



Research Article

SEROLOGICAL STUDY FOR RUBELLA VIRUS INFECTION IN WOMEN WITH BAD OBSTETRIC HISTORY

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Abstract- Rubella virus when contracted during pregnancy results in miscarriage, stillbirth or congenital rubella syndrome (CRS), characterized by deafness, heart disease and cataract. In the present study, blood samples were obtained from 200 antenatal women aged 19-35 years with Bad obstetric history. Sera was separated and tested using ELISA kits provided by Ratio Diagnostics, Frankfurt, Germany. 32 and 92 samples were positive for Rubella IgM and IgG antibodies respectively. Only 8 cases were positive for both Rubella IgM and IgG. Rubella seropositivity was highest amongst women who had history of abortion (41.94%) followed by intrauterine death (22.58%). Maximum number of cases (58.06%) belonged to 25-30 years age group, 40.32% cases were in 19-24 years age group. Majority of cases (60.48%) belonged to rural areas. 45.16% seropositive women were housewives, 27.42% were farmers, 19.35% women were labourers. 37.09% cases had education till primary or middle school level and 34.67% cases were illiterate. Thus, we concluded that women of this geographical area may be contracting Rubella infection due to poor hygienic conditions, low level of education, staying indoors which implied poor living conditions.

Keywords- Rubella, congenital rubella syndrome (CRS), Bad obstetric history (BOH), Immunoglobulin G (IgG), Immunoglobulin M (IgM), ELISA

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Introduction

Rubella virus generally causes common childhood infection although transient arthropathy may occur in adults. Acquired (i.e. not congenital) Rubella is transmitted via air borne droplet emission from the upper respiratory tract of active cases. Human is the only known natural host for the virus [1]. Children recover more quickly than adults. If contracted during pregnancy, it may result in miscarriage, stillbirth or an infant born with congenital rubella syndrome (CRS), characterized by deafness, heart disease, cataract or other permanent congenital manifestations [2]. In developing countries, more than 100,000 children are born with CRS each year [3,4]. The sero-positivity for rubella among pregnant women varies widely in different countries. In developing countries, Rubella sero-positivity among pregnant women has been reported to range from 54.1% to 95.2% [5]. Clinical diagnosis of Rubella during pregnancy proves difficult as only approximately 50% of the infected people present with typical exanthematous skin lesions [5,6]. Hence, serological screening of Rubella, based on the detection of immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies, remains the mainstay for diagnosis. Therefore, the present study is undertaken to screen all antenatal cases with bad obstetric history for Rubella infection as early diagnosis and appropriate intervention, will help in proper management of these cases. The study also assesses some socio-demographic factors like age, education, occupation and residence that increase the risk of infection rate among antenatal women. This would not only provide current information on the numbers of women with BOH at risk of these viral infections but also provide useful information for health promotion activities

Materials and Methods

This study was approved by the Institute Ethical Committee and conducted for a

period of 1 year and 6 months, from January 2015 to June 2016. Blood samples were obtained from 200 antenatal women aged 19-35 years with Bad obstetric history (BOH) in the form of two or more consecutive spontaneous abortion, intrauterine fetal death, still birth, early neonatal death and congenital anomalies. Women with any other medical and obstetric conditions such as Hypertension, eclampsia, heart disease, gestational diabetes mellitus, thyroid dysfunction, Ovarian or cervical carcinoma were excluded.

Rubella testing using ELISA kits

After obtaining consent from each woman, approximately 5mL of venous blood was collected in a container with strict aseptic precautions. Serum was extracted from the blood samples by centrifugation at 2500 rpm for 10 minutes. Serum sample for each case was tested for the presence of Rubella IgM and IgG antibodies using ELISA kits provided by Ratio Diagnostics, Frankfurt, Germany. The test was performed according to the manufacturer instructions. The absorbance / optical density (OD) of the solution in the wells was read using a microplate reader at a wavelength of 450 nm.

Interpretation of the results

The ratio between the OD value of the sample and that of the cut-off control was calculated. The sample was considered positive if the ratio was >1.1 and negative if the ratio was < 0.9.

Results

Out of the 200 samples tested, 32 were positive for Rubella IgM antibodies. Thus, the prevalence of Rubella IgM seropositivity was 16.00%.

