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SUICIDE AMONG EXTERNAL CAUSES OF DEATH IN THE BALTIC STATES 1970–2004

Master Thesis in Public Health

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LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following original publications referred to in the text by their Roman numerals:

I VÄRNIK, A., WASSERMAN, D., PALO, E. & TOODING, L.-M. Registration of external causes of death in the Baltic States 1970–1997, *European Journal of Public Health* 2001, 11:84–88.

II VÄRNIK, A., TOODING, L.-M., PALO, E. & WASSERMAN, D. Suicide Trends in the Baltic States, 1970–1997, *Trames* 2000, 4:79–90.

III PALO, E., VÄRNIK, A., KÕLVES, K. & TOODING, L.-M. Suicide in Estonia, 1970–2000. In: Vetik, R. (Ed.) *Estonian Human Development Report 2001*, pp. 42–45 Tallinn, Iloprint 2001.

IV VÄRNIK, A., KÕLVES, K., PALO, E. & TOODING, L.-M. Eesti suitsiidikõver on võtnud S-kuju, *Eesti Arst* 2001, The Estonian suicide line has assumed the S-shape, *Estonian Doctor* 2001, 80:141–144.

USED ABBREVIATIONS

EU–15	European Union member states before 01.05.2004
HFA-DB	WHO Health for All Database
ICD–10	International Statistical Classification of Diseases and Related Health Problems (10^{th} revision)
p	probability of statistical significance
rho	Spearman correlation coefficient
α	level of statistical significance
SMR	standardized mortality ratio (rate)
WHO	World Health Organization

SUMMARY

SUICIDE AMONG EXTERNAL CAUSES OF DEATH IN THE BALTIC STATES IN 1970–2004

The goals of this master's thesis were to describe the classification, coding and registration procedures for external causes of death in the Baltic States and to describe and compare total and gender trends of external death and suicides in the Baltic States during 1970–2004.

In terms of data, the articles use crude mortality rates derived from the volumes issued by the Statistical Offices of the countries. The graphs presented in this paper are based on the World Health Organization (WHO) Health for All Database data for the years 1981–2004. The data derived from the databases of statistical offices of the Baltic States has been standardized according to WHO rules. The information about the classification and registration procedures of the causes of death has been obtained from the employees of the statistical offices of Estonia, Latvia and Lithuania (qualitative analysis) through personal contacts of the author of this thesis and her supervisor.

The procedure of reporting deaths and the registration of causes of death remained the same throughout the Soviet period and was strongly controlled. Interviews with respective officials assured that despite of some organizational changes, the arrangement of registering suicides in the Baltic countries has remained unchanged.

The study showed that in all three Baltic countries, the main trends of mortality due to external causes of death including suicide are similar: a slight increase from 1970 to the end of the stagnation period followed by a sharp decrease in mortality of all external causes of death as well as in suicide since 1984 to 1988. The latter period coincided with the first years of *perestroika*.

Reforms during *perestroika* included a strict anti-alcohol policy that has a preventive effect from suicide and other external causes of death as proven by Värnik-

Wasserman suicide research group. Aspirations for democracy, social optimism and hopes for higher living standards could also have contributed to a decline in external causes of death.

Unexpectedly, a sharp increase in external causes of death and in suicide rates occurred since 1989 for both sexes in the Baltic States. This rise can be explained by the relaxation of anti-alcohol restrictions, but also by large economic and social reforms that required fast adaptation and major adjustments to new lifestyle.

The falling trend from 1994 may be explained by external factors – stabilisation of the socio-political 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. However, the continuously falling trend, especially among males in Estonia and Latvia, needs further investigation.

According to the data of WHO, men are more likely to commit suicide than women practically anywhere in the world. In Estonia and other Baltic States, the male-female ratio of suicides was 4–5:1 on the average. The suicide curve for women is rather stable and socio-political events are poorly reflected there. Men's suicide curve is more sensitive to social changes and thus there are large differences in the male-female suicide ratio during different periods.

Traditionally, the probability of committing suicide increases with age. In the recent decades, the suicide risk among young people has been rising in Western countries. In Estonia, the main risk group is still middle-aged men. The data of this thesis showed that in both 1998–2000 and 2005, men aged 45–54 belong to the main risk group. Suicidal tendencies for women increase with age.

Regarding the prevention of suicides, it is necessary to improve the quality of diagnosing depression and other mental health disorders in the primary health care, which has been proved to be an effective preventive measure in addition to regulations in alcohol consumption policies. High suicide rates in the Baltic States also refer to the necessity to initiate national suicide prevention programs.

1. **INTRODUCTION**

According to the Tenth Revision of International Statistical Classification of Diseases and Related Health Problems (ICD–10), causes of death are divided into two groups based on their cause: those caused by diseases (Chapter I–XVIII) and external causes (Chapter XIX–XX). Chapter XIX (codes S00–T98) is used for coding different types of injuries related to body regions, poisoning and certain other consequences of external causes. Chapter XX codes (V01–Y98) are used for classifying environmental events and circumstances such as the cause of injury, poisoning and other adverse effects. External causes of death (Chapter XX) can be divided into unintentional or accidental and intentional or violent death (Kaasik & Uusküla, 2003). The latter includes assault or homicide (X85–Y09) and intentional self-harm or suicide (X60–X84) – the most extreme self-destructive behaviour.

Suicide lacks a unanimously agreed definition and there is a variety on the field of suicidology. A well-known definition of suicide can be found in 1973 edition of the Encyclopaedia Britannica: "the human act of self-inflicting one's own life cessation" (Shneidman, 1985). In the official classification, suicide is defined as death resulting from intentional self-inflicted harm. According to the present definition, death must be caused by injury (or poisoning) affected by the deceased him- or herself, which can usually be reliably settled in the death scene investigation (World Health Organization, 1992). Today, the researchers consider suicide a biopsychosocial phenomenon with several determinants (Wasserman, 2001).

According to the United Nations report, suicide is an increasing public health problem. During the last decades, a standpoint has been developed and deepened that suicides can be avoidable and that member states need to work out and implement national suicide prevention programs (United Nations, 1996).

Health for all" policy framework "Health 21" for the WHO European Region (World Health Organization, 1999) brings out the need to improve people's mental health. One of the important targets (target 6 – Improving mental health) aims to reduce one third of the suicides by 2020, especially in the countries and target groups with very

high suicide rates. WHO recommends to with public discourse about suicide, ensure support to prevention policy, give information about the situation. Its recommendations also include training everyday life skills to improve individuals' and communities' abilities to detect problems and cope with stressful situations and events. A separate target under the policy framework "Health 21" is to reduce injury from violence and accidents (target 9).

In 2005, 52 countries signed the Mental Health Declaration for Europe, which states that the priorities of WHO, European Union and European Commission include the promotion of mental health; prevention, treatment and rehabilitation of mental health disorders and improving the qualification of field and research specialists (WHO European Ministerial Conference on Mental Health, 2005). The declaration indicates the need to create an integrated and effective mental health system on the basis of common knowledge and reforms including promotion, prevention, treatment, rehabilitation and care.

2. BACKGROUND

Three independent Baltic countries – Estonia, Latvia and Lithuania – were occupied by Soviet forces and incorporated into the USSR in 1940. The independence was restored in 1991. The Baltic States experienced turbulent political, economic and social changes: painful withdrawal from the Soviet system and creation of a new society after the disintegration from the USSR. The present study covers the stagnation period between 1970 and 1984 followed by reforms initiated by Mikhail Gorbatchev in 1985.

Epidemiological mortality research was banned in the USSR and did not begin until 1989, when the Soviet leadership of the *Glasnost* era granted access to the secret archives storing data on suicide mortality.

Over the observed period (1970–2004), the main causes of death in the three Baltic States – Estonia, Latvia and Lithuania – were cardiovascular diseases, neoplasms and external causes of death (Statistical Office of Estonia, 1998a; World Health Organization http://data.euro.who.int/hfadb). The same ranking order of the causes of death is characteristic to all Europe, but in the Baltic States, the mortality from external causes of death has been several times higher. According to WHO data (World Health Organization http://data.euro.who.int/hfadb), the risk of external causes of death (ICD–10: V00–Y89) was five times higher in the Baltic States than the average of EU member states (EU–15) in the middle of 1990s.

In 2004, the rate of external causes of death per 100 000 inhabitants was still 3–4 times higher than in the old EU member states (ranging from 27 in Netherlands to 72 in Finland, EU–15 average 37.5) and at least twice as high as in other new EU member states (ranging from 28 in Malta to 80 in Hungary). Only Russia (212), Byelorussia (162) and Ukraine (144) beat Baltic States in the rate of external causes of death in 2004 (World Health Organization http://data.euro.who.int/hfadb).

Previous studies have mapped the trends of external causes of death and other mortality data for the Baltic countries (Krumins & Zvidrins, 1992) and for all the

former Soviet republics (Mesle, Shkolnikov, & Vallin, 1992). Series of articles have been published on epidemiology of suicides in the former Soviet republics (Wasserman, Värnik, Dankowicz, & Eklund, 1998) and several authors have analysed the data on external causes of death for Estonia and Lithuania (Gaizauskiene & Westerling, 1995; Kaasik, Andersson, & Horte, 1998; Katus & Puur, 1997; Leinsalu, 1995). According to our knowledge, no comparative analysis on the external causes of death in the Baltic States has been published.

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, & Eklund, 1994) and later to all the 15 Soviet republics (Wasserman & Värnik, 1994; Wasserman, Värnik, & Eklund, 1994, 1998; Värnik, 1997a; Värnik & Wasserman, 1992; Värnik, Wasserman, Dankowicz, & Eklund, 1998a, 1998b). These studies confirmed a close connection between sociopolitical reforms, including a strict anti-alcohol policy, and suicide mortality.

3. AIMS OF THE STUDY

The aims of this study were to

- describe the classification, coding and registration procedures for external causes of death in the Baltic States;
- describe and compare the trends of external causes of death for the Baltic States during the period 1970–2004 for total and by gender;
- describe and compare the trends of suicide for the Baltic States during the period 1970–2004 for total and by gender;
- observe age-specific suicide rates in Estonia by gender.

4. MATERIAL AND METHODS

4.1. Data sources

The empirical material of this study consists of External Causes of Death (Chapter XX of ICD–10) concerning injury and poisoning, including motor vehicle accidents, accidental poisoning by alcohol, accidental falls, suicide, homicide, accidental drowning and submersion. Articles I and II are based on the data published by the statistical offices of the three Baltic States containing crude mortality rates (Central Statistical Bureau of Latvia, 1997, 1998; Department of Statistics to the Government of the Republic of Lithuania, 1996, 1997a, 1997b, 1998; Statistical Office of Estonia, 1998a, 1998b, 1998c); articles III and IV are based on the data from Estonian Statistical Office containing crude mortality rates.

For the latest period 1981–2004, the figures for the Baltic States presented in this paper are based on the mortality data from WHO Health for All Database (World Health Organization http://data.euro.who.int/hfadb/). The data for 1970–1980 has been acquired from statistical offices of the three Baltic States. All mortality rates are standardised by the author in 5-year age groups according to WHO rules (World Health Organization http://data.euro.who.int/hfadb/ – Indicator definitions). Information about the classification and registration procedures of causes of death is obtained from the employees of the national statistical offices of Estonia, Latvia and Lithuania by means of qualitative analysis.

4.2. Statistics

The data analysis of this thesis used mainly descriptive statistics – mean values and standard deviation. Some derived indicators – annual ratios – were also used. Linear regression was employed to calculate annual increase in rates and the associations between the rates in three Baltic countries were calculated through Spearman correlation coefficients (rho). The level of statistical significance was set at $\alpha = 0.05$.

Age-standardized death rates per 100,000 inhabitants are calculated using the direct method. The standardization is used for adjusting differences in population age distribution and represents what the crude death rate would have been if the population had the same age distribution as the European Standard Population.

5. RESULTS

The results of the thesis contain materials of the four published articles and their follow-up study. Study I describes registration, coding and classification of causes of death in the former Soviet Union and Baltic States, illustrating the issue by showing absolute numbers, rates and the proportion of external causes of death to the total number of deaths in the Baltic States for the years 1970–1997. Study II presents analysis and compares gender- and age-specific suicide trends in the three Baltic countries in 1970-1997. Study III refers to the distribution of suicides by age groups in Estonia, showing the average for the years 1998-2000. Study IV analyses total and gender-specific suicide trends in different socio-political period in Estonia for the years 1970-1999. In the present thesis, a follow-up study up to the years 2004/5 has been added to the articles described above.

