Original Article

Identification of Seronegative Women in Reproductive Age Group Eligible for Immunization Against Rubella

Saima Bibi[1], Ammara Arooj [2], Nimra Khan[3], Rizwana Chaudhri [4]

[1]Senior Registrar, Holy Family Hospital, Rawalpindi, [2]Woman Medical Officer, Holy Family Hospital, Rawalpindi
[3]Medical student, [4]Professor of Obs & Gynae, Holy Family Hospital, Rawalpindi

Correspondence: *Dr. Saima Bibi, Senior Registrar, Holy Family Hospital, Rawalpindi*
Email: saima_amer@hotmail.com

Abstract

Objective: To emphasize the importance of vaccination against rubella in reproductive age group by introducing MMR vaccination in EPI programme.

Study design: Descriptive study.

Place and Duration: Medicare Hospital Saidpur road Rawalpindi, 1st January 2016 to 30th June 2016.

Methodology: This study was conducted on 690 women of reproductive age group (15 to 40years) presented to Medicare hospital in outpatient departments and screening was done quantitatively using enzyme-linked immune assay (ELISA).

Results: Out of 696 women 576 (82.76%) were seropositive 73 (10.49%) were seronegative and 47 (6.75%) were equivocal.

Conclusion: Rubella vaccine is cost-effective but requires strengthening and modification of routine local immunization services and surveillance systems. We recommend selective rubella vaccination in childbearing age and postpartum vaccination of susceptible women should also be ensured along with routine MMR in childhood EPI programme.

Keywords: Rubella, vaccination, CRS.

Cite this article as: Bibi S, Arooj A, Khan N, Chaudhri R. Identification of Seronegative Women in Reproductive Age Group Eligible for Immunization Against Rubella. J. Soc. Obstet. Gynaecol. Pak. 2017; Vol 7(4):187-190.

Introduction

Rubella is a contagious but vaccine-preventable viral disease that is mostly characterized by febrile illness and rash.[1] In the absence of vaccination, rubella is an endemic disease with epidemics occurring every 6–9 years.[2]

It is usually asymptomatic infection in adults which in turn imparts lifelong immunity. On the contrary, rubella infection in first 20 weeks of pregnancy is categorized by dire fetal consequences in non-immune mothers. It can cause a spectrum of health problems ranging from miscarriages, preterm birth, stillbirth as well as variety of birth anomalies collectively known as congenital rubella syndrome (CRS)[3].

Common congenital defects of CRS include cataracts, congenital heart disease, hearing impairment, and developmental delay.

Worldwide more than 100,000 Children are born each year with CRS.[4] Prenatal infection of Rubella congenital syndrome contributes to 2-3% of all congenital anomalies.[5] However maternal anti-rubella antibodies, acquired as result of childhood infection, have a lifetime protective effect and they may prevent its dangerous effect in pregnancy.[6]

Authorship Contribution: [1]Conceived the idea, collection of data, manuscript writing, [2]Data analysis, [3]Data review and article drafting, [4]Supervised and reviewed the study.

Funding Source: none
Conflict of Interest: none

Received: July 21, 2017
Accepted: Dec14, 2017

In 1969, to prevent CRS, Vaccine was developed against rubella virus. It is a live attenuated vaccine and introduced into childhood immunization programme of many countries.[7] Being alive attenuated vaccine however it is contraindicated in pregnancy.[8] Therefore, generalized vaccination as part of EPI programme remains the mainstay of management of Rubella in pregnant women globally. The countries using rubella vaccines in their national immunization programmes are on the rise which in turn leads to a parallel decline in rubella cases.

According to "measles and rubella global strategic plan 2012 to 2010 midterm review"[9], there was a major reduction in the prevalence of CRS in American, European, South-East Asian and Western Pacific regions attributed to introduction rubella vaccine in EPI programme. But in eastern Mediterranean and African regions, there was almost no reduction in rubella incidences per million populations. In African region, there was rather increased incidences from 3.9(2010) to 5.6(2015). Socioeconomic status, political structure, and health system challenge influenced immunization programme coverage in African regions. The major reduction in rubella infection after the introduction of MMR (measles, mumps, and rubella) vaccination is well documented in developed countries, however about still 10-15% of women reached childbearing age without immunity against rubella virus[10] due to missed opportunities for Vaccine and immigration from places where rubella is endemic.[11] Rubella Vaccination is also being introduced in developing countries where the incidence of CRS is also thought to be quite high.[12] But the introduction of Rubella vaccine in the national immunization programs is implemented in less than one-third of developing countries.[13] It was determined earlier that 80-85% rubella vaccine coverage of population is mandatory in order to induce herd immunity[14], highlighting the importance of wider coverage of the populations, to protect pregnant women from the delirious effect of CRS.

