



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3831821>Available online at: <http://www.iajps.com>

Research Article

**RUBELLA IMMUNITY IN JUNIOR HIGH SCHOOL GIRLS IN
RURAL AND URBAN AREAS OF MULTAN DIVISION****¹Dr Muhammad Asad Raza, ²Dr Munnaza Imran, ³Dr Madiha Naeem**
^{1,2,3}Nishter Medical College.**Article Received:** March 2020**Accepted:** April 2020**Published:** May 2020**Abstract:**

In this report, a sero-epidemiological survey was performed to determine the prevalence of rubella immunity and antibody titer in 11-16-year-old girls in urban and rural areas of Multan division. The results and conclusion are presented.

***Place and Duration:** In the Department of Community Medicine Of Nishter Hospital Multan for one year duration from February 2019 to February 2020.*

***Methods:** A total of 812 serum specimens were collected by random sampling; 613 from rural and 199 from urban regions. The size of the samples was approximately proportional to the number of total junior high school girls in these areas, and ensure that the estimated error does not exceed 3% with 95 percent correlation.*

***Results:** 812 serum samples were tested for rubella antibody. 17% had antibody titers below or equal to 1:10, but the rate of sero-negativity was 20.5% in urban and 16.3% in rural areas. 80 percent of the 11-12-year age group and 85 percent of the 13-14 year and 15-16-year age groups are immune to rubella.*

***Conclusion:** In Pakistan, information about the immunity status in different parts of the country is scant and it is advisable to monitor sero-epidemiological studies in different geographical urban and rural regions in' order to design the most suitable and economical vaccination policy.*

Corresponding author:**Dr. Muhammad Asad Raza,**
Nishter Medical College.

QR code



Please cite this article in press Muhammad Asad Raza et al, Rubella Immunity In Junior High School Girls In Rural And Urban Areas Of Multan Division., Indo Am. J. P. Sci, 2020; 07(05).

INTRODUCTION:

Rubella is classified as a member of the toga virus family. The virion has 60nm diameter, it has an internal nucleocapsid surrounded by a glycoprotein envelope with short spikes of hemagglutinin. The incubation period of rubella infection is about 17 days, and prodromal symptoms including adenopathy, malaise, low grade fever, mild sore throat and coryza may precede the rash by one to five days. The rash persists two to three days. About 50% of children have inapparent infection, but this rate may be lower in adult populations. During an epidemic it has been shown that the rate of subclinical infection was 17% 'in pregnant women. The virus can be isolated from the pharynx and the blood about one week before the onset of symptoms. The virus may persist in the pharynx about two weeks and disappears from the blood with the appearance of antibody. In pregnant woman during the viremic stage, the virus can infect the placenta and the fetus. By serological studies, Cradock-Watson, et.al. have demonstrated that the placenta and fetus can be infected at any time during pregnancy, but this particularly can occur during the first trimester. In this period of pregnancy, transplacental transfer of maternal antibody is defective and the fetal immune defense is immature, and the virus can infect the placenta and fetal organs and a chronic infection may be established. Infection of the placenta is more frequent than fetal infection, and fetal infection is not always accompanied by congenital malformation. In a study based on viral isolation during the first trimester of pregnancy, the virus was found in 85 % and 50% in the placenta and fetus respectively in the case of maternal infection, but the rate of congenital malformation is about 20% in neonates in this period. At reexamination several years later, further signs of disease may be demonstrated in these children due to persistent infection of rubella virus, and the risk of damage will thus increase to 30-35 percent. In this respect, hearing loss and occasionally panencephalitis may occur. As subclinical infection is prevalent in rubella and as it is not possible to diagnose clinical rubella from other exanthematous diseases, the only evidence of past infection and immunity relies on the presence of specific antibody which is best determined by hemagglutination inhibition (HI) technique. A serum HI titer equal to 1:10 or higher is indicative of passed infection and immunity to rubella. Variations in the level of immunity in different populations may

be due to factors such as socioeconomic status, climate, occurrence of recent epidemics and population size and density. To have a rubella immunity profile in our country, seroepidemiological surveys have to be done in different urban and rural regions of Pakistan. In this study, the prevalence of immunity and antibody titer in 11 to 16-year-old junior high school girls in urban and rural regions of Tonkabon, a district situated in the north of Pakistan, is determined.

MATERIALS AND METHODS:**Study population:**

3089 and 658 girls were attending junior high schools in rural and urban regions respectively. A total of 812 serum specimens were collected by random sampling; 613 from rural and 199 from urban regions. The size of the samples was approximately proportional to the number of total junior high school girls in these areas⁸, and ensure that the estimated error does not exceed 3% with 95 percent correlation.

