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CHILD AND ADOLESCENT PSYCHIATRY – CHANGE IN THE DYNAMICS OF TREATMENT CAUSED BY THE CORONAVIRUS PANDEMIC

DEČJA I ADOLESCENTNA PSIHIJATRIJA – PROMENA DINAMIKE LEČENJA USLOVLJENA PANDEMIJOM KORONAVIRUSA

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Summary

Introduction. The coronavirus pandemic caused a restructuring of mental health services, marked by a decrease of hospital work capacity and increased reliance on telemedicine. Children and adolescents are a particularly vulnerable group that has been affected by the newly arisen corona virus-19 pandemic. The objective was to evaluate the correlation between the coronavirus pandemic and alternations in hospitalization rates, seasonal distribution, and sociodemographic characteristics of patients admitted to the Department of Child and Adolescent Psychiatry. **Material and Methods.** The study was conducted at the Psychiatry Clinic of the Department of Child and Adolescent Psychiatry at the University Clinical Center of Vojvodina in the period from March 6, 2017 to March 5, 2021. The sample comprised 1114 inpatients and individuals undergoing partial hospitalizations, diagnosed with mental disorders classified according to the International Classification of Diseases. Participants were categorized into two groups: one treated before the onset of the pandemic (March 2017-March 2020) and another treated during the pandemic (March 2020-March 2021). Statistical analysis was performed on the collected data, with the results presented in tables and graphs. **Results.** During the pandemic, an overall reduction in admissions (-32.34%) was observed, accompanied by a noticeable decrease in admissions during the spring compared to the pre-coronavirus period (p=0.011). The most prevalent diagnoses were F9 and F4, respectively (p<0.01). A higher number of hospitalizations were noted in middle adolescence (p<0.001), among females (p=0.006) and those residing in urban areas (p=0.009). **Conclusion.** The coronavirus pandemic led to alternations in the functioning and dynamics on Department of Child and Adolescent Psychiatry. The sociodemographic characteristics of the youth changed during the pandemic.

Key words: COVID-19; Pandemics; Mental Disorders; Hospitalization; Sociodemographic Factors; Risk Factors; Child; Adolescent

Sažetak

Uvod. Pandemija koronavirusom je uslovila reorganizaciju psihijatrijske zdravstvene zaštite u vidu smanjenog kapaciteta rada klinika i sve veće upotrebe telemedicine. Deca i adolescenti predstavljaju naročito vulnerabilnu grupu, koju je pogodila novonastala pandemija koronavirusom. Cilj je bio ispitivanje povezanosti pandemije koronavirusa sa promenom učestalosti hospitalizacija, sezonskom distribucijom i sociodemografskim karakteristikama pacijenata na Odeljenju za dečju i adolescentnu psihijatriju. **Materijal i metode.** Studija je sprovedena na Klinici za psihijatriju, na Odeljenju za dečju i adolescentnu psihijatriju Univerzitetskog kliničkog centra Vojvodine, tokom perioda od 6. marta 2017. godine do 5. marta 2021. godine. Uključila je 1.114 kompletnih i parcijalnih hospitalizacija pod ispisnim dijagnozama mentalnih poremećaja po Međunarodnoj klasifikaciji bolesti. Ispitanici su podeljeni u dve grupe: grupa bolesnika lečenih pre pandemije (mart 2017−mart 2020. godine) i grupa bolesnika lečenih tokom pandemije (mart 2020−mart 2021. godine). Podaci su statistički obrađeni, a rezultati predstavljeni tabelarno i grafički. **Rezultati.** Tokom pandemije je zabeležen ukupan pad broja hospitalizacija (-32,34%) i vidljiv pad tokom proleća u odnosu na period pre pandemije (p = 0,011). Najzastupljenije dijagnoze su bile iz grupe F9 i F4, redom (p < 0,01). Više hospitalizacija je zabeleženo u drugoj fazi adolescencije (p < 0,001), kod ženskog pola (p = 0,006) i ispitanika iz urbane sredine (p = 0,009). **Zaključak.** Pandemija koronavirusom je dovela do promene u radu i dinamici na Odeljenju za dečju i adolescentnu psihijatriju. Tokom pandemije je zabeležena promena sociodemografskih karakteristika mladih.

