

SUICIDE IN THE ELDERLY 60 YEARS OF AGE AND OVER IN THE SOUTH-EAST PART OF SERBIA

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SUMMARY

Some previous investigations indicated that economic crisis (inflation in Serbia 1993/94) have great influence on increasing suicide rates in Serbia. After that suicide decreased, despite the war and bombing in 1999, specially among the elderly people. A total of 453 suicides were registered on the territory of south-eastern Serbia during 1995-2001 years. Of them 295 (65.1%) were aged over 60 years. Generally, linear trends of suicide among both genders from 1995 to 2001 decreased, but the slope of decreasing was greater among males than among females. The highest rates among the both genders were registered in the years with the maximum number of suicides, but the linear trends of rates have statistically important correlation with time ($r > 0.5$). Average annual suicide rate among males was 42.5, and among women it was 18.7. The highest average annual suicide rate among men was observed in the age group 75 years and over (93.3), and the lowest in the age group 65-69 (20.6). Among males, in the all age group linear trends of suicide rates decreased, with the highest slope among 75 years and over and the lowest among 65-69 years. The highest suicide rate among females was registered in age group 75 years and over (25.6), the lowest in the age group 65-69 (13.5). The linear trends are similar as among males: downward trend was observed among all aged groups, with the highest slope among women 75 years and over. The most common way of suicide among men was hanging up (63%), poisoning and by firearms. There were no statistical differences between way of suicide and age groups. The most frequent way of suicide among females was hanging up (55%), poisoning (25%) and drowning (12%). There were statistically significant differences in drowning between age groups, 70-74 and 75 and over ($p < 0.05$), and between poisoning and age groups 60-64 years and 75 years and over. Poisoning and drowning are statistically more frequent among women than among men.

Key words: suicide, elderly, south-eastern Serbia

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INTRODUCTION

At the end of the 1990s, several analyses were performed on epidemiologic characteristics of suicides committed in the southeastern part of Serbia (Nisava, Pirot and Toplica County). These analyses confirmed that suicides had undulant pattern, and that the annual number of suicides mostly depended on socio-economic and political circumstances in the country (1). Generally, linear trend of suicide decreased, but not in the all age groups (1, 2). The highest suicide rates were among the elderly, and the most common ways of suicide were hanging up and poisoning, and by firearms (among males).

The aim of this study was to specify basic epidemiological pattern of suicides among persons 60 years and over in the south-eastern part of Serbia (Nisava, Pirot and Toplica County) from 1995 to 2001, that is among persons considered to be at the greatest risk for suicide.

MATERIAL AND METHODS

To assess suicides, the data of the Serbian Bureau for Statistics were processed, as well as original death certificates and DEM-2 forms.

The data for 15 municipalities in southeastern part of Serbia (the Nisava County, Toplica County and Pirot County) were analysed for the period 1995-2001. For the analysis, the standard descriptive epidemiologic method was employed, the rates were calculated per 100,000 inhabitants (the 1991 and 2002 census), and statistically significant differences were registered at $p < 0.05$. The rates were calculated and compared by gender and age group. Due to important differences between two censuses (11 years), in order to determine the most precise rates, the annual number for each year and for each age group and gender were estimated in the following way:

$$\begin{aligned} (N_{2002(a)} - N_{1991(a)}) : 11 &= p \\ N_{1992(a)} &= N_{1991(a)} + p \\ N_{1993(a)} &= N_{1991(a)} + 2p \\ N_{2002(a)} &= N_{1991(a)} + 10p \end{aligned}$$

$N_{2002(a)}$ - number of inhabitants by gender in age group (a) by 2002 census

$N_{1991(a)}$ - number of inhabitants by gender in age group (a) by 1991 census

p - annual differences by gender in the age group (a)

$N_{1992, 1993 \dots 2001(a)}$ - estimated population by gender in the age group (a) for 1992, 1993...2001.

RESULTS

On the territory of south-eastern Serbia, a total of 453 suicides were registered during 1995 - 2001, and of them 295 (65.1%) were aged over 60 years. The number of suicides by gender and linear trend are given in Table 1 and Figure 1.

