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SOCIO-DEMOGRAPHIC CHARACTERISTICS OF PERSONS WITH PSYCHIATRIC DISORDERS WHO COMMITTED SUICIDE

SOCIODEMOGRAFSKE KARAKTERISTIKE OSOBA SA MENTALNIM OBOLJENJIMA KOJE SU POČINILE SAMOUBISTVO

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Summary

Introduction. Psychiatric disorders represent an important risk factor for death by suicide. The aim of this study was to assess the incidence of psychiatric disorders among the persons who committed suicide in the territory of the City of Niš in the period 2001 - 2010. Additionally, this study aimed to compare the socio-demographic characteristics between persons with and without psychiatric disorders. **Material and methods.** This retrospective study included 524 persons who committed suicide (330 with and 194 without psychiatric disorders) in the period 2001 - 2010. Data on socio-demographic characteristics, previous suicide attempts, and methods of suicide were obtained from medical and police records (Police Directorate for the City of Niš, and Statistical Office of the Republic of Serbia). **Results.** We studied the incidence of suicides among the persons with psychiatric disorders compared to persons without any medical condition in the studied period. Depression (104, 31.5%) and personality disorders (103, 31.2%) were the most common psychiatric disorders among the persons who committed suicide, whereas only 21 persons (6.36%) had schizophrenia. Persons with psychiatric disorders had a higher level of education, more of them were divorced, had a private source of income and more frequently attempted suicide compared to persons without any diseases ($p < 0.001$). The most common methods of suicide were hanging and poisoning in both investigated groups. **Conclusion.** Depression was the most common disorder registered among the persons with psychiatric disorders who committed suicide. It is necessary to develop a national strategy for suicide prevention for groups at high risk of suicide.

Key words: Mental Disorders; Suicide; Suicide, Attempted; Demography; Population Characteristics; Risk factors; Depression; Asphyxia

Introduction

Suicide is an act with a fatal outcome which the deceased, knowing or expecting a fatal outcome, had initiated and carried out with the purpose of

Sažetak

Uvod. Mentalna oboljenja predstavljaju značajan faktor rizika za nastanak samoubistva. Cilj istraživanja bio je da se utvrdi učestalost pojedinih mentalnih oboljenja kod osoba koje su počinile samoubistvo na teritoriji Grada Niša u periodu između 2001. i 2010. godine. Takođe, istraživanje je imalo za cilj da uporedi sociodemografske karakteristike osoba koje su počinile samoubistvo, a koje su bile i mentalno obolele sa osobama koje nisu bile mentalno obolele. **Materijal i metode.** Retrospektivno istraživanje obuhvatilo je 524 osobe koje su počinile samoubistvo (330 sa mentalnim oboljenjima i 194 bez registrovanog oboljenja) u periodu između 2001. i 2010. godine. Podaci o sociodemografskim karakteristikama, istoriji prethodnih pokušaja samoubistva i načinu izvršenja samoubistva prikupljeni su iz medicinskih i policijskih izveštaja baze Policijske uprave Grada Niša i Zavoda za statistiku Republike Srbije. **Rezultati.** Uočen je trend povećanja broja samoubistava među osobama sa mentalnim oboljenjima u odnosu na osobe bez registrovanog oboljenja u analiziranom periodu. Najveći broj osoba koje su počinile samoubistvo imale su dijagnozu depresije (104, 31,5%) i poremećaja ličnosti (103, 31,2%), a 21 osoba (6,36%) imala je shizofreniju. Osobe sa mentalnim oboljenjima imale su veći stepen obrazovanja, u većem procentu vlastiti izvor prihoda, ali i češći pokušaj samoubistva i razvoda u odnosu na osobe bez registrovanog oboljenja ($p < 0,001$). Najčešći način izvršenja samoubistva u obe analizirane grupe bilo je vešanje i trovanje. **Zaključak.** Depresija je najčešće oboljenje dijagnostikovano kod mentalno obolelih osoba koje su počinile samoubistvo. Neophodno je razviti nacionalnu strategiju za prevenciju samoubistava među grupama sa rizikom. **Cljučne reči:** mentalni poremećaji; samoubistvo; pokušaj samoubistva; demografija; karakteristike stanovništva; faktori rizika; depresija; asfiksija

