

IMPACT OF THE COVID-19 PANDEMIC ON THE REGULAR IMMUNIZATION OF CHILDREN IN THE MOSTAR HEALTH CENTER

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ABSTRACT

Introduction: Vaccines for protection against 10 infectious diseases are available in the Program of Regular Immunization in the Federation of Bosnia and Herzegovina. These vaccines save the lives of up to 3 million people worldwide every year. The latest report of the Institute of Public Health of the Federation of Bosnia and Herzegovina on regular immunization carried out during 2020 shows that the rate of vaccination of children during the 2019 coronavirus disease (COVID-19) pandemic with regular vaccines has decreased compared to previous years. Such a situation in the health system leads to a potential risk of outbreaks of infectious diseases that are prevented by vaccination.

Objective: To examine the impact of the COVID-19 pandemic on the regular immunization of children in the Mostar Health Center.

Materials and methods: A retrospective cross-sectional epidemiological study was conducted. Data on regular immunization of children from the Mostar Health Center, Herzegovina-Neretva County in the Federation of Bosnia and Herzegovina from 2017, 2018, 2021 and 2022 were used.

Results: A statistically significant difference was obtained in vaccination against measles, mumps and rubella during a period of four years. Vaccination with the mentioned vaccines was significantly higher in 2017 and 2018 than in 2021 and 2022.

Conclusion: It was shown that the COVID-19 pandemic affected the regular immunization of children in the Mostar Health Center.

Keywords: regular immunization of children, COVID 19 pandemic, MMR vaccine, Mostar

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INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) was discovered in Wuhan, China, in December 2019, triggering a worldwide public health emergency. The disease was declared a pandemic by the World Health Organization (WHO) on March 11, 2020 worldwide. The pandemic has affected more than 200 countries globally, and has seriously affected the economy and global health (1). Most people who have been infected with the COVID-19 virus have experienced mild to moderate respiratory illness without the need for special treatment. People from the elderly population as well as those with more serious diseases such as cancer, diabetes, chronic respiratory diseases developed serious symptoms (2, 3).

As the pandemic progressed, the number of newly infected, hospitalized with critical conditions and people who succumbed to the coronavirus infection grew, so that the measures gained momentum and were increasingly strict all over the world. A state of complete lockdown prevailed in the world with a decline in the quality of life (4-6) as well as psychological consequences (7-9), while some authors also mentioned the media construction of an infection similar to the seasonal flu (10, 11). At that time, a large number of works

on the contagiousness of this virus had already been published in the world (12). The health system was facing serious challenges such as lack of medical equipment, hospital capacity and staff. The lack of cooperation and dialogue between the entities made it even more difficult to allocate resources efficiently. The damage caused by the coronavirus pandemic has forced the health care system to make prevention a top priority (13,14), especially for those with limited resources, because in 2019, over 250 thousand people died from corona in the world (15, 16), and the mortality rate in Herzegovina was 5.1% (17).

The benefits of vaccination are clearly visible in the eradication or huge decrease in the frequency of numerous vaccine-preventable diseases. In recent decades, there has been a significant reduction in diseases that can be prevented through routine vaccination programs (18). Vaccination of children is very effective in reducing the incidence of a number of infectious diseases, as well as reducing the associated morbidity and mortality (19). However, despite the large body of evidence showing that childhood vaccination is safe and effective, vaccination coverage rates do not always

meet the rates required for collective immunity suggested by the WHO (20). The World Health Organization defines vaccination as creating immunity by introducing substances that stimulate the immune system to produce antibodies against a specific pathogen (21). In the mandatory vaccination program in Bosnia and Herzegovina, children are vaccinated against tuberculosis, hepatitis B, diphtheria, tetanus, whooping cough, polio, hemophilus influenza type b, measles, rubella and mumps (22).

Measles, mumps and rubella are highly contagious diseases associated with a significant medical and social burden. Effective vaccines against these diseases are available, and the implementation of vaccination programs has drastically reduced the incidence of the disease on a global scale. However, reports of outbreaks of measles and mumps in recent years highlight the remaining challenges in eliminating these diseases. Measles, mumps and rubella are highly contagious viral infections that cause a significant burden on affected individuals and healthcare systems. Children are vaccinated from 12 months of age and in the first grade of primary school. The vaccine is administered subcutaneously or

intramuscularly in the upper arm in a dose of 0.5 ml (23).

Due to the risk of infection and the need to maintain physical distance during the early stages of the COVID-19 pandemic, many countries have temporarily and justifiably suspended preventive mass vaccination campaigns against infectious diseases such as measles, polio, diphtheria, whooping cough, polio, tetanus and meningitis. The causes of delayed or interrupted vaccinations are parents' fears, restrictions on movement, more precisely, quarantine policies, changing priorities for COVID-19 among health personnel, as well as logistical problems with delivery (i.e., delays in the transport of vaccines). The World Health Organization, UNICEF and GAVI, The Vaccine Alliance reported that routine immunization programs have been significantly disrupted in at least 68 countries, affecting approximately 80 million children (24).

