

PREVALENCE OF ANTI- RUBELLA ANTIBODIES IN HAZARA DIVISION

ANIS-UR-REHMAN, MBBS, FCPS, MEHR DIL KHAN WAZIR, MBBS,
DCH, FCPS, AND S. HUMAYUN SHAH,* MBBS, M. Phil

*From the Department of Pediatrics, and the *Dept. of Pathology, Ayub Medical College, Abbottabad,
Pakistan.*

ABSTRACT

Two hundred and twenty five school going girls belonging to three districts of Hazara Division, Pakistan were sampled for rubella antibodies. Age range selected was 5 to 15 years. IgG was positive in 78.22% of cases and IgM in 24.44% of cases. The antibodies pattern and prevalence was the same in all the three districts. A clear increase of IgG was seen up to the age of 11 years but between 12 and 15 years of age the increase of IgG was not very significant. This study reveals high prevalence of IgG (78.22%) up to the age of 15 years but still a very high figure of about 21.74% of girls remained susceptible to rubella at a critical period of child-bearing age (i.e. 15 years). This is in contrast to the susceptible subjects of 1.1-4.2% in developed countries.

MJIRI, Vol. 7, No. 4, 249-251, 1994.

INTRODUCTION

Rubella (German measles) is a common contagious viral disease associated with rash, enlarged tender posterior occipital lymph nodes and mild constitutional symptoms. It occurs worldwide, affects children and adolescents more frequently, but is not uncommon in young adults.¹

The importance of disease lies in the ability of the virus to cause foetal damage resulting in congenital rubella syndrome, when the clinical or subclinical infection occurs in pregnancy.²

The epidemiological studies have revealed that incidence of congenital rubella has decreased over the past few years due to active immunization in the western countries. There is little epidemiological data available in Pakistan regarding susceptibility to rubella in pregnancy and incidence congenital rubella syndrome in newborns.³

MATERIAL AND METHOD

School-going girls between 5 to 15 years irrespective of their economical status were included in the study. Sampling

population included residents of three districts of Hazara (i.e. Abbottabad, Mansehra and Kohistan).

5 mL blood was taken after preparing the site for venepuncture. Blood thus collected was sent to District Headquarters Hospital. It was allowed to clot at room temperature, centrifuged and serum separated and stored at -20°C. ELISA technique was used to detect IgG and IgM. Two different kits for IgG and IgM were used. All the samples were analyzed at the same time after bringing to room temperature. Positive and negative controls were set and results read photometrically within one hour of the procedure.

RESULTS

The results are shown in Tables I, II, III and IV. Two hundred included. IgG was positive in 78.22% and IgM in 24.44% in Hazara Division. Prevalence of rubella antibodies in relation to age group was also worked out.

There was a gradual increase in IgG positivity with increasing age whereas IgM positivity is more at 9 to 11

Anti-Rubella Antibodies

Table I: Prevalence of anti-rubella IgG in Hazara Division

Age Group (Years)	No of Cases	IgG Positive	%
5-8	69	52	73.36
9-11	72	57	79.36
12-15	84	67	79.76
Total	225	176	78.22

Table II: District-wise prevalence of anti-rubella IgG.

District	No of Case	IgG Positive	%
Abbottabad	80	65	81.25
Mansehra	79	63	79.74
Kohistan	66	51	77.27

Table III: Prevalence of anti-rubella IgM in Hazara Division

Age Groups	No of Cases	IgM Positive	%
5-8 years	69	20	28.9
9-11 years	72	24	33.3
12-15 years	84	18	21.4
Total:	225	55	Average:24.44

Table IV: District-wise prevalence of anti-rubella IgM.

District	No of Cases	IgM Positive	%
Abbottabad	80	20	25.0
Mansehra	79	22	27.8
Kohistan	66	16	24.24

years, reflecting more recent infection in this age group. The prevalence of antibodies was found to be similar and the age wise distribution was also similar in all three districts.

DISCUSSION

The study reveals high prevalence of IgG (78.22%) in younger age group up to 15 years and there is a clear increase with age. This indicates exposure to infection in early age and only about 21.78% of women remain susceptible to infection in child-bearing age. This susceptibility ratio is very high as compared to the susceptibility in Europe, such as only 1.1-4.2% of pregnant women in London are

susceptible to infection.^{5,6} The prevalence rate observed in three districts of Hazara Division have no significant difference. However, the prevalence in Abbottabad District is slightly higher (81.25%) as compared to the other two districts (i.e. 79.74% and 77.27% in Mansehra and Kohistan, respectively). The high prevalence in Abbottabad, though statistically insignificant, ($P>0.25$), may be due to congested population as compared to other two districts where widespread set up to population is present.

Judging from global point of view, the prevalence of IgG is rather intermediate, being higher when compared to prevalence of 66.6% in Nigeria.⁷ However, this prevalence appears to be low when compared to 91.7% (IgG) in non-pregnant females in Manchester,⁸ 95.8% in 1984 and 97% in 1986 in London⁶ and in Arabian women (92.5%).⁹

The high prevalence in London and Manchester are due to mass anti-rubella vaccination programmes while in Pakistan and Nigeria, there is no mass anti-rubella vaccination programme.

