

RUBELLA SEROPREVALENCE IN PREGNANT WOMEN IN SHARIATTI HOSPITAL, TEHRAN, IRAN

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Abstract - Rubella a benign viral and modestly contagious illness in children, becomes a very dangerous story when acquired by pregnant women. The potential of its teratogenicity is obvious. Since prevention is preferred to treatment, diagnosis of rubella infection syndrome being difficult in early stages of pregnancy, the uncertainty about fetuses being really infected and therapeutic abortion because of fetal indication being prohibited by law in our country in a descriptive study, the rubella antibody titer (IgG-HI assay) was measured in 500 pregnant women referred to the prenatal clinic, Shariatti Hospital. 76% of women were immune. The immune status improved with advancing age ($P < 0.01$). More than half of these women had no information regarding their previous vaccination status. Only 25 percent reported of being vaccinated, of which, 40 percent was done at 1.5 years of age. No one had been vaccinated in postpartum period. With regard to the results, It is proposed to immunize all children in the second year of life, at preschool entry or high school, screen women in prepubertal, premarried, prenatal period, in the family planning centers and health care places and vaccinate them at appropriate time.

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Key Words: Pregnant women, rubella infection, rubella antibody titer

INTRODUCTION

Serological evidence of rubella has been detected in every country where appropriate investigations have been performed.

Therefore, it is reasonable to assume that congenital rubella occurs world wide. In developed countries, prior to immunization programmes, 10-20% of young adults were susceptible with out comprehensive immunization programmes including childhood vaccination of males and females, rubella epidemics occurring every 5-9 years. During such epidemics the risk of maternal rubella may increase 10 fold. (with particular risk from their own children) (1).

Rubella is usually acquired by droplet spread from the nasopharynx of infected persons. Patients may be infectious for up to seven days before and 4-7 days after the onset of the rash. Rubella antibodies are present by the time the rash appears. As clinical diagnosis is unreliable, laboratory investigation is required to make the specific diagnosis especially during pregnancy (2,3). Maternal viremia associated with either symptomatic or asymptomatic primary disease is a prerequisite for fetal infection. In total 0.5-2 percent of susceptible pregnant women are infected each year. Congenital defects occurring in 0.2-0.5 per 1000 birth. During epidemics the incidence of congenital disease may reach 4-30% of susceptible pregnancies (4).

The likelihood of fatal infection and damage is dependent on the gestation of maternal infection (5-7).

Primary rubella in the first 16 weeks of pregnancy constitutes a major risk to the fetus. The consequences for the pregnancy and the fetus may be sufficiently severe to result in abortion or stillbirth.

If the pregnancy continues to term a wide range of abnormalities may be seen (Table 1) (1,8-11).

Table 1. Features of congenital rubella

| | |
|---|-------------------------------------|
| Ocular defects | Central nervous system |
| Cataracts (uni-/bilateral) | Microcephaly |
| Pigmentary retinopathy | Psychomotor retardation |
| Microphthalmia | Meningoencephalitis |
| Glaucoma | Behavioural disorders |
| Iris hypoplasia | Speech disorders |
| Auditory defects | Intrauterine growth retardation |
| Sensorineural deafness (uni-/bilateral) | Thrombocytopenia, with purpura |
| Cardiovascular defects | Hepatitis/hepatosplenomegaly |
| Persistent ductus arteriosus | Bone lesions |
| Pulmonary artery stenosis | Pneumonitis |
| Myocarditis | Lymphadenopathy |
| | Diabetes mellitus |
| | Thyroid disorders |
| | Progressive rubella panencephalitis |

With regard to rubella teratogenicity, necessity of invasive techniques to confirm whether the fetus is involved, and prohibition of induced abortion due to fetal indications in our country, in a study the rubella seroprevalence was measured in pregnant women, to show the state of rubella immunity of our pregnant women.

MATERIALS AND METHODS

The current study included all pregnant women admitted to prenatal clinic of Shariatti Hospital during October 95 until July 96. All of them were sent to one laboratory (Behdasht laboratory, Jallal al ahmad street in front of the Shariatti Hospital). A sample of whole blood for routine prenatal tests was obtained and rubella antibody titer (IgG) was determined by Hemagglutination Inhibition Assay (HI). The maternal age, gestational age, antirubella antibody titer (HI), history of antirubella vaccination and time of vaccination were recorded.