The aim of this study was to examine the impact of the COVID-19 pandemic on the regular immunization of children in the Mostar Health Center.

MATERIALS AND METHODS

A retrospective cross-sectional epidemiological study was conducted in the period between March and May 2023.

The research includes processing of statistical data and belongs to the field of descriptive epidemiology. Data on regular immunization of children from the Mostar Health Center, Herzegovina-Neretva County in the Federation of Bosnia and Herzegovina were used. For data on immunization before the pandemic, databases from 2017 and 2018 were used, while for data on immunization during and after the pandemic, data from 2021 and 2022 were taken into account. The data was collected in such a way that the Mostar Health Center provided insight into the data on children's immunization, i.e. the number and percentage of children vaccinated with the measles, mumps and rubella (MMR) vaccine. Information on the gender of the children was also collected in order to describe the demographic characteristics of the sample. A number of 1734 children participated in the research from the records of regular immunization of children in the Health

Center in Mostar, from 2017 to 2018 and from 2021 to 2022.

STATISTICAL ANALYSIS

Data were analyzed in the Statistical Program for the Social Sciences (SPSS) for Windows, version 26.0. The results were analyzed using descriptive and inferential statistics methods. Categorical variables are presented as frequencies and percentages, and the difference between them was tested with the Chi-square test. Statistical procedures were two-way. The level of statistical significance for all tests was $p < 0.05$.

RESULTS

Male gender is predominant in the sample, 887 of them or 51.2%, while 847 of them or 48.8% are female. Table 1 shows that the highest vaccination rate was with the bacillus Calmette-Guérin (BCG) vaccine, and the lowest with the MMR vaccine.

Table 1. - Basic sample data

		N	%
Sex	Male	887	51,2
	Female	847	48,8
Year of data collection	2017.	457	26,4
	2018.	513	29,6
	2021.	395	22,8
	2022.	369	21,3
Vaccine	BCG	1517	87,5
	Type B	1499	86,4
	Dtap-IPV-Hib	1503	86,7
	MMR	812	46,8
Complete order		233	13,4
Not vaccinated		211	12,2
Revaccination	No revaccination	1049	60,5
	One revaccination	222	12,8
	Has revaccinations	463	26,7

Table 2 shows that there was a decline in MMR vaccination from 2017-2022, and

especially in the pandemic years of 2021 and 2022.

Table 2. - Presentation of differences with immunization with the MMR vaccine before and after the COVID 19 pandemic

	MMRvaccine			χ^2	df	p
	no	yes	total			
2017	92	365	457	631,770	3	<0,05*
2018	169	344	513			
2021	325	70	395			
2022	336	33	369			

χ^2 = chi-square test, df = degrees of freedom, p < 0,05*

The last chi-square test confirmed the expected difference. A significant difference was obtained in the regular immunization of children with the MMR vaccine between 2017, 2018, 2021 and 2022 (p < 0.05). Significantly more

children were vaccinated with the aforementioned vaccine in the period before the COVID 19 pandemic, more precisely from 2017 to 2018, than during the aforementioned pandemic, that is, from 2021 to 2022. It is interesting to note that

before the pandemic, more children were vaccinated with the MMR vaccine, while during and after the pandemic, it was recorded that most children were not vaccinated with the mentioned vaccine.

DISCUSSION

The aim of the research was to examine the impact of the COVID 19 pandemic on the regular immunization of children in the Health Center in Mostar. With regard to the results of the latest research (23-31), it was expected that vaccination coverage with regular vaccines for children would be lower in the period during and after the pandemic, that is, in 2021 and 2022, than in the period before the pandemic, specifically in 2017 and in 2018. The results of the research conducted by Bramer et al. in 2020 (25) showed that the vaccination rate of children with regular vaccines decreased for all children's age cohorts, except for hepatitis B immunization. A similar study was conducted in the same year by Chandir et al. (26) in Pakistan. Factors contributing to low vaccination coverage included fear of exposure to the virus in health care facilities, restrictions on movement across the city, worker shortages, and the diversion of resources from child health to addressing the pandemic (27). Other researchers obtained similar results in their

research (28-30). Nuzhath and colleagues in 2021 (31) also obtained results in their research that show a reduced rate of regular immunization of children during the pandemic. The drop in the vaccination rate was the largest for regular immunizations in the age groups of 5 and 16 months, and the smallest for vaccines administered at birth.

Based on the data obtained from the mentioned literature, it can be assumed that the COVID-19 pandemic had a negative impact on the regular immunization of children in the Federation of Bosnia and Herzegovina, specifically in the area of the city of Mostar. The data analysis determined that the frequency of immunization with regular vaccines (MMR) is statistically significantly lower in the period during and after the pandemic than before the COVID 19 pandemic.