5.1. Registration, coding and classification of cause of death (Study I)

The registration of cause of death in the Baltic States was based on medical death certificates. The procedure for reporting death and the registration of death remained the same throughout the Soviet period and was strongly controlled (Wasserman & Värnik, 1998). Study I confirmed that despite of some organisational changes, the same pattern of registration of cause of death is used in the Baltic States today.

5.1.1. Registration procedure

In the case of a person's death, the family is required to obtain the medical death certificate from the institution concerned (ambulatory, hospital or medico-legal bureau) and present it to the civil registration office. In case of an external cause of death, a forensic expert from a medico-legal bureau must perform an autopsy and issue a medical death certificate. An autopsy must be performed in all cases where death occurred as a result of violence. Death must be registered in the local civil registration office within three days after the death occurs.

The copies of death registration records and confirmed medical death certificates are sent to higher administrative institutions in charge of civil registration. The National

Civil Registration Office is required to deliver all medical death certificates monthly to their national Statistical Offices in Tallinn, Riga or Vilnius.
As in all the countries reporting to the WHO, three levels of cause of death can be registered on the death certificate: the underlying (principal), immediate, and associated (contributory or secondary) cause of death. Statistical tables are calculated using the underlying (principal) cause of death.

Between 1970 and 1990, the annual mortality data in the former Soviet republics including the three Baltic republics was first compiled by the statistical office of each republic, and then the copies were delivered to the Central Statistical Committee in Moscow. For the period of 1970–1990, the tables comprised the data for both sexes separately in 5-year age groups and by urban and rural areas. The official forms in statistical offices were filled in by hand and unpublished until 1988 (Värnik, 1997a).

After the three Baltic States regained independence in 1991, the data on causes of death was transferred from the Soviet mainframe technology to PC computers. Since 1992, national databases (registers) have been established.

5.1.2. Classification and coding

A modified WHO International Classification of Diseases (ICD) was obligatory for use in all the former Soviet Republics and differed slightly from that used in Western countries (Goskomstat SSSR, 1975). The classification of external causes of death used in present study was based on the ICD–8 classification, codes 160–185 (World Health Organization, 1965) and the ICD–9 classification, codes 160–175 (World Health Organization, 1977).

The coding of cause of death using the four-digit system of the ICD–9 classification (World Health Organization, 1977) was introduced in Lithuania in 1993 and in Estonia and Latvia in 1994. The ICD 10th revision (World Health Organization, 1992) was applied in Latvia in 1996 and in Estonia and Lithuania in 1997.

The number of items used in the classification of cause of death in the former USSR (Goskomstat SSSR, 1975) is considerably smaller than in the ICD system (World Health Organization, 1965, 1977). The relationship between the items in the abridged

classification used in the former USSR and the ICD–8/ICD–9 classification systems were detailed in a special document (Tsentralnoje statistitsheskoje upravlenije, 1980). All thirteen categories or groups of external causes of death from these tabulation lists were comparable.

It is also important to point out that until 1988, under the Soviet classification, suicide, homicide and occupational accidents were concealed for political reasons and tabulated separately in a special 'secret' table. Such secrecy is not difficult to understand: in 1970, for instance, the standardized death rate by homicide in the former USSR was almost eight times higher than the European average (Mesle, Shkolnikov, Hertrich, & Vallin, 1996).

The cause of death was described on the death certificates in words only, in all the three Baltic countries these diagnoses were coded in Central Statistical Offices by a consultant medical doctor. Similarly to previous years, the central coding of causes of death has stayed the same throughout the Baltic States. The only difference is that since 1997, Health Statistics and Medical Technology Agency is the institution responsible for the cause of death statistics in Latvia.

5.2. Trends of external causes of death in Baltic States by gender in 1970–2004 (Study I)

A slightly increasing trend for external causes of death was observable in all the three countries in the years 1970–1984. After 1984, a sharp decline in external causes of death occurred until 1986 – 1988, which was followed by a rapid increase of rates until 1994, and then by a sharp fall until 1996 described in Study I.

Since 1997, the decreasing trend has been smooth until the end of the study period. Despite of the decrease in the second half of the 1990s, the mean rates were higher for the independence period (1991–2004) compared to the Soviet period (1970–1990) in all three countries. The average rate of external causes of death per 100 000 inhabitants during the Soviet period (1970–1990) was been 123.0 for Estonia, 133.9 for Latvia and 123.4 for Lithuania. The average rate of external causes of death per 100 000 inhabitants during independence period (1991–2004) has been 160.2 for

Estonia, 167.0 for Latvia and 157.8 for Lithuania. In Lithuania, the changes in rates were less volatile than in the other two countries.

The rates of external causes of death were considered separately for men and women in Estonia, Latvia and Lithuania (Figure 1). During the Soviet period, female external death rates were 3.6–4.2 times lower than for males. During the independence period, the rates for females were 4.0–4.5 times lower than for males. The peak in 1994 was observable on all curves. During 1970–2004, Estonian male and female rates of external causes of death were statistically significantly correlated with Latvian (male: rho=0.88, p<0.001; female: rho=0.71, p<0.001) and Lithuanian figures (male: rho=0.97, p=<0.001; female: rho=0.75, p<0.001).

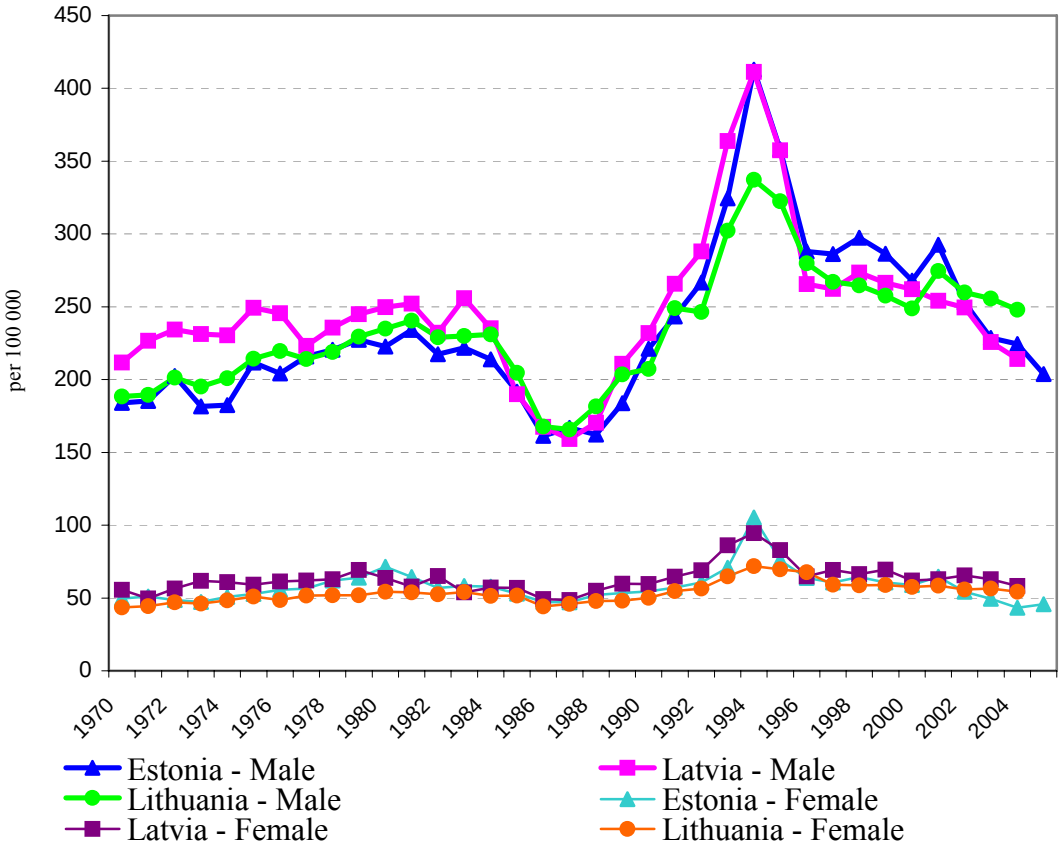

Figure 1. Male and female rates of external causes of death in the Baltic States, 1970–2004

5.3. Trends of suicides in the Baltic States by gender in 1970-2004 (Study II &IV)

Among the other external causes of death, the suicide rates rose slowly and steadily in 1970–84. The mean annual increase in suicide rates was 0.04 for Estonia, 0.35 for Latvia and 0.82 for Lithuania. The overall suicide rates of this period fluctuated between 32.8 – 37.7 in Estonia, 28.3 – 34.4 in Latvia and 24.8 – 36.3 in Lithuania with standard deviations of 1.7 for Estonia, 2.0 for Latvia and 3.5 for Lithuania. Since 1985, there has been fall-rise-fall pattern of the suicide curves in all the three countries. In 1985–2004, the suicide rates varied more intensively than during the previous period with standard deviations 6.0 for Estonia, 6.4 for Latvia and 8.0 for Lithuania. The highest rates were registered in 1994 – 41.0 per 100 000 inhabitants in Estonia, 42.5 in Latvia and 46.4 in Lithuania. However, in 2004, the suicide rates for Estonia (22.8) and Latvia (22.3) were on the lowest level of the whole study period, and still very high (38.9) in Lithuania. The average suicide rate per 100 000 inhabitants during the Soviet period (1970–1990) was 31.8 for Estonia, 30.1 for Latvia and 30.9 for Lithuania. The average suicide rate per 100 000 inhabitants during the independence period (1991–2004) has been 32.1 for Estonia, 32.6 for Latvia and 43.4 for Lithuania.

The male-female ratio of suicides during the Soviet era was roughly 4–5:1 in the Baltic States. The trends of suicide rates for males and females are presented in Figure 2. The turning point of 1984 for males corresponds well to the socio-political changes in society. In the stagnation period, 1970–84, the mean male suicide rate was higher in Estonia (56.2) in comparison with Latvia (54.4) and Lithuania (54.8). The corresponding figures for the independence period (1991–2004) were 57.9 for Estonia, 58.9 for Latvia and 78.6 for Lithuania. During 1970–2004, the Estonian suicide rates for males were statistically significantly correlated with Latvian (rho=0.79, $p<0.001$) and Lithuanian rates (rho=0.44, $p=0.009$).

During the stagnation period, the suicide rates of females were, on the average, similar in Latvia and Estonia (14.3 for Estonia, 13.5 for Latvia) and somewhat lower in Lithuania (10.8). Compared to the first period, there is no general change in average suicide rates in the independence period for Estonia (rate 11.1) and Latvia (rate 11.3), with the exception of Lithuania (rate 13.6). During 1970–2004, the

Estonian suicide rates of females were statistically significantly correlated with Latvian rates (rho=0.76, p<0.001), but not with Lithuanian rates (rho=-0.30, p=0.078).

