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ORIGINAL ARTICLE

Pregnancy and Congenital Rubella Incidence

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ABSTRACT

Background: Rubella is major cause of neonatal abnormalities and miscarriages on worldwide level.
Objective: To find the incidence of rubella in congenital births by assessing antibodies against rubella.
Study Design: Cross sectional study
Place and Duration of Study: Department of Obstetrics & Gynaecology, Sandeman Provincial Hospital, Quetta 1st April 2019 to 31st March 2021.
Methodology: Four hundred pregnant women were analyzed for their IgG and IgM levels. A complete socioeconomic, demographics and clinical information was recorded on a well designed questionnaire.
Results: The mean age of pregnant women was 24.5±4.1 years. Majority of women were between 35-40 years. High IgG were seen in all patients compared with IgM. The seropositivity for IgG increased with increasing age.
Conclusion: The total reported IgG positive cases were up to 16% while of IgM were 3%.
Keywords: Rubella, Pregnancy, Birth defects

INTRODUCTION

Rubella commonly named as “German Measles” is caused by member of family togaviridae. It results in a benign form of illness which is similar to the mild measles cases.[1] The symptoms of rubella include fever, lymphadenopathy as well as rash. An estimate reports that almost 70% of women suffering from its infection develop arthritis. In cases where rubella is developed in first trimester then about 85% of future neonates born have either restricted growth or birth defects. These birth abnormalities are referred to congenital rubella syndrome (CRS). The birth defects can include patent ductus arteriosus, diabetes, blindness, growth retardation.[2,3] Rubella as well as CRS were first notifiable as a disease inside united states of America in year 1969. Within this year 58 novel cases were reported per 0.1 million population. However, there was an evident decline in its incidence with the formation of vaccine later in the same year leading to only a few reported cases until year 1983.[4]

In developing countries where the immunization program is not monitored at an efficient rate CRS still remains a major cause of birth defects and anomalies such as impaired hearing and blindness.[5] A global incidence of rubella among fecundity women remains as high as 60 percent with around 0.1 million births with congenital rubella syndrome.[6,8] The virus is transmitted through sneezing, coughing, or inhaling the microbes from an infected person.

The preliminary site of infection is upper respiratory tract followed by blood system and replication in the lymphoid naso-pharyngeal tissues. This leads to the infection of multiple organs including placenta in case of gestation.[7] Viremia occurs post this stage causing fetal damage, cell destruction and mitotic cessation.[8] In cases of acute infection neurological disabilities and impairment can be caused by autoimmune reactions as research has proved no evidence of virus presentation inside the brain of infected individual.[9-11] The present study was designed for estimating the incidence of rubella in pregnant women of Pakistan so that they can be better managed and policies could be drafted for awareness of women towards opting immunization against the disease for their and their new born safety.

MATERIALS AND METHODS

It was a cross sectional study conducted at for duration of 24 months from The study included women between the age of 18 to 41 years of age. Year 18 was taken in consideration of the age licensed/permitted for marriage in Pakistan. A total of 400 pregnant women were enrolled. There demographic, clinical features and symptoms were recorded on a questionnaire. Each patient 5cc blood was withdrawn for measuring IgG and IgM specific to rubella. Pre-analysis serum was separated from the blood and stored at -20 degree Celsius. Test quality assurances were kept under standardized protocol. Enzyme linked immune sorbent assay was used for analysis of IgG and IgM. Data was analyzed by using SPSS version 24.0 through one-way ANOVA and t test. Frequencies were analyzed by chi square with taking p value no more than 0.05 as significant.

RESULTS

The mean age of pregnant women was 24.5±4.1 years. There were 26.5% pregnant women within the age group of 18-24 years with a seropositivity as 14% and 3.77% of IgG and IgM respectively. The IgG seropositivity increased with increase in age and was measured as 18.5% in pregnant women between the age of 35-40 years. The total reported IgG positive cases were up to 16% while of IgM were 3% (Table 1).

The current study assessed the socioeconomic status of each participant and found that women who belonged to lower socioeconomic class had higher prevalence of serum positive for IgG as well as IgM in comparison to mediocre class. The lowest serum positivity was seen in higher income class (Fig. 1).

