RELATIONSHIP OF MEASLES CASES IN MEASLES VACCINATED CHILDREN DURING OUTBREAK OF MEASLES IN BAHAWALPUR.

Shahzadi Asma Tahseen

ABSTRACT... To evaluate the clinical profile and case fatality rate and their comparison in relation with vaccination status in admitted children. Study Design: Case series retrospective study. Setting: Pediatric units of the tertiary care Hospitals (Bawahal Victoria Hospital and the Civil Hospital) affiliated with Quaid-e-Azam medical College Bahawalpur situated in Southern Punjab, Pakistan). Period: 01/01/2016 to 06/07/2016. Methods and Material: A clinical diagnosis of measles (as made by consultants of said Pediatric units) and residing in Bahawalpur district for more than one month of period before admitting in the hospital was included and reviewed. The help of Statistical department of Executive District Officer Health Bahawalpur was taken for missing information as the measles is notifiable disease and all cases were notified to Executive District Officer Health. The children who were nonresident of Bahawalpur District or with incomplete data were excluded. The children were divided into three groups depending on number of measles vaccine doses given. Results: The data of 557 children admitting during the period 01/01/2016 to 06/07/2016 with a clinical diagnosis of measles and resident of Bahawalpur district was included. 52.97% were males. 26.57% were unvaccinated and 73.43% vaccinated (39.14% with one dose and 34.29% with two doses). The mean age ± SD in unvaccinated children was 24.68±27.04, with one dose vaccination 50.94 ±35.58 and with two doses vaccination was 45.05 ±23.67 months. The case fatality rate was 2.87%. The case fatality was significantly higher in males vaccinated with two doses of vaccine as compared to either ones vaccinated with one dose or unvaccinated ones but this difference was not found in females. Conclusion: This study shows that there is urgent need of proper surveillance of measles cases.

Key words: Case Fatality, Measles, One Dose, Outbreak, Two Doses, Vaccination, Zero Dose.

INTRODUCTION

Measles is a vaccine preventable highly contagious disease with high morbidity and mortality. The case fatality rate varies from less than 0.01% in developed countries to more than 5% in developing countries. Globally the measles incidence decreased 75% and, mortality decreased 79% while measles first dose coverage increased from 72 to 85% during 2000-2015. The measles vaccine is safe, effective and inexpensive. The measles vaccination is given at 9 months and at 15 months of age in the Expanded Program for Immunization (EPI) in Pakistan. The second dose was introduced in EPI in Pakistan in April 2009. The vaccination coverage in Pakistan against measles first dose, with fluctuations, increased from 77% in 1991 to 88% in 2012 and then fell to 66% in 2013.

Measles epidemics are still going on in various countries with some of the best, and, some of the worst health systems in the world and even those areas where it had been eradicated. Measles is endemic in Pakistan with periodic epidemics. There were more than 8700 cases of measles reported by Pakistan to WHO in 2013 which were maximum cases in a year since 1991. This epidemic, claimed the maximum casualties when compared with recent outbreaks occurring in other parts of world. This epidemic started in late November 2012 in Sindh and continued into 2014 in other parts of the country involving all of Pakistan’s provinces including the Punjab. This part of Punjab province (Bahawalpur district)
was mainly affected during the first nine months of 2013.

The measles vaccine effectiveness is 96.7% with one and 99.7% with two doses⁶ while its effectiveness with single dose was found to be 87.4 and 93% in Pakistan.⁷ The vaccine failure rate had been reported as high as 50% in developing countries.⁸ There is general consensus that measles in vaccinated children is not as severe as in unvaccinated children.⁹,¹⁰,¹¹,¹²,¹³

The purpose of this study is to evaluate the clinical profile and case fatality rate and their comparison in relation with vaccination status in admitted children.

METHODS AND MATERIAL
This study was conducted in the Pediatric units of the tertiary care Hospitals (Bahawal Victoria Hospital and the Civil Hospital) affiliated with Quaid-e-Azam medical College Bahawalpur situated in Southern Punjab, Pakistan). The data of children admitting during the period 01/01/2016 to 06/07/2016 with a clinical diagnosis of measles (as made by consultants of said Pediatric units) and residing in Bahawalpur district for more than one month of period before admitting in the hospital was included and reviewed. The help of Statistical department of Executive District Officer Health Bahawalpur was taken for missing information as the measles is notifiable disease and all cases were notified to Executive District Officer Health. The children who were nonresident of Bahawalpur District or with incomplete data were excluded. The children were divided into three groups depending on number of measles vaccine doses given.

