

IMMUNIZATION AND GETTING DISEASED FROM SOME RESPIRATORY, VACCINE-PREVENTABLE DISEASES

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Contagious diseases present the leading causes of getting diseased and mortality in different parts of the world, regardless of improved socio-economic life conditions. The most important among them are the diseases which can be spread by air and water.

Immunization against contagious diseases presents the most effective form of prevention, ending, elimination and, where possible, eradication of disease. When there are good programmes of immunization properly implemented, and when they greatly cover the population which they refer to, the changes in frequency of vaccineable diseases can be observed, eg. contagious nosological entities that could be prevented by vaccination.

Certain vaccines protect from bacterial or viral infections and reduce the possibility of infection, that is, prevent its transmission.

The objective of the research is to point to the results of conducting the compulsory systematic immunization and to examine the effect of immunization on spreading of some respiratory vaccine-preventable diseases within Sumadija Region.

This study shows the scope of immunization and spreading of some respiratory vaccine-preventable diseases, before all morbilli, parottitis epidemica, rubella and pertussis, in Sumadija Region for the last ten years.

By means of great scope of compulsory immunization, the aforementioned respiratory vaccine-preventable diseases could be prevented. *Acta Medica Medianae* 2005;44(4): 55 – 59.

Key words: immunization, prevention, contagious diseases

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Introduction

Besides improved hygienic and socio-economic conditions, novelties on causes and spreading, globally, contagious diseases still present the leading cause of getting diseased and mortality of the population in some areas.

Analysis of spreading of contagious diseases in correlation with interhuman transmission and its path shows the domination of the group of contagious diseases transmitted by air and water, generated because of overpopulation and great migrations of the population (1,2).

Immunization against contagious diseases presents the most effective form of prevention, ending, elimination and, when possible, eradication of disease. When there are good programmes of immunization properly implemented, and when they greatly cover the population which they refer to, the changes in frequen-

cy of vaccineable diseases can be observed, eg. contagious nosological entities that could be prevented by vaccination (3,4).

The aforementioned changes depend on the effects of vaccine mechanism, the achieved coverage, the presence of non-human hosts, as well as the features of the infective organism. Certain vaccines protect man from bacterial or viral infections and reduce the possibility of infection, eg. prevent its transmission. Live viral vaccines, for example, against infantile paralysis and morbilli, offer a high level of protection from infection, and by immunization of the great per cent of the community, they contribute to the formation of solid collective immunity, preventing transmission of infective agencies (5,6). On the other hand, some vaccines reduce the seriousness of the clinical presentation of the very disease.

The cause of morbilli is morbilli virus from Paramyxovirida group. The source of the disease is the patient itself. The overall period of contamination is 9 days, starting from the end of incubation to five days after the appearance of rash. The disease is transmitted by air and water over Fluge's drops. Sensitivity is general in its nature, and the most sensitive are children, old persons, or persons that did not get morbilli or were not vaccinated against them. After the patient gets over from morbilli, the solid, lifetime immunity remains. Vaccine-induced immunity is also solid, but

it lasts shorter, only 10 years. The infants are protected until the 6th month of their lives, by diaplacental acquired immunity from their mothers. Incubation lasts from 9 to 11 days. Vaccination is a prophylactic method of choice.

Mumps are an acute, viral, contagious disease followed by high morbidity. The cause is Paramyxovirus, which belongs to the family of Rubulaviruses, eg. to the family Paramyxoviridae (7). The cause has the affinity towards the glandular and nervous tissue. The infection can be transmitted by air, water, through the direct contact with the saliva of the diseased (by kiss) or by indirect contact over the newly contaminated objects. Incubation usually lasts 18-21 days. The best measure of protection is vaccination.

Rubella is a mild, viral, highly contagious disease. It has a great teratogenous effect on foetus if a pregnant woman catches it during the first months of pregnancy. With pregnant women that caught rubella, the disease is defined as a special nosological entity (MKB-10: P35). In 90% of newborn infants whose mothers had rubella infection during the first three months of their pregnancy, the syndrome of congenital Rubella appears (CRS). Congenital Rubella can cause foetus' death, miscarriage, premature birth or birth with congenital malformations (7,8).

The cause is Rubella virus that belongs to the family Rubivirus, that is, the family Togavidae. Incubation with rubella lasts from two to three weeks, and in most cases, it is 18 days. Sensitivity to the infection is general. When the patient gets over from the disease, the solid, but not lifetime immunity remains. With 3% of persons, reinfections are possible. Systematic vaccination was introduced in the USA in 1969, and in Serbia in 1981.

Whooping cough is an acute infective disease caused by gram-negative coccobacillus, *Bordetella pertussis* (7). The disease can be transmitted by air and water over Fluge's drops. Children up to 5 years of age are most sensitive. With ageing, this disease is rarely registered. Diaplacental immunity acquired from the mother is not transmitted with pertussis, so that the infant can already be diseased in the second month of its life.

