ORIGINAL ARTICLE

Seronegative Rubella IgG Status in Pregnant Women Visiting Tertiary Care Hospital

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ABSTRACT:
Objective: To determine the seronegative rubella IgG status in pregnant women visiting antenatal clinic at Jinnah Medical College Hospital.
Materials and Methods: This cross sectional study was carried out after ethical approval in Jinnah Medical College Hospital, Karachi from 1st April 2014 to 31st March 2015.Ninety three primigravidae in first trimester presenting to antenatal clinic were selected from the obstetrics and gynecology OPD. Blood samples of all women were taken and sent to laboratory for evaluation of IgG rubella antibody by ELISA technique. SPSS version 20 was used for data analysis.
Results: Out of 93 pregnant women, 11(11.8%) were negative for rubella IgG antibody in the first trimester of pregnancy. Mean ±SD of age of the study participants was 25.66(± 6.29) years. Majority of the women patients belonged to low socioeconomic group having educational status less than matriculation.
Conclusion: Rubella seronegativity is common in pregnant women visiting tertiary care hospital.
Keywords: Congenital rubella syndrome, Immunization, Seronegativity, Pregnancy

INTRODUCTION:

Rubella is a teratogenic virus.[1]Congenital rubella syndrome(CRS) is characterized by deafness, cataract and heart malformation. In addition the affected children can have microcephaly, hepatosplenomegaly and thrombocytopenia.[2]When a woman acquires rubella virus early in pregnancy, she has a 90% chance of passing the virus on to her fetus. This can cause the death of the fetus, and may cause CRS.[3]Before the introduction of rubella vaccine, the incidence of CRS varied from 0.1 to 0.2/1000 live births during endemic periods, and from 0.8 to 4/1000 live births during rubella epidemics. However, rubella vaccination during the past decades has drastically reduced or practically eliminated rubella and CRS in many developed countries and in some developing countries.[4]

Pakistan falls in moderate to high susceptibility risk zone but without documented congenital rubella syndrome.[5] In many developing countries, congenital rubella syndrome is an under-recognized Public Health Problem.[6] Inclusion of rubella vaccine in the national immunization program was found to be implemented in less than one third of developing countries as per the review conducted by WHO[7]. So, there is a need for mechanism to identify and vaccinate non-immune women[8].Therefore, the aim of this study was to identify the frequency of seronegative pregnant women so as do determine the proportion eligible for immunization against rubella and devise program to cover the population and prevent morbidity.

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MATERIALS AND METHODS:

This consecutive cross sectional study was conducted at Jinnah Medical & Dental College Hospital Karachi, for a period of one year from April 2014 to March 2015. Sample size was calculated by using the formula in which we selected 95% confidence interval with 10% margin of error and proportion of presence of rubella is 40% seronegative patients. During this period 93 pregnant women presented in the obstetrics and gynecology OPD, all being primigravidae and of child bearing age (14-49) with first trimester of pregnancy confirmed by ultrasound, were enrolled for the study.Data was collected after taking informed consent for enrollment in the study. Blood sample was collected for detection of rubella-IgG antibodies and was analyzed by ELISA technique using ETI-RUBEK G plus kits.All sera with antibody titer equal to or less than 10.1 IU/ml were regarded as seronegative, between 9.9-10.1 IU/ml was considered as equivocal and titers greater than 10.1 IU/ml was regarded as seropositive, as indicated in kit prospectus.The data of patients was collected on constructed proforma designed for the study which contained demographic information (name and age), hospital registration number, gestational age (in weeks), educational status (i.e. illiterate, < matric, > matric, intermediate and >intermediate), and rubella IgG status (positive or negative).Confounding variables were controlled by excluding pregnant women of second and third trimester of gestation, multigravidae and those women who had history of flu-like symptoms with

maculopapular rash or exposure to rubella like rash in less than 06-months of duration. Bias was minimized by obtaining results of rubella IgG status from same laboratory. Software program SPSS 20, was utilized for all statistical analyses. Frequencies and percentages were used to summarize categorical variables like rubella IgG status and educational status. Mean ± standard deviation (SD) were computed for numerical variables like age distribution and gestational age. Stratification with regards to age, educational status and gestational age was done to control the effect modifiers. Any inferential test of significance was not applicable for this cross sectional study.

