



## Seropositivity of Anti-Rubella antibodies among Health Care Professionals

### KEYWORDS

Rubella, Seroprevalence, IgG, Health care professionals, Rubella vaccination

### Velvizhi G

M.D., Department of Microbiology,  
Tirunelveli Medical College,  
Tirunelveli - 627 011, Tamil Nadu,  
India

### Sucilathangam G

M.D., Department of Microbiology,  
Tirunelveli Medical College,  
Tirunelveli - 627 011, Tamil Nadu,  
India

### Anna T

Ph.D., Professor and Head,  
Department of Veterinary  
Parasitology, Veterinary College and  
Research Institute, Tirunelveli, Tamil  
Nadu.

### ABSTRACT

*Rubella is traditionally considered a childhood disease but has the potential to cause outbreaks in hospital set ups. It is important to know the susceptibility status of health care workers (HCWs) as to frame guidelines for their immunization and thus prevent hospital outbreaks. The rubella susceptibility status of 90 HCWs working in the institute was assessed. This study was initiated after we reported an outbreak due to rubella among HCWs of our institute. The serum samples were tested to determine Rubella IgG titres by enzyme linked Immunosorbent assay (ELISA). Overall, 48 (15.3%) subjects were found to be negative, thereby indicating their susceptibility to infection. Out of them, 29 (60.5%) were in contact with pregnant women during the course of their employment. There is a risk of nosocomial transmission of rubella from affected HCWs to their contacts especially pregnant women as many of the rubella infections are asymptomatic. Hence, we stress the need for vaccinating the HCWs at the start of their employment to contain the spread of infection and also to reduce the risk of outbreaks in work place.*

### Introduction

Rubella is an acute febrile illness characterized by rash, fever and lymphadenopathy, but when it is contracted in the first trimester of pregnancy, it can infect the foetus and cause the devastating condition of congenital rubella syndrome (CRS). Congenital Rubella syndrome is an important cause of blindness, deafness, congenital heart diseases and mental retardation.<sup>[1]</sup>

According to Cutts *et al*, more than 1million infants worldwide are born with CRS every year and in 1996 there were 1.1 million infants affected by CRS in developing countries. Serosurveys from 45 developing countries have shown a wide range of susceptibility to rubella from 10 to 25%.<sup>[2]</sup> Congenital rubella syndrome (CRS) accounts for a significant amount of mortality and morbidity in India as well.<sup>[1]</sup>

Occupational exposure of the health care personnel to rubella infection deserves special attention. Health care personnel without protective anti-rubella antibodies are at high risk of getting rubella infection. If health care providers are not immune to rubella they are at risk of contracting it, especially from their patients. Occupational exposure (doctors, nurses, lab technicians etc.) is another factor that increases the chances of contracting rubella infection in the hospital environment.<sup>[3]</sup>

Serosurvey studies among the hospital personnel from various countries showed that 2.4-36.3 per cent of the female health care workers were seronegative against rubella and were at the risk of acquiring infection.<sup>[4,5]</sup> Health care professionals should be vaccinated at the beginning of their medical training.

As there are very few studies from this part of country with respect to rubella immunity in the medical community, this serosurvey was conducted to assess the burden of rubella among health care professionals and to assess the association between seropositivity and sociodemographic variables.

### Materials and Methods

#### Study design and settings

This prospective study was conducted at the Microbiol-

ogy Department at Tirunelveli Medical College Hospital, Tirunelveli, Tamil Nadu from May 2013 to October 2013. The study protocol was approved by the Institutional Scientific and Ethics Committee.

#### Study population

Subjects aged between 15-40 years were included in the study. All the subjects were given background information about the study. Those who provided an informed consent to participate were enrolled. A detailed pre-structured questionnaire was administered on socio-demographic profile and vaccination history.

#### Sample collection

A 5ml blood specimen was obtained from each subject. The serum was separated and stored at the study site at 4-8 °C.

#### Rubella IgG ELISA

Rubella specific IgG antibodies were detected using a commercial IgG Enzyme Linked Immunosorbent Assay (ELISA). All subjects were informed about the results. Seronegative subjects were counselled and were advised to undergo RA 27/3 vaccination.

#### Results

Of the 90 participants, majority were DMLT students 68 (76.7%) followed by MBBS students 15(16.7%), lab technicians 5(5.5%), doctor 1(1.1%), ECG student 1 (1.1%). **Table 1** shows the distribution of the subjects according to their educational status. The age range of the participants was 18-40 years. Among the 90 subjects, 76 (84.6%) were positive for IgG antibodies and 14(15.6%) were seronegative for IgG antibodies against rubella. The age-wise distribution of seropositive and seronegative HCW is shown in **Table 2**. Three (3/14, 21.42%) of the seronegative workers were married. The proportion of seronegative workers was not significantly ( $P > 0.5$ ) higher among the married workers (21.1%) than among single workers (78.57%).

