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**The impact of COVID-19 pandemic on suicide attempts
in the Republic of Serbia**

Утицај пандемије КОВИД-19 на покушаје самоубиства
у Републици Србији

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The impact of COVID-19 pandemic on suicide attempts in the Republic of Serbia

Утицај пандемије КОВИД-19 на покушаје самоубиства у Републици Србији

SUMMARY

Introduction/Objective Previous studies suggest that number of suicides and suicide attempts will increase due the COVID-19 pandemic. The aim of this study was to investigate the impact of the COVID-19 pandemic on the frequency and characteristics of suicide attempts in the Republic of Serbia.

Methods The study observed two periods: the period from March to August 2020 (the COVID period) and the same period of the previous year (the non-COVID period). The observation during the mentioned periods encompassed patients who were examined at the Dr. Laza Lazarević Clinic for Mental Disorders in Belgrade due to suicide attempts (1987 persons during COVID period and 2300 persons during non-COVID period).

Results Concerning suicide attempts, a statistically significant difference between the observed periods was registered in respect of total number of monthly clinical examinations, monthly distribution of suicide attempts, patients' gender and age, mode of suicide attempt and the diagnostic category. Binary logistic regression determined that statistically significant factors that can influence the suicide attempt were year, months, patients' gender and age, and diagnostic category.

Conclusion COVID-19 pandemic creates the increased exposure of the people to suicide risk factors, which points to the significance of consistent monitoring of mental health during the COVID-19 pandemic and thereafter.

Keywords: suicide; suicide attempts; COVID-19; pandemic

САЖЕТАК

Увод/Циљ Претходна истраживања указују да ће се услед КОВИД-19 пандемије број самоубиства и покушаја самоубиства повећати. Циљ овог истраживања је био да се испита утицај КОВИД-19 пандемије на учесталост и карактеристике покушаја самоубиства у Републици Србији.

Метод Истраживање је укључило два временска периода: период од марта до априла 2020. године (КОВИД период) и исти период током године која је претходила (период без КОВИД-а). Поменути временски периоди су се односили на пацијенте који су због покушаја самоубиства били прегледани у Клиници за психијатријске болести „Др Лаза Лазаревић“ у Београду (1987 особа током КОВИД периода и 2300 особа током периода без КОВИД-а).

Резултати Статистички значајна разлика између два посматрана временска периода забележена је у погледу укупног броја прегледа посматрано по месецима, дистрибуције покушаја самоубиства, пола и старосног доба пацијената, начина покушаја самоубиства и дијагностичке категорије. Бинарном логистичком регресијом утврђено је да су фактори који могу статистички значајно утицати на покушаје самоубиства били година, месец, пол и старосно доба пацијената, као и дијагностичка категорија.

Закључак: КОВИД-19 пандемија ствара услове за повећану изложеност људи факторима ризика са самоубиство, што потенцира значај континуираног праћења менталног здравља људи у току КОВИД-19 пандемије и после ње.

Кључне речи: самоубиство; покушај самоубиства; пандемија КОВИД-19

INTRODUCTION

In January 2020, World Health Organization (WHO) declared the COVID-19 outbreak to be a public health emergency of international concern, with a high risk of disease spreading to all countries around the world¹. In March 2020, WHO made an assessment that COVID-19 should be characterized as a pandemic disease [1]. The clinical spectrum of COVID-19 varies from asymptomatic forms to clinical conditions characterized by

respiratory failure that necessitate mechanical ventilation and support in an intensive care unit (ICU), as well as life threatening sepsis, septic shock, and multiple organ dysfunctions syndrome (MODS) [2]. Therefore, medical workers and public health professionals are focused on treating individuals with COVID-19, as well as preventing the spread of corona virus in the general population, but paying less attention to the psychiatric consequences of the COVID-19 crisis [3].

Previous studies suggest that number of suicides and suicide attempts may increase due the COVID-19 pandemic [3,4]. Global responses such as social isolation and psychical distance have heightened depression, anxiety, loneliness, anger, irritability, relationship conflicts, post-traumatic stress disorder (PTSD), economic uncertainty, fears and increased use of psychoactive substances [5]. All of these are previously identified as risk factors for suicide behavior, especially in vulnerable categories (such as psychiatric patients), and population that was not considered as a risk for suicide prior to the COVID-19 pandemic [6].

