

Original Article

Adverse Events Following Measles and Rubella Immunization Campaign in Shahrekord, Iran ; 2003-2004

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ABSTRACT

Objective: To report on the adverse events following the administration of Measles and Rubella (MR) vaccine during an immunization campaign in Shahrekord, Iran.

Design: Prospective study conducted between December 2003 and January 2004.

Setting: Nurseries, primary schools, high schools and universities in Shahrekord, Southwest of Iran,

Subjects and Methods: Four thousand children and students from the above institutions were randomly selected and recruited. They were followed up for one month after vaccination for any adverse events. Data collected using a questionnaire and physical examination were analyzed using SPSS 11 software.

Main outcome measure: Adverse events following MR vaccine administration

Results: The overall incidence rate of adverse events was

25.4%. Lymphadenopathy (8.7%), fever (8.3%) and sore throat (7.3%) were the most prevalent complications. Incidence of lymphadenopathy and arthralgia was higher in males ($p < 0.01$, $p < 0.02$ respectively), whereas myalgia was more common in females ($p < 0.002$). Lymphadenopathy was less common in the older age groups. Fever frequency was higher in the 5-10 and 21-25 age groups ($p < 0.001$). Myalgia and arthralgia was seen with higher frequency in the 11-15 and 16-20 age groups ($p < 0.001$). Skin rash was more common in the 5-10 and 11-15 age groups ($p < 0.001$).

Conclusion: Large scale interventions such as this vaccination campaign in a population revealed adverse events, but the frequency of serious adverse events with MR vaccine was low. Therefore, the benefit to risk ratio of such a campaign is favorable and such programs can be undertaken safely.

KEY WORDS: adverse events, measles, rubella, vaccination

INTRODUCTION

Measles and Rubella (MR) are viral diseases with worldwide distribution. Measles is a contagious disease with a mortality rate of about 1-5 percent in developing countries and this disease remain the leading cause of vaccine preventable death^[1]. In each country, the aim has been to reduce mortality rate and other complication of measles by large scale vaccination programs. In Iran, immunization program for this disease started in 1967 and is usually offered as two doses for all children at nine and fifteen months of age. World Health Organization (WHO) recommended that to prevent future outbreaks and to achieve high population immunity with the aim of interrupting measles transmission, mass immunization campaign should be conducted^[2,3]. Although Rubella is a mild disease, the ability of the virus to affect the fetus and create Congenital Rubella Syndrome (CRS) is a real health problem^[4]. Despite 95% coverage of vaccination

in Iran, there have been measles outbreaks that occurred in persons 10-25 years old^[5]. The WHO advises vaccination of all children and adult females for elimination of rubella. This advice resulted in the National Center for Control of Disease, Iran to offer a national measles immunization campaign which was conducted from December 2003 to January 2004. This immunization campaign was also a unique opportunity for rubella control^[5]. Measles and rubella vaccines are attenuated vaccines. Thus vaccine administration may cause fever, adenopathy, arthritis, arthralgia and other adverse events^[6,7]. This research reports the adverse events of combined MR vaccine during a national vaccination program in 4000 vaccinated individuals in Shahrekord, Iran.

SUBJECTS AND METHODS

This is a prospective investigation in which the study population consisted of 174,757 persons

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aged 5-25 years in Shahrekord city located in southwest of Iran. These persons were vaccinated in a national MR vaccination campaign^[5]. The vaccination campaign was carried out during 32 days from December 2003 to January 2004.

A sample size of 4000 individuals was randomly selected from among vaccinated children in nurseries and also vaccinated students in primary schools, high schools and universities. In this campaign a combined attenuated MR vaccine manufactured by Merio India Co. was used. These 4000 cases were followed up for one month on days 3, 7, 10 and 30 after vaccination to evaluate the adverse events of immunization. Each individual was subjected to physical examination by trained general practitioners to observe adenopathy, local reactions and arthritis. A questionnaire form about adverse events of MR vaccine such as diarrhea, fever, cough, sore throat, headache and adenopathy was also used for every individual. The collected data was entered into the SPSS (11th version) software and were analyzed using descriptive and analytic tests (such as, t-test and chi-square test).

RESULTS

Out of 4000 study cases 1837 (45.9 %) were female and 2163 (54.1%) were male (Table 1).