The prevalence rate observed in this study is similar to one reported by Lever et al. (1987) in the pregnant women of Indian sub-continent and also similar to children of age group 6-12 years (76%) of Britain.¹⁰ This indicates that in Indian sub-continent the prevalence is similar to our study due to the similar living conditions, socio-economic, and geographical factors, whereas the rate of natural infection in younger age groups in Britain difference of high prevalence in older age can be due to vaccination of pubertal females.

The regional experience in Pakistan, however, is slightly different in the prevalence of rubella antibodies. The findings of Azmi et al. (1987) found low prevalence in prepubertal females (i.e. 51%). This difference may be due to the reason that they only screened a small number of prepubertal girls (i.e. 35 subjects). However, the prevalence of IgG is similar (i.e. 77%) in child-bearing females of Pakistan.¹¹

Information concerning the level of immunity against rubella is scanty in developing countries as in Pakistan. In WHO-sponsored study conducted in Argentina and Brazil, it was found that 80% of females of child-bearing age had haemagglutinating antibodies against rubella.¹² In Angolian population it was seen that 73% of prepubertal females and 71% of girls between 15 to 19 years of age had antibodies against rubella.¹³ This may indicate that natural infection is similar in these countries and susceptibility to rubella during pregnancy is very high as in Pakistan.

We recommend that:

- A nation-wide survey for assessing the prevalence of rubella infection including congenital rubella syndrome should be undertaken,
- The prevention of congenital rubella should be integrated with national programmes of mother and child protection, ideally by means of obligatory prenatal serological tests

- and continue monitoring of those women who are not immune,
- c) Rubella immunization programmes should be launched for children with EPI programme and for susceptible child-bearing women also.

ACKNOWLEDGEMENT

The authors are very thankful to Mr. Ageel, Laboratory Assistant for his help and Mr. Mohammad Iqbal, Stenographer, PMRC, for typing the manuscript.

REFERENCES

1. Paul DP, Hope EG, Harry MM: Rubella virus. In: Samuel, Baron (eds.). Medical Microbiology, pp. 622-5, 1982.
2. Norman G: Congenital cataract following German measles in the mother. *Transact Ophthal Soc Australia* 4: 35-46, 1941.
3. MMWR: Rubella and congenital rubella-United States, 1984-1986. *JAMA* 258: 2491-2500, 1987.
4. Rasul S, Rizvi S, Khurshid M, Rizvi J: Rubella susceptibility and continuing risk of infection in pregnancy. *JPMA* Vol. 4(5): 102-3, 1990.
5. Miller E, Nicahok A, Rousseau OSA, et al: Long rubella in babies of South Asian Women in England and Wales and excess and causes. *BMJ* 294: 737-9, 1987.
6. Norman DN, Sarah EP: Immunity to rubella in women of child-bearing age in United Kingdom. *BMJ* 297: 1301-4, 1988.
7. Gomwalk NW: Seroepidemiology of rubella in IMO state of Nigeria. *Transact Royal Soc Trop Med Hyg* 79: 777-80, 1985.
8. Miller CL, Miller E: Rubella vaccination in U.K. *Lancet*-ii 732, 1985.
9. Lever AM, Ross MG, Baboonian C, Griffiths PD: Immunity to rubella among women of child-bearing age. *Br J Obst Gyn* 94(3): 208-12, 1987.
10. Munro ND, Wild NS, Sheppard S, Smithells RW, Hambling MH: Fall and rise of immunity to rubella. *BMJ* 294: 481, 1987.
11. Azmi F, Iqbal J, Rab A, Khan MA, Amin A: Prevalence of rubella antibodies in pregnant and prepubertal women. *JPMA* 37: 6-7, 1987.
12. Dowdte WR, Ferreria W, Gomes D, et al: WHO collaborative study in seroepidemiology of rubella in Caribbean and middle and South American population. *Bull. WHO* 42: 419-22, 1970.
13. Casmiro C, Escudeiro M, Wanda C, Ferreira W: Rubella antibody status in Angolian population. *Am J Trop Med Hyg* 24: 1043, 1975.

Editorial Comment:

Dear Dr. Humayun Shah;

Please reply to us about the following problem:

The presence of specific IgM in the range of 21%-33% in different age groups and in three regions shows high epidemic state of rubella in blood sampling period which you did not point to, and if there was not such an epidemic state, the results of IgM would be false positive.

Sincerely yours,
M. Farhadi, M.D.
Chairman

Author's reply

It has been established that IgM antibody responses can occur in secondary or reactivated viral infections. Rubella IgM responses are occasionally demonstrated in reinfections, most commonly if the first infection was with a vaccine virus. In two instances, individuals with natural immunity who subsequently received vaccine have been shown to demonstrate rubella IgM antibody responses.¹

Therefore it is clear that the seropositivity (IgM) in our study was not due to epidemic.

Thanking you,
Prof. Dr. Syed Humayun Shah
Department of Pathology,
Ayub Medical College,
Abbottabad-Pakistan.

REFERENCE:

1. Harcourt GC, Best JM, Banatvala JE: (1980). Rubella-specific serum and nasopharyngeal antibodies in volunteers with naturally acquired and vaccine-induced immunity after intranasal challenge. *J Infect Dis* 142: 145-155, 1980.