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Determination of Rubella Virus Infection in Women of Child Bearing Age in Vom, Jos South Local Government Area, Plateau State

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Abstract **Original Research Article**

The determination of rubella IgG antibody among two hundred and seventy-two (272) women of child bearing age in Vom was carried out, using the Immune – ELISA rubella IgG quantitative test kit. Seventy – two (72) specimens came from non-pregnant women while 200 specimens came from pregnant women. Out of 72 blood specimens from non-pregnant women investigated, 66(91.67%) were positive for rubella IgG antibody while 169(84.50%) were positive out of 200 specimens from pregnant women. Rubella IgG antibody was detected in all the age groups of the women. The women age ranges from 18-45 years and had no previous history of rubella vaccinations. Among the age groups ages, 21-25 years had the highest rubella antibody (36.11%) in the non-pregnant women while ages 26-30 years had the highest rubella antibodies with 30.00%. in pregnant women. The least rubella antibody among the non-pregnant was 9.72% in ages 31-35 years while it was lower in ages 41-45 with 1.00% in pregnant women. On parity, 1-2 had the highest positive rubella antibodies in both non-pregnant, (38.00) and pregnant women (34.72%) while 11-12 had the least in non-pregnant (1.00%) and 7-8 in pregnant women with 12.50%. the study has shown that a significant proportion of the women have been naturally exposed to rubella virus infection and therefore immuned for life. Rubella virus infection being a disease of medical importance should be given serious attention. Based on the findings of this study it is strongly recommended that all females before the child bearing age should be vaccinated against rubella.

Key words: Rubella, Rubella virus, women, pregnancy.

INTRODUCTION

Rubella virus infection in human is a global public health problem especially in developing countries where women of child bearing age are not often vaccinated, and are susceptible to rubella virus, infection that may result to congenital defects [1]. Rubella is caused by rubella virus, a single stranded, positive sense RNA virus with envelope glycoprotein spikes. It is a member of the genus rubivirus in the family of togaviridae [2]. Epidemiologically, rubella is a worldwide human disease and it is endemic in virtually all congenital rubella syndromes [3-5]. Over 40% of infected persons fail to develop symptoms [6] while about 30,000 cases of congenital rubella syndrome have been documented [7, 8].

The disease is characterized by abortion, still birth, rash, mild upper respiratory symptoms, low grade, fever with arthalgia and arthritis common in young adults as the disease progresses. During infection the evidence of IgM antibody is diagnostic of recent infection while IgG is considered for immunity due to natural infection in vaccinated susceptible young women or due to vaccination [9, 5]. This study was designed to determine rubella virus infection among women of child bearing age in Vom-Plateau State, North Central Nigeria.

MATERIALS AND METHODS

Samples: Blood serum specimens were collected from women of child bearing age, between ages 18-45 years. Seventy –two (72) specimens came from no-pregnant women while 200 specimens were obtained from pregnant women. A total of 272 specimens were collected by vane puncture, allowed to

clot and serum separated by centrifugation at 2500 rpm for 10 minutes. The sera were heat inactivated at 56^0C for 30 minutes in a water bath and kept at – 20^0C ready for use.

Sample laboratory assay: The presence of rubella virus antibody in the samples was determined using immunocomb II rubella IgG and IgM, code 6040062 version 400/E5, format 3 X 12 test kit (organics Ltd, Israel). It is an indirect solid phase Enzyme Immuno Assay (EIA) and a quantitative tecnique based on the antigen-antibody reaction principle. The test results and interpretations were done according to the manufacturer's instructions and specifications [8, 10].

RESULTS

Table 1 presents the overall distribution of rubella antibody amongst the two groups of women investigated. The pregnant women had the highest rubella antibody level with 73.53% than the non-pregnant women. Although more samples were obtained from pregnant women than the non-pregnant women.

Table-1: Overall distribution of Rubella IgG Antibody in women of child bearing age

Category of women	No. sample	No. Positive	No. Negative
Non-Pregnant	72	66(91.67)	6(8.33)
Pregnant	200	169(84.50)	31(15.50)

The age distribution of rubella IgG antibody among the non-pregnant women is shown in table 2. The results show that ages 21-25 year had the highest rubella antibody with 36.11% while ages 31-35 year have the least (9.72%). However, there were no samples obtained in ages 36-40 and 41-45 years.

Table-2: Age Distribution of Rubella IgG Antibody in Non-pregnant women

Age groups (years)	No. sample (%)	No. Positive (%)	No. Negative (%)
15-20	19	16(22.22)	3(4.16)
21-25	28	26(36.11)	2(2.78)
26-30	18	17(23.61)	1(1.39)
31-35	7	7(9.72)	0(0.00)
36-40	0	0(0.00)	0(0.00)
41-45	0	0(0.00)	0(0.00)
Total	**71**	**66(91.67)**	**0(8.33)**

Table 3 shows the age distribution of rubella IgG antibody among pregnant women. The result showed that ages 26-30 years had the highest rubella antibody level with 30.00% followed by ages 21-25 years (21.00%) while age 42-45 years had the least level with 1.00%.

