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Case Study On Rubella Virus

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Abstract

The infection caused by Rubella virus is also known by the name of German measles. The number of birth defects might develop in the fetus of a rubella virus infected woman during the early stage of pregnancy. These defects are termed as congenital rubella syndrome (CRS).There is also possibility that the infection due to virus can lead to abortions. The study was conducted to find out the cases of CRS among the pregnant women. A combined vaccine against measles, mumps, and rubella was licensed for use for the first time in the year 1971 in the United States. The report from the data collected in the various studies have proved the rubella infection to be the cause for about 3-5 percent of all suspected CRS cases in India. A questionnaire was prepared and pregnant women as well as female of child-bearing age were asked about the rubella vaccination. In the research survey, more than 1000 females were involved in different areas and age-groups. It was concluded that very less or negligible data is available related to awareness about the routine immunization among the common people of India. Thus, it is required to conduct more research in this field and make people more and more aware about the harmful effects of not being vaccinated at the proper age. Indians need to collect reliable and accurate data to prioritize and tackle the serious consequences of CRS.

Keywords CRS: Congenital Rubella Syndrome, ASD: Atrial Septal Defect, PDA: Patent Ductus Arteriosus, MMR: Measles-Mumps and Rubella and PCR: Polymerase Chain Reaction

INTRODUCTION:

The infection caused by Rubella virus is also known by the name of German measles. The characteristic feature of measles is rashes that affects children, adolescents as well as young adults throughout the world (1). The virus gets transmitted to the fetus if infects the pregnant women in early stage. The defects at the time of birth are found among the infants born to such infected women. This is the reason that the diagnosis of rubella virus is critical (2).
The number of birth defects might develop in the fetus of a rubella virus infected woman during the early stage of pregnancy. These defects are termed as congenital rubella syndrome (CRS) (3). There are three proteins present in the structure of a rubella virus. These proteins are the capsid protein of weigh about 31 kDa and the glycoproteins E1 of weight about 58kDa and glycoproteins E2 of weight about 42-47 kDa (4). There is an interaction of the capsid protein with the RNA genome for the formation of nucleocapsid. The lipid membrane surrounds the nucleocapsid on which arrangement is done of E1 and E2 proteins (5). The infection by rubella during the early months of pregnancy might lead to congenital deformities or defects at the time of birth (1). The example of different birth defects include deafness, cataract, defects in heart and mental retardation among the infants. Such children are not readily accepted by the society and thus often become burden for the parents and family both financially and mentally (2). There is also possibility that the infection due to virus can lead to abortions. The rubella virus is airborne and spreads through coughing and sneezing (3). The active period of the virus is about 2 hours on the infected surface. The initial symptoms of infection are fever, running nose, cough, and redness in eyes and soreness in the throat (5). The secondary symptom is presence of rashes all over the body. The complications associated with the virus are blindness, encephalitis, diarrhea, pneumonia and miscarriage (4).

LITERATURE REVIEW

The danger that can be caused by the Rubella virus on the pregnant women was studied in the initial stage by the scientist Harshalguptaet. al. in the year 2013 (6). The subject were pregnant women in the 16^{th} week stage and different complications like miscarriage, abortion, stillbirth, and congenital rubella syndrome (CRS) were studied (7). Even at the present time, World Health Organization (WHO) has estimated 1,10,000 lakh cases of CRS throughout the world per year (8). The two ways are commonly adopted for preventing the cases of CRS. The first strategy is based on screening for the status of immunization especially of the women who are young and in the stage to bear child. The second strategy is vaccination drive for all the adolescents and young women (9).