Thought its specialized organizational unit (Psychiatric Emergency Department), the Dr. Laza Lazarević Clinic for Mental Disorders is the only one psychiatric institution in Belgrade (having about 2,500,000 inhabitants) that takes care of suicide attempts, as well as other urgent psychiatric conditions.

Considering the data from current literature and the lack of data for the territory of the Republic of Serbia, the aim of this study was to investigate the impact of the COVID-19 pandemic on the frequency and characteristics of suicide attempts in the Republic of Serbia.

METHODS

This is a retrospective study that includes two periods: the period from March to August 2020 (the COVID-period) and the same period of the previous year (the non-COVID period). The mentioned two periods referred to the patients who were examined in the Clinic for Mental Disorders “Dr. Laza Lazarevic“ in Belgrade for suicide attempts. The approval for the study was obtained from the Ethic Committee of the Clinic for Mental Disorders “Dr.

Laza Lazarevic” in Belgrade, Republic of Serbia (No. 7108/2020), and the study was conducted in accordance with the Declaration of Helsinki.

At the Psychiatric Emergency Department of the Clinic, the medical history of all the examined patients in the observed periods were searched in order to find suicide attempts, which was the only inclusion criterion. During the non-COVID period, 2,300 persons were examined in the Psychiatric Emergency Department, 139 (6.04%) of which were suicide attempts. However, during the COVID period, 1,987 persons were examined in the same department, 159 (8.00%) of which were suicide attempts. Patients’ data noted from medical history were: gender, age, residence, method of attempting suicide (self-poisoning, self-injury by a sharp object or a weapon, hanging, jump from high, and self-ignition), and psychiatric diagnosis.

Descriptive statistical methods, methods for testing statistical hypotheses and regression analysis were used to analyze the data. Statistical differences were tested at a significance level $p \leq 0.05$. All statistical analyses were conducted using Statistical Package for the Social Sciences (SPSS) 22.0 (SPSS, Inc., Chicago, IL, USA).

RESULTS

During the non-COVID period, the most clinical examinations were done during April (17.4%) and July (20.1%) - Figure 1. During the COVID, the most of clinical examinations were done during June (18.5%) and August (18.4%) - Figure 1. A statistical significance between these two observed periods was registered in respect the number of total clinical examinations distributed by months ($\chi^2 = 23.207$; $p = 0.000$).

During the non-COVID period, the most suicide attempts were noted in March, July and August (Table 1). During the COVID period, the highest percent of suicide attempts was recorded during May and August (Table 1). A statistically significant difference was noticed in the distribution of suicide attempts during the observation periods (Table 1). In the non-COVID period, the largest number of patients who attempted suicide were females (64.0%). All patients were between 18 and 86 years of age, and most of them were living in Belgrade.

Almost 60% of them attempted suicide by self-poisoning, and 35.3% of them belonged to the diagnostic category F20 to F29 (Table 1). On the other hand, in the COVID period, most of the persons who tried to commit suicide were males, aged between 18 and 92, living in Belgrade (Table 1). Like in the non-COVID period, during the COVID period, over 50% of patients attempted suicide by self-poisoning and belonged to the diagnostic category F20 to F29 (Table 1). A statistically significant difference between these two observed periods was noticed for month, gender, method of suicide attempt and diagnostic category (Table 1).

During the COVID-period, a statistical significance between genders in terms of month, residence, method of suicide attempts and diagnostic category wasn't registered (Table 2).

Binary logistic regression determined that statistically significant factors influencing suicide attempt were year (COVID and non-COVID period), month, gender, age of patients and their diagnostic category (Table 3).

DISCUSSION

Globally, the data and the research connected with the topic of suicide during the current pandemic are missing. The reports on the suicide rate and the successful suicide attempts are generally rare in real time, that is, there is a time delay in their publishing, which, in the current situation, is extremely important due to the need for timely response of the society and the health system to this challenge.