Table 1: Age distribution of vaccinated individuals

Age group	Frequency	Percent
5-11	904	22.6
11-15	1925	48.12
16-20	926	23.15
21-25	245	6.12
Total	4000	100

Adverse events related to MR vaccine occurred in 1805 (25.4%) vaccinated individuals, (Tables 2 and 3). There was no death resulting from the administration of MR vaccine during the period of the campaign.

There was a significant difference in the rate of agreements between lymphadenopathy, arthralgia, myalgia and gender. Incidence rate of lymphadenopathy and arthralgia was higher in males ($p < 0.01$ and $p < 0.022$ respectively). Myalgia was more frequent in females ($p = 0.002$). There was no significant relationship between skin rash and fever with gender ($p = 0.27$). There was a significant difference in the rate of agreements between adenopathy, fever, myalgia, arthralgia, rash and age. Adenopathy was more frequent among individuals aged 16-20 years ($p < 0.001$).

Fever was more frequent in children aged 5-10 years and adults aged 21-25 years ($p < 0.001$). Myalgia and arthralgia was more frequent in

Table 2: Number of adverse events in the study group

Number of adverse events	Number of cases with adverse events	Percent
Only 1	325	32.00
2	417	41.08
3	153	15.07
4	79	7.78
> 4	41	4.04
All	1015	100

Table 3: Distribution of complications among the study group following MR vaccination

Adverse events	Case number with side effect	Percent
Adenopathy	347	8.7
Fever	332	8.3
Sore throat	292	7.3
Myalgia	252	6.3
Arthralgia	214	5.4
Eye involvement	196	4.9
Cough	195	4.9
Headache	164	4.1
Paresthesia	136	3.4
Urticaria and pruritus	137	3.4
Nausea and vomiting	99	2.5
Skin rash	85	2.1
Diarrhea	28	0.7
Local reactions	3	0.1
Convulsion	1	0

individuals aged 11-15 years and 16-20 years. ($df = 3$, $p < 0.001$). Skin rash was more common among children aged 5-10 and 11-15 years ($df = 3$, $p < 0.001$).

DISCUSSION

The MR Immunization campaign in Iran was performed on the age group 5-25 years. The majority of the vaccine recipients were aged 11-15 years^[5]. Adverse events were detected in 25.4% of 4000 vaccinated individuals and the most frequent complications were lymphadenopathy and fever. Considering the number of signs as adverse events, presence of two signs together was more frequent (Table 2).

In an investigation performed in London city on adverse events of MR vaccination, the frequency of lymphadenopathy, fever and skin rash was 23.8, 16.8 and 26.9% respectively^[8]. However, in our study the frequency of these adverse events was 8.7, 8.3 and 2.1 respectively. The very sharp difference between results of the two studies may be due to precision of examination, age groups of the population studied or vaccine components.

In another study performed in Japan, 66 children received MR vaccine and were followed up for the adverse events. Fever and skin rash were observed

in 17 and 3 children respectively^[9]. The result of this study regarding fever is not in agreement with our results. This difference may be due to the fact that in our study the age distribution had a wider range.

In another study performed in Saudi Arabia, fever was the most frequent adverse event of MR vaccine^[10]. In our study, fever after adenopathy is the most frequent adverse event. In another study in Australia, three mild local reactions and another two severe local reactions were reported. The incidence rate reported was 0.3 per 100,000 administered^[11]. In our study, three cases out of 4000 (incidence rate = 0.1%) developed mild local reactions following MR vaccination.

In Costa Rica, a system of surveillance for vaccine safety detected 60 cases of adverse events per 100,000 individuals attributed to MR vaccines. Of these events 70% were reported by health professionals^[12]. In our study the incidence rate of adverse events is 25.4%.

In the majority of investigations, adverse events of MR vaccine have been evaluated voluntarily based on physician or other health care worker reports, whereas in our study all 4000 vaccine recipients were prospectively and actively followed to detect any adverse events, using a questionnaire and physical examinations.

CONCLUSION

Large scale interventions such as this vaccination campaign in a population revealed adverse events but the frequency of serious adverse events with this MR vaccine was low. The benefit to risk ratio is favorable and such campaigns can be undertaken safely.

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