provoking the changes that he desired [1]. It is a complex, dynamic and heterogeneous social phenomenon that affects the whole society, not only the people who commit suicide. A single explanation why people commit suicide does not exist. Basi-

cally, it is a consequence of several interacting factors, such as personal, social, psychological, cultural, biological and environmental [2, 3].

Compared with the data from 2000, the number of suicides has decreased by 9%. However, suicide still represents a major public health problem worldwide. The World Health Organization (WHO) estimated that 804.000 suicide deaths occurred worldwide in 2012, with a suicide rate of 11.4 per 100.000 population (15.0 for males and 8.0 for females). In 2012, suicide was the fifteenth cause of death in the general population and the second leading cause of death in 15 - 29-year-olds [4, 5].

Previous studies showed that the prevalence, characteristics and methods of suicide vary widely in regard to geographic regions, different communities and ethnic origin, sex, age and time [6, 7]. Although the age-standardized suicide rate is slightly higher in high-income countries (HICs) than in low- and middle-income countries (LMICs) (12.7 versus 11.2 per 100.000 population), 75.5% of all global suicides occur in LMICs. Globally, men commit suicide more frequently than women. Suicide rates are high in many countries. With regard to age, suicide rates are highest in elderly people of both sexes in almost all regions of the world [2, 6, 7].

In Serbia, from the early 1950s to the mid-2010s, the total number of suicides exceeded 75.000. Recent data from the Statistical Office of the Republic of Serbia showed that the average age-standardized mortality rate was 17.4 suicides per 100.000 inhabitants in the whole country. The highest rate was in Vojvodina region with 22.7 suicides per 100.000 inhabitants, and the lowest was in South and East Serbia with 14.0 suicides per 100.000 inhabitants. Gender and age differences in suicide deaths in Serbia follow the world trend. In the last two decades, out of the total number of suicides, 70.7% were committed by males, and only 29.3% by females. In addition, 48.1% of person who committed suicide were aged 60 years or over [8].

Suicide risk factors can be divided into proximal and distal factors. Distal factors increase the predisposition, whereas proximal act as precipitants [9].

Psychiatric disorders represent one of the most important proximal risk factor. Previous studies reported that psychiatric disorders are present in about 80 - 90% of persons who committed suicide. Moreover, recent findings confirmed that persons with more than one psychiatric disorder are at higher risk for suicide [10-12]. Additionally, it has been reported that functional psychiatric disorders (major depressive disorder, bipolar disorders, schizophrenia, etc.) are associated with higher suicide risk than organic psychiatric disorders (epilepsy and brain injury) [13].

Recent studies have reported the suicide mortality rate of Serbian population in different time periods related to age and sex [14 - 16]. On the other hand, there are no previously reported findings about the socio-demographic characteristics of persons with psychiatric disorders who committed suicide. Therefore, this study aims to investigate the socio-demographic characteristics of persons with psychiatric disorders who committed suicide and to compare them with the same characteristics of persons without registered psychiatric or physical disorders in the territory of the City of Niš in the period from 2001 to 2010. Furthermore, this study investigates the annual trend growth of suicide deaths and the differences in the incidence of specific psychiatric disorders among the persons who committed suicide.

Material and methods

This retrospective study included 524 persons (264 males and 260 females) who committed suicide in the territory of the City of Niš, Republic of Serbia, in the period from 2001 to 2010. Data on persons who died of suicide and self-inflicted injury were obtained from the Police Directorate for the City of Niš, Ministry of Internal Affairs, and from the Statistical Office of the Republic of Serbia, Department of Demography.

