

ORIGINAL ARTICLE

Socio-demographic Profile and Complications of Measles in Children: A Hospital Based Study

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Abstract

Background: Measles is a self-limited viral disease. But it can cause serious complications in young children and still remains as an important cause of mortality and morbidity in under five children worldwide.

Objectives: The aim of the study was to determine the complications of measles in hospitalized children and to observe the socio-demographic profile of them.

Methods: A prospective observational study was conducted in Dr M R Khan Shishu Hospital and Institute of Child Health from March to December 2019. Children of 6 months to 10 years who came with signs and symptoms of measles according to the case definition criteria by WHO, like fever with maculopapular rash associated with cough, runny nose and conjunctivitis were included in the study. Their socio-demographic profile was recorded and different complications were noted.

Results: A total of 86 children suffering from measles with different complications were admitted during the study period. They were from 6 months to 10 years. Among them 59% were below 1 year, 80% were below 4 years and 94% were less than 7 years. Thirty eight percent children were from lower and thirty percent from middle socio-economic background. Pneumonia was the main complication found in 62(72%) cases followed by diarrhea 28(32%), oral ulcer 26(30%), croup 5(6%) and febrile seizure 4(4.6%). Most (79%) of the children, had normal nutritional status. Among 62 children aged 9 months to 10 years, only 16(26%) received 2 doses of measles vaccine, 14(23%) only the first dose and 32(52%) was not vaccinated at all. Vaccination rate was poor (27%) in low socio-economic condition. The mortality rate was 1(1.16%).

Conclusion: About 60% of the children, suffering from measles, were less than one year of age. Fifty nine percent of them were not vaccinated. The children developed complications like pneumonia, diarrhea, oral ulcers etc. Vaccination status was poor in low socio-economic condition. So, awareness should be created about timely vaccination of measles.

Keywords: Measles, complications.

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Received: 9 October 2022; **Accepted:** 6 December 2022

Introduction

Measles is a highly contagious systemic viral infection which affects susceptible individual of all ages and has the potential to cause serious complications.¹ Although safe and effective vaccine is available for its prevention since many years, measles still causing epidemics in different parts of the world. It remains as an important cause of mortality and morbidity among young children globally.² Due to worldwide vaccination program measles cases dropped from 850,000 to 132,000 between 2000 and 2016. Since 2017 measles cases were increasing again in different parts of the world including Bangladesh and cases surged to 360,000 in 2018 globally.^{3,4} More than 140,00 people died from measles in 2018- mostly under the age of 5 years.³ In 2019 highest number of measles cases were reported in last 23 years with an estimated death of 207,500.⁴ Measles is highly contagious and more than 95% vaccine coverage is required to control community transmission. Suboptimal vaccination coverage and large pockets of unvaccinated children have resulted in serious measles outbreaks in many parts of the world.⁵

Measles is caused by measles virus which belongs to the paramyxo viridae family with ssRNA genome and a lipid envelop.⁶ The virus spreads through droplets produced from the mouth, nose or throat of an infected person and enters via the respiratory tract or conjunctiva.⁷ The disease starts with high fever which begins 10 to 12 days after exposure to the virus and lasts for 4 to 7 days. Cough, runny nose, red and watery eyes and small white spots inside the cheeks (Koplik spot) can develop in the initial stage. After few days there is eruption of maculopapular rashes usually on the face, behind ears and neck; rashes then spread to the trunk and extremities. The rash persists for 5 to 6 days, then fades often with desquamation.³ A person remains infectious 4 days prior to the onset of rash to 4 days after its eruption.⁸

Most measles related deaths are due to complications associated with the disease.¹ Serious complications are more common in children under the age of 5 years, or adults over the age of 30.³ Infection with measles virus has interesting immunological factors as it causes transient but profound immunosuppression, resulting an increased susceptibility to opportunistic infections.⁹ Many manifestations of the disease like rashes, stomatitis and conjunctivitis are

related with the immune response to the virus. Again, this immune response clears the virus from the body and confers to lifelong immunity.²

Measles is a self-limited viral disease but some patients especially younger children and immunocompromised persons may suffer from serious complications.¹⁰ The most important complications are bronchopneumonia, otitis media, croup, diarrhea, encephalitis and blindness.^{3,10} Secondary bacterial infections play important role in measles-related-deaths. Among them pneumonia is the commonest and accounts for 60% of measles related death.^{9,11} Ear infection frequently occurs in measles children and can result in permanent hearing loss.¹² Febrile seizure occurs <3% of children with measles. Encephalitis is a post infectious immunologically mediated process which usually occur during the exanthem and manifest as lethargy, irritability and seizure.¹³ Sub-acute sclerosing panencephalitis (SSPE), is one of the fatal neurological complications of measles, usually developed in a person 7 to 10 years after measles infection.⁶ In malnourished children with impaired immunity measles virus clearance is slow and accounts for higher case-fatality rates. Children with clinical and subclinical vitamin A deficiency may suffer from serious vitamin A deficiency after measles infection which may lead to severe ocular complications including blindness.¹² The aim of the study was to observe the socio- demographic profile and complications of measles in hospitalized children.

