

GENDER DIFFERENCES IN RELATION TO SUICIDES COMMITTED IN THE CAPITAL OF MONTENEGRO (PODGORICA) IN THE PERIOD 2000-2006

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SUMMARY

Background: The purpose of the study was to research gender differences in suicides committed in Podgorica between 2000 and 2006, including sociodemographic variables (e.g. age, marital status, education etc.), methods of and motives for committing suicide. Data were taken from the Police Directorate of Montenegro.

Subjects and methods: We used data on 220 males and 83 females who committed suicide. Statistical analysis was done by using the crude specific rate. Significance between two independent crude rates is constructed around their 95% confidence intervals and it utilizes the difference between the two rates (D) to determine significance.

Results: The incidence of suicide in males was found to be higher than in females (the male to female suicide ratio is 2.6 to 1). Females were older than males. Females had completed elementary education more frequently, and they were single or divorced or widows. Males had completed secondary education more frequently and they were married. The most frequent employment status of both gender groups implied pensioner and unemployment statuses. There was a significant difference in suicide rates between the genders during the reporting period. Suicide rates increase with age in both genders. Males chose firearms, hanging, strangulation and suffocation and jumping. Females chose hanging, strangulation and suffocation, jumping and drowning as the most frequent methods of suicide. The most frequent motive for suicide in both gender groups was physical illness. The second most frequent motive was mental illness. Emotional and financial difficulties were motives which were more common in males, whereas family problems appeared to be motives two times more frequent in females.

Conclusions: The complex multifactorial etiology of suicide suggests the need to consider gender differences when developing effective strategies for the therapy and the prevention of suicide.

Key words: suicide - gender differences – epidemiology - Montenegro

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INTRODUCTION

Suicide is an important mental health problem and one of the leading causes of death among young people (Cheng et al. 2000). The National Committee on Mental Health of Montenegro arranged, in 2005, a seminar on the theme of suicide prevention. One of the conclusions was that Montenegro, according to the number of suicides, belongs to the category of "very high-risk" countries. Pekovic stated that the most critical period for suicide risk was between the ages of 45 and 55 and that the suicide rate was the highest in the northern region of Montenegro, and also that it had been noticed that there was a decreasing trend in the female suicide rate. (Pekovic personal communication).

Socio-demographic factors related to the highest suicide rates are being male, white, elderly, and single (divorced/widowed) (Chaudron & Caine 2004). Since gender is regarded as one of the most important risk factors for suicide, gender differences in suicidal behavior have been analyzed in a number of current

studies (Hawton 2000, Canetto & Sakinofsky 1998, Moscicki 1994).

In most countries, more suicides were committed by men than by women; however, there are more attempted suicides among women (Hawton 2000). Nevertheless, some investigations reported higher suicide rates among females. For example, Ji et al. (2001) found female suicide rates 25% higher than male suicide rates, and Cheng et al. (2000) indicated that groups aged 15 and below and those between 15 and 24 showed higher female suicide rates. Furthermore, we reported that in Podgorica, during the 1996, male to female suicide ratio was 1:1.66 (Injac et al. 2000). There are very few studies of gender differences in suicide in Montenegro.

The aim of this study was to examine gender differences in cases of completed suicide and to consider the factors associated with suicide (i.e. age groups, suicide methods and motives for suicide) committed within the capital of Montenegro (Podgorica) during the period from 2000 to 2006.

SUBJECTS AND METHODS

The total population in Podgorica was 162,925 and 172, 626 inhabitants in 2000 and 2006 respectively, making up 30% of the total population in our country (Statistical Yearbook 2006). All completed suicides recorded in the foregoing population during the period from 2000 to 2006 were included in the study.

The data on suicide deaths that occurred in Podgorica from 2000 to 2006 were collected in the Montenegro Police Department Headquarters and analyzed in the Institute of Public Health and in the Department of psychiatry of the School of Medicine in Podgorica. In Montenegro a death is declared suicidal after the following steps have been taken: a) the police and the investigating judge are informed of all cases of sudden, violent or suspicious death, b) the police interview the family, witnesses and doctors regarding the deceased person, c) the place and method of execution is investigated and officially recorded, d) a judicial-medical autopsy is carried out e) a common decision is made by the investigating judge, the medical investigation and the police.