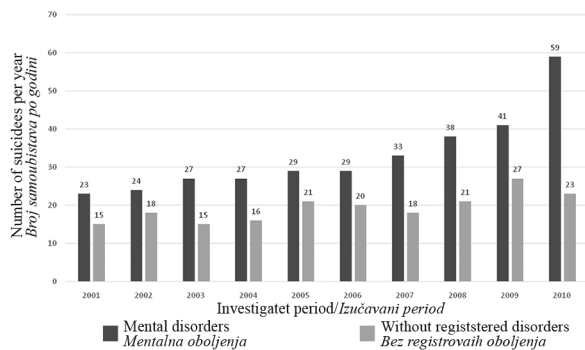
The study sample was divided into two groups. The first group included 330 persons (169 males and 161 females) who committed suicide with previously diagnosed psychiatric disorders according to the International Statistical Classification of Diseases and Related Health Problems (ICD-X) [17]. The second

Table 1. Persons who committed suicide included in the study

Tabela 1. Osobe koje su počinile samoubistvo uključene u istraživanje

Study group/Ispitivana grupa	Type of disorder/Vrsta poremećaja	N
Persons with psychiatric disorders <i>Osobe sa mentalnim poremećajima</i>	Depressive episodes/ <i>Depresivne epizode</i> (ICD, <i>IKB-V-F 32</i>)	104
	Adult personality disorders/ <i>Poremećaji ličnosti</i> (ICD, <i>IKB-V-F 60-63</i>)	103
	Disorders due to alcohol abuse <i>Poremećaji usled upotrebe alkohola</i> (ICD, <i>IKB-V-F10</i>)	69
	Opioid-related disorders <i>Poremećaji usled upotrebe opioidnih sredstava</i> (ICD, <i>IKB-V-F 11</i>)	33
	Schizophrenia/ <i>Shizofrenija</i> (ICD, <i>IKB-V-F-20-21</i>)	21
Persons without disorders <i>Osobe bez poremećaja</i>		194
Total/ <i>Ukupno</i>		524

ICD - International classification of diseases/*IKB* – *Internacionalna klasifikacija bolesti*; N - number of persons/*broj osoba*



Graph 1. Numer of suicides in the investigated period
Grafikon 1. Broj samoubistava u izučavanom periodu

group included 194 persons (95 males i 99 females) without diagnosed psychiatric or physical disorders who committed suicide (**Table 1**). Using family interviews, medical and police records, we extracted details about the age, sex, marital status, level of education, source of income, criminal record, history of previous suicide attempts, and methods of suicide of each person who committed suicide.

Statistical analysis was performed using IBM SPSS Statistics for Windows Software (Version 20.0 < IBM Corp, Armonk, NY, USA). The results were presented as frequencies and percentages. The Pearson's chi-squared test was conducted to assess statistical significance between categorical data. All p values under .05 were considered significant.

Results

Of the total number of committed suicides (524), 63% (330, 169 males and 161 females) were committed by persons with psychiatric disorders, while the rest of 37% (194, 95 males and 99 females) were committed by persons without registered psychiatric or physical disorders.

Depression (104, 31.5%) and personality disorders (103, 31.2%) were the most frequently diagnosed psychiatric disorders among the persons who committed suicide. On the other hand, only 21 persons were diagnosed with schizophrenia (6.36%) (**Table 1**).

The number of suicide deaths increased annually in both groups within the investigated period. In 2001, the number of suicides was 0.65 times more frequent among the persons with psychiatric disorders compared to persons without registered disorders. Moreover, in 2010, the observed ratio was 2.57 (**Graph 1**).

The average age of persons with psychiatric disorders was 49.86 ± 18.11 years, and in the group of persons without registered disorders it was 55.82 ± 25.23 years (**Table 2**). The observed difference was statistically significant ($p < 0.001$).

