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RESEARCH ARTICLE

A STUDY OF SEROPREVALENCE OF RUBELLA AMONG REPRODUCTIVE AGE WOMEN IN A TERTIARY CARE TEACHING INSTITUTE OF UTTAR PRADESH

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ABSTRACT

Background: Rubella, also known as German Measles or three-day measles, is an infection caused by a RNA virus, belonging to Togaviridae family.According to a study done by WHO in developing countries;10 to 25% women tested seronegative(2) Up to 50% of maternal infections are subclinical in spite of viremia that may cause spontaneous abortion or devastating fetal infection.Up to 90% of pregnant women with rubella and rash during first 12 weeks of gestation have an affected fetus. **Objectives:** To estimate the seroprevalence of rubella immunity in reproductive age women To administer vaccine to seronegative women.**Method:** This study was conducted in department of obstetrics and gynecology in collaboration with department of microbiology at M L N medical college, Prayagraj, UP among patients attending to gynecology OPD. in collaboration with the microbiology department. After obtaining written informed consent, a questionnaire form was filled ELISA kit Rubella IgG and IgM purchased from BIOGENIX, Inc., were used for serological testing **Results:** Out of 530 Healthy pregnant women of reproductive age group enrolled in study, 517 (97.5%) were immune to rubella and 13 women (2.45%) were susceptible to rubella whereas no women were found to have active or acute rubella infection during the course of study. **Conclusion:** IgG seroprevalence can be used as an indicator of rubella elimination in the country.Screening for rubella susceptibility by serology for all women of childbearing age at their first preconception counselling is still relevant. The need for intensification of awareness programmes regarding government immunization strategies should also be considered.

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INTRODUCTION

Rubella, also known as German Measles or three-day measles, is an infection caused by a RNA virus, belonging to Togaviridae family.(1) Transmission of this virus occurs through nasopharyngeal secretions, and rate of transmission to nonimmune individual is very high, that is 80%. Mainly its incidence amplifies around late winter and spring season. Maternal rubella is usually a mild febrile illness that follows an incubation period of 12-23 days. A generalized maculopapular rash begins on the face and spreads to the trunk and extremities. Other symptoms may include arthralgias or arthritis, head and neck lymphadenopathy, and conjunctivitis.Viremia usually precedes clinical signs by approximately a week, and adults are infectious during viremia and through 7 days after the rash appears.According to a study done by WHO in developing countries ;10 to 25% women tested seronegative(2) Up to 50% of maternal infections are subclinical in spite of viremia that may cause spontaneous abortion or devastating fetal infection. Rubella virus is one of the most complete teratogens, and its effects are worst during organogenesis. Up to 90% of pregnant women with rubella and rash during first 12 weeks of gestation have an affected fetus. At 13-14 weeks of gestation, this incidence is 50 %, and by the end of second trimester, it is 25%. Defects are rare after 20 weeks of gestation. Features of congenital rubella syndrome are cardiac septal defects, pulmonary stenosis, microcephaly, cataracts, microphthalmia, and hepatosplenomegaly(3) Other abnormalities include sensorineural deafness, intellectual disability, neonatal purpura, and radiolucent bone disease.

Aims and objectives: To estimate the seroprevalence of rubella immunity in reproductive age women. To administer vaccine to seronegative women.

MATERIALS AND METHODOLOGY

This study was conducted in department of obstetrics and gynecology in collaboration with department of microbiology

at M L N medical college, Prayagraj, UP among patients attending to gynecology OPD.

Inclusion criteria: Healthy non pregnant women between age 15-49yrs and willing to participate were included in the study.

Exclusion criteria: Pregnant patients were excluded from the study. Patients who had not given consent were excluded. Sample size-530.

The study was started after approval by the ethical committee and research committee of our institution; in collaboration with the microbiology department. After obtaining written informed consent, a questionnaire form was filled for each participant through a face-to-face interview. Data including age, marital status, education level, occupation, place of residence, income, pregnancy status, history of birth defects, abortion etc. were taken. Approximately 5ml of blood was obtained from each participant by venipuncture under aseptic precaution.ELISA kit Rubella IgG and IgM purchased from BIOGENIX, Inc., were used for serological testing. According to the manufacturer's instructions, sample O.D. equal to or more than standard cut off will be considered positive. Results were conveyed to the women through printed reports. Seronegative women were then counselled and administered R-VAC to prevent any impact on reproductive performance of the women in future pregnancy.