However, there is a serious issue with universal coverage which varies among different nations from 13% to 99%, thereby finding the need for selective childbearing age vaccination along with the childhood vaccination for tackling the nonimmune women in the population. The aim of this study is to identify the percentage of rubella seronegative women in reproductive age group and to emphasize the importance of vaccination against rubella in women especially before conception and in the postpartum period.

Methodology

It was a descriptive cross-sectional study of 696 women of reproductive age group (15 TO 40 Years of age). Our study population was all women who come for subfertility or antenatal checkup at Medicare hospital. All the selected women were screened for rubella IgG. The screening was done quantitatively using enzyme-linked immunoassay (ELISA); IgG antibodies to rubella in maternal serum is evidence of past infection or immunization by vaccine and give lifelong immunity against rubella, IgM antibodies to rubella in maternal serum indicates recent infection. Nonpregnant ladies found seronegative were counseled for active immunization by MMR vaccination with 3 months contraception and pregnant women were advised postnatal vaccine.

Results

696 women were screened during six months (1st January 2016 to 30th June 2016) period; 576 (82.76%) were seropositive, 73 (10.49%) were seronegative and 47(6.75%) showed the equivocal result. Mean age of participants in this study was 29 Years.

No. of Patients	Result of rubella IgG	Percentage
576	seropositive	82.76%
120	seronegative	17.24%

Discussion

Rubella also known as German measles or three-day measles is a viral infection with half of the people not realizing that they are sick. It generally causes fever, flu, sore throat, joint pains and few complications, that may include bleeding problems, testicular swellings and swollen lymph nodes. In non-pregnant, it is usually unnoticed however its seriousness and health importance starts from its ability to cross the placental barrier and infect the fetal tissues resulting in (CRS) congenital rubella syndrome, which includes eye defect, ear defect, such as cataract deafness, heart

and brain abnormality. CRS is very rear after 20th week of pregnancy. There is lack of awareness about existence and impact of rubella virus infection in Pakistan. This fact is coupled with non-availability of local data on the prevalence of CRS in the country.

To prevent CRS strategies should include childhood rubella vaccination by introducing MMR in EPI programme, selective vaccination of the childbearing woman and susceptible woman in the post-partum period and a combination of both approaches, In Sweden, two different approaches have been practiced to prevent CRS with coverage of 90% population. The first approach target school girls, susceptible women after pregnancy. The second approach is two-dose (MMR) measles, mums, and rubella for both girls and boys at the age of 18 months. Since 1985 no case of CRS is registered.[15] The UK and other countries also demonstrated a mass decline in the CRS.

Serosuscibility surveys of the woman of Childbearing age and easy availability of rubella vaccine across the country is the mainstay of this public health problem. In Pakistan, several studies have been conducted in the past to know the extent of problem and rubella immunity in childbearing age group. The sample size remains always questionable in most of them.

This study was planned to estimate the burden of rubella seronegative women in reproductive age group so as to emphasize the importance of vaccination against rubella in these women. It was observed that 82.76% of the female were already immune and 17.24% were nonimmune to rubella. Thus, in our study, the rubella vaccine coverage is target group is high as compare to other regional research conducted. The reason being that this study is conducted in a private hospital which caters affluent section of the population which are considered to have enhanced awareness of health issues and wider accessibility to childhood vaccination services.

In a different seropositive survey conducted in India the 61.8% of a pregnant woman were found to be seropositive in central India[16] along with 32.7% of school going adult girls are seronegative for Rubella.[17]

Both these researchers underline the need for robust immunization program tackling the adult girls.

In Pakistan, we have very few sero-surveillance surveys regarding Rubella. This coupled with the fact that we have variable population characteristic in a different part of countries when it comes to acceptability and accessibility to any health intervention including immunization.

