

Author Affiliation:

*Assistant Professor,
Ananthapuri College of Nursing,
**Assistant Professor
Government College of Nursing
Thiruvananthapuram, Kerala.

Reprint Request:

Athirarani M.R.,
Assistant Professor
Government College of Nursing
Thiruvananthapuram, kerala-680596.
E-mail: athiraaparna@gmail.com

Rubella Vaccine: Is It Mandatory for Adolescent Girls

Premini S.*, Athirarani M.R. , Asha K.V.****

Abstract

Infant mortality is considered as an important indicator of the health status of a community. Any reduction in infant mortality in developed countries will depend upon preventing one of its principal causes that is congenital anomalies. The decline in Infant mortality has been attributed to improved perinatal care, and better control of communicable diseases through proper vaccination. Maternal infections such as TORCH also contribute to the development of congenital malformations. It also highlights the health care importance in the preconceptional period. By giving more attention to this, now Rubella vaccine is included in the immunization schedule for adolescent girls as they are the prospective mothers. Infant death audit reveals that 50% of infant deaths are due to congenital anomalies and other brain related injuries. Most of the congenital anomalies are due to genetic causes except some develops due to vaccine preventable diseases like rubella. In order to overcome this problem, some preventive measures have to be taken like vaccination.

Keywords: Rubella; German measles; Adolescent; Congenital anomalies.

What is Rubella?

The name rubella is derived from Latin, meaning "little red." Rubella was initially considered to be a variant of measles or scarlet fever and was called "third disease". It was first described as a separate disease in the German medical literature, hence the common name "German measles". Following a widespread epidemic of rubella infection in 1940, Norman Gregg, an Australian ophthalmologist, reported in 1941 the occurrence of congenital

cataracts among 78 infants born following maternal rubella infection in early pregnancy. This was the first published recognition of congenital rubella syndrome (CRS). Rubella virus was first isolated in 1962 by Parkman and Weller [1].

Rubella or German measles is an acute childhood infection, usually mild, of short duration (approximately 3days) and accompanied by low-grade fever, and a macular papular rash. Infection in early pregnancy may result in serious congenital defects including death of the foetus. The disease is worldwide in distribution and tends to occur in epidemics, in non-immunised populations, every 6 to 8 years.

It is caused by an RNA virus of the toga virus family and mainly affects children particularly in the age group of 3-10 yrs. Clinical or sub clinical cases are considered as source of infection. The virus is transmitted by droplets from nose and throat. Incubation period is 2-3 weeks. Clinical manifestations include low grade fever, coryza, sore throat, enlargement of post auricular and posterior cervical lymph nodes which usually appears 7 days before the appearance of rash. It appears first on face and spreads rapidly to trunk and extremities and which is considered as the first indication of the disease in children. Definitive diagnosis of rubella is possible only through virus isolation and serological tests such as haemagglutination inhibition test, ELISA and radio-immune- assay and throat swab is recommended for virus isolation [5]. Complications include arthralgia, arthritis, encephalitis, orchitis, neuritis and haemorrhagic manifestations like thrombocytopenic purpura [1].

Why is it Important

Rubella, though a mild, vaccine-preventable disease, can manifest with severe teratogenic effects

in the fetus labelled as congenital rubella syndrome due to primary maternal rubella infection. Despite a reduction in disease burden of several vaccine-preventable diseases through childhood immunization, CRS continues to account for preventable severe morbidity including childhood blindness, deafness, heart disease, and mental retardation [2]. CRS refers to infants born with defects secondary to intrauterine infection or who manifest symptoms or signs of intrauterine infection sometimes after birth. Congenital infection with rubella virus can affect virtually all organ systems. The severity of the effects of rubella virus on the foetus depends largely on the time of gestation at which infection occurs. As many as 85% of infants infected in the first trimester of pregnancy will be found to be affected and defects are rare when infection occurs after the 20th week of gestation [1].

Rubella infection inhibits cell division, and this is probably the reason for congenital malformation and low birth weight. The classic triad of congenital defects are deafness, cardiac malformations and cataracts. Other resulting defects include glaucoma, retinopathy, microcephalus, cerebral palsy, intrauterine growth retardation, hepato splenomegaly, mental and motor retardation [5].

