve in the last period does not differ much from the long-time trend.

Male and female suicide rates

The trends of suicide rates for men and women are presented in Figure 1. The turning point of 1984 for male corresponds well to real changes. In the first period, 1970–84, the mean male suicide rate is higher in Estonia but relatively closer in Latvia and Lithuania (Table 2). The time trend in Estonia is very weak, somewhat stronger in Latvia and considerably stronger in Lithuania.



Female suicide rates are, on average, closer to each other in Latvia and Estonia and somewhat lower in Lithuania. In the reform period (1985–97), there is no general rise in suicide rates (except in Lithuania) compared with the first period. The variability of the male rate exceeds that of the female.

Table 3 portrays the results of the analysis of factors of the suicide rate by logistic regression separately for two periods. These complex results confirm that men's suicide rate is far higher than that of women in both periods. The "pure" effect of gender (see component *Gender:men*) determines men's suicide rate 4.2 times during the first and 1.7 times higher during the second period. These

constants should not be interpreted individually but as the parameters of a general tendency in suicide rate on the basis of a model considered here. Neither can these proportions directly be compared with those of mean values (Table 2) because of additional interaction effects of gender with the other factors besides the “pure” effect.

Table 2

Men's and women's suicide rates

	Male			Female		
	Estonia	Latvia	Lithuania	Estonia	Latvia	Lithuania
Stagnation period (1970–84)						
Mean rate	55.7	53.5	54.1	14.5	14.0	10.8
Standard deviation	3.5	3.4	6.4	1.2	1.4	1.3
Lowest rate	50.6	45.1	42.6	12.2	12.0	8.8
Highest rate	65.0	57.1	63.4	17.8	16.8	13.3
Reform period (1985–97)						
Mean rate	52.4	51.8	60.2	13.7	13.6	12.7
Standard deviation	11.8	13.9	15.0	1.4	1.6	2.2
Lowest rate	37.2	34.0	42.6	11.1	10.8	9.7
Highest rate	70.7	72.2	81.9	16.0	16.8	17.0

Table 3

Factors of variability of suicide rate by logistic regression model

Component	Period 1970–1984		Period 1985–1997	
	Coefficient ¹ in logistic model b	exp(b) ²	Coefficient in logistic model b	exp(b)
Time	0,01	1,01	0,01	1,01
Gender: men	1,44*	4,24	0,54*	1,71
Country: Latvia ³	-0,06	0,94	-0,88*	0,42
Country: Lithuania	-0,34*	0,71	-0,57*	0,57
Time by Country: Latvia	0,00	1,00	0,04*	1,05
Time by Country: Lithuania	0,01	1,01	0,02*	1,02
Country: Latvia by Gender:men ⁴	-0,07	0,94	-0,42	0,66
Country: Lithuania by Gender:men	0,09	1,10	0,50*	1,64
Time by Gender: men	-0,01	0,99	0,04*	1,04
Time by Country: Latvia by Gender: men	0,01	1,01	0,02	1,02
Time by Country: Lithuania by Gender: men	0,02*	1,02	-0,01	0,99
Constant	-8,92		-9,13	

¹ Symbol * means significance of the effect on significance level 0,05.

² The parameter means proportion of suicide rate on concrete level of the factor to the suicide rate in reference group.

³ Reference group: Estonia

⁴ Reference group: women

It appears that during the second period the growth in time of men's suicide rate was slightly faster in comparison with women (component *Time by Gender:men*). In the first period this interaction is weaker and has decreasing effect. Country-specific effect on men's and women's dynamics of the suicide rate is most conspicuous in Lithuania during the first period (component *Time by Country:Lithuania by Gender:men*) and points to men's higher suicide rate in comparison with Estonia. A rather similar effect can be observed in Latvia in the second period. Country-specific effect on the dynamics of men's and women's suicide rate varies in different countries approximately in the same way in both periods.

Let us consider the disparities between the countries. In the first period the Latvian suicide rate did not differ on the basis of "pure" effect from that of Estonia (component *Country: Latvia*), while the Lithuanian rate was lower (0.71; component: *Country:Lithuania*). In the second period Latvia and Lithuania do not differ by country-specific "pure" effect, but remain behind Estonia in this respect.

