MEDICAL CHANNEL

Original Article

RUBELLA IMMUNE STATUS OF CHILD BEARING AGE WOMEN

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ABSTRACT

Objective: To determine the Rubella immune status of child bearing age women irrespective of marital status, parity and pregnant status who are visiting to Gynae and Obstetrics Department of Isra University Hospital, Hyderabad.
Study Design: Cross sectional study
Place and Duration of Study: Department of Obstetrics and Gynaecology, Isra University Hospital, Hyderabad, from 21st July 2005 to 20th January 2007.
Methodology: All women between the age group of 15-35 years irrespective of marital status, parity and pregnant status and with no past history of rubella immunization were included while women with immune disorders like Systemic Lupus Erythematosus (SLE) and Immune Thrombocytopenic Purpura (ITP) and women on immunosuppressive therapy were excluded. Blood samples of the women were collected on their first outpatient department visit, after taking informed consent and tested for rubella Ig G antibodies by using Micro Enzyme Immunoassay (MEIA) technique. 50% discount on the test cost was provided to the patient by the hospital. All relevant features like women's age, marital status, parity and rubella antibody levels were recorded on proforma and analyzed by using SPSS version-11.
Results: Total105 women were incorporated in the study. Majority of women were married i.e. (91.4%), nulliparous women (40.0%), commonest age group was 21-25 years (38.1%). Mean of Ig G level of Rubella in the females was 85.0±55.47 ranging from 1 to 253. Among 105 women, 95 women (90.5%) were immune to rubella.
Conclusion: It is concluded from this study that majority of the studied population appeared to possess protective levels of Rubella Ig G antibodies. Screening for the protective immunity appears always to be necessity for future protection against re-infection.

Key Words: Rubella, Congenital Rubella syndrome, Child bearing age, Immunization

INTRODUCTION

Rubella is an important health problem worldwide[1]. Rubella infection in pregnant woman, especially in the first trimester, can result in serious neonatal morbidity and mortality due to congenital rubella syndrome (CRS)[2].
Rubella is caused by a RNA togavivus (genus Rubivirus) which spread by droplet infection[3]. Patients, who acquire rubella infection, develop a rash after 2-3 weeks of incubation period that spreads from face to trunk and lasts for about three days[4]. The other common features of this infection are fever, arthralgia, post auricular and sub occipital lymph adenopathy. The affected individual is infectious for the last week of incubation period and the first week after the rash appears[5].
While the disease can acquire sporadically, epidemics are not uncommon. It has a world wide distribution[6]. The importance of rubella in public health relates to the risk of malformations in fetus when pregnant woman gets this infection[7]. It affects the fetuses of up to 80% of all women who contract it during the first trimester and no ill effects

result from infection in the third trimester[6].

Rubella outbreaks leading to CRS have been well documented in different countries in recent years. During rubella outbreaks, rates of CRS were at least 1.7 per 1000 live births in Israel, 0.7 in Oman, 2.2 in Panama and 1.5 in Singapore[8].

In 2002, Tariq WZ et al has shown that because of the lack of virology service in most of the health care providing system there is lack of awareness about existence and impact of rubella infection in Pakistan[9].

CRS can be prevented if woman of child bearing age i.e. 15-35 years are immunized against rubella. This age group should be screened for rubella to allow the immunization in seronegative population. The evaluation of immunity to rubella virus relies on the presence of specific IgG antibodies which are present for life after natural infection or after vaccination[10]. These antibodies have protective effects and these may prevent congenital rubella and spontaneous abortions due to the exposure to rubella virus in first trimester. There is a 20% mortality rate among congenitally virus infected infants, symptomatic at birth[11].

All the susceptible women who are receiving healthcare should ideally have their serological state tested. Opportunistic testing for this can be performed, for example in the family planning clinics and during investigating a couple with infertility[12].

Outbreaks of rubella can occur if the proportion of susceptible women of child of bearing age increases as a result of poor up take of rubella vaccination[13]. This study was carried out to determine the at risk immune negative population so that vaccination against rubella would be offered before pregnancy to prevent the neonatal and infant morbidity and mortality due to CRS.

