# DEMOGRAPHIC PROFILE, VACCINATION STATUS AND OUTCOME OF MEASLES PATIENTS AT CIVIL HOSPITAL, BAHAWALPUR DURING MEASLES EPIDEMIC

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## ABSTRACT

**Background:** Measles is a vaccine preventable disease of childhood. It occurs in epidemics in developing world like Pakistan. It has significant morbidity and mortality due to its complications. **Objective:** This study was conducted to determine the demographic factors, immunization status, complications and outcome in measles patients, admitted at Civil Hospital, Bahawalpur during measles epidemic. **Material and Methods:** The cross-sectional study was conducted at Civil Hospital, Bahawalpur from 4th March, to 15th August, 2013. A total of 166 patients were admitted who presented with signs and symptoms of measles according to WHO criteria. Demographic profile including age, gender, residential status, immunization status and nutritional status of these patients was observed. They were evaluated for complications like pneumonia, gastroenteritis, encephalitis, otitis media, post measles state, dysentery and myocarditis. The outcome of these admitted patients was seen in terms of discharge, leave against medical advice, referral and death. The data was entered and analyzed by using SPSS 15. **Results:** In the patients, 93 (56%) were males and 73 (44%) were females. Mean age was 3.72 $\pm$ 2.7 years. One hundred and fifty seven (94.6%) patients were unvaccinated and 9 (5.4%) were partially vaccinated for measles. One hundred and seven (64.5%) were from rural area and 59 (35.5%) to urban area. Fifty nine (35.5%) were well nourished and 107 (64.5%) undernourished. Seventy two (43.4%) patients were having pneumonia. Thirty seven (22.3%) patients were having gastroenteritis. Nine (5.4%) patients were having encephalitis. Post measles state was found in 11(6.6%). Majority of patients (88.6%) were discharged in a satisfactory condition while 9 patients (5.4%) expired. **Conclusion:** Measles was mainly found in unvaccinated children aged 1-5 years. Malnutrition was a major risk factor for mortality in our study. So we recommend two doses measles vaccine schedule and > 90% routine coverage in order to minimize the chances of measles outbreak.

**Key Words:** Measles, Immunization status, Nutritional status, Pneumonia, Encephalitis, Post measles state.

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## INTRODUCTION

Measles is a highly contagious infectious disease. It is one of the communicable disease which presents in epidemics in children. Worldwide nearly 40 million children are affected annually.[1] Measles is an endemic as well as epidemic in Pakistan. It is prevented by means of vaccination. EPI schedule has changed frequently in near past. Nowadays measles vaccine is being given at 9 and 15 months of age through EPI in Pakistan. American Pediatric Association highlights no significant protection below one year by measles vaccine. The advisory committee on immunization practices for the United States advises two doses measles vaccine schedule.[2] The first dose at 12-15 months of age while the second dose is recommended at 4-6 years of age. Any dose of measles-containing vaccine given before 12 months of age is not counted as part of series. Contraindications of measles vaccine are rare and adverse reactions following its vaccination are generally mild and transient. During an outbreak, measles vaccine may be given to infants as young as 6 months of age.[2,3,4] Pakistan recently faced measles epidemic with slight variation of intensity at different territories across the country. Measles is one of the diseases contributing under five mortality. Reduction in under five mortality facilitate us in achieving Mellinium Development Goal. Measles remains a common disease in certain regions of the world and accounts for 50-60% of the 1.6 million deaths each year by vaccine preventable childhood diseases.[5]

Measles commonly occurs in 1-5 years (preschool) children. Although can occur after 6 months of age to well adolescence if not immune. It's transmitted through respiratory droplets. Infectivity starts 3 days before to 5-6 days after the appearance of rash. Prodromal phase consists of cough, coryza and conjunctivitis; koplick spot (pathognomic for measles) followed by eruptive phase of maculopapular rash. Measles is clinically diagnosed on basis of identification of measles suspected case

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defined by WHO. Isolation of measles virus is not recommended as a routine method to diagnose measles. Molecular detection by polymerase chain reaction (PCR) is possible but is a research tool.[6] Pneumonia, diarrhea, encephalitis are the common complications of measles. It causes immunosuppression so can see various kind of infection in these patients more frequently. Usually supportive management is required but complicated ones need hospitalization for experienced evidence based specialized care. All patients having measles should be given vitamin A supplementation as part of compulsory management as it reduces morbidity and mortality.[7,8,9] The objective of this study was to determine the demographic status, immunization status, complications and outcome of measles patients admitted at Civil Hospital, Bahawalpur during measles epidemic.

## MATERIAL AND METHODS

This was a cross-sectional study conducted at Civil Hospital, Bahawalpur. It included all indoor patients with clinical measles, diagnosed according to WHO criteria for measles case. Data collection was started from 4th March to 15th August, 2013. All the information including, age, sex and address, nutrition status were noted on a performa especially designed for it. Complications i.e. pneumonia, diarrhea, were noted clinically. Encephalitis was diagnosed clinically and by CSF analysis. Co-morbidity like asthma, febrile fits, hospital stay in days, days of rash appearance, vaccination status particularly for 2 doses regimen, evidence of spontaneous bleeding either at presentation or during hospital stay and their fate in the form of discharge, expire, refer or LAMA were also mentioned. Patients included were from 6 months to 14 years of age. The data was entered and analyzed by using SPSS version 15.

## RESULTS

A total of 166 measles patients were admitted during the outbreak in which 93(56%) were male and 73(44%) were female. 100 (60.2%) patients belonged to age group from 1-5 years, 39 (23.5%) were above 5 years and 27(16.3%) were below 1 year. Mean age for measles affected patient was $3.72 \pm 2.7$ years and ranged from 6 months to 12.5 years. Only 59 (35.5%) has normal nutritional status remaining 107 (64.5%) patients were found undernourished. Vaccination against measles was markedly lacking; 157 (94.6%) had no history of measles vaccine ever and 9 (5.4%) had single dose measles vaccine and none of the patient had latest 2 doses schedule. Majority of the patients were from rural area 107(64.5%) and 59 (35.5%) were urban. (Table: I)

**Table I: Demographic profile and vaccination status of measles patients at Civil Hospital, Bahawalpur**

| Demographic Profile | Frequency | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 93 | 56% |
| Female | 73 | 44% |
| **Age** | | |
| Below 1 year | 27 | 16.3% |
| 1 to 5 years | 100 | 60.2% |
| Above 5 years | 39 | 23.5% |
| **Immunization Status** | | |
| Un-vaccinated | 157 | 94.6% |
| Partially vaccinated (1dose) | 9 | 5.4% |
| Fully vaccinated (2doses) | 0 | 0 |
| **Nutrition Status** | | |
| Well nourished | 59 | 35.5% |
| Under nourished | 107 | 64.5% |
| **Residential Status** | | |
| Rural | 107 | 64.5% |
| Urban | 59 | 35.5% |

Pneumonia was most common complication 72(43.4%). Gastroenteritis was found in 37(22.3%), 11(6.6%) were in post measles state and encephalitis was found in 9(5.4%). 147 patients (88.6%) were discharged after adequate management, 6(3.6%) were LAMA and only 4 (2.4%) were referred to highly equipped specialized center for further management. There were 9 (5.4%) deaths among 166 admitted patients. Among 9 expired patients, 3 had pneumonia, 3 were in post measles state, 2 encephalitis and one died of myocarditis complication. (Table II)

**Table II: Complications and Clinical Outcome of Patients (N= 166)**

| Complications | Nutritional Status | | Outcome | | | |
|---|---|---|---|---|---|---|
| | Well Nourished | Under Nourished | Discharge | Expire | Refer | LAMA |
| Gastroenteritis/ Diarrhea | 14 (37.8%) | 23 (62.2%) | 36 (97.3%) | 0 | 0 | 1 (2.7%) |
| Pneumonia | 24 (33.3%) | 48 (66.7%) | 66 (91.7%) | 3 (4.2%) | 0 | 3 (4.2%) |
| Encephalitis | 4 (44.4%) | 5 (55.6%) | 4 (44.4%) | 2 (22.2%) | 2 (22.2%) | 1 (11.1%) |
| Post Measles State | 5 (45.5%) | 6 (54.5%) | 6 (54.5%) | 3 (27.3%) | 2 (18.2%) | 0 |
| UARI | 1 (14.3%) | 6 (85.7%) | 7 (100%) | 0 | 0 | 0 |
| Myocarditis | 1 (100%) | 0 | 0 | 1 (100%) | 0 | 0 |
| Dysentery | 1 (50%) | 1 (50%) | 2 (100%) | 0 | 0 | 0 |
| No Significant Complication | 10 (35.7%) | 18 (64.3%) | 27 (96.5%) | 0 | 0 | 1 (3.5%) |

UARI: Upper Acute Respiratory Tract Infection. LAMA: Leave against medical advice.

## DISCUSSION

Measles is one of the oldest infectious disease of mankind and it's known to exist for nearly 5000 years.[10] In spite of effective vaccine availability since long times, measles is still causing epidemics particularly in developing countries like Pakistan. In this recent epidemic, 166 patients got indoor treatment at Civil hospital according to their need as per policy guidelines provided by Director General Health, Government of Punjab, Lahore. Male to female ratio was found 1.27:1, a slight higher on male side reflecting male preference trend for health care seeking behaviour in our society as it was observed in other studies of our region.[11-12]

Profile revealed that majority patients were from ages between 1 to 5 years as it is proved to be the main target population for measles. Presence of passive immunity from mothers protects measles especially in early infancy only.[13] Lack of immunization is the principal cause of recent measles epidemic as clearly observed in this profile record where almost 95% had no measles vaccine history and only 5% has single dose administered history and no one has followed latest 2 doses schedule. Vaccine coverage was found poor both in urban and rural area even at Karachi in one recent clinical audit report, which showed >80% measles victims had no measles vaccine history.[14] It was reported >85% affected cases were unvaccinated for measles at Erbil city.[15] Measles outbreaks with similar trends (low vaccination coverage over time, persons aged less than five years being the most affected) have been reported in other areas of world such as the Mirriah district in Niger and the Shivpuri district in India.[16,17]

Children with malnutrition are the easy target of measles like other infections. Moreover, they suffer more up and down hills during the disease as compared to well nourished. Morbidity in the form of hospital stay is varied, undernourished had found prolong stay as compared to well nourished on an average. In another study, the same observation in measles patients was found at Pediatric ward of Khyber Teaching Hospital, Abbottabad .[18]

Pneumonia was the most common complication in measles and occurred in 43.4% patients and constituted one third of total mortality. The similar pattern was seen in different studies where pneumonia occurred in 16-77% of measles patients and remained the leading complication in measles globally.[19,20] Diarrhoea/ gastroenteritis was the second common complication and occurred in 22.3% in measles patients in present study, similar observation was found in developing countries like Pakistan in other studies.[19,21,22] Patients in post measles state were 6.6% at our indoor in cascade of various complications. However, post measles complications rate was as high as 29.6% in one community based study at India.[23]

Clinical outcome provided overall mortality was only 5.4% which is low in comparison with some other studies at Karachi, where it was around 9.5%, eight percent reported at Multan by Yunous and 10% by Qaiser at B.V. Hospital, Bahawalpur.[11,14,22] But at Islamabad and Khaberpakhtunkha case fatality rate in measles was almost same i.e, 5.17% and 5.8% respectively.[17-22] Although in epidemics mortality rate is usually raised as compared to endemic situations,[24] case fatality rate may be as high as 25%.[25] Measles with its complications runs a severe course even in the prosperous countries and can lead to death.[26] Encephalitis outnumber the pneumonia in mortality percentage ratio in acute complications as 22.2% encephalitis patients expired and only 4.2% pneumonia affected died in present study. Encephalitis is a dreadful complication and is a leading cause of death in measles most of the time throughout the world.[11,14,18-19,21-22] Post measles state was also seen in significant proportions with 27% ended in death. Death due to measles can occur within 30 days after onset of rash. Rash may not be present at the time of death and in post measles state.[27] Malnutrition was also a major contributor of mortality in present study, where two third mortality was among malnurished patients. It is a well documented observation in developing countries.[11] Despite routine measles vaccine coverage of >80% since 1990 in Pakistan, measles is a major cause of morbidity and mortality among children aged below five years. Strengthening of routine vaccination should be the cornerstone of measles control to achieve > 90% coverage and it could be achieved by identifying population without access to routine coverage, raising community awareness of the need for vaccination and providing sustainable outreach services. The introduction of second dose of measles vaccine is considered in National Immunization

Schedule of India as well. Supplementary immunization activity for measles is cost-effective. However, this cannot be considered superior to a second dose of measles in routine immunization.[28]

## CONCLUSION

Measles was found among unvaccinated children of ages 1-5 years mainly. Malnutrition was a major risk factor for mortality of measles patients, with comparatively low fatality rate. Two doses measles vaccine schedule and > 90% routine coverage must be ensured to minimize the chance of measles outbreak.

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