

STUDY ON SEROPREVALENCE OF MUMPS - SPECIFIC IGG ANTIBODIES IN A HEALTHY POPULATION

Karcheva M.* , M. Atanasova, I. Makaveev*, M. Daskalova*

* *Department of Epidemiology, Parasitology and Tropical Medicine, Department of Anatomy, Histology, Cystology and Biology, Medical University - Pleven, Bulgaria*

SUMMARY

Mumps is a vaccine preventable viral infection. Its typical clinical manifestations are characterized by pain and swelling of the salivary glands, fever, and fatigue. Often other organs are affected - testes in males after puberty (orchitis), ovaries in women (ooforitis), pancreas (pancreatitis), central nervous system (meningitis). The use of specific immune prophylaxis led to a significant success in the fight against mumps, but there are still unresolved issues related to the immunological and epidemiological effectiveness of the vaccines. The disease continues to interest researchers today. The main issues being tackled are related to the conduct of virological, clinical and sero-epidemiological studies in different countries. Objectives of the study is to determine the frequency distribution of mumps-specific IgG antibodies in healthy populations in the region of Pleven, Bulgaria. Methods: a cross-sectional sero - epidemiological representative population - based survey in the area was made. Enzyme immunoassay method was used for an indirect proof of mumps - specific IgG serum antibodies. 410 people were examined at an average age of 25 (1 to 84). Of these, 250 (61 %) were women and 160 (39 %) - men. Results: Of all test results, the negative were 72 (19 %), the borderline were 12 (3 %), the positive were 182 (44 %), and highly positive were 144 (35 %). The vaccination status showed that 242 (69 %) of all surveyed were immunized with a vaccine against mumps. According to the immunization schedule in Bulgaria, 132 (33 %) people were immunized with monovaccine during the years - 1 intake, 80 (20 %) with trivaccine - 1 intake, and 64 (16 %) - 2 doses. Conclusion: We believe that despite the specific immunoprophylaxis carried out against mumps decades on end, the necessary level of protection leading to its elimination has not yet been reached.

Key words: mumps, seroprevalens, immunoprophylaxis

INTRODUCTION:

Mumps infection is widespread worldwide. In recent years, outbreaks have occurred in countries with mandatory immunization - UK, Ireland, Austria, Spain, USA, Canada

and others [1, 2, 3, 8, 9, 12, 13]. The spread of mumps in Bulgaria is not significantly different from the situation in the other European countries having introduced two dosage immunization regimens, namely registration of outbreaks involving adolescents and young adults [1, 4, 7, 10, 11].

The growth intensity of an infectious disease epidemic process depends on the level of collective immunity. Collective immunity as an expression of epidemiological population immunity is present when there is natural or artificial immunity of the whole population or at least 80-85% of it. In these cases, we talk about an immune stratum, i.e. population distribution according to different levels of individual immunity. This immunologic structure of the population shows what percentage of it has immunity, respectively susceptibility to an infection. It is assumed that the more numerous an immune stratum is, the more limited is the infection ability to spread among the public and vice versa [6].

In recent years, outbreaks of mumps in many countries, including ours, show a high percentage of immunized infected persons [5]. This requires making sero - epidemiological studies [9].

AIMS:

To determine the frequency distribution of specific IgG antiparotid antibodies among healthy population in Pleven, Bulgaria.

MATERIAL AND METHODS:

A cross - sectional, sero - epidemiological representative population study in Pleven was made. Participation in the survey was voluntary with guaranteed confidentiality. A questionnaire was developed by which we gathered information on gender, age and immunization status regarding mumps. The participants had venous blood taken by qualified personnel for serological testing. The obtained sera were stored at -20°C before testing them. Was administered an enzyme immunoassay test as instructed by the producer Origenium Laboratories (FINLAND). Mumps IgG Antibody EIA75 was used, intended for semi -

quantitative serum determination of specific IgG mumps antibodies.

The obtained results were interpreted in the context of epidemiological information and the purpose of the study. 410 persons were examined, average age 25 (1 to 84). Of these, 250 (61%) women and 160 (39%) - men.

RESULTS AND DISCUSSION:

Of the total number of tested individuals negative results were shown by 72 (19%), 12 (3%) were borderline,

182 (44%) were positive and 144 (35%) - high positive (Table 1).

The distribution of tested persons according to vaccination status is presented in Fig. 1.

As seen from the chart, immunized individuals are 69% (242) of all surveyed. According to the immunization calendar of the country over the years they have been immunized with vaccines of which 16 percent have been reimmunized.