Materials and Methods

It was a prospective observational study conducted in Dr M R Khan Shishu Hospital and Institute of Child Health from March to December, 2019. Children of 6 month to 10 years admitted in hospital with measles and its complications were included in the study. Measles was diagnosed clinically according to case definition criteria by World Health Organization like high fever (>38°C) associated with cough, coryza (runny nose), conjunctivitis (red eye, watering).⁸ Doubtful cases of fever with rashes and patient having chronic illness like congenital heart disease, hemolytic anemia was excluded from the study.

After taking informed written consent from parents, history was taken regarding age, sex, socio-economic condition, gestational age, breast feeding and vaccination status. Then thorough physical

examination was done, their weight and height were recorded and different complications were noted. Investigations like CBC, CRP and CXR were done in all cases and urine or stool routine examination, serum electrolytes, CSF study were done where needed. Socio-economic condition was classified into four groups according to their monthly income; lower - upto 10,000 taka/month, lower middle- 10,000 to 30,000-taka/month, middle- >30,000 to 50,000 taka/month and upper: >50,000 taka/month. Data were analyzed by SPSS version 23 and results were presented in tabulated form.

Results

Total 86 children suffering from measles with different complications were admitted during the study period. Among them 46(53%) were male and 40(47%) were female. Male to female ratio was 1.1:1. Age range of children was from 6 months to 10 years. Maximum children were from 6 months to 1 year age group 51(59%). Table I showing the age distribution of the study population.

Table I

Age distribution of the study population (N=86)

Age group	No of patients	Percentage
6 months to 1 year	51	59.30
>1 to 4 years	18	20.93
>4 to 7 years	12	13.95
>7 to 10 years	5	5.82
Total	86	100

We also classify our study population according to their socio-economic condition (Table II). Lower income group has the highest number 33(38.37%), then middle income group 26(30.23%).

Table II

Socio economic classification of study children (N=86)

Socio economic group	No of patient	Percentage
Lower	33	38.37
Lower Middle	18	20.93
Middle	26	30.23
Upper	9	10.46
Total	86	100

Lower: income- upto 10,000-taka/month, Lower Middle: income 10,000-30,000-taka/month, Middle: income >30,000- 50,000 taka/month and upper: >50,000 taka/month.

Regarding nutritional status, 68(79%) children had normal nutritional status, 11(13%) had moderate acute malnutrition and 7(8%) had severe acute malnutrition (Fig.1).

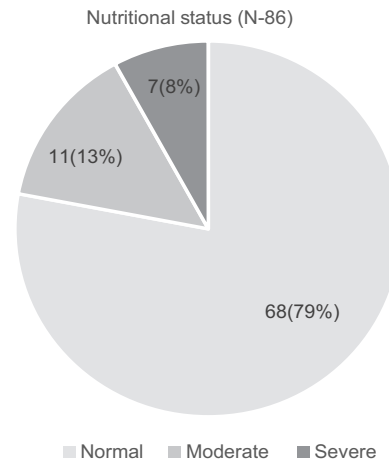


Fig.-1 Nutritional status of the study children

We noted the complications in all (86) study children having measles. Pneumonia was the most frequent complication 62(72%) followed by diarrhea 28(32%) and oral ulcer 26(30%). Five (6%) patients had croup, 4(4.6%) developed febrile seizure and 1(1.2%) developed encephalitis and corneal ulcer each (Fig 2).

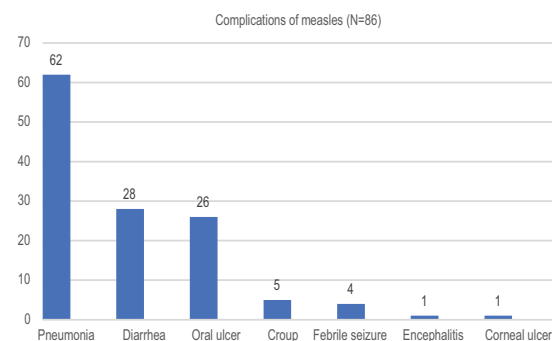


Fig.-2 Complications of measles

Among 86 study population, 62(72%) were from 9 months to 10 years. Out of them 16(26%) were vaccinated with two doses of measles vaccine, 14(23%) received only first dose and 32(52%) were not vaccinated at all. Twenty-seven (31%) children were between 9 months to 1 year. Among them 11(41%) received first dose of measles vaccine, 16(59%) did not. From one year to two-year total children were 12. Among them only 2 (17%) children completed 2 doses of measles vaccine (Table III).

Table III
Vaccination status of the study population

Age of the children	N	Vaccination status	N (%)
Children from 9 months to 10 years	62	Complete vaccination	16(25.80)
		First dose only	14(22.59)
		No vaccination	32 (51.61)
Children from 9 months to 1 year	27	First dose given	11 (40.74)
		First dose not given	16 (59.26)
Children from >1 year to 2 year	12	Complete vaccination	2 (16.67)
		First dose only	3 (25)
		No vaccination	7 (58.33)

Total 62 study children were between 9 months to 10 years. Among them 22 belonged to lower socio-economic group; 6(27%) of them were vaccinated and 16(73%) were not. In lower middle class total children were 14, among them 5(36%) were vaccinated and 9(64%) not. In middle income group total population was 22, among them 15(68%) were vaccinated and 7(32%) not. Four children were from upper class and all (100%) were vaccinated (Table IV))

Table IV <i>Vaccination status according to socio-economic class</i>			
Socio-economic class	N	Vaccinated N (%)	Not vaccinated N (%)
Lower	22	6(27.27)	16(72.72)
Lower middle	14	5(35.71)	9(64.28)
Middle	22	15(68.18)	7(31.81)
Upper	4	4(100)	0

Among 86 study children one patient died. This patient had pneumonia and severe malnutrition. Mortality rate was 1.16%.

Discussion

Measles is a contagious disease characterized by high fever, cough, coryza, conjunctivitis and a prominent exanthem.⁷ It may lead to serious complications and death.^{12,13} A total of 86 children suffering from measles with complications were studied. Male were 53% and female were 47%. The ratio was 1.1:1 which was 1.5:1 in Khan et al⁷ study. Study population was children of 6 months to 10 years. Most of the study children 51(59%) were from 6 month to 1 year age group. Ahsan et al. found 35% of measles cases from

9 month to 1 year and 48% in between 13-14 months.¹⁴ In khan et al's study 78% of children was below 3 years.⁷

In our study pneumonia was the main complication, 62(72%) followed by diarrhea 28(32%). In Rashid et al's¹ study pneumonia was 68% and khan et al's⁷ study 56% and in many other studies pneumonia was the main complications of measles.^{12,15} But some other studies showed diarrhea as main complication of measles.¹⁶ We found diarrhea in 28(32%) cases which was consistent with Rashid's et al study (31%).¹ We found oral ulcer in many of our patients, 26(30%) but it was low in other studies like 2% in khan et al's study.⁷ Croup and febrile seizure were 5 (6%) and 4(4.6%) in our study; those were 3% for both in khan et al's study⁷ and febrile seizure was 2% in Rashid et al's study.¹ Frequency of encephalitis was 1.2% in our study which was consistent with Rashid et al's study (1%).¹ We found corneal ulcer in one patient who was severely malnourished. Majority of our study children 70(82.6%) had normal nutritional status and only 7(8%) had severe malnutrition.

The overall complete (2 doses) vaccination status from 9 months to 10 year was 26% in our study which was 8.7% in Ahsan et al's study.¹⁴ Measles patient of 9 months to 12 months were 27. Among them 41% received first dose of measles vaccine and 59% did not. In 1 to 2-year age group only 17% completed 2 doses measles vaccine and 25% received only the first dose. The schedule for first dose of measles vaccine in our country is at the end of 9 month and second dose at 15 months. But many of the children are having measles at or before timing of measles

vaccine. Ahsan et al's study showed that many measles cases occurring between 9 months to 14 months, that means before completion of 2 doses of measles vaccines.¹⁴ In our study 59% of measles children of 9 months to 1 year did not receive the first dose. In most of these cases parents said that they deferred measles vaccination due to minor illnesses like fever, cough and cold, diarrhea etc. Some other cases parents agreed that they were not aware of vaccination at due time. Vaccination status was poor in lower income group (27%) but 100% in upper class. Though patients suffered from many complications mortality rate was less in our study (1.16%). The study reflects the socio-demographic profile of measles in children before COVID-19 pandemic. At that time outbreak of measles in different parts of the world were reported and actions were being taken to combat the situation. But during and immediately after the pandemic routine vaccination program could not run successfully and outbreak of measles can occur again.

Conclusion

The study showed that a number of children are suffering from measles along with different complications. Many children suffered from the disease during their infancy. Vaccination status against measles was unsatisfactory among lower income group making them vulnerable to develop measles and complications. So, we should ensure two doses of measles vaccine at proper time and if needed measles catch up campaign in special situation.

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