

# Complication of Measles among admitted patients in Balochistan

MOBIN-UR-REHMAN, MUSHTAQ AHMED JAFFAR, SHAMYAL MOUNDOKHEL

## ABSTRACT

**Aim:** To determine the frequency of complications of measles in admitted patients.

**Methods:** This was a cross sectional analytical study conducted at Bolan Medical Complex Hospital pediatric unit-I from January 2014 to December 2014. A total of 139 patients of either sex from the ages of 6 months to 14 years who presented with measles or its complications were included with non-probability convenient sampling technique. Detailed history and physical examination encompassing tuberculous exposure, caloric intake and complications such as otitis media, epiglottitis, myocarditis, encephalitis etc was done and findings entered into proforma. Patients of the Measles with other chronic illnesses like congenital heart disease, chronic renal failure were excluded.

**Results:** The male to female ratio was 1.3:1. 35.9% were well nourished, 34.6% were moderately malnourished and 29.5% were severely malnourished. The patients in the age group 2-5 years were 48.9%, 28% were between 6-9 years, 15.2% were between 6 months to 1 year and 7.9% were more than 10 years. Pneumonia was the most common complication occurring in 46% of patients followed by diarrhoea (23.8%), tuberculosis (22.4%), encephalitis (3.6%), croup (2.8%) and cancrum oris (1.4%). The mortality was 8(5.8%), 5 patients died due to encephalitis and 3 due to pneumonia.

**Conclusion:** Measles and its many complications are still a significant cause of morbidity and mortality

**Keywords:** Measles, Complications, Pneumonia, Diarrhoea, Encephalitis

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## INTRODUCTION

Measles is the leading killer among vaccine-preventable diseases; it is responsible for an estimated 44% of the 1.7 million vaccine-preventable deaths among children annually.<sup>1</sup> Pakistan has one of the highest burden of measles and measles-related deaths in the world<sup>2</sup>. The proportion of incompletely immunized children in Pakistan varies from 37-58%, and this has recently resulted in outbreaks of measles<sup>3</sup>. Countrywide measles outbreaks with over 15,000 cases and several hundred deaths in 2012-13 underscore sub-optimal EPI performance in delivering routine immunizations<sup>4,5</sup>. Measles is a disease with protean and potentially deceptive clinical manifestations, especially in the immunocompromised patient. Measles-associated pneumonitis and its complications, and less commonly post infectious encephalomyelitis, are the main source of morbidity and mortality<sup>6</sup>. Measles with its complications still present as a fatal illness even among vaccinated children<sup>7</sup>.

## PATIENTS AND METHODS

This was a cross sectional analytical study conducted in Bolan Medical Complex Hospital pediatric unit-I from January 2014 to December 2014. A total of 139 patients of either sex from the ages of 6 months to 14 years who presented with measles or its complications were included with non-probability convenient sampling technique. Children under 6

months of age were excluded because they were considered to be protected from measles because of maternal antibodies. All patients presented with signs and symptoms suggestive of measles according to WHO criteria, i.e., fever (38°C and lasting >3 days), maculopapular rash (nonvesicular), and cough, coryza, or conjunctivitis<sup>8</sup>. Patients were classified as meeting the WHO case definition of pneumonia if they had both 1) cough or difficulty breathing and 2) age-specific WHO-defined tachypnea. The primary outcome was radiographic pneumonia based on the final radiology report.<sup>9</sup> Central nervous system was considered to be involved if there was lethargy, irritability, headache, fits, disorientation or other neurological deficit. Detailed history and physical examination encompassing tuberculous exposure, caloric intake and complications such as otitis media, epiglottitis, myocarditis, encephalitis etc was done and findings entered into proforma. Patients of the measles with other chronic illnesses like congenital heart disease, chronic renal failure were excluded. Immunization status was assessed by parental inquiry or inspection of immunization card when available. Malnutrition was assessed as per WHO charts and standard deviation was determined for weight for height. The patients were divided into well nourished, moderately malnourished (Wt for Ht >3SD) and severely malnourished (Wt for Ht <3 SD or oedematous malnutrition). Clinical outcome was compared between males and females, as well as different age groups.

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Department of Pediatrics, Bolan Medical College, Quetta  
Correspondence to Dr. Mobin-ur-Rehman e-mail:  
mobin38@gmail.com

**RESULTS**

A total of 139 patients were admitted in our unit during the study period with measles and its complications. The male patients constituted 57.5% of the total patients and 42.5% were female with male to female ratio of 1.3:1. As far as the nutritional status is concerned 35.9% were well nourished, 34.6% were moderately malnourished and 29.5% were severely malnourished. Almost half of the patients were in the age group 2-5 years (48.9%), 28% were between 6-9 years, 15.2% were between 6 months to 1 year and 7.9% were more than 10 years. More than 90.7% patients were unvaccinated against measles while 9.3% were given one dose of measles vaccine. Tuberculous contact was positive in 38% of the patients while it was negative in 62% of patients. The majority of patients (80.6%) were discharged within a week while 19.4% stayed for longer than 7 days. Pneumonia was the most common complication occurring in 46% of patients followed by diarrhoea (23.8%), tuberculosis (22.4%), encephalitis (3.6%), croup (2.8%) and cancrum oris (1.4%). The mortality was 5.8% (8 patients). Five patients died due to encephalitis and 3 due to pneumonia (Table 1).