Persons with psychiatric disorders who committed suicide had higher level of education (296, 89.7%) than persons without registered disorders (136, 70.1%). In addition, a higher number of persons without any education or only with elemen-

tary school were observed among the persons without registered disorders (58, 29.9%) compared to persons with psychiatric disorders (34, 10.3%) (**Table 2**). These differences were statistically significant ($p < 0.001$).

The analysis of the marital status of persons who committed suicide showed that persons with psychiatric disorders were 4.18 times more often divorced compared to persons without registered disorders. Additionally, persons with psychiatric disorders were 1.98 times more frequently married or in non-marital relationships. Roughly, the same number of persons who committed suicide in both groups were widowed (**Table 2**). The observed differences were statistically significant ($p < 0.001$).

A significantly higher number of persons with psychiatric disorders had an income or pension (223, 67.6%), while persons without registered disorders were dependent or received a social welfare (107, 55.1%) (**Table 2**).

A previous suicide attempt was 8.13 times more frequent among the persons with psychiatric disorders, compared to persons without disorders ($p < 0.001$) (**Table 2**). Although persons with psychiatric disorders were more frequently criminally offended compared to persons without disorders, a significant difference was not found ($p = 0.053$) (**Table 2**).

In both investigated groups hanging and intentional self-poisoning, using drugs or liquid substances, were the most common methods of suicide. However, differences between methods of suicide were not statistically significant among the observed groups ($p = 0.210$) (**Table 3**).

Discussion

It is well known that numerous factors contribute to suicide. Previous psychological autopsy case-control studies reported a strong relationship between suicide and psychiatric disorders [10–12]. The results of Harris & Barraclough [13] suggest that the risk of suicide is 5 to 15-folds higher in persons with psychiatric disorders. Moreover, previous studies showed that specific psychiatric disorders were associated with a higher risk of suicide [18, 19]. Mood disorders (RR = 13.4), substance-related disorders (RR = 5.2), personality disorders (RR = 4.5) and psychotic disorders (RR = 6.6) are the most common psychiatric disorders among the persons who commit suicide [18]. These results are in accordance with the study of Ferrari et al. [19] who estimated that the relative risk of suicide in an individual with a major depressive disorder was 19.9 (OR = 9.5–41.7), with schizophrenia 12.6 (OR = 11.0–14.5), and with alcohol abuse 9.8 (OR = 9.0–10.7).

Our findings are in agreement with the previously reported results. Of 330 persons with diagnosed psychiatric disorders who committed suicide in the territory of the City of Niš, 104 (31.5%) were with depression, and 103 (31.2%) were with personality disorders. Schizophrenia was the least frequent psychiatric disorder registered in our sample (21, 6.36%). Depression is recognized as the leading diagnosis associated with suicide, occurring in almost two-thirds of cases [20].

Table 2. Socio-demographic characteristics of persons who committed suicide
Tabela 2. Sociodemografske karakteristike osoba koje su počinile samoubistvo

Socio-demographic characteristics <i>Sociodemografske karakteristike</i>	Persons with psychiatric disorders/ <i>Oso- be sa mentalnim poremećajima</i> N (%)	Persons without disorders <i>Osobe bez poremećaja</i> N (%)	p value <i>p vrednost</i>
<i>Sex/Pol</i>			
Male/ <i>Muški</i>	169 (51.2%)	95 (49%)	p=0.620 ^a
Female/ <i>Ženski</i>	161 (48.8%)	99 (51%)	
Age (year)/ <i>Starost (godine)</i> (Mn±SD)	49.86±18.11	55.82±25.23	p=0.002 ^a
<i>Level of education/Stepen obrazovanja</i>			
Illiterate/ <i>Nepismeni</i>	10 (3.0%)	13 (6.7%)	p<0.001 ^a
Elementary school/ <i>Osnovna škola</i>	24 (7.3%)	45 (23.2%)	
High school/ <i>Srednja škola</i>	168 (50.9%)	103 (53.1%)	
Faculty/ <i>Fakultet</i>	128 (38.8%)	33 (17.0%)	
<i>Marital status/Bračni status</i>			
Single/ <i>Samac</i>	87 (26.4%)	57 (29.4%)	p<0.001 ^a
Married/ <i>Bračna zajednica</i>	75 (22.7%)	41 (21.1%)	
Extramarital relationship <i>Vanbračna zajednica</i>	26 (7.9%)	16 (8.2%)	
Divorced/ <i>Razveden</i>	92 (27.9%)	22 (11.3%)	
Widowed/ <i>Udovac</i>	50 (15.2%)	58 (29.9%)	
<i>Source of income/Izvor prihoda</i>			
Salary/ <i>Plata</i>	162 (49.1%)	35 (18.0%)	p<0.001 ^a
Pension/ <i>Penzija</i>	61 (18.5%)	52 (26.8%)	
Social welfare/ <i>Socijalna pomoć</i>	21 (6.4%)	20 (10.3%)	
Dependent/ <i>Izdržavano lice</i>	86 (26.1%)	87 (44.8%)	
<i>Previous suicide attempts/Prethodni pokušaji samoubistva</i>			
No/ <i>Ne</i>	135 (40.9%)	170 (86.7%)	p<0.001 ^a
Yes, once/ <i>Da, jednom</i>	140 (42.4%)	19 (9.8%)	
Yes, more than once/ <i>Da, više puta</i>	55 (16.7%)	5 (2.6%)	
<i>Criminal record/Krivično kažnjavan</i>			
No/ <i>Ne</i>	248 (75.2%)	157 (80.9%)	p=0.053 ^a
Yes/ <i>Da</i>	82 (24.8%)	37 (19.1%)	

^a Pearson Chi – square test/^a *Pirson Hi – kvadrat test*, Mn – mean/*srednja vrednost*, SD – standard deviation/*standardna devijacija*, N – number of persons/*broj ispitanika*

A particularly disturbing fact is that depression is increasing among the young people [21]. A recent systematic review of Hawton et al. [22] identified the following risk factors for suicide in persons with depression: male gender, family history of suicide or psychiatric disorder, history of attempted suicide, hopelessness, and comorbid disorders such as anxiety, personality disorder, drug and alcohol abuse. This is in accordance with the number of persons with personality disorders, drug and alcohol abuse who committed suicide in our study. Compared with the group without registered disorders, these pathologies may increase the risk of suicide in persons with mental disorders [22]. Additionally, Coryell & Young [23] reported that clinical predictors of suicide in persons with a major depressive disorder include a history of attempted suicide, high level of hopelessness, and high suicidal tendencies.

Our findings indicate a slightly higher suicide rate in males than in females, with an average age

of 55.83 years. These results are in accordance with the previously reported findings [3, 6, 7]. There are several explanations for this specific ratio. Basically, males are more impulsive and aggressive compared to females. Additionally, males choose more effective methods of suicide than women [24]. From the cultural aspect, less social acceptance of suicide attempts in males causes more suicide deaths and fewer attempts that are converse compared to females [25]. Increased alcohol and psychoactive substance abuse [26], suppression of emotions [27], and non-acceptance of medical care [28] contribute to higher suicide rate in males.

Our findings also showed that suicide is more common among elderly people in both investigated groups. These results are in line with previously reported results which suggest that suicide deaths are more common in advanced age [3, 6, 7]. Moreover, recent studies have shown that high percentage of people older than 65 years suffered from depres-

Table 3. Methods of suicide
Tabela 3. Načini izvršenja samoubistva

Methods of suicide <i>Način izvršenja samoubistva</i>	Persons with psychiatric disorders/ <i>Osobe sa mentalnim poremećajima</i> N (%)	Persons without disorders/ <i>Osobe bez poremećaja</i> N (%)
X60-65, X68-69 Self-poisoning by drugs or by exposure to liquid substances/ <i>Trovanje zboupotrebom droga i izlaganjem tečnim supstancijama</i>	83 (25.2%)	51 (26.3%)
X70 Hanging/ <i>Vešanje</i>	116 (35.2%)	67 (34.5%)
X71 Drowning and submersion/ <i>Davljenje i potapanje</i>	31 (9.4%)	30 (15.5%)
X72-75 Firearm and explosive material/ <i>Oružje i eksploziv</i>	60 (18.2%)	28 (14.4%)
X80 Jumping from height/ <i>Skok sa visine</i>	40 (12.1%)	18 (9.3%)

N – numbers of persons/*broj osoba*

sion [20]. A diagnosed depression additionally increases the risk of suicide among the elderly. Another obvious problem is that in the majority of cases, depression is unrecognized due to the symptoms of other diseases in the elderly and side effects of various drugs [29]. Apart from this, the risk of suicide in old people increases with alcohol abuse [30], and a higher rate of comorbidity [31].

Socio-demographic data showed that persons with psychiatric disorders who committed suicide had a higher level of education, personal source of income, were more frequently divorced, and have already attempted to commit suicide compared to persons without registered disorders. Previous studies indicate that divorced persons had higher suicide rates and increased risk of suicide compared to married persons [32, 33]. Marriage has a protective role, providing social and emotional stability and easier integration into the community. Divorce or loss of a spouse may increase the risk of suicide [33]. Previous studies reported that suicide is more common among the persons with lower level of education and poor socioeconomic status [6, 7]. Our findings showed that the majority of persons who committed suicide had a personal source of income, whereas data of Statistical Office of the Republic of Serbia showed that the lowest incomes were found in the South and East Serbia [34]. Higher incidence of well-educated persons who committed suicide can be explained by the fact that females in Serbia have higher level of education than males [34].

For every suicide, there are many more people who attempt suicide every year. A prior suicide attempt is the single most important risk factor for suicide in the general population. Persons who have attempted suicide are at significantly higher risk of suicide in the future [2, 4]. Our study showed that persons with psychiatric disorders who committed suicide more frequently attempted to commit suicide compared to persons without registered disorders (59.1% versus 12.4). These findings are in accordance with the previously published results [21, 22], that showed a higher suicide rate among the persons with psychiatric disorders.

We did not observe a significant difference in suicide methods between the study groups. In both

groups, the most common suicide method was hanging, followed by intentional self-poisoning. The most lethal methods of suicide are firearms and hanging. Highly lethal methods are more commonly used in committing suicide, while less lethal methods are more frequent in suicide attempts [35]. In general, men tend to choose more violent and highly lethal methods, whereas women often choose methods which are less violent and less lethal [36]. The previous study in Serbian population showed that the leading methods of suicide were by hanging and firearms, which is in line with our findings [16]. Furthermore, our results are in agreement with previously published results worldwide [6, 7].

There is strong evidence that suicide is preventable [37, 38]. According to World Health Organization reports, world-wide evidence-based interventions for suicide prevention are classified into universal, selective and indicated interventions [39]. We assume that additional screening tests [40–42] among the most vulnerable risk groups (i.e. males, older persons and persons with registered psychiatric disorders) should decrease the rate of committed suicides.

Conclusion

In conclusion, persons with psychiatric disorders committed suicide more frequently compared to persons without registered disorders in the territory of the City of Niš in the period from 2001 to 2010. Depression was the most commonly registered psychiatric disorder among the persons who committed suicide. Socio-demographic characteristics of persons with psychiatric disorders indicate that suicide deaths occurred more frequently among males, divorced, with personal sources of income and higher level of education. Furthermore, persons with psychiatric disorders attempted to commit suicide more frequently than persons without registered disorders.

Although no way exists to predict those who will commit suicide, more epidemiological studies should help to recognize population groups prone to self-injuring. It is necessary to establish a national suicide prevention strategy with specific goals to decrease suicidal behavior in all risk groups, especially among the persons with mental disorders.

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