Ključne reči: COVID-19; pandemija; mentalni poremećaji; hospitalizacija; sociodemografski faktori; faktori rizika; dete; adolescent

Introduction

Since the onset of the COVID-19 pandemic, all segments of human life experienced significant changes.

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Abbreviations
UCCV – University Clinical Center of Vojvodina
PTSD – Post-traumatic stress disorder

The organization of work within healthcare institutions adapted to the epidemic situation. Consequently, the work dynamics at the Psychiatry Clinic of the University Clinical Center of Vojvodina (UCCV) underwent changes in line with recommendations from the relevant authorities. These adjustments impacted, among other things, the reduced contact of children and adolescents with their designated psychiatrist through outpatient treatment and partial hospitalization.

Being in the phase of psychological development, children and adolescents are more sensitive to external influences than adults. Thus, it was assumed that the pandemic would negatively affect them [1–4]. The declaration of a state of emergency and the closure of schools/colleges brought about significant changes for this age group. Factors such as physical distance and isolation from peers and teachers, discontinuation of classes and extracurricular activities, separation from family members, concerns about the infection of loved ones, and the fear of death are identified as major adverse influences on the mental health of children and adolescents during the pandemic. Post-traumatic stress disorder (PTSD) may have neuroanatomical and neurofunctional consequences, and its occurrence in a certain number of young people triggered by the pandemic necessitates further investigation [1]. Given that the defense mechanisms of children and adolescents are often embedded in daily activities, the interruption of such routines during the state of emergency and curfew potentially led to relapses of psychiatric disorders that were previously under control [1, 3, 4]. The role of the family emerged as a crucial factor in the mental health of children and adolescents during this period. While increased time spent with the family could foster closer relationships, such effects have not yet been conclusively confirmed. On the other hand, the increased amount of time spent at home with the family heightened instances of violence in certain cases, as supported by some studies [1, 5].

Telemedicine

Experts in the field of mental health promptly drew attention to the need for greater psychological and psychiatric support during this period, leading to additional emphasis on telemedicine. On March 16, 2020, the Republic of Serbia introduced helplines to provide psychosocial support, aiming to safeguard mental health during the pandemic. A dedicated helpline named "How are you?" was established for young people and parents of children under 18, intending to offer essential information regarding the pandemic and dispense advice on managing fear and anxiety [6]. Telemedicine, including tele-child-psychiatry, also experienced a surge in other countries in order to preserve mental health [5, 7, 8]. Throughout the state of emergency, the UCCV Psychiatry Clinic facilitated telephone consultation with psychiatrists, psychologists and social workers providing their services to the broader population.

The objective of this paper was to explore the correlation between the coronavirus pandemic and alternations in the frequency, seasonal distribution and representation of various psychiatric hospitalizations among children and adolescents. The sociodemographic characteristics of the hospitalized patients were also examined.

Material and Methods

All patients who were treated at the Psychiatry Clinic of the Department of Child and Adolescent Psychiatry at the UCCV, during the four-year period from March 6, 2017 to March 5, 2021, were included in the study. Clinical data of the patients including gender, age, place of residence, number of hospitalizations, seasonal distribution, and clinical diagnoses, were taken from the electronic medical records through the clinical information system of the UCCV Psychiatry Clinic. Approval for the research was obtained from the Director of the Psychiatry Clinic and the Ethics Committee of the University Clinical Center of Vojvodina (approval number and date: 00-231, December 29, 2021). Inclusion criteria for patients in the study were as follows:

1. Complete or partial hospitalization at the UCCV Psychiatry Clinic, Department of Child and Adolescent Psychiatry, from March 6, 2017 to March 5, 2021.
2. Hospitalization with documented diagnoses of mental disorders according to the International Classification of Diseases (ICD-10) [9].
3. Patients must not be older than 24 years.

For further statistical data analysis, the respondents were categorized into two groups: patients treated before the pandemic (March 6, 2017 - March 5, 2020) and patients treated during the pandemic (March 6, 2020 - March 5, 2021).