Death records report socio-demographic information (sex, age, marital status, educational level, and employment status), the method of suicide including ICD-X code (WHO 1992) and reason for suicide.

For determining the significance of the difference between arithmetic means, we used Student's t-test. For

the assessment of the significance of the difference in frequency, we used Pearson's chi-square (χ^2) test. For the statistical analysis, we used a crude specific rate based on the number of suicides within a specific population (female or male) per 100,000 persons in that specific population. The significance between two independent crude rates, is constructed around their 95% confidence intervals and utilizes the difference between the two rates (D) to determine significance (Dever 1984). For the statistical analysis, we used SPSS software program (Morgan et al. 2004).

RESULTS

The total number of recorded suicide cases between 2000 and 2006 in Podgorica were 303. During the reporting period, there were 220 (72.6%) male suicides and 83 (27.4%) female suicides. The average age of patients was 50.52 ± 17.89 (16 - 91 range). Females were older than males, 49.22 ± 17.41 vs. 53.97 ± 18.78 respectively ($t[283] = 2.045$; $p = 0.042$). There were some differences between genders concerning socio-demographic characteristics (i.e. marital status, educational level), see Table 1.

Suicide rates (per 100,000) ranged from 33.0 per 100,000 to 18.1 per 100,000 between 2000 and 2006, being the lowest in 2004 and the highest in 2002. Annual suicide rates among males and females are shown in Table 2.

Table 1. Socio-demographic characteristic of subjects committing suicide

	Males (n=220)	Females (n=83)	test	P value
Age mean \pm SD	49.22 \pm 17.41	53.97 \pm 18.78	$t[283] = 2.045$	0.042
<i>Marital status n (%)</i>				
Single	124 (56.4)	51 (61.4)		
Married	84 (38.2)	21 (25.3)	$\chi^2[3] = 8.043$	0.045
Divorced	6 (2.7)	5 (6.0)		
Widowed	6 (2.7)	6 (7.2)		
<i>Educational level</i>				
primary school	41 (18.6)	32 (38.6)		
secondary school	157 (71.4)	43 (51.8)	$\chi^2[3] = 13.471$	0.004
high school	10 (4.5)	4 (4.8)		
university	12 (5.5)	4 (4.8)		
<i>Employment status</i>				
No employed	61 (28.2)	27 (32.5)		
Employed	82 (38.0)	26 (31.3)	$\chi^2[2] = 1.202$	0.548
Retired	73 (33.8)	30 (36.1)		

As illustrated in Table 2. suicide cases occurred more frequently by males than females in every reporting year. The year with the highest suicide rate for males was 2003 (49.5 per 100,000). The highest suicide

rate among females was in 2002 (26.7 per 100,000). There was a significant difference in suicide rates between genders in the reporting period (2000-2006) ($p < 0.05$).

Table 2. Annual suicide rates (per 100.000) in males and females

Year of suicide	Specific rate per 100,000			D	CI 95% for D	
	Total	Males	Females		Lower Bound	Upper Bound
2000	29.5	38.6	18.5	20.1	8.3	32.0
2001	20.6	31.4	9.3	22.1	8.4	35.8
2002	33.0	38.6	26.7	11.9	1.7	32.9
2003	28.4	49.5	8.1	41.4	25.1	57.7
2004	18.1	31.4	5.8	25.6	12.5	38.7
2005	22.6	37.4	9.3	28.1	13.5	42.8
2006	29.1	39.8	19.7	20.1	3.6	36.6
Mean	25.9					

Table 3. shows that the suicide rates increased with ages in both gender groups. The highest mean rates of suicides are among females >65 years old (26.4 per 100,000). This pattern did not differ from that of males, among whom the highest suicide rates occurred in the oldest years (64.7 per 100,000). Suicide rates differed between males and females by age. A statistically significant difference between the genders has been found. ($p < 0.05$). (see Table 3.)