Our study, performed in the observed COVID period, has established that the final absolute number of patients who have attempted suicide is higher in comparison to the non-COVID period. The majority of published studies with the topic of suicide during COVID-19 pandemic are either study cases or cross-sectional surveys on non-representative samples, which haven't provided us with the clear data in the change of suicide rate [7]. The only study that compared the period of the first four weeks of the pandemic with the same time period previous year, and whose subjects were the patients reporting to the urgent psychiatric department, has actually shown the decrease in the number of patients attempting suicide [8]. The research performed on the pregnant women in China has shown the increased level of

suicidal thoughts during the pandemic in comparison to the thoughts of the pregnant women in the same stage of pregnancy, just prior to COVID-19 pandemic [9]. Keeping in mind that the pandemic is still ongoing and that the performed researches, including ours, have observed only the first period of the pandemic, it can be expected, based on the study results from the previous pandemics that the suicide rate will increase. The epidemic of Spanish flu was connected to the increased death toll caused by suicide, and it has also been established that the reductions in social interaction and fears caused by epidemic were the factors that influenced the increase of this rate [10]. The study by Yip and al. also showed a significant increase in the suicide rate in the people over the age of 65, during the SARS epidemic in 2003 [11]. That research showed that the increase in suicide rate is connected with the fear of getting infected, fears that the person might become a burden to the family, anxiety, social isolation and distress. Many adverse risk factors existing during the periods of these epidemics exist during the COVID-19 breakout, as well. However, there are significant differences between COVID-19 and the previous pandemics, especially when we compare their virulence, speed of the disease spreading, death rate and the level of socio-economic influence, which, to some extent, limits our ability to predict the influence of COVID-19 pandemic on mental health and suicide rate [12].

The results of our research show that, in the observed COVID period of time, males have attempted suicide more often, that they were on average 41 years old, and that they most often attempted suicide was by self-poisoning. Comparing COVID and non-COVID period, it can be noticed that in the COVID period, although in both periods the most common way of suicide attempt was self-poisoning, the number of people who tried suicide in this way decreased, and the number who tried suicide by self-injury increased. The researches related to the period of COVID-19 pandemic, even being performed on a small number of test subjects, or represented as case studies, also show that men attempted and committed suicide more often [8,13]. The most common method of suicide, according to the available data, was either by jumping or hanging [14-16]. According to the results of the available researches, males who are under pressure of meeting traditional expectations, hide their feelings, don't take too much care of themselves, postpone looking for medical help when they need it, are unemployed or have lost their job, have problems in emotional connections, or use psychoactive substances are the ones who are facing the higher risk [17, 18].

According to our research, even though the people who have attempted suicide in the COVID period have mostly suffered from psychosis belonging to schizophrenia spectrum, we have noticed a significant reduction in the percentage in the number of these patients in the general pool of patients, in comparison to non COVID period. Our study has shown that, during the COVID period, there has been an increase in the number of patients suffering from organic disorders, anxiety and stress related disorders, substance-related disorders, as well as personality and behavior disorders that have attempted suicide. Organic disorders usually appear in people belonging to older age group, who are, according to the results of the previous researches, under a greater risk of suicide during the epidemic, both due to the increased prevalence of already known risk factors connected to suicide, and to the imposed measures targeted at the control of the spread of the virus, which increase social isolation and psychological vulnerability [19]. More researches conducted during the period of the pandemic show the increase in substance-related disorders, as well as the fact that people who had already been the consumers of psychoactive substances have increased the consumption of those substances during the period of the pandemic [20,21]. According to a study by Ferrando et al. dealing with psychiatric emergencies during the height of the COVID-19 pandemic in the suburban New York City area, the most common reason for reporting to the emergency psychiatric service was due to depression and suicidal ideation, as in pre-COVID period. In the same study it was present a significant increase in the number of people with anxiety disorders, compared to the pre-COVID period, as in our study [22]. No study, to our knowledge, has dealt, in particular, with the diagnostic categories of patients attempting suicide during COVID-19 pandemic. According to our study, comparing the data obtained in relation to gender during the COVID period, it was noted that women who attempted suicide were older than men and more often used self-poisoning as a method of suicide. Comparing the diagnostic categories, women who attempted suicide had an equal prevalence of psychotic and affective disorders, while men were more likely to suffer from psychosis than from affective disorders.

The factors that may increase suicidal risk during the pandemic, especially in the vulnerable groups (such as people with a previous history of a psychiatric disorder, people over the age of 65, people who have previously attempted suicide, health care professionals working with COVID-19 infected patients, COVID-19 infected people, people recovering from COVID-19, as well as people whose family member or a friend has died from COVID-19) are social isolation, anxiety, fear of getting infected, insecurity, chronic stress, economic

consequences, and the reduced availability of doctors working in non-COVID system [3, 12, 23].

