EVALUATION OF THE ANTIBODY IgG AGAINST RUBEALLA IN THE HEALTHY FEMALE MEDICAL STUDENTS OF ISFAHAN MEDICAL UNIVERSITY

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Abstract: Rubella is an infectious disease of children and adults which usually is associated with the symptoms such as fever, lymphadenopathy and rash. After infectious with rubella, a permanent immunity is developed against it. Regarding the severe congenital malformations attributed to the infection with rubella virus during pregnancy, routine vaccination against it has been recommended during early adulthood. To better clarify the need for routine vaccination against rubella in young adults, we evaluated the IgG serum level in the females. This was a cross sectional study performed in the Isfahan University of Medical Science students with age range of 18-26 years old. Overall, 96 female students were selected by simple sampling technique and antibody against rubella were checked in them using ELISA technique. Demographic data were obtained using questionnaires. The collected data were analyzed using SPSS program. Our study showed that 14.5% of the students were non-immune and 82.2% of them were immune to the rubella. The prevalence distribution of antibody against rubella in the unvaccinated students was also evaluated. Out of the 96 students, 93 students (96.8%) had no history of vaccination against rubella. Out of these 93 students, 4 students (15%) were non immune to rubella, 3 students had suspicious antibody level and 76 students (81.8%) were immune. Our study showed that 82.2% of the females in child bearing age are immune to rubella but only 3.1% of them had history of vaccination against rubella. Due to the low income and the cost of widespread vaccination, it can be concluded that routine vaccination of rubella is not necessary in Iran.

Key words: Rubella, Immunity, Vaccination, Iran

INTRODUCTION

Rubella is an infectious disease of children and adults that is usually associated with the symptoms such as fever, lymphadenopathy and rash. Rubella can be transmitted to the fetus during pregnancy and cause a severe malformation in the fetus that is called congenital rubella syndrome. Ever since the discovery of rubella vaccine in 1969, epidemic of this infectious disease is rarely reported [1,2].

After being infected with rubella, specific antibodies i.e., IgG and IgM and cell mediated immunity are developed in individuals that prevent the recurrent infection (1, 2). Therefore, after infection with rubella, a permanent immunity develops against it. The Presence of specific antibodies against rubella has been demonstrated 14 years after immunization (3).

The incidence of congenital rubella is varied in the different populations and depends on the numbers of susceptible populations and recent use of rubella vaccine (4). The most important factors in the pathogenesis of infection in the neonates are the pregnancy age at time of infectious (4). Acquired rubella is a mild disease and even may be subclinical that making its diagnosis difficult. The Laboratory diagnosis of rubella is based on the immunoassay measurement of IgG and IgM using ELIZA kit (1) The Presence of IgM against rubella shows an acute infection but the presence of IgG indicate a previous infectious that may show immunity against rubella.
based on the immunoglobulin serum level. In the current vaccination program of Iran, all of the infant aged 12-15 months are vaccinated against rubella and the second dose of vaccination is performed in the age of 4-12 Years old. It is also possible to perform vaccination in any non-pregnant individual who is susceptible to rubella. Vaccination against rubella is contraindicated in pregnancy. Regarding the hazards of rubella infection during pregnancy (especially in the first trimester), it is a common practice to measure antibody against rubella 3 months before pregnancy to determine immunity against it and in the case of insufficient immunity, the patients are advised for vaccination against it. The objective of the current study was to determine the level of IgG level against rubella in adult female university students to evaluate immunity state in them.

MATERIALS AND METHODS

A cross sectional study performed in the Isfahan Medical University female students aged 18-26 years old. Overall 96 female students were selected by simple sampling technique. Student with history of abortion or immunodeficiency or pregnant were excluded from the study. Written consent was obtained from all participants and the relevant data were recorded in especial questionnaires designed for this purposes.

Blood sampling was performed and the samples were sent to laboratory under the cold chain condition. In the laboratory, samples were centrifuged (4500 rpm for 3 minutes) and sera were removed and kept in 70 °C. Serum IgG level of the each sample was measured by Enzyme linked Immunosorbent Assay Technique (ELISA) using Trinity Biotech rubella IgG, USA kits.

