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Spectrum of Vaccine Preventable Diseases Amongst Children in Isolation Ward of Tertiary Care Hospitals

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Author`s Contribution

[1]Conception and design, [2.3]Acquisition,analysis, [4]interpretation of data, [5]Statistical analysis, Drafting, revision [4,6]Writing of manuscript

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ABSTRACT

Objective: To determine the spectrum of vaccine preventable diseases amongst children in pediatric medical unit of tertiary care hospitals and also determine its relationship with the vaccination status.

Methodology: It was a cross sectional study held at isolation ward of pediatric therapeutic division of The Children's Hospital and University of Child Health Sciences and Shaikh Zayed Hospital Lahore from December 2019 to November, 2020. We included children aged between 2 months to 16 years. After getting parental consent, precise history taken and examination done. Patients admitted with different vaccine preventable diseases analyzed. The collected data were analyzed using SPSS version 20, and the results were interpreted in percentages. The data were stratified into three age groups. To determine the significance, the chi-square test was applied, and a p-value less than 0.05 was considered statistically significant.

Results: One hundred and twenty patients were enrolled. Amongst them, 55.83% were male and 44.17 % were female. Amongst spectrum of diseases, most common was chicken pox 43(35.83%) followed by measles 32(26.6 %), tetanus 20 (16.6%), diphtheria 13(10.83 %), mumps 12 (10%).

Conclusion: Amongst diseases, chicken pox was the commonest one. Non-vaccination is the major reason that children are presenting with these potentially morbid diseases. Moreover, vaccine against varicella should be included in EPI Programme for our country.

Keywords: Chicken pox, vaccination status, vaccine preventable diseases, EPI.

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Introduction

Worldwide implementation of well-planned vaccination programs for infants and children has significantly reduced the morbidity and mortality of many infectious diseases. Vaccination coverage is the most significant indicator for the protection of people against vaccine-preventable diseases (VPDs).[1] The level of under-vaccination in Pakistan is alarming. Diseases that have been successfully eliminated through the aid of vaccination in other countries have not been eliminated in Pakistan.[2] Our neighbor country, China, has achieved 0.79 years increase in total life expectancy against 11 VPDs.[3] Under-vaccination is attributed to the poor healthcare, socio-demographic characteristics of the family and parents' knowledge, boldness and views about immunization.[4,5,6] Moreover, low literacy rate, belief in conspiracy theories, cultural and religious beliefs have made parents doubtful about vaccinations. This term is known as vaccine hesitancy.[7] In August 2015, WHO stated that vaccine hesitancy is an increasing challenge for the vaccination programs.[8-11] Factors leading to vaccine hesitancy can be divided into three categories: convenience, confidence and complacency as said by "Three Cs" model offered by a World Health Organization working group.[12]

Extended Immunization Program (EPI) of Pakistan has been vaccinating against 9 VPDs with a coverage rate of 40-80%. Over the recent years, this program has started immunizing against VPDs like rota virus diarrhea, typhoid fever, and rubella. However, this program is facing cultural and social barriers leading to spatiotemporal differences in coverage. [13] Performance of immunization program is assessed by completing third dose of diphtheria, pertussis, and tetanus whereas a child is labelled as fully vaccinated if he has received the Bacillus Calmette Guerin (BCG), oral polio vaccine third dose, pentavalent3 and measles.[1] There is scarce data about success of preventing these diseases in our population through immunization programs.

We are aiming to see the spectrum of various VPDs in our medical isolation ward to have an insight into the frequency of these diseases and see their relationship with vaccination status of the children. This will help us know about common VPDs and efficacy of vaccines to eliminate these diseases. Our study will play a great role in developing future vaccination policies.

Methodology

A cross-sectional study was conducted at the medical isolation ward of The Children's Hospital and University of Child Health Sciences, Lahore, and Sheikh Zayed Hospital, Lahore, from December 2019 to November 2020 after obtaining approval from the Institutional Review Board (Approval No: 2019-85-CHICH). A total of 120 patients were enrolled using a consecutive nonprobability sampling technique. Informed consent was obtained from the guardians, and a predesigned proforma comprising a brief medical history and a comprehensive clinical analysis, including vitals, systemic examination, and investigations, was filled out.

The study included children aged between 2 months and 16 years who were admitted to the isolation ward during the specified study period. Patients under 2 months of age were excluded from the study. Children who had received all doses of vaccines against diseases were classified as vaccinated, those with incomplete doses were considered partially vaccinated, and those who had not received any vaccines against diseases were categorized as unvaccinated.

Data were recorded in the proforma, and treatment was administered based on the underlying disease. Once patients showed clinical improvement, they were discharged from the medical ward. The collected data were analyzed using SPSS version 20, and the results were interpreted in percentages. The data were stratified into three age groups. To determine the significance, the chi-square test was applied, and a p-value less than 0.05 was considered statistically significant.

Results

Out of 120 patients, 55.83% were male and 44.17 % were female. As far as age distribution is concerned, it is shown in Figure 1.

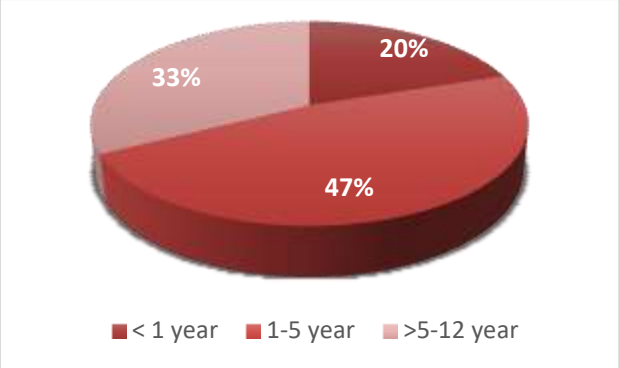

Figure 1. Age Distribution.