The damage caused to the growing fetus can be due to number of factors as studied by the researcher Suiji George et. al. in the year 2018 (10). The damage could be due to combination of cellular damage and the effect on the dividing cells (11). The factors related with the existence of CRS were identified and explored by the researchers by the Piyush Gupta and others in a review on rubella virus in the year 2012 (12). The article concluded the need of revamping the immunization policy on the national level. It is also required to make people aware about the virus causing rubella in the immunization program (13).
Therefore, surveillance of rubella and CRS should be done in an active mode for reducing the cases of CRS in India (14). Despite of the rubella being the first teratogenic virus, the ultrasound findings of the CRS were not adequate to prove teratogenicity (15). In 2009 CRS was described as a rare disorder by Robert S Duszak and his team because of the devasting ocular and systemic consequences (16). The number of measures had been taken to eliminate the risk of transmission of virus but still there are some areas throughout the world that are affected by this virus (17). The after effects of the virus are risky and life-threatening for the patients. Thus, it is strongly recommended that the person and the whole society should adopt vaccination and other appropriate strategies for reducing the risk of transmission of virus (8).

Rubella had been known to be a contagious disease that is transmitted by rubella virus. The virus if transmitted can give rise to number of negative outcomes in the pregnant women (18). The example of outcomes include abortions, low birth weight, stillbirths, and CRS syndrome in the new born baby (19). It was found that the clinical manifestations were mild and self-limiting in case of non-pregnant women. This result was obtained from the cross-sectional study performed in the hospital (20). In the study, approximately 1985 samples of blood were collected from women bearing age who attended outpatient department of different hospitals for serological detection of Rubella infection (21).

The antibodies of rubella were Immunoglobulin M and immunoglobulin G (IgM/IgG). The methods used for detection were either enzyme linked immunosorbent assay i.e. ELISA or by the use of Polymerase chain reaction (PCR) (22). The results again proved the urgent need to run vaccination drive in order to decrease the rate of transmission of virus among the pregnant women and prevent the ill-effects on the infant (23). This would also help in decreasing the rate of stillbirths and complications in the pregnancy (24). The patients suspected of being infected with the virus were made to go through complete clinical examination including cardiovascular system, ophthalmic system and for the presence of hearing disorder (25).
Thus, the different data obtained from various surveillance studies confirmed the rubella to be the persistent public health problem in India (26). The seropositivity to IgG indicated exposure to rubella virus i.e. protective immunity in the past. On the other side, the seropositivity to IgM indicated recent exposure or being re-infected with rubella virus (25).

The report from the data collected in the various studies have proved the rubella infection to be the cause for about 3-5 percent of all suspected CRS cases in India. The fact is that vaccination for rubella is being received by only 45-60% of pregnant women and infants (28). The infant born to a pregnant female with rubella virus was of less weight at the time of birth. Further investigation detected the presence of conditions like pallor, and hepatosplenomegaly (29). The results of the echocardiography revealed that the baby suffered from ostium secundum atrial septal defect (ASD) and a large patent ductus arteriosus (PDA). The baby also suffered from bilateral cataract and had to undergo surgical treatments for the disorder PDA (30).
In 1940, Australia experienced an epidemic of rubella: a contagious, viral illness also known as German measles. The following year, an ophthalmologist working in Sydney observed that babies he was treating for an unusual type of congenital cataract had been born to mothers who had contracted rubella early on in their pregnancies (31).The antibodies of rubella were Immunoglobulin M and immunoglobulin G (IgM/IgG). The methods used for detection were either enzyme linked immunosorbent assay i.e. ELISA or by the use of Polymerase chain reaction (PCR) (32).

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The report from the data collected in the various studies have proved the rubella infection to be the cause for about 3-5 percent of all suspected CRS cases in India (24). The fact is that vaccination for rubella is being received by only 45-60% of pregnant women and infants (13). The infant born to a pregnant female with rubella virus was of less weight at the time of birth. Further investigation detected the presence of conditions like pallor, and hepatosplenomegaly (19). The results of the echocardiography revealed that the baby suffered from ostium secundum atrial septal defect (ASD) and a large patent ductus arteriosus (PDA). The baby also suffered from bilateral cataract and had to undergo surgical treatments for the disorder PDA (31).