Table 1. Seroprevalence of mumps specific IgG antibodies in the tested individuals

Benchmarks (S/co ratio)	Results	Number (n) / Ratio/ (%)	Interpretation
< 0.8	0.108-0.788 (0.446±0.22) 0.824-0.922	72 (19)	Negative
0.8 - 0.99	(0.871±0.04) 1.015-6.190	12 (3)	Borderline
1 - 4	(2.384±0.88) 4.020±15.497	182 (44)	Positive
>4	(6.899±2.39)	144 (35)	High positive

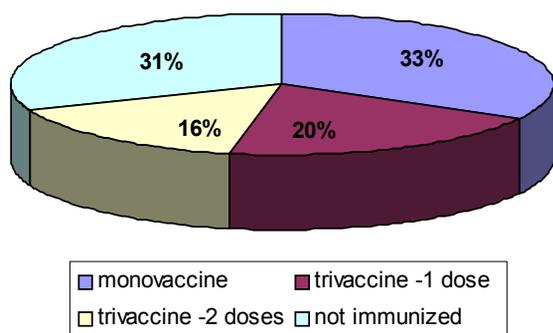


Fig. 1. Immunization status of the tested persons

Of people showing negative results - 72 (19%), 40 (58%) have been immunized once, (12%) have been immunized with 2 doses of trivaccine; 23 (30%) have not been immunized. It is evident that of the negative - 49 (40 +9) (70%) were immunized (Table 2).

Table 2. Distribution of the tested individuals according to their vaccination status

Vaccine	Number (n), Ratio(%)	Negative	Borderline	Positive	High positive
Monovaccine 1 dose	138(33%)	25	2	69	40
Trivaccine 1 dose	80(20%)	15	6	36	24
Immunization and reimmunization	64(16%)	9	2	34	20
Nonimmunized	128(31%)	23	2	44	60

This result questions the existence of unprotected immunized persons. This can be connected directly to the immunogenicity of the vaccine. Our data are similar to those received by some American authors [8]. This makes it possible for us to join the global discussion on discussing new ideas regarding the immunization patterns. As for the negative nonimmunized individuals - 23 (30%), our opinion is that in all likelihood some have already had the disease in the past, and others have had the disease subclinically.

Table 2 shows also that 182 persons with positive results for IgG, have immunological status associated with vaccine administration: 105 (57%) with one dose, two doses - 34 (19%) and 44 (24%) - nonimmunized. The last group of nonimmunized individuals has positive results because of the natural infection. Such a conclusion can be drawn for the high positive group, comprising 144 people of whom 84 (58%) were immunized and 60 (42%) - , nonimmunized.

We divided the surveyed people in 4 age groups: 0

- 11, 12 - 18, 21 - 29 and over 30 years of age. The distribution of the results according to the age groups is presented in Table. 3. As shown in the table, among those with negative results dominate those over 30 years of age. - 24 (33%), and those in the group 19 - 29 years of age - 30 (42%). Troublesome is the fact that 19 percent negative were found in those in child immunization age having already received two vaccines. Concerning adults over 30, this phenomenon in all likelihood is due to gradual loss of antibodies and a rare meeting with natural infection. As to the positive group - 182 (44%), it is typical that in all age groups the percentage is relatively equal - between 15% and 36%. This is due both to the immunization process and the common meeting of the majority of the population with natural infection. It may be taken for granted that this group includes people with higher productivity of humoral immunity. Similar conclusions can be drawn for the high positive persons, too.

Table 3. Result distribution according to the age of the individuals

Results Age groups	Negative	Borderline	Positive	High positive
0-11	14 (19%)	6 (50%)	36 (20%)	24 (17%)
12-18	4 (6%)	-	27 (15%)	20 (14%)
19-29	30 (42%)	4 (33%)	54 (29%)	44 (31%)
Over 30	24 (33%)	2 (17%)	66 (36%)	56 (38%)
Altogether	72 (100%)	12 (100%)	182 (100%)	144 (100%)

CONCLUSION:

Based on the observed results and their interpretation, the following conclusion can be made. Seroprevalence on specific mumps IgG antibodies of the population indicates that the immune stratum in Pleven region has reached a level that should limit the epidemic spread of the disease. However, there are still diseases among the immunized persons with both mono and

trivaccines. Our results were confirmed by those of the epidemiological services of the United States, Britain and other European countries in 2009. The world debate on the use of highly effective live vaccines is not over.

Our studies confirm the new concept to increase reimmunization, as demonstrated by the epidemiological practices in the last 1-2 decades.

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Address for correspondence:

Milena Karcheva, MD,
Department of Epidemiology, Parasitology and Tropical Medicine,
Medical University - Pleven,
1, Kliment Ohridski Str., 5800 Pleven, Bulgaria
Tel: +359/64/884 269,
E-mail: milena_karcheva@abv.bg,