Amongst spectrum of diseases, most common was chicken pox 43(35.83%) followed by measles 32(26.6 %), tetanus 20 (16.6%), diphtheria 13(10.83 %), mumps 12 (10%). (Figure 2).

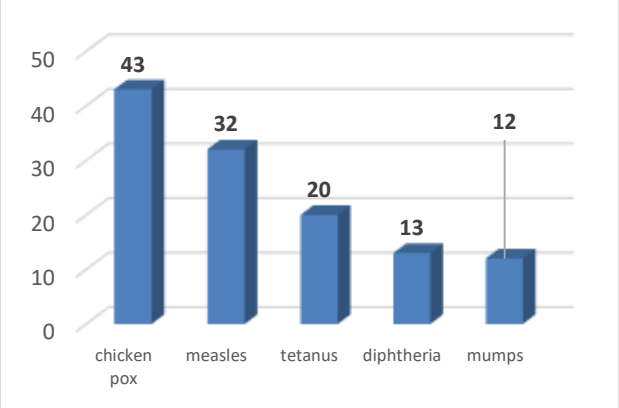

Figure 2. Frequency of spectrum of diseases.

These diseases were seen mostly in children between 1-5 years of age (Figure 3) and in patients who were unvaccinated or partially vaccinated with p-value of less than 0.05 which is important (Table I). About 18 (28%) cases were vaccinated, 35 (54%%) cases were unvaccinated and 12 (18%) were partially vaccinated. However, no child was vaccinated against Chicken Pox and Mumps as they are not covered by routine EPI schedule.

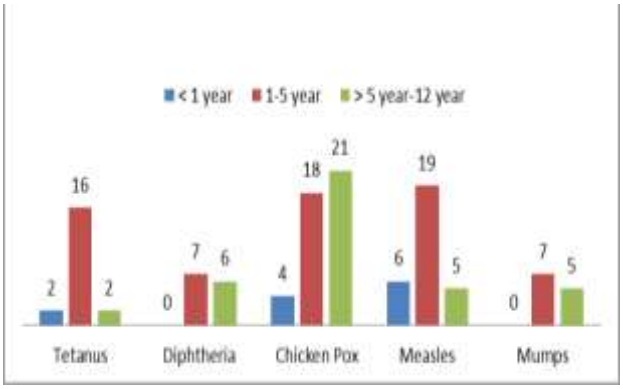

Figure 3. Relationship of Diseases with Age.

Table I: Relationship of diseases with vaccination status

Diseases	Vaccinated	Un vaccinated	Partially Vaccinated	P-Value
Tetanus	5	12	03	0.049
Measles	10	16	06	0.034
Diphtheria	03	07	03	0.04

Discussion

In current times, vaccination programs in high income countries has reduced vaccine-preventable diseases.[14] The expansion of vaccinations is deliberated as the greatest health action of present era. Vaccination is continued to improve the health of people in the whole world. In our country, the Extended Program of Immunization inoculates against nine contagious infectious diseases (i.e., measles, pertussis, tetanus, polio, diphtheria, disease caused by hepatitis B, hemophilic influenza B, rota virus and pneumococcal). It has recently expanded to cover typhoid and rubella. In this study, the most common disease was chicken pox (35.83%) followed by measles (26.6 %), tetanus (16.6%), diphtheria (10.83%), mumps (10%). Chickenpox is commonly a self-limiting and highly infectious disease in children. Complications include pneumonia, cerebellar ataxia, encephalitis, and orchitis. Measles is characterized by fever, coryza, cough and conjunctivitis. Pneumonia, encephalitis, otitis media, sclerosing, subacute, pan encephalitis and diarrhea, are the complications of the disease. In 2016, 89,780 deaths in children under age five were caused by measles around the world.[15] Worldwide measles vaccination analysis is currently at 85%, but 95% analysis is required to attain dismissal.[16] Pertussis is characterized by a higher respirational contamination, cough and fever and the problems include pneumonia and suppurative otitis media.[17] Tetanus is caused by Clostridium bacterium that breeds on the wound and produces poison with general neuromuscular effects. Diphtheria is severe upper respiratory illness and major complication of diphtheria is fatal acute respiratory obstruction.[18] In this study, these diseases were observed in 47 (72%) cases who were unvaccinated or partially vaccinated while 28% vaccinated patients were diseased. However, all children were unvaccinated against chicken pox and mumps as it is not covered by EPI schedule.

Although, developed countries have a high vaccination coverage but still different studies revelaed invasive Haemophilus influenzae type b disease,[19] varicella,[20] pneumococcal disease,[21] measles,[22] and pertussis[23] outbreaks associated with vaccine refusal. Nonmedical exclusions can contain spiritual exceptions.[24-26] We are standing far behind the world with poor vaccination coverage due to multiple reasons.

According to our study, chicken pox had the highest frequency amongst the vaccine preventable diseases. Our children are not routinely vaccinated against chicken pox. This study is an eye-opener for the policy makers to reduce the patient load of isolation wards by adding varicella vaccine to Extended Program of Immunization of Pakistan. Future studies with large sample size, covering all the major tertiary care hospitals should be conducted to know the spectrum of vaccine preventable diseases in our country and devise policies accordingly.

Conclusion

For the reduction of sickness and death cases in kids, vaccination still is most important preventive intervention. Amongst diseases, chicken pox was the commonest one. Non-Vaccination is the major reason that children are presenting with these potentially morbid diseases. Moreover, vaccine against varicella should be included in EPI for our country.

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