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SEROPREVALENCE OF RUBELLA AMONG THE WOMEN (WITH BAD OBSTETRIC HISTORY) VISITING A TERTIARY CARE HOSPITAL LOCATED IN CENTRAL INDIA

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Abstract

Background: Rubella is a mild exanthematous disease of global distribution. However, there is a risk of infection to the foetus subsequently causing congenital defects, if it infects susceptible pregnant women**.**
Aims & Objective: To detect seroprevalence of Rubella in women with Bad Obstetric History**.**
Materials & Method: The present prospective study was carried out from June 2018 to May 2019 in the Department of Microbiology of a teaching tertiary care hospital located in the Central India. The serum samples received from 107 women with Bad Obstetric History were tested for TORCH panel. Rubella IgG & IgM antibodies were tested by ELISA method (Calbiotech, USA)**.**
Results & Discussion: Among the 55 serum samples showing Rubella seropositivity, 10.9 % samples were IgM positive, 80 % were IgG positive and 9.09 % samples were found to be positive for both IgM & IgG antibodies**.** Several studies have also quoted the seroprevalence of Rubella ranging from 4.0 % to 29 %.
Conclusions: The results indicate high prevalence of Rubella among the female with Bad Obstetric History. Serological screening has contributed to the prevention of congenital infection due to Rubella and also helps in proper management of fetal outcomes.

Key Words: Rubella, Bad Obsteric History, Seroprevalence, IgG, IgM

Introduction

The members of TORCH complex are known to play a very important role in *in utero* transmission of maternal infections at several stages of pregnancy. These infections are the major cause of congenital malformations, multiple abortions, intrauterine fetal deaths, still births and women sterility. [1] Infections can occur in the neonates transplacentally, perinatally or postnatally.[2]

Rubella virus is one such member of TORCH complex responsible for causing an exanthematous infectious disease known by the name Rubella or German measles, following a typically benign clinical course. Symptomatology is generally characterized by fever, maculopapular rash accompanied by enlargement of lymph nodes and mild respiratory symptoms along with the broad spectrum of other possible manifestations. However, a high percentage of rubella infection in both children and adults are subclinical. [3,4]

Bad Obstetric History (BOH) implies previous unfavourable foetal outcomes in terms of two or more consecutive spontaneous abortions, history of intrauterine growth retardation and foetal death, still births,

early neonatal death and/or congenital anomalies.[2,3,5,6] Cause of BOH may be genetic, hormonal, abnormal maternal immune response and maternal infection.[2,3,5,7]

Rubella during pregnancy may result into miscarriage, still birth, intrauterine growth retardation, multiple congenital Rubella syndrome characterized by cataract, patent ductus arteriosus, septal defects, pulmonary artery stenosis, sensorineural deafness, meningoencephalitis, and osseous changes in the child. Rubella infection if acquired in the first trimester, may lead to high risk of foetopathy.[3,5]

These infections are usually asymptomatic or in apparent in mothers and hence difficult to diagnose clinically. However, they are transmitted to foetus in the womb or during birth process thereby causing a cluster of birth defects.[2] Therefore, the diagnosis of these infections depends upon serological evidences. The detection of the IgM antibody against Rubella is the best approach for its identification. Due to the lack of a national screening programme, no baseline serological data regarding any of the TORCH infections are available at the time of pregnancy.[1]

The present study was undertaken to find out the prevalence of Rubella infection in women with Bad Obstetric History by establishing the presence of the specific IgM antibodies. Detection of IgM and IgG antibody by Enzyme-Linked Immunosorbent Assay (ELISA) is a useful method for diagnosis of Rubella infection and may be helpful in determining the causative role of Rubella in abortion and still births.