RUBELLA VACCINE:

A combined vaccine against measles, mumps, and rubella was licensed for use for the first time in the year 1971 in the United States (33). Thus, rubella vaccine is available as measles, mumps, and rubella (MMR-II) and measles, mumps, rubella, and varicella vaccine (MMRV) in the name of ProQuad (34). The live and attenuated viruses are present in both MMR and MMRV vaccines. In the US, no single antigen rubella vaccine is available. It is advised by the Advisory Committee on Immunization Practices (ACIP) that MMR or MMRV vaccine must be used when any child or individual is indicated for vaccination (35-77).

Tests performed for Diagnosis of Rubella virus: A positive immunoglobulin i.e. IgG test is always desired as it indicates that the person is immune to rubella (36). The person is not at probability of being infected and thus don't require to be vaccinated. On the other side, negative IgG indicates that the person is not immune to rubella and thus need to be vaccinated on immediate basis (33).

MATERIAL & METHODS

QUESTIONNAIRES…….?

Name_____ **Age_____**

Gender_____ **Date_____**

Address_____
_____
_____
_____

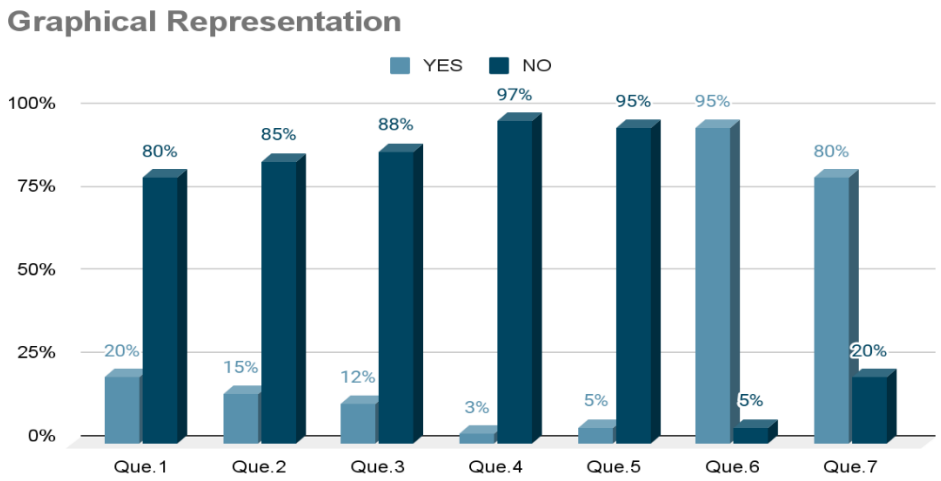
Q1.How long is a person with Rubella Contagious?
Q2.Can a person get rubella more than once?
Q3.What are complications during Pregnancy & how serious Rubella?
Q4.What is the treatment of rubella?
Q5.what changes you feel after Immunization?
Q6. Can Pregnant women take the vaccine?
Q7.How long does this vaccination offer protection against Rubella?

RESULT:

In the research survey, more than 1000 females were involved in different areas and age-groups. The answers obtained are compiled below in tabular form:

Q.No	Variables	Yes	No
1	Do you know About the rubella Virus	20%	80%
2	Do you know that rubella infection during pregnancy causes adverse effects on the fetus?	15%	85%
3	Do you consider rubella to be a problematic disease?	12%	88%
4	Have you had rubella?	3%	97%
5	Did rubella infect a member of your family or one of your fellow schools?	5%	95%
6	Have you heard of the rubella vaccine?	95%	5%
7	Do you know the time for rubella vaccine	80%	20%

The answer collected from different people of the questions asked to them is compiled in the form of histogram.



DISCUSSION:

Rubella vaccination is of greater concern in medical professionals as they (if not immune) are at risk of contracting it especially from their patients and can also act as a potential vector in the transmission of the virus. Secondly as medical professionals are set examples for general population, greater engagement of health professionals and media is important to enhance the general population awareness. As per our review, awareness regarding routine immunization is low in the general population of India. No data is available about awareness of rubella vaccine in the general population of India and this necessitates recommendation for further research in this area. Indians need to collect reliable and accurate data to prioritize and tackle the serious consequences of CRS.

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