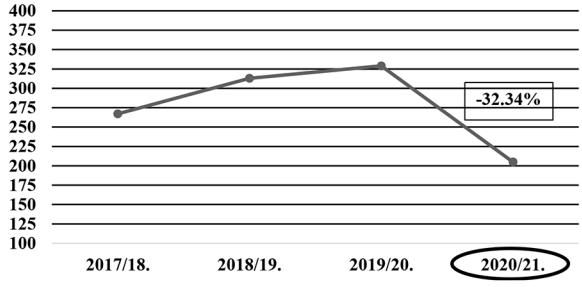
In terms of seasonal distribution, hospitalizations were categorized into four groups based on seasons: spring (March 20 – June 20), summer (June 21 – September 21), fall (September 22 – December 20), winter (December 21 – March 19).

In terms of age, the respondents were divided into 4 groups: children (0-9 years), early adolescence (10-14 years), middle adolescence (15-17 years), and late adolescence (18-24 years).

The respondents were also classified based on their place of residence into those from urban (≥25,000 inhabitants) and the ones from rural areas (<25,000 inhabitants).

Diagnoses of mental disorders were grouped based on the International Classification of Diseases – ICD-10: F0-F9.

Numerical characteristics are presented through mean values (arithmetic mean), minimum and maximum values, and measures of variability (standard deviation). Attributive characteristics are presented using frequencies and percentages. The χ^2-test was employed to assess the difference in frequencies of attributive characteristics, while the Kruskal-Wallis test was utilized to examine differences in attributive char-



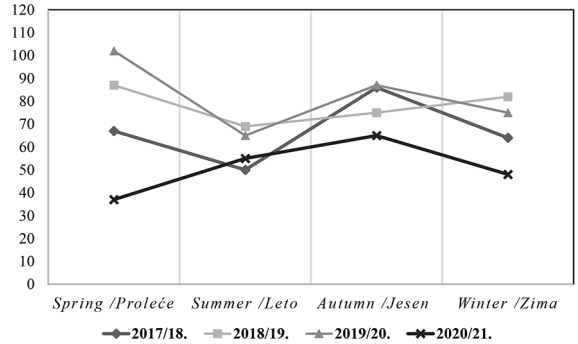
Graph 1. Number of hospitalizations throughout the years
Grafikon 1. *Broj hospitalizacija po godinama*

acteristics between three or more groups. Values with a significance level of $p<0.05$ were considered statistically significant. Microsoft Excel 2019 and JASP 0.16 were used for statistical data processing, and the results are illustrated through tables and graphs.

Results

The study included 1114 admissions at the Department of Child and Adolescent Psychiatry of both complete and partial hospitalization over a four-year period. The total number of patients during that period amounted to 613. **Graph 1** illustrates the dynamic pattern of hospitalizations over the four years. The lowest number of hospitalizations was recorded during the year of the pandemic, indicating a substantial decrease (-32.34%). This difference in the number of hospitalizations between the period during and before the pandemic was statistically significant ($p<0.05$).

Regarding the number of hospitalizations per patient, there was no significant difference during the four-year period. The median number of hospitalizations for all observed years was 1. However, during the pandemic, the highest number of hospitalizations per patient reached 10.



Graph 2. Seasonal distribution of hospitalizations
Grafikon 2. *Sezonska distribucija hospitalizacija*

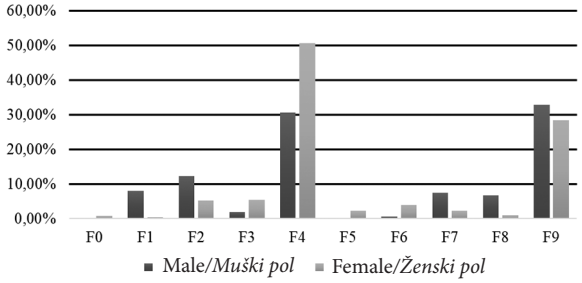
The season-related dynamic of hospitalizations is shown graphically for each year **(Graph 2).** During 2020/21, the fewest hospitalizations were recorded in the spring, while the highest number was recorded in the fall. This difference is statistically significant ($\chi^2=11.110$, $p=0.011$, Cramer's $V=0.100$).

