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ORIGINAL ARTICLE

Vaccination Status in Children presenting with severe complicated Measles

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Abstract

Background: Measles occurs worldwide and remains a leading cause of mortality especially among children ≤5 years of age. Present study will determine this association in our local population.

Objective: The aim of the study was to determine the frequency of unvaccinated children in patients presenting with severe Measles.

Material and Methods: After permission from Hospital ethical committee. Total 145 patients of severe measles were enrolled, and frequency of unvaccinated children was noted. This study was conducted in Children Ward, Women & Children Hospital, MTI Bannu from October 2022 to April 2023. The results obtained were presented in the form of tables and graphs and level of significance was determined statistically.

Results: In our study, total 145 patients were enrolled. Mean age of patients was 7.07±2.3 years. Minimum age was 3 years and maximum age was 12 years. There were 46.2% males and 53.8% female patients. Most of patients belonged to middle socioeconomic status i.e. 57.2. Regarding maternal education 50.3% were having 6-10 years of education, 20.9% had less than 5 years of education, 16.6% had 11-12 years of education while only 4.1% had more than 12 years of education. In our study participants 47.6% lived in urban area and 52.4% lived in rural area. There were 66.2% unvaccinated children and 33.8% were vaccinated. Data stratification for age group, BMI, residential status and socioeconomic status was significant i.e. p-value≤ 0.05.

Conclusion: Severe measles infections are prevalent among unvaccinated children due to their susceptibility to complications such as pneumonia and encephalitis. Vaccination remains the most effective measure to prevent measles outbreaks and safeguard public health.

Key Words: Measles, Unvaccinated, Poor socio-economic status, Rural area

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Introduction:

Measles occurs worldwide and remains a leading cause of mortality especially among children ≤5 years of age. Individuals at risk for measles include children too young to be vaccinated, those who have not been vaccinated for medical or other reasons, those who have not received a second dose of measles vaccine, and those for whom the vaccine failed to elicit a protective immune response.[1] Travel to areas where measles is endemic or contact with ill persons arriving from these countries increases the risk of exposure to measles.[2,3,4,,] Ideally, immunization efforts should focus on Control, followed by outbreak control, then elimination and finally eradication.5Measles incidence has decreased in all regions where vaccination has been instituted. Data from 2000 to 2014 demonstrated a reduction in the annual reported measles incidence of 87 percent (from 145 to 19 cases per million persons) and a reduction in annual estimated measles deaths of 84 percent (from 550,000 to 89,780).[6] Another report demonstrated that during 2000 to 2015, measles incidence decreased from 146 to 36 cases per 1 million, and 82 percent of countries included two doses of measles-containing vaccine regimens.7Pakistan is among the five nations where almost a million children did not receive their first

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dose of measles vaccination and outbreaks of the disease resulted in 4386 cases in 2011, 14,687 cases in 2012 with 310 deaths. In 2013.
about 25,401 cases of measles were reported and 321 affected children died.[8] Niazi AK, et al in their report stressed upon the understanding the multifactorial determinants of the Measles epidemic and a multidimensional approach for eradication of Measles from Pakistan.[9]In a local case control study, Zahidie A, et al determined the risk factors regarding guardian's practices associated with development of Measles and also find out effectiveness of Measles vaccine among children less than 12 years of age. They reported that cases were more likely to be never vaccinated [adjusted mOR: 10.1, 95% CI 4.5 - 22.5]. Authors also found that lower education status of mothers was the major determinant factor affecting the vaccination of their children.[10]In another recent study, Faneye AO, et al investigated measles infection in children between age 1-5 years and its association with the vaccination status. They enrolled a total of 234 children. Severe complicated measles was found in 66 children and out of those 37.9% (n=25/66) gave the documented history of vaccination and 62.1% (n=41/66) were never vaccinated. Authors concluded that severity of measles infection as significantly associated with vaccination status and the children who were never vaccinated had more severe infection (P<0.05).[11]
It has been reported that severity of measles infection and its complications are significantly associated with vaccination status of the child.[10,11] Present study will determine this association in our local population. This will help the physicians to triage the children presenting with measles who are never vaccinated. These children need special attention as there is high likelihood of developing severe disease along with associated complications. and mortality in our region.

Materials and Methods:

Study design:
Cross sectional study
Sample size:
Sample size was calculated by using WHO sample size calculator taking
Confidence Interval : 95%
Anticipated Population Proportion: 62.1%11
Absolute Precision Required: 8%
The sample size calculated came out to be 142 patients rounded to 145
Sample technique:
Non-probability consecutive Sampling Technique
Sample selection:
Inclusion criteria:
Children presenting with severe complicated measles as per operational definition
Both gender Age 3 to 12 years
Exclusion criteria:
Children with congenital anomalies
Children with history of tuberculosis
Diagnosed cases of poliomyelitis
Data collection procedure:
The study design was presented to the hospital ethics committee for permission and approval. Patients were taken from the indoor wards of pediatric department Women &Children Hospital, Bannu. A written informed consent was taken from the parent/guardian. All the patients who were fulfilling the inclusion criteria were enrolled for the study. Vaccination status was inquired from the parents and vaccination records were reviewed.
All the demographic data and experimental information was entered on the predesigned proforma by the researcher.
Data Analysis:

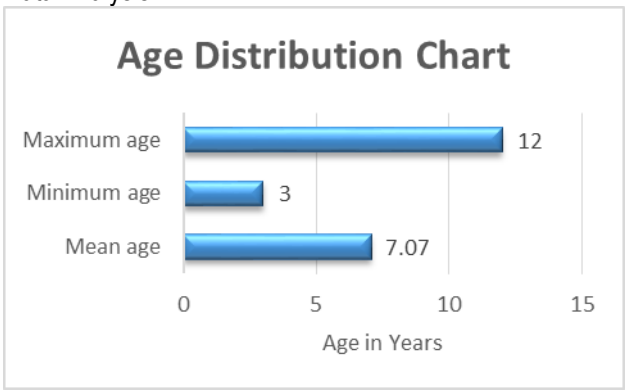

Figure 1: Age Distribution Chart

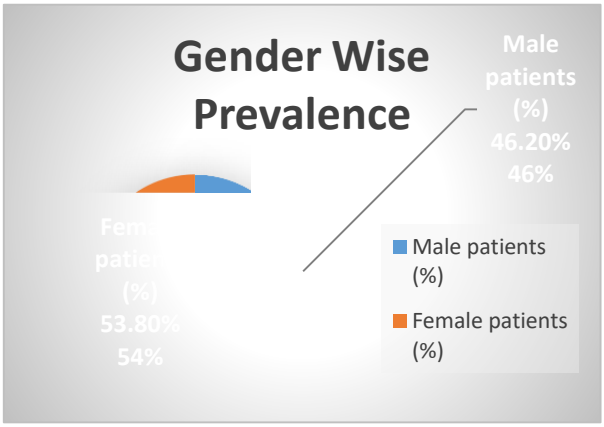

FIGURE 2: GENDER WISE PREVALENCE OF MEASLES

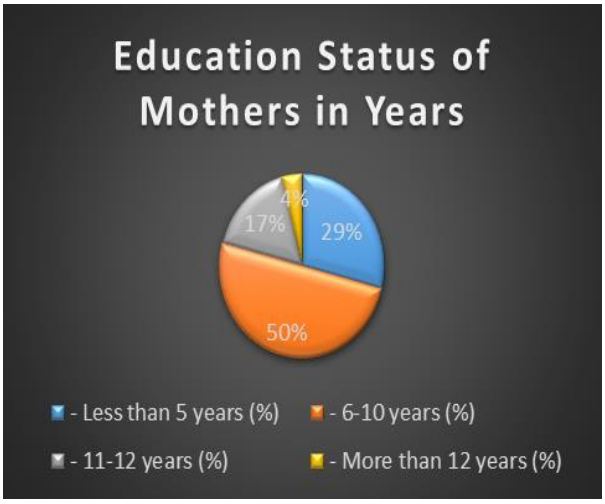

Figure 3: Education Status of Mothers in Years

Table 01: Residential status		
Area of Residence	Percentage	Number
- Urban (%)	47.6%	69
- Rural (%)	52.4%	76

Table: 02 Vaccination status		
	Percentage	Number
- Unvaccinated (%)	66.2%	96
- Vaccinated (%)	33.8%	49

Data was entered on computer software SPSS version 22. Quantitative variables like age, height, weight and was measured as mean ± SD. Frequencies and percentages were calculated for all qualitative variables like gender, socioeconomic status, maternal education status, residential status and vaccination status. Effect modifiers like age, gender, BMI, socioeconomic, maternal education and residential status were stratified. Post stratification chi-square test was applied and P-value ≤0.05 was considered as significant.

Results:

In our study total 145 patients were enrolled. Mean age of patients was 7.07±2.3 years. Minimum age was 3 years and maximum age was 12 years as shown in Figure:01. There were 46.2% males and 53.8% female patients as shown in figure-2. Most of patients belonged to middle socioeconomic status i.e. 57.2. Regarding maternal education 50% were having 6-10 years of education, 29% had less than 5 years of education, 17% had 11-12 years of education while only 4% had more than 12 years of education as show in Figure -3. In our study participants 47.6% lived in urban area and 52.4% lived in rural area as mentioned in Table-01. There were 66.2% unvaccinated children and 33.8% were vaccinated as mentioned in Table 02. Data stratification for age group, BMI, residential status and socioeconomic status was significant i.e. p-value≤ 0.05.

Discussion:

The findings of our study align with previous research conducted locally and internationally. In a study conducted in Pakistan, it was observed that measles cases were more prevalent among children who had never received vaccination, indicating a significant association between lack of vaccination and measles infection[8]. Similarly, another study in Pakistan highlighted the importance of vaccination, showing that only 29.9% of the sampled children were vaccinated with two doses of measles vaccine, underscoring the need for improved vaccination coverage[9].International studies also support our findings. For instance, research from Nigeria revealed measles virus infection occurring among both vaccinated and unvaccinated children, suggesting potential gaps in vaccine effectiveness or coverage [11.] Additionally, data from the GeoSentinel Global Network emphasized the ongoing risk of measles transmission to travelers, emphasizing the importance of measles control strategies on a global scale [2].

Furthermore, studies on measles incidence in Poland and Mariupol underscore the significance of vaccination in preventing measles outbreaks. The reported incidence of measles among unvaccinated populations in Poland was notably higher compared to vaccinated individuals, highlighting the protective effect of vaccination [10]. Similarly, in Mariupol, where measles diagnosis relied on clinical symptoms and serological testing, a substantial proportion of hospit

By contextualizing our findings within the broader body of research, we reinforce the importance of vaccination in mitigating the risk of severe measles infection, particularly among unvaccinated children.

Conclusion:

Severe measles infections are prevalent among unvaccinated children due to their susceptibility to complications such as pneumonia and encephalitis. Vaccination remains the most effective measure to prevent measles outbreaks and safeguard public health.

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