SEROPREVALENCE OF RUBELLA AMONG ASYMPTOMATIC PREGNANT WOMEN IN A RURAL TEACHING HOSPITAL

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ABSTRACT

Rubella although a mild viral illness, is of high public health importance owing to the teratogenic effects that can result from congenital rubella infection. The aim of this study was to determine the seroprevalence of rubella virus IgG among pregnant women attending ante-natal clinic in Tamil Nadu. A total of 100 sera from ante-natal women who attended a camp in Tertiary Care Hospital was analyzed by using the Rubella IgG ELISA kit (DSI DIAGNOSTICS). Of the 100 antenatal women, 90 were found to be immune to rubella and the rest 10 were seronegative. Majority of seronegative had Bad Obstetric History (BOH) and they belonged to the age group 21-25 years. The immunity to rubella wanes as the age increases. Hence there is a need to emphasize vaccination for adolescent girls.

KEYWORDS: Rubella, Ante-Natal Women (ANC), Bad Obstetric History (BOH)

INTRODUCTION

Rubella is mainly a disease of children affecting the skin and lymph nodes.1 The etiologic agent is a positive sense single-stranded RNA rubella virus in the family Togaviridae.2 The virus is transmitted by respiratory route and replicates in the nasopharynx and lymph nodes.3 The disease is of much concern in pregnant women where it acts as a teratogen and causes multiple birth defects collectively known as congenital rubella syndrome (CRS).4 Humans are the only known reservoir for rubella virus; hence, its maintenance requires continuous access to a susceptible population. Rubella is preventable with the rubella vaccine with a single dose being more than 95% effective.5 Often it is given in combination with the measles vaccine and mumps vaccine, known as the MMR vaccine.1

In spite of the availability of a safe and effective vaccine against rubella, an estimated over 100,000 infants are born with congenital rubella syndrome annually worldwide6. According to the estimates based on a statistical model derived from the seroprevalence data from SEAR during 2000-2009, 46,621 infants with CRS are born annually in South East Asian Region (SEAR) alone.7 Additionally, approximately 3 to 23% of adults remain susceptible to rubella virus infection in various countries and areas, although studies have shown that a large
proportion of unimmunized populations in areas where rubella is endemic are infected and become seropositive before puberty. In addition to appropriate vaccination with good coverage, adequate surveillance of CRS is needed to ensure continued control.

**AIM**

The aim of this study was to determine the seroprevalence of rubella virus IgG among pregnant women attending ante-natal clinic in a tertiary care hospital in Tamil Nadu.

**MATERIALS & METHODS**

**Setting of the Study:** This study was conducted in a tertiary rural teaching hospital, near Trichy, Tamil Nadu, from a camp conducted for antenatal women in the months of June to August 2015.

**Sample Size:** Total number of samples collected were 100.

**Inclusion Criteria:** Ante-natal women of age group between 15 and 40, both primi gravida and multi gravida belonging to all three trimesters of pregnancy with different socio-economic status from places in and around Trichy. All antenatal women were asymptomatic; antenatal women with history of previous abortions were also included in the study.

**Exclusion Criteria:** Ante-natal women with active lesions, rash, fever, lymphadenopathy, and arthralgia were excluded from the study.

**Institutional Ethics Committee Certificate:** The research proposal was presented before IEC and certificate was received from the IEC committee.

**Informed Consent:** Informed consent was obtained from the women participating in this study. A structured proforma was used to collect a detailed history.

**Methodology**

3ml of blood sample was collected and serum was separated and stored at 4°C until analysis. The IgG antibodies were detected using the Rubella ELISA kit (DSI Diagnostics). The result was interpreted as seropositive if the antibody titre was more than 10 IU/ML as per the kit insert.

**Statistics**

Simple descriptive statistics was used in this study.

**RESULTS**

<table>
<thead>
<tr>
<th>S.no</th>
<th>Sociodemographic details</th>
<th>Number/ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15-20</td>
<td>19 (19%)</td>
</tr>
<tr>
<td></td>
<td>21-25</td>
<td>46 (46%)</td>
</tr>
<tr>
<td></td>
<td>26-30</td>
<td>17 (17%)</td>
</tr>
<tr>
<td></td>
<td>31-35</td>
<td>10 (10%)</td>
</tr>
<tr>
<td></td>
<td>36-40</td>
<td>08 (08%)</td>
</tr>
</tbody>
</table>
The antenatal women who participated in the screening study belonged to the age group of 15-40. Most of the women belong to the age group of 21-25 (46%). (78%) of women did not cross graduation. (80%) of women belonged to middle or lower middle socio-economic status and (66%) of women were from urban area.

