

Original Article

Evaluation of Immunity against Rubella and Measles Nine Years after Mass Vaccination Program in Babol Medical Students in Iran

Sadeghi F¹, Hajiahmadi M², Abdollahpour S M³, Yahyapour Y^{4*}

1. Cellular and Molecular Biology Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran.
2. Non-Communicable Pediatric Diseases research Center, Babol University of Medical Sciences, Babol, Iran.
3. Students Research Committee, Babol University of Medical Sciences, Babol, Iran.
4. Infectious Diseases & Tropical Medicine Research Center, Babol University of Medical Sciences, Babol, Iran.

Abstract

Background and Aims: Medical students are exposed to various infectious diseases during their clinical training period, including measles and rubella. In Iran, to control the outbreaks of measles and rubella a mass vaccination campaign was conducted on 2003. The present investigation evaluates Immunity to measles and rubella in a group of Babol medical students and determines the prevalence of medical students susceptible to these infections.

Materials and Methods: A total of 191 medical students (preclinical and clinical) from College of Medicine and Health Sciences at Babol University of Medical Sciences enrolled in this cross-sectional study. IgG antibodies for measles and rubella was evaluated using enzyme-linked immunosorbent assay.

Results: A total of 60 (31.4%) students had insufficient measles immunity or were totally non-immune, whereas non-immune status to rubella was seen in 1 (0.5%) subject.

Conclusion: This study showed insufficient measles immunity in a group of Babol medical students.

Keywords: Measles, Rubella, Immunity, Medical Students, Babol

Introduction

Serological surveillance provides estimates of population-level immunity against vaccine-preventable diseases. Seroepidemiology is important for evaluating the impact of vaccination programs (1). Medical students are exposed to diverse infectious diseases during their clinical training stage, and vaccine-preventable infections are a serious risk for these students (2). Despite the

presence of effective vaccine, there are several reports of outbreaks of measles, and rubella among medical students (3-5). Measles and rubella are major public health problems especially in developing countries. In Iran, to control the outbreaks of measles and rubella a mass vaccination campaign was conducted on December 2003 and more than 33 million doses of vaccine (measles, Edmonston Zagreb strain; rubella, RA27/3 strain; Serum Institute of India LTD, 212/2, Hadehsar, Pune-411 028, India) were administered to the 5-to 25-year-old subjects (6). Due to this national-wide vaccination program incidence of measles and rubella remarkably decreased but sporadic transmission continues to occur.

* **Corresponding author:** Yousef Yahyapour, Infectious Diseases & Tropical Medicine Research Center, Babol University of Medical Sciences, Babol, Iran. Tel/Fax: (+98) 11-32196476
Email: uyahyapoor@yahoo.com.

Medical students have an occupational risk for acquiring measles and rubella infections and susceptible students may have a role in outburst of these diseases within healthcare centers, which may be potential sources of outbreaks particularly among immunocompromised individuals (7). The present study investigated immunity to measles and rubella in a group of Babol medical students and determined the prevalence of medical students susceptible to these infections.

Methods

The current cross-sectional study was conducted in 2012 (nine years after measles and rubella mass vaccination in Iran) in 191 medical students (preclinical and clinical) from College of Medicine and Health Sciences at Babol University of Medical Sciences. Data on vaccination was collected using a self-administered questionnaire. This study was approved by the Ethical Committee of Babol University of Medical Sciences and, for all subjects, written informed consent was obtained.

About 5 ml of peripheral blood was taken from each subject using sterile EDTA – containing tubes and then plasma was separated and frozen at -70°C until use. The plasma samples were assayed for Measles and Rubella IgG antibodies using enzyme-linked immunosorbent assay (ELISA) kits (NovaLisa™, NovaTec Immundiagnostica GmbH, Germany) according to the manufacturer's instructions.

The statistical analyses were performed using SPSS version 16 software (SPSS, Chicago, USA). Statistical differences between groups were assessed by χ^2 -test. *P* value of ≤ 0.05 was considered to be statistically significant.

Results

This investigation included 191 medical students. The mean age of the subjects (male 61, female 130) was 21.4 ± 2.2 years (range

18–34 years). As indicated in Table 1, a total of 96 (50.3%) subjects were seropositive for measles, whereas 189 (99%) cases were seropositive for rubella. Equivocal serologic result for measles and rubella were observed in 35(18.3%) and 1(0.5%) subjects, respectively. A total of 60 (31.4%) students had insufficient measles immunity or were totally non-immune, whereas non-immune status to rubella was seen in 1 (0.5%) subject (Fig. 1).

