Anti-Rubella IgM status in antenatal checkup visiting women

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ABSTRACT

Background: Rubella is a viral infection. Congenital rubella syndrome is the most serious consequences of rubella which has been observed in pregnant women. This study has been done to reveal the association of rubella infection in women.

Methods: The serum specimens were collected from women during their regular antenatal check up, in, was included in the study. Specimens were tested at NPHL every week following standard operating protocol of NPHL utilizing Human ELISA (German) kits and reagents. The results of the tests along with the clinical histories collected from the patient on a proforma file carried by the patients were analyzed following standard statistical tools.

Results: During the three years study period, 320 serum samples were collected in 2006, 372 in 2007 and 400 in 2008, out of which 38 (11.87%), 72 (19.35%) and 49 (12.25%) of the women visiting NPHL during their antenatal checkup were found positive to anti-rubella IgM antibody respectively, indicating recent infection. Almost above 80% of the positive cases were from age group 20-30 years.

Conclusions: The study showed the significant association of recent rubella infection in women which emphasizes requirement of adolescent or adult immunization with rubella vaccine at the earliest.

Key words: anti-rubella IgM, congenital rubella syndrome, pregnant women, rubella.

INTRODUCTION

Rubella is caused by Rubella virus; an enveloped, non-segmented, positive sense RNA virus, which was first isolated in cell culture in 1962 by Perkman and Weller.[1,2] It is a non-arthropod borne Toga virus which is the only member of the genus Rubi virus.[3]

Rubella usually with minor complications when contracted by pregnant women during the first trimester of pregnancy, can lead to miscarriage, stillbirth, or an infant born with congenital rubella syndrome (CRS).[4,5] Some defects associated with CRS may be recognizable at birth, while others are detected months or even years later.[6,7] The consequences of rubella infection in pregnant women is disastrous, so this study aims to find out the significance of rubella infection in women visiting NPHL for antenatal checkup.

METHODS

This is a cross sectional descriptive study based at National Public Health Laboratory (NPHL), Teku, Kathmandu from January 2006 to December 2008. The ethical approval and patient consent has been taken prior the sample collection. A total of 1092 blood samples during the three years study period, were collected from women of age 15 to 45 years, referred by the respective

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gynecologists for testing anti-rubella IgM antibodies at NPHL. All the serum samples collected from the women of age group from 15 years to 45 years were included in the study. Samples from the women above 45 years and below 15 years were not included in the study. All the blood samples were collected following standard methodology at NPHL and separated for serum for sero-diagnostics. Thus obtained serum samples were stored at -20⁰C, after proper labeling, till further processing. The samples collected during the entire study period were tested on weekly basis using standard operating protocol developed at NPHL utilizing Human anti rubella IgM ELISA kit (Germany).[8] The data was entered in the Microsoft excel spread-sheet 2003 and further analyzed by statistical tool (Chi square test), using Win-Pepi (Version 1.55 and 1.69; 2003-2007) as a statistical package software .

RESULTS

A total of 1092 serum samples from women of age group 15 to 45 years were collected during the entire period with 320 during 2006, 372 during 2007 and 400 during 2008.
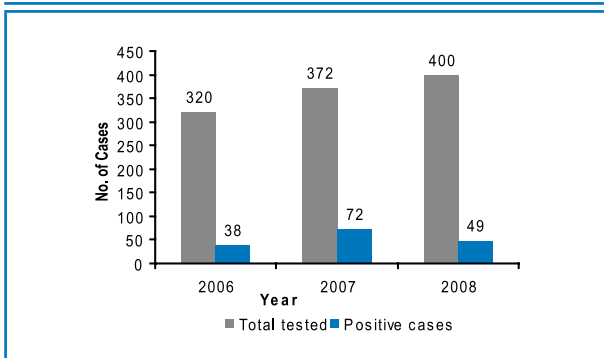

Figure 1. Anti-Rubella IgM Positivity

In the year 2006, of the total 320 serum specimens tested, 11.87% showed positive for anti-rubella IgM antibodies, likewise 19.35% were positive from 372 tested specimens during 2007 and 12.25% from 400 specimens tested during 2008.
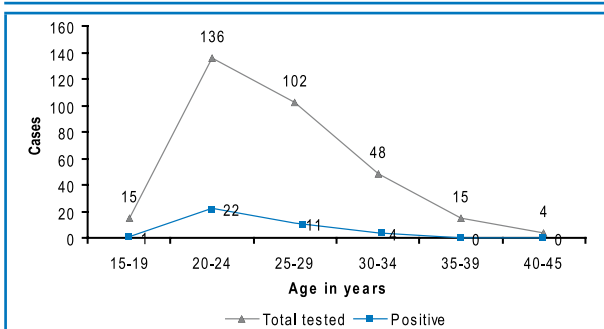

Figure 2. Age wise distribution of rubella in 2006

The age wise distribution of rubella in 2006 showed that the highest number of suspected cases and the positive cases were in the age group of 20 to 24 years with no positive cases above 35 years.
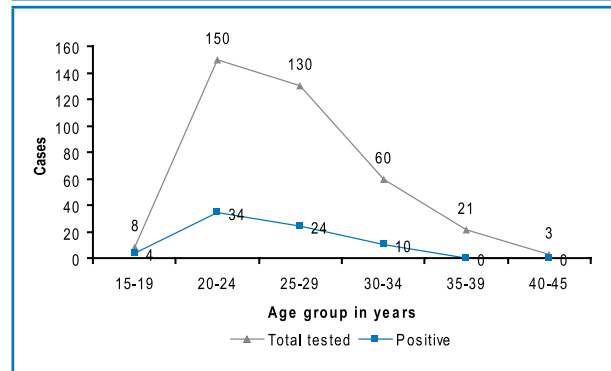

