

# Rubella Immune Status of Pregnant & Non-pregnant women in Indian Population

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## Abstract

**Objective:** This study was undertaken to determine in a cross-sectional survey whether rubella virus circulation in the Indian population induces detectable immunoglobulin G (IgG) antibodies with a protective level, in a random group of pregnant & non-pregnant women.

**Methods:** Rubella-IgG antibody status was assessed in 1182 Indian women comprising of 617 pregnant women, 497 non-pregnant women of childbearing age group and 68 women who suffered from miscarriage.

**Results:** Rubella IgG was detected in 91.73% of pregnant women, 88.93% of non-pregnant women of childbearing age and 92.65% of women who had miscarriage. Rubella IgG antibody titers amongst the Indian women studied ranged between 15-272 IU/ml.

**Conclusion:** Majority of the Indian women appeared to possess protective level of Rubella IgG antibodies. However there is a significant group that does not possess the immunity. Screening to pick up such women is necessary so that rubella vaccine can be offered to such women for the protection of offspring's born in subsequent pregnancy.

## INTRODUCTION

Rubella (German measles) meaning 'Little Red' is a viral exanthema of childhood that is generally sub-clinical and inconsequential. Devastating teratogenic effects also known as congenital rubella syndrome however, make rubella a virus of major public health importance when it occurs in pregnancy [1,2,3].

It is over 50 years since the syndrome of congenital abnormalities following maternal rubella infection was first recognized. Despite this rubella immunization rates are not optimal and infections during pregnancy still occur [4,5,6]. Many countries do not incorporate rubella vaccine in their national immunization program. Therefore, 5 to 25% of women of childbearing age lack Rubella IgG antibodies and are susceptible to primary infection [2,7]. There is dearth of information on the immune status of Indian women against Rubella infection. The evaluation of immunity to rubella virus relies on presence of specific antibodies and its titers in blood.

Rubella Immunoglobulin G (IgG) test is done to evaluate whether a woman is immune to rubella as a result of childhood exposure or immunization, or whether she may be presently infected with the disease. Although the disease itself is not serious in adults, it can cause miscarriage, stillbirth or damage to the fetus during the first trimester of pregnancy. The rubella IgG test is regarded as a more reliable indicator of the patient immune status than her history, because re-infection with rubella is possible even after immunization [8].

When a woman is infected with the rubella virus, the body produces both Immunoglobulin G (IgG) and Immunoglobulin M (IgM) antibodies to fight against infection. Once IgG exists, it persists for a lifetime, but IgM antibody usually wanes over six months. If rubella IgG is present it can confirm that a patient has immunity to rubella. Specific IgG determination is performed through enzyme linked fluorescent assay (ELFA) techniques. The results are expressed in IU/ml.

## MATERIALS & METHODS

The prevalence of Rubella IgG antibody was assessed in random group of pregnant, non pregnant women of childbearing age group and those who had miscarriage Total 1182 women of 22-40 years of age (average 25.2 years) were subjected to Rubella IgG test in one year duration i.e., from April 04 to March 05. Out of 1182 women, 617 women were pregnant, 497 were non-pregnant women of childbearing age group and 68 women were those who had miscarriage. History of Rubella vaccination was found in 34 females out of which 15 were pregnant and 19 women were non-pregnant.

Blood samples taken from these women were referred to the laboratory to be serologically tested for rubella. The blood samples were obtained through venous puncture using the vacutainer system in a tube. In the laboratory, each sample was centrifuged and the serum processed by ELFA method using mini VIDAS system following the set recommendation. Determination of Rubella specific IgG antibodies using quantitative vidas is a precise and reliable method [9].

Reference ranges for IgG in the ELFA were as follows: negative: below 10 IU/ml, inconclusive between 10 and 15 IU/ml and positive equal to or above 15 IU/ml. We suggested repeating the two tests, both IgG and IgM, two weeks later in all cases of indeterminate results.

## RESULTS

Out of the 1182 women tested for rubella IgG, 1071(90.61%) had positive results; negative results were seen in 100(8.46%) women. Equivocal results observed in 11(0.93%) of the total female subjects, but none of these returned to be tested again.

Positive results among pregnant, non pregnant and women who had history of miscarriage were 91.73%, 88.93%, and 92.65% respectively. 7.62% of pregnant women, 9.66% of non-pregnant women and 7.35% of women who had miscarriage had negative results for IgG (Table I).

**Figure 1**

Table 1

S.No.		POSITIVE		NEGATIVE		EQUIVOCAL	
1.	PREGNANT (617)	566	91.73%	47	7.62%	4	0.65%
2.	NON-PREGNANT (497)	442	88.93%	48	9.66%	7	1.41%
3.	MISCARRIAGE (68)	63	92.65%	5	7.35%	-	-

The Rubella IgG antibody titers showed noticeable variability that ranged between 15-272 IU/ml (average 94.3 IU/ml)

Levels ranged between 15 and 50 IU/ml in 443(41.36%) women between 50-200 IU/ml in 509 (47.53%) and >200 IU/ml in 119 (11.11%) of women.