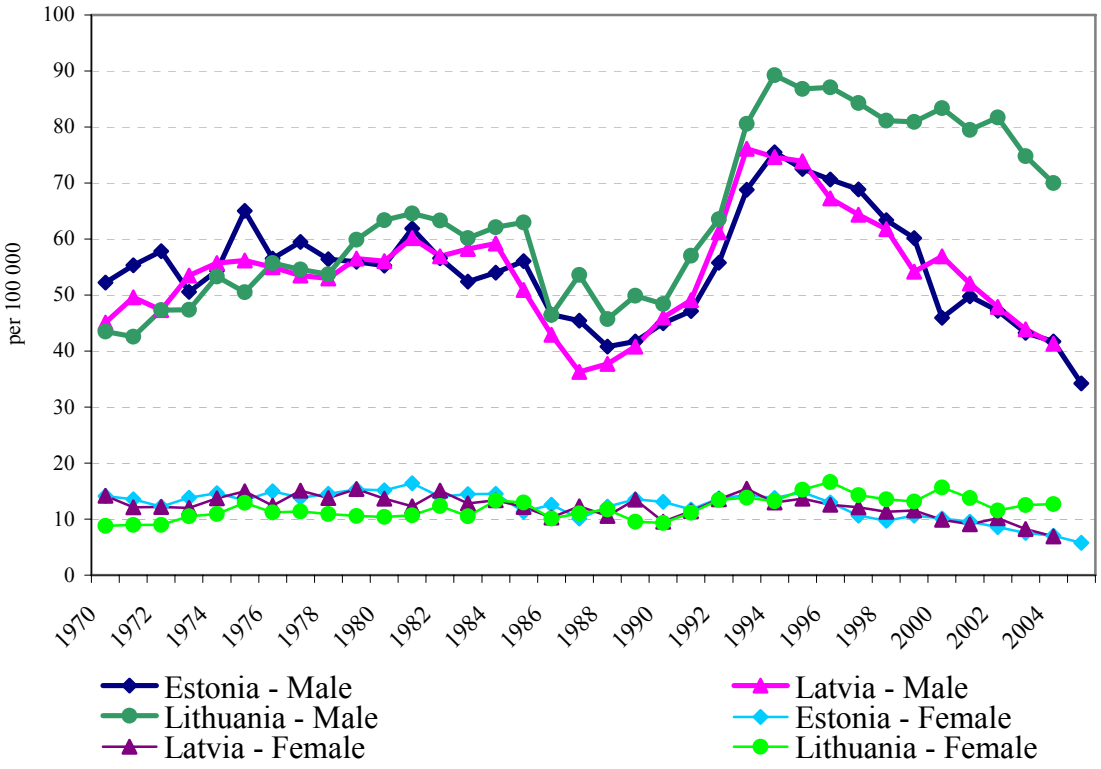

Figure 2. Male and female suicide rates in the Baltic States, 1970–2004

5.3.1. Suicide rates in Estonia by age (Study III)

Study III has shown that middle-aged males (45–54) had the highest suicide rates in Estonia in 1998–2000. Figure 3 compares the mean suicide rates for males by age groups for 1998–2000 and the latest data for 2005. Figure 4 reflects the same data for females. The largest decrease in percentages occurred in the age group 55–64 (54.1%) for males and 35–44 (77.7%) for females.

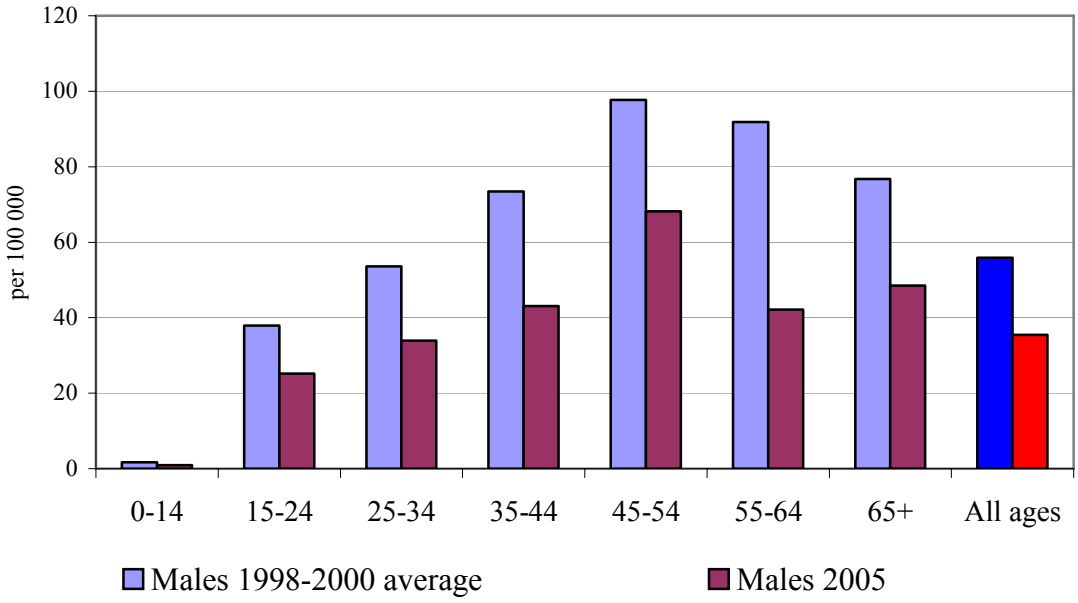

Figure 3. Male suicide rates by age groups in Estonia – the mean of 1989–2000 and 2005

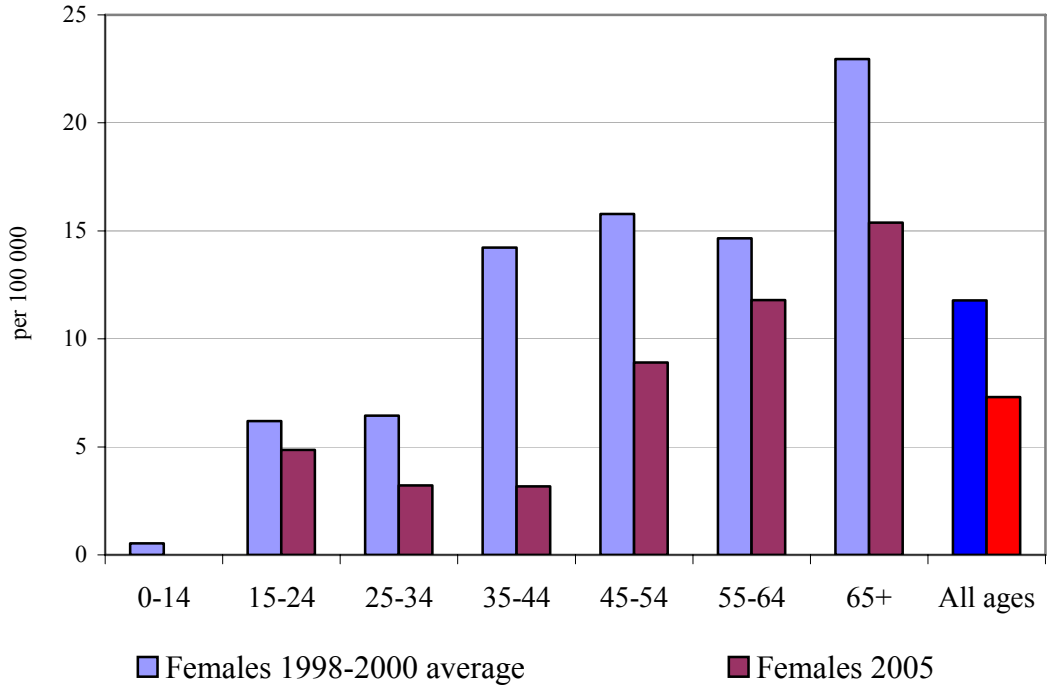

Figure 4. Female suicide rates by age groups in Estonia – the mean of 1989–2000 and 2005

6. DISCUSSION

The present thesis serves as a framework for the four original publications of the author, which integrates a precise description of the registration procedure of external causes of death and changes in male and female mortality trends. A special attention is paid to suicides and their distribution by age groups during socio-politically different time periods between 1970-1997/9 in the Baltic States. A similar research up to the years 2004/5 has been added to the articles of this study.

One of the articles (Study I) is published in *European Journal of Public Health*, a journal that is indexed in Science Citation Index Expanded (ISI Web of Knowledge), Study II is published in an internationally peer-reviewed journal (*Trames*), and Studies III and IV are published in local scientific issues (*Eesti Arst (Estonian Doctor)* and *Estonian Human Development Report)*.

6.1. Validity and reliability of the data

The validity and reliability of the statistics on external causes of death in the former USSR have been addressed previously. Reliability of suicide statistics in the Baltic countries is considered to be good (Leon, Cheney, Shkolnikov, Zakharov, Shapiro, Rakhmanova et al., 1997; Mesle, Shkolnikov, Hertrich et al., 1996; Wasserman & Värnik, 1998).

Quantitative and qualitative analysis of classification and registration processes of external causes of death in the former USSR in 1970–1990 showed that the data was reliable concerning the Slavic and the Baltic States (Wasserman & Värnik, 1998). In the Baltic States, there has not been any change in the registration procedure since that period. Population estimates for the periods between the censuses of 1970, 1979 and 1989, which were first compiled by the Moscow statistical office, were recalculated in the 1990s by the Estonian Interuniversity Population Research Centre to test the hypothesis of possibly undercounted migration registration. The recalculated population estimations have been found to have only a very slight

influence on mortality rates (Katus & Puur, 1997; Statistical Office of Estonia, 1998d).

6.2. Suicide among external causes of death in the Baltic States

In all the three Baltic countries, the main trends of mortality due to external causes of death and suicide among them are similar: a slight increase from 1970 to the end of the stagnation period followed by a sharp decrease in mortality of all external causes of death as well as in suicide since 1984 to 1988. The latter period coincided with the first years of *perestroika*. As similar trends have also been found in other post-Soviet countries (Mesle, Shkolnikov, Hertrich et al., 1996; Mesle, Shkolnikov, & Vallin, 1992; Wasserman, Värnik, Dankowicz et al., 1998), one can hypothesize that this development was due to a similar social background throughout the region.

Reforms during *perestroika* included a strict anti-alcohol policy that is known to have been a preventive factor against suicide (Wasserman, Värnik, & Eklund, 1994, 1998) and other external causes of death (Wasserman, Värnik, Dankowicz et al., 1998). The same situation was found in most post-Soviet countries (Leon, Chenet, Shkolnikov et al., 1997; Mesle, Shkolnikov, & Vallin, 1992; Wasserman, Värnik, Dankowicz et al., 1998), especially in Russia, where alcohol consumption played a major role in external death (Mesle, Shkolnikov, Hertrich et al., 1996; Nemtsov, 1998; Nemtsov, 2002). This points to the need for strong preventive measures, including an anti-alcohol policy, as an important part of the countries' health policy.

In the same time, aspirations for democracy, social optimism and hopes for higher living standards could also have contributed to a decline of external causes of death and suicides in the first years of perestroika. In the years of decline of mortality due to external causes, the total mortality rate decreased as well; the improvement in the life expectancy of people was notable (Leon, Chenet, Shkolnikov et al., 1997).

Unexpectedly, a sharp increase in external causes of death and in suicide rates occurred since 1989 in the Baltic States for both males and females (Gailiene, Domanskiene, & Keturakis, 1995; Krumins, 1993; Wasserman & Värnik, 1994; Värnik, 1997b, 1997c, 1997a). Dramatically rising trends were also observed in the

three Slavic republics of the former USSR (Mokhovikov & Donets, 1996; Sartorius, 1995) and Kazakhstan (Buckley, 1997), where 60% of the inhabitants were Slavs. The rise in mortality since 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 (Värnik, Kõlves, Väli, Tooding, & Wasserman, in print).

The falling trend from 1994 can be explained by external factors – stabilisation of the socio-political 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 as following: 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 by then and the survivors adapted to changes, so suicide death became fewer. However, the continuously falling trend, especially among males in Estonia and Latvia, needs further investigation.

There is no data available about whether the changes in trends of external causes of death in the Baltic countries in recent years could be explained by changes in socio-economic and socio-political situations, better health service or by other reasons.

The fall in external causes of death in the mid-1980s and rapid increase in the early 1990s coincided closely with the trends in total mortality rates and influenced life expectancy figures remarkably (Statistical Office of Estonia Central Statistical Bureau of Latvia Lithuanian Department of Statistics, 1996; Statistical Office of Estonia, 1998a). A comparison of changes in life expectancy at birth for the male and female populations of all the three Baltic countries showed that the overall upward trend in life expectancy in the 1980s did not continue in 1990s.

The trend in the early 1990s turned downward for both sexes, but the decline was particularly pronounced among men. In 1989, a drop in life expectancy due to all external causes of death was 4.6 years for males and 1.7 for females; for 1994, these shortfalls were respectively 6.3 and 2.4 years (Krumins & Zvidrins, 1992). By 1994, men’s life expectancy had fallen dramatically to the lowest level of the study period in

all the three Baltic countries (Statistical Office of Estonia Central Statistical Bureau of Latvia Lithuanian Department of Statistics, 1996; Statistical Office of Estonia, 1998a). The growth of life expectancy began again in 1995 and increased considerably between 1995–2004 in Estonia and Latvia (respectively 5.8 and 7.0 years for males and 5.0 and 3.8 years for females). In Lithuania, the growth of life expectancy has been significantly lower – 3.8 years for males and 2.7 for females (World Health Organization http://data.euro.who.int/hfadb).