METHODOLOGY

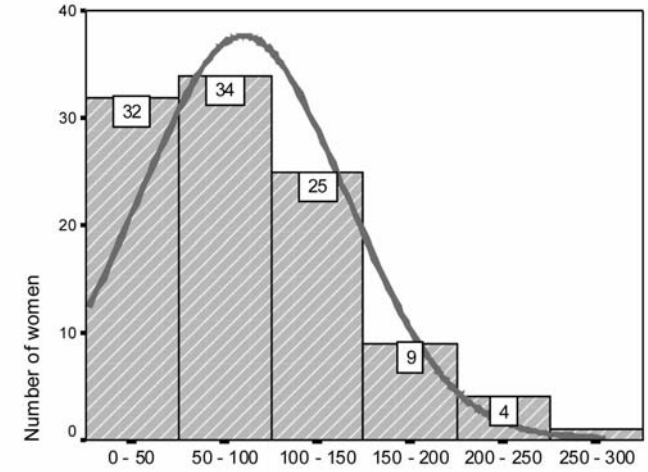
This study was carried out in outpatient department of Obstetrics and gyneacolgy, ISRA University Hospital, Hyderabad from 21st July 2005 to 20th January 2007. Women of child bearing age (15-35years) group, irrespective of marital status, parity and pregnant status and with no prior history of rubella vaccination were included. However women with immune disorder like Systemic Lupus Erythematosus (SLE), Immune Thrombocytopenic Purpura (IPT) and those who are on immunosuppressive therapy were excluded. Total 105 women were recruited by non-probability purposive sampling. All women were required to provide verbal informed consent, and blood samples of the women were collected on their first outpatient department visit and tested for rubella Ig G antibodies by using Micro Enzyme Immunoassay (MEIA) technique. Hospital has provided 50% discount to the patient on the total test cost. All the relevant features like women's age, marital status, parity and rubella antibody levels were recorded on Proforma. On the basis of the levels of IgG, immunity of women assessed. The presence of at least 10 international Unit (IU) of antibodies per milliliter (ml) of serum is indicative of past exposure to rubella virus and these levels make and individual immune positive. Antibody levels below 10 IU/ml may be insufficient to provide protection from clinical illness upon exposure to rubella virus and an individual is termed as immune negative. Data was analyzed with the help of SPSS version 11. Frequencies and percentages were calculated for categorical variables such as marital status and age. Rubella Ig G level was analyzed as a continues as well as categorical by splitting up in two categories i.e. positive and negative and was explored according to age, marital status and parity status.

RESULTS

Among 105 women of child bearing age, 13 (12.4%) women were 15-20 years old, 40 (38.1%) were from 21-25 years, 32 (30.5%) were from 26-30 years and 20 (19%) women were 31-35 years old.

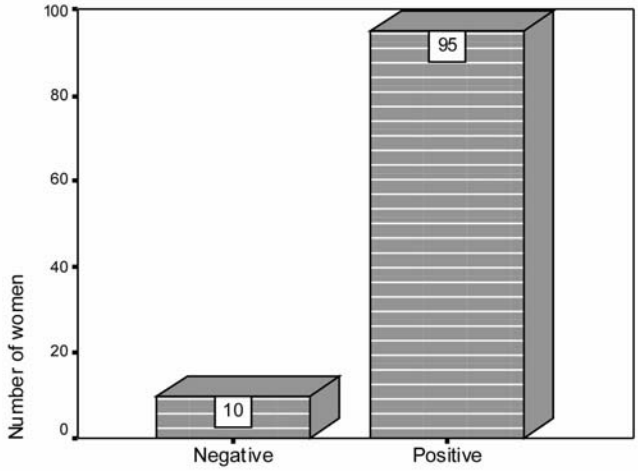
There were 96 (91.4%) married women and 9 (8.6%) single unmarried women. Apart from 09 (8.6%) unmarried singles, majority of the women i.e. 42 (40.0%) were nulliparous women, 22 (21.0%) were primiparous, 27 (25.7%) were multiparous and 05 (4.8%) were grand multiparous women.

GRAPH -1
RUBELLA IgG LEVEL DISTRIBUTION OF CHILD BEARING AGE GROUP WOMEN
n =105



Mean ± SD = 85.0 ± 55.4 (Range=1 – 253)

GRAPH -2
RUBELLA IMMUNE STATUS DISTRIBUTION OF CHILD BEARING AGE GROUP WOMEN
n =105



Negative = Ig G levels less than 10 IU/ml.
Positive = Ig G levels equals to or more than 10 IU/ml.

TABLE – 1

RUBELLA IMMUNE STATUS AMONG WOMEN OF CHILD BEARING AGE GROUP ACCORDING TO MARITAL STATUS

n = 105

	Rubella IgG level		
Marital status	**Positive**	**Negative**	**Total**
Single	05 (55.6)	04 (44.4)	09
Married	90 (93.8)	06 (6.30)	96

Negative = Ig G levels less than 10 IU/ml.
Positive = Ig G levels equals to or more than 10 IU/ml.

TABLE – 2

RUBELLA IgG STATUS AMONG WOMEN OF CHILD BEARING AGE ACCORDING TO AGE GROUPS

n = 105

	RUBELLA IgG LEVEL		
Age (years)	**Positive**	**Negative**	**Total**
15-20	10 (76.9)	3 (23.1)	13
21-25	38 (95.0)	2 (5.0)	40
26-30	29 (90.6)	3 (9.4)	32
31-35	18 (90.0)	2 (10.0)	20

Mean of Ig G level of Rubella in the females enrolled in the study were 85.0±55.47 ranging from 1 to 253. A lot of variability was observed in the value of Ig G level in our study as evident by range. Histogram of Rubella Ig G level is presented in graph-1. In order to interpret the variable of Rubella Ig G level in a meaningful way, it was converted from continuous to categorical variable and on the basis of Rubella Ig G value immune status was divided into two categories i.e. immune positive and immune negative, and the women containing the frequencies respectively were 95 (90.5%) and 10 (9.5%), which reveals that the proportion of rubella immunity in the females of Hyderabad is 90.5%.(Graph-2)

Out of 96 married women, 90 (93.8%) had positive Rubella Ig G status and 6 (6.3%) were negative. Out of 9 unmarried singles, 5 (55.6%) had positive Rubella Ig G status and 04 (44.4%) were negative. Data reveals significantly higher proportion of positive Rubella Ig G status among married women than unmarried child bearing age females (Table-1).

