



Sero-Prevalence of Rubella Virus IgM Antibodies among Pregnant Women Attending Muhammadu Abdullahi Wase Specialist Hospital Kano

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Abstract. Rubella is a generally mild illness and its serious complications are rare. Although a major section of pregnant women are immuned, cases of rubella infection occur in Nigeria among pregnant women. This study was carried out to assess the prevalence of rubella virus IgM among obstetric population aged 15 – 47 with an average mean of 28.5 years attending Antenatal Clinic Muhammad Abdullahi Wase Specialist Hospital Kano. Of the total 288 patients screened, 50 (17.4%) were reactive to rubella IgM. Out of 50 infected patients 20 (6.95%) were from 20 – 24 years age bracket representing the most susceptible age group while the infection rate was lowest (0.35%) in 45 – 49 age group, even though when statistically analyzed rubella susceptibility is not age dependent ($P = 0.894$). Moreover, obstetric history and obstetric losses among various age groups with respect to rubella sero – prevalence shows that of the 50 reactive patients, 35 had a previous abnormal obstetric history. Premature delivery was observed to be almost uniform across all the ages with a prevalence rate of (13.0%), still birth was having the same prevalence with that of premature delivery but with highest frequency in 20-24 years age group. However congenital anomalies was found to have least prevalence rate of (6.5%), neonatal death has prevalence rate of 10.5% with declining frequency towards the ages of 35-49 years ($P=0.02$). It was found that rubella infection still occurs and rubella susceptibility has no relationship with age group.

Keywords: Rubella, Susceptibility, Infection, Obstetric, Prevalence

Introduction

Rubella, commonly known as German measles, is a disease caused by the rubella virus. The name “rubella” is derived from the Latin, meaning little red. Rubella is generally a mild illness and serious complications are rare. However, primary maternal rubella virus infection during the first trimester of pregnancy carries a high risk for the development of congenital rubella syndrome (CRS) with characteristic malformations of the heart, eye and ear or even death of the fetus. Although rubella vaccination has reduced the incidence of rubella virus substantially; the World Health Organization (WHO) estimates that worldwide more than 110,000 cases of CRS are from developing countries [16].

In Nigeria, previous studies among pregnant women have detected rubella IgG antibodies to 68.5% in Ibadan, 54.1% in Maiduguri and 76% in Lagos [1] [3] [10] . Also in the seventies in a multicenter study (North East and West Nigeria), [8] showed that an average of 68% of the Nigerian population possessed rubella antibody [6]. Therefore on the average, approximately 66.2% of pregnant women in Nigeria are already immune to rubella infection probably due to subclinical or clinical exposure to rubella virus as there is no policy for immunization against rubella infection and there is a 33.8% susceptible population [6]. Although a major section of pregnant women in Nigeria are immuned, cases of CRS are still been seen in hospitals. For example, in 2006, a case of confirmed CRS was reported in Port-Harcourt in a three month old male with heart failure [11]. This means that pregnant women continue to harbor the virus despite the availability of an effective vaccine. Rubella is not reportable disease in Nigeria and data of its burden are extremely rare [16].

MATERIALS AND METHODS

Study Population

The population studied was a homogenous of different age groups, ethnicities, educational and socio-economical status.

Study Design

General descriptive study was used to design out a cross-sectional (prevalence) survey which will be carried out according to the ethical standard for human experimentation. An ethical clearance was obtained from Hospitals Management Board Kano. A written informed consent form was also administered.

Sample size

A total of 288 pregnant women who completed the patient's consent form were recruited for this study.

Sample Collection/Storage

The upper arm of the subject was tied with a tourniquet; the ante cubital region was disinfected with 70% alcohol. 5mls of blood was drawn by venepuncture using a sterile syringe through the antecubital vein. The tourniquet was removed and the puncture blocked with cotton wool and moderate pressure was applied to stop bleeding, the blood was transferred into sterile centrifuge tube and allowed to clot. The clotted blood samples was spun at 300rpm for 10mins, the serum was separated and transferred 5ml universal container and stored at -20°C until use [4] .

Screening for Rubella Antibody (Rubella IgM)

Rubella virus antibody was analyzed using enzyme-linked immunosorbent assay (ELISA) which is the most sensitive and reliable procedure for detection of antibodies to Rubella [12].

RESULTS

Out of the 288 pregnant women screened, 50 patients were reactive to rubella IgM antibody showing a prevalence rate of (17.4%). Similarly, out of a total of 288 patients enrolled for the study 2 patients were sero-reactive to HIV. It was observed that the advancing age is associated with progressively decreasing odd of rubella susceptibility. The age of the women studied ranged from 15 – 47 years with a mean of 28.25 years. There was a steady in the age groups of the obstetric population studied with a peak in the 20 – 24 years and a decline toward 30 – 47 years age group.