In industrialized countries, severe congenital anomalies account for more than 20 percent of infant mortality and cause the largest number of years of life lost. As per the estimated incidence in 1989, congenital malformations accounts for 17-30/1000 live birth. The causes for this include genetic factors, environmental factors like intrauterine infections such as rubella, cytomegalovirus syphilis etc. This highlights the importance of Immunization against rubella and now vaccination is routine in some countries which bound to some reduction in congenital abnormalities [5].

Rubella Vaccination

Active immunization against rubella is now possible with live attenuated vaccines. The goal of rubella vaccine immunization is the prevention of rubella infection during a future pregnancy [5]. Rubella vaccine is available combined with measles and mumps vaccines as MMR, or combined with mumps, measles, and varicella vaccine as MMRV (ProQuad). The RA 27/3 rubella vaccine is a live attenuated virus. It was first isolated in 1965 at the Wistar Institute from a rubella-infected aborted fetus. Rubella vaccine is available combined with measles and mumps vaccines as MMR, or combined with mumps, measles, and varicella vaccine as MMRV [1].

Rubella vaccine is highly effective and has resulted in elimination of rubella and CRS from the western hemisphere and several European countries. Review of several studies documents the duration of protection over 10-21 years following one dose of RA27/3 vaccination, and persistent sero positivity in over 95% cases. Studies in India show sero negativity to rubella among adolescent girls to vary from 10% to 36%. Although due to early age of infection resulting in protection in the reproductive age group, incidence of rubella in India is not very high. However, due to severity of CRS coupled with introduction of Rubella Containing Vaccine (RCV) in some of the states likely lead to sub-optimal coverage and resulting higher risk of rubella during pregnancy in the coming decades, it is mandatory to adopt the goal of rubella elimination. Moreover to control measles, the country has adopted strategy of delivering second dose of measles through measles campaigns covering children 9 months to 10 years of age in 14 states and elimination can achieved by replacing measles vaccine by MMR vaccine. Other states which are to give second dose of measles through routine immunization will also have to adopt campaign, in order to eliminate rubella from the country over 10-20 years. Subsequently, measles vaccine can be replaced by MR or MMR vaccine in the national schedule [3].

The Indian Academy of Pediatrics (IAP) recommends a dose of measles-mumps-rubella vaccine (MMR) at 15-18 months of age, fulfilling the need for a second dose of measles vaccine [10].

Considering the severity of CRS and availability of affordable, acceptable, safe and effective vaccine to prevent it, most of the European countries like Denmark, Sweden and United States have included two doses of rubella in their immunization schedule. In these countries first dose of Measles, Mumps and Rubella (MMR) vaccine is given at 15-18 months of age followed by second dose at 12-14 years of age as MMR vaccine or rubella vaccine exclusively for girls. WHO recommended introduction of rubella-containing vaccines in immunization program of countries that have not yet introduced it. This can be achieved by booster dose of vaccination at school age or adolescence [11]. 10-30% of adolescent females and 12-30% of women in the reproductive age-group are susceptible to rubella infection in India. RCVs are highly immunogenic in Indian adolescents and women. The coverage data of RCVs in India is not available. However, the coverage of MMR vaccine has been reported as 42%, 30% and 5% from Delhi, Chandigarh and Goa, respectively [2].

Vaccines for measles, mumps, rubella (MMR)

vaccine, should be given a month or more before pregnancy. Rubella infection in pregnant women can cause unborn babies with serious birth defects or even die before birth. Pre-pregnancy blood test is recommended to identify whether the person is immune to the disease. After getting vaccinated, avoid becoming pregnant until one month and ideally not until immunity is confirmed by a blood test [7].

Global Measles Rubella Strategic Plan 2012-2020

This plan is first attained in Cuba. As per WHO 2020, Rubella should be prevented along with measles and associated congenital anomalies like congenital rubella syndrome. To eradicate rubella, death due to rubella should be reduced to 95%.