The results of IgG test were categorized according to immune status ratio (ISR) in to 3 groups of immune (ISR $\geq$ 1.1), suspicious (0.9 < ISR < 1.1) and non immune (ISR < 0.9). The collected data were analyzed using SPSS software.

RESULTS

Overall 96 female students were evaluated. The mean age of evaluated students was 24.8 years old. 21 students (27.87%) were married and rest of them were single. 93 students (96.8%) knew the symptoms of the rubella infection. 17 students reported a history of rubella infection and 79 students (82.29%) did not report such a history. Out of 96 students, 39 students (40.6%) knew their contact with rubella infected patients and 57 students (59.3%) were unaware of it (Table 1).

Regarding the results of antibody against rubella, 14 students (14.5%) had antibody level less than 0.90 (i.e. negative for antibody against rubella), 3 students had antibody level between 0.9 – 1.09 (suspicious for antibody against rubella) and finally 79 students (82.2%) had antibody level $\geq$ 1.1 (i.e. positive for antirubella antibody).

The prevalence distribution of antibody against rubella in the unvaccinated students was also evaluated. Out of the 96 students, 93 students (96.8%) had no history of vaccination against rubella. Out of these 93 students, 4 students (15%) were non immune to rubella, 3 students had suspicious antibody level and 76 students (81.8%) were immune (Table 2).

<table>
<thead>
<tr>
<th>Prevalence</th>
<th>Number</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>&lt;0.9 (LU)</td>
<td>14</td>
<td>14.5</td>
</tr>
<tr>
<td>0.9&lt;ISR&lt;1.1 (LU)</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>1.1 (LU) $\geq$</td>
<td>79</td>
<td>82.2</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>100</td>
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</table>

<table>
<thead>
<tr>
<th>Vaccination History</th>
<th>Vaccinated Students</th>
<th>Unvaccinated Students</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibody Level</td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>&lt;0.9 (LU)</td>
<td>0</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>0.9&lt;ISR&lt;1.1 (LU)</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>1.1 (LU) $\geq$</td>
<td>3</td>
<td>100</td>
<td>76</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>100</td>
<td>93</td>
</tr>
</tbody>
</table>

Table-1: Prevalence distribution of the antibody against rubella in the female students:

Table-2: Prevalence distribution of the antibody against rubella in the vaccinated and unvaccinated students:
DISCUSSION

Our objective in this study was to evaluate the titer of IgG antibody against rubella in the females. For this purpose the students of Isfahan University of Medical Sciences were selected. The study showed that 14.5% of the students were non-immune and 82.2% of them were immune to the rubella. Researchers in other countries have shown that 6.71% of the females in the Canada 7.7% in Kuwait, 10% in the U.S.A and 60% in Bangladesh, were non-immune against rubella [6,7,8,9].

It is evident from our data that immunity against rubella in Iran was less than other 3rd world countries and more than developed countries. At the time of this study, rubella vaccination was not routinely performed for the susceptible people in Iran. In this study, only 3.1% of the evaluated students were vaccinated and all of them were immune. Thus 96.9% of them were not vaccinated. In the unvaccinated group, 81.8% were immune to rubella and 15% were non-immune. The possible mechanism involved in immunity of these unvaccinated students is infection with the rubella virus in the childhood period that might be asymptomatic.

From overall study, it can be accomplished that the most cases of rubella are asymptomatic. This fact may be a warning to pregnant females who may have a contact with the people encompass asymptomatic rubella. In the USA, despite widespread vaccination program, the immunity level is 90% only [10]. Our study showed that 82.2% of the females in child bearing age are immune to rubella but only 3.1% of them had history of vaccination. Thus it can be concluded that routine vaccination of rubella is not necessary in Iran.

After thoroughly analyzing the data of present study, we feel that for precaution, a routine screening of the anti rubella antibody should be carried out in all young females before marriage or at least 3 months before pregnancy and in case of insufficient immunity against rubella, vaccination against it should be performed.

REFERENCES