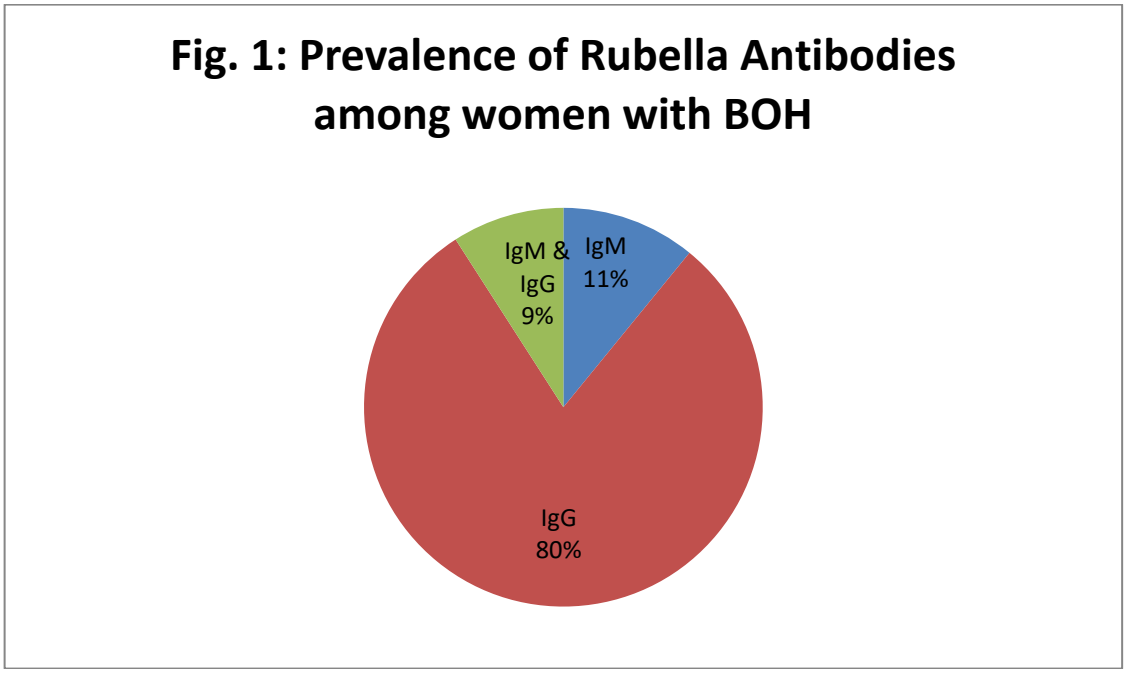
Materials & Method

The present prospective study was carried out from June 2018 to May 2019 in the Serology section of the Department of Microbiology of a teaching tertiary care hospital located in the central India. Three to five ml. of venous blood was collected from the women of reproductive age group having Bad Obstetric History. The blood samples were centrifuged at 1000 rpm for three minutes in order to obtain serum. The serum was tested for Rubella IgM and IgG antibodies by ELISA method (Calbiotech Inc, USA) following the manufacturer's instruction. Diluted patients' serum was added to micro wells coated with the purified Rubella antigen. IgM & IgG specific antibodies if present in patients' serum bounded to the Rubella antigen. All the unbounded material was washed away and the enzyme conjugate was added to bind to the antigen-antibody complex if present. Excess enzyme conjugate was again washed off and substrate was added. The ELISA plate was incubated to allow the hydrolysis of the substrate by the enzyme. The intensity of the color generated was proportional to the amount of IgM & IgG specific antibodies present in the patients' sample. Optical Density was measured at 450 nm using automated ELISA microplate reader (Transasia Biomedicals Ltd, Mumbai, India). Results were interpreted as sero positive, if the optical density value of serum samples were more than that of the cut off value mentioned in the provided literature. The antibody-index value for the samples were considered as positive when it was greater than 1.1 and negative when it was less than 0.9. The verbal consent of the patients was obtained and the study was approved by the institutional ethical committee. [3,8,9]