Out of 40 women of 21-25 years of age, 38 (95%) had positive Rubella Ig G status and only 2 (5%) women in this age group had negative Rubella Ig G status followed by 90.6% positive and 9.4% negative Rubella Ig G status, which was seen in the age group of 26-30 years. It explicitly exhibits higher levels of Rubella Ig G among women of age group 21-25 years and 26-30 years, however the difference of positive proportions among age groups was not statistically significant (Table-2).

DISCUSSION

Rubella is a mild exanthematous disease of worldwide distribution. It is not notifiable in many countries and its clinical diagnosis is frequently inaccurate, serosurveys are used to assess the epidemiologic pattern of rubella in a community.

The result of this study indicates that 95 (90.5%) women were immune to rubella while rest of the women 10 (9.5%) were lacking protective levels of rubella antibodies and therefore susceptible to rubella infection.

At first glance the high level of immunity may seems reassuring; however at the time of reaching childbearing age nearly 1 in 10 women in the Hyderabad remains susceptible in an environment with the rubella virus.

A study in the Virology department of Armed Forces Institute of Pathology, Rawalpindi from January 1994 to September 1996 showed a seroprevalence of 7.7% for rubella in general population[9]. A study from Lahore showed that 81.78% females had immunity to rubella, indicating that virus is present in the environment[11]. The overall seropositivity for Ig G in a study from Karachi among pregnant women was observed as 94%[14] and 89%[15]. Another study conducted at Shifa International Hospital, Islamabad in 2002, showed that 61% of the women were immune to rubella[16]. In an Indian study, the data of 15 years was evaluated and it was seen that immunity status against rubella in child bearing age group of women increased steadily from 49% in 1998 to 87% in 2002[17].

There is great variation in the age specific seroprevalence of rubella between countries.[18] Knowledge of rubella antibody titers of female population at various ages is essential for an effective rubella immunization programme.

The present study shows that maximum number of women (38%) belongs to 21-25 years age group and this is the age group which shows maximum seropositivity i.e 95%. while in a study conducted by Zanette DM, in Brazil, shows that seroprevalence was 70% in the age group of 20-25 years.[19]

However in a study conducted in India, it was found that maximum number of women were seropositive (77.2%) in the age group of 26-35 years.[20]

Result of this study shows that lowest frequency of age group was of 15-20 years. Among them 76.9% were immune and 23.1% were non immune to rubella .This result is of concern as pregnancy, with a slight risk to the fetus, occurs more often in these women. In a study conducted in the Western Cape province of South Africa, a total of 95.3% of women in the 15-24 year age group, 97.5% in the 25-34 year group and 98% in the 35-45 year group were immune to rubella.[21]

In this study it was found that among 96 married women. 90 women (93.75%) were immune to rubella however 6 women (6.25%) lacks immunity and this is the group who is at maximum risk of developing CRS if, becomes pregnant and expose to rubella during the first trimester, therefore prompt vaccination against rubella offered to this group after ruling out the pregnancy, provided that they would avoid pregnancy for a period of at least one month following immunization.

Strengthening of rubella and CRS surveillance programs is also recommended in parallel with pre marriage counseling regarding rubella and CRS for young females.

Parity has been shown to be an important factor in the assessment of rubella status and may reflect the post partum immunization.[22]However previous history of immunization, was an exclusion criteria of this study.

Result of the present study shows that among 96 married women, 42 women were nulliparous and among them 41 have protective levels of rubella Ig G antibodies and only 1 woman was non immune. Rest of the 54 married women were parous and among them 5 lacked immunity while rest of them were immune.

One reason for the seropositivity among parous women could be the more exposure of parous women to young children in their own and in neighbouring households. Such children may transmit the rubella which would explain the higher prevalence of rubella antibody seen in women with children.[22]

Limited numbers of studies have evaluated this variable in the past but this factor must be controlled in the future studies of rubella.

During the course of this study it was observed that initial poor compliance of patients was slowly replaced by gradual acceptance. This change of attitude is not self-sustainable in a traditionally hierarchical system and requires constant persuasion. Most of the women questioned me about the significance of the test while the test was offered to them. Good compliance was seen because of better understanding of disease and regular follow up.

CONCLUSION

It is evident from the present study that rubella virus infection is prevalent in our population. However, a substantial number of women reach childbearing age without acquiring natural immunity to Rubella. Hence screening for the protective immunity appears always to be necessity for future protection against re-infection. Until high vaccination rates become the rule throughout the whole country, it seems unlikely that the seropositivity rates of childbearing women age will improve. There is need to formulate an effective rubella immunization program to prevent repeated pregnancy wastage and birth of infants with CRS.

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