Table 1: Rubella Susceptibility Among Various Age Groups

| Age Group (years) | No. Screened | Rubella IgM (%) Prevalence |
|-------------------|--------------|----------------------------|
| 15 – 19 | 21 | 2 (0.70) |
| 20 – 24 | 115 | 20 (6.95) |
| 25 – 29 | 81 | 15 (5.22) |
| 30 – 34 | 45 | 7 (2.44) |
| 35 – 39 | 22 | 5 (1.74) |
| 40 – 44 | 3 | 1 (0.35) |
| 45 – 49 | 1 | 0 (0.00) |
| Total | 288 | 50 (17.4) |

(P = 0.894)

Moreover, obstetric history and obstetric losses among various age group with respect to rubella IgM sero – prevalence was observed. Of the 50 sero – reactive rubella IgM studied, 35 had a previous abnormal obstetric history. Abortions constituted a highest percentage of (62.9%) with highest frequency among 30 – 34 years age group and least in 15 – 19 years age group.

Table 2: Seroprevalence of Rubella IgM Antibodies According to Various Obstetric Losses Among Various Age Groups.

| Obstetric history | Various Age Group (Years) | | | | | | | | Percentage |
|----------------------|---------------------------|----------|----------|-----------|----------|----|----------|----------|-----------------|
| | 15 –19 | 20-24 | 25 –29 | 30 –34 | 35 –39 | 39 | 40-44 | 45-49 | |
| Abortions | 1 | 3 | 5 | 8 | 4 | | 1 | - | 22 (62.9) |
| Premature delivery | - | 1 | - | 1 | 1 | | 1 | - | 4 (11.4) |
| Still birth | | 2 | 1 | - | 1 | | - | - | 4 (11.4) |
| Congenital anomalies | - | - | - | 1 | - | | 1 | - | 2 (5.7) |
| Neonatal death | - | - | - | - | 1 | | 1 | 1 | 3 (8.6) |
| Total | 1 | 6 | 6 | 10 | 7 | | 4 | 1 | 35 (100) |

(P = 0.02)

DISCUSSIONS

Rubella antibodies appear in the serum of patients as the rash fades 1 – 3 weeks. Much of the initial antibody consists of IgM antibodies, which generally do not persist beyond 6 weeks after the illness. IgM rubella antibodies found in single serum obtained 2 weeks after the rash give evidence of recent rubella infection [2] .

When a women is infected with the rubella virus early in pregnancy, she has a 90% chance of passing the virus on to her fetus and this can cause the death of the fetus or it may cause CRS [6].

Rubella viruses is known to cause infection in vitro and are often responsible for abortion, still births premature delivery and congenital malformation. There is considerable variable in the prevalence of the agent among the women of child in the prevalence of the agent among the of child bearing age in different geographical areas [15].

In this present study a prevalence rate of 17.4% was reported i.e the subject studied had a detectable IgM level which is a marker of recent infection. Detection of IgM is well established as a means of diagnosing recent rubella/CRS and is recommended by the WHO as the primary test for the laboratory confirmation of rubella. In present study antibodies to rubella were found in 17.4% women which is accordance with the study of [15] with 17.5% prevalence rate and that of [13] with 17.7% prevalence rate. However, the figure 17.4% is in line with the WHO Worldwide prevalence rate of rubella susceptibility i.e 7.5 – 17.4% [5].

The result obtained 17.4% is however higher than 4.2% found in pregnant women in Makurdi, Beneu State [6] and 10.0% also among pregnant women attending antenatal clinic Benin Teaching Hospitals [9] . Moreover, [17] [7], reported 6.5% and 10.38% respectively. Whereas [14] reported rubella IgM positivity as 26.8%.

The difference in the prevalence rate may be due to the season in which the samples were collected, geographical location, cultural behavior, ethnicity, sexual behavior and socio economic status. The wide variation may also be due to the fact that the study area i.e. Muhammad Abdullahi Wase Specialist Hospital

antenatal clinics attend to different group of people from various destinations of multiple ethnicities. All the women who participated in this study were between the ages of 15 – 47 years. Although the highest prevalence was observed in 20 – 24 years age group, but when analyzed statistically the ($P > 0.05$) which signifies that there is no significant difference i.e rubella has no relationship with age groups. This agrees with the finding of serologic survey rubella IgM in pregnant in Makurdi which shows that ($P > 0.05$) and considered statistically not significant [6].

CONCLUSION

This study confirms a high sero prevalence of Rubella Virus infection among obstetric population in Kano metropolis antenatal centre. It is therefore recommended that pregnant women should be routinely screened for Rubella Virus IgM as part of their antenatal care and the vaccine should be administered prior to their delivery avoiding the risk of vertical transmission from mother to child.

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