A similar impact on life expectancy due to external causes of death as in the Baltic States has been described for Russia – years of growth of life expectancy were closely correlated with the decrease in the external causes of death (Leon, Chenet, Shkolnikov et al., 1997).

The high proportion of external causes of death has especially influenced the life expectancy of males. In 1985–2005, the mean proportion of external causes in mortality among males was 18.1% in the Baltic States and 6% in old EU member states, the respective numbers for females were 5.2% and 2.7%. The average proportion of suicides among external causes of death in the Baltic States in 1970–2004 was 24.4% for males and 21.3% for females (World Health Organization http://data.euro.who.int/hfadb).

6.3. Suicide rates in Estonia by gender and age

According to the data of the World Health Organization, men are more likely to commit suicide. However, in most countries in Western Europe (Diekstra, 1993), the male-female ratio is roughly 3:1, the situation is exceptional only in China, where women commit more suicides than men, the corresponding ratio being 0.8 to 1 (Bertolote, 2001). In Estonia and other Baltic States, the ratio was 4–5:1, which is closer to the Slavic republics of the former USSR (Wasserman, Värnik, & Dankowicz, 1998). The suicide curve for women is rather stable, so social and economic events are poorly reflected there. The higher number of male suicides in general, and on the territory of the former Soviet Union in particular, could be explained by the fact that more men than women like alcoholic beverages. It could

also be explained by the different hypotheses set up in different studies, according to which men are more sensitive to changes within the social network.

Traditionally, the probability of committing suicide increases with age. It is also known that social ties are lost in the older age groups (Bertolote, 2001). Nowadays, a growing tendency of suicide risk has been observed among young people, especially aged 15–24 (Cantor, 2000). In Estonia, the main risk group during the entire period of observation was middle-aged men (Värnik, 1997b, 1997c; Tooding, Värnik, Wasserman 2004). The breakdown of men has its peak at ages 45–54 both in 1998–2000 and 2005. Suicidal tendencies for women increase with age, the age breakdown pattern and figures are similar to worldwide averages. However, the average of similar indicators for men is very different from the world level – both regarding the high rates and the pattern of age breakdown.

6.3.1. Suicide prevention

For several reasons, health promotion, including suicide prevention, has had no sound basis in post-Soviet countries. The Soviet ideology included the oppression of individual integrity and promotion of collectivism. Taking care of oneself was considered egoism, and thus rejected.

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. Doctors made the decisions without discussing with patients. Patients were not encouraged to take part in the recovery process: their role was passive. Alcohol consumption was state-facilitated due to political and economic reasons.

The conditions described above have made it difficult for people to realise now that they are responsible for their own health, which is based on their own attitudes, and that health is a basic value.

Estonian-Swedish Mental Health and Suicidology Institute (ERSI) has been the focal point (appointed by WHO/EURO) of suicide prevention in Estonia since 1993. Among other preventive initiatives, ERSI has elaborated a draft of National Suicide

Prevention Programme ordered by Estonian Health Insurance Foundation in 2001 (Wasserman, 2003), which has not been officially launched yet.

Epidemiology of suicide by gender and age helps to conceptualise prevention measures by target groups. Different gender and age groups respond differently to changes in the society. Middle-aged males have shown to be especially vulnerable to changes in transition societies. Studies on the effects of *perestroika* have shown that strict anti-alcohol policy was extremely effective in preventing suicides in former USSR, especially in Baltic and Slavic republics (Värnik, Wasserman, Dankowicz et al., 1998a, 1998b; Värnik, Wasserman, & Eklund, 1994). WHO-CHOICE study in Estonia has considered reduction in alcohol consumption as the most cost-effective intervention to reduce alcohol-related harm (Lai, Habicht, Reinap, & Kiivet, 2006).

Besides the regulations in alcohol policy, there is a need to improve the quality of diagnosing depression and other mental health disorders in the primary health care, which has been proved to be an effective prevention measure (Mann, Apter, Bertolote, Beautrais, Currier, Haas et al., 2005). High suicide rates in the Baltic States are indicating that national suicide prevention programmes are needed.

7. CONCLUSIONS

Classification and registration of external causes of death in the former USSR was strictly regulated and considered to be reliable. Despite of some organisational changes, the same pattern of classification and registration of causes of death is used in the Baltic States today.

The trends of external causes of death and suicide are similar in all three Baltic States, perhaps because of the similar social background of the countries. A slight rise in the stagnation period was succeeded by a marked fall-rise-fall in the reforms period. Social stresses and alcohol consumption could be considered the factors influencing the mortality rates and specific fluctuations in trends of external death and suicide. However, the constantly falling trend of the last decade, especially among males in Estonia and Latvia, needs further investigation.

The male-female ratio for suicides in the Baltic States was high during the study period, roughly 4–5:1. The fluctuations of male suicides coincide with social changes and state alcohol policy. The suicide curve for women is rather stable, social and economic events are poorly reflected there.

Middle-aged males (45–54) had the highest suicide rates by age groups in Estonia in 1998–2000 and in 2005. Female suicides increased by age. The largest decrease for males by the year 2005 occurred in the age group 55–64 (54.1%) and for females in age group 35–44 (77.7%).

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SUMMARY IN ESTONIAN

SUITSIID VÄLISPÕHJUSTEST TINGITUD SURMADE HULGAS BALTI RIIKIDES 1970–2004

Käesoleva magistritöö eesmärgid olid kirjeldada välispõhjustest tingitud surmade klassifitseerimist, kodeerimist ja registreerimist Balti riikides, kirjeldada ja võrrelda Baltimaade välispõhjustest tingitud surmade ja suitsiidide trende aastatel 1970–2004 meestel ja naistel ning vaadelda Eesti suitsiidikordajaid vanusgrupiti vastavalt soole.

Artiklites on kasutatud suremuse üldkordajaid, mis pärinevad Baltimaade statistikaametite väljaannetest. Töös esitatud joonised põhinevad Maailma Terviseorganisatsiooni (WHO) Tervis Kõigile andmebaasi (WHO Health for All Database) andmetele aastate 1981–2004 kohta. Aastate 1970–1980 kohta saadud andmed Balti riikide statistikaametite andmebaasidest on standarditud vastavalt WHO reeglitele. Informatsioon surma põhjuste klassifitseerimise ja registreerimise protseduuri kohta on saadud läbi töö autori ja tema juhendaja isiklike kontaktide Eesti, Läti ja Leedu statistikaametite töötajatega (kvalitatiivne analüüs).

Surmade registreerimise ja klassifitseerimise protseduur oli sama kogu Nõukogude perioodi vältel ja seda kontrolliti rangelt. Intervjuud vastavate riigiametnikega kinnitasid, et vaatamata mõningatele organisatsioonilistele muudatustele on surmade registreerimise korraldus Baltimaades jäänud endiseks.

Uuring näitas, et kõigis kolmes Balti riigis on välispõhjustest tingitud surmade trend sarnane, nende hulgas ka suitsiidide trend: kerge tõus alates 1970. aastast kuni stagnatsiooniperioodi lõpuni, millele järgnes järsk langus nii välispõhjustest tingitud surmade kui suitsiidide kordajates aastatel 1984 kuni 1988. Languse periood ühtis esimeste *perestroika* aastatega. *Perestroika* reformid sisaldasid ranget alkoholivastast poliitikat, millel on Värnik-Wassermani suitsiidiuuringute grupi poolt tõestatud kaitsev efekt suitsiidide ja välispõhjustest tingitud surmade vastu. Langusele võisid kaasa aidata ka sotsiaalne optimism, lootus demokratiseerimisele ja kõrgemale elatustasemele.

Järsule langusele järgnes ootamatult tõus alates 1989. aastast välispõhjustest tingitud surmade trendides kõikides Baltimaades. Tõusu võis tingida alkoholivastaste piirangute lõppemine, aga ka ulatuslikud majanduslikud reformid, mis nõudsid inimestelt kiiret kohanemisvõimet.

Alates 1994. aastast langevat trendi võib seletada väliste sotsiaalsete teguritega (sotsiaal-poliitiline ja majanduslik stabiliseerumine) ja psühholoogiliste teguritega (indiviidi kohanemine muutustega), aga ka psühhiaatrilise abi paranemise, vaimse tervise edendamise ja suitsiidaalset käitumist ennetavate meetmetega. Järjekindlalt langev suitsiidikõver, eelkõige Eesti ja Läti meestel, vajab põhjalikumat uurimist.

WHO andmetel sooritavad kogu maailmas mehed suitsiide sagedamini kui naised. Eestis ja teistes Baltimaades oli vaadeldaval perioodil meeste ja naiste suitsiidide suhe keskmiselt 4–5:1. Naiste suitsiidikõver on vähe muutuv ja sotsiaal-poliitilised sündmused kajastuvad selles nõrgalt. Meeste suitsiidikõver reageerib tundlikult sotsiaalsetele muutustele ning seetõttu on meeste ja naiste suitsiidide suhtarvus eri perioodidel suured erinevused.

Traditsiooniliselt suureneb suitsiidirisk vanusega, viimastel aastakümnetel on Lääneriikides tõusnud noorte suitsiidikordaja, kuid Eestis on suurimaks riskigrupiks jätkuvalt keskealised mehed. Käesoleva töö andmed näitasid, et nii aastatel 1998–2000 kui ka aastal 2005 olid enim ohustatud 45–54 aastased mehed. Eesti naiste puhul tõuseb suitsiidirisk vanusega.

Preventsiooni seisukohalt on oluline parendada depressiooni ja teiste vaimsete häirete diagnoosimise ja ravi kvaliteeti esmatasandi arstiabis, mis on tõestatud kui efektiivne preventiivne meede lisaks alkoholipoliitika regulatsioonidele. Kõrged suitsiidikordajad Balti riikides viitavad riiklike suitsiidide preventsiooni programmide vajadusele.

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PUBLICATIONS

PAPER I

VÄRNIK, A., WASSERMAN, D., PALO, E. & TOODING, L.-M. Registration of external causes of death in the Baltic States 1970–1997, *European Journal of Public Health* 2001, 11:84–88.

EUROPEAN JOURNAL OF PUBLIC HEALTH 2001; 11: 84–88

Registration of external causes of death in the Baltic States 1970–1997

AIRI VÄRNIK, DANUTA WASSERMAN, ENE PALO, LIINA-MAI TOODING *

Background: Trends in external causes of deaths in the Baltic States – Estonia, Latvia and Lithuania – were analysed against the background of turbulent political, social and economic changes. The reliability of mortality statistics concerning external causes of death in these countries is considered to be good. Method: This study is based on data published by the statistical offices of the three Baltic States and on data obtained through interviews with personnel employed at the national statistical offices. The study period was divided, by socio-political and economic factors, into a period of stagnation (1970–1984) and a period of reforms (1985–1997). Results: During 1970–1984 a stable slightly upward trend of external causes of death rates was observed. The curve became S-shaped in the reform period: between 1984 and 1988 a marked decrease occurred followed by a rapid increase of rates until 1994, and then by 1997 a fall to the approximate level of 1984. The male to female ratio of external causes of death was between 3.4:1 and 4.2:1. External deaths accounted for 10% to 14% of all deaths before 1984. During the period 1984–1988 the proportion of external deaths was under 10% and peaked in 1994 at 16%. Fluctuations in the trends of external death were more pronounced among males than females in all Baltic countries. Conclusion: Trends in external causes of death were similar in Baltic States. High proportions of violent death decreased life-expectancy for both sexes, but markedly for males. Social stresses and alcohol consumption could be considered as factors influencing the mortality rates and specific fluctuations in trends of external death, especially among males.

Keywords: Baltic States, epidemiology, external causes of deaths, trends, 1970–1997

Three independent Baltic countries – Estonia, Latvia and Lithuania – were occupied by Soviet forces and incorporated into the USSR in 1940. Historically, the study covers the stagnation period between 1970 and 1984 followed by reforms initiated by Mikhail Gorbatchev from 1985. When the country disintegrated, the Baltic republics restored their independence in 1991. Baltic countries went through turbulent political, economic and social changes: painful withdrawal from the soviet system and the building up of a new society.

In 1988, mortality and population data were released as a result of the reforms in the former USSR, and it became possible to publish and analyse mortality data by cause of death.

