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Gender differences in suicide in Serbia within the period 2011–2015

Polne razlike kod suicida u Srbiji u periodu 2011–2015. godine

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Abstract

Background/Aim. The World Health Organisation (WHO) estrimates that approximately 1,000,000 people die by suicide every year. The aim of this study was to examine the gender differences in cases of committed suicides, including suicide rates, socio-demographic factors and methods of suicide in Serbia within the period 2011–2015. This investigation is continuing the previous investigation from the period 2006–2010. **Methods.** Data were obtained from the Statistical Office of the Republic of Serbia. Their classification related to the suicide method was carried out on the basis of International Classification of Diseases-Tenth Revions-Clinical Modification (ICD-X-CM) (WHO 1992). Statistical analysis was done by using the crude number of committed suicide. **Results.** Within the period 2011–2015, the total number of suicides in Serbia was 5,897, of which 74.56% were males and 25.44% females (male to female suicide ratio was 2.93). Annual suicide rate (per 100,000) showed constantly decreased from 2011 to 2015, and in 2015 it was 15. Male/female suicide ratio was the highest among adolescents and decreased with age. The suicide was the most often committed by married males (47.6%) and widowed females (38.86%) with completed high school, retired, Serbs. About a quarter (23.38%) suicide committers were older than 75 years, and 39.39% were older than 65 years. The most common suicide method males (64.63%) and females (59.00%) used was hanging, strangulation and suffocation. The second most common method males used was by firearm (18.96%) and females by poisoning (16.73%). **Conclusions.** Suicide Prevention Programme in Serbia should be primarily oriented towards two age groups at highest risk to commit suicide, towards the adolescents whose suicide was on the rise and towards the elderly male population, less ready to refer to the doctors for help because of problems related to their mental health. With the aim to suicide prevention, doctors should become familiar with community, state and national resources that are concerned with youth and elderly populations, including mental health institutions, family and crisis intervention centers.

Key words:
suicide; gender identity; risk factors; serbia.

Apstrakt

Uvod/Cilj. Prema procenama Svetske zdravstvene organizacije (WHO) oko 1 000 000 ljudi godišnje umire usled samoubistva. Cilj istraživanja bio je utvrđivanje polnih razlika kod izvršenog suicida, prema stopi suicida kao i prema socio-odemografskim karaktersitikama osoba koje su izvršile suicid i metodama suicida izvršenog u Srbiji u periodu od 2011. do 2015. godine. Rad je nastavak istraživanja suicida u Srbiji za period od 2006–2010. godine. **Metode.** Podaci za istraživanje su dobijeni od Republičkog zavoda za statistiku Srbije. Klasifikacija podataka koji se odnose na metod suicida su utvrđeni na osnovu međunarodne klasifikacije bolesti revizija – klinička modifikacija (ICD-X-CM) (WHO 1992.). Statistička analiza je rađena koristeći sirove podatke broja izvršenih suicida. **Rezultati.** U periodu od 2011. do 2015. godine u Srbiji je izvršeno ukupno 5 897 suicida, od toga se 74,56% odnosi na muškarce, a 25,44% na žene (muškarci su 2,93 puta češće izvršili suicid od žena). Stopa suicida (na 100 000) pokazuje konstantno sniženje od 2011. do 2015. godine, i za 2015. godinu iznosi 15. Polne razlike u stopi suicida su najveće kod adolescenata i opadaju sa godinama života. Suicid najčešće izvršavaju oženjeni muškarci (47,6%) i žene udovice (38,86%), sa srednjim obrazovanjem, penzioneri, srpske nacionalnosti (80,49%). Oko četvrtinu (23,38%) suicida su izvršile osobe starije od 75 godina, a 39,39% osobe starije od 65 godina života. Najčešći metod suicida kod muškaraca (64,63%) i žena (59%) su vešanje i davljenje. Kod muškaraca je na drugom mestu vatreno oružje (18,96%), a kod žena trovanje čvrstim i tečnim supstancama (16,73%). **Zaključak.** Program prevencije suicida u Srbiji bi trebalo da bude usmeren na dve dobne populacije sa najvećim rizikom da izvrše suicid, na adolescente kod kojih je suicid u porastu i na populaciju starih muškaraca, koji su manje spremni da se obrate lekaru kada imaju probleme u vezi sa mentalnim zdravljem. U cilju prevencije suicida, lekari bi trebalo da

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sarađuju sa državnim i nacionalnim institucijama koje vode brigu o mladima i populaciji starih, uključujući i institucije mentalnog zdravlja, porodicu i centre za intervencije u krizi.

