ORIGINAL ARTICLE

Measles in Children: Still a Problem Today

ASMA MUSHTAQ, SAMIA NAZ, ATTIA BARI, *TAHIR MASOOD*

ABSTRACT

Aims: To determine the frequency of measles complications and their relationship with nutritional status and vaccination status of the children.

Patients and methods: This hospital based cross-sectional analytical study was conducted in Pediatric Medical Unit, isolation ward, The Children's Hospital and The Institute of Child Health, Lahore from January 2012 to June 2012. Total 100 patients were included in the study, who were diagnosed as measles according to WHO criteria. All patients were evaluated for measles complications during hospital stay and their relationship with nutritional status and vaccination status of patients was noted and statistically analysed.

Results: Total 100 patients were studied, majority of children 47 (47%) were between 1-4 years of age and females 58 (58%). Most of the patients 60(60%) were from urban areas and 40(40%) patients were from rural areas. Most of the patients 60(60%) were not vaccinated against measles. Regarding nutritional status, most of the patients 78 (78%) were malnourished. Pneumonia was the commonest complication 93(93%) and second common complication was diarrhea 44(44%) and otitis media 44(44%). Most of the complications were found in severely malnourished and unvaccinated measles patients. Sixteen children died and most of them 14(87.5%) were unvaccinated (p= 0.014).

Conclusion: Severe degree of malnutrition and unvaccinated status had higher incidence and severity of complications. The need for improvement in nutritional status and large coverage of measles vaccine in our country especially amongst the malnourished children is obvious.

Key words: Measles, Malnutrition, Vaccination.

INTRODUCTION

Measles is one of the leading causes of childhood morbidity and mortality in the world despite the availability of a safe, effective and relatively inexpensive vaccine[1]. In 2010, there were 139,300 measles deaths globally, nearly 380 deaths every day or 15 deaths every hour. More than 95% of measles deaths occur in low-income countries with weak health infrastructures. Measles vaccination resulted in 74% drop in measles deaths between 2000 and 2010 worldwide[2]. In Pakistan, the estimated measles deaths are 81,000 annually among children under 5 year old[3]. The Fourth Millennium Development Goal (MDG[4]) aims to reduce the under-five mortality rates by two-thirds between 1990 and 2015 and routine measles vaccination coverage has been selected as an indicator of progress towards achieving MDG 4[2].

Measles, also known as morbili is a highly infectious childhood disease, caused by RNA virus of the genus morbilivirus in the family paramaxoviridae[4]. Clinically measles is characterized by prodromal stage (high grade fever, coryza, conjunctivitis) and eruptive stage (generalized maculopapular rash). It is more common in preschool age and spreads through respiratory tract by droplet spray, mostly during the prodromal period (7 days before and 7 days after rash appears)[5]. About 30% of measles cases develop one or more complications, including pneumonia, ear infection and diarrhea. These complications are more common among children under 5 years of age and adults over 20 years old. As many as 1 out of every 20 children with measles gets pneumonia, and about 1 child in every 1,000 who get measles will develop encephalitis[6]. Routine measles vaccination for children combined with mass immunization campaigns in countries with high case and death rates, are key public strategies to reduce global measles deaths. The measles vaccine has been in use for over 40 years. It is safe, effective and inexpensive. Two doses of the vaccine are recommended to ensure immunity, as about 15% of vaccinated children fail to develop immunity from the first dose[7].

Department of Paediatric Medicine, isolation ward, The Children's Hospital and Institute of Child Health, Lahore, Correspondence to Dr Asma Mushtaq, Assistant Professor 113-D , 5TH avenue, NFC society, near Wapda Town ,Lahore. Mob no 0333-4309000, Email: dr.asma.mushtaq2@gmail.com.

PATIENTS AND METHODS

This hospital based cross-sectional analytical study was conducted at Pediatric Medical Unit, Isolation ward, The Children's Hospital and The Institute of

Child Health, Lahore from January 2012 to June 2012. A total of 100 patients between 6 months to 15 years who were hospitalized because of measles and its complications, were included in the study. Children below six months were excluded because they were considered to be protected from measles because of measles antibodies[8]. Clinical measles was diagnosed in patients according to World Health Organization (WHO) criteria, which is generalized maculopapular rash (non-vesicular), fever (38 C and lasting >3 days) and cough, coryza or conjunctivitis.

Patients of measles with chronic diseases like congenital heart disease, chronic renal disease or any congenital malformations were excluded. All patients were evaluated for measles complications like pneumonia, diarrhea, encephalitis, corneal ulceration, otitis media and oral ulcers. Pneumonia was diagnosed by using WHO criteria of increased respiratory rate or infiltrates on chest X-ray.(9) Central nervous system was considered involved if there was lethargy, headache, unconsciousness, history of convulsions or neurological deficits.

The detailed history and physical examination was done and noted on a especially designed proforma. Vaccination status of the patients against measles also noted. Weight for age was plotted on National Center for Health Statistics (NCHS) charts and was classified as well-nourished (50^{th} centile), mild malnutrition ($<50^{th}>25^{th}$ centile), moderate malnutrition ($<25^{th}$ $>5^{th}$ centile) and severe malnutrition ($<5^{th}$ centile).

Investigations like chest X-ray and complete blood count were carried out in all patients. Lumbar puncture was done only in patients with clinical encephalitis. All patients were managed for their complications according to hospital protocol and Vitamin- A orally was given to all patients at the time of admission. All the data was analyzed by using SPSS version 16. Chi square test was applied and p-value calculated.

RESULTS

A total of 100 patients with complications of measles were included in the study out of which 42(42%) were males and 58(58%) were females. Majority of children 47(47%) were between 1-4years age, 41(41%) were between 6 months to 1year and 12(12%) were in the age group 5-7 years old. No patient was of more than 7years. The mean age of these patients was 22.9 months. Majority of the patients 60(60%) were living in urban areas and 40(40%) were from rural areas. Regarding vaccination against measles, only 40(40%) patients were vaccinated while 60(60%) patients were not vaccinated. Regarding nutritional status, 22(22%) patients were well nourished, 13(13%) with mild malnutrition, 18(18%) with moderate malnutrition and 47(47%) with severe malnutrition. History of contact with a measles patient was found in 48(48%) patients while it was absent in 52(52%) patients.

The highest complications were seen in the respiratory system which was pneumonia found in 93(93%) patients followed by diarrhea in 44(44%) patients, otitis media in 44(44%) patients, encephalitis in 34(34%) patients, oral ulcers in 22(22%) patients and corneal ulceration in 5(5%) patients. Most of the patients 78(78%) had stay <7days and only 22(22%) patients stayed in hospital for >7days. The mean duration of stay in the hospital was 6 days (SD=3.5days).

Regarding outcome, 84(84%) patients discharged and 16(16%) patients expired. Six expired patients had encephalitis, 6 had pneumonia and 4 had encephalitis along with pneumonia. The complication of the measles were compared with nutritional status of the children (Table-1) and with vaccination status of the children (Table-2)

It is obvious that complications increased with malnutrition and most of the patients with complications belong to category of severe malnutrition. Similarly most of the complications were found in un-vaccinated group, and out of 16 patients who expired, 14(87.5%) patients were unvaccinated. (p value=0.014)

Table-1: Relationship of measles complications with nutritional status

Complication	Well nourished	Mild malnutrition	Moderate malnutrition	Severe malnutrition	Total	P.value
Pneumonia	18 (19.4%)	11 (11.8%)	18 (19.4%)	46 (49.5%)	93	0.034
Diarrhea	8 (18.2%)	5 (11.4%)	12 (27.3%)	19 (43.2%)	44	0.197
CNS	6 (17.6%)	8 (23.5%)	5 (14.7%)	15 (44.1%)	34	0.155
Otitis media	10 (22.7%)	7 (15.9%)	7 (15.9%)	20 (45.5%)	44	0.859
Oral ulcers	4 (18.2%)	2 (9.1%)	1 (4.5%)	15(68.2%)	22	0.109
Eye changes	0	1 (20.0%)	1 (20.0%)	3 (60%)	5	0.669
Discharged	16 (19.0%)	8 (9.5%)	16 (19.0%)	44 (52.4%)	84	0.015
Expired	6 (37.5%)	5 (31,2%)	2 (12.5%)	3 (18.8%)	16	

Table-2: Relationship of measles complications with vaccination status

Complications	Vaccinated	Non vaccinated	Total	p.value
Pneumonia	38 (40.9%)	55 (59.1%)	93	0.522
CNS	16 (47.1%)	18 (52.9%)	34	0.301
Diarrhea	18 (40.9%)	26 (59.1%)	44	0.869
Otitis media	14 (31.8%)	30 (68.2%)	44	0.139
Oral ulcers	9 (40.9%)	13 (59.1%)	22	0.921
Eye changes	3 (60.0%)	2 (40.0%)	5	0.349
Discharged	38 (45.2%)	46 (54.8%)	84	0.014
Expired	2 (12.5%)	14 (87.5%)	16	

DISCUSSION

Measles is a leading cause of vaccine preventable childhood mortality. While the vast majority of patients survive measles, complications occur fairly frequently and may include chest infection and encephalitis which is potentially fatal. As high as 10% of measles cases result in death among populations with high levels of malnutrition and a lack of adequate health care. Unvaccinated young children are at highest risk of measles and its complications, including death[7].

In our study, majority 88(88%) were <4years of age. This is similar to various other studies[10,11]. In the present study measles was more common in female patients in 58(58%) patients as compared with male patients. However some studies had shown male predominance while others have shown female predominance[12]. The present study revealed that only 40% of the patients with measles received a measles vaccine. The other study also reported a low vaccination status among measles cases[13]. The common complications observed in our study were pneumonia (93%) followed by diarrhea (44%) and otitis media (44%). The various studies have reported complication rates of a similar range with slight differences[14,15,16]. In this study 22(22%) patients had oral ulcers and 5(5%) patients had corneal ulceration. Similar finding of ulcerative lesions of the eye and mouth have been described in children with measles[17]. The lesions tend to be more severe in malnourished children and progress rapidly in spite of treatment, as seen in our study[18]. Both measles and malnutrition are known to cause immunosuppression predisposing to secondary infection. In this study most of the patients (78%) have malnutrition, and most of the complications were seen in severely malnourished group. Similar findings were reported in various other studies[11,16]. In this study most of the complications were seen in the unvaccinated group. Marufta T et al also reported that risk of the complications is higher in non-vaccinated cases and vaccine is protective against occurrence of complications[19]. In our study, case fatality rate was found to be 16% and the common complications associated with mortality were measles pneumonia and measles encephalitis, and these findings were similar to many other studies[20,21].

CONCLUSION

This study points out that a large proportion of complicated measles cases occur among the unvaccinated and malnourished children. However many cases also occur in vaccinated children which point to an increase in vaccine failure. So if Pakistan wants to eliminate measles this study recommends that the issue of improving vaccine coverage, maintenance of cold chain, public awareness regarding vaccination and improvement in nutritional status needs to be addressed and an effective surveillance system needs to put into place immediately.

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