All the 34 females who had received rubella vaccination in the past had showed positive results with antibody titers ranging between 82-250IU/ml (average 148). There is no significant statistical difference in Rubella immune status and antibody titers in women from rural and urban population (Table II).

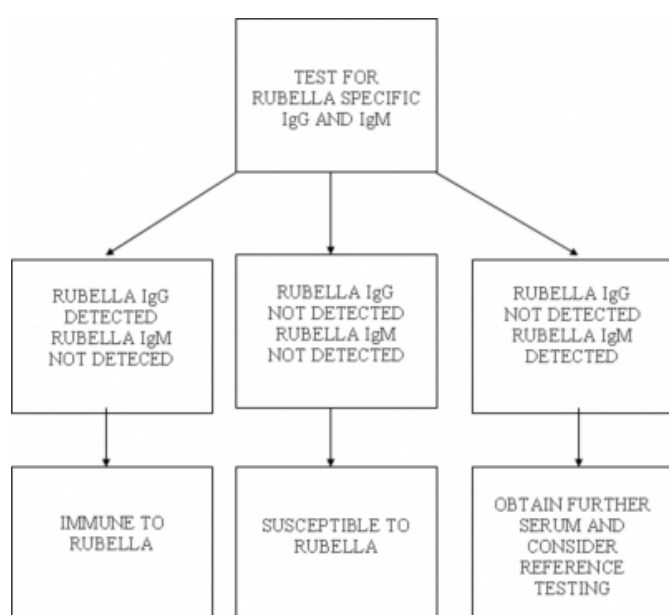
**Figure 2**

Table 2

RANGE	FEMALE	PERCENTAGE
15-50 IU/ML	443	41.36%
50-200 IU/ML	509	47.53%
>200 IU/ML	119	11.11%

## DIAGNOSIS

**Figure 3**



## DISCUSSION

This study determines the immune status of pregnant and non-pregnant women in native population of Indore. In the studied population 90.61% women were immune to rubella. Reis et.al. [10] reported positive results in 84% of the patients and most of them had high levels of antibodies. Cuzy et al [8], Palihadwadana et.al. [1] and Onyenekwe et.al. [3] reported 76% positive results. Bamboye et.al. [2] reported positive results in 68.5% of the female subjects. In our study 8.46% of the women were non-immune to rubella. The incidence is similar to that reported by a number of authors [1,2,5,8,10]. Noticeable variability ranging from 15-272IU/ml was observed in our study. Seker et.al. [3] showed similar variability in serum IgG level that ranged between 24-143 IU/ml. Higher values were observed in women more than 28 years (average 30.2) of age. Seropositivity in pregnant females increases with age. Bamgboye et.al. [2] found statistically significant higher prevalence of antibody in rural population than those in urban areas. Female subjects who had values >200IU/ml were asked to get their Rubella IgM done. No conclusions can be made, as patient's cohort was not significant. All the pregnant women who were non-immune to rubella were followed till 6 weeks of delivery. Neonatal outcome was similar to that of immune group.

Though none of our neonate suffered from congenital rubella syndrome, still teratogenic affects of rubella infection is well known. Although majority of the studied population appeared to possess protective levels of Rubella IgG antibodies, screening for protective immunity appears

always to be necessity for future protection against reinfection.

During the course of our study it was observed that initial poor compliance of patients was slowly replaced by gradual acceptance. This change of attitude is not self-sustainable in a traditionally hierarchical system and requires constant persuasion.

Most of the women questioned us about the significance of the test while the test was offered to them. Good compliance was seen because of better understanding of disease and regular follow up. Every woman in the study was asked about her knowledge regarding Rubella vaccination. Only 86 women knew about it and out of them 34 had vaccinated themselves for Rubella virus. Clinicians must systematically check rubella serology in all the women desiring pregnancy and/or have reproductive age even if they have been vaccinated [11]. Rubella serology must be checked in all pregnant women even if they were seropositive during a previous pregnancy [11].

Prenatal screening and vaccination of seronegative women is recommended to reduce morbidity and mortality related to rubella virus [2,3]. A policy has

been established at our clinic that women without immunity should receive immunization against rubella provided that they avoid pregnancy for a period of 8 weeks following immunization. Also all young unmarried girls should receive Rubella vaccine. Kukino et.al. [12] found 100% seroconversion rate when seronegative subjects were vaccinated for Rubella. All women in the studied group accepted a dose of rubella vaccine.

Considerations should be made on the necessity for a mass rubella vaccination program [1] and to increase the awareness through media. Test for detection of antibodies are to be carried out routinely as a protocol of premarital study and women of reproductive age.

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