Table 1: IgG and IgM assessment among various age groups

Age (years)	Total	IgG		IgM	
		+ve	-ve	+ve	-ve
18-24	106	15(14%)	91(85.8%)	4(3.77%)	102(96.2%)
25-34	127	18(14.1%)	109(81.8%)	7(5.5%)	120(94.4%)
35-40	167	31(18.5%)	136(81.4%)	1(0.59%)	166(99.4%)
Total	400	64(16%)	336(84%)	12(3%)	388(97%)

P value<0.05

Table 2: Distribution of IgG and IgM positivity among various trimesters

Gestational period (months)	Total	IgG	IgM	P value		
		+ve	-ve	+ve	-ve	
1-3	121	11 (9%)	110 (90.9%)	2 (1.65%)	119 (98.3%)	0.044
4-6	167	30 (17.9%)	137 (82%)	5 (2.9%)	162 (97%)	0.045
7-9	112	23 (20.5%)	89 (79.4%)	5 (4.46%)	107 (95.5%)	0.003
Total	400	64 (16%)	336 (84%)	12 (3%)	388 (97%)	>0.05

There was highest incidence of IgG and IgM seropositivity observed in pregnant women having 3rd trimester while 2nd trimester had better picture than last trimester. Least positive IgG and IgM cases were analyzed in 1st trimester with a significant

variance with other trimesters (Table 2).

In the present study symptoms as headache, joint pain was not included. Specific symptoms like fever, rash, swollen lymph nodes were observed in women as major clinical symptoms of rubella. As a result many women symptoms were overlapped with their general health condition during pregnancy and such 17 IgG positive and 6 IgM positive women were missed for their clinical symptomology presentation. Rash was most common symptom in IgG positive cases while fever was observed more in IgM positive pregnant women (Table 3).

Table 3: Clinical symptoms of pregnant women in comparison with their IgG and IgM values

Symptoms	IgG		IgM	
	+ve	-ve	+ve	-ve
Rash	25 (39%)	50 (14.8%)	4 (33.3%)	66 (17.01%)
Fever	17 (26.5%)	99 (29.4%)	2 (16.6%)	102 (26.28%)
Lymphadenopathy	5 (7.8%)	177 (52.6%)	-	34 (8.7%)

The above percentages has been taken from actual total positive and negative cases of IgG and IgM.p value <0.05

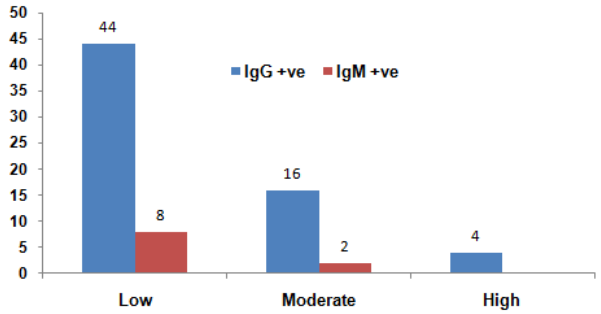

Fig 1: Distribution of IgG and IgM positivity in income classes of pregnant women

DISCUSSION

The prevalence of rubella has been reported with a wide variance on global pattern. This variance is a consequence of data collected from developed countries in comparison to the one recorded from under developing and developing countries like Pakistan itself. The present study enrolled women between the age of 18-40 years. The similar age has been enrolled by other Pakistani researchers as well.[12] The mean age of women was 24.5±4.1 years. A study from China reported that mean age of women tested for seroprevalence of rubella as 30.5 years, however the lower age of enrollment was taken as 21 years in this study in contrast to 18 years in the present study.[13]

The present study also focused that the incidence of IgG positivity was much higher than IgM. An incidence of 16% IgG and 2.5% IgM has been elaborated by a group of Pakistani researchers.[12] The incidence of developing seropositivity escalates with the increase of age of the pregnant women. Studies has documented increase in seropositivity rate with increasing age up to 10.7 percent in young pregnant females to 85.5% percent in those between the age of 36-40 years.[14-15]

Urban women have better awareness of rubella in consideration with those residing in rural areas. An increase of 18.8% from 12.04% IgG and 2.5% from 2.4% IgM has been observed among pregnant women living in rural area in comparison to urban regions respectively. This suggests that higher awareness is associated with advancement of technology, media which is definitely much appropriate in urban regions than rural areas.[16] Unfortunately the current research has no supportive data in this context but has demonstrated that lower economic population had higher seropositivity risk than upper class [12]. Third trimester was the most highlighted trimester in context of higher seropositivity incidence of IgG and IgM. The rate of seropositivity escalates with increasing gestational-age suggesting that majority of women seek medical help for their rubella infection at later stages of their pregnancy. The common symptoms related with rubella and in many cases of pregnancy such as headache, joint pains is mostly overlooked during pregnancy.[17,18]

The previous studies have reported a seropositivity of 92.32 % with almost 7% having high risk of developing rubella infection. Vaccination can safe women who are of child bearing age from the lethal consequences of this disease.[19,20]

CONCLUSION

The total reported IgG positive cases were up to 16% while of IgM were 3% referring to those women who had higher incidence of giving congenital anomalies in neonates.

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