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## **A review on measles and its risk factors**

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**Abstract**---Measles is a highly transmitted disease caused by a measles virus, Morbillivirus that can replicate in the nose and throat of an infected individuals. It can be spread by various mode of transmission. Measles is classed as an acute, communicable ailment. Communicable method that the ailment is infectious. Acute method that the length of the ailment is much less than three months and the height of the signs takes place and subsides at some point of this time period. The ailment starts with a fever, runny nostril, cough, crimson eyes, and sore throat, and is followed with the aid of using a rash that spreads everywhere in the body. According to the WHO trendy Measles surveillance data, India is the fourth most type of Measles Cases withinside the world. Symptoms will show interior 10-14 days after infection or incubation period. High fever 1030 F – 1050F, Runny nostril, Troublesome cough, enlarged lymph nodes, Conjunctivitis, Aversion to light, Malaise, Rash fades and peels, but cough can also moreover live up to two to a few weeks later. And Koplik's spots (rash on mucous membranes). Most common risk factors include Unvaccinated babies, Unvaccinated humans, Incomplete vaccination, Vitamin A deficiency, Pregnant Women with Measles and Travelling Internationally.

**Keywords**---measles, risk factors, highly transmitted, incomplete vaccination.

### **Introduction**

Measles is likewise referred to as rubeola or crimson measles, it's also regarded with the aid of using the call of German measles or Standard measles. It is an extraordinarily contagious respiration contamination because of an epidemic which reasons rashes everywhere in the body. The virus lives withinside the mucus of the nostril and throat of humans with this contamination. Physical

contact, coughing and sneezing can unfold the contamination. In addition, inflamed droplets of mucus can continue to be lively and contagious for round hours. This method that the virus can stay out of doors the body - for example, on surfaces and door handles. Measles is classed as an acute, communicable ailment. Communicable method that the ailment is infectious. Acute method that the length of the ailment is much less than three months and the height of the signs takes place and subsides at some point of this time period. The ailment starts with a fever, runny nostril, cough, crimson eyes, and sore throat, and is followed with the aid of using a rash that spreads everywhere in the body. Roughly three out of 10 folks that get measles will broaden one or greater headaches consisting of pneumonia, ear infections, or diarrhoea. Complications are greater not unusual place in adults and younger children<sup>(1,2)</sup>. There are two types of measles which include:

- Measles that is the standard form caused by the rubeola virus
- Rubella, or German measles that is caused by the rubella virus

Rubella has a more risk to unborn infants than more youthful youngsters if a woman contracts the virus whilst she is pregnant. It is neither as infectious nor as severe as desired measles. Rubella is considered to be a milder sickness that only lasts spherical three days. Rubeola can come to be an intense contamination that lasts several days and can motive one-of-a-kind intense eternal complications<sup>(3,4)</sup>. Measles impacts teens and adults who've been in no way absolutely vaccinated or, in unusual instances, impacts people who acquired the recommended vaccine but in no way superior immunity or superior immunity that waned over time.

## **Epidemiology**

Measles epidemics get up every 2 years in developed international locations withinside the absence of giant use of vaccine, Poverty and overcrowding will boom epidemics. In tropical areas particular in Africa kids beneath 1 year of age undergo extra attacks, and mortality charge will boom and Malnutrition is an outstanding contributing factor. Approximately 30 million measles times are stated annually. Most stated times are from Africa. In 1998, the times of measles in step with 100,000 standard population stated to the World Health Organization have become 1.6 withinside the Americas, 8.2 in Europe, 11.1 withinside the Eastern Mediterranean region, 4.2 in South East Asia, 5.0 withinside the Western Pacific region, and 61.7 in Africa. Only 187 confirmed times had been stated withinside the Western Hemisphere (in particular in Venezuela, Mexico, and the United States). In developing international locations, measles affects 30 million kids a year and motives 1 million deaths. Measles motives 15,000- 60,000 times of blindness in step with year<sup>(5,6)</sup>.

According to the WHO trendy Measles surveillance data, India is the fourth most type of Measles Cases withinside the world. The Country's Disease occurrence charge in step with million is 29.68, the lowest the numerous distinct top 10 Countries recording the type of Measles Cases. Children in India who are beneath the age of one through and massive gets affected by the virus, as they've got the very quality occurrence charge of 76.4 in step with million population. The second

most occurrence charge takes vicinity in kids withinside the age agency of 4-6 years. And the 1/3 most occurrence charge takes vicinity a number of the age agency of 5-9 years<sup>(6,7)</sup>.

### **Causes of measles**

Measles is caused by a measles virus which is a spherical, nonsegmented, single-stranded RNA virus belonging to the **Morbillivirus** family, it is closely related to the rinderpest and canine distemper viruses <sup>(1,3)</sup>.