Collection of Specimens and Antibody Assay:

5 ml of blood was collected from every student, separated sera were sent in cold storage to the Department of Virology, School of Public Health, Tehran University of Medical Sciences, and were stored at -20°C until tested. Hemagglutination inhibition antibody was determined in dilutions from 1:10 to 1:640 of sera by microtiter technique.⁹ The rubella antigen was obtained from a commercial source (Orion Diagnostica, Helsinki, Finland) and used in 4 hemagglutinating units. The sera were treated with 25% acid-washed kaolin and 50% pigeon red blood cells in dextrose gelatine veronal buffer to remove non-specific inhibitors and hemagglutinins. The test was controlled by including a negative and positive standard serum in each microtiter plate. A rubella HI titer of less than 1: 10 was judged to be seronegative and greater than or equal to 1:10, seropositive. All sero-negatives were retested.

RESULTS:

812 serum samples were tested for rubella antibody and the results are summarized in Tables I to IV. Of a total of 812 sera titrated, 17% had antibody titers below or equal to 1:10, but the rate of seronegativity was 20.5% in urban and 16.3% in rural areas (Table I).

Table I. Prevalence of susceptibility to rubella (HI antibody titer \leq 1:10) in 812 junior high school girls in urban and rural areas

Location	No. of sera tested	No. of susceptible	Percent of susceptible
Urban areas	199	41	20.6
Rural area	613	100	16.3
Urban and rural	812	141	18.45

Table II shows the number and the percentage of sero-negativity in different age groups in rural areas. 80 percent of the 11-12-year age group and 85 percent of the 13-14 year and 15-16-year age groups are immune to rubella. In urban areas, the percentage of immune students gradually increased with age (Table III).

Table II. Prevalence of susceptibility to rubella (HI antibody titer \leq 1:10) in rural areas relative to different age groups.

Age Group in Years	No. of sera tested	No. of susceptible	Percent of susceptible
11-12	150	30	20
13-14	349	53	15.2
15-16	114	17	14.9
Total	613	100	16.7

Table III. Prevalence of susceptibility (HI antibody titer \leq 1:10) in urban areas relative to different age groups.

Age Group in Years	No. of sera tested	No. of susceptible	Percent of susceptible
11-12	72	18	25
13-14	98	20	20.6
15-16	29	3	10.3
Total	199	41	20.6

In the total of 812 sera, the relationship between antibody titer and age is shown in Table IV.

Table IV. HI antibody titers in 812 junior high school girls in urban and rural areas relative to different age groups.

Age Group in Years	No. of sera tested	HI antibody titers						
		< 1:10 Percent	1:10 Percent	1:20 Percent	1:40 Percent	1:80 Percent	1:16 Percent	1:32 percent \leq
11-12	222	21.6	4	15.3	25.2	22.5	6.4	4.9
13-14	447	16.3	4.4	20.1	28.6	18.5	10.4	1.7
15-16	143	13.9	3.4	22.3	27.3	20.9	7.7	4.3
Total	812	17.27	3.93	19.23	27.03	20.63	8.17	3.63

The highest percentage of all students (27.4%) had 1:40 antibody titers. 19% have antibody titers of 1:20 and 20% have 1:80, and only 4% possess 1:10 HI titers. 17% of all students are susceptible to infection. Analysis of the data in Table IV with the X² test indicates that there is a statistically significant rise in the rate of immunity (titer > 1:10) with increasing age (P = 0.05).

DISCUSSION:

In most parts of the world where children are not routinely vaccinated against rubella, this infection is predominantly a disease of preschool and school-age

children and during epidemics they act as sources of infection for other susceptible, including pregnant women, even when only a thin stream of susceptibility is observed. By serologic survey during an outbreak, it has been possible to demonstrate that 3.5% of pregnant women became infected, the rate of susceptibility being about 12.5% in these women. Our study in Tonkabon District shows that overall, 17% of junior high school girls are still susceptible to rubella and the rate of immunity shows a gradual increase with age groups: prevalence of immunity is about 78.4% in the 11-12-year age group and 86% in the 15-16-year-old. The percentage with antibody in urban areas is slightly

lower than rural areas, a difference of 5% in immunity rate being observed in all age groups in rural and urban regions. Overall, 16.3% are susceptible in rural as compared to 20.6% in urban areas. As shown in Table IV, the highest proportion of children have antibody titers between 1:20 and 1:80. Low titers of 1:10 are only found in 4% and titers of $\geq 1:320$ in 3% of this population. Scattered investigations concerning the rate of immunity and studies about vaccine effectiveness had been performed in Pakistan. In a study performed in 1981 in Teheran, 10-29% susceptibility had been observed in 18-25-year-old girls and women. Based on the seroepidemiological studies immunization programs are planned and are effectuated in different countries.

The two main immunization strategies are: 1) Immunization of all children in the second year of life in order to reduce the rate of infection and the rate of transmission to pregnant women. This strategy is now supplemented by identification of seronegative nonpregnant women at child bearing age and the booster immunization in adolescent females .2) In most areas of the world, vaccination is provided for 12-13 year old girls and women in the post-partum period.18 Other schemes of vaccination consist of screening of all females of 12-45 years and vaccination of seronegative. In populations with high natural immunity in women of childbearing age, premarital testing and vaccination of seronegative females is also proposed. In Pakistan, information about the immunity status in different parts of the country is scant and it is advisable to monitor seroepidemiological studies in different geographical urban and rural regions in' order to design the most suitable and economical vaccination policy.