IMPLICATION

Rubella IgG and IgM antibodies are important immunoglobulins to study when investigating the prevalence of rubella in a given area Olajide et al.,2015(4)The presence of only IgM or both IgM and IgG antibodies at the same time indicates an acute/recent rubella virus infection. However, the presence of IgG antibody in absence of IgM antibody indicates is a seromarker of immunity against rubella virus Taneja and Sharma, 2012(5)The absence of both IgM and IgG antibodies indicates susceptibility to acquire rubella infection. The screening of women of child bearing age before conception, introduction of rubella vaccination, and a strong surveillance system is most important to reduce rubella associated health complications in the country. This study emphasizes the need for preconception screening as we would have an opportunity to vaccinate susceptible women. Though improving immunity to rubella year by year is a welcome sign, still the proportion of susceptible females of reproductive age who need to be vaccinated is significant(6) With successful eradication of polio, elimination of rubella and measles being the next targets, combined vaccination strategy is the key to rubella elimination.

RESULTS

A total of 530 nonpregnant female of reproductive age group were enrolled in the present study, of which 297 (56.03%) patients belonged to 21-30yrs, among them 286 (53.96%) and 11 (2.07%) patients were tested seropositive and seronegative for anti-rubella IgG respectively. Very few number of patients (6) were found between 51-60 yrs, all of them were tested positive for anti-rubella IgG. No patients were tested negative for anti-rubella IgG between 31-60 yrs age group. In this study, majority of the patients belonged to lower middle class 256 (48.30%), followed by upper middle class 191(36.03%). 40 patients and 39 patients respectively belong to upper lower and upper class. A very a smaller number of patients belong to

TABLE 1: Distribution of Study Participants as per Sociodemographic Factors (N=530)

Study parameters	IgG+	%	IgG-	%
Age				
11-20 years	74	13.96%	2	0.37%
21-30 years	286	53.96%	11	2.07%
31-40 years	117	22.07%	0	0%
41-50 years	34	6.41%	0	0%
51-60 years	6	1.13%	0	0%
Socioeconomic status				
Upper	39	7.35%	0	0%
Upper middle	186	35.09%	5	0.94%
Lower middle	249	46.98%	7	1.32%
Upper lower	39	7.35%	1	0.18%
Lower	4	0.75%	0	0%
Residence				
Urban	128	24.15%	1	0.18%
Rural	389	73.39%	12	2.26%

lower class 4(0.75%). Most of the patients in our study had come from rural area 401 (75.66%), of which 73.39% and 2.26% patients were seropositive for anti-rubella IgG and seronegative for anti-rubella IgG respectively. Rest of the patients were from urban area 129 (24.33%).

Table 2. Distribution of study participants as per status of immunity to Rubella (N=530)

Test Reports	Status	No. of participants	%
IgG+, IgM-	Immune to Rubella	517	97.54%
IgG-, IgM-	Susceptible to Rubella	13	2.45%
IgG-, IgM+	Acute Infection	0	0%

From table 2, it was seen that 517 patients were immune to rubella,13 patients were susceptible to rubella infection whereas no patients were found to have active rubella infection.

Table 3. Distribution of Study Participants as per Obstetric Mishaps (N=530)

Study parameters	IgG+	%	IgG-	%ge
Still Births	8	1.50%	0	0%
Abortion	115	21.69%	2	0.37%

Table 4. Distribution of study participants as per Past history of Infection and immunization (N=530)

Past History	IgG+	%	IgG-	%
Immunization	373	70.37%	0	0%
H/o Fever with rash	442	83.39%	13	2.45%

From the present study, we observed that 8 patients who tested positive for anti-rubella IgG had history of still birth and 115 patients (21.69%) had history of abortion. Beside this, 2 patients who tested negative for anti-rubella IgG negative, also had history of abortion.Among the study participants,373 (70.37%) patients had immunization history in past and 455(85.84%) patients had history of fever with rash. Among the patients with history of fever with rash, 442 patients were tested positive for anti-rubella IgG and rest (2.45%) were seronegative.