Social isolation and quarantine are important measures in the fight against spreading of COVID-19 pandemic, but they also have negative effects on the psychic health of humans and are connected to the appearance of depression, generalized anxiety disorder, suicidal thoughts and behavior, especially in vulnerable categories, since social interaction is an important factor of both emotional and social stability [3, 23].

Anxiety and the fear of getting infected are connected to the fear of the unknown, but could also be induced by the news and information about COVID-19 pandemic to which the people are exposed through all types of media [12]. The worries and concerns might lead to the development of anxiety disorders, depression and insomnia [24]. Li et al. have, in their study, analyzed on-line posts of 17,865 users of Chinese social networks, comparing the immediate prior to COVID-19 and COVID periods, and have noted the increase in negative emotions, such as anxiety and depression during the period of pandemic [25]. Huang et al. have performed a web-based study on 7,236 subjects in China during the period of the COVID-19 pandemic, which showed that more than one third of the subjects met the criteria for generalized anxiety disorder, while the depression prevalence was 20.1%, and insomnia prevalence was 18.2% [26]. Insomnia also represents an isolated factor of suicidal risk [27].

The measures aimed at combating the epidemic have left significant consequences on the world economy and have caused the global economic recession [23]. Millions of people worldwide have lost their jobs, while many others fear the loss of their jobs, experience material insecurity and are afraid for their financial future. Unemployment and the fear of losing a job represent important risk factors for the development of depressive symptoms [3]. Study by Nordt et al. has found that the suicidal risk connected to unemployment was increased by 20–30% [28]. Kawohl et al. have estimated in their study that owing to the increase in the worldwide unemployment rate due to COVID-19 pandemic, the number of suicides will be increased by between 2135 and 9570 cases yearly [29].

Many patients are afraid of the infection and avoid coming to check-ups, which in psychiatric patients, as a vulnerable category, might lead to their own decision to stop taking

the therapy, and it might also lead to disorder relapse, the appearance of depressive symptoms and suicidal thoughts and behavior [30].

CONCLUSION

Suicide is possible to be prevented in many cases, which is why it is extremely important to formulate measures and strategies for its prevention. The early detection of the people under the increased risk of suicide, people expressing suicidal behavior or verbalizing suicidal thoughts is, along with timely psycho-social and pharmaco-therapeutic interventions, the imperative in the prevention of a tragic outcome.

Even though there are still no researches which clearly show the increase in the suicide rate during the current pandemic, the fact that is supported by the results of our research as well, COVID-19 outbreak has been connected to the increased exposure of people to the risk factors for suicide, which tells us that it is important to continue following the mental health influenced by COVID-19 pandemic. The repeated cross-sectional and longitudinal researches of the influence of COVID-19 pandemic on mental health and suicide rate are important because of the collection of real time data, as well as the following of patients' needs, so that the available resources could be targeted at those parts of the system used for the protection of mental health, which suffer the highest pressure.

Conflict of interest: None declared.

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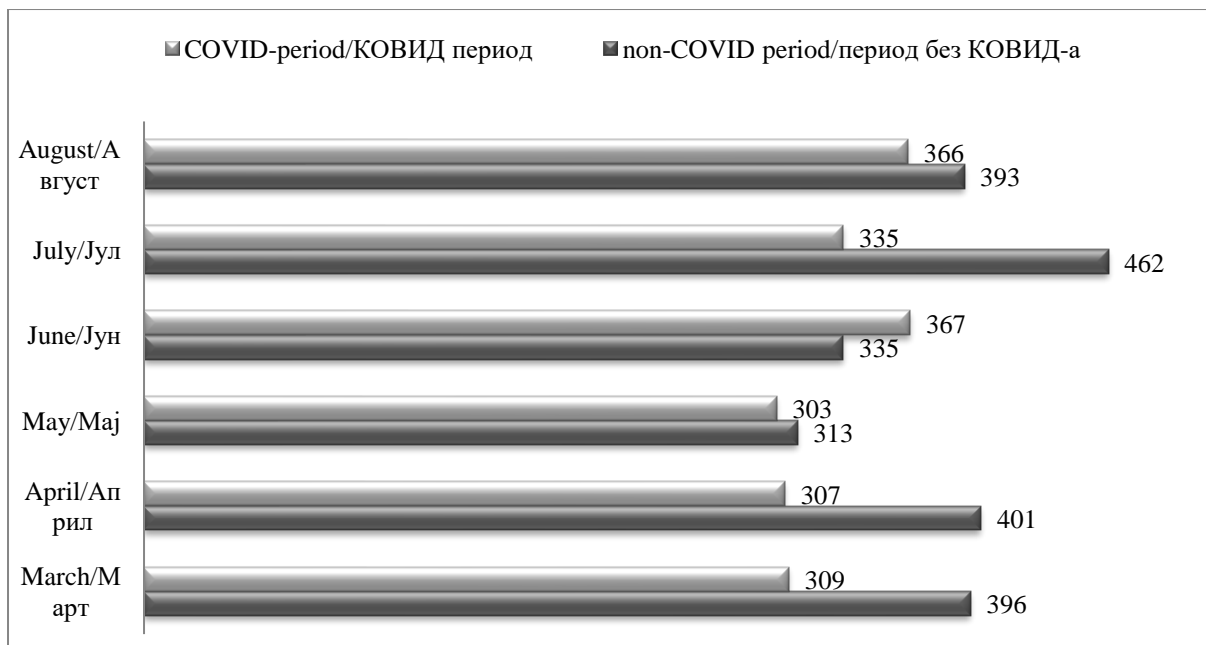