The highest prevalence of mental disorders in the three years before the pandemic was within the F4 group, constituting 42.024%, while during the 2020/21 period, the F9 group took the lead with 47.805%. Disorders within the F9 group were in the second place in the three years before the pandemic, with 30.253%, while during the 2020/21 period, the second position was occupied by the F4 group with 24.878% ($\chi^2=48.685$, $p<0.01$, Cramer's $V=0.209$).

Sociodemographic data of patients, including age, gender, and place of residence, are presented in **Table 1.** Over the four-year period, the highest percentage of patients were in middle adolescence (Before vs. During the pandemic; 48.295% vs. 53.171%), while the lowest percentage was recorded in children. This variation in the representation of age categories is highly statistically significant

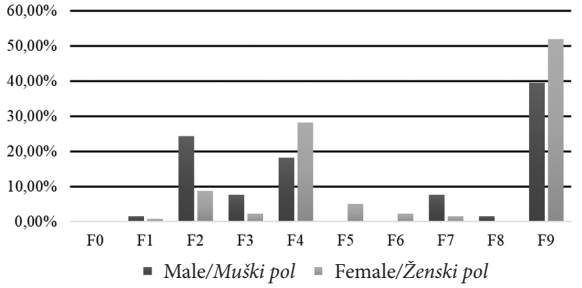
Table 1. Patients' sociodemographic data
Tabela 1. *Sociodemografski podaci bolesnika*

Patient characteristics *Karakteristike bolesnika*		Before the pandemic *Pre pandemije*						During the pandemic *Tokom pandemije*	
		2017/18		2018/19		2019/20		2020/21	
		N/*Br.*	%	N/*Br.*	%	N/*Br.*	%	N/*Br.*	%
Gender/*Pol*	Male/*Muški*	109	40.82	139	44.41	132	41.12	66	32.20
	Female/*Ženski*	158	59.18	174	55.59	189	58.88	139	67.80
Age group *Starosna kategorija*	Children (age 3 – 9)/*Deca (3–9 godina)*	23	8.61	26	8.31	6	1.82	1	0.49
	Early adolescence (age 10–14) *I faza adolescencije (10–14 godina)*	71	26.59	76	24.28	110	33.43	59	28.78
	Middle adolescence (age 15–17) *II faza adolescencije (15–17 godina)*	119	44.57	157	50.16	163	49.54	109	53.17
	Late adolescence (age 18–24) *III faza adolescencije (18–24 godina)*	54	20.22	54	17.25	50	15.20	36	17.56
Residence area *Mesto prebivališta*	Urban/*Urbano*	157	58.80	195	62.30	167	50.76	136	66.34
	Rural/*Ruralno*	110	41.20	118	37.70	143	43.47	63	30.73
	No data/*Bez podataka*	0	0.00	0	0.00	19	5.78	6	2.93



Graph 3. Percentage rate of gender-related psychiatric diagnosis - Before the pandemic
Grafikon 3. *Procentualna zastupljenost psihijatrijskih dijagnoza u odnosu na pol – pre pandemije*

(χ^2=120.054, p<0.001). The number of children under the age of 9 is significantly lower in the year of the coronavirus pandemic than the expected number observed before the pandemic (χ^2=11.124, p=0.011, Cramer's V=0.100). The female gender is statistically significantly more represented than the male gender in the observed period both before and during the pandemic. During the pandemic, the number of admissions of male children and adolescents was significantly lower than expected (χ^2=7.468, p=0.006, Cramer's V=0.082). In terms of place of residence, the number of people from urban areas was greater every year, but during the pandemic, the ratio of admissions from urban and rural areas changed significantly, with a larger share of admissions from cities than from villages (χ^2=6.822, p=0.009, Cramer's V=0.079).



Graph 4. Percentage rate of gender-related psychiatric diagnosis – During the pandemic
Grafikon 4. *Procentualna zastupljenost psihijatrijskih dijagnoza u odnosu na pol – tokom pandemije*

Graphs 3 and 4 illustrate the percentages of psychiatric diagnoses concerning gender, both before and during the pandemic. During the pandemic, there was an increase in diagnostic groups F9 and F5 among female patients. There was also a decrease in the percentage representation of diagnostic groups F4 and F3. For male patients during the pandemic, there was an increase in diagnostic groups F2 and F3, while a decline in the percentage representation of diagnostic groups F1, F4 and F8 was observed (χ^2=48.685, p=0.006, Cramer's V=0.209).