In the first period no gender-specific trends could be observed neither in Latvia nor Lithuania. However, in the second period, these effects are significant: By interaction effect of gender and country the Latvian men's suicide rate is somewhat lower and Lithuanian one higher in comparison with women's rate of suicides. (respectively components *Country:Latvia by gender:men* and *Country:Lithuania by Gender:men*).

In summary we can conclude that the differentiation of the suicide rates by gender and the country is in the second period stronger than in the first period. The time-dependent dynamics is also faster. However, in interpreting these circumstances it should be considered that the exponential model does not fit the second period S-shaped period data not so well as the first period data in spite of linearising the transformation of the rate to the logarithmic scale. In our opinion the employed complex analysis enabled to explain quite adequately the sources of variability in descriptive statistics presented in Table 2.

Discussion

Registered suicide rates in the Baltic States are, besides Russia, the highest in the world (Schmidtke et al. 1999) with an overall slightly upward trend, the weakest being in Estonia and the strongest in Lithuania.

Reliability of data

Procedure for registering causes of death in the former USSR and the newly independent Baltic States did not change during the years under observation. An abridged classification (Goskomstat SSSR 1975), based on the regular versions of the 8th and 9th editions of the ICD classification, was used throughout the former USSR in 1970–90. The codes for suicides were 183 and 173 respectively

(Goskomstat SSSR 1975, Tsentralnoje 1980). In 1991–97, causes of death in the Baltic States were recorded in accordance with the ICD-9 classification. The reliability and validity of the USSR data are discussed elsewhere (Wasserman and Värnik 1998). Reliability of suicide statistics in the Baltic countries is considered to be good.

Similar pattern for suicide trends in the three Baltic States

The analysis of suicide trends in this study compares the periods before and after the year 1985, the base year, when the stagnation period in the USSR ended and the reforms initiated by Mikhail Gorbachev, known worldwide as *perestroika*, began. All three Baltic States had high suicide rates and a slight but steady rise in suicide trends during the stagnation period (1970–84).

A sharp fall in suicide rates during the initial years of *perestroika* (1985–88), not only in the Baltic States (Värnik et al. 1994) but in all the 15 republics of the Soviet Union, with an average decrease of 35% for the USSR as a whole, has been described previously (Värnik and Wasserman 1992, Värnik et al. 1998, Postovalova 1989).

This drop was followed by an unexpectedly sharp increase in suicide rates from 1989 for males and females in the Baltic States (Wasserman and Värnik 1994, Värnik 1997a, Krumins 1993, Gailiene et al. 1995). Dramatically rising trends were observed in the three Slav republics of the former USSR (Sartorius 1995, Mokhovikov and Donets 1996) and Kazakhstan (Buckley 1996), where 60% of the inhabitants were Slavs. Specific details of suicidal behaviour in the Baltic and Slav republics are described elsewhere (Värnik et al. 1994, Värnik et al. 1998).

Regarding the causes of the U-shaped trend of suicide rates during the reform period, the authors underline the role of the emotionally positive political climate and the contribution of the anti-alcohol campaign in 1985–88. The rise in suicide frequency from 1989 has been explained by the relaxation of anti-alcohol restrictions and difficulties in redirecting the market economy, subordinating individuals' personal identity and requiring major adjustments to new lifestyles.

In recent years, the pattern of Baltic suicide trends has been completely different. The curve turned downwards, becoming S-shaped, in the reform period (1985–97). The falling trend from 1994–96 may be explained by external factors – stabilisation of the sociopolitical and economic situation, and by psychological factors – the individuals' adjustment to change, as well as reforms in psychiatric care, mental health promotion and efforts to prevent suicide. An additional hypothesis to explain the falling trend could be postulated: there is a certain level of stress tolerance to social changes that determines suicide rate among individuals. Those who exceeded this border, had already committed suicide, survivals adapted to changes, and suicide death became fewer.

Problems specific to the transition period in the Baltic countries may prove to have been just a historical phase. This may prompt the conclusion that historical

events still cause fluctuations in suicide frequency. However, in the long run the predominant trend may, to some degree, be predicted on the basis of factors that are peculiar to nations and regions.

Disparities in suicide rates between the Baltic States

Despite the similar patterns of suicide trends in the Baltic States and nearly the same mean for total suicide rates for the period 1970–1997, certain differences persist. Changes in Lithuanian trends have been more sluggish, while fluctuations are larger. Suicide rates were also higher in Lithuania than in the other Baltic countries in 1984–97. The rise in Estonian suicide rates levelled as early as at the beginning of stagnation period (Värnik 1997a). This country thus started with the highest overall suicide rate, 31.5/100,000, and had the slowest increase – 4.4%. Lithuania's suicide rate had the lowest starting point, 25.1, but rose by 44.6% during the period. Latvia occupied an intermediate position.

