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"A study on prevalence of measles at tertiary care hospital and study on demographic profile of patients infected with measles virus"

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ABSTRACT:

Introduction: Measles virus belonging to the genus Morbillivirus in the family Paramyxoviridae, transmitted by aerosol and characterized by fever, respiratory symptoms, redness of eyes & maculopapular rash. **Material & methods:** Children's 0-15 years of age with suspected case of measles symptoms like fever, cough, redness of eyes & maculopapular rash attending at Hospital which included in the study. Serum samples were screened for measles IgM by ELISA method. **Result & discussion:** Out of 346 samples, total 42 (12.14%) were positive for measles IgM Ab. Among the positive measles cases 26 (61.9%) were 0-5 years of age, 12 (28.6%) were 6-10 years of age and 04 (9.5%) were 11-15 years of age. A majority of the Measles case belong to lower socioeconomic status (66.7%). It was found that as much as 64.3% of the mothers of children were illiterates while nearly half of cases (54.8%) were non-working mother. Only 21.4% infants were exclusively breast fed and 59.5% cases found in not immunized children. **Conclusion:** This study recognized age, nutritional status of children, socioeconomic status vaccination status of children as important demographic and risk factor of measles virus infection in children.

Keywords: Measles virus, Maculopapular rash, Aerosolized secretion, IgM, ELISA.

INTRODUCTION:

Measles virus (MV) is a single-stranded, negative-sense, enveloped (non- segmented) RNA virus of the genus Morbillivirus within the family Paramyxoviridae. Humans are the natural hosts of the

virus; no animal reservoirs are known to exist. Measles is a highly contagious infectious disease caused by the measles virus [1, 2]. Symptoms usually develop 10–12 days after exposure to an infected person and last 7–10 days. The major complications of measles are encephalitis, alveobronchiolitis and otitis media. Encephalitis and alveobronchiolitis are the major causes of death. Measles is an airborne disease which spreads easily through the coughs and sneezes of infected people. It may also be spread through contact with saliva or nasal secretions [3, 4].

Initial symptoms typically include fever, often greater than 40 °C (104.0 °F), cough, runny nose, and inflamed eyes. Small white spots known as Koplik's spots may form inside the mouth two or three days after the start of symptoms [5]. A red, flat rash which usually starts on the face and then spreads to the rest of the body typically begins three to five days after the start of symptoms. Measles virus is transmitted via the respiratory route and causes systemic disease. MV enters the host by infection of alveolar macrophages and/or dendritic cells in the airways and is amplified in local lymphoid tissues. Systemic infection occurs with the respiratory epithelium of the nasopharynx as the primary site of infection. After the invasion and replication in the respiratory epithelium and regional lymph nodes for about 2 to 3 days, a primary viremia occurs with subsequent infection of the reticuloendothelial system, there is a further viral replication in regional and distal reticuloendothelial sites. A second viremia is said to occur 5-7 days after the initial infection. During the second viremia, there may be infection of the respiratory tract and other organs. Measles virus is shedded from the nasopharynx starting with the prodromal until 3-4 days after rash onset. Despite the availability of an effective live attenuated vaccine, measles is still a severe problem with high morbidity and mortality rates primarily among children in developing countries. Nine out of ten people who are not immune and share living space with an infected person will catch it. People are infectious to others from four days before to four days after the start of the rash [9]. Most people do not get the disease more than once. The measles vaccine is effective at preventing the disease, and is often delivered in combination with other vaccines. Vaccination has resulted in a 75% decrease in deaths from measles between 2000 and 2013, with about 85% of children worldwide being currently vaccinated. Once a person has become infected, no specific treatment is available, but supportive care may improve outcomes. This may include giving oral rehydration solution (slightly sweet and salty fluids), healthy food, and medications to control the fever, Antibiotics may be used if a secondary bacterial infection such as pneumonia occurs. Vitamin A supplementation is also recommended in the developing world [3, 7]. Measles affects about 20 million people a year, primarily in the developing areas of Africa and Asia [6]. No other vaccine-preventable disease causes as many deaths [8]. In 1980, 2.6 million people died of it, and in 1990, 545,000 died; by 2014, global vaccination programs had reduced the number of deaths from measles to 73,000 [10, 11]. The risk of death among those infected is usually 0.2%, but may be up to 10% in people with malnutrition, ost of those who die from the infection are less than five years old [6, 10]. The classic symptoms include a four-day fever (the 4 D's) and the three C's—cough, coryza (head cold, fever, sneezing), and conjunctivitis (red eyes)-along with fever and rashes [12]. Fever is common and typically lasts for about one week; the fever seen with measles is often as high as 40 °C (104 °F) [13]. Koplik's spots seen inside the mouth are diagnostic for measles, but are temporary and therefore rarely seen [12]. Koplik’s spots are small white spots that are commonly seen on the inside of the cheeks opposite the molars [14]. Recognizing these spots before a person reaches their maximum infectiousness can help reduce the spread of the disease [15]. The characteristic measles rash is classically described as a generalized red maculopapular rash that begins several days after the fever starts. It starts on the back of the ears and, after a few hours, spreads to the head and neck before spreading to cover