In the Baltic countries – Estonia, Latvia and Lithuania – in the period 1970–1996 the main causes of death were cardiovascular diseases, neoplasms and external causes of death.[1]

According to WHO data,[2] the risk of external causes of death (ICD-10: V01-Y89) in the Baltic States was five-six times higher than in the United Kingdom (in 1996 – 28.5) and the Netherlands (in 1996 – 29.7). The rate of external deaths in Nordic countries was about three times higher in 1996 ranging from 38.6 in Sweden to 73.5 in Finland. In accordance with WHO internet page www.who.dk "Country information" HEALTH FOR ALL Statistical Database (HFA-DB), version: January 2000, very high rates of external causes of death were registered in Newly Independent States – 151.3 in 1997.

The validity and reliability of causes-of-death statistics in the Soviet period have been addressed in a number of studies, particularly for the former USSR[3] and Russia.[4,5] Trends of external causes of death for different time periods have been presented previously along with other mortality data for the Baltic countries[6] and for all of the former Soviet republics[7] as well as for suicide only.[8] A few authors have analysed the data on external causes of deaths for Estonia and Lithuania,[9–12] but no comparative analysis of external death in the Baltic States has been published previously.

The aim of this study is

- to describe the classification, coding and registration procedures for external causes of death in the Baltic States;
- to compare trends for external death for the Baltic States during the period 1970–1997;
- to estimate the ratio of external death to total mortality.

MATERIAL

Material for the study contains External Causes of Death (Chapter XX of ICD-10) as follows: Injury and Poisoning,

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in which motor vehicle accidents, accidental poisoning by alcohol, accidental falls, suicide, homicide, accidental drowning and submersion are counted.

This study is based on:

Data published 1996–1998 by the statistical offices of the three Baltic States – Estonia, Latvia and Lithuania[1,13–20] concerning:

- absolute numbers of external causes of deaths and
- external death rates per 100,000 inhabitants (presented in *table 1*).

Information about the classification and registration procedures for cause of death, obtained through personal contact by the authors (EP, AV) with personnel employed at the national statistical offices of Estonia, Latvia and Lithuania.

The analyses in this article cover the period from 1970 to 1997. The study period is divided by socio-political terms into two different parts: the stagnation period (1970–1984) and the period of reforms (1985–1997).

RESULTS

Registration, coding and classification of cause of death

The registration of cause of death was based on medical death certificates. The procedure for reporting deaths, and the registration of death, remained the same throughout the Soviet period and was strongly controlled.[3] The same pattern of registration of cause of death continues to be used in the Baltic States today.

- Registration procedure

In the case of a person's death, the family is required to obtain a medical death certificate from the institution concerned (hospital or medico-legal bureau) and present it to the civil registration office. Medical certification of external cause of death must be obtained from the medico-legal bureau after the autopsy of the body by a forensic expert. An autopsy is performed in all cases where death occurred as a result of violence. Deaths must be registered in the local civil registration office within three days after the death occurs.

Copies of the confirmed medical death certificates, and death registration records are sent to the institutions in charge of civil registration at higher administrative levels. The National Civil Registration Office is required to deliver all medical death certificates monthly to the Statistical Offices of Tallinn, Riga and Vilnius.

As in all countries reporting to WHO, three levels of cause of death can be registered on the death certificate: underlying (principal), immediate, and associated (contributory or secondary) cause of death. The statistical tables are calculated using the underlying (principal) cause of death. Annual mortality data for the three Baltic countries between 1970 and 1990 were first compiled by the statistical office at the level of each republic, and then the copies were delivered to the Central Statistical Committee in Moscow. For the period 1970–1990 the tables comprised the data for both sexes separately in 5-year age groups, and by urban and rural areas. Part of those data are unpublished and exist only in hand-written form.[21]

After independence was regained in the three Baltic States in 1991 the statistics on cause of death were transferred from Soviet mainframe technology to PC computers. Since 1992 national databases (registers) have been established.

- Classification and coding

A modified WHO International Classification of Diseases (ICD) was obligatory for use in all former Soviet Republics and differed slightly from that used in Western

Table 1 Absolute numbers and rates of external causes of death in the Baltic States

	Absolute numbers			Rate per 100,000 inhabitants		
Years	Estonia	Latvia	Lithuania	Estonia	Latvia	Lithuania
1970	1513	2994	3459	111.2	126.9	110.2
1971	1551	3105	3575	112.6	130.7	112.5
1972	1661	3307	3842	119.3	138.0	119.6
1973	1533	3372	3773	109.0	139.6	116.3
1974	1580	3379	3932	111.4	138.6	120.1
1975	1802	3599	4225	126.1	146.5	128.0
1976	1788	3608	4299	124.2	146.0	129.1
1977	1888	3382	4302	130.2	136.1	128.2
1978	1975	3557	4416	135.3	142.4	130.7
1979	2049	3760	4606	139.5	150.0	135.6
1980	2089	3768	4759	141.4	150.0	139.4
1981	2186	3860	4854	146.9	153.2	141.4
1982	2033	3797	4668	135.7	150.0	135.0
1983	2090	3748	4755	138.5	147.2	136.4
1984	2035	3584	4822	134.0	139.9	137.2
1985	1860	3198	4379	121.7	124.0	120.2
1986	1525	2718	3536	99.0	104.5	98.8
1987	1576	2638	3564	101.5	100.4	98.6
1988	1600	2933	3952	102.4	110.5	108.1
1989	1749	3489	4349	111.5	130.7	117.8
1990	2053	3728	4461	130.7	139.6	119.8
1991	2212	4138	5241	141.2	155.4	140.1
1992	2355	4485	5212	152.5	170.4	139.3
1993	2758	5487	6248	181.8	212.2	167.5
1994	3497	6009	6918	233.2	235.9	185.9
1995	2950	5194	6539	198.8	206.5	176.0
1996	2323	3882	5848	158.1	155.9	157.6
1997	2313	3874	5443	158.6	156.9	146.9

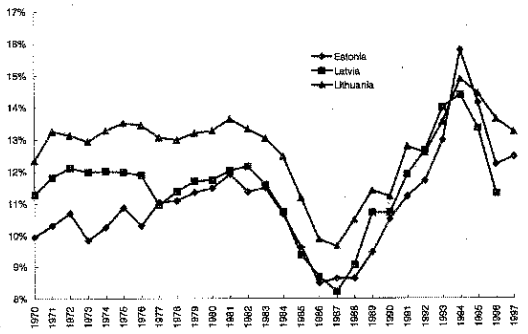

Figure 1 External causes of death as a percentage of the total number of deaths

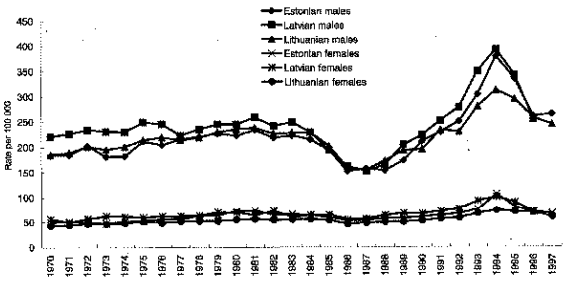

Figure 2 Male and female rates of external causes of death in the Baltic States

countries.[22] The classification of violent (external) causes of death was based on the ICD-8 classification, codes 160–185[23] and the ICD-9 classification, codes 160–175.[24] The number of items used in the classification of cause of death in the former USSR[22] is considerably smaller than in the ICD system.[23,24] The relationship between the items in the abridged classification used in the former USSR and the ICD-8/ICD-9 classification systems were detailed in a special document.[25]

Thirteen categories or groups of violent (external) causes of death from these tabulation lists were comparable.

It is also important to point out that until 1988, under the Soviet classification, suicide, homicide and occupational accidents were concealed for political reasons and tabulated separately in a special 'secret' table. Such secrecy is not difficult to understand: in 1970, for instance, the standardized death rate by homicide in the former USSR was almost eight times higher than the European average.[4]

The coding of cause of death using the four-digit system of the ICD-9 classification[24] was introduced in Lithuania in 1993, and in Estonia and Latvia in 1994. The ICD 10th revision[26] was applied in Latvia in 1996 and in Estonia and Lithuania in 1997.

The cause of death on the death certificates was described in words only. In all three Baltic countries the diagnoses were coded in Central Statistical Offices by a consultant medical doctor.

Trends of external causes of deaths

The time-trend of the rates of external causes of death for the total population in Estonia, Latvia and Lithuania during the period studied can be divided into two time periods. A slightly increasing trend was observable in all three countries in the years 1970–1984. After 1984 a sharp decline of external causes of death occurred until 1986...1988, which was followed by a rapid increase of rates until 1994, and then by a sharp fall until 1997. Mean rates were higher for the years 1985–1997 in all three countries. Latvia has higher rates for both periods than Estonia and Lithuania. In Lithuania the changes in rates were less volatile than in the other two countries *(table 1)*.

External causes of death as a percentage of the total number of deaths for the years 1970–1997 for all three Baltic countries are presented in *figure 1*. The proportional mortality due to external death ranged from 10 to 14% before 1984. From the year 1984 this indicator was around 8 to 10%, but after 1988 followed a rapid increase that peaked at 16% in 1994. By the end of the period studied, in 1997, the level of external causes of death was only slightly higher than in 1984. The total share of external deaths during 1970–1991 was higher in Lithuania than in Latvia and Estonia.

The rates due to external causes of death were considered separately for men and women in Estonia, Latvia and Lithuania *(figure 2)*. Female external death rates were 3.5–4.2 times lower than for males during 1970–1984. During 1985–1997 rates for females were 3.4–3.9 times lower than for males. The peak in 1994 was observable on all curves.

DISCUSSION

The validity and reliability of statistics on external causes of death in the former USSR have been addressed previously.[3–5]

Quantitative and qualitative analysis of processes for classification and registration of external causes of deaths in the former USSR, 1970–1990, showed that the data were reliable concerning the Slavic and the Baltic States.[3] In the Baltic States there has not been any change in the registration procedure since that period. Population estimates for the periods between the censuses of 1970, 1979 and 1989, which were first compiled by the Moscow statistical office, were recalculated in the 1990s by the Estonian Interuniversity Population Research Centre to test the hypothesis of possibly undercounted migration registration. The recalculated population estimations have been found to have only a very slight influence on mortality rates.[9,27]

In all three Baltic countries the main trends of mortality due to external causes of death are similar: a slight increase from 1970 to the end of the stagnation period followed by a sharp decrease in mortality from 1984 to 1988. The latter period coincided with the first years of perestroika. As similar trends were also be found in other post-Soviet countries,[4,7,8] one can hypothesize that this development was due to a similar social background throughout the region.

Reforms during perestroika included a strict anti-alcohol policy that is known to have been a preventive factor against suicide[28,29] and other external causes of death.[8] The same situation was found in most post-Soviet countries,[5,7,8] especially in Russia, where alcohol consumption played a major role in external death.[4] This points to the need for strong preventive measures, including an anti-alcohol policy, as an important part of a health policy.

At the same time, aspirations for democracy, social optimism and hopes for higher living standards could also have contributed to a decline of external causes of death in the first years of perestroika. In the years of decline of mortality due to external causes, the total mortality rate also decreased; the improvement in the life expectancy of people was noticeable.[5]

The year 1989 marked the beginning of the complicated socio-economic period. The strict State anti-alcohol policy calmed down and the change to a market economy caused unemployment. Weapons and modern cars became available. Alteration of social classes and growing sharp differences in income distribution produced psychological stress and high criminality.

For the male population, an increasing trend in external causes of death was observed between 1990 and 1994. The number of external deaths more than doubled in this six-year period, and the trend clearly diverged from all other causes of death.

In 1995 a considerable decrease in mortality from external causes began, back to the rates typical of the early 1990s. The peak in 1994 and decrease in rates thereafter should be investigated further by separate subdivisions of external causes of death and by age groups. Suicide and homicide mortality in the Baltic States during the period 1970–1998[30,31] had shown parallel trends, falls and rises in the total external causes of death. The overall stabilization of society, adaptation to the ongoing reforms, strengthening of statehood and progress in medical aid could be considered as reasons for the interrupted upward trend in 1994.

The changes in the trends of external causes of death for both sexes were identical in all Baltic States throughout the period of observation, although men's mortality rates were 3–4 times higher than those of women, and fluctuated much more. One possible explanation could be that men are more socially oriented and dependent on external socio-political factors, in contrast to women who are more dependent on family life.[21]

There are no data available to explain whether the changes in trends of external causes of death in recent years can be explained by changes in socio-economic and socio-political situations, the better health service in the Baltic countries or for other reasons.

