

Seroprevalence Of Rubella Virus Antibodies Among Pregnant Women Attending Antenatal Clinic in Ekiti State

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ABSTRACT

Rubella virus infection poses a great threat to the foetus whose mother acquires the infection. This study was therefore carried out to determine the seroprevalence of rubella virus IgM antibodies among the pregnant women attending Federal Teaching Hospital, Ido Ekiti. One hundred and ninety two (192) sera were collected from pregnant women and screened for rubella virus IgM antibodies. A structured questionnaire was administered to subjects to obtain socio-demographic data. The sera samples were analysed using Enzymes Immunosorbent Assay (EIA) IgM rubella kit. Out of 192 pregnant women screened, 6(3.1%) subjects were sero-positive. Age group 31-35years recorded the highest prevalence 3(1.56%). Pregnant women with tertiary education had the highest prevalence of 4(2.08%) among different educational level; civil servants have a prevalence of 4(2.08%) compared with other occupational status. However, prenatal screening and post-partum is highly encouraged to detect congenital rubella syndrome. There is also a need to include rubella screening as part of the routine procedure for the expectant mother.

Keywords: Rubella, Seroprevalence, Pregnant women, Antibodies.

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I. INTRODUCTION

Rubella is a non-arthropod borne disease caused by rubella virus, measuring about 60nm in diameter and it occurs worldwide [1]. The virus is a single stranded RNA with an envelope, non-segmented, positive sense, and replicates in the cytoplasm [2]. Humans are the only known natural host for rubella virus [3]. The disease has an incubation period of 2-3 weeks after contact [4] and the symptoms develop and after usually mild without consequences and complication [5]. The infection is characterized by appearance of rash

(Exanthema) on the face which spreads to the trunk and limbs and usually fades after 30 days. Other symptoms include low grade fever, swollen glands (post cervical lymphadenopathy), joint pains, conjunctivitis [6]. The result of acute infection of the virus is a benign systematic rash which is significantly pathogenic to humans [7].

There are over 12 million cases of rubella in the United States with 2000 cases on encephalitis, resulted to 11,000 deaths and over 20,000 infants born with congenital rubella syndrome [1]. In Nigeria, 68% of 1847 Nigerian from 3 geographical areas possesses rubella antibodies. The trend of

increase in rubella antibodies from 1970 to 2000 indicates that infection over the year may be a gradual increase hence the need to project unexposed population considering abnormalities associated with rubella infection during pregnancy [8].

Rubella virus infection poses a great threat to the foetus whose mother acquires the infection. During the first trimester, considering the fact that rubella screening is carried not routinely in hospitals in Nigeria. Therefore, screening of the pregnant women will provide the baseline information on the prevalence rate; with the view of formulating appropriate policy for the control measures. This study was therefore carried out to determine the seroprevalence of rubella virus IgM antibodies among the pregnant women attending Federal Teaching Hospital, Ido-Ekiti.

II. METHODOLOGY

A. Study Group/Location

The research was carried out in an antenatal clinic of the Federal Medical Centre (now Federal Teaching Hospital) Ido-Ekiti, Ekiti State. Pregnant women attending antenatal of the above-named hospital were used for this study.

B. Ethical Consideration/Consent

The ethical clearance for this study was obtained from the ethical committee of the hospital; and a well-structured questionnaire and informed consent form were administered.

C. Sample Collection

A total of 192 blood samples were collected by taking 3ml of patients' blood obtained aseptically by ant cubical vein after disinfected the site with 70% alcohol. The blood is allowed to clot on the bench and the serum was collected into cryovials and packed in ice pack jar until when the result is carried out.

D. Processing of Sample

The method described by Eleazu *et al.* [9] was used for the sample processing. The sera samples were analysed using Enzymes Linked Immunosorbent Assays (ELISA) method. ELISA is a sensitive and reliable procedure for qualitative detection of rubella IgM antibodies in human sera. Rubella antigens are fixed to the interior surface of the micro wells and patient's serum is added and antibodies to rubella antigens present in the serum bind to these antigens. The micro wells are washed to remove on bound serum proteins. Antibodies conjugated which horseradish peroxidase enzymes and directed against human IgM was added and in turn bind to any human IgM present. The micro wells are washed to remove unbound conjugated and then chromogen or substrate is added. In presence of peroxidase enzyme, the colourless substrate is hydrolysed to coloured end product. The colour intensity is proportional to the amount of antibodies present in the patient serum. The colour intensity of the solution in each well was measured using a micro well reader with a 450 nm filter within 30 minutes (Manufacturer instruction). The presence and quality of Rubella IgM antibodies in the serum samples was determined by comparing the optical density of the test sample to a standard range and were calculated in international unit system/ml (iu/

ml). Serum samples with a titre <15 iu/ml were classified as negative for Rubella IgM antibodies and samples rises titre of greater than 20 iu/ml were classified as positive (manufacturer Instruction).

E. Statistical Analysis

The data generated were analysed using SPSS 20.0. Chi square and p value were used. p value < 0.05 is regarded as significant.

III. RESULTS

The overall prevalence of rubella IgM antibodies among pregnant women screened were shown in table 1. Out of the 192 pregnant women screened 6(3.1%) were positive and 186 (96.0%) were negative.