DISCUSSION

In our study, 530 nonpregnant patients of reproductive age were tested for rubella IgG and IgM antibodies, majority 297 (56.03%) patients were belonged to 21-30yrs, among them 286 (53.96%) and 11 (2.07%) patients were tested seropositive and seronegative for anti-rubella IgG respectively. A study by

Gupta et al. in Lucknow investigated the seroprevalence of rubella in pregnant women, revealing a significant proportion of women were still susceptible to rubella infection, highlighting the need for rubella vaccination in adolescent girls and women of child bearing age. (7) Another study performed in Tamil Nadu, found 15% seronegativity for rubella among healthcare worker. In study conducted by JAYAKRISHNAN T et al(8)among pregnant woman 94.3% (95% CI 86.2-97.8) of them have protective level of IgG. The rest 5.7% (95% CI 2.2-13.8) were susceptible. There is considerable variation in the prevalence of rubella IgG among women of child bearing age in different geographical regions in India, ranging from 65.7% in Trivandrum, Kerala, 68.8% in Punjab, 87.2% in Delhi and 88.2% in Utter Pradesh (UP). Seropositivity in our study is 97.45%. It may be due to natural infection or vaccination. Although we did get history of primary vaccination (373 women) and fever with rash (469 women)in our study participants but definite Rubella past infection status could not be determined as in almost all cases documentation was lacking.only a small number of patients were susceptible to rubella infection 13(2.45%) but this is still enough for transmission of the virus to occur in the society and leads to CRS.No patients were found to have active rubella infection in our study. European women have relatively high (93.2%) rubella immunity as compared to African (86.7%) and Asian origin (78.4%).. In the study by Muliyil D E et al 83.4%were seropositive (9).A high seropositivity rate was similar to the results of our study.In the study by Tamirat B et al a total of 422 pregnant women who attended the ANC of Adare Hospital and Hawassa University Comprehensive Specialized Hospital were approached, and Serological analysis found that 2.1% of the study participants were positive for antirubella IgM, indicating a recent rubella virus infection.The seropositivity rate of antirubella IgG was 86.3%, which indicates past exposure/infection with development of protective immunity. (11).In a cross-sectional study among female medical and nursing students by Shashank Shekhar et al(14.36%) were seronegative and (85.6%) were seropositive. The students of the institute enrolled in the study were selected by a Pan India entrance test and were truly representative of every region of India(12). Another study by Swesi AR on random sample of female students in 2022 showed 86.7% were IgG positive , 13.3 % were IgG negative and 100% were IgM negative similar to our study (13).In the study, conducted by Pandya H B et al among pregnant women, 88.9% had a protective level of IgG antibodies while the rest 11.1% were susceptible(14).A cohort of women seeking infertility treatment were tested for Rubella and among 150 women 127 (84%) were immune. (SHARDA NARAYAN HOSPITAL ,MAU,UP,2024). From our study we observed that seroprevalence of anti-rubella IgG decreases with age, minimum seroprevalence between 51-60 yrs.The most interesting fact noted in our study that large proportions of patients were from low socioeconomic background (56.58%) and from rural area (75.65%) .This is probably because majority of patients in our hospital came from rural area and person living in a crowded place are more prone for acquiring communicable disease.Thereby developing more natural immunity and herd immunity in rural area as compared to urban area. From the present study, we observed that 8(1.50%) patients and 115 patients (21.69%) who tested positive for anti-rubella IgG had history of still birth and history of abortion respectively. After taking detail history, we have found that 70.37% patients had history of immunization and 83.39% patients had history of fever with rash who were tested positive for anti-rubella IgG. But no documentation was available regarding vaccination and treatment history. This again emphasizes that higher seroprevalence anti-rubella IgG may be because of vaccination or natural infection. Childhood immunisation programmes have suggested that 80% RCV coverage is sufficient to avoid long-term increases in CRS incidence post-RCV introduction across a range of demographic and epidemiological contexts (15). All 13 women who were found to be susceptible to rubella were called for a counselling session where they wre educated regarding adverse effects of rubella infection in pregnancy and motivated for vaccination.Two women had conceived,one had acute febrile illness and one denied vaccination as was breastfeeding.Among 9 women who consented for vaccination ;five agreed to visit the facility due to inconveniences in travelling because of MAHAKUMBH.Only 2 women were finally vaccinated at our facility ;counselled regarding strict contraception for 1 month and discharged without any adverse event.