The drop in violent deaths in the mid-1980s and rapid increase in the early 1990s coincided closely with trends in total mortality rates, and markedly influenced life expectancy figures.[1,19]

A comparison of changes in life expectancy at birth for the male and female populations of all three Baltic countries showed that the overall upward trend in life expectancy in the 1980s did not continue into the 1990s. The trend in the early 1990s turned downward for both sexes, but the decline was particularly pronounced among men. In 1989, a drop in life expectancy due to all external causes of death was 4.6 years for males and 1.7 for females; for 1994, these shortfalls were 6.3 and 2.4 years, respectively.[6] By 1994, in all three Baltic countries men's life expectancy had fallen dramatically to the lowest level of the study period. Although the decline in life expectancy for the female population was less steep, the three countries' trends were similar. The growth of life expectancy started again in 1995 and increased considerably in 1996–1997.[1,19]

A similar impact of mortality due to external causes on life expectancy as in the Baltic States has been described for Russia – years of growth of life expectancy were closely correlated with a decrease in the external causes of death.[5]

CONCLUSION

Classification and registration of external causes of deaths in the three Baltic States has good validity and reliability. Trends for mortality from external causes were similar in all three Baltic States. High proportions of external death in the Baltic States decreased life-expectancy for both sexes, but markedly for males. Social stresses and alcohol consumption could be considered as factors influencing the mortality rates from violent death, and specific fluctuations in trends, especially among males.

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PAPER II

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TRAMES, 2000, 4(54/49), 1, 79–90

SUICIDE TRENDS IN THE BALTIC STATES, 1970–1997[1]

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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.

[1] The study should be attributed to the University of Tartu, Faculty of Social Sciences, and the Swedish National Centre for Suicide Research and Prevention, Stockholm, Sweden.

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

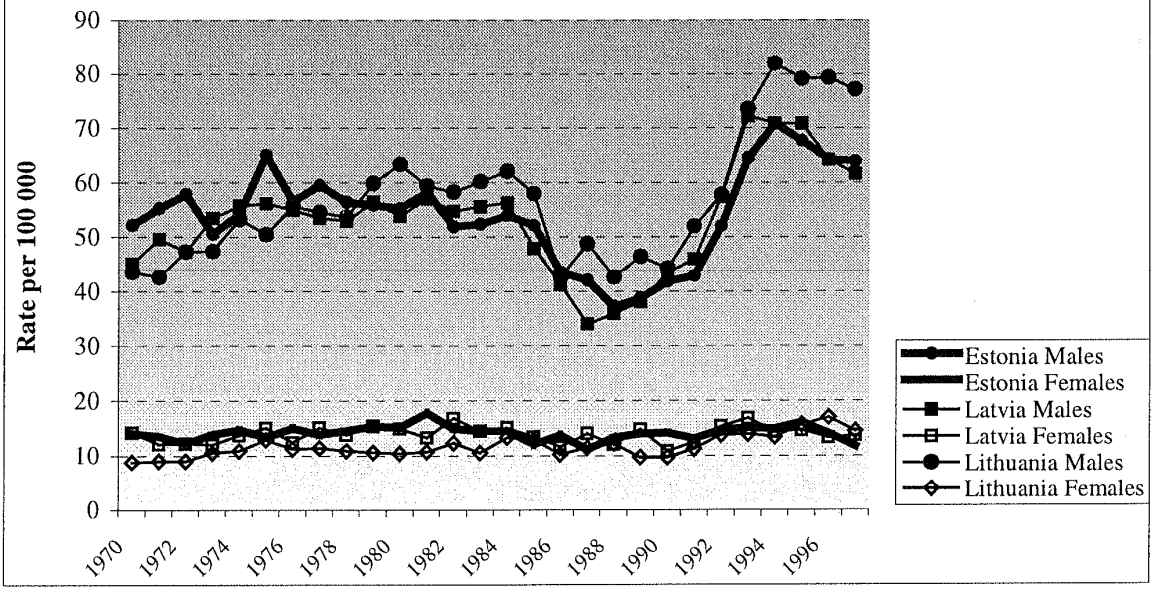
considered carefully because the observation period is short. Additionally, the mean values are weak location parameters for the period of the S-shaped profile.

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.

Figure 1. Dynamics of males and females suicide rates



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 womens' 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 Lituania. 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 womens' 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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PAPER III

PALO, E., VÄRNIK, A., KÕLVES, K. & TOODING, L.-M. Suicide in Estonia, 1970–2000. In: Vetik, R. (Ed.) *Estonian Human Development Report 2001*, pp. 42–45 Tallinn, Iloprint 2001.

Estonian Human Development Report 2001

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2. Social Problem Areas in Estonian Society

2.3. Suicides in Estonia, 1970–2000

In order to be able to interpret behavioral processes, focus needs to be on assessing the causal relations stemming from individual and societal factors. In other words, researchers are interested in knowing to which extent a phenomenon is related to individual circumstances such as biological, psychological and genotype-related causes and to which extent the phenomenon is related to environmental factors. The radical social and political changes, which accompanied the dissolution of the Soviet Union, have turned Eastern Europe into an area of extensive social experimentation. This is turn means that we can assess the impact of environmental factors on human behaviour, including those related to health and death rates.

The social aspect has been convincingly demonstrated in the trends of suicide deaths in the former Soviet Union republics, since they are measured in a population of nearly 300 million. Figure 2.9 shows a very high suicide death rate in the male population but a drop of nearly 40% during the first three years of *perestroika*. The suicide index for females is 4 to 5 times lower and the *perestroika*-related drop is not particularly marked (18%) (Värnik, 1997a, 1998).

The well-known sociologist and suicidologist Emile Durkheim (1951) was the first to claim more than 100 years ago that the number of suicides shows the overall cohesion of society and that the main issue is the level of social integration. At the same time, Durkheim found that suicides are provoked by both too strong and too weak integration. Later on, researchers have stressed the phenomena of weak integration and a poor social network within those societies where the suicide rate is high.

The Estonian suicide curve moves in harmony with social and political flows

The database of the present report has been constituted according to data from the archives of the Statistical Office. The objective of the research is to observe the suicide curve in Estonia during the last thirty years, according to the integration level of society.

The suicide curve in Estonia, 1970–2000 may, due to its shape, be conditionally divided into two (Figure 2.10), corresponding to different socio-economic and political periods (Värnik, 1997b, 2000). During the first fifteen years of the period under observation, the so-called stagnation era, the index of suicides was permanently high and showed a slightly increasing tendency. During the last sixteen years, i.e. the period of reforms, which was a series of radical historical events, the suicide curve has taken an S-shape. At the same time the average suicide indices of the two periods are almost identical.

FIGURE 2.9.

Suicides in the former Soviet Union

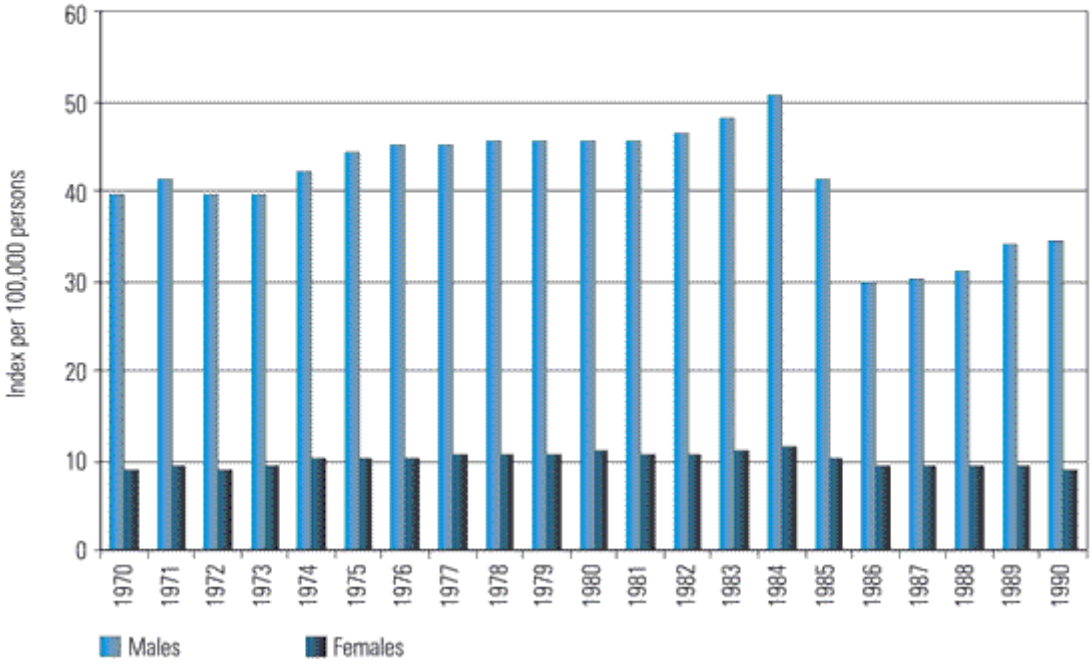
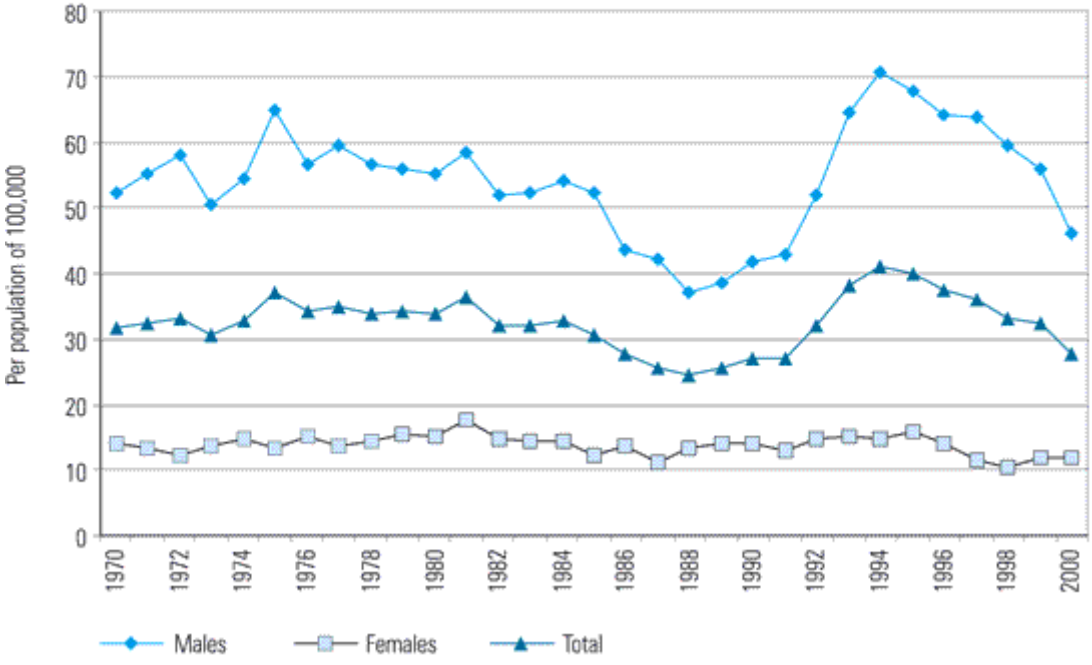


FIGURE 2.10.

The suicide curve in Estonia, 1970–2000 (the suicide indices have been calculated for males and females, respectively, for a population of 100,000)



The stagnation period (1970–1984) was characterised by the isolation of the entire Soviet Union from the rest of the world, as well as by strict censorship regarding freedom of expression and freedom to publish, by suspicion, double standards and identity crises. The integration of individuals was overregulated, resulting in reactions of passive resistance, alcoholism and suicides. Any utilization of psychiatric assistance was unpopular. It was taught that suicidal behaviour was a symptom of mental disease, whereas the psychological and social reasons for suicide were considered irrelevant. Suicidal patients were forcibly incarcerated in psychiatric hospitals under strict medical surveillance.