Aims

The aim of the research was to point to the results of conducting the compulsory systematic immunization and to examine the effect of the immunization on spreading of some respiratory vaccine-preventable diseases within Sumadija Region.

Materials and methods

Materials used in this study included:

- data from disease/death registrations of vaccineable diseases within the Sumadija Region in the period from 1991 to 2000;
- annual reports on immunization plan realization for the same period forwarded to the epidemiology section of the Public Health Institute in Kragujevac;
- annual reports of Public Health Institute in Kragujevac;
- the results of conducted immunizations for the territory of the Republic of Serbia of the Public Health Institute of Serbia;
- annual reports of the Center for prevention and control of contagious diseases, Public Health Institute of Serbia, for the period from 1991 to 2000.

In this study, descriptive and analytical epidemiological methods were used.

Results and discussion

Tables 1 and 2 show the number of vaccinated and revaccinated children with the scope of immunization against morbili, mumps, rubella and whooping cough.

The scope of vaccination in Sumadija Region against morbili, mumps, rubella and whooping cough (Table 2), was permanently decreasing from 1998 to 2000, which was mainly caused by unavailable, and therefore insufficient vaccine doses, especially MMR vaccine.

During the observed period, the compulsory immunization against pertussis was conducted with the scope of 96% to 100% in Sumadija Region (Table 2).

Table 1. The number of immunized persons from morbili, parottitis epidemica, rubella and pertussis, the Region of Sumadija, 1991- 2000

Year vac/rev		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
		Number of the immunized									
MM	vac	3507	3237	3347							
	rev										
MMR	vac				3047	2185	2205	2742	2647	2380	2553
	rev				3898		1855	4173	3894	3514	3826
Di-Te-Per	vac	3343	3324	3091	3782	2885	2806	2655	2608	2466	2606
	rev	3620	3278	3239	3200	2938	2915	2855	2798	2504	2517
Pertussis	rev	3656	3480	3134	3366	3163	3074	2862	2790	2706	2831

Table 2. Scope (%) immunization against morbilla, parottitis epidemica, rubella and pertussis, The Region of Sumadija, 1991- 2000

Year	vac/rev	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
		Success (% of immunization)									
MM	vac	87.0	98.0	99.0							
	rev										
MMR	vac				94.6	94.0	99.0	98.0	99.0	96.0	94.4
	rev				99.6		86.0	99.0	99.0	94.0	98.3
Di-Te-Per	vac	98.6	99.0	99.0	96.0	96.0	100	99.0	97.0	98.0	97.2
	rev	97.9	100	99.0	96.4	96.0	99.0	97.0	97.0	97.0	97.0
Perussis	rev	98.1	99.0	98.0	96.4	96.0	99.0	97.0	95.0	97.0	95.7

Table 3 shows a progression of the respiratory vaccine preventable diseases and Table 4 shows the rate of getting diseased caused by respiratory vaccine preventable diseases in Sumadija Region for the period 1991- 2000.

During the observed period, morbilla were registered almost every year, with the exception of 1996 and 2000. In 1993, morbilla epidemic was registered when 290 persons got ill, more than half of which had been completely vaccinated. The majority of the diseased were 15 to 19 of age. Introducing the compulsory revaccination against morbilla from 1994, the rates of getting diseased were much lower, and during 1996 and 2000 there was not a single registered case of morbilla in the region. The scope of persons for compulsory vaccination and revaccination in the observed period ranged from 87% to 99%.

In the aforementioned decade, on average, 29 newly diseased persons suffering from parottitis were registered in Sumadija Region. The greatest number, 82 newly diseased persons, was registered during 1996, and after that the fall of the diseased was registered, while there were 10 newly diseased persons registered in 1999 and 2000. The greatest number of the diseased was registered among persons 15 to 19 years of age. Epidemic appearance of parottitis was not registered. At the same time, the scope of persons for compulsory vaccination and revaccination against parottitis ranged from 87% to 100%.

During the last ten years, there were from 4 to 14 rubella diseased persons. The greatest number of newly diseased cases was registered in the Region during 1991, 1994, 1997 and 2000. All registered cases were sporadic. The scope of vaccinated and revaccinated children in the aforementioned period ranged from 86% to 99%.

During the observed period in Sumadija Region, there were only three registered whooping cough cases; in 1991, two children aged 6 and 10, who had been completely vaccinated and one case of the diseased child, one year of age in 1993, who had not been completely vaccinated.

The average annual morbidity caused by the morbilla in the examined Region for the analyzed ten-year period was approximately 15 per 100000 persons. In the period from 1995 to 2000, there was extremely low morbidity caused by the morbilla, from 0,0 to 0,6 per 100000 citizens.