RESULTS:

The range of age of women was between 17 to 46 years. Majority of these women were between 21 to 25 years of age. Twenty one women (22.6%) were between 26 to 30 years of age. Seventeen (18.3%) were between 14 to 20 years, and five were between 31-35 and 36 to 40 years of age group respectively. Only four (4.3%) women were between 41 to 49 years of age group in this study. Mean (± SD) age was 25.66 (±6.29) years. In this study, mostly positive Rubella IgG status was encountered in women up to 30 years of age group. (Table 1) Detection of rubella IgG antibody status in majority of these primigravidae was carried out at thirteenth weeks of gestation. Twenty four (25.8%) women were attending antenatal clinic at twelfth weeks of their gestational age. The range of their gestational age was between 7th to 13th weeks in this study. Mean (± SD) gestational age was 11.91 (±1.53) weeks. As major bulk of women attended antenatal clinic at twelfth and thirteenth weeks, therefore significant proportion of positive Rubella IgG status observed at these gestational age groups. (Table 2) In this study, educational status of major proportion of pregnant women was below matric. Intermediate was 19(20.4%) and illiteracy rate was observed in 14(15.1%) women. Educational status of above intermediate was noticed in only 10(10.8%) pregnant ladies. This was attributed to belonging of these women to middle and low socioeconomic class. Hence, majority of positive Rubella IgG status was detected in these women. (Table 3) Out of 93 pregnant women, 11(11.8%) were negative for rubella IgG antibodies in the first trimester of pregnancy. Seropositivity was encountered in the rest of 82(88.2%) pregnant women.

Table: 1
Age distribution of women in relation to Rubella IgG status

AGE OF WOMEN (Years)	FREQUENCY (n= 93)	PERCENTAGE (%)	RUBELLA IgG STATUS Present n = 82	(%)	Absent n = 11	(%)
14-20	17	18.3	16	19.5	1	9.1
21-25	41	44.1	36	43.9	5	45.5
26-30	21	22.6	18	22	3	27.3
31-35	5	5.4	4	4.9	1	9.1
36-40	5	5.4	5	6.1	0	0
41-45	3	3.2	2	2.4	1	9.1
46-49	1	1.1	1	1.2	0	0

Mean age± S.D = 25.66± 6.29

Table: 2
Gestational age distribution in relation to Rubella IgG status

Gestational Age (Weeks)	Frequency (n= 93)	Percentage (%)	RUBELLA IgG STATUS Present n = 82	(%)	Absent n = 11	(%)
Seventh	3	3.2	3	3	0	0
Eighth	2	2.2	2	2	0	0
Ninth	3	3.2	2	2	1	1.1
Tenth	7	7.5	6	6	1	1.1
Eleventh	8	8.6	8	8	0	0
Twelfth	24	25.8	22	22	2	2.2
Thirteenth	46	49.5	39	39	7	7.5

Mean gestational age ± S.D = 11.91 ± 1.53

Table: 3
Educational status in relation to Rubella IgG status

Educational Status	Rubella IgG Status Present	Presentage	Absent	Presentage
	n = 82	(%)	n = 11	(%)
Illiterate	10	12.2	4	36.4
<Matric	30	36.6	6	54.5
>Matric	14	17.1	0	0
Intermediate	18	22	1	9.1
>Intermediate	10	12.2	0	0

DISCUSSION:

Rubella virus is the common agent of prenatal infection. Congenital malformation rate is very high among pregnant women who are infected with rubella primarily during the first trimester of pregnancy[9]. In this study screening of rubella IgG antibody status was carried out during first trimester of pregnancy.