The period of reforms started after Gorbachev came to power in 1985. Hope-inspiring political reforms occurred in Estonia, including a congress of representatives from creative associations, the events of Hirvepark and the Singing Revolution, which created a close and emotional bond amongst Estonians and democratically-minded non-ethnic Estonians. The very strict alcohol policy which was implemented during the first years of perestroika can also be considered significant. Against the background of those events, the suicide index dropped by a quarter both in Estonia and the other Baltic countries. Suicidologists call the events which occurred within the Soviet Union the most effective prevention of suicides during the past century (Värnik et al., 1998; Wasserman et al., 1994; Wasserman et al., 1998; Wasserman, Värnik, 2001).

The extensive economic reforms which followed these events required the ability to quickly adapt as well to reassess past values and lifestyles. The suicide curve shows that many people could not cope with these requirements. Since 1989, the number of suicides significantly increased, and reached the highest level of the 20th century in 1994, when 614 suicides were registered in Estonia (41 deaths per 100,000 inhabitants). On the basis of existing observations it may be suggested that the stagnation period pushed to suicide those who felt trapped by restrictions to their freedom and by fake moral standards. However, in Estonia after the re-establishment of independence, there are other categories of people who are unable to cope. These are mainly people in the extreme categories – those who learned to be helpless in the Soviet Union, where relations between individuals and the state were overregulated, or those who became alcoholics. The other extreme category includes people who take unreasonably large risks, as well as those whose expectations of a free Estonia have been disappointed.

During recent years (1995–2000), the suicide curve in Estonia has shown a steady trend downwards (Värnik et al., 2001). Various theories could be put forward to explain the reasons for this trend. According to the mechanical approach, it might be presumed that the system underwent fluctuation after being pushed out of balance, and was now stabilizing at the previous level. It could be concluded that the situation in Estonia has stabilized and that the very hard times are over. One cannot overlook the fact that psychiatric and psychological assistance is more professional now and is seen as more acceptable for those who need it. Suicidology-related knowledge is more widespread – among experts, organizations which offer emotional help and the entire population.

The suicide curve in Estonia is similar to those in the other Baltic countries (Värnik et al., 2000; Värnik et al., 2001; Wasserman, Värnik, 1994), in Byelorussia and Russia (WHO Department of Mental Health, 1999a, b), but is not similar to the general European trend in 1972–1990 (Wasserman et al., 1997). The trend also differs from that of our kindred peoples, the Finns and the Hungarians, in 1970–1993 (Värnik, 1997b). This permits the suggestion that the frequency of suicides is genuinely related to social and political circumstances. At the same time, what is happening in society is interpreted and received by the individual alone. Consequently the strengthening of mental resistance and the development of coping mechanisms are other factors, in parallel to the creation of a more favourable environment, which help to prevent suicides.

Differences in suicide curves for men and women

According to data from the World Health Organization, men are more likely to commit suicide. The ratio of men to women in western European countries is 3:1, on the average. The situation is exceptional only in China where women commit more suicides than men, the corresponding ratio being 0.8 to 1 (Bertolote, 2001).

The suicide male:female ratio in Estonia is 4–5:1. The suicide curve for women is not very mobile so social and economic events are poorly reflected there. The curve for males, however, does react to social and political changes, so the male:female ratio exhibits major differences during various periods (Figure 2.10). The higher number of male suicides in general, and on the territory of the former Soviet Union in particular, could be explained by the fact that more men than women like alcoholic beverages. It could also be explained by the different hypotheses set up in different studies, according to which men are more sensitive to changes within the social network.

Differences according to age

Traditionally the probability of committing suicide increases with age. It is also known that social ties loosen in the older age groups (Bertolote, 2001).

Nowadays a growing tendency of suicide risk has been observed among young people, especially in the 15-24 age group (Cantor, 2000).

In Estonia, during the entire period under observation, the main risk group has always included middle-aged men (Värnik, 1997c). The average indicator for 1998–2000, as to the breakdown of men according to age in Estonia, has its peak for the 45–54 age group (Figure 2.12). Suicidal tendencies for women increase with age, with the pattern and figures for the age breakdown in the separate age groups similar to worldwide averages. However, the average of similar indicators for men are very different from the world level – both regarding the high rates and the pattern of age breakdown. The suicide index for Estonian men within the 45–54 age group is three times higher than the world average (Bertolote, 2001).

FIGURE 2.11.

Male:Female suicide rates in various regions of the world, and in countries with a higher suicide rate (1985–1996, WHO)

Source: Bertolote, 2001.

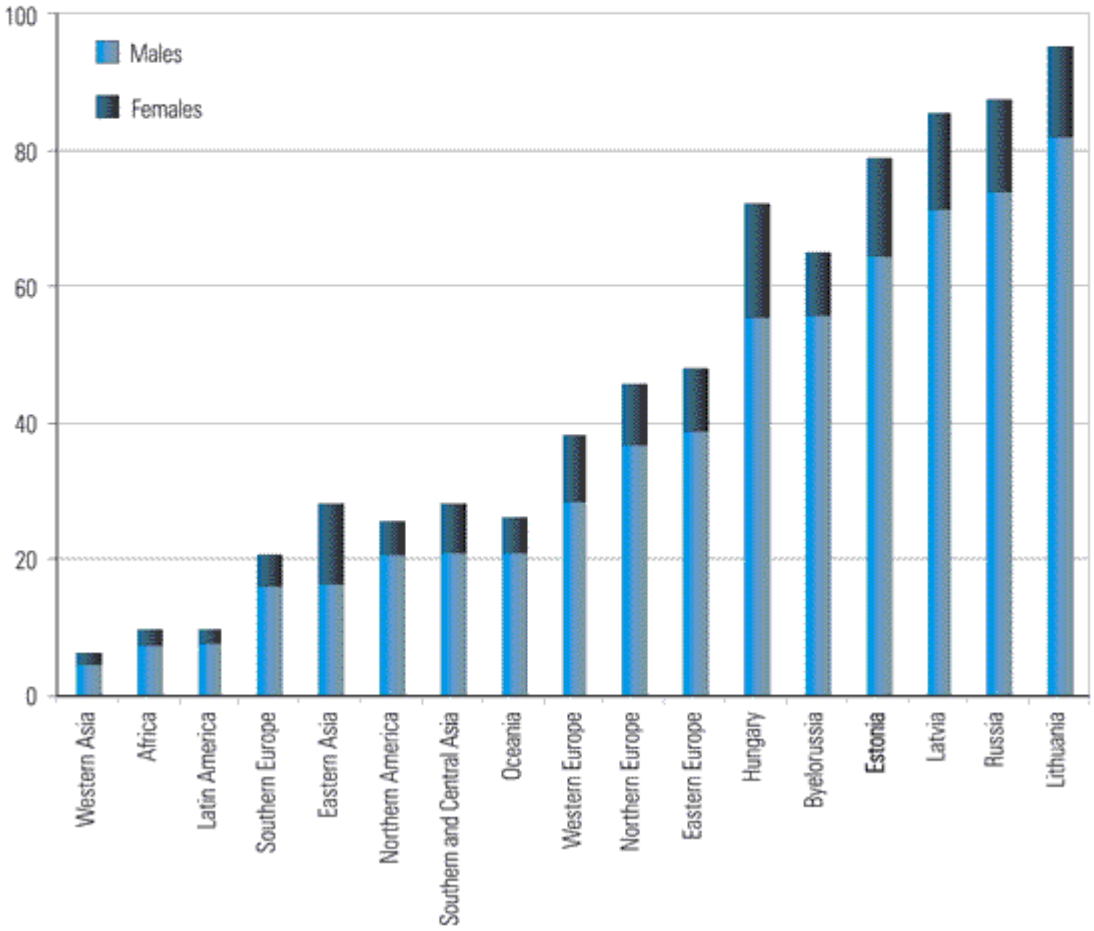
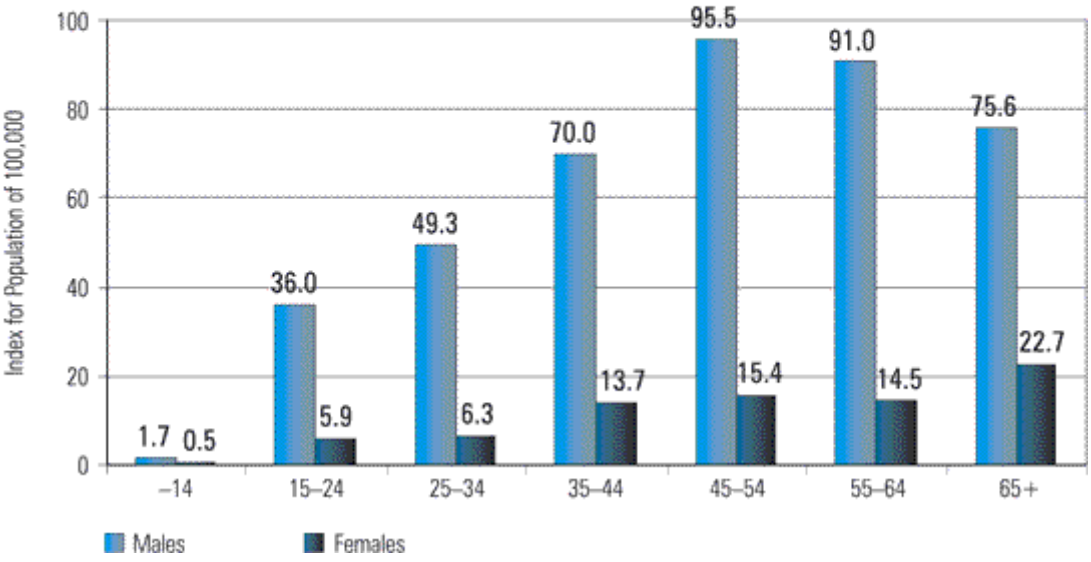


FIGURE 2.12.

Suicide rates per 100,000 according to gender and age group (1998–2000 average rates)



42% of the males committing suicide in Estonia belong to the age groups between 35 and 54. For women, those aged 65 and over make up more than a third of female suicides.

It is difficult to explain the high number of male suicides. From the aspect of social integration, job loss or separation from spouse or partner often becomes fatal for this age group – all this often being related to alcohol abuse. At the same time, alcoholism and suicidal trends have somewhat similar roots. Apparently, one of the reasons is also the fact that in our traditional society men who experience internal crises do not consider the seeking of help to be suitable behaviour. It could be said that Estonian men prefer to suffocate in their silence.

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PAPER IV

VÄRNIK, A., KÕLVES, K., PALO, E. & TOODING, L.-M. Eesti suitsiidikõver on võtnud S-kuju, *Eesti Arst* 2001, 80:141–144.

Eesti Arst 2001; 80(3): 141—144

Eesti suitsiidikõver on võtnud S-kuju

Airi Värnik[1,2], Kairi Kõlves[1,2], Ene Palo[3], Liina-Mai Tooding[2] – [1]Eesti-Rootsi Suitsidoloogia Instituut, [2]Tartu Ülikooli sotsiaalteaduskond, [3]Sotsiaalministeerium

suitsiid, epidemioloogia, sotsiaalsed muutused, soolised erinevused

Suitsiidide arv kasvab nii arenenud kui ka arengumaades. Enesetappe sooritatakse sõltumata soost, vanusest ja sotsiaalsest klassist, kuigi teatud inimrühmadel on selleks suurem risk kui teistel. Maailma Tervishoiuorganisatsiooni (MTO) andmetel on suitsiidikordaja maailmas ajavahemikul 1950–1995 kasvanud ligikaudu 60%. Suitsiidid on sagenenud keskmiselt 10,1 suitsiidilt 16,0 suitsiidini 100 000 inimese kohta (1). MTO andmetel on Baltimaad ja Venemaa suitsiidide sageduse poolest üheks maailma kriisipiirkonnaks (2).

Suitsiidikõver peegeldab küllaltki tundlikult mingi riigi või regiooni inimeste elukvaliteeti, sotsiaal-majanduslikku ja poliitilist situatsiooni, samuti rahvatervist, populatsiooni üldist stressitaluvust ning tervishoiu ja sotsiaalhoolekande taset (3–10).

Selle töö eesmärgiks oli analüüsida Eesti suitsiidikõvera dünaamikat aastatel 1970–1999 ning meeste ja naiste suitsiidikõvera erinevusi ühiskonnas toimunud sotsiaalsete muutuste taustal.