The most frequent methods of suicide among males were firearms, explosives (42.7%) and hanging, whereas

self-strangulation and suffocation were most common among females (48.2%). For the male group, other methods of suicide, according to their frequency, were: hanging, self-strangulation and suffocation (25.5%), jumping from high places (14.5%), submersion (drowning) (8.2%). Other methods of suicide in females were: jumping from high places (20.5%), drowning (15.7%), firearms and explosives (8.4%). During the reporting period, there were statistically significant differences between genders concerning the methods of suicide ($\chi^2 = 38.579$; $df = 6$; $p = 0.000$), see Table 4.

Table 3. Age-specific suicide rates (per 100.000) in males and females

Age range	Specific rate per 100.000		D	CI 95% for D	
	Males	Females		Lower Bound	Upper Bound
15-24	14.1	3.2	10.9	3.8	17.9
25-34	18.4	6.8	11.6	4.3	18.9
35-44	31.6	11.5	20.1	8.1	32.0
45-54	37.3	20.4	17.0	15.7	18.2
55-64	54.2	20.4	33.8	13.7	53.8
>65	64.7	26.4	38.2	17.2	59.3

Table 4. Methods of suicide in males and females

Methods of suicide		Males (%)	Females (%)	M/F ratio
X60-69	Poisoning	2.7	4.8	0.56
X70	Hanging, strangulation and suffocation	25.5	48.2	0.53
X71	Submersion (drowning)	8.2	15.7	0.52
X72-77	Firearms and explosives	42.7	8.4	5.08
X78-79	Cutting and piercing instruments	5.0	2.4	2.08
X 80	Jumping from high place	14.5	20.5	0.70
X83-84	Other and unspecified	1.4	0.0	

Considering the reported motives, physical illness was the most frequent reason for suicide among males and females, 34.5% and 38.6% respectively. Mental illness was the second known motive for suicide in males and females. It must be noted that motives for suicide were unknown in 23.2% of males and 19.3% of

females. According to M/F ratio, emotional problems and economic problems were more typical in males than in females (3.79% and 5.67 % respectively). Inversely, family problems were two times more often the reason for suicide in females, see Table 5.

Table 5. Motives of suicide in males and females

Motives	Males (%)	Females (%)	M/F ratio
Physical illness	34.5	38.6	0.89
Mental illness	16.4	19.3	0.85
Family problems	8.2	15.7	0.52
Emotional problems	9.1	2.4	3.79
Economic problems	6.8	1.2	5.67
Other	1.8	3.6	0.50
Unknown	23.2	19.3	1.20

DISCUSSION

The findings from the present study have confirmed the ones from the earlier studies, i.e. that there are gender differences in risk factors related to committed suicides. In addition, an increase in the suicide rate has also been observed. The research on gender differences in the completed suicides included socio-demographic variables (e.g., gender, age, marital status, education, employment status), as well as methods of and motives for suicide.

All the observed socio-demographic variables, except employment status, have shown statistically significant differences between males and females ($p < 0.05$).

During the reported seven-year period, 220 males and 83 females committed suicide, which is slightly less than three males to one female (the male to female suicide ratio is 2.6 to 1). Proportionally, the male to female suicide rate is similar to that in other countries. For example, in Croatia (2000), Hungary (1999) and Slovenia (1999) it was approximately 3:1; however, in Italy (1998) it was approximately 4:1 (Suicide rate. WHO).

The incidence of suicide in males was found to be higher than in females, a phenomenon that is almost universally observed and attributed mainly to males being more aggressive and choosing suicide methods which are more violent and effective (Hawton 2000). This is often stated as the major reason for the difference. However, the arguments disclose that this phenomenon is much more complex. In addition, other explanations also exist referring to the existence of differences in psychopathology between males and females, for example the abuse of substances, aggression, impulsivity and externalization are more frequent among males (Beautrais 2002).

