

Prevalence of Common Infectious Diseases in Paediatric Age Group Admitted in Children's Hospital Lahore, Pakistan

Muhammad Rashid^{1*}, Iqbal Bano², Asif Hanif¹

1. Gulab Devi Postgraduate Medical Institute, Lahore-54600, Pakistan
2. The Children's Hospital & The Institute of Child Health, Lahore-54600, Pakistan

*Corresponding author: muhammadrashiddm3@gmail.com

Abstract

Background: Infectious diseases are common causes of presenting in emergency having severe signs and symptoms. Having significant mortality and morbidity are on the rise in Pakistan. The objective of the study was to determine the prevalence of infectious diseases in paediatric population.

Methodology: We studied 200 consecutive patients from 1 month to 12 years of age presenting with infectious diseases. Their detailed history was then taken including symptoms at presentation and the type of infection was assessed with the help of history and laboratory investigations. Following are the common infectious diseases including pneumonia, meningitis, enteric fever, malaria, measles, tuberculosis, acute watery diarrhoea.

Results: Frequency wise infectious diseases are pneumonia (63.5%), meningitis (20%), acute watery diarrhoea (8.5%), enteric fever (4%), malaria (2%), tuberculosis (2%), and no measles case found. Infectious diseases are more common in rural areas than urban areas and success after treatment is more (49.5) than death (2%) but a bad impact is that (48.5%) patient went without treatment.

Conclusion: This data is taken in winter season that is why Pneumonia is most common infectious disease, second most common infectious disease is meningitis, and others are acute watery diarrhoea, enteric fever, malaria and tuberculosis in our patients. The awareness of risk factors amongst the public is low. Thus, there is an urgent need to create more and more awareness about the preventive aspects and healthier life style behaviour in our community.

Key Words: Infectious diseases, paediatric population

Introduction:

Infection remains the main cause of morbidity and mortality in humans, particularly in developing areas where it is associated with poverty and overcrowding. Although the prevalence of infectious diseases has reduced in the developing world because of increasing prosperity, immunization and antibiotic availability, antibiotic-resistant strains of microorganisms and diseases such as human

immunodeficiency virus (HIV) infection have emerged. (1)

WHO established the external Child Health Epidemiology Reference Group (CHERG) in 2001 to develop estimates of the proportion of deaths in children younger than age 5 years attributable to pneumonia, diarrhea, malaria, measles, and the major causes of death in the first 28 days of life. (2)

Enteric Fever is characterized by severe systemic illness with fever and abdominal pain. (3) Typhoid fever is more common in

children and young adults than in older patients. (4) Because a history of travel to settings in which sanitation is poor or with a known typhoid case or carrier is useful, although a specific contact is identified in a minority of cases. (5) Typhoid fever, the generalized infection of the spleen, liver, and bone marrow, gut-associated lymphoid tissue, and gall bladder, is the quintessential infectious disease associated with inadequate sanitation and lack of protected drinking water. (6)

Pneumonia is an important cause of morbidity in the developed world, and morbidity and mortality in the developing world. The terms pneumonia strictly represents any inflammatory condition involving the lungs, which include the visceral pleura, connective tissue, airways, alveoli, and vascular structures. (7)

Diarrhoea is defined as stool weight more than 200 grams per day. (8) Morbidity and mortality due to acute diarrhoea is significant even in the United States. Worldwide, diarrhoea remains one of the most common illnesses among children. In the United States, children < 5 years of age experience > 20 million episodes of diarrhoea each year, leading to several million doctor visits, 200,000 hospitalizations, and approximately 400 deaths. Much of this morbidity is due to the dehydration associated with acute watery diarrhoea. (9)

Meningitis is an inflammatory disease of the leptomeninges, the tissues surrounding the brain and spinal cord. The meninges consist of three parts: the pia, arachnoids, and Dura mater. Meningitis reflects inflammation of the arachnoids mater and the cerebrospinal fluid (CSF) in both the subarachnoid space and in the cerebral ventricles. (10)

Tuberculosis (TB): is a major, but often unrecognized, cause of disease and death in

young children from countries with high TB incidence rates among adults. (11)

Malaria is a serious disease of childhood, and it is estimated that in endemic areas 5-15 % of deaths in children are due to malaria. In highly endemic areas of malaria the first infection, if it occurs in the early months of life, is often mild, with few if any clinical symptoms. (12)

Measles An outbreak of measles (rubella) occurred in a city in north-eastern Ohio between January and June 1969, involving 14 children previously inoculated with live attenuated measles virus vaccine and 46 unvaccinated children. (13) The illness is characterized by a two to three day of fever and complaints of pain (head, muscle, and abdomen, or both muscle and abdomen) followed by the development of rashes. (14) Incidence of different infectious diseases is different in different age groups, area, and gender in the world. In this study we find out the incidence of infectious diseases in paediatrics in Pakistan. There is little work done so far regarding this in Pakistan and our study will contribute to a better understanding of incidence of infectious diseases in children. The objective of current study was to determine the prevalence of infectious diseases in paediatric population.