Discussion

The pandemic caused by the new SARS-CoV-2 virus brought about major changes in the organization of health systems worldwide. At our Clinic, partial hospitalization was canceled in line with the recommendations from authorities responsible for preventing the spread of the coronavirus. The discontinuation of services provided to low-urgency cases through partial hospitalizations was also visible in other countries [8]. These adjustments required identifying adequate alternatives to provide mental support to those in need. The solution was found in the development of and increasing reliance on telemedicine, a form of healthcare delivery reliant on remote telecommunication technologies, which proved highly effective for psychiatric patients during the pandemic [6, 8, 10].

Findings from a study in Italy suggest that analyzing hospital admissions is a useful approach in assessing the impact of the pandemic on people's mental health. This assessment of the pandemic's psychosocial impact is challenging due to the way data is collected and analyzed [7]. In the „COVID" year, an overall decrease in the number of hospitalizations at the Clinic in Novi Sad was observed when compared individually to the three years preceding the pandemic. Foreign authors also recorded reductions in admissions at their clinics for the general population [7, 8, 11, 12]. An American study that included adolescents [13] reported an overall decrease in hospitalizations from March 2020 to January 2021 compared to the same period before the pandemic. Notably, they conducted a keyword analysis of the subjects' medical records related to the pandemic („coronavirus", „quarantine", „pandemic", etc.), revealing a connection to the coronavirus pandemic in 53.24% of hospitalizations. Another American study looked at the number of hospitalizations among young people during and before the pandemic, and noted a 40% reduction in hospitalizations [14]. The decline in mental health clinic admissions was potentially caused by the fear of possible contagion, increased symptom tolerance in patients and their families, heightened caution among doctors regarding hospitalizations to reduce the virus spread in their departments, and a surge in outpatient activities for less urgent cases through telemedicine and online platforms [7, 8].

In the above studies from Italy and Malta, a sudden drop in hospitalization rates was observed in the first week following the implementation of lockdown measures in March, which is statistically significant when compared to the same period in the year prior to the pandemic [7, 8]. Similarly, our study identified a reduced number of hospitalizations during the spring, showing statistically significant difference compared to the „pre-COVID" period (spring - % of hospitalizations during and before the pandemic: 18.05% vs. 28.16%) (p=0.011). Reflecting on the anti-coronavirus measures in the Republic of Serbia, the state of emergency was lifted in May, accompanied by a more favorable epidemic situation. Subsequently, there was an increase in hospitalizations during the

summer, which, at the Clinic, had lower rate of hospitalization compared to spring before the pandemic. In the same period of time, the number of infected people decreased, and anti-coronavirus measures were relaxed in Malta. This paper also noted the increase in the number of hospitalizations already in May. This raises the question of whether the improved epidemic situation led to an increase in hospitalizations or if a certain cohort of patients had lingering symptoms, leading to decompensation at that specific moment [8]. Another plausible explanation, relevant to the group of respondents of our study, is that children and adolescents do not attend school during the summer, which may cause different crises due to reduced contact with peers and fewer extracurricular activities, compounded by the entire pandemic situation [13]. The growing trend in the number of hospitalizations at the Clinic continued in the fall. Notably, the percentage of hospitalizations during the fall of 2020 did not differ significantly compared to the period before the pandemic (fall - % of hospitalizations during and before the pandemic: 31.71% vs. 27.28%).