REFERENCES:

1. Mirambo, Mariam M., Mtebe Majigo, Seth D. Scana, Martha F. Mushi, Said Aboud, Uwe Groß, Benson R. Kidenya, and Stephen E. Mshana. "Rubella natural immunity among adolescent girls in Tanzania: the need to vaccinate child bearing aged women." *BMC women's health* 18, no. 1 (2018): 3.
2. Majigo, M., M. M. Mirambo, Seth D. Scana, Martha F. Mushi, and Said Aboud. "Rubella natural immunity among adolescent girls in Tanzania: the need to vaccinate child bearing aged women." (2018).
3. Bukasa, Antoaneta, Helen Campbell, Kevin Brown, Helen Bedford, Mary Ramsay, Gayatri Amirthalingam, and Pat Tookey. "Rubella infection in pregnancy and congenital rubella in United Kingdom, 2003 to 2016." *Eurosurveillance* 23, no. 19 (2018).
4. Hoes, J., M. J. Knol, L. Mollema, A. Buisman, H. E. de Melker, and F. R. M. van der Klis. "Comparison of antibody response between boys and girls after infant and childhood vaccinations in the netherlands." *Vaccine* 37, no. 32 (2019): 4504-4510.
5. Zahraei, Seyed Mohsen, Talat Mokhtari-Azad, Shahrokh Izadi, Mahdi Mohammadi, and Azam Sabouri. "Seroprevalence of anti-rubella and anti-measles antibodies in women at the verge of marriage in Pakistan." *Vaccine* 38, no. 2 (2020): 235-241.
6. Hayford, Kyla, Simon Mutembo, Andrea Carcelen, Hellen K. Matakala, Passwell Munachoonga, Amy Winter, Jane W. Wanyiri et al. "Measles and rubella serosurvey identifies rubella immunity gap in young adults of childbearing age in Zambia: The added value of nesting a serological survey within a post-campaign coverage evaluation survey." *Vaccine* 37, no. 17 (2019): 2387-2393.
7. BoucoPakistan, Isabelle, and Eliana Castillo. "No. 368-Rubella in Pregnancy." *Journal of Obstetrics and Gynaecology Canada* 40, no. 12 (2018): 1646-1656.
8. Dontigny, Lorraine, Marc-Yvon Arsenault, and Marie-Jocelyne Martel. "No. 203-Rubella in Pregnancy." *Journal of Obstetrics and Gynaecology Canada* 40, no. 8 (2018): e615-e621.
9. Azami, Milad, Zahra Jaafari, Ali Soleymani, Gholamreza Badfar, and Shamsi Abbasalizadeh. "Rubella Immunity in Pregnant Pakistani Women: A Systematic Review and Meta-Analysis." *International journal of fertility & sterility* 13, no. 3 (2019): 169.
10. Robyn, Misha, Elizabeth Dufort, Jennifer B. Rosen, Karen Southwick, Patrick W. Bryant, Jane Greenko, Eleanor Adams et al. "Two imported cases of congenital rubella syndrome and infection-control challenges in New York State, 2013–2015." *Journal of the Pediatric Infectious Diseases Society* 7, no. 2 (2018): 172-174.
11. Sreepian, Preeyaporn Monatrakul, and Apichai Sreepian. "SEROPREVALENCE OF RUBELLA IMMUNITY AMONG WOMEN OF CHILDBEARING AGE IN BANGKOK, THAILAND." *Southeast Asian Journal of Tropical Medicine and Public Health* 49, no. 1 (2018): 76-81.
12. Vynnycky, Emilia, Timoleon Papadopoulos, and Konstantinos Angelis. "The impact of Measles-Rubella vaccination on the morbidity and

- mortality from Congenital Rubella Syndrome in 92 countries." *Human vaccines & immunotherapeutics* 15, no. 2 (2019): 309-316.
13. KANDASAMY, S., D. JEYAKUMARI, E. PREMALATHA, JAMUNRANI SRPAKISTANGARAMASAMY, and M. BALAMURUGAN. "Seroprevalence of Rubella Immunity (IgG Antibody) among Female Health Care Workers of our Hospital in Southern India." *Journal of Clinical & Diagnostic Research* 13, no. 7 (2019).
 14. Kaushik, Ashlesha, Sanjay Verma, and Praveen Kumar. "Congenital rubella syndrome: A brief review of public health perspectives." *Indian journal of public health* 62, no. 1 (2018): 52.
 15. KARCHEVA, Milena D., Anton P. GEORGIEV, and Alexander B. BLAZHEV. "RUBELLA IMMUNITY IN A COHORT OF PREGNANT WOMEN–SEROLOGICAL SURVEY." (2019).