Excluding pregnancy where it causes fetal morbidities, rubella infection carries little morbidity and apparently only minor complications during childhood.[10] Thus, the primary objective of rubella immunization program is prevention of congenital rubella syndrome.[11] In developing countries like Pakistan, rubella outbreaks can occur without clinical recognition. In one study that screened four hundred cases for IgG rubella antibody status using ELISA technique increase prevalence of antibody with increasing age was observed. Moreover, 81.78% pregnant women were seropositive to rubella antibody. Finally, they concluded that there is persistent horizontal transmission of virus in the environment.[12] Therefore, in developing countries, need for determination of rubella antibody status of all pregnant women and immunization of non-immune women have been emphasized by WHO.[7]

Rubella susceptibility in pregnant women from low socioeconomic class is 10 times higher.[13]than the high socioeconomic class. This is due to lack of awareness, poor literacy rates and healthcare facilities and also due to financial constraints.[14] In this study, majority of the pregnant women belonged to low socioeconomic group having literacy rate less than matriculation. The prevalence of rubella and the incidence of rubella infection in pregnancy and thus the risk of congenital rubella syndrome cannot be assessed without serological evidence. Serological studies have been undertaken in many developing countries to assess the proportion of the population susceptible to rubella by age, and thus to define the degree of risk to women of childbearing age. Results vary widely between countries and between different parts of same country.[10]In a recent study from India, the serological status of 1,329 healthy adolescent school girls, aged 12-15years, from 12 districts, has documented overall rubella seropositivity of 76.4%. The urban population had a comparatively better immune status than that of the rural population (80.2% versus 73.1%).[15]Protective levels of antirubella IgG were documented in 72% of pregnant women in sudan[16] and 53% in Nigeria[17], 93% in Cartogena(Columbia).[18]A study in Toronto examined data among 5783 consecutive women for rubella susceptibility. They encountered low rubella immunity among women immigrant from North Africa and Middle East as compared to Canadian born nationals. This is due to improper or lack of immunization program in these developing areas.[19]

A study in the Gynecology Department of Shifa International Hospital, Islamabad in the year 2002, showed seronegativity of 39% for rubella in pregnant women.[20] Contrary to this, a study from Lahore has documented that 81.78% females of child bearing age had immunity to rubella[12] which is comparable to the results of our study. Thus, a wide range of seroprevalence exist among different cites of Pakistan. This is probably because of epidemic outbreaks of rubella in our general population as previously mentioned by Iqbal and Bokhari.[21]

A study conducted at Department of Obstetrics and Gynecology, Jinnah Postgraduate Medical center, Karachi observed 94% of seropositivity and 6% of seronegativity for rubella in pregnant women[22]. Similar type of study conducted in the same Department showed 89% of pregnant women were immune to rubella[23]. The overall seropositivity for IgG in studies from Karachi among pregnant women was observed from 89 to 94%. Hence, 6% to 11% of pregnant women are susceptible. In this study, 11.8% of gravid females were shown no immunity to rubella, which is in the range of seronegative pregnant women of above mentioned studies.

The rationale of this study was to focus on those women who show no immunity against rubella, as shown by IgG levels, give them rubella vaccine after the completion of pregnancy. Furthermore, measures should be performed to cover the population at risk and prevent morbidity.

Rubella vaccine, in the form of MMR vaccine, is a live attenuated vaccine and cannot be given during pregnancy. However, the best method of personal prevention is for women to have their rubella immunity checked before trying to conceive and to get immunized if necessary. It is necessary to realize that treatment of CRS is costly whereas rubella vaccination programs are highly cost effective.[24]The introduction of rubella vaccine requires ongoing strengthening of routine immunization services and surveillance systems.[25]

CONCLUSION:

Significant number of pregnant women visiting tertiary care hospital was not immune to rubella virus. Hence, their fetuses were susceptible to congenital anomalies. Therefore, screening of pregnant women should be recommended to determine those who are eligible for immunization against rubella.

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