Ključne reči:
samoubistvo; pol, faktor; faktori rizika; Srbija.

Introduction

The World Health Organization (WHO) estimates that approximately 1,000,000 people die by suicide every year. This roughly corresponds that about 3,000 people commit suicide every day throughout the world, or to one death every 40 seconds. At the same time, it is estimated that up to 25 times as many again attempt suicide. According to the WHO in all European countries, suicide is more common among men, while suicide attempts are more frequent among women [1, 2].

In 2012, suicide in the world was the fifth leading cause of death among people between 30 and 49 years of age, and the second one in people between 15 and 29 years of age [1]. Traditionally, suicide rate is the highest among older men, but suicide among young people is on the rise and makes the group with the highest risk in many countries [3]. The average suicide rate (number of suicides per 100,000 inhabitants) in the world was 16. Three countries with the highest suicides rate in the world were: Guyana (44.2), South Korea (28.1) and Sri Lanka (28.8). The lowest suicide rates in the world were in Saudi Arabia, Syria, Kuwait and Lebanon, where the suicide rate is less than 1 per 100,000 inhabitants. Two countries with the highest suicide rate in Europe are Lithuania (28.2) and Kazakhstan (23.8), followed by 10 countries of the former Soviet Republics [4].

Suicide rate in the world for the last 50 years increased by 60%. Since 1953, a growing trend of suicide rate has also been observed in Serbia. The lowest suicide rate was registered at the beginning of the 50s of the 20th century; it was about 12 to 100,000. Downward trend in suicide mortality occurred in Serbia in last two decades (1991–2014) [5]. The highest suicide rate was 20.9 per 100,000 in 1992 and 1997. The suicide rate in Serbia has been permanently decreasing since 2000 [6–8]. Investigations confirmed that particularly in last two decades the increase in mortality in older men, especially due to firearm suicides, air rifles, and explosives is worrying [5].

According to data obtained from the Statistical Office of the Republic of Serbia (Department for Demography), within the period 2006–2010, the total number of suicides in Serbia was 6,673, of which 71.9% were males and 28.1% females (male to female suicide ratio was 2.56). In this five-year period, their average rate was 18.15 per 100,000 persons, namely, 26.85 per 100,000 for males and 9.92 per 100,000 for females. The suicide was the most often committed by the married males and females with completed high school, retired, the Serbs. The suicide rate in Serbia has been increasing in parallel with the age of the suicide committers and it is the highest in subjects of both genders aged over 75 years. The most common suicide method in males (62.78%) and in females (58.38%) was hanging and strangling. The second most common method in males was by firearm (18.65%) and in females by poisoning (19.26%) [9].

The aim of this study was to examine the gender differences in cases of committed suicide, including suicide rates and/or trends obtained for population as a whole and to consider socio-demographic factors (age groups, education, employment, marital status, nationality) and methods associated with it in Serbia within the period 2011–2015.

This investigation is continuation of previous investigation of gender differences in suicide in Serbia 2006–2010.

Methods

The data for this study were obtained from the Statistical Office of the Republic of Serbia (Department for Demography). All completed suicides recorded in the foregoing population in Serbia (Central Serbia and Vojvodina) during the period from 2011 to 2015 were included in the study. Statistical analysis was done by using the crude number of committed suicides.

The male/female ratio of suicide was calculated for the total number of suicides, for number of deaths caused by suicide within the total mortality and for annual suicide rates, within the period from 2011 to 2015. We calculated male/female ratio for socio-demographic characteristics (education, employment and marital status, nationality and age) and for the methods of suicide within the observed five-year period. A classification of the data related to the suicide methods were defined on the basis of the International Statistical Classification of Diseases and Related Health Problems 10th revision, World Health Organization (ICD-X Code) [10].

Annual suicide rates *per* 100,000 population were calculated using the population data for total population, and for female and male population separately.

Data processing was carried out in the statistical package program SPSS (Statistical Package for the Social Sciences), software version 20.0.

Results

Gender differences in the numbers of suicides, number of deaths caused by suicide within the total mortality and annual suicide rates in Serbia within the period 2011–2015 are shown in Table 1.