The sociodemographic characteristics revealed certain statistically significant differences. During the pandemic, the mean age of the patients was 15.82 years (SD=2.28), with a median of 16. Comparative literature data from studies reported values of 14.6 years (SD=2.21, $p < 0.05$) [14] and 15 years [13]. Middle adolescence (15-17 years) showed a slight increase during the pandemic, with a highly statistically significant difference in the representation of age categories ($p=<0.001$). Although ranking last in the representation of age categories during and before the pandemic, the group that includes children displayed a lower value than expected during the pandemic ($p=0.011$). There is no corresponding literature information in the research of other authors regarding this data. The female gender was more represented throughout the observed period, with an additional increase compared to the male gender during the pandemic. In other words, male respondents were less represented during the pandemic than expected ($p=0.006$). Studies [14] and [13] also noted a higher percentage of women (58% and 62.43%, respectively) among their respondents.

Concerning the representation of diagnostic groups, the two most prevalent groups were behavioral and emotional disorders with an onset usually in childhood and adolescence (F9) and neurotic, stress-related and somatoform disorders (adjustment disorders/adolescent crises) (F4). These two groups together accounted for 72.68% of all hospitalizations at the Department of Child and Adolescent Psychiatry at the UCCV during the pandemic. If disorders from the F2 group are added, this percentage amounts to 86.34%. In our study, F4 group disorders showed a decrease during the pandemic in both genders, declining from 42.02% to 24.88%, with a more pronounced decrease observed in women. Regarding the place of residence, a higher percentage of children and adolescents were from urban environments compared to rural areas, a trend consistent even before the pandemic. Across age categories, there was a decline in all age groups, most notably in middle adolescence (18-24 years). Studies from China indicated that the percentage of anxiety symptoms in children and adolescents were present in 18.9% and 37.6% of respondents, respectively [15, 16]. While the first study did not find a connection between gender and anxiety, other studies indicated that female gender was the risk factor [3, 16, 17]. In addition, one of the papers noted that anxiety symptoms were lower in urban than in rural areas, which contrasts slightly with our results [16]. It is important to note that our study presented subjects undergoing hospital treatment, and outpatient examinations or telemedicine consultations were not taken into account.

F9 group disorders showed an increase during the pandemic compared to the period before it, rising from 30.253% before to 47.805% during the pandemic. Regarding F9 group disorders, no specific studies investigating this group of disorders were found.

Concerning eating disorders (F5), which were recorded exclusively in women in our study, there was an increase in the percentage during the pandemic. Notably, this diagnosis was only represented in urban areas during the pandemic, while before the pandemic, the ratio was equal. It was most common in middle adolescence (15-17 years). Similar results were observed in a Canadian study conducted in a comparable period to ours (January 1, 2017 – December 26, 2020) [18]. It was determined that there was a statistically significant difference in the increase in the rate of hospitalizations for eating disorders during the pandemic compared to the „pre-COVID" period. The elevated prevalence of this diagnosis may be attributed to the stress induced by the pandemic and lockdown measures on young people, more time spent on social networks, increased feelings of anxiety, and loss of control [19] - all potential triggers for eating disorders [18]. Physical activity is an important thing for the mental health of young people. Adolescents were aware of the importance of everyday physical activity when it came to both anxiety and eating disorders (nutrition) during the pandemic. According to a study conducted in Serbia, female participants claimed that physical activity helped them cope with stress and anxiety. Also, both sexes confirmed that physical activity improved their sleep and rest patterns. It is necessary that the health care system pays more attention to physical activities as one of the significant prevention methods [20].

In our study, there was an increase in the percentage of schizophrenic and other psychotic disorders, with the male gender experiencing a more significant increase, aligning with literature data for the general population without a statistically significant difference [7, 8]. A study focusing on adolescents noted a decrease in the percentage representation, although without a statistically significant difference [14].

Conclusion

The findings of this research lead to the conclusion that crisis situations, including the coronavirus

pandemic, have a significant impact on the work organization at the Department of Child and Adolescent Psychiatry and alter the treatment dynamics for these age categories. The representation of sociodemographic characteristics among young people is changing, with girls more frequently requiring hospital treatment for behavioral and eating disorders, while boys are more commonly admitted due to worsening of schizophrenic and other psychotic disorders. This underscores the necessity for preventive measures targeting mental disorders, specifically directed towards the category of young people during crisis periods, recognizing them as an extremely vulnerable population group. Special attention should be given to the challenges that have escalated during this pandemic. It is important to carefully organize the psychiatric services to ensure that professional assistance is available at all times.

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