### **Pathogenesis & pathology of measles**

- Way of transmission of the measles virus is through air – Air Borne Disease.
- It spreads through cough & sneezes /through contact with saliva or nasal secretion.
- The Measles Virus then gets deposited on epithelial cells in Respiratory Tract, Oropharynx or Conjunctivae.
- During the first 2 – 4 days after infection. Measles Virus proliferates locally in the respiratory mucosa and spreads to lymph nodes.
- It then enters to the blood stream in infected leukocytes (Primary Monocytes).
- Producing the Primary Viremia that disseminates infection throughout the reticuloendothelial system.
- Further replication results in Secondary Viremia that begins 5 – 7 days after infection and disseminates Measles Virus throughout the body.

### **Signs & symptoms of measles**

Signs and Symptoms of Measles are the following: - Symptoms will show interior 10-14 days after infection or incubation period. Person is contagious four days in advance than the onset of the rash and as a good deal as 5 days after onset. High fever 1030 F – 1050F, Runny nostril, Troublesome cough, enlarged lymph nodes, Conjunctivitis, Aversion to light, Malaise, Rash fades and peels, but cough can also moreover live up to two to a few weeks later. A crimson blotchy rash usually develops about three to four days after the number one signs. It typically starts off evolved off advanced at the pinnacle and neck, and spreads down the body. It takes 2-3 days to cover most of the body. The rash frequently turns into a brownish shadeation and grade by grade fades over a few days. And Koplik's spots (rash on mucous membranes). It is a Small white spot which typically boom withinside the mouth a day or 24-forty-8 hr. in advance than rash appears. This can persist for several days. It mainly occurs withinside the Buccal mucosa, opposite the lower 2nd molars and growth interior 1day and spread but fade quick after rash onset<sup>(8,9)</sup>.

### **Risk factors of measles**

A young, unvaccinated toddler is the maximum essential threat component for contracting the measles virus and for developing complications. If exposed to the measles virus and one have now not been vaccinated, the danger of getting its miles 90 percent, irrespective of the age of a character. Other common vicinity

threat factors for measles include the following: Unvaccinated babies because of the truth they may be too young: The measles vaccine does not work for infants because of the truth their immune systems have not matured enough to create the desired shielding immunologic response to the vaccine. Unvaccinated humans due to medical reasons: Some humans aren't capable of getting the MMR vaccine because of medical problems which consist of being immunocompromised or the reality that they may be taking fine drugs, like maximum cancers' chemotherapy or immoderate doses of steroids. Incomplete vaccination: Those who have not obtained a second booster dose of MMR do not have whole immunity to measles. Most kids who have not collected their booster shot until a long term 4 to 6 years. The first vaccine is 90-93 percent effective, but the second one is 90-97 percent effective. Not developing immunity after vaccination: This takes place in approximately 3 percent of vaccinated humans. Immunocompromised humans: This is real in spite of the truth that they had previously obtained the MMR vaccine. Vitamin A deficiency: This trouble makes the body more likely to settle measles and for the contamination to be greater severe. Pregnant Women with Measles: Pregnant women with measles can on occasion bring about death, miscarriage, premature starting, and low starting weight. Human regular immunoglobulin (HNIG) is an idea to reduce complications of the disorder. Travelling Internationally: An unvaccinated character who has shrivelled measles from an exclusive region can transmit and spread the disorder to others, while traveling internationally<sup>(8,9)</sup>.

### **Complications of measles**

These are the certain types of Measles Complications, namely; Bacterial Superinfection, Respiratory: pneumonia (bacterial or giant cell), bronchiolitis, croup, GI Tract: diarrhoea, malnutrition, Skin: desquamation, Eyes: conjunctivitis, corneal ulcer, blindness due to deficiency of Vitamin A, Mouth: buccal ulceration, cancrum oris, Haemorrhage, Acute encephalitis 1:1000, Preterm labour and Ear infection.

### **Measles vaccination**

Measles Vaccine is called the MMR Vaccine which offers safety in opposition to three illnesses measles, mumps and rubella. The first dose of MMR is given on the age of 12 – 15 months, and the second at 4 – 6 years of age. Adults and young adults also can take MMR vaccinations as required. It is in addition powerful within the uncombined or combined form. The combination proved to be powerful and safe. The measles vaccine (in use for forty years) is safe, powerful and inexpensive<sup>(9,10)</sup>.

- The Vaccines are Live attenuated containing Edmonston B or Schwartz strains which will give seroconversion rate of 90%.
- The immunity produced may be lifelong.

### **Types of Measles Vaccines**

- Measles vaccine (standalone vaccine)

- Measles and rubella combined vaccine (MR vaccine)
- Mumps, measles and rubella combined vaccine (MMR Vaccine)
- Mumps, measles, rubella and varicella combined vaccine (MMRV vaccine)

### **Two doses of Measles Vaccine**

Continued development relies upon on making sure that everyone youngsters obtain doses of measles vaccine along with one dose through their first birthday, strengthening sickness surveillance systems, and offering powerful remedy for measles.