Generally, linear trends of suicide among both genders from 1995 to 2001 decreased, but the slope of decreasing was greater among males than among females. In fact, the trends of suicide are not linear, but polynomial: among males the highest number of suicides was observed in 1996 and 1999, and among women during 1996, 2000, and 2001 years. In the last 5 years the trends of males and females suicides were opposite: among males first

increased then decreased whilst among women it first decreased then increased. Due to important changes in the population between two censuses, it is better to analyze the rates than crude number of suicide.

The highest rates among the both genders were registered in the years with the maximum number of suicides (Table 2), but the linear trends of rates have statistically important correlation with time ($r>50\%$) (Fig. 2). The males suicide rates, by age are presented in the Table 3, and Figure 3.

Cumulative number of males aged 60 and over in the south-eastern Serbia from 1995 to 2001 was 452,090, and 549,906 women respectively. Average annual suicide rate among males was 42.5, and among women it was 18.7. This result suggests that males had 2.3 times higher rate than women. The highest average annual suicide rate among men was observed in the age group 75 and over (93.3), and the lowest in the age group 65-69 (20.6). Among males, the linear trends of suicide rates decreased in all age groups, with the highest slope among 75 and over and the lowest among 65-69.

The highest suicide rate among females was registered in the age group 75 and over (25.6), the lowest among 65-69 (13.5). The linear trends are similar as among males: decreasing frequency was observed among all age groups, with the highest slope among women 75 and over (Table 4, Fig. 4).

Sex ratio between males and females increased with age: from 1.5 (60-64, 65-69) to 3.6:1 (75 and over) (Table 5).

The most common way of suicide among men was hanging up (63%), poisoning and by firearms. There were no statistical differences between way of suicide and age groups (Fig. 5).

Table 1. The total number of suicides in the south-eastern Serbia in the period 1995-2001.

Year	Total	Males	Females
1995	44	28	16
1996	57	37	20
1997	37	23	14
1998	37	26	11
1999	44	32	12
2000	42	27	15
2001	34	19	15
1995-2001	295	192	103

Table 2. Suicide rates in the south-eastern part of Serbia in the period 1995-2001.

Year	Males	Females
1995	45	21.1
1996	58.7	26.1
1997	36.1	18.0
1998	40.3	14.0
1999	48.9	15.1
2000	40.8	18.7
2001	28.4	18.4

Table 3. Age-specific suicide rates among males in the south-eastern part of Serbia in the period 1995-2001.

Year	60-64	65-69	70-74	75+
1995	24.5	29.0	27.2	111.1
1996	24.8	22.8	68.8	146.5
1997	40.1	5.6	57.2	50.7
1998	35.5	27.7	54.5	50.1
1999	25.7	16.4	37.2	134.5
2000	10.4	21.5	49.9	98.0
2001	10.5	21.2	27.3	62.3

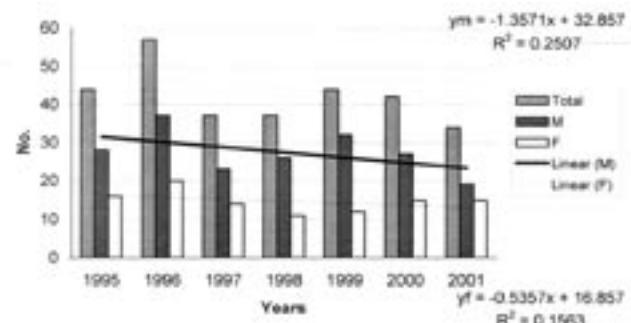


Fig. 1. Total number of suicides and linear trends of suicides in the south-eastern part of Serbia in the period 1995-2001.

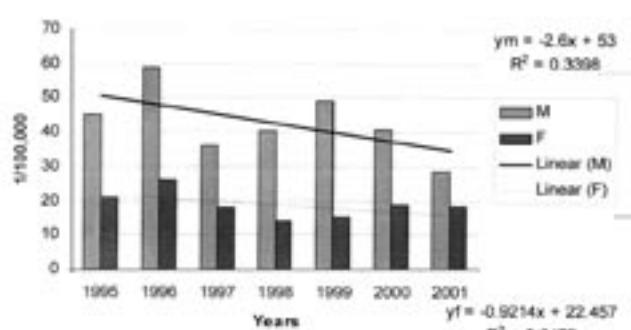


Fig. 2. Suicide rates and linear trends of suicides in the south-eastern part of Serbia in the period 1995-2001.