Total of 5,897 suicides were committed in Serbia (Central Serbia and Vojvodina) within the period from 2011 to 2015. In observed period 4,397 (74.56%) males and 1,500 (25.44%) females committed suicide, namely, on average, males did it 2.93 times more often than females.

Male/female ratio in suicide number in the total mortality in Serbia, including Central Serbia and Vojvodina within the period 2011–2015 was 2.43 in 2011 to 3.00 in 2012, 2013 and 2015.

Table 1

Gender differences in number of suicides, number of deaths caused by suicide within the total mortality and annual suicide rates in Serbia within the period 2011–2015

Variable	Year of suicide	Total (n)	Males (n)	Females (n)	M/F ratio
Number of suicides					
	2011	1256	909	347	2.62
	2012	1245	934	311	3.00
	2013	1198	902	296	3.04
	2014	1134	857	277	3.09
	2015	1064	795	269	2.95
	Total	5897	4397	1500	2.93
Number of deaths caused by suicide within the total mortality					
	2011	1.2	1.7	0.7	2.43
	2012	1.2	1.8	0.6	3.00
	2013	1.2	1.8	0.6	3.00
	2014	1.1	1.68	0.55	2.96
	2015	1.0	1.5	0.5	3.00
Annual suicide rates (per 100,000)					
	2011	17.4	25.8	9.3	2.77
	2012	17.3	26.6	8.4	3.17
	2013	16.7	25.9	8.1	3.20
	2014	15.9	24.7	7.6	3.26
	2015	15.0	23.0	7.4	3.11

M – males; F – females.

Male/female ratio in suicide rate in Serbia continually increased from 2.77 in 2011. to 3.26 in 2014 and slowly decreased in 2015.

Annual suicide rate (per 100,000) within the period 2011–2015 showed constant decrease from 2011 to 2015 and in 2015, suicide rate was 15.0 (Figure 1).

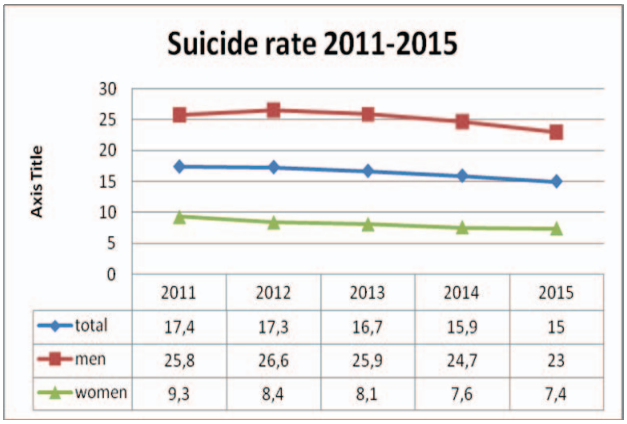

Fig. 1 – Annual suicide rates (per 100,000) in males and females in Serbia within the period 2011–2015.

Gender differences in socio-demographic data (marital status, educational level, employment, nationality and age range) of committed suicide in Serbia within the period 2011–2015 are shown in Table 2.

About half of the men who committed suicide (47.6%) were married, with secondary education (45%). About a third of women who have committed suicide were widowed (38.86%) or married (36.4%) with secondary education (31.33%). About a half of men (49.80%) and women (51.6%) who had committed suicide were retired.

According to the nationality, Serbs committed suicide the most frequently within observed period, then followed Hungarians and Croats ethnic minority. Male/female ratio in suicide was 2.92 in Serbs, 3.23 in Hungarians and 2.23 in Croats.

Male/female ratio in age differences varied from 2.5 in the youngest and the oldest group (younger than 15 years, older than 65 years) to 3.5 in the group of middle age (25 to 54). The highest ratio was in the group from 15–24 years of age.

The most common method of suicide both in males and females were hanging, strangulation and suffocation. Males 3.21 times more often committed suicide by hanging, strangulation and suffocation than females. The second most common method in males was by firearm and explosive material and by self-poisoning in females. Males 14.2 times more often committed suicide by firearm and explosive material than females, but females 1.17 times more often committed suicide by self-poisoning and by drowning and submersion than males (Table 3).