most of the body, often causing itching. The measles rash appears two to four days after the initial symptoms and lasts for up to eight days. The rash is said to "stain", changing color from red to dark brown, before disappearing [16]. Overall, the disease from infection with the measles virus usually resolves after about three weeks [17]. Complications: Complications with measles are relatively common, ranging from mild complications such as diarrhea to serious complications such as pneumonia (either direct viral pneumonia or secondary bacterial pneumonia), bronchitis (either direct viral bronchitis or secondary bacterial bronchitis), otitis media [18], acute brain inflammation [19] (and very rarely SSPE—subacute sclerosing pan encephalitis) [20], and corneal ulceration (leading to corneal scarring) [21]. A specific drug treatment for measles, ERDRP-0519 has shown promising results in animal studies, but has not yet been tested in humans [22, 23]. In India, measles was the major cause of mortality and morbidity in the pre-vaccination era. The major factors which determine the occurrence of the measles outbreak are, accumulation of the susceptible population, illiteracy, poor hygiene, low income, overcrowding and a refusal for vaccines [24]. The measles immunization coverage in India which ranged from 42.2-58.8%, suggested that there was a gradual increase in the coverage [25]. A nationwide coverage evaluation survey which was conducted by UNICEF in 2009-documented 74.1% and 78% measles immunization coverages among children who were aged 12-24 months in India and Gujarat respectively [26]. Because of the increase in the measles vaccine coverage, there is a reduction in the number of outbreaks and this has changed the epidemiological pattern which involves older children [27]. The new Strategic Plan presents a five-pronged strategy to cut global measles deaths by at least 95% by 2015 compared with 2000 levels and to achieve measles and rubella elimination in at least five WHO regions by 2020 [28]. The strategies include:

- High vaccination coverage;
- Monitoring spread of disease using laboratory-backed surveillance;
- Outbreak preparedness and response and measles case management;
- Communication and community engagement; and
- Research and development.

MATERIALS AND METHODS:

This study was carried at the Department of Microbiology, Shri. M. P. Shah Gov. Medical College, Jamnagar from January 2017 to December 2018. where samples of suspected measles patients from OPD, indoor patients, CHC and PHC of Jamnagar district. Total 346 blood sample were collected by venipuncture under aseptic precaution and centrifuge, the serum was separated for investigation. The anti-measles virus IgM ELISA kit brought at room temperature for testing. Negative control, positive control, and calibrator are ready to use. Prepare 1:20 dilution of test samples, by adding 10µl of the sample to 200µl of sample diluent. Mix well. Dispense 100µl of diluted sera, calibrator and controls into the appropriate wells. For the reagent, blank, dispense 100ul sample diluent in 1A well position. Tap the holder to remove air bubbles from the liquid and mix well. Incubate for 20 minutes at room temperature. Remove liquid from all wells. Wash wells three times with 300µl of 1X wash buffer. Blot on absorbance paper or paper towel. Dispense 100µl of enzyme conjugate to each well and incubate for 20 minutes at room temperature. Remove enzyme conjugate from all wells. Wash wells three times with 300µl of 1X wash buffer. Blot on absorbance paper or paper towel. Dispense 100µl of TMB substrate and incubate for 10 minutes at room temperature. Add 100µl of stop solution. Read optical density at 450 nm using ELISA

reader within 15 min, dual wavelength is recommended with reference filter of 450-655 nm. Interpretation done by kit manufacture instruction.

RESULTS AND DISCUSSION:

In this study total 346 serum samples of suspected case of measles virus infection, collected and processed for measles IgM antibody test. Total 42 samples found positive for measles IgM, so seroprevalence of Measles IgM antibody was 12.14% (Table-01).

Table-01: Seroprevalence of Measles Virus

Total Patients	Positive	Prevalence
346	42	12.14%

Among the positive measles cases 26 (61.9%) were 0-5 years of age, 12 (28.6%) were 6-10 years of age and 04 (9.5%) were 11-15 years of age. (Table-02).

Table-02: Prevalence of Measles according to age group

Age Group (In Years)	No. of cases (n=42)
0-5	26 (61.9%)
6-10	12 (28.6%)
11-15	04 (9.5%)

A majority of the Measles case belong to lower socioeconomic status (66.7%). It was found that as much as 64.3% of the mothers of children were illiterates while nearly half of cases (54.8%) were non-working mother (Table-03). It was found that out of 42 positive children only 21.4% infants were exclusively breast fed. Measles attack rate maximum in partially immunized and not immunized children 38.1% and 59.5% respectively (Table-03)

Table-03: Socioeconomic status, literacy and working status of mother of Measles cases And Feeding, immunization and nutritional status of Measles cases

SOCIOECONOMIC STATUS	NO. OF CASES (n=42)
Lower	28 (66.7%)

Middle	11 (26.2%)
Upper	03 (7.1%)
EDUCATION STATUS OF MOTHER	
Illiterate	27 (64.3%)
Literate	15 (35.7%)
OCCUPATION OF MOTHER	
Non-working	23 (54.8%)
Working	19 (45.2%)
IMMUNIZATION STATUS	
Completely Immunized	01 (2.4%)
Partially Immunized	16 (38.1%)
Not Immunized	25 (59.5%)
FEEDING STATUS	
Exclusively breast fed	09 (21.4%)
Formula fed	33 (78.6%)

CONCLUTIONS: The finding of this study confirms that the presence of MV was more common in young age children (most of <5 years of age group) and in male patients in Jamnagar district during study period and still poses a public health problem, despite the availability of a safe and vaccine. Therefore, it is important for health providers and policy makers to recognize the health implications of this virus, review the vaccination age of infants, and intensity vaccination campaign programs.

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