All of the susceptible cases were advised for immunization after delivery.

RESULTS

A total of 500 pregnant women were admitted to the hospital during October 95-July 96. 380 of them (76%) had rubella IgG titer of > 1.16 (HI assay) who were classified as immune (Fig. 1). The remainder 120 patients (24%) had a rubella antibody IgG titer of < 1.16 who were classified as susceptible.

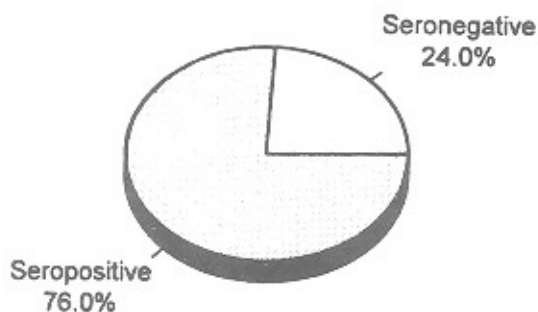


Fig. 1. Rubella Seroprevalence in pregnant women in Shariatti Hospital

Rubella antibody titer of < 1.16 were seen in 20% of 15-20 year old pregnant women, 10% in 21-25 year old, 15% in 26-30 year old, 35% in 31-35 years old and 30% in 36-40 year old (Fig. 2). 275 (55%) had no information regarding their previous vaccination status. 125 (25%) had not been vaccinated and only 100

(20%) of them informed that they had been vaccinated (Fig. 3). Of those being vaccinated, 40% had been done at 1.5 years of age (vaccination programmes of Health Ministry). 35% of vaccinated subjects, had been vaccinated randomly (premarital or unknown period) ($P < 0.01$). No one had been vaccinated in post partum period (Fig. 4).

DISCUSSION

Although clinical cases seen in hospitals does not necessarily reflect the true prevalence of immunity in a community, it may give a fairly good idea about immunity pattern in the community.

A rubella seroprevalence rate of 76% was seen in study group. It means that 24% of women of childbearing age are susceptible to rubella infection.

A rubella seroprevalence of 96.7% in pregnant women is reported from Australia (12), but the rate is lower (78.6%) in immigrant Asian women over 30 years old. In Japan 21.7% of pregnant women who had delivered between 1987-1988 were eligible for vaccination programme (13). In England and Wales after vaccination in school ages (5-16 years old) in 1994, the rubella seronegativity decreased from 15.7% to 3.4% (14).

A report from Canada (Quebec) shows a rubella seroprevalence of 94% in pregnant women (15).

In Switzerland the reported rubella seroprevalence in 1996 was 76% (16). In Sweden the percentage of susceptible pregnant women was 2% in 1994 (17). 85-87% of pregnant Thais had antibody against rubella (18). In developing countries, rubella seronegativity was below 10% in 13 countries, 10-24% in 20 countries and $> 25%$ in 12 countries (14).

The rate of immunity improved with advancing age in the study group, which is in concordance with literature, that rubella seroprevalence is age related (4, 19).

In our study group, only 20% had been vaccinated, which shows that in most of the women the immunity is naturally acquired. The average age of infection is therefore expected to rise, thus involving a risk of increasing age-dependent complications (16).

Vaccination was done randomly in 35% of cases which is statistically significant ($P < 0.01$). Only 25% of the study group were vaccinated in prepubertal period. All reports show that vaccination in school years is necessary to increase the seropositive rate. For instance twelve years after rubella immunization was routinely given to 6 primary school boys in Singapore in 1982, 97.1% were seropositive in a cohort of Singapore Armed forces (SAF) in 1994 (20).

In Switzerland, in the MMR vaccination cohort (age 1.5-6.5 years) rubella seroprevalence attained 80%, but