#### Discussion

Rubella is an infectious disease affecting all age groups and both sexes. Health care personnel without protective anti-rubella antibodies are at high risk of getting rubella infection.

Majority of such rubella infections are subclinical and hence there is a risk that infected HCWs may unknowingly transmit the virus to other patients or staffs.

Typically in developing countries like India, nursing staff, students and resident doctors have rotational duties in different sections of the hospital; hence the spread of rubella may occur far and wide leading to institutional outbreaks as has been reported from Bangalore, Vellore and also from Chandigarh. [6-8] This study revealed that 15.6% were seronegative. This is in concordance with the data from a study by Chan PK et al who have shown that, among 134 health workers, 16.4% were susceptible to rubella infection [4] The major portion of seronegativity was observed in participants of 15-20 year age group. (15.9%) .This is in agreement with a study from Tamil-Nadu; by Nalini Ramamurthy et al showed 13.5% of females between 10-16 years were seronegative for rubella [9,10].

Among other seroprevalence studies done in India, C Valsan et al from Kerala, revealed that protective level of antibodies was present in 73(58.8%) but absent in 42(33.8%) of health care students, [11]. In a study by N Singla et al on Seroprevalence of rubella in a medical community at Amritsar district (Punjab), India, 20% were found to be susceptible with the risk of acquiring rubella infection. [12]

Perumalsamy Vijayalaxmi et al in their study observed that among 1000 female hospital personnel aged between 18-40 years, 150(15%) of were seronegative. [3] Thanapal Amala Rajasundari et al. have shown 11.4% seronegativity in 581 health care professional volunteers (59 females and 7 males). [13] Significant proportions of the female population in India are at risk with non-immune percentages ranging between 11.4-33.8% across the country. The need of the hour is to vaccinate this population with rubella vaccine thus preventing CRS.

Studies across the globe have shown the following data. A study done among healthy university students in S. Korea by Kye Sook Park showed that, 26.9% of healthy women in the 18- 26 year age groups did not have sufficient immunity against rubella virus. [14]

In pregnant women and women of child bearing age, reports by Sasmaz T et al and Seker et al from Turkey indicate that rubella seropositivity varies widely, ranging from 55% in Mersin province to 100% in Istanbul city [15,16]. Barah F & Chehada AG have shown a 14.4% susceptibility in healthy female students of a pharmacy college in Syria. [17]

According to, Mou J et al 22.4% of female migrant factory workers in Shenzhen, China were not immune against rubella virus. [18] A Nessa et al also have shown a seropositivity of 77.4% among females of both urban & rural areas of 16-20 age groups in Bangladesh. Thus there exist a significant percentage of seronegative subjects worldwide as well, who need to be vaccinated against rubella in order to prevent

CRS. [19] World over, 124 countries have reported a national policy of rubella vaccination in 2002. Although studies indicate that rubella immunisation is a cost effective means of reducing the impact of CRS, India and other South Asian countries except Srilanka and Maldives have not included this vaccine in their national immunisation programmes. [20]

### Conclusion

The key elements to prevent rubella outbreak is to ensure a high level of rubella immunity through effective immunization as is done in the developed nations. As per guidelines of Indian Academy of Paediatrics, Measles Mumps Rubella (MMR) vaccine should be given to seronegative hospital staffs that frequently come in contact with pregnant mothers. In the health care set up, vaccination of both female and male HCWs is desirable at the time of employment both for self protection and also to restrict further spread of the virus in the hospital and in the community at large. It is worthwhile to have an institutional policy on rubella vaccination among hospital staff, medical and nursing students following routine screening for serostatus at the time of their employment to prevent hospital-based outbreaks. This will also reduce the risk of CRS in children born to immunized HCW as presence of maternal rubella specific IgG antibodies is protective.

**Table -1 Distribution of subjects according to Educational status**

Education	No (%)
MBBS Students	15(16.67%)
Doctors	1(1.11%)
DMLT Students	68(75.56%)
Lab technicians	5(5.56%)
ECG Student	1(1.11%)
Total	90

**Table -2 Seropositivity in relation to age of subjects**

Age group(years)	Number	IgG positive	IgG negative
15-20	63	53(84.12%)	10(15.9%)
21-25	14	13(92.85%)	1(7.14%)
26-30	10	10(100%)	0
31-35	1	0	1(100%)
36-40	2	1(50%)	1(50%)

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