As compared to the average age, females who committed suicide were, statistically, significantly older than males. The study of meta-analysis, which examined the fundamental gender-related comparisons based on causes, has also shown suicidal tendencies among the older-age females who committed suicide and were being considered in the study to male suicides (Arsenault-Lapierre et al. 2004).

In relation to the marital status of both genders, the major number of persons who committed suicide refers to single persons. The second place belonged to married persons. As regards the family structure, our findings are partly different from that of other studies which have shown that in both genders those who are unmarried, divorced or single commit suicide more frequently (Kposowa 2000, Lawrence et al. 1999). In neighbouring countries, such as Croatia, suicide rates in relation to marital status for the 1972-2002 period showed a striking decrease among married persons and an increasing trend in suicide rate was observed among singles (Jakovljević et al. 2004), which corresponds to our findings. Males covered by our study, who committed suicide, were statistically significantly more often married, whereas females were, statistically, significantly more frequently single, divorced or widowed ($p = 0.045$).

The majority of both male and female citizens who committed suicide had completed secondary school, meaning that the highest suicide rate is among the secondary school population of both genders. Statistically, females had completed elementary education more frequently. Males had completed secondary education more frequently ($p = 0.004$). Compared the neighbouring countries - Belgrade for example - the data distribution concerning the same period appeared to be similar to ours (Nikolić-Balkoski et al. 2006).

In relation to the employment status, no significant statistical difference has been detected between the genders. The majority of persons who committed suicide belonged to the pensioner (69.9%) and unemployed (60.7%) populations respectively. As regards the effects of employment and financial impacts on suicidal behavior, a Danish study Qin et al. (2003) confirmed the data from our report, showing that the majority of the persons who committed suicide had belonged to the pensioner and unemployed populations. The employment rate was 69.9%. Taking into consideration that the highest number of suicides was among the population with the completed secondary school education, which also reflects the subjects' social and financial status in society, we can conclude that the employed persons who committed suicide are of middle social and financial status. Qin et al. (2003) confirmed

that suicide risk was increased by a higher unemployment rate among males, but not among females. In addition, the comparisons of high, low and middle social and financial status shows that middle social and financial status implies a significant reduction of suicide risk among females, but not among males. The findings of other studies in relation to the employment status appear to be different. For example, a lower suicide rate in relation to a higher unemployment rate were detected in the Mediterranean part of Croatia while a higher suicide rate in relation to a lower unemployment rate were found in the continental part of Croatia (Sedić et al. 2003). The connection between unemployment and suicide is largely dependent on what exactly unemployment means for the individual. A job can provide many things, as well as social contacts, but corresponding phenomena cannot be discerned in modern times - which may explain the low suicide rates in relation to low unemployment rates.

The average suicide rate in Podgorica between 2000 and 2006 was 25.9/100,000 inhabitants. The highest suicide rate among males was registered in 2003 and it was 49.5/100,000 inhabitants, whereas it was recorded among females in 2002 and it was 26.7/100,000 inhabitants. There was a significant difference in suicide rates between the genders in the reporting period (2000-2006). The male suicide rates in Podgorica showed greater mortality in males, which corresponds to the data from Croatia (Jakovljević et al. 2004), Slovenia (Marušič et al. 2004), Hungary (Levi et al. 2003), Italy (Guaiana et al. 2002), Serbia and Montenegro (Nikolić & Dimitrijević 2002) and many other countries (Cantor 2000).

As compared to Hungary (1999), which recorded the highest suicide rate among males, i.e. 51.5, as well as to Slovenia (1999) with the rate of 47.3, Croatia (2000) with the rate of 32.9 and Italy (1998) that recorded low suicide rates, i.e. 12.3 (Suicide rate. WHO), our findings have shown that Podgorica with 38.1 (2000-2006) was in the middle. The suicide rate among females in Podgorica was 13.9 (2000-2006) and, as compared to Hungary and Slovenia (1999) that experienced the suicide rates of 15.4 and 13.4 respectively, or as compared to Croatia (2000) with 10.3/100,000, and Italy with 3.6 /100,000 (1998) (Suicide rate. WHO), our findings have led us to the conclusion that the suicide rate among females in Podgorica was approximate to those in the countries recorded as the ones with the highest suicide rate among females in Europe and the region. As compared to the period from 1996 to 1999, when the average suicide rate in Podgorica was 23/100,000 persons, it has been concluded that the suicide rate is higher (Injac et al. 2000). According to the data obtained from the neighbouring countries the suicide rate in Croatia showed an increasing trend from 1966 to 1992. From 1993 to 2002, it showed oscillations, but an evident decreasing trend. The suicide rate declined from 25.86 per 100,000 in 1992 to