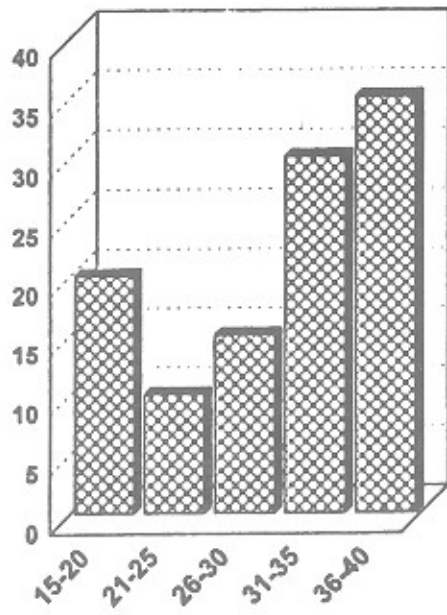


Fig. 2. Age distribution of rubella seroprevalence

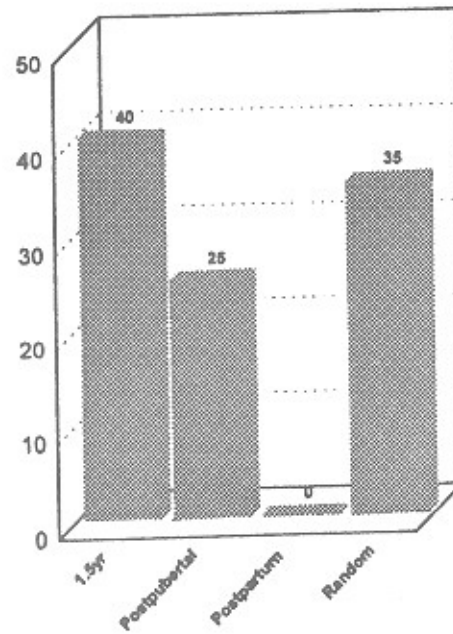


Fig. 4. Time of vaccinations in studied group

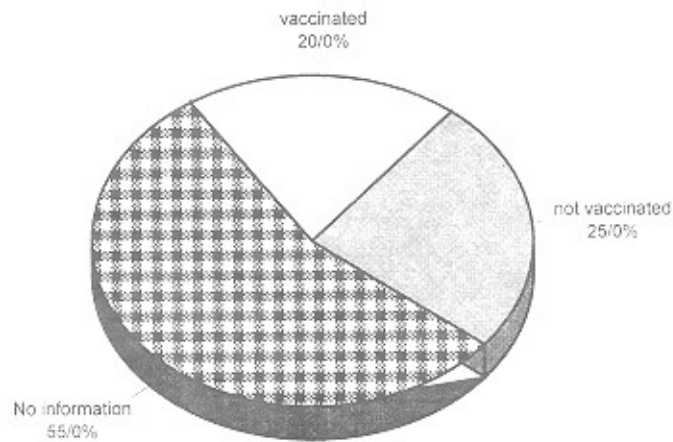


Fig. 3. History of prior vaccination in studied group

declined to 60% between 7 and 12 years of age. MMR vaccination campaigns performed at school since 1984 have increased seroprevalence in this population segment and continued efforts at catchup vaccination during school age for rubella are necessary to avoid the accumulation of susceptible young adults (16).

In England since rubella vaccination of children aged 5-16 years in 1994, rubella susceptibility fell from 15.7% to 3.4% (14).

In Sweden with immunization of school girls and susceptible women after pregnancy in 1973-74 and 2 dose MMR vaccination of both boys and girls in 18 months and 12 years in 1982, the percentage of acquired disease in pregnant women was reduced from 12% in 1978 to 8% in 1987 and 2% in 1994 (17).

In study group no one had been vaccinated in the postpartum period, showing either that they had not been screened before or that they had no information about rubella teratogenicity. There is a report from United States of America that in 122 cases of congenital rubella syndrome (CRS) seen between 1985-1996, there were 121 known missed opportunities rubella vaccination among 94 mothers of infants with indigenous CRS and 98 (81%) were missed post partum opportunities (21).

It seems that most of the women in the study group had no information about rubella teratogenicity when acquired in pregnancy. Being informed about rubella danger in pregnancy most of the women will probably have preconceptional counseling about their immunity status.

Because it is assumed that 24% of our pregnant women are susceptible to rubella infection, it is proposed that :

1- Immunization of all children in second year of life with a catch up campaign targeted at preschool entry four years of age or vaccination in high school regardless of immunity status is performed.

2- Women being informed of rubella teratogenicity in high schools, prenatal and family planning clinics.

3- Screening and immunization of susceptible women in general practice, occupational health, family planning, women clinics, prenatal clinics (immunization after delivery) and health care workers (male and female) to reduce the exposure of pregnant women in health care.

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