Results & Discussion

In the present prospective study, a total of 107 samples from women with BOH were serologically tested for TORCH panel. Out of them, 55 (51.4 %) serum samples tested positive for Rubella antibodies (with or without the presence of other TORCH antibodies). Among them, a total of 06 (10.9 %) samples were found to be IgM positive and 44 (80 %) were IgG positive while 05 (9.09 %) patients had both IgM and IgG antibodies. IgG antibodies were found in significantly higher number of women as compared to IgM. ($p < 0.001$) All the women belonged to the reproductive age group with the average age of study population being 24.4. The seropositivity rates have been shown in Table 1 & represented by pi-chart. (Fig 1)

	Table 1: Prevalence of Rubella antibodies among women with BOH						
	IgM	IgG		IgM & IgG			
Total number of serum samples collected from women with BOH	Total number of serum samples tested positive for Rubella antibodies	No. of Patients	%	No. of Patients	%	No. of Patients	%
107	55	06	10.9	44	80	05	9.09



Acute infection during pregnancy was noticed when IgM positivity was diagnosed. During our study 11 (20 %) women had acute infection. The results were in clinical correlation since 06 out of 11 women who had IgM seropositivity & 24 out of 49 women who had IgG seropositivity had the history of one or more abortions and eight women had the history of still birth. The differences were found to be statistically significant. ($p < 0.001$). In rest of the women, cause of abortions & still birth could have been other organisms of TORCH complex. Infection with Rubella virus can be dangerous in early gestation. The virus may affect multiple organs and cause varying congenital defects like intrauterine growth retardation & neurological impairment in foetus. Several studies conducted in India and abroad during the past, have detected the IgM seroprevalence of Rubella ranging between 4.0 % and 29 % among the women of reproductive age group. In India, pregnant women belonging to the low socioeconomic group may become exposed to various pathogenic microorganisms due to poor environment and hygiene. Maternal infection such as Rubella can be considered as a significant factor resulting into poor pregnancy outcome. In our study, IgM & IgG seropositivity was found to be 20 % and 89 % respectively. Our results revealed higher seroprevalence as compared to that detected during the study conducted in 2013 by Shrivastava *et al*. upon 64 females in the same hospital. During their study, the seropositivity of the women for Rubella IgM & IgG were detected as 17.18 % & 76.56 % respectively.[8] The other studies conducted by Yashodara *et al* in Hyderabad reported 12.5% positive cases for Rubella IgM antibodies.[9] Kaur *et al.* reported IgM seropositivity of 8.3% in New Delhi.[10] Thapliyal *et al* in kumaon region Uttarakhand reported 28.6% positive cases for Rubella IgM antibodies.[11] IgM seropositivity of 30.4 % was detected among pregnant women in Varanasi district located in North India.[1] Ramana et al. reported 12.6% IgM seropositivity in a study conducted in Andhra Pradesh.[3] A study conducted by Barik et al. in East India collected data from 377 patients from 2011-2018 revealing IgG seropositivity of 70.5 %. [12] Among the various studies conducted at the international level, the IgM Seroprevalence of Rubella infection was reported to be 13% in the USA[13], 5-6 % in Saudi Arabia[14,15], 2% in Spain [16], 5-6% in Turkey [17,18] and 76.4 % IgG among pregnant women in South Korea. [19] All the above results with high seropositivity confirm the previous exposure to wild type rubella virus. The difference in the values of seropositivity in different geographical regions may pertain to

the socio-economic inequalities observed with respect to uptake of Rubella vaccines during early parts of their life.[20]

Conclusion:

The present prospective study establishes a strong association between Rubella infection and Bad Obstetric History in women. Introduction of Rubella vaccine has greatly modified the epidemiology of Rubella. The cases related to Bad Obstetric History in women should be managed after correlating the previous histories of pregnancy loss and serology results. Early diagnosis & timely interventions can reduce the fetal outcomes by preventing the morbidity and mortality of infants born to such mothers. In addition, there is a strong need to modify vaccine strategies by immunizing all adolescent girls and/or women of reproductive age group before conception in order to reduce incidences of congenital rubella syndrome and bad obstetric outcomes. Also, Gynaecologists and general practitioners should encourage the women of childbearing age for Rubella screening before they conceive, so as to identify those women lacking Rubella antibodies.

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