This Strategic Plan 2012–2020 explains how countries, working together with the MR Initiative to achieve a world without measles, rubella and CRS. The Plan builds on the experience and successes of a decade of accelerated measles control efforts that resulted in a 74% reduction in measles deaths globally between 2000 and 2010. It integrates the newest 2011 World Health Organization policy on rubella vaccination which recommends combining measles and rubella control strategies and widespread use of combined measles-rubella vaccine formulations, i.e. measles-rubella (MR) and measles-mumps-rubella (MMR). The strategy focuses on the implementation of five core components.

1. Achieve and maintain high levels of population immunity by providing high vaccination coverage with two doses of measles- and rubella-containing vaccines.
2. Monitor disease using effective surveillance, and evaluate programmatic efforts to ensure progress.
3. Develop and maintain outbreak preparedness, respond rapidly to outbreaks and manage cases.
4. Communicate and engage to build public confidence and demand for immunization.
5. Perform the research and development needed to support cost-effective operations and improve vaccination and diagnostic tools.

This also provides the global context and an assessment of the current state of the world with respect to national, regional and global management of measles and rubella. In addition to this, it outlines guiding principles that provide a foundation for all measles and rubella control efforts, including country ownership, strengthening routine immunization and health systems, ensuring linkages with other health

interventions and equity in immunization by reaching every child. It also examines key challenges to measles and rubella control and elimination, including financial risks, high population density and highly mobile populations, weak immunization systems and inaccurate reporting of vaccination coverage. More than that, it also offers solutions to these challenges, discusses the roles and responsibilities of stakeholders, and provides indicators to monitor and evaluate national, regional and global progress towards the vision and goals. Countries bear the largest responsibility for measles and rubella control and elimination, and they must support sustainable national planning, funding and advocacy to protect their citizens from devastating preventable disease [8].

KERALA; State-Level Initiative to Prevent Childhood Disabilities

In Kerala, the Departments of Health and Social Welfare launched the vaccination as part of a larger initiative to prevent childhood disabilities. The Health Department implemented rubella vaccination in a campaign mode, targeting girls from classes VIII to XII. Alongside, the second dose of measles vaccine, currently administered to infants at 18 months as part of routine immunisation, will be replaced by the MMR (mumps-measles-rubella) vaccine, so that all children are protected against measles and rubella.

The programme is being implemented by utilising the funds provided by the Social Justice Department under its mega initiative, State Initiative on Disabilities (SID), to detect disabilities in children at an early stage for appropriate interventions.

The strategy of the World Health Organisation for the elimination of measles and rubella says that all infants be administered the MMR vaccine, while special precaution be taken to ensure that all girls in the post-pubertal or marriageable age (who might not have received MMR vaccine in infancy) are protected by a dose of monovalent rubella vaccine [9].

References

1. Rubella: Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book: Course Textbook - 13th Edition (2015).
2. Dewan P, Gupta P. Burden of Congenital Rubella syndrome in India: a systematic review. Indian Pediatr. 2012 May; 49(5): 377-99.
3. Davendra k, Taneja Pragya, Sharma. Indian Journal of Public Health. Review article. Targetting Rubella

- for elimination. 2012; 56(4): 269-272.
4. WHO web site (www.who.int).
 5. Park.K. Park's Text book of preventive and social Medicine.M/s Banarsidas Bhanot Publishers, Jabalpur, India.21st edn. 2011; 140-41,532.
 6. <http://nrhm.gov.in/-in-state.html>
 7. <http://www.cdc.gov/vaccines/pub/printbook/rubella>
 8. Vaccine Information for Adults.
 9. [http://www.thehindu.com/news/cities/Thiruvananthapuram z/all-adolescent-girls-in-kerala-to-be-vaccinated-against-rubella/article5160177.ece](http://www.thehindu.com/news/cities/Thiruvananthapuram/z/all-adolescent-girls-in-kerala-to-be-vaccinated-against-rubella/article5160177.ece).
 10. <http://www.iapindia.org/immunisation/immunisation-schedule>.
 11. Harshal Gupta et al. Rubella vaccine: Awareness Alone Cannot Influence the Attitude of People : A cross-sectional survey among medical students and professionals in central india International Journal of Medical Science and Public Health. 2013; 2.
 12. www.ncbi.nlm.nih.gov > NCBI > Literature > PubMed Central (PMC)by TJ John-2011-cited by 2-Related articles.
-