Figure 1. Total number of clinical examinations done at the Psychiatric Emergency Department of the Clinic in the two observed periods

Table 1. Data about persons with attempted suicide

Characteristics	non-COVID period n (%)	COVID period/ n (%)	χ^2/ U	p
Month				
march	28 (20.1)	24 (15.1)	16.927	0.005*
april	26 (18.7)	26 (16.4)		
may	13 (9.4)	40 (25.2)		
june	10 (7.2)	16 (10.1)		
july	28 (20.1)	17 (10.7)		
august	34 (24.5)	36 (22.6)		
Gender				
male/	50 (36)	82 (51.6)	7.316	0.007*
female/	89 (64)	77 (48.4)		
Age (years)				
X \pm SD; Med (min–max)	41.6 \pm 14.6; 40 (18–86)	44.6 \pm 17.3; 41 (18–92)	-1.281	0.200
Residence				
Belgrade region	118 (84.9)	144 (90.6)	2.248	0.134
other regions in Serbia	21 (15.1)	15 (9.4)		
Method of attempting suicide				
self-poising	83 (59.7)	80 (50.3)	4.002	0.135
self-injury (sharp object, weapon, etc.)	24 (17.3)	42 (26.4)		
other (hanging, jumping from hight, ignition)	32 (23.0)	37 (23.3)		
Diagnostic category (ICD-10)				
F20-F29	49 (35.3)	37 (23.3)	20.306	0.000*
F30-F39	43 (30.9)	27 (17.0)		
other diagnosis	47 (33.8)	95 (59.7)		

U – Mann–Whitney test;
*statistically significant

Table 2. Patients attempting suicide during the COVID-period, distributed by gender

Characteristics	Males n (%)	Females n (%)	χ^2/ U	p
Month				
march	16 (19.5)	8 (10.4)		
april	10 (12.2)	16 (20.8)		
may	25 (30.5)	15 (19.5)		
june	6 (7.3)	10 (13.0)	7.931	0.160
july	7 (8.5)	10 (13.0)		
august	18 (22.0)	18 (23.4)		
Age (years)				
X \pm SD; Med (min–max)	43.7 \pm 17.5; 41 (19-92)	45.5 \pm 17.2; 44 (18-87)	-1.281	0.200
Residence				
Belgrade region	75 (91.5)	70 (90.9)	0.015	0.902
other regions in Serbia	7 (8.5)	7 (9.1)		
Method of attempting suicide				
self-poising	36(43.9)	44 (57.1)		
self-injury (sharp object, weapon, etc.)	25 (30.5)	18 (22.1)	2.845	0.241
other (hanging, jumping from hight, ignition)	21 (25.6)	16 (20.8)		
Diagnostic category (ICD-10)				
F20-F29	20 (24.4)	17 (22.1)		
F30-F39	10 (12.2)	17 (22.1)	2.756	0.252
other diagnosis	52 (63.4)	43 (55.8)		

U – Mann-Whitney test;
*statistically significant

Table 3. Binary logistic model concerning suicide attempts /

Independent variables	#CI (95%)	p
Year	6.234	0.013*
Month	24.319	0.001*
Gender	5.772	0.016*
Age	-0.009	0.012*
Residence	0.642	0.423
Diagnostic category	76.270	0.000*

*Statistically significant

Paper accepted