

Rubella seroprevalence and demographic feature analysis in pregnant women from Southern Pakistan

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Abstract

The present study was conducted to estimate the prevalence of rubella infection in pregnant women of district Lakki Marwat leading to foetal death, abortion, premature birth or congenital rubella syndrome. A total of 200 blood samples were collected from pregnant women visiting different maternal health care centers of the study area. Sera samples were tested for rubella-specific IgG and IgM antibodies through ELISA. The overall sero-positivity rate for IgG was 16% and for IgM was 2.5% in the pregnant women respectively. A higher sero-positivity rate was observed in the age group of 26-33 years. Women of rural areas showed higher sero-positivity rate than urban areas. The high sero-prevalence of rubella in the pregnant women of the study area poses a serious threat to the developing foetus.

Keywords: IgM, Lakki Marwat, Pregnant, ELISA, IgG.

Introduction

Rubella is a viral infection which frequently causes a maculopapular rash accompanied with fever in children. Adults can rarely be infected. It is a self-limiting disease but can cause severe consequences when pregnant women are infected, particularly in the first trimester.¹ Maternal rubella infection affects all organs of the emergent foetus and leads to Congenital Rubella Syndrome (CRS) resulting in stillbirth, abortion, miscarriage, combination of birth defects, blindness, deafness, mental retardation and heart diseases.²

Each year more than 100,000 infants are born with CRS in non-industrialized countries.³ Throughout the entire globe it is estimated that from 40% infants -below 5 years of age, 36% deaths are due to infections.⁴

In India, rubella is encountered as 94% IgG and 7% IgM,⁵ while in Bangladesh 68.87% is IgG.⁶ A study conducted in Pakistan showed that 34% were positive for IgG and 3% for IgM.⁷

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Little data is available in Pakistan regarding rubella in pregnant women therefore the present study was designed to assess the prevalent situation of rubella among pregnant women of southern region of Pakistan.

Methods and Results

The study was carried out in district Lakki Marwat, a southern part of Khyber Pakhtunkhwa.

A total of 200 Blood samples were randomly collected from pregnant women from December 2014 to May 2015 visiting different healthcare centers of the study area. Each woman was asked questions on Rubella infection by a proper format. Sera was separated from the blood and were tested for rubella-specific IgG and IgM antibodies through ELISA (enzyme linked immunosorbent assay).

Ethical clearance was obtained from the institutional review board of the Kohat University of Science and Technology, Kohat.

Data were analyzed through appropriate statistical tests using SPSS software version 18.

Females aged 18-41 years constituted the study population. Table 1 shows the prevalence of rubella related to the demographic characteristics of the participants. Their ages range between 18-41 years with a mean of 28.90 ± 7.25 years.

When the sero-positivity ratio of rubella among the participants was tested, a higher prevalence of rubella specific IgG and IgM antibodies was observed in the age group of 26-33 years (n=17.46%) than other age groups. High rate of IgG and IgM antibodies was observed among pregnant women of rural (IgG=19.70% and IgM=2.91%) areas than those of urban areas. With respect to education level, it was observed that sero-positivity ratio and education had an inverse relationship to each other. Housewife and women of low economic status showed higher positivity rate of both IgG and IgM (Table-1).

Clinical feature as a rash showed high positivity in IgG(34.28%) cases, while joint pain was found in a higher proportion in women with IgM antibodies.

Table-1: Prevalence of rubella infection among pregnant women with respect to demographic characteristics.

Characteristic	IgG				IgM				Total	P-value
	Sero-positivity		Sero-negativity		Sero-positivity		Sero-negativity			
	N	%	N	%	N	%	N	%		
Age(year)										
18-25	8	15.09	45	84.9	2	3.77	51	96.22	53	
26-33	11	17.46	52	82.53	3	4.76	60	95.23	63	0.0002*
34-41	13	15.47	71	84.52	0	0	84	100	84	
Residence										
Urban	5	7.93	58	92.06	1	1.58	62	98.41	63	
Rural	27	19.7	110	80.29	4	2.91	133	97.08	137	0.1899**
Education										
Illiterate	20	21.05	75	78.94	3	3.15	92	96.84	95	
Matric	8	13.33	52	86.66	1	1.66	59	98.33	60	0.0022*
Graduate	4	8.88	41	91.11	1	2.22	44	97.77	45	
Occupation										
Housewife	24	22.85	81	77.14	3	2.85	102	97.14	105	
Farming	7	11.66	53	88.33	2	3.33	58	96.66	60	0.0153*
Employed	1	2.85	34	97.14	0	0	35	100	35	
Economic position										
Low	22	18.64	96	81.35	4	3.38	114	96.61	118	
Medium	8	14.03	49	85.96	1	1.75	56	98.24	57	0.0718*
High	2	8	23	92	0	0	25	100	25	
Stage of pregnancy										
1st trimester	5	8.19	56	91.8	1	1.63	60	98.36	61	
2nd trimester	16	18.82	69	81.17	3	3.52	82	96.47	85	0.0001*
3rd trimester	11	20.37	43	79.62	1	1.85	53	98.14	54	

*One way ANOVA, **Chi-square test.

Table-2: Prevalence of rubella infection in respect to various symptoms.

Clinical Feature	IgG				IgM				Total	P-value
	Sero-positivity		Sero-negativity		Sero-positivity		Sero-negativity			
	N	%	N	%	N	%	N	%		
Rash	12	34.28	23	65.71	2	5.71	33	94.28	35	
Joint pain	2	31.33	13	86.66	1	6.66	14	93.33	15	
Fever	8	14.03	49	85.96	1	1.75	56	98.24	57	
Headache	5	11.36	39	88.63	0	0	44	100	44	0.0001*
Enlarged lymph nodes	2	11.76	15	88.23	0	0	17	100	17	
Eye problem	3	9.37	29	90.62	1	3.12	31	96.87	32	

*One way ANOVA.

Discussion

Across the globe there is a considerable variation in the prevalence of rubella among women of child bearing age. In the present study, we found that 16% women were positive for IgG and 2.5% for IgM antibodies respectively, against rubella virus infection.

It was also observed in the current study that frequency of IgG and IgM antibodies increased gradually with the rise in age and were found higher among the women of 33-38 years age. Our study is also in accordance with the study

by O. Olajide in Nigeria.⁸

Women residing in areas showed a high positivity (IgG=18.8% and IgM=2.5%) than women living in urban areas (IgG=12.04% and IgM=2.4%). This may be due to improper management, less of education and poor hygienic conditions.

Our findings indicate that education and rubella virus infection are in inverse proportion to each other. This could be due to fact that educated women have more knowledge on employing preventive measures against

infectious diseases.⁹

Analyzing RUBV infection among the study participants on occupational basis, it was observed that housewives were at a higher risk for rubella virus infection compared to farmer and employed women. This could be due to the fact that housewives live in larger families and experience crowding, which can facilitate RUBV transmission via close contact.⁹

Observing the positivity rate related to the trimester of pregnancy it was found that women in the 3rd trimester were more positive for IgG (20.37%) whereas women in 2nd trimester for IgM (3.52%). This shows that prevalence rate increases with gestational age, which may be due to the fact that most pregnant women start seeking medical care when pregnancy advances.¹⁰

Rubella infection becomes noticeable due to the appearance of the rash. In this study it was observed that women presenting with the rash had a higher positivity rate for both IgG (34.28%) and IgM (5.71%). But generally it is known that clinical features do not play a dominant role in the prevalence of such infections.

Conclusions

A lot of women were antibodies positive against RUBV infection suggestive of placing many unborn babies to a high risk for acquiring rubella infection.

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