19.88 in 2001 and 19.69 in 2002, a fall of 6.17 (23.9%) (Jakovljević et al. 2004). For example, Zagreb County and Zagreb City recorded an average suicide rate of 17.36/100,000 inhabitants in 2001 (Sedlar et al. 2003).

In Belgrade, in 2001, the suicide rate was 23.5/100,000 inhabitants (Nikolić-Balkoski et al. 2006) meaning that the average suicide rate in Podgorica in 2001 was higher as compared to the neighboring region and that it is in the category of high risk suicide rate.

Suicide rates increase with age (Waern et al. 2002). This was so in our study in both gender groups. The youngest citizen who committed suicide was 16, and the oldest one was 91. All-ages male suicide rates showed an increasing trend in Podgorica during the period under study, as was the case in other countries as well (Madianos and Madianou 1991). High suicide rates were recorded both among females and males older than 65 (26.4/100,000 vs. 64.7/100,000). According to the findings of Jakovljević et al. (2004), Croatia, with a decreasing trend in suicide rates, recorded higher male suicide rates than female suicide rates in all age groups and showed an increasing suicide trend among males over 65 years - which corresponds to our findings. However, age distribution of female suicide rates showed a decreasing trend in suicides in all age groups except in the group below 15 - which is different from our findings. The age of a suicide victim suggests that a society should improve the care of and achieve the goal of preventive programs to reduce or limit the number of suicides.

The most frequent suicide methods in both gender groups were hanging and firearms, which was experienced by some other countries, such as Croatia, Slovenia, Italy and Greece (Jakovljević et al. 2004, Marušič et al. 2004, Zacharakis et al. 1998, Guaiana et al. 2002). In Podgorica males chose firearms and explosives (42.7%), and females chose hanging, strangulation and suffocation (48.2%). In the male group and in order of frequency, other methods of suicide, were: hanging, strangulation and suffocation (25.5%), jumping from high places (14.5%), and drowning (8.2%). Other methods for suicide in females were: jumping from high places (20.5%) and drowning (15.7%). There were statistically significant differences between gender in regard to methods for suicide ($p=0.000$). In a similar way as in other countries (Hawton et al. 2001, Diekstra i Gulbinat 1993) males used firearms more frequently, whereas females in Podgorica tended to use violent methods (Hawton 2000). In the countries of our region, males commit suicide significantly more often by firearms and explosive, whereas females by jumping from high places, drowning or poisoning (Kozarić-Kovačić 2000, Nikolić Balkoski et al. 2006). Such high percentage of completed suicides by hanging is due to easy access to the method and strict legal sanctions prescribed for illegal possession of firearms - which explains the lower number of suicides committed by firearms.

The most frequent motive of suicide among both genders was physical illness. However, one presently unanswered question is to what extent the severity of pain contributes to risk for suicide-relevant outcomes such as suicidal ideation in patients suffering from painful conditions. For example, although some studies report that suicidal ideation is more common in the context of more severe pain (Hinkley and Jaremko 1994, Smith et al. 2004a) other research indicates no association between pain severity and suicidal ideation after controlling for depression (Smith et al. 2004b, Fisher et al. 2001), an important methodological consideration in such studies (Benjamin et al. 2000, McBeth et al. 2002). The analysis of the most frequent motives for suicide has shown a specific feature of the Montenegrin population, i.e. that physical illness was the most frequent motive for suicide. The second most frequent motive for suicide in both gender groups was mental illness.