In a study conducted on Internally displaced pregnant women of North Waziristan Agency, 19.6 % women demonstrated Rubella protective IgG antibodies while 3.6% woman were found to be positive for IgM showing a high prevalence of Rubella infection.

In another study from Lahore 77.3% women showed immunity to rubella. Adil MM, et al[18] observed that 40% women were nonimmune to rubella, similar were findings of Tariq WZ, et al[19] in his study at virology department of Armed Forces Institute of Pathology, Rawalpindi.

Thus, this underpins the fact mentioned earlier that there is wide regional variation in the coverage of childhood immunization programme Large-scale studies in different settings are however required to describe the CRS burden in Pakistan.

Serosurvey of rubella in Jeddah, the western region of Saudi Arabia showed that 8.4% women were susceptible.[20] A study from Tamil Nadu India[21] showed rubella susceptibility of 48.3%, similar findings were reported from Turkey[22] and Jordan.[23]

In industrialized countries rate of seronegativity for rubella are much lower. In Switzerland seroprevalence of rubella nationwide in women of childbearing age is 94.3%[24], similar results were obtained by a study in Netherlands[25], seroprevalence was 95%. The difference in rubella immune status in the developed world can be explained by the wider availability, affordability, and acceptability of good health care systems. The universal vaccination approach in American countries reduced the incidence of rubella by more than 98% and led to the absence of CRS since 2008.[26] Vaccination against rubella is very effective and provides lifelong immunity and definitely can reduce the risk of CRS[27] in developing countries as well.

Conclusion

A safe and effective rubella vaccine is available. The vaccine is cost effective.

We recommend:

Serosurvey is different settings to recognize the susceptible women.

Strengthening the existing childhood immunization programme by introducing the second dose of rubella vaccine entering 10th grade to decrease the prevalence of seronegative young female in our community. We also recommend preconception rubella screening, vaccination and implementation of postpartum vaccination if found seronegative during pregnancy.

Recommendations

This study is an important step in addressing the issue of the need for vaccination of general population. Our Childhood immunization programme has issues with the universal coverage. We have in some part of the country massive internal migration of residents and along with various belief and myths associated with the vaccination progammes in other areas. Thus, to address all multitude of issues we must consider immediate postpartum period vaccination and also among the women of the reproductive age group in our community so as to highlight the still unrecognized public health problem of CRS.

Acknowledgment

We gratefully acknowledge the collaboration of Medicare hospital and Citi Lab Rawalpindi in collecting data.