The qualitative data was compared by Chi square test while One-Way ANOVA was used to compare the quantitative data. P value <0.05 was taken as significant. Tukey HSD Test was used to compare more than two groups if p value was <0.05 in One-Way ANOVA test. The VassarStats program available at: http://vassarstats.net/index.html was used for analysis of data.

RESULTS
There were 557 children with clinical measles who were included in the study. The comparison of mean age ± SD, the mean duration from onset of fever to onset of rash ± SD and mean duration from onset of fever to admission ± SD in various groups (male versus female, unvaccinated versus vaccinated with one dose versus vaccinated with two doses children, unvaccinated versus vaccinated with one dose versus vaccinated with two doses male children, unvaccinated versus vaccinated with one dose versus vaccinated with two doses female children, unvaccinated children with age ≤ 9 months versus unvaccinated children with age > 9 months and the cases survived versus cases died) are shown in Table-I. There were 79 (14.18%) children who were unvaccinated and had measles before ≤ 9 months of age (Table-I).

There were 16 deaths giving case fatality rate as 2.87%. The comparison of case fatality in various groups are shown in Table-II. The case fatality rate was significantly higher in children vaccinated with two dose (5.24%) as compared with children vaccinated with one dose (2.29%) and unvaccinated children (0.68%).

DISCUSSION
There were 52.97% males in this study. Other national¹¹-²¹ and international¹⁰,²²,²³ studies except two national studies²⁴,²⁵ and one international study⁹ showed male dominance.

Both national¹¹-¹⁴,¹⁶-²⁰,²⁴,²⁵ and international⁹,²²,²³,²⁶,²⁷ studies, unlike this study, showed high rate of unvaccinated children. Rabia et al 2014¹⁵ showed that 62% were vaccinated (only 8.6% with two doses).

The higher age for measles, unlike this study, was seen in two national¹⁷,¹⁹ and two international¹⁰,²⁶ studies while other national¹¹,¹²,¹³,²⁰,²⁵ and international⁹,²³,²⁷ studies showed occurrence of the disease at lower age group.
The case fatality rate was 2.87% in this study. The national studies showed lower case fatality rate while other ones gave higher values (3.41% - 16%). The international studies also gave variable results from 0-8.5%. The case fatality rate was higher in males (4.07%) as compared to females (1.53%) but the difference was insignificant. Aurangzeb B et al 2005, other Pakistani study, showed 3.41% case fatality rate in males but zero in females. Hussain S et al 2016 showed mortality was 1.47% and the patient who died was a male and unvaccinated. The study conducted in Cameroon also showed that the survival was better in females as compared to males. Grais RF et al 2007 found excess measles mortality in females.

This study showed that case fatality was significantly higher in children vaccinated with two doses of vaccine (5.24%) as compared to either ones vaccinated with one dose (2.29%) or unvaccinated ones (0.68%) but other studies showed that mortality was significantly associated with unvaccinated status.

The case fatality was significantly higher in males vaccinated with two doses of vaccine compared to either ones vaccinated with one
dose or unvaccinated ones but this difference was not found in females.

There were 14.18% children in this study who had measles before ≤ 9 months of age while other national studies\textsuperscript{11,20,25,31,32} showed 13.5% - 54.4% had measles before ≤ 9 months of age.

The case fatality rate in unvaccinated children who had measles before ≤ 9 months of age was 1.27% as compared to unvaccinated children above 9 months of age. Other studies\textsuperscript{31,32} gave variable results.

The differences (especially significantly high mortality rate in children vaccinated with two doses) in this study from others may be due to that it is hospital based study and there is analysis of only available data and may not true reflect the picture. The record was missing about the nutrition status, exposure to other infectious diseases, presence of vitamin A deficiency, living conditions and whether the case was index or secondary one, type of complications present in the case. These factors may also affect the severity and case mortality of the disease.\textsuperscript{1,2} Moreover the diagnosis of measles was clinical and was not confirmed by laboratory. The death due to measles was labeled by the duty pediatrician. So it is very difficult to interpret the high mortality among vaccinated group. In conclusion, there is urgent need of improvement in measles case surveillance.

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REFERENCES


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<tr>
<th>Group</th>
<th>Total Cases (%)</th>
<th>Deaths</th>
<th>Case Fatality Rate (%)</th>
<th>P-Value</th>
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<td>295 (52.97)</td>
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<td>Children with two dose</td>
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