Table 2: Seroprevalence of Rubella IgG Among Antenatal Women(n=100) According to Age

<table>
<thead>
<tr>
<th>S.No</th>
<th>Age</th>
<th>No Tested</th>
<th>Rubella IgG Positivity(%)</th>
<th>Rubella IgG Negativity(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15-20</td>
<td>19</td>
<td>17(17%)</td>
<td>2(2%)</td>
</tr>
<tr>
<td>2</td>
<td>21-25</td>
<td>46</td>
<td>39(39%)</td>
<td>7(7%)</td>
</tr>
<tr>
<td>3</td>
<td>26-30</td>
<td>17</td>
<td>16(16%)</td>
<td>1(1%)</td>
</tr>
<tr>
<td>4</td>
<td>31-35</td>
<td>10</td>
<td>10(10%)</td>
<td>NIL(0%)</td>
</tr>
<tr>
<td>5</td>
<td>36-40</td>
<td>08</td>
<td>08(08%)</td>
<td>NIL(0%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>90(90%)</td>
<td>10(10%)</td>
</tr>
</tbody>
</table>

Figures in Parenthesis Denote Percentage

Out of the seropositive women (7%) were from the age group of 21-25 years, (2%) were from the age group of 15-20 and (1%) belonged to the age group of 26-30 years. Out of the ten seronegative cases 7 were associated with bad obstetric history while 3 did not have any history of abortions.

Figure 1: Percentage of Antenatal Women in Different Trimesters
DISCUSSIONS

Rubella although a mild viral illness is of high public health importance owing to the teratogenic effects that can result from congenital rubella infection (CRI), leading to miscarriage, fetal death or birth of an infant with congenital rubella syndrome (CRS). (11, 12, 13) Prior to the introduction of universal immunization programs, rubella was endemic worldwide and peak infection occurred in the 5-9 year old age group. (14) After vaccine implementation, the disease shifted from children to young adults. However, a substantial number of women of childbearing age (10-25%) were reportedly susceptible to rubella. (15)

The overall age of the study participants ranged from 19-44 years of age, with the majority of women from the age group 21-25years. This is comparable with the studies done by Olatunji et al and Obijimi et al, Nigeria. (15) In this study, age-wise seropositivity to rubella was found to decrease with increasing age, possibly due to more frequent exposure of the younger age groups to rubella virus with the waning of seropositivity with age. (16)

More than 80% of the women belong to lower socio-economic status. It is comparable to a study done in Srilanka in 2003. In this study urban women are immune to rubella. This is because rural pregnant females are more susceptible to rubella than urban females because of overcrowding, more members in a family and hence the secondary attack is more.

Waning immunity is not important following natural infection with rubella but it has been documented that the antibody level declines over time in vaccinated persons. In this study women belonging to age group 21-25 are more susceptible to rubella infection. Higher immunity in the younger age group could also be due to persistence of immune response to measles mumps rubella (MMR) vaccination in childhood and thereby of the 10 seronegative people remain susceptible to infection. This is in concordance with the study done by Palihawadana et al in srilanka in the year 2003 (17) and is contrary to the study done by Ekta Gupta et al from AIIMS in the year 2004. (18) It is not clear as age increases the women acquires sub clinical infection from their children and become immune to it. Further studies have to be performed in this area.

Women with Bad Obstetric History (BOH) are more vulnerable to rubella infections. In the present study 7 out of 10 seronegative women were having BOH. So it is of utmost importance that any woman of reproductive age should be analyzed for TORCH infections particularly rubella.

This is because virus has teratogenic properties and is capable of crossing the placenta and infecting the fetus where it stops cells from developing or destroys them. (3)

Table 4: Comparison of Rubella Antibodies (IgG) by ELISA with other Studies Across the Globe

<table>
<thead>
<tr>
<th>S.No</th>
<th>Article</th>
<th>Total Samples Tested</th>
<th>Seropositivity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2014,Nigeria,Olatunji et al 13</td>
<td>200</td>
<td>175(87.5%)</td>
</tr>
<tr>
<td>2</td>
<td>2001,Australia,G.C Gilbert et al 14</td>
<td>3000</td>
<td>2820(94%)</td>
</tr>
<tr>
<td>3</td>
<td>2005,Western Cape, Craig Corcoran 15</td>
<td>1200</td>
<td>1158(96%)</td>
</tr>
<tr>
<td>4</td>
<td>2003,Srilanka,Palihawadana et al 17</td>
<td>620</td>
<td>471(76%)</td>
</tr>
<tr>
<td>5</td>
<td>2004,North India Ekta Gupta et al 18</td>
<td>305</td>
<td>265(87%)</td>
</tr>
<tr>
<td>6</td>
<td>2003,South India,Padmaja et al 19</td>
<td>485</td>
<td>318(65%)</td>
</tr>
<tr>
<td>7</td>
<td>2015,South India,Current study,**</td>
<td>100</td>
<td>90(90%)</td>
</tr>
</tbody>
</table>

Figures in parenthesis denote percentage
CONCLUSIONS

The seroprevalence of Rubella IgG antibodies in the current study was 90% meaning they are all immune as 66% came from urban areas. The immunity to rubella exists till the age of twenty due to the MMR vaccine taken in childhood and decreases after that. The women become immune later by infection acquired from their children. Protection from rubella can be provided by the adolescent vaccine. Rubella not only causes 1st trimester abortions but also congenital rubella syndrome if the pregnancy continues. Therefore not only the importance of the adolescent vaccine should be emphasized upon but also awareness should be created among the ante-natal women about rubella and its adverse outcomes. This study will help in further studies on Rubella and thus create awareness and change the attitude of the people about rubella infection and its consequences.

LIMITATIONS

- Sample size is small.
- Single center study.
- Titre values not determined by other techniques hence comparative statistics cannot be done.

REFERENCES


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