Table-3: Age Distribution of Rubella IgG Antibody in pregnant women

Age groups (years)	No. sample (%)	No. Positive (%)	No. Negative (%)
15-20	13(6.60)	12(6.00)	1(0.50)
21-25	48(24.00)	42(21.00)	6(3.00)
26-30	73(36.50)	60(30.00)	13(6.50)
31-35	45(22.50)	37(18.50)	8(4.00)
36-40	18(9.00)	16(8.00)	2(1.00)
41-45	3(1.50)	2(1.00)	1.(0.50)
Total	**200(100)**	**169(84.50)**	**31(15.50)**

The distribution of rubella antibody based on parity is shown in Table 4. The highest levels of the antibody to rubella were 76(38.00%) and 25(34.72%) in non-pregnant and pregnant women respectively and decreases as the parity increases from 1-2 to 11-12. The least's were 2(1.00%) and 9(12.50%) among the non-pregnant and pregnant respectively.

Table-4: Distribution of Rubella IgG Antibody based on Parity

	Pregnant Women		Non-Pregnant	Women
Parity	**No. tested**	**No. Positive (%)**	**No. Tested**	**No. Positive (%)**
1-2	85	76(38.00)	28	25(34.72)
3-4	56	50(25.00)	21	19(26.39)
5-6	38	26(13.00)	14	13(18.06)
7-8	13	10(5.00)	9	9(12.50)
9-10	5	5(2.50)	0	0(0.00)
11-12	3	2(1.00)	0	0(0.00)
Total	**200**	**169(84.50)**	**72**	**66(91.67)**

Table 5 shows the distribution of the subjects based on the concentration of the rubella IgG antibody in their test serum. More women among the non-pregnant child bearing category had their rubella antibody concentration in between 31 to 120 iu/ml. Also among the pregnant women in the child bearing age, more women had their rubella antibody concentration within 31-12iu/ml. The pregnant women had more women (41) than the non-pregnant women in the 0-30iu/ml concentration of rubella antibody.

Table-5: Distribution of Subjects based on Rubella Antibody concentrations (iu/ml) in Women

Rubella IgG Conc. (iu/ml)	No. of Non-Pregnant Women (%)	No. of Pregnant Women (%)
0-15	1(1.52)	8(4.73)
16-30	4(6.06)	33(19.53)
31-60	22(37.88)	74(43.97)
121-240	14(21.21)	13(7.69)
Total	**66(100)**	**169(100)**

DISCUSSION

Human infection with rubella virus is one of the major public medical health problems, especially in susceptible women of child bearing age [8] and has the tendency to cause abortion, stillbirth and many other major complications in foetuses and neonates [11]. Evidence of rubella virus infection and congenital rubella syndrome has been documented in Nigeria [12, 3].

In this study, 91.67% prevalence of rubella antibody was obtained from non-pregnant child bearing age women and 84.50% prevalence rate from pregnant women. These results were higher than rubella haemagglutinating inhibition prevalence rate of 67% reported by [13] in Imo State and ELISA rubella IgG antibody prevalence rate of 77% reported by [14]. It is also higher than 73.50% and 79.30% prevalence rates obtained from Adamawa and Kaduna States respectively [8] and 57% prevalence recorded in Makurdi [15] (table 1). The age distribution of rubella antibodies showed that ages 21-25 years had the highest prevalence rate (36.11%) among the non-pregnant and ages 26-30 years had the highest with 30.00% in the pregnant of the child bearing age women. The least prevalence rates came from ages 31-35 years (9.72%) and ages 41-45 years with 1.00% in non-pregnant and pregnant women respectively (Table 2 and 3).

On parity, the rubella antibodies were highest in 1-2 with 3800% in pregnant and 34.72% in non-pregnant women (Table 4) the prevalence rates decreases as the parity level increases from 1-2 to 11-12. The distribution of subject base on the rubella antibody concentrations in women serum. The predominating rubella IgG concentrations were in 31-60 and 61-120 iu/ml in both non-pregnant and pregnant women of child bearing ages. However, 14 no pregnant and 13 pregnant women had their rubella antibody concentrations in 121-240 iu/ml. This could be attributed to the period during which the rubella virus was acquired. The influx of people with very close interaction, lack of awareness of the disease, refection and poor vaccination program, poor rural medical facilities, many below poverty level and the availability of susceptible women may be responsible for the spread and maintenance of the disease in the State.

The higher prevalence rates obtained in this study may be attributed to ELISA test technique used in the laboratory assay, which is more sensitive and specific compared to the haemagglutinating inhibition and single radial haemolysis used by previous workers which is less sensitive. Some of the recent infections observed among the women may have occurred during child delivery and child hood immunization against rubella, where children are put together in a closed environment and may shed the virus to their susceptible mother [11, 8]. Sometimes the disease condition may occur due to the state of the patient at the one set of infection. Since pregnancy is a contra indication to rubella vaccine, it is important to note that pregnant women are not supposed to be vaccinated and pregnancy should be avoided for at least four weeks after receiving rubella vaccine[8].

In conclusion the study has shown that rubella virus infection is present and is circulating among women of child bearing age. To prevent further transmission and spread of rubella infection, adequate vaccination against rubella should be given to women of child bearing age. Our medical facilities in the hospital and medical centres should be improved and very sensitive and modern serological techniques should be introduced in our health centres to ensure early detection of the disease.

We wish to recommend that more work be done in all the medical and health centres nationwide to determine the national prevalence.

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