A number of factors may have contributed to a decrease in the rate of vaccination with regular vaccines for children during the COVID-19 pandemic. In many areas, including Bosnia and Herzegovina, during the pandemic, access to health facilities was closed or restricted, resulting in reduced availability of regular health services, including vaccinations. In addition, during the pandemic, the fear of infection was also significantly present,

especially when visiting health institutions. It is possible that parents were concerned about separating their child from home and taking them to health care facilities for fear of exposure to the COVID-19 virus, which may have resulted in delaying or avoiding routine health care visits, including vaccinations. Healthcare systems have been under enormous pressure during the pandemic, focused on diagnosing, treating and monitoring COVID-19 patients. This may have resulted in reduced capacity to implement regular health programs, including vaccination (25). During the pandemic, the focus of the public and health authorities was on the fight against COVID-19. Messages about the importance of regular vaccination may have been neglected or lost in the mass of information about the pandemic (27, 29). The financial difficulties of many families during the pandemic may have resulted in priorities, where some parents may have decided to cut costs, including those related to health care.

An interesting finding from this research is certainly the fact that most children, during and after the pandemic, were not vaccinated with the MMR vaccine. It is shown that in the rest of the world, vaccination with this vaccine is lower than usual (23). One of the reasons may be the

fear of vaccine side effects or even the age of vaccination. Namely, the first dose of the MMR vaccine is received at 12 months, and the second at 6 years. Of all regular vaccines for children, this vaccine is received last. So, it can be assumed that one of the reasons is the later age of receiving the first dose (only at one year), therefore the unintentional carelessness of the parents, which can occur with the passage of time since the first vaccines, can play a significant role.

Only 26.7 % of the sample has gone through revaccination, which can be attributed to the fear of side effects or even accidental negligence on the part of the parents, but also to the belief that the dose itself is sufficient prevention and that revaccination is not necessary, which again results from parents' ignorance and insufficient information about vaccination.

The research carried out provides an insight into the real health status of children's immunization in the previous two years in the area of the city of Mostar. The results can direct health system workers and researchers to the consequences of the COVID-19 pandemic and how this pandemic affected the prevention and treatment of other infectious diseases, which decades before the current pandemic were eradicated

thanks to vaccination. Research findings can contribute to raising awareness of the importance of regular immunization of children, as well as increasing the quality of health services. This kind of research can motivate to conduct similar research in other parts of the Federation of Bosnia and Herzegovina and beyond.

CONCLUSION

It was shown that the COVID-19 pandemic affected the regular immunization of children in the Mostar Health Center. The potential reduced immunization of children during the COVID-19 pandemic is insufficient to create collective immunity and also represents an additional risk of outbreaks of other, highly contagious diseases, especially highly virulent diseases such as measles, rubella and parotitis. There is a risk of additional burden on the health system, families and children. It is necessary to raise awareness in the population and point out the importance of mandatory vaccination as the most effective primary prevention measure against infectious diseases.

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UTJECAJ PANDEMIJE COVID-19 NA REDOVNU IMUNIZACIJU DJECE U DOMU ZDRAVLJA MOSTAR

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SAŽETAK

Uvod: U Programu redovne imunizacije u Federaciji Bosni i Hercegovini dostupna su cjepiva za zaštitu od 10 zaraznih bolesti. Navedena cjepiva svake godine spašavaju živote do 3 milijuna ljudi diljem svijeta. Najnovije izvješće Zavoda za javno zdravstvo Federacije Bosne i Hercegovine o redovnoj imunizaciji provedenoj tokom 2020.godine pokazuje kako je stopa procijepljenosti djece za vrijeme pandemije koronavirusne bolesti 2019 (COVID-19) redovnim cjepivima smanjena u odnosu na ranije godine. Takva situacija u zdravstvenom sustavu dovodi do potencijalnog rizika od izbijanja epidemija zaraznim bolestima koje se preveniraju cijepljenjem.

Cilj: Ispitati utjecaj pandemije COVID-19 na redovnu imunizaciju djece u Domu zdravlja Mostar.

Materijali i metode: Provedeno je retrospektivno presječno epidemiološko istraživanje. Korišteni su podaci o redovnoj imunizaciji djece iz Doma zdravlja Mostar, Hercegovačko-neretvanske županije u Federaciji Bosne i Hercegovine iz 2017., 2018., 2021. i 2022. godine.

Rezultati: Dobivena je statistički značajna razlika u procijepljenost cjepivom protiv ospica, zaušnjaka i rubeole tijekom razdoblja od četiri godine. Značajno je veća procijepljenost navedenim cjepivima bila u 2017. i 2018. nego u 2021. i 2022. godini.

Zaključak: Pokazalo se da je pandemija COVID-19 utjecala na redovnu imunizaciju djece u Domu zdravlja Mostar.

Ključne riječi: redovna imunizacija djece, pandemija COVID 19, MMR cjepivo, Mostar

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