Materials and Methods:

Study Design: This study was cross sectional.

Sample Size: 200 patients with infectious diseases were included in the study.

Duration of Study: Study was completed in 3 months.

Study Settings: Study was conducted at Medical Unit II of The Children's Hospital and Institute of Child Health, Lahore.

Inclusion Criteria: Infectious diseases patients with age between 1 month and 12 year who were admitted in hospital.

Exclusion Criteria: Patients with age between 1 month and 12 years who were not registered at Children Hospital. Any foreigner patient and patients who were not diagnosed properly by clinical evaluation.

Sampling Technique: Non-probability (purposive) sampling was employed.

Data Collection Instrument: Data was collected by questionnaire.

Data Analysis: Data was analysed by SPSS of version 20.0.

Methodology: Because the study was non-invasive and did not touch the sensitive barriers of religion and social norms, so a formal ethical approval was not taken. A short-structured questionnaire was prepared, and patients were interviewed in the ward after taking verbal consent.

Statistical Analysis: Categorical data are presented as percentages and in forms of graphs while Descriptive and frequency distribution were used for quantitative data.

Results

Seven age groups were defined in study population. Frequencies of these age groups are described in table 1 while gender distribution in study population is described in table 2. Study population showed pneumonia as the most prevalent infectious disease in studied children while measles as the less prevalent. Frequency of all infectious diseases present in study population is described in table 3 and **Figure 1**. Frequency distribution of hospital stay of children with infectious diseases is presented in **Figure 2** with an average stay of 4 days. Rural and urban study population was as 54.5% and 45.5% as described in table 4. Outcomes of infectious diseases in children are described in table 5. 2% children of the study population were deceased due to acquired infectious disease.

Discussion

This study has some limitations: first, the sample size was small but even with this sample size can demonstrate the prevalence of infectious diseases in children that were observed in western countries using large sample sizes. Second, Pakistan is developing so the life style of peoples is poor; children mostly are malnourished, uneducated mothers, lack of resources. Most of the population lives in villages where ponds are frequently found, farming is common, drinking water resources are not good, sanitation system is poor, unavailability of medical centres etc. The condition of cities in Pakistan is also not satisfactory. Cities are overcrowded. Sanitation system is poor. Clean drinking water is not available. Lack of medical facilities due to overcrowded, smoke and dust is common.

The World Health Organization (2) estimates there are 156 million cases of pneumonia each year in children younger than five years, with as many as 20 million cases severe enough to require hospital admission. In the developed world, the annual incidence of pneumonia is estimated to be 33 per 10,000 in children younger than five years and 14.5 per 10,000 in children 0 to 16 years (15), while in current study results 63.5 total cases of pneumonia in which more than 20% below 6 months, about 10% in 1 year and less in above 1 year.

The incidence of bacterial meningitis in United States children varied with age (10): less than 2 months — 80.69 per 100,000 population, 2 through 23 months — 6.91 per 100,000 population, 2 through 10 years — 0.56 per 100,000 population, 11 through 17 years — 0.43 per 100,000 population while meningitis results (20%) in this study among which more common in age less than 6 months.

In a US study (6%) patient reported having an acute diarrheal illness. Rates of diarrheal illness were highest among children aged <5 years (16), this study reports (8.5%) diarrhoea patients and more common in age < 6 months. According to results of (17) six countries accounted for 80 percent of cases: Mexico, India, the Philippines, Pakistan, El Salvador, and Haiti (28, 25, 10, 8, 5, and 4 percent respectively) these results are close to current study as 4% of children have enteric fever.

It is estimated that there were 515 (range 300–660) million episodes of clinical malaria in 2002. These global estimates are up to 50% higher than those reported by the World Health Organization (2) and 200% higher for areas outside Africa, reflecting the WHO's reliance upon passive national reporting for these countries (18), in current study results (2%) malaria patients.

In a study 1261 cases were reported with tuberculosis, out of (20%) were white, (36%) were black, (13%) were Asian, (4%) were American, (28%) