Section: Pediatrics

Original Research Article

CLINICAL PROFILE AND OUTCOME OF MEASLES AMONG CHILDREN AT A TERTIARY CARE CENTER

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ABSTRACT

Background: Measles is a common infection affecting young age group which can lead to significant morbidity and mortality. Thus it is important to find out the clinical profile, outcomes and identify the associated risk factors to which are preventable. Rise in infectious disease was seen in post covid era due to low immunization coverage. The aim and objective are to evaluate the clinical profile of measles and find out association of nutritional status and immunization status with complications in measles.

Materials and Methods: It is a prospective observational study. All the children <18years age who were admitted at our pediatric ward from December 2022 to May 2023 were considered. All the patients with symptoms like fever, cough, coryza, conjuctivitis and rash were suspected to have measles, relevant history and investigations like CBC, IgM Measles, CRP and CXR were done. Supportive treatment was given and then patient was followed up for complications. All confirmed measles cases were included in the study.

Results: Total 95 cases were studied and the most common affected age group was 2-5 years (28.4%). The most common symptom seen was fever and rash (77.9%). Pneumonia was the most common complication (42.1%) followed by acute gastroenteritis (11.5%) and encephalitis (3.1%). Mortality was 4.12%. No statistical significance was found between nourishment status and outcomes. Strong association was found between immunization status and outcome (p value 0.02).

Conclusion: Measles is an infectious disease and affecting children <5 years. Improving the immunization coverage will reduce incidence of complications in these cases.

Keywords: Measles, Clinical Profile, Outcome.

INTRODUCTION

Measles is a highly contagious viral infection of childhood. Although vaccination has resulted in a decline in measles cases still the disease is a significant cause of morbidity and mortality amongst children of developing countries. It is a vaccine preventable disease and hence good immunization coverage can lead to decreased incidence in cases.[1] Among the burden of vaccine preventable diseases it ranks first with 38% disease burden.[2]

The symptoms usually occur 8-10 days after exposure and includes high grade fever, cough, coryza, conjuctivitis which is followed by Koplik spots followed by maculo -papular rash which starts on the face and later spreads to neck, trunk and extremities.[1] After 4-5 days the recovery phase starts and rash starts to disappear in the sequence in which it had appeared.

Measles virus weakens the immune system resulting in various complications like pneumonia, otitis media, acute gastroenteritis, Acute Disseminated Encephalomyelitis, subacute sclerosing pan encephalitis (rarely).[1] Thus it is important to prevent measles using the vaccine which is safe as well as cost effective. According to MoHFW, >=95% vaccination coverage with 2 doses of measles-rubella vaccine is necessary for preventing the measles outbreak.[3] And according to NFHS 5-2019-2021 data of Gujarat state which is the pre-COVID era 86.8% of the children aged 12-23 months had received first dose MCV while only 27.3% of the

children aged 24-35 months had received second dose of MCV.[4] Thus it is important to improve the vaccination strategies to prevent the spread of measles.

Measles outbreak is defined by WHO as >=5 suspected cases of measles that are epidemiologically linked or >=2 lab confirmed cases of measles that are temporarily related and epidemiologically linked.[5] And our center had witnessed an outbreak during post-COVID period probably due to glitch in the vaccine coverage which had led us to study the clinical profile and outcomes in cases of measles and to find out the risk factors that are associated with development of complications in measles who are admitted at our tertiary care hospital.

MATERIALS AND METHODS

Study Population: All the children <18 years of age with a clinical diagnosis of measles were admitted at pediatric ward at a tertiary care center.

Study Design: Hospital based prospective observational study design.

Study Duration: 6 months (From December 2022 to May 2023)

Sample size: 95

Study Type: It was a prospective observational study.

Inclusion Criteria

All the patient 1month to 18 year of age with history of fever with maculo- papular rash and fulfilling the definition of laboratory confirmed case as per WHO.[6]

Exclusion Criteria

Viral exanthematous fever other than measles (Serum IgM measles negative).

Ethical Approval: Taken from Institutional Ethics Committee (Reference Number - 05-06/04/2023 IEC)

Data Collection

-All the suspected measles cases who were admitted at pediatric general ward were enrolled and sociodemographic data likeage, sex, residence, vaccination status, family history, significant past history were noted. Clinical symptoms like fever, rash, cough, coryza, conjunctivitis etc and signs like Koplik's spots and anthropometric data were noted.

-Baseline investigations like CBC, Chest Xray, CRP and IgM Measles antibody testing done with NOVATEC ELISA Kit at Microbiology department for all the 110 suspected patients out of which 95 had IgM Measles positive hence included in the study.

-All the patients were followed up daily clinically till discharge.All the patients whose illness resolved spontaneously within 7-10days without any complications were labelled as uncomplicated measlesand were given supportive treatment along with Vitamin A. Complications were managed as per standard protocol.

-Outcome was measured as favourable if patient has clinical resolution within 7-10 days. Unfavourable outcome was considered if patient had developed complications like pneumonia, acute gastroenteritis, otitis media, encephalitis, ADEM or died during the course of illness.

Statistical Analysis: Data were entered in MS Excel (2007) and analyzed using IBM SPSS statistics for Windows Version 20.0 Armonk, NY:IBM Corp. For statistical significance, Pearson's Chi square was applied to check association between complications developed v/s immunization status and nourishment status at 5% level of significance.

RESULTS

In the present study, there were 95 laboratory confirmed cases of measles admitted from December 2022 to June 2023.The highest incidence of measles was in the age group of 2-5yrs n=27(28.42%) and the least was in 0-6 months n=3 (3.16%) age group. Total 7.36% cases were >10 years age. 52 males were affected and 43 females, thus male to female ration is 1.2. [Table 1]

In clinical features, fever and rash was the most common symptoms observed in n=74(77.89%) patients. The least common symptom observed was convulsion which had developed in only n=2(2.10%) cases. A total 55 (57.89%) patients had developed complications. The commonest complication was pneumonia with n=40(42.10%) cases. Occurrence of other complications like acute gastroenteritis, encephalitis and ADEM (Acute Disseminated Encephalomyelitis) were n=13 (5.26%), n=3(3.16%), n=1(1.05%) respectively. [Table 2]

Figure 1: Month wise distribution of Measles positive cases

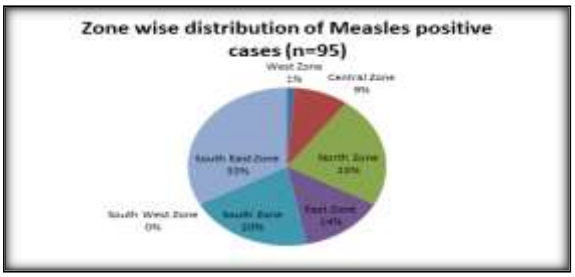

Figure 2: Zone wise distribution of measles cases of Surat city.

The maximum number of cases noted during the late winter and spring seasons. Most of the cases were noted in January followed by March and then February, least cases were seen in the month of May [Figure 1].

The zone wise distribution of measles cases among the total 95 cases showed that maximum number of cases were from south east zone includes Limbayat, Godadara, Dindoli, Parvat patiya followed by north zone which includes Dabholi, Ved, Katargam in Surat city.[7] [Figure 2].

Total 24 patients out of 69 patients under 5 years were malnourished, of which 75% patients had unfavorable outcomes. Similarly out of 26 patients who were > 5 years age, 11 patients were undernourished of which 36.3% had unfavorable outcomes. The p value did not show any statistical significance between the nutritional status and outcomes. [Table 3]

Out of the 95 cases,58 patients were unvaccinated of which 40(68.9%) had unfavorable outcome .6 patients had taken 1 dose of MR vaccine. And 31 patients were fully immunized of which 13 (41.9%) had unfavorable outcomes. The p value came to be 0.02 hence showed statistical significance. In the overall outcome of the disease, there were 4 deaths (4.21%) and out of them 3 patients had not taken MR vaccine thus showing strong co-relation between vaccination and development of complications. [Table 4]

Table 1: Demographic profile of measles patients

	Number of cases(n=95)(%)
Age	
0-6 months	03(3.16)
6-12months	26(27.37)
1-2 year	13(13.68)
2-5 year	27(28.42)
5-10 years	19(20)
>10 years	7(7.36)
Median (IQR)	31(11-67) months
Sex	
Male	52 (54.7)
Female	43 (45.3)
M:F Ratio	1.2:1

Table 2: Clinical profile of measles cases

Symptoms		**(%)**
Fever	74	77.90
Cough	66	69.73
Rash	74	77.90
Convulsion	02	2.10
Vomiting	17	17.89
Loose stools	16	16.84
Conjunctivitis	43	45.26
Koplik's spots	24	25.26
Complications		
Pneumonia	40	42.10
Acute gastroenteritis	11	11.58
Otitis media	0	0
Encephalitis	3	3.16
Acute demyelinating Encephalomyelitis(ADEM)	1	1.05
Total	55	57.8
MR Vaccination status		
Fully immunized	31	32.63
1 dose MR taken	6	6.32
No MR dose taken	58	61.05
Outcome		
Discharge	78	82.11
Death	4	4.21
LAMA	13	13.68

Table 3: Association between nutritional status with outcome

Weight for Height (<5 years age)	**Unfavorable outcome n(%)**	**Favorable outcome n(%)**	**p value**	**Chi square**
≤-2SD(n=24)	18(75)	6(25)	0.28	1.15
≥-2SD (n=45)	28	17(37.7)		
BMI (>5 years age)				
<5th percentile(n=11)	4(36.3)	7(63.6)	0.87	0.02
>5th percentile(n=15)	5(33.3)	10(66.6)		
	55	40		

Table 4: Association between MR vaccination status with outcome

	Unfavorable outcome n(%)	**Favorable outcome n(%)**	**p value**	**Yates Chi square**
Unvaccinated (n=58)	40(68.9)	18(31)	0.02	5.74
1 dose MR taken (n=6)	2(33.3)	4(66.6)		

Fully immunized with MR(n=31)	13(41.9)	18(58)		
	55	40		

DISCUSSION

In the present study, the maximum cases noted in the age group 2-5yrs which was similar was similar to other studies,[8-10] the highest number of cases was observed in 1-5yrs of age group. Maximum number of cases in our study was noted in the month of January(n=27) followed by March(n=25), while it was in the month of March (n=12) according to Mehta et al,[10] and in April(n=96) according to Mohammed et al.[11] Also according to Lopez et al,[12] most of the cases occur during Spring months.

In our study most common symptom was of fever and rash. The fever was present in 77.89% cases, while it was 95.24% ,86.8% and 91.33% respectively in other studies.[10,13,11] Rash was present in 77.89% cases in our study, it was seen in 100% in [11 and 10 each] and 96% in.[13] Cough was seen in 69.73 % in present study which was quite comparable with 79.06% with,[11] 76.19% and 53.2% in.[10,14] respectively. In our study 2.10% cases had convulsion, which is comparable with 3.6% in Marin et al,[8] and it was 7.14% in Mehta et al.[10] Koplik spots are present in 25.26% cases in our study, while it was 4.33% & 17.2% respectively in.[11,14]

Pneumonia was the most common complication and was seen in of 42.10% cases in our study whereas its incidence in Mehta et al,[10] was 38.7%, Mohammed et al,[11] was 28.51%, Kiraly et al,[15] was 21.8% .Acute gastroenteritis was noticed in 11.58% cases in our study, which is comparable with Mohammed et al,[11] 12.63% and Kiraly et al,[15] 15%. In our study3.16% cases had developed encephalitis, while it was seen in 6.45% in Mehta et al.[10]

In the our study out of 95 patients admitted, mortality rate was 4.21%. Also in Hyde et al,[13] there were 3 deaths of which 2 were due to severe pneumonia and 1 due to encephalitis, while in Mohammed et al,[11] there were 2 deaths,1 is due to severe pneumonia and 1 is due to septicemia.

75% of malnourished children <5years had unfavorable outcomes whereas 62.2% malnourished children > 5years had unfavourable outcomes, the p-value was 0.28 thus no statistical significance found. A study conducted in 1982 by Tatang K et al,[16] compare same outcome(p-value <0.05).

61.05% of our children were not vaccinated for measles, while it was 73.28%in Mohammed et al.[11] 66.6% of these had unfavorable outcomes, 33.3% children with sinle dose vaccine had unfavorable outcomes, whereas 41.9% fully immunized children had developed unfavorable outcomes, the p-value was 0.02 which showed statistical significance. This finding was similar to Phi et al,[17] in which vaccination had significantly reduced the complications (14.4% vs85.6%, p value <0.001), severity of disease and mortality.

CONCLUSION

Risk factors associated with occurrence of measles were a lower age group which is 2-5 years. Risk factors significantly associated with complications were vaccination status. Nutritional status did not have a significant relation with complication rate in our study.

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