Table-1 Result of Rubella IgM and IgG antibody ELISA

Result	Interpretation	No. of cases	Percentage
Only IgM positive	Primary Rubella infection	24	19.35%
Both IgM and IgG positive	Secondary Rubella infection	08	6.45%
Only IgG positive	Past Rubella infection	92	74.19%
Total		124	100%

Table-2 Bad Obstetric history of Rubella seropositive cases

Bad Obstetric history	Primary Rubella Infection	Secondary Rubella infection	Past Rubella Infection	Total
Abortion	09 (7.26%)	04 (3.23%)	39 (31.45%)	52 (41.94%)
Intrauterine death	06 (4.84%)	02 (1.61%)	20 (16.13%)	28 (22.58%)
Intrauterine growth restriction	04 (3.23%)	01 (0.81%)	11 (8.87%)	16 (12.90%)
Early neonatal death	03 (2.42%)	01 (0.81%)	14 (11.29%)	18 (14.52%)
Preterm labor	02 (1.61%)	0.00	08 (6.45%)	10 (8.06%)
Congenital malformation	0.00	0.00	0.00	0.00
Total	24 (19.35%)	08 (6.45%)	92 (74.19%)	124(100%)

Tabl-3 Age - wise distribution of Rubella seropositive cases

Age group (years)	Primary Rubella Infection	Secondary Rubella infection	Past Rubella Infection	Total
19-24	06 (4.84%)	02 (1.61%)	42 (33.87%)	50 (40.32%)
25-30	18 (14.52%)	06 (4.84%)	48 (38.71%)	72 (58.06%)
31-36	0.00	0.00	02 (1.61%)	02 (1.61%)
Total	24 (19.35%)	08 (6.45%)	92 (74.19%)	124 (100%)

Table-4 Residence of Rubella seropositive cases

Residence	Primary Rubella Infection	Secondary Rubella infection	Past Rubella Infection	Total
Rural	19 (15.32%)	05 (4.03%)	51 (41.13%)	75 (60.48%)
Urban	05 (4.03%)	03 (2.42%)	41 (33.06%)	49 (39.52%)
Total	24 (19.35%)	08 (6.45%)	92 (74.19%)	124 (100%)