Within the territory of the Region during the observed period, the fall of morbidity caused by the mumps, eg. at the beginning of the observed period, was 10,6 ‰/0000, and at the end of the period approximately 3,0 ‰/0000. The greatest values of the rate of getting diseased were registered in the middle of the period analyzed, while in 1996, the rate of getting diseased was 26,3 ‰/0000.

Table 3. The number of diseased from respiratory diseases that can be prevented by vaccination, the Region of Sumadija, 1991-2000

Year/ disease	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Diseased persons									
Morbilla	3	54	290	9	11	0	2	1	2	0
Parottitis	33	17	22	35	29	82	37	12	9	10
Rubella	12	10	5	12	8	4	11	9	6	14
Pertussis	2	0	1	0	0	0	0	0	0	0

Table 4. Rates of getting diseased* caused by respiratory vaccine-preventable diseases in Sumadija Region for the period from 1991 to 2000

Year/ disease	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Morbidity									
Morbilli	1.0	17.3	93.2	2.9	3.5	0.0	0.6	0.3	0.6	0.0
Parotitis	10.6	5.5	7.1	11.2	9.3	26.3	11.9	3.8	2.9	3.0
Rubella	3.6	2.7	1.3	3.9	2.7	1.4	3.8	2.7	1.8	4.1
Pertussis	0.6	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

*Mb=1:100 000

Morbidity caused by rubella during the observed period oscillated between 1,3 ‰/0000 in 1993 and 4,1 ‰/0000 in 2000.

From 1994, not a single case suffering from pertussis was registered in the Region. Morbidity caused by whooping cough was the highest in 1991 and it was 0,6 ‰/0000.

The planned immunization in Sumadija Region, as well as in the Republic, against whooping cough, was performed with a good scope, and was about 97%. In addition, revaccination of two-year-old children, according to the reports, was achieved with high scope, over 97%. Decreasing tendency concerns vaccination and revaccination against morbili, mumps and rubella, mainly because of the lack of vaccines, which is a warning to expect worsening of the epidemiological situation of the aforementioned diseases.

Conclusion

- At the territory of Sumadija Region during the period from 1991 to 2000, a permanent presence of the vaccineable diseases was registered.

- With the permanent presence of these diseases, also their permanent decrease was observed, concerning their absolute number and incidence.

- During the observed ten-year period in Sumadija Region, only one epidemic of vaccineable diseases was registered. It was morbili epidemic in 1993, when there were 290 diseased persons, more than a half of which had been completely vaccinated.

- During the observed period in Sumadija Region systematic compulsory immunizations were conducted permanently with satisfactory success. The exception is MMR vaccination and revaccination, with which in some years the law minimum was not reached, which was mainly the result of the lack of vaccines.

In the years to come, epidemiology as well as other sections should intensify their activities on implementing the programme of protection of the population from contagious diseases, and in such a way to achieve even better results in accordance with the goals set in the Programme, because every failure, especially in conducting of immunizations could have manifold negative consequences.

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IMUNIZACIJA I OBOLEVANJE OD NEKIH RESPIRATORNIH, VAKCINOM PREVENTABILNIH BOLESTI

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Zarazne bolesti i dalje predstavljaju vodeće uzroke obolevanja i smrtnosti u mnogim delovima sveta i pored poboljšanih socio-ekonomskih uslova života. Najznačajnije među njima su bolesti koje se prenose vazdušno-kapljičnim putem.

Imunizacija protiv zaraznih bolesti predstavlja najefikasniji način prevencije, suzbijanja, eliminacije i, tamo gde je to moguće, eradikacije bolesti. Kada postoje dobri programi imunizacije koji se pravilno implementiraju, uz veliku pokrivenost populacije nad kojom se sprovode, uočavaju se promene u učestalosti vakcinabilnih bolesti, odnosno, kontagioznih nozoloških entiteta koje se mogu sprečiti vakcinacijom.

Pojedine vakcine štite čoveka od bakterijskih ili virusnih infekcija i smanjuju mogućnost, odnosno sprečavaju transmisiju infekcije.

Cilj istraživanja bio je da ukaže na rezultate sprovođenja obavezne sistematske imunizacije i da ispita uticaj imunizacije na kretanje nekih respiratornih, vakcinom preventabilnih bolesti na području Šumadijskog okruga.

U radu je prikazan obuhvat imunizacije i kretanje nekih respiratornih, vakcinom preventabilnih bolesti pre svih, morbilla, parottitis epidemica, rubella i pertussisa, u Šumadijskom okrugu u desetogodišnjem periodu.

Velikim obuhvatom obavezne imunizacije mogle bi se prevenirati navedene respiratorne, vakcinom preventabilne bolesti. *Acta Medica Medianae 2005;44(4): 55 – 59.*

Ključne reči: imunizacija, prevencija, zarazne bolesti