As the findings of Qin et al. (2000) indicate, mental illness is the predominant factor found in suicide of both genders. Their data suggest that this is an even greater risk in females. The differences between genders are less pronounced among individuals who are treated in a psychiatric clinic, and in fact, more treated women than men committed suicides (Marušić et al. 2002b). Emotional disorders and economic problems were common motives for suicide among males. The facts that males are reluctant to show their emotional feelings and that they show negative behavior, such as expressing anger reflected in a "protest", may imply that there is a link between emotions and suicidal behaviour. In addition, this observation supports the hypothesis that men respond more strongly to economic conditions than women do in the development of suicidal behavior (Taylor et al. 1998). Family problems were two times more frequent as a motive for suicide among females, which corresponds to the findings derived from other studies. (Levi et al. 2003, Sainsbury et al. 1980). Nevertheless, females in Montenegro are less inclined to commit suicide than males, so we can conclude that the Montenegrin women show a stronger psychological resistance to suicide due to their maternity and their inclination to sacrifice themselves unselfishly for their families. Motives for suicide of males and females were unknown in 23.2% and 19.3% cases respectively.

The trends in suicides may be related to an increase in the incidence of physical illnesses and as well as to the trends in the prevalence of mental disorders in Podgorica, which has not been studied yet (empirical evidence suggests a notable increase in alcohol and drug abuse). Suicide is generally more prevalent in regions where instances of alcohol-related disorders are found. In Slovenia, the prevalence of alcohol-related disorders is the best predictor for regional suicide rates (Marušić et al. 2004).

Timely diagnosis of mental disorders (particularly affective disorders, abuse of alcohol and substances,

personality disorder) and an appropriate therapy are the most important factors in preventing suicide among both gender groups. Socio-economic factors such as the changing social roles of the two genders and weakening of traditional family values during the transitional time have probably contributed to the increase in male and female suicides. It would be interesting to monitor the suicide rate after the proclamation of independence of Montenegro, taking into account that some countries from our region - such as Croatia for example - according to the findings of Jakovljević et al. (2004), recorded decreasing trends in suicide rates during the period after independence.

Taking into consideration that suicide is a complex multifactorially induced behavior, as well as that the therapy and prevention are complex, we believe that more attention should be paid to gender differences when both conducting studies of suicide behaviors and developing efficient strategies for suicide prevention and treatment interventions.

Limitations of this study include a shortage in medical documentation, especially regarding psychiatric treatment since we consider that a significantly smaller presence of mental disorders in persons who committed suicide, are a consequence of an underestimation of mental disorders by the family or a consequence of fear of stigma. Prospective studies which would include these variables (i.e. psychiatric treatment, absence/presence of mental or somatic illness, marital status etc), could help in answering this question.

CONCLUSION

Research in social and demographic factors have shown the presence of risk factors in relation to the gender in completed suicide cases. The male to female suicide ratio is 2.6 to 1. Females were older than males. Females had completed elementary education and were unmarried, divorced, or widowed and chose hanging, strangulation and suffocation, jumping from high places and submersion (drowning) as the most frequent methods of suicide. Males had completed secondary school education and were mainly married and chose firearms and explosives hanging, strangulation and suffocation, jumping from high place and submersion (drowning) as the most frequent methods of suicide. Most frequently, both genders were pensioners and unemployed persons. Suicide mortality increased with age in both genders. The highest suicide rate in Podgorica among males was recorded in 2003 and it was 49.5/100,000 inhabitants, whereas among females it was recorded in 2002 as 26.7/100,000 inhabitants. Thus, Podgorica was among the European and regional towns and countries which recorded the highest suicide rates. The most frequent motive of suicide was physical illness in both genders. The second most frequent motive in both groups was mental illness. Emotional disorders and economic problems were more common

motives for suicide among males. Family problems were two times more frequently motives among females. Taking into consideration that suicide is a complex multifactorially induced behavior, as well as that the therapy and prevention are complex, then the gender differences should be taken into consideration when developing effective strategies for suicide prevention.

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