Table 2

Gender differences in marital status, educational level, employment, nationality and age range of committed suicide in Serbia within the period 2011–2015

Socio-demographic data	2011 M;F	2012 M;F	2013 M;F	2014 M;F	2015 M;F	Total M;F	M/F ratio
Marital status							
single	194;56	230;33	210;41	202;37	217;47	1053;214	4.92
married	468;130	453;115	427;119	413;104	348;78	2109;546	3.86
widowed	149;124	164;128	156;104	139;112	147;115	755;583	1.29
divorced	86;32	79;31	102;30	98;19	76;29	441;141	3.12
unknown	12;5	8;4	7;2	5;5	7;0	39;16	2.43
Educational level							
no school	21;39	11;33	21;20	19;27	63;56	135;175	0.77
uncompleted primary school	129;77	125;69	100;49	101;53	92;28	547;276	1.98
primary school	265;96	285;83	271;91	246;73	221;81	1288;424	3.03
secondary school	414;94	447;108	407;105	381;90	330;73	1979;470	4.21
high school	27;15	20;7	38;14	25;9	27;7	137;52	2.63
university	32;12	29;7	37;10	37;15	45;17	180;61	2.95
no data	21;14	17;4	28;7	48;10	17;7	131;42	3.12
Employment status							
employed	414;83	435;76	441;81	383;69	305;60	1978;369	5.36
unemployed	219;52	267;41	252;56	234;47	142;34	1114;230	4.84
retired	469;169	470;156	429;152	443;148	379;149	2190;774	2.82
dependents	25;95	29;79	32;63	31;60	31;60	148;357	0.41
Nationality							
Serbs	732;280	742;251	714;241	680;220	668;219	3536;1211	2.92
Hungarians	63;21	67;24	81;17	72;21	43;21	326;104	3.13
Croats	13;7	17;6	11;4	8;4	9;5	58;26	2.23
Age range (years)							
< 15	1;1	1;0	1;0	0;0	2;1	5;2	2.5
15–24	28;11	33;9	29;2	32;4	27;7	149;33	4.5
25–34	77;21	85;17	73;24	73;21	70;21	378;104	3.6
35–44	104;29	119;25	113;32	89;31	99;32	524;149	3.5
45–54	172;48	153;47	162;50	130;32	120;33	737;210	3.5
55–64	171;71	210;71	204;78	191;61	175;46	951;327	2.9
65–74	145;71	132;57	134;48	152;42	111;52	674;270	2.5
> 75	211;95	199;85	185;62	190;86	189;77	974;405	2.4

M – males; F – females.

Table 3

Gender differences in methods of committing suicide in Serbia within the period 2011–2015

Method of suicide	2011 M; F	2012 M; F	2013 M; F	2014 M; F	2015 M; F	Total M; F	M/F ratio
Self-poisoning by drugs and by exposure to liquid substances (X 60-65, X 68-69)	40;56	38;53	50;50	49;46	38;46	215;251	0.85
Hanging, strangulation and suffocation (X70)	603;215	618;191	562;172	558;162	501;145	2842;885	3.21
Drowning and submersion (X71)	19;23	14;23	20;24	24;23	20;20	97;113	0.85
Firearm and explosive material (X72-X75)	174;17	173;8	173;10	162;15	152;7	834;57	14.63

M – males; F – females.

Discussion

According to the data obtained from the Statistical Office of the Republic of Serbia (Department for Demography) within the period 2011–2015, about 1,200 people committed suicide on the average per year. In the observed five-year period (2011–2015), 776 suicides were committed less than in the previous five -year period (2006–2010) and recorded a reduction in the total number of suicides in Serbia by 11.62% [9]. A decrease of the total number of committed suicide is a result of yearly trend of permanent decreasing the total number of inhabitans in Serbia in the observed five-year

period. According to the data obtained from the Statistical Office of the Republic of Serbia (Department for Demography), the total number of inhabitans decreased in the period from 2011 to 2015 for 138,716 (1.97%) inhabitants, namely, from 7,234,099 in 2011 to 7,095,383 in 2015.

The trend of increasing number of suicides among male population comparing to female one, which began in 2006 continued in the following five-year period (2011–2015). The increase from 71.9% to 74.56% share of the male population in the total number of suicides in the observed five-year period was recorded. In that way, the male/female ratio increased from 2.56 on average (2006–2010) [9] to 2.93 in the observed period (2011–2015).

The male/female ratio in suicide number in the total mortality in Serbia, including Central Serbia and Vojvodina, continually increased from 2.52 times in previous period (2006–2010) [9] to 2.88 in the observed period (2011–2015).

In the observed period, the suicide rate decreased constantly from 17.4 in 2011 to 15.0 in 2015 and continued the tendency of suicide rate decrease in the last decade permanently from 19.43 (2006) [9] to 15.0 (2015).

As for socio-demographic data, differences were not observed in the socio-demographic characteristics of suicide committers according to the previous five-year period (2006–2010) [9]. The trend that suicide was most often committed by married males and females with completed high school, retired, the Serbs, which began in 2006 continued in the following five-year period.

Serbs most often committed suicide in Serbia, and it is expected, because the Serbian nationality is the majority nationality (83.3%) in Serbia. In accordance with the total Serbian population, the Serbs, both males (80.47%) and females (80.71 %), equally committed suicide, but regarding gender, males committed suicide about three times more often than females.

On the other side, in ethnic minority some differences with regard to gender are noticed. There are discrepancies in suicide rates between national minority, primarily in Hungarian national minority which makes 5.5% of committed suicide, according to 3.5% of Hungarian inhabitants in Serbia. Inversely, Croatian national minority makes 0.98% of committed suicide according to 0.8% of Croatian inhabitants in Serbia. Those differences are results of cultural factors that mediate suicide rates in minority ethnic groups. Suicide rates were higher in areas where ethnic minority groups were in lower concentration [11]. Comparing with the other regions of Serbia, Hungarian minority ethnic group could be considered the highest risk group, because of their constantly the highest suicide rate over last period [5]. Hungarian and Croats males more often committed suicide than females in the five-year observed period.

As for the age, there were two age groups at highest risk to commit suicide. Firstly, there were the adolescents, the people younger than 24 and secondly there were the elderly older than 65. It is well known that suicide is the third leading cause of death for 15 to 24-year olds, and that suicide among young people is on the rise and makes the group with the highest risk in many countries in the world [1–3]. Our investigation is in accordance with those investigations, and confirmed that male/female suicide ratio was the highest among adolescents and decreased with age. In Serbia, male adolescents more often committed suicide than female adolescents in the observed five-year period (2011–2015).

About a quarter of suicides in Serbia was pcommitted by individuals older than 75 years. Our investigation is in accordance with some investigations in other countries and confirmed that traditionally suicide rate is the highest among the elderly [1, 2].

On the other side, our results are not in accordance with the data in many investigations where individual suicide risk factors are varied, but in many countries suicide rates are highest in men, those who are divorced or separated, the unemployed and who are socially isolated [12–14].

It is shown that marital status was not a protective factor for suicide in Serbian population. Although loneliness is an important suicide risk factor it is not confirmed in our investigation [2]. Serbia in late 20th century and early 21st century faced a significant number of widowed persons and their participation in total population. The population of Serbia (excluding Kosovo) is extremely old. In Serbia, there are 1,250,316 people who are older than 65 years and among them, there are more women. Every second person is older than 70 years, and at the same time there are more widows (57%) than widowers (43%) [14].

It is well-known that loneliness, often manifested by intense feelings of emptiness and abandonment, can lead to depression and suicide. Social isolation is often associated with major life events, such as a death of a partner, divorce, unemployment or disability. Such events are usually accompanied by a loss of social ties. The relationship with the family and relatives changed, contacts are mostly focused on acquiring help. Seniors are more often exposed to such losses than young people. Reaching out to those who have become disconnected from others and offering them support and friendship may be a life-saving act [15, 16].

According to data obtained from the Statistical Office of the Republic of Serbia (Department for Demography), elderly people make 17% population in Serbia. More and more lonely pensioners are living without any help from their family and social institutions [14]. During the difficult economic situation, the large percentage of unemployed in the category of the working age population and economic stagnation, the elderly are faced with insufficient resources that could enable them to secure economic life and institutional care of them. These findings show a consistent trend at the individual level indicating that poverty, particularly in the form of worse economic status, diminished wealth, and retirement is associated with suicidal ideations and behaviors [17–19].

The most common cause for elderly suicide is untreated depression accompanied with health problems [17–19]. Social losses such as a death of a spouse, a loss of work roles and work sites provoke a desire to die caused by a lost sense of social belonging and the perception that life is not worth living [18]. Existence of chronic illness, physical impairment, unrelieved pain, sensory deficit and cognitive impoverishment

accompanied with depression, could be a trigger for suicide thoughts [17]. This implies that depression and factors causing depression might be more important suicide risk factors than social isolation.

The most common method of suicide both in males (64.63%) and females (59.00%) was hanging, strangulation and suffocation. The second most common method in males was by firearm and explosive material (18.96%) and by self-poisoning in females (16.73%). Differences in suicidal behavior could be explained by cultural factors. Males choose more efficient and lethal methods of suicide than women. On the other hand, females unlike males, more often commit suicide by poisoning either with solid or liquid substances, or drowning and submersion. Our results coincided with the results from the literature [2].

Based on the results of the present study, some initial ideas for potential intervention strategies can be proposed.

In our investigation, it is confirmed that there are two risk groups of suicide committers. First, there are adolescents, whose suicide was, like in many other countries, on the rise and the second, there are elderly male population, who the most often committed suicide in the observed five-year period (2011–2015) in Serbia.

In suicide prevention, all persons in suicidal risk should seek a professional help from a physician or a qualified mental health professionals. Doctors should recognize the medical and psychiatric needs of the suicidal persons and work closely with their families and health care professionals involved in the management and follow-up of those who are at a risk to commit suicide. Multidisciplinary treatment teams of mental health professionals for depression and anxiety treatment, including psychiatrist and other professionals such as psychologist, social worker and occupational therapist are recommended [2].

Some investigations confirm that, unfortunately, males, especially elderly, are less ready to refer to a doctor for help because of problems related to their mental health. With the aim to easier detect and treat them for psychiatric disorders and to reduce suicide risks, health education should have as a goal an improvement of motivation, particularly in elderly male population, to be ready to ask for doctor's help [20, 21]. Continuous education and training of general practitioners (GPs) and other health care staff are needed in order to gradually and steadily improve depressive treatment as effective in the prevention of suicide, too. With support from their family and appropriate treatment, suicidal persons can heal and return to a healthier path of development.

On the other side, it is necesery to establish some new forms of social protection of the elderly. This situation entails the need to undertake a series of social measures of care for elderly people. There are, among other things, gerontological and geriatric centers, opening counseling and services to help the elderly, the construction of special housing and homes for the elderly. It is necessery to think about their physical needs, including its psychological aspects. The elderly should be allowed to have guarantees that life in the institutions of social protection have adequate support and respect, and to participate in decisions concerning living conditions in the institution ensuring high quality of life. Financial support by the goverment is necessary. Intergenerational solidarity and the development of prevention measures and procedures to mitigate adverse environmental impacts of variety non-institutional forms of social protection and inclusion of elderly persons in society are also necessary [19, 20]. The elderly should be allowed to remain active members of society, to lead a decent life and play an active part in public, social and cultural life, to choose freely their lifestyle and to lead independent lives in their familiar environment.

The main limitation of the present study is that in our investigation we used only data from Statistical Office of the Republic of Serbia (Department for Demography). On the other hand, psychological autopsy could give more precise information, using hetero anamnesis data from a suicide's relatives, family members and friends, and medical data primarily in the field of mental health and somatic diseases of a suicide. Investigating a suicide, for example, by psychological autopsy is considered to be an effective method for clarifying the characteristics of suicide. So, psychological autopsy could give explanation of the different suicide risk factors, especially differences in sociodemographic characteristics (marital status, unemployment/retired status etc).

Add to these, there is a gap for explanation of a suicide risk factors in some ethnic minority groups and the skewed age distribution of ethnic minorities towards different age groups.

The present findings enrich the discussion of the spectrum of reasons for gender differences in lethality of suicidal behaviour and development of gender specific strategies of suicide prevention, consistent with our previous research of the same topic.

The present study provides initial data for researchers in the field of suicidology and should be further investigated.

Conclusion

Suicide Prevention Programme in Serbia should be primarily oriented towards two age groups at the highest risk to commit suicide, first, towards the adolescents whose suicide was on the rise and second, towards the elderly population, less ready to refer to the doctor for help because of problems related to their mental health.

Doctors should become familiar with community, state and national resources that are concerned with adolescents and elderly suicides, mental health institutions, family and crisis intervention centers, including social and financial support.

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