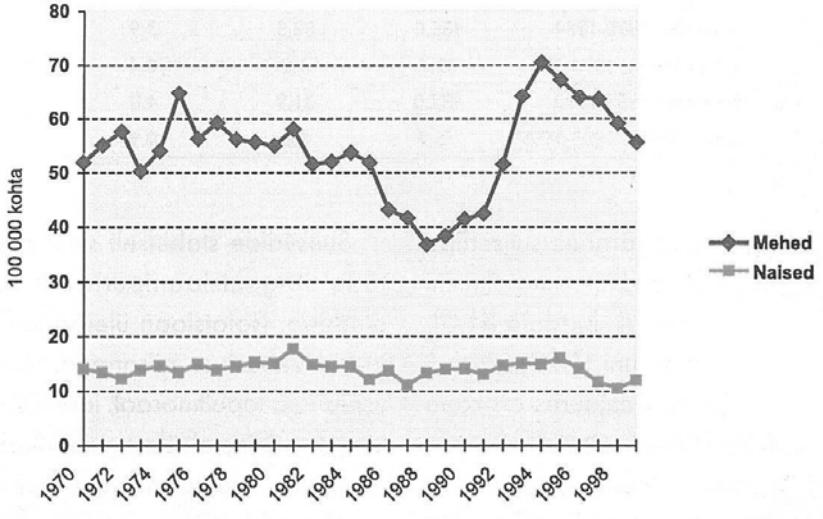
Uurimismaterjal ja -meetodid

Uuringus on kasutatud suitsiidide ja rahvastiku statistilisi andmeid Eestis ajavahemikult 1970–1999. Analüüsi aluseks on nii kogu rahvastiku kui ka meeste ja naiste suitsiidide absoluutarvud ja kordajad 100 000 inimese kohta 30 aasta vältel.

Tulemused ja arutelu

Suitsiidide esinemissageduse muutused

Uuringutulemuste põhjal võib Eesti suitsiidikõvera ajavahemikul 1970–1999 tinglikult jagada kaheks osaks vastavalt perioodidele, mis erinevad teineteisest nii sotsiaal-majanduslikult kui poliitiliselt (3, 4). Esimesel viieteistkümnel aastal (1970–1984) on suitsiidikordaja püsinud stabiilselt suurena – 33,5 suitsiidisurmajuhtu 100 000 inimese kohta (standardhälve 1,8). Teisel 15-aastasel perioodil on suitsiidikõver aga S-kujuline (vt tabel 1, jn 1). Ajavahemikul 1985–1988 vähenes järsult suitsiidide sagedus ja suitsiidikordaja kahanes



Joonis 1. Meeste ja naiste suitsiidikõver Eestis aastatel 1970–1999

Tabel 1. Suitsiidide arv, kordajad 100 000 inimese kohta ja meeste-naiste suitsiidide suhe aastatel 1970–1999

Aasta	Absoluutarv	Kordaja	Meeste-naiste suhe
1970	429	31,5	3,7
1971	450	32,6	4,1
1972	462	33,2	4,7
1973	432	30,7	3,7
1974	467	32,9	3,7
1975	532	37,2	4,9
1976	492	34,2	3,8
1977	507	35,0	4,3
1978	495	33,9	3,9
1979	501	34,1	3,7
1980	498	33,7	3,7
1981	544	36,6	3,3
1982	481	32,1	3,5
1983	484	32,1	3,6
1984	499	32,9	3,7
1985	470	30,7	4,3
1986	425	27,6	3,2
1987	396	25,5	3,8
1988	382	24,5	2,8
1989	401	25,6	2,8
1990	425	27,1	3,0
1991	423	27,0	3,3
1992	497	32,1	3,5
1993	579	38,2	4,3
1994	614	41,0	4,7
1995	595	40,1	4,2
1996	551	37,5	4,6
1997	525	36,0	5,5
1998	482	33,2	5,7
1999	469	32,4	4,7
Keskmine 1970-1984	485,0	33,5	3,9
Standardhälve 1970-1984	32,7	1,8	0,4
Keskmine 1985-1999	482,0	31,9	4,0
Standardhälve 1985-1999	75,9	5,6	0,9

32,9-lt 24,5-le (34%). Sellele järgnes suitsiidide dramaatiline sagenemine, mis saavutas maksimumi 1994. aastal (614 suitsiidi aastas, kordaja 41,0), ning seejärel taas vähenemine kuni 1999. aastani (469 suitsiidi, kordaja 33,2). Seejuures on kahe vaadeldava perioodi keskmised suitsiidikordajad peaaegu võrdsed. Seega on 1985. aastal alanud suitsiidide sageduse järsud muutused vaibunud ja suitsiidide arv on stabiliseerunud endisel tasemel.

Suitsiidide stabiilselt suurt sagedust võib seostada stagnatsiooniperioodi sotsiaal-poliitiliste oludega: isolatsioon ülejäänud maailmast, sõna- ja trükivabaduse piirangud, range tsensuur, umbusaldus ja topeltmoraal, identiteedikriis. Indiviidide integreerimine oli ülereguleeritud, sellele reageeriti passiivse vastupanu ja alkoholismiga. Psühhiaatrilise abi otsimine oli sel ajal ebapopulaarne, suitsidaalset käitumist peeti vaimuhaiguse

tunnuseks, suitsiidi psühholoogilisi ja sotsiaalseid põhjusi ei peetud olulisteks. Suitsidaalsed patsiendid paigutati psühhiaatriahaiglatesse range režiimiga osakondadesse, nende ravi oli üksnes bioloogiline.

Ühiskondlike reformide periood (1985–1999) algas M. Gorbatšovi võimuletulekuga, kelle lootustandvaid poliitilisi reforme ja ranget alkoholipoliitikat on seostatud ka enesetappude arvu olulise vähenemisega aastatel 1985–1988 (7, 8, 9). Järgnenud suured majanduslikud reformid nõudsid inimestelt kiiret kohanemisvõimet, mis suitsiidikõvera põhjal otsustades ei olnud paljudele jõukohane, sest suitsiidide arv kasvas aastail 1989–1993. Perioodi viimaseid aastaid (1994–1999) iseloomustab stabiliseerumine: enesetappude arv hakkas vähenema ja on praeguseks alla stagnatsiooniperioodi keskmist taset (1998. ja 1999. a publitseerimata andmed, saadud Statistikaametist).

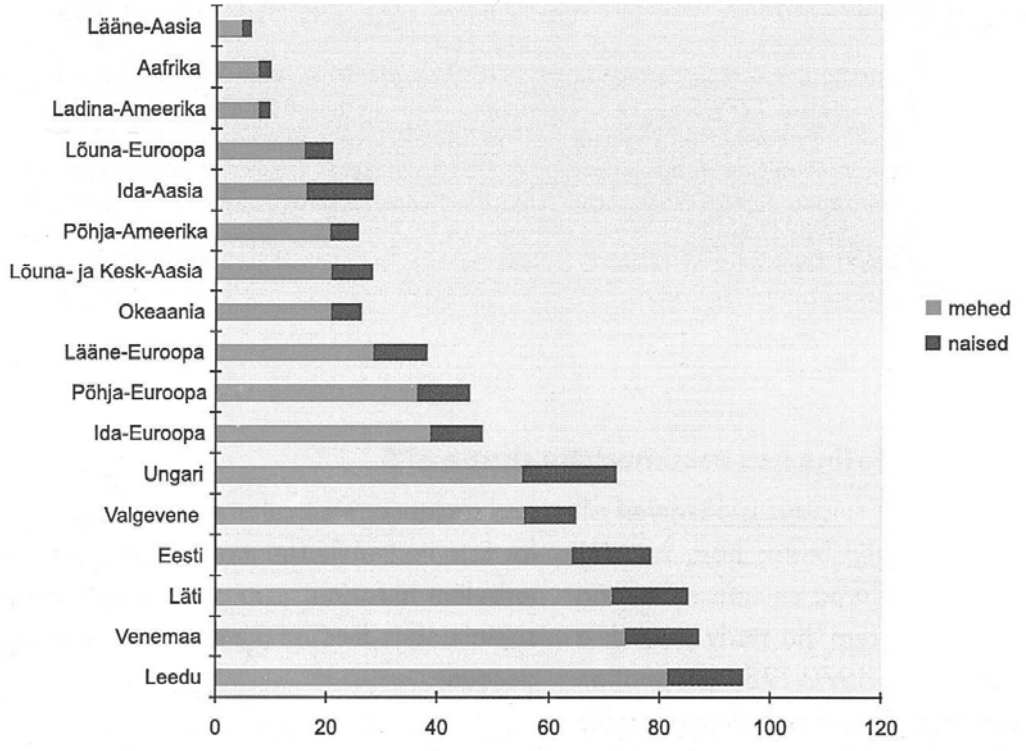
Kirjeldatud suitsiidikõver on omane Baltimaadele (3), Valgevenele ja Venemaale (1, 11), kuid erineb nii Euroopa riikide omast aastatel 1972–1990 (11) (vt jn 2) kui ka meie hõimurahvaste soomlaste ja ungarlaste omast aastatel 1970–1993 (4). See lubab oletada, et suitsiidide sagedus on seotud sotsiaal-poliitiliste oludega, ning kinnitab veelkord Emilé Durkheimi klassikalist sotsioloogilist teooriat, mille kohaselt ühiskonnas valitseb teatav kollektiivne tung suitsiidile, kusjuures suitsiidide sagedus on määratud selle ühiskonna struktuuri, eeskätt sotsiaalse regulatsiooni ja integratsiooni tasemega.

Ometi interpreteerib ühiskonnas toimuvat ja võtab vastu otsuseid üksikisik individuaalselt. Seega on suitsiidide preventsioonis oluline nii indiviidi vaimse vastupanu tugevdamine ja toimetulekumehhanismide arendamine kui ka riigi käsutuses olevate hoobadega soodsama elukeskkonna loomine.

Suitsiidide sagedus meestel ja naistel

MTO andmetel sooritavad kogu maailmas mehed suitsiide sagedamini kui naised. Erandlik on olukord ainult Hiinas, kus naised sooritavad suitsiide rohkem kui mehed, meeste ja naiste suitsiidide suhe on seal 0,8 : 1 (1).

Eestis oli vaadeldaval perioodil meeste ja naiste



Joonis 2. Meeste ja naiste suitsiidikordajad maailma erinevates piirkondades (andmed aastatest 1985–1996)

suitsiidide suhe vahemikus 2,8-5,7 (keskmiselt 4 : 1). Viimase viie aasta jooksul oli meestel suitsiide ligikaudu 5 korda rohkem kui naistel. Naiste suitsiidikõver on vähe muutuv ja sotsiaal-poliitilised sündmused kajastuvad selles nõrgalt. Meeste suitsiidikõver reageerib tundlikult sotsiaalsetele muutustele ning seetõttu on meeste ja naiste suitsiidide suhtarvus eri perioodidel suured erinevused.

Kokkuvõte

Eesti on üks suurema suitsiidiriskiga riikidest maailmas. Omapärane on kolme viimase aastakümne suitsiidikõvera kuju, mille lineaarne algosa muutub 1985. aastast alates S-kujuliseks. Eesti suitsiidikõver sarnaneb teiste Baltimaade ja Venemaa kõveraga, erineb aga Põhja- ja Lääne-Euroopa omast. Kõverat on muutnud peamiselt meeste suitsiidide arv, sest meeste enesetapud domineerivad aastatel 1970-1999 vahekorras 4 : 1. Meeste suitsiidikõvera muutusi saab seostada muutustega riigi sotsiaal-poliitilises ja majanduslikus situatsioonis. Naiste puhul on nimetatud seos tunduvalt nõrgem. Suitsiidide ennetamiseks on oluline inimkeskne sotsiaalpoliitika, üksikisiku vaimse vastupanu tugevdamine ja toimetulekumehhanismide arendamine.

Uurimus on valminud rahvatervise teadus- ja arendusprojekti 99-38 raames.

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Summary

The Estonian suicide line has assumed the shape of S

An increasing trend of suicides is observed all over the world. The Baltic States had, besides Russia, the highest registered suicide rates and similar suicide curves during the study period: a stable high suicide line in 1970-1984 (stagnation period in the former USSR) and an S-shaped profile - fall-rise-fall - in 1985-1999 (period of political and socioeconomic reforms). The male-female ratio for Estonia is 4:1. The male suicide line reflected turbulent historical events. In suicide prevention, social and individual aspects should be taken into account.

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Publications:

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