Figure 3. Age wise distribution of rubella in 2007

In 2007 also the highest number of rubella cases was from 20-24 year age group with no positive cases above 35 years.
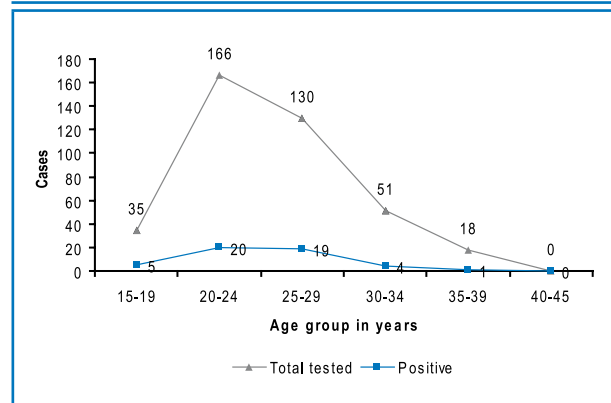

Figure 4. Age wise distribution of rubella in 2008

Here in age group 20 to 24 and 25 to 29, rubella cases were comparable with no cases observed above 40 years.

DISCUSSION

This study was focused to reveal the incidence of rubella in women of child bearing age visiting NPHL for antenatal checkup by detecting anti-rubella IgM antibodies in serum samples which indicates the recent infection, in contrast to anti-rubella IgG antibodies which gives life long immunity. In developing countries, rubella outbreaks can occur with out clinical recognition thus the prevalence of rubella can not be assessed with out the serological evidence.[9,10] The present findings will be helpful for the commencement preventive measures against rubella and CRS as in context of selection and formulating the target population for MMR vaccination

as the recognition of CRS is often hindered by its subtle or delayed manifestations, which contributes to the lack of data on the incidence of CRS.[11]

Worldwide, it is estimated by WHO those more than 100,000 infants are born with congenital rubella syndrome annually.[5] The annual WHO report showed that cases have been increasing in recent years with more disease burden in developing countries where rubella vaccination have not been introduced.[12,13] Studies demonstrated that in many developing countries rubella infects children at different ages and that varying proportions of women have not acquired the protective antibody when they reach the child bearing age.[14-16] The highest risk for the CRS is found in the countries with high susceptibility rate among the women of child bearing age. Understanding of the epidemiology of Rubella in Asian countries is relatively limited, because there are many other prioritized childhood diseases.[17] Serosurveys from 45 developing countries have shown a wide range of susceptibility: the proportion of rubella sero-negative women was 25% or higher in 12 countries, 10%-24% in 20 countries, and below 10% in 13 countries [18] but it seems possible that in underdeveloped countries like Nepal with no rubella immunization may have high incidence rate than do the reporting countries. To the best of our knowledge, based on reports and literature review, nation wide sero surveillance had not been conducted in the country till 2008.

During this study period 11.87% in 2006, 19.35% in 2007 and 12.25% in 2008, of the women's during different age, tested positive for anti rubella IgM antibody. These were mostly women who visited maternity hospital (Paropakar Maternity and Women's Hospital) Katmandu for their regular antenatal check ups and are referred to NPHL However; this maternity hospital is a major hospital of the country where women throughout the country visit for check ups and majority of the patients it caters come from low middle class family living in and around Katmandu valley. Although the result may not represent whole country on epidemiological and geographical grounds, Katmandu valley being a cosmopolitan city roughly represents the indication of rubella infection during pregnancy in Nepal.

The unpublished data of NPHL also showed the anti-rubella positivity of 8.55%, 6.82%, 12.8% and 14.7% during 2001/2, 2002/3, 2003/4 and 2004/5 respectively. This indicates recent rubella infection.

In 2006, it was observed that the highest no of positive cases (22 cases) were in 20-25 years which constitutes 57.89% of the total positive cases, 11 cases in 25-30 years which accounts for 28.95% of the total positive cases, 4 cases (10.53%) in 30-35 years and a case in 15-20 years

of age. The sero-positive trend in 2007 and 2008 is more or less similar to 2006 where of the total positive cases were clustered with in the age group of 20-30 years which comprised almost 80% of the total positive cases in each year. No positive case above 35 years in 2006 and 2007, however single case is observed in 2008. Though the association between age group and rubella infection is not found statistically significant for 2006 and 2008 (P=0.302, x^2 =6.045 for 2006; P=0.035, x^2 =11.972 for 2007 and P=0.646, x^2 =2.49 for 2008).

The higher percentage of positive cases and the total tested cases in the age groups 20-30 years may be because many of the women's marry in their early 20's and get pregnant during the same period in context of our social practices. However, the low sample size in age group 15-20 might be due to the women getting married after 20 years and all the samples of child bearing aged women were received as a part of ante-natal checkup. Such pattern of distribution of rubella positive cases might be due to the natural immunity acquired by the rubella infection in early age of life as there is no policy for immunization against the rubella virus infection in the country. This is why the positive cases were in decreasing pattern as with the increase in age groups.

CONCLUSIONS

The present findings indicates 20-30 years age group as more vulnerable age group for Rubella infection which might as a consequence can lead for the public health burden because this is the most common child bearing age group in context of our country. Thus, this study result stresses need for more extensive studies on the Rubella seroprevalence with different age groups and geography to give more information.

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