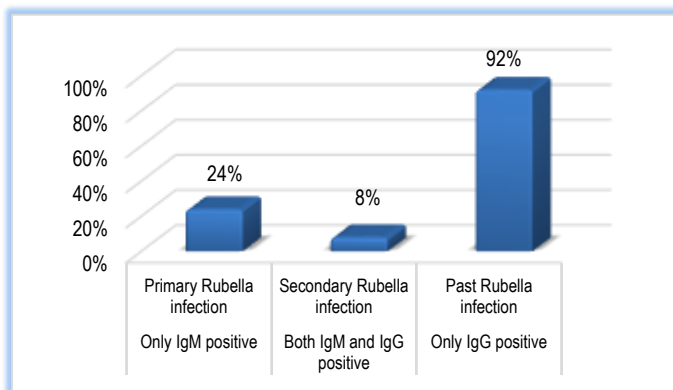


Fig-1 Result of Rubella IgM and IgG antibody ELISA

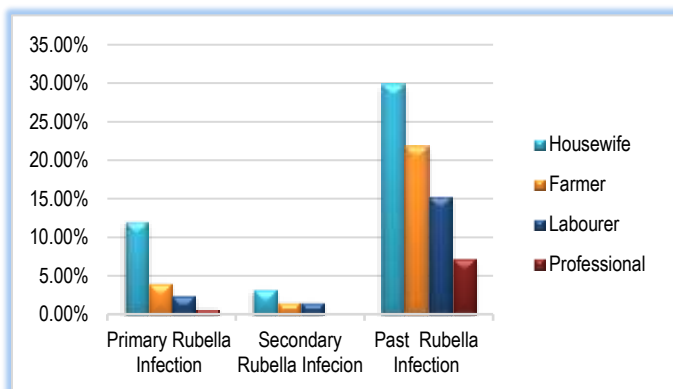


Fig-2 Occupation of Rubella seropositive cases

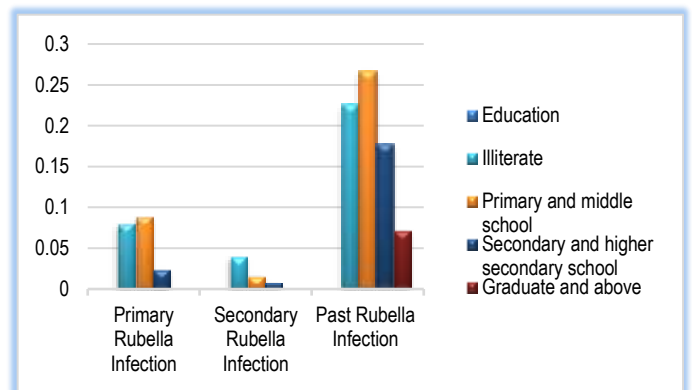


Fig-3 Educational level of Rubella seropositive cases

group and only 2 (1.61%) cases were in the 31-36 years age group [Table-3]. Out of 124 Rubella positive cases, majority of the cases [75 (60.48%)] belonged to rural areas. Primary, secondary or past Rubella infection was seen more in rural areas [Table-4]. Out of 124 Rubella seropositive cases, 56 (45.16%) were housewives, 34 (27.42%) were farmers, 24 (19.35%) were laborer's whereas 10 (8.06%) were professionals [Fig-2]. Most of the cases [46 (37.09%)] had education till primary or middle school level, 43 (34.67%) cases were illiterate, 26 (20.97%) cases were educated till secondary or higher secondary level and only 9 (7.26%) cases had education till graduate level or above [Fig-3].

Discussion

Prevalence of Rubella IgM seropositivity in our study is 16.00% which resembles with the reports of Tiwari *et al* [7] and Suryawanshi *et al*. (18.00%) [8] Padmavathy *et al*. [9] reported 4.60% and Sadik *et al*. [10] reported 4.65% IgM seropositivity to Rubella infection. This may be due to variation from one geographical area to another. In the present study, past Rubella infection (74.19%) outnumbered the cases with recent (primary and secondary) Rubella infection (16%). Similar findings were reported by Raveendran *et al* [11] and Turbadkar *et al*. [12]. The overall seropositivity of Rubella in our study was highest amongst women with history of abortion (41.94%)

92 cases were positive for Rubella IgG antibodies. Only 8 cases were positive for both Rubella IgM and IgG [Fig-1]. The overall seropositivity of Rubella was highest amongst women who had history of abortion [52 (41.94%)] followed by intrauterine death [28 (22.58%)] [Table-2]. Maximum number of cases [72 (58.06%)] belonged to the 25-30 years age group, 50 (40.32%) cases were in the 19-24 years age

It is in accordance to other studies done by Agrawal *et al.*[13] and Chopra *et al.* [14]. Age - wise distribution of Rubella seropositive cases in our study showed that maximum number of cases (58.06%) belonged to the 25-30 years age group. These findings correlated with the study of Padmavathy *et al* [9] and Raveendran *et al.*[11]. In our study, out of 124 Rubella positive cases, majority of the cases (60.48%) belonged to rural areas which was found similar to that observed by Gupta *et al.*[15] and Mwambe *et al* [2] Other workers like Rathore *et al.*[16] and Farhadi *et al.*[17] found higher Rubella IgM seropositivity amongst women living in urban areas. Poor hygienic environment in rural area might expose them more to Rubella virus infection. Majority of Rubella seropositive cases were housewives [56 (45.16%)] and had education till primary or middle school level (37.09%). Similar findings were observed by Rathore *et al* [16] and Farhadi *et al.*[17].

Conclusion

Seropositivity of 124 cases with Rubella virus (either primary or secondary infection) is amongst highest reported so far in India. Women of this geographical area may be contracting Rubella infection due to their age being more than 25 years, poor hygienic conditions, low level of education or staying indoor which implies poor living conditions.

Application of research: Screening and early diagnosis of Rubella virus in women with bad obstetric history may help in early detection and appropriate management. In addition, the present study is the one of the first to evaluate both IgG and IgM seropositivity in high risk pregnant women on a larger sample size from Central West India.

Research Category: Clinical Microbiology

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Study area / Sample Collection: Department of Microbiology, Dr S C Govt. Medical College, Nanded, 431601

Conflict of Interest: None declared

Ethical approval: Ethical approval taken from Dr S C Govt. Medical College, Nanded, 431601, Maharashtra University of Health Sciences, Nashik, 422004, Maharashtra, India.

Ethical Committee Approval Number: 565/2014, 11/12/2014

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