CONCLUSION

IgG seroprevalence can be used as an indicator of rubella elimination in the country.Screening for rubella susceptibility by serology for all women of childbearing age at their first preconception counselling is still relevant in INDIA despite childhood immunization strategies. Vaccination of seronegative women with R-VAC will go a long way in reducing incidence of obstetric mishaps due to Rubella infection contracted during pregnancy in susceptible women. We would also like to emphasize the reluctance regarding vaccination and propose an intensified education and awareness programs to increase interest of healthy women population in accessing health care facilities and seeking immunization benefits.

Conflict of Interest: None

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Key Points

- This study aimed to identify seronegative women among reproductive age group and vaccinate them so as to prevent potential complication during pregnancy like first trimester abortion, undue medical termination of pregnancy.
- This study emphasizes the need for preconception screening as we would have an opportunity to vaccinate susceptible women.
- Though included in the National immunization programme, awareness regarding importance of vaccination that can significantly impact future reproductive performance is vital.

REFERENCES

Lambert N, Strebel P, Orenstein W, Icengelo J, Poland G. Rubella. Lancet. 2015;385(9984):2297-307.

World Health Organization, Regional office for South-East Asia. Strategic Plan for Measles Elimination and Rubella and Congenital Rubella Syndrome Control in the South-East Asia Region 2014-2020 Int J women health. Available from: https://apps.who.int/iris/handle/10665/205923. Accessed on 2 April 2021.

Mawson AR, Croft AM. Rubella virus infection, the congenital rubella syndrome, and the link to autism. Int J Env Res Pub Heal. 2019;16(19):1-6.

Olajide OM, Aminu M, Randawa AJ, Adejo DS. Seroprevalence of rubella-specific IgM and IgG antibodies among pregnant women seen in a tertiary hospital in Nigeria. Int J Womens Health. 2015 Jan 6;7:75-83. doi: 10.2147/IJWH.S68667. PMID: 25610003; PMCID: PMC4294645

Lebo EJ, Kruszon-Moran DM, Marin M, Bellini WJ, Schmid S, Bialek SR, et al. Seroprevalence of measles, mumps, rubella and varicella antibodies in the United States population, 2009–2010. Open Forum Infect Dis 2015. January;2(1):ofv006. [DOI] [PMC free article] [PubMed] [Google Scholar]

Introduction of Measles. Rubella vaccine guidelines (campaign and routine immunisation)-Operational guidelines. MoHFW, Government of India; 2017.

GuptaA, Jain P, Jain A. Sero-prevalence of rubella virus antibodies in pregnant women in the vicinity of Luck now, Uttar Pradesh. Arch Med. 2015;7(3):7.

Jayakrishnan T, Murkoth A, George B, Rao B, Vidya K. Sero prevalence of rubella immunity in pregnant women in Kerala, India. Int J Med Public Health. 2016;6(4):189-92.

Muliyil DE, Singh P, Jois SK, Otiv S, Suri V, Varma V, et al. Sero-prevalence of rubella among pregnant women in India, 2017. Vaccine. 2018;36(52):7909-12.

Barik S, Faruque F, Al Hossaini SS, Kar S, et al. Seroprevalence of Rubella in a subfertility clinic of a semi urban tertiary care private hospital of Eastern India. IJCMR. 2020;7(7):1-4.

Tamirat B, Hussen S, Shimelis T. Rubella virus infection and associated factors among pregnant women attending the antenatal care clinics of public hospitals in Hawassa City, Southern Ethiopia: a cross-sectional study. BMJ Open. 2017;7:10.

Shashank Shekhar, Vijaya Lakshmi Nag, Singh P, Kaushal R, et al. Rubella seroprevalence among Indian female medical and nursing students at a tertiary care teaching institute and its correlation with socioeconomic status. Indian J Comm Med 2020;45(2):246–56.

Swesi AR. Seroprevalence of Rubella antibodies Among Reproductive-Age Women in The Municipality of Alasabaa-Libya. AJAPAS. 2024;3(1):176-9.

Pandya HB, Zala P, Vala R, Vohra U, Walvekar O, Vagadia Y, et al. Seroprevalence of rubella immunity in rural pregnant women attending antenatal clinics at a tertiary care centre in Piparia, Gujarat, India. J Clin Diagn Res. 2021;15(2):DC01-4.

Winter AK, Pramanik S, Lessler J, Ferrari M, Grenfell BT, Metcalf CJE. Rubella vaccination in India: identifying broad consequences of vaccine introduction and key knowledge gaps. Epidemiol Infect. 2018;146:65-77.c

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