Again, Lithuania showed deviant dynamics of the S-shaped curve of suicide rates during the reform period. For Estonia and Latvia the lowest point came in 1988, while in Lithuania it was extended for three years, 1988–90. Latvian and Estonian rates in this period both peaked in the years 1993 and 1994, while the Lithuanian peaked in 1996.

One possible explanation for these differences may be religious disparities. The culture of present-day generations – though not considered religious – is influenced by the religious faith of their ancestors. Religious beliefs appear to serve as the foundation of attitudes towards life and death, including suicide (Durkheim 1951). Lithuania is a Roman Catholic stronghold with native population of 81% and Polish 7% (data by 1989 Census), while Estonia inclines somewhat towards Protestantism and Latvia is a semi-Protestant, semi-Catholic country. In Estonia, Slav migrants with predominantly weak Orthodox background compose 33% and in Latvia 38% of the population.

Societies where religion was weak, were supposedly more vulnerable to the Soviet regime and active atheist propaganda. Initially stronger psychological resistance based on common belief and the more profound disappointment that ensued may be the reason why similar changes in the Lithuanian suicide curve appeared later in time, and were on a larger scale, than in Estonia and Latvia.

Male and female suicides

WHO statistics show that, worldwide, men are far more likely to commit suicide than women, and this also applies to the Baltic States. However, in most countries in Western Europe (Diekstra 1993) the male-female ratio is roughly 3:1, while in Baltic States it was 4–5:1, i.e. closer to the Slav republics of the former USSR (Wasserman, Värnik and Dankowicz 1998).

Gender differences in suicide trends between the Baltic States in the years 1970–90 have been described previously (Värnik et al. 1994). The mean trends

are similar for men and women, but the fluctuations are less marked for female suicides. Historical events appear to have much less impact on the level of female suicides, while men seem to be more sensitive to social factors.

The sharp rise in Lithuanian suicide rates, male and female alike, in 1990–96 has one possible explanation: the fact that political and economic reforms proceeded more slowly in Lithuania than in Estonia made their effects even more painful, causing uncertainty in society and higher suicidality than the relatively rapid changes in the latter country.

History and geographical location align Estonia and Latvia more closely with the Nordic countries, while Lithuania has always been more closely linked to Poland. In the first half of this century Lithuania was predominantly agricultural. Accordingly, gender roles there differed from those in Latvia and Estonia, where industrialisation was already in full swing.

The disparities in suicide trends between the Baltic States need further explanation.

Suicide prevention

For several reasons health promotion, including suicide prevention, in post-Soviet countries has had no sound basis. The goal of Soviet ideology was to make people easier to manipulate, and the means to this end included the oppression of individual integrity and promotion of collectivism. Taking care of oneself was considered egoism, and thus rejected. No abiding value was assigned to the individual or the individual's life and death.

People were made passive and obedient by totalitarian leadership, and this related to medical care as well. Patients admitted to hospitals had no access to the results of their examinations, diagnosis and plan of treatment. All decisions were made by doctors without taking the patient's wishes into account. Patients were not encouraged to take part in the recovery process: their role was passive.

Alcohol consumption was state-facilitated. It was advantageous to the state to divert citizens' minds from politics by alcohol. The state also reaped a large profit from the sale of alcohol.

The conditions described above have made it difficult for people now to realise that they are responsible for their own health, that health care is based on their own attitudes, and that health is the basic value. As far as medical care is concerned, it will take time for all doctors to accept the ethical principles of their profession.

Conclusion

Suicide trends are sensitive to social changes. The suicide trends in the Baltic States, for both men and women, show a similar pattern. Male suicide rates react

to turbulent changes in society with much larger fluctuations, while female rates show greater resistance and stability. Differing cultural, religious and historical backgrounds and the varying speed of change in a period of transition may have influenced the observed differences between the countries.

Besides common principles, a suicide-prevention strategy should include specific targets for rehabilitation, given residual attitudes from the Soviet period. Epidemiological research to identify trends, risk groups and risk factors is an important part of suicide-prevention strategy.

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