Discussion

Seroepidemiological studies are considered as an important surveillance method to monitor the impact of vaccination campaign on susceptibility to viral infections. Establishing serosurveillance programs has been involved in the successful control of measles and rubella in many countries, where age-specific data on susceptibility to the disease has influenced vaccine strategy. The present study investigates Immunity to measles and rubella in a group of Babol medical students, nine years after the Iran mass vaccination program in 2003.

The serological results of the current study showed that 49.7% of the students had insufficient measles immunity or were totally non-immune (equivocal plus negative for measles IgG). These results are inconsistent with previous reports from different regions of Iran. Two studies in Shiraz and Tehran, one and five years after mass vaccination revealed the presence of measles antibody in 87.5% (prevalence in 21-26 age group) and 88.5% of the studied subjects (8, 9). In addition measles antibody prevalence was reported in 90.3% and 91.6% of subjects in Babol and Tabriz, respectively (10, 11). Based on a comprehensive investigation among 900 subjects (under 25 years old) who referred to health care and medical center of Ahvaz during 2011, 91.2% had immunity to measles (12). In the present study, 99.0% of the students had sufficient rubella immunity, which is consistent with previous reports from Iran (6, 8,13).

Table 1: Seroprevalence of Measles and Rubella in Babol medical students.

Results	Rubella ¹			Measles ²		
	Male	Female	Total	Male	Female	Total
Positive (%)	61 (100)	128 (98.5)	189 (99)	25 (41)	71 (54.6)	96 (50.3)
Equivocal (%)	0 (0.0)	1 (0.8)	1 (0.5)	13 (21.3)	22 (16.9)	35 (18.3)
Negative (%)	0 (0.0)	1 (0.8)	1 (0.5)	23 (37.7)	37 (28.5)	60 (31.4)
Total	61 (100)	130 (100)	191 (100)	61 (100)	130 (100)	191 (100)

¹A positive result is >10 IU/mL, equivocal 5.0 to 9.9 IU/mL, and negative 0.0 to 4.9 IU/mL.

²A positive result is >0.70 relative fluorescence value (RFV), equivocal >0.50 to <0.70 RFV, and negative <0.50 RFV.

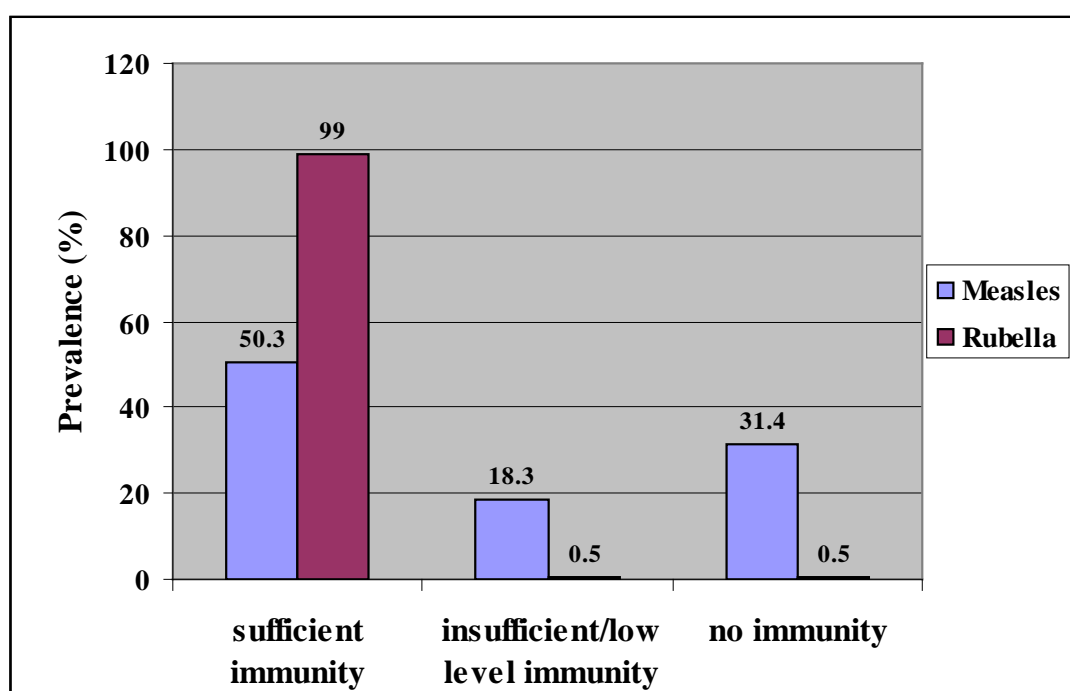


Fig. 1. Measles and rubella-seroprevalence in Babol medical students.

Conclusion

Taken together, the current investigation showed that 49.7% of the students had insufficient measles immunity and requires re-immunization. Based on our findings, pre-matriculation screening tests for measles antibodies should be performed in medical students before to enter university.

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