**DISCUSSION**

Most of the cases in our study occurred from July to December. Although seasonal variation is well documented, Nigerian workers found measles to be more common from January to May that is in contrast to our study<sup>10</sup>. But they have highlighted the concept of "human thermal comfort indices" which may be different in Pakistan. In England for example most of the cases occur in Autumn<sup>11</sup>. So there is a seasonal pattern specific to every country and region. The predominant gender affected in our study was male. This is consistent with studies conducted in Senegal<sup>12</sup>. It may be due to the fact that in both developing countries boys are more like to be brought for medical care. But Spanish workers also showed the male predominance<sup>13</sup> as well as workers from Dublin<sup>14</sup>. Therefore the susceptibility of males to measles as compared to females may be the common factor involved. In our study we found that the percentage of malnourished children was higher than shown in other studies<sup>15</sup>. This may be due to poverty, immigration, lack of immunization and civil war that are rampant in this region. Indeed it has been shown that patients with malnutrition have higher rate and increased severity of measles.<sup>16</sup> Severe acute malnutrition (SAM) is associated with increased severity of common infectious diseases, and death amongst children with SAM is almost always as a result of infection<sup>17</sup>. Infections in undernourished children are a common cause of death, and taking this finding into account helps to

reduce the case fatality rate in severely malnourished patients<sup>18</sup>.

Table 1: Demographic data of measles among patients (n=139)

Variable	No.	%
<b>Month wise</b>		
January	4	2.8
February	2	1.4
March	4	2.8
April	2	1.4
May	10	7.2
June	8	5.8
July	26	18.8
August	27	19.4
September	16	11.5
October	8	5.8
November	10	7.2
December	22	15.9
<b>Gender</b>		
Male	80	57.5
Female	59	42.5
<b>Nutritional status</b>		
Well nourished	50	35.9
Moderate malnutrition	48	34.6
Severe malnutrition	41	29.5
<b>Age</b>		
6 m – 1 year	21	15.2
2 – 5 years	68	48.9
6 – 9 years	39	28.0
>10 years	11	7.9
<b>Vaccination status</b>		
Vaccinated	13	9.3
Unvaccinated	126	90.7
<b>Hospital stay</b>		
< 7 days	112	80.6
> 7 days	27	19.4
<b>Complication</b>		
Pneumonia	64	46.0
Diarrhoea	33	23.8
Cancrum oris	2	1.4
Croup	4	2.8
Encephalitis	5	3.6
Tuberculosis	31	22.4

Most of the children in our study were from 6 months to five years and it is consistent with international studies from Congo<sup>19</sup> and Japan.<sup>20</sup> Infants might be susceptible to measles between ages 4 months and 14 months, the age at which maternal antibodies have disappeared and the first measles, mumps, rubella (MMR) vaccination is administered, respectively.<sup>21</sup> Most of the patients in our study were unimmunized even for single dose of measles vaccine. This is due to myriad of factors that have been documented by international studies like awareness of these vaccines particularly among low-income families<sup>22</sup>, paternal education<sup>23</sup>, female children and perceived contraindication<sup>24</sup>, migrant children<sup>25</sup>, maternal knowledge about EPI<sup>26</sup>, religiosity<sup>27</sup>, existence of obstacles<sup>28</sup> and immigration<sup>29</sup>. All these factors converge in Balochistan therefore here vaccination rate is low then in other parts of Pakistan. The hospital stay was less than a week in almost four fifth of the patients and it is consistent with other international studies.<sup>30,31</sup> Measles complications are more severe

in children than adults.<sup>32</sup> The frequency of complications in our study was more than reported from Italy.<sup>33</sup> Pneumonia was the most frequent complication encountered in this study that is consistent with that shown by Chinese and French workers<sup>34,35</sup>.

The second most common complication was dehydration due to diarrhoea and it is also supported by studies done in Turkey<sup>8</sup> and Pakistan.<sup>36</sup> Tuberculosis has been known to complicate measles<sup>37</sup> but the described frequency has been low<sup>38</sup>. The high frequency found in this study could be due to exposure to tuberculosis that is rampant here. Encephalitis is the most frequent neurological complication of measles virus infection.<sup>39</sup> Mortality is significantly associated with encephalitis<sup>36</sup> and in this study five out of eight patients died due to encephalitis.

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