- First dose of MMR at 12-15 months
- 12 months is the minimum age
- Second dose of MMR at 4-6 years
- Second dose may be given any time at least 4 weeks after the first dose intended to produce measles immunity in persons who failed to respond to the first dose.
- May boost antibody titers in some persons

### **MMR vaccine indication**

- All children 12 months of age and older
- Susceptible adolescents and adults without documented evidence of immunity
- All persons who work within medical facilities should have evidence of immunity to measles.

In 2007, approximately 82% of the world's kids obtained one dose of measles vaccine via way of means of their first birthday thru ordinary fitness services, up from 72% in 2000. (Two doses of the vaccine are advocated to make certain immunity, as approximately 15% of vaccinated kids fail to broaden immunity from the primary dose)<sup>(10)</sup>.

### **Treatment of measles**

There is no specific medicine that kills the measles virus. Treatment aims to ease symptom until the body's immune system clears the infection. For most cases rest and simple measure to reduce fever are advised. Symptoms will usually disappear within 10 days. Following measure are useful:

### **Supportive Care**

- Anti-biotic drugs such as Penicillin and Streptomycin may be prescribed to prevent pneumonia, bacterial infections and to ease the symptoms of measles.
  - Neonates and infants up to 3 months of age – 15mg per kg
  - Infants 3 months of age and older – 6.7 to 13.3 mg per kg or 12.5 to 22.5 mg per kg

- Adults, teenagers and children (13 years and older) – 250 to 500 mg every 8 hours or 500 to 875 mg every 12 hours, depending on the type and severity of infection.
- Acetaminophen and Ibuprofen may be given to relieve fever and muscle pain.
  - Infants age 0 to 3 months – 40 mg/1.25 ml
  - Infants age 4 to 11 months – 80 mg/2.5 ml
  - Infants age 12 to 23 months – 120 mg/3.75 ml
  - Children age 2 to 3 years – 160 mg/5 ml
  - Adults – 325 mg or 500 mg
- Two doses of vitamin A supplements, can be given 24 hours apart. This can help prevent eye damage and blindness and to lessen the severity of measles. Vitamin A supplements have been shown to reduce the number of deaths from measles by 50%. High doses Vitamin A in severe/ potentially severe measles/ patients less than 2 years 100,000IU—200,000IU.
- IV-Fluids and Oral Rehydration Solution can be given to avoid dehydration as recommended by WHO.

### **Precautions for measles**

- **Air-Borne Precautions** are used for those patients who have or are suspected to have Measles.
  - One must avoid contact with the infected.
  - No visitors are allowed to make a visit to the patient's room.
  - An infected patient must have a separate room from the rest.
- **MMR Vaccine**  
The initial measles immunization, usually as measles-mumps-rubella (MMR) Vaccine, is recommended at 12 -15 months of age. For both the children and adults, 0.5ml dose of MMR Vaccine was given. MMR Vaccine may be given for
  - Measles Postexposure.
  - Outbreak Prophylaxis as early as 6 months of age.

### **Measles vaccination program**

WHO and UNICEF have collaborated together to promote the following:

- Strong routine immunization: for children by their first birthday.
- A 'second opportunity' for measles immunization through mass vaccination campaigns, to ensure that all children receive at least one dose.
- Effective surveillance in all countries to quickly recognize and respond to measles outbreaks.
- Better treatment of measles cases, to include vitamin A supplements, antibiotics if needed, and supportive care that prevents complications.

The Government of India has launched the Measles and Rubella Vaccination Campaign in 2017 with a view to providing measles-rubella (MR) vaccines to children between the ages of nine months and under 15 years. The campaign was launched by the Union Ministry of Health and Family Welfare with the purpose of

covering more than 40 crore children. Under the campaign, the vaccine will be provided free of cost to children. The campaign is aimed at protecting the children from the two highly contagious viral diseases measles and rubella. India is targeting the elimination of measles and rubella from the country<sup>(9,11)</sup>.

Measles kills almost 49000 Indian children annually. And, rubella (Congenital Rubella Syndrome or CRS) causes blindness and irreversible birth defects. While there are no treatment options available for both these diseases, they can be prevented by vaccinations. Measles immunization will lead to a decrease in the rate of under-five mortality in India. Additionally, India also strengthens surveillance for measles and rubella, which is important learning from the country's polio eradication program that helped to identify infected and vulnerable areas and populations and enabled the program to adopt appropriate strategies to eradicate the disease<sup>(11)</sup>.

## Conclusion

Measles has been globally known to be a highly transmitted disease, which mainly affects the children, as well as in adults in rare cases, especially the one who have not been vaccinated. The mode of transmission of the disease is mainly through Air, therefore it is an air-borne disease. By taking the MMR Vaccine it can help prevent the spread the disease, as well as from contracting it. Hence, it is mandatory to take Measles Vaccination from birth or at an appropriate age of vaccination.

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