TABLE I: OVERALL PREVALENCE OF RUBELLA IGM AMONG PREGNANT WOMEN

	No of sample (%)	P value
Positive	6 (3.1)	0.0125
Negative	186 (96.9)	

The age distribution of the pregnant women with rubella is shown in Table II. Age group 31-35 years had the highest prevalence rate 3(1.56%) while age group 15-20 years had 1(0.52%) prevalent rate. No prevalent rate was recorded in age groups 36-40 years, 41-45 years, and 46-50 years.

TABLE II: AGE DISTRIBUTION OF PREGNANT WOMEN WITH RUBELLA IGM

Age (years)	Number tested	Number positive (%)	P value
15-20	4	1(0.52)	0.196
21-25	26	1(0.52)	
26-30	68	1(0.52)	
31-35	62	3(1.56)	
36-40	20	0(0.0)	
41-45	4	0(0.0)	
46-50	8	0(0.0)	
Total	192	6(3.12)	

The prevalence of Rubella in relation to the trimesters of the pregnant women was shown in Table III. Pregnant women in 1st and 3rd trimester had rubella with prevalent rate 3 (1.56%) each. No rubella was recorded among pregnant women in the second trimester.

TABLE III: SEROPREVALENCE OF RUBELLA IGM ANTIBODIES AMONG PREGNANT WOMEN IN RELATION TO TRIMESTER OF PREGNANCY

Trimester	Number tested	Number positive (%)	p value
1st	100	3(1.56)	0.035
2nd		30 0(0.0)	
3rd	62	3(1.56)	
Total	192	6 (3.12)	

The educational status of pregnant women with rubella was shown in Table IV. The highest prevalent was seen among those that had secondary and tertiary education with prevalent rate of 2(1.04) and 4(2.08), respectively.

TABLE IV: SEROPREVALENCE OF RUBELLA IGM AMONG PREGNANT WOMEN IN RELATION TO THEIR EDUCATIONAL STATUS

Educational Status	Number tested	Number positive (%)	p value
Primary	12	0(0.0)	0.579
Secondary	30	2(1.04)	
Tertiary	144	4(2.08)	
Not available	6	0(0.00)	
Total	192	6 (3.12)	

The occupational distribution of pregnant women with rubella IgM is shown in Table V. Civil servant had the highest prevalence 4(2.08%), housewives and traders recorded 1(0.52%) each while no prevalent rate was recorded among student and self-employed pregnant women.

TABLE V: SEROPREVALENCE OF RUBELLA IGM AMONG PREGNANT WOMEN IN RELATION TO THEIR OCCUPATION

Occupation	Number tested	Number positive (%)	p value
Civil servants	124	4(2.08)	0.612
Housewives	8	1(0.52)	
Students	4	0(0.00)	
Trade	24	1(0.52)	
Self-employed	20	0(0.00)	
Not available	12	0(0.00)	
Total	192	6 (3.12)	

IV. DISCUSSION

Rubella virus is an important public health problem and is mostly responsible for congenital infections, which leads to severe congenital abnormalities. Humans are the only known host. Transmission requires close person to person contact [1]. However, in this study, 3.1% pregnant women were sero positive for rubella virus antibodies. This further confirms one of the documented evidence that was reported by Cutis *et al.* [13] whose reported that the serological data from 45 developing countries including Nigeria indicated that the proportion of positive screened samples for rubella IgM were less than 10.0%. Also, Okonko *et al.* [10] reported a prevalence rate of 13.9% among vulnerable pregnant women in River State, Nigeria. The seroprevalence of the virus increases gradually with age and was highest in pregnant women of less than 35 years; at least more than half of these 3.1% pregnant women with rubella IgM antibodies fall within the age range at which the infection is likely to occur. These pregnant women had non protective IgM antibodies are likely to have been recently infected with the virus. Therefore, the lack enough IgG antibodies to protect their foetus. The pregnant women on 1st and 3rd trimester were the mostly affected in this study, although it is not statistically significant suggested that rubella infection can be detected at any of the 3 trimesters. Also, either the women contacted it during 1st, 2nd, 3rd trimester, and most likely to have a baby with congenital rubella syndrome [11], [12]. The pregnant women who had tertiary education had the highest prevalent (2.08%). This is statistically not significant. The high prevalence might be due to the high number of samples collected from pregnant women with tertiary education [13], [14]. The age distribution of pregnant women with rubella is shown in table 2. The highest prevalent was seen among age group 31-35 years. Although it is not statistically significant meaning that rubella is not age dependent and age is not a criterion for the

infection. These findings similar to the Study conducted by Shaheem *et al.* [15] in India.

V. CONCLUSION

Rubella infection poses a great threat to the expectant mother as well as the foetus. This is because it can go unnoticed by the mothers as well as the health practitioners; therefore, based on the report of this finding, proper care must be taken by the prospective mothers during childbearing age, particularly, during her gestation period in order to avoid any health problems. More so, the need for proper awareness among the populace cannot be over emphasized and, immunization of prospective mothers and women of childbearing age is a welcome development.

VI. RECOMMENDATION

Rubella as a congenital infection constitutes a major problem among the populace. Therefore, rubella vaccination should be included in the national immunization policy, so that every woman of childbearing age will have access to it. There is also a need for more study to be done on non-pregnant women so as to ascertain their status. Above all, screening for rubella should include as routine for pregnant women that register for ante natal as it has been for HIV and Hepatitis.

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