References

1. Mounerou S,Malewe K,Anoumou YD,Sami N,Koffi A,Mireille PD.Seroprevalence of Rubella IgG Antibody among Pregnant Women Attending Antenatal Clinic in Lome,Togo.American Journal of Infectious Diseases and Microbiology.2015;3(4):134_136.
2. Gregg NMA. Congenital cataract following german measles in the mother. Epidemiol Infect 1991;107(1):3–14. doi: 10.1017/S0950268800048627
3. Kolawole OM,Anjorin EO,Adekanle DA,Kolawole CF,Durowade KA.Seroprevalence of Rubella IgG Antibody in pregnant women in Osogbo,Nigeria.Int J Prev Med.2014;5(3):287_292
4. World Health Organization.Global measles and rubella strategic plan:2012_2020.GENEVA:WHO;2012.
5. Wazir MS,Iqbal s.Rubella_Should it be a Priority in the National Immunization Programmes?J Ayub Med Coll Abbottabad.2015 Oct-Dec;27(4):747_8.
6. Wysokinska T,Janaszek W,Bucholc B,Gorska P,Gniadek G,Slusarczyk J,Rawicz M.The prevalence of anti_rubella antibodiesin women of childbearing age in Poland.Vaccine.2004 May 7;22(15_16):1899_902.
7. Plotkin SA.The history of rubella and rubella vaccination ieading to elimination.2006 Nov 1;3:164_8.
8. CDC. Prevention of measles, rubella, congenital rubella syndrome, and mumps, 2013: summary recommendations of the Advisory
9. World Health Organization. Global measles and rubella strategic plan: 2012. ISBN 978 92 4 150339 6. http://apps.who.int/iris/bitstream/10665/44855/1/9789241503396_eng.pdf
10. Hutchinson MK,Sandall SR.Congenital ToRCH infections in infants and young Children:neurodevelopmental sequelae and implications for intervention.Top early Child Educ.1995;15:65_82.
11. Gadhoke I,Aggrwal R,Lal S,Khare S.Seroprevalence and incidence of rubella in and around Delhi(1988_2002).Indian J Med Microbiol 2005;23:164_7. from CRS.Bull World Health Organ 1997;75:55_68.
12. Cutts FT,Robertson SE,Diaz Ortega JL,Samuel R.Control of rubella syndrome(CRS) in developing countries,Part 1:burden of disease
13. Hafeez M,Anwar S,Abid S,Chaughtai S.Identification of Seronegative Age Group Eligible for Immunization againsRubella.JIMSA.Oct_Dec 2010;23:4.
14. Diodati C. Immunization. Windsor, Ont.: Integral Aspects; 1999. [cttation]
15. Böttiger M, Forsgren M. Twenty years' experience of rubella vaccination in Sweden: 10 years of selective vaccination (of 12-year-old girls and of women postpartum) and 13 years of a general two-dose vaccination. Vaccine. 1997;15(14):1538-1544
16. Susceptibility of Rubella Among Pregnant Women Attending the Antenatal Clinic in a Tertiary Care Hospital, Jabalpur, Central India (PDF Download Available). Available from: https://www.researchgate.net/publication/311502053_Susceptibility_of_Rubella_Among_Pregnant_Women_Attending_the_Antenatal_Clinic_in_a_Tertiary_Care_Hospital_Jabalpur_Central_India [accessed Feb 10 2018].
17. Sharma H, Chowdhari S, Raina TR, et al. Serosurveillance to assess immunity to rubella and assessment of immuno-genicity and safety of a single dose of rubella vaccine inschool girls. Indian J Community Med 2010;35:134–137
18. Adil MM,Zubair M,Alam AY,Raja KS.Identification of seronegative pregnant women eligible for immunization against rubella.Rawal Med J. 2005;30:22_4.
19. Tariq WZ,Ziaullah,Karamat KH.Rubella Virus_Cause of preventable congenital anomalies.Pak Armed Forces Med J.2002;52:92_5.
20. Alsibiani SA.Rubella Immunity among Pregnant Women in Jeddah,Western Region of Saudi Arabia.Obstet Gynecol Int.2014;2014:659838.
21. Ramamurty N,Murugan S,Raja D,Elango V,Mohana,Dhanagaran D.Serosurvey of Rubella in five blocks of Tamil Nadu.Indian J Med Microbiol.2006;123:51_4.
22. Sasmaz T,Kurt AO,Ozturk C,Bugdayci R,Oner S,Rubella seroprevalence in women in the reproductive period,Mersin,Turkey.Vaccine.2007 15;25:912_7.
23. Jarour N,Hayajneh WA,Balbeesi A,Otoom H,Al_Shurman A,Kharabsheh S.Seroprevalence of rubella among Jordanian women of childbearing age.Vaccine.2007 4;25:3615_8.
24. Zufferey J,Jacquier P,Chappuis S,Spinnler O,Hohlfeld P,Zuber PL,Bille J.Seroprevalence of rubella among women of childbearing age in Switzerland.Eur J Ciin Microbiol Infect Dis.1995 Aug;14(8):691_6.
25. Smits G,Mollema L,Hahne S,de Melker H,Tcherniaeva I,Vanderklis F,Berbers G.Seroprevalence of rubella antibodies in The Netherlands after 32 years of high vaccination coverage.Vaccine.2014 Apr 1;32(16):1890_5.
26. Mongua_Rodriquez N,Diaz_Ortega JL,Garcia_Garcia L,Pina_Pozas M,Ferreira_Guerrero E,Delgado_sanchez G,Ferreyra Rayes L et' al.A Systematic review of rubella vaccination strategies implemented in the Americas:impact on incidence and seroprevalence rates of rubella and congenital rubella Syndrome.Vaccine.2013 Apr 19;31(17):2145_51.
27. Hinman AR,Irons B,Lewis M,Kandola K.Economic Analysis of rubella and rubella vaccines:Aglobal review.Bull World Health Organ.2002;80:264_70.