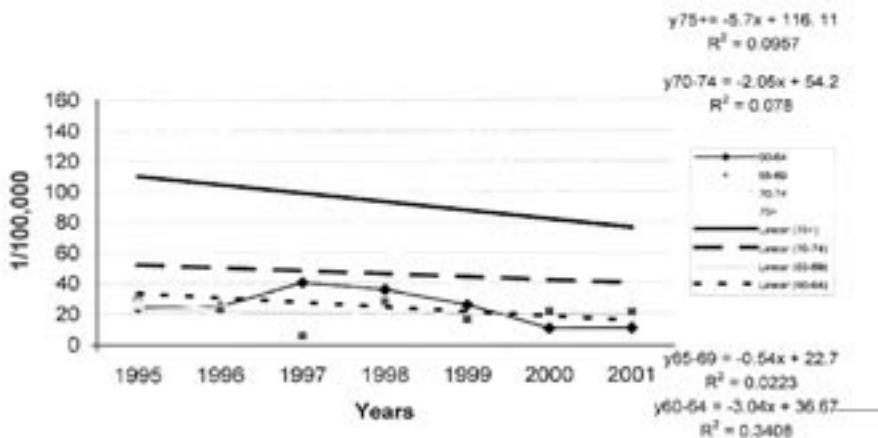


Fig. 3. Age-specific suicide rates and linear trends among males in the south-eastern part of Serbia from 1995 to 2001.

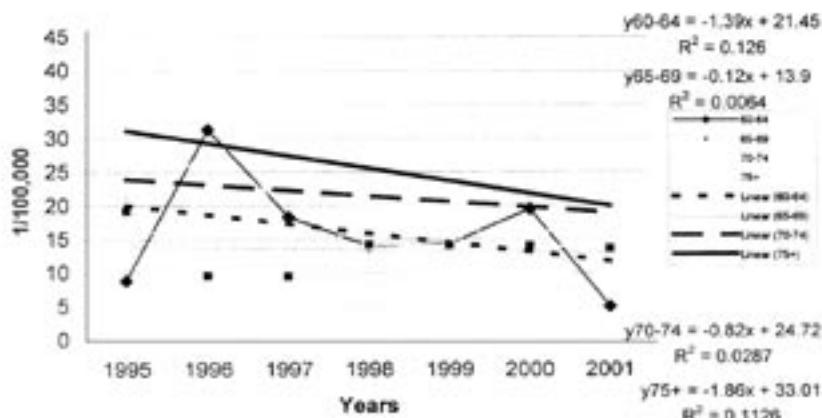


Fig. 4. Age-specific suicide rates and linear trends among females in the south-eastern part of Serbia from 1995 to 2001.

The most frequent way of suicide among females was hanging up (55%), poisoning (25%) and drowning (12%). There were statistically significant differences in drowning between age groups 70-74 and 75 and over ($p<0.05$), and poisoning between age groups 60-64 and 75 and over.

Poisoning and drowning are statistically more frequent among women than among men (Fig. 6).

DISCUSSION

Our previous investigations concluded that suicide rates in the south-eastern Serbia are relatively low in comparison with other parts of Serbia and Monte Negro and other countries in the world. According to WHO mortality data, many countries in the world

Table 4. Age-specific suicide rates among females in the south-eastern part of Serbia from 1995 to 2001.

Year	60-64	65-69	70-74	75+
1995	8.8	19.2	21.6	38.3
1996	31.3	9.6	27.4	37.3
1997	18.3	9.5	32.5	15.6
1998	14.0	14.2	6.2	20.3
1999	14.3	14.1	11.8	19.8
2000	19.5	14.0	34.1	9.7
2001	5.0	13.6	16.3	37.9

Table 5. Suicide rates sex-ratio in the south-eastern part of Serbia from 1995 to 2001.

Age	Males:Females
60-64	1.5:1
65-69	1.5:1
70-74	2.1:1
75+	3.6:1

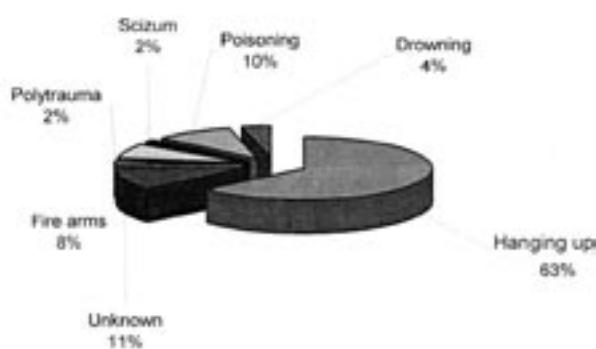


Fig. 5. The mode of suicide among males in the south-eastern part of Serbia from 1995 to 2001.

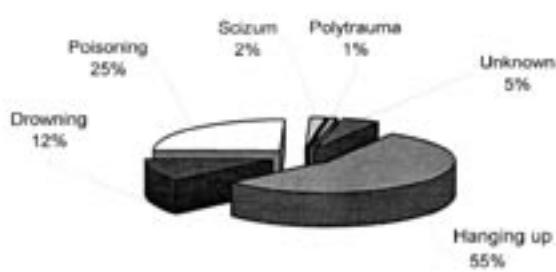


Fig. 6. The mode of suicide among females in the south-eastern part of Serbia from 1995 to 2001.

show increasing trends of suicide, but in some countries (Germany, Sweden) this trend decreases (3, 4). The upward trend of suicide in some European countries, as well as in Serbia and Monte Negro, among adolescents and the young, confirmed by some investigations, is worrying (5, 6). According to our investigations from 1987 to 1993 (7, 8, 9) the suicidal rates in Nisava, Pirot and Toplica district (south-eastern Serbia) increased from 1987 to 1992 and after that, with some medium oscillation, decreased.

Males aged 75 and over have the highest rates of suicide in almost all industrial countries in the world, and in many of them suicide rates rise with age (10). However, in England and Wales, as well as in many countries in the world, suicide rates decreased by 30 to 40% among the eldest people (11). In contrast, the younger males exhibited a 30-55% rise between 1983 and 1995. Female suicide rates have shown a similar overall decrease among the elders (10).

This investigation showed a decreased suicide rates among persons aged 60 and over for about 37% among males and 13% among females from 1995 to 2001, which correlates with the mentioned investigations.

The ratio of male to female elderly suicide rates in the world is about 3:1 (10), or less (2.05) (12). In the south-eastern Serbia the sex ratio was 2.3 (ranging from 1.5 to 3.6:1 depending on age group). The highest ratio was among males aged 75 and over, which suggested that the oldest males are more vulnerable than the oldest females.

The highest suicide rates among oldest people can be explained by many risk factors including social factors (economic instability,

living alone, unemployment, retirement...) (12), psychiatric and physical illness which are more frequent among the elder compared to young people. This investigation suggest that there are very important differences in male and female suicide rates. These differences could be explained by different risk factors for suicide for men and women or different importance of these factors for men and women. Some previous investigations concluded that some risk factors for male suicides are protective for females (13). For example, early widowed men seems especially vulnerable for suicide, likewise widowed and married elderly women showed similar risk (14).

It is well known that elderly men adopt more violent methods than women. In England and Wales, hanging up is the most common method for suicide among men, while poisoning is most often used by women. In USA, fire arms are used in about 60% of all completed suicides. Some recent studies indicate that there is a considerable evidence of relationship between the availability of suicidal means and the method of suicide (15, 16, 17).

In this investigation the most common way of suicide among both genders were hanging up and poisoning, but there are statistically important differences among men and women: poisoning and drowning are more common way among females. Among males, very important way of suicide is by fire arms. This was especially observed after war in Kosovo ended (1). There were no statistically important differences in suicide method among different age groups.

CONCLUSION

From 1995 to 2001 the suicide rates in the south-eastern part of Serbia among both sexes and among all age groups decreased. The highest suicidal rates were registered among the oldest people, specially among men and women aged 75 and over. In this age group male to female ratio was 3.6:1, which indicates that the old men are more vulnerable than women. The most common way of suicide among both sexes were hanging up and poisoning, and on the third place among women it was drowning, and by firearms in men respectively. There were statistically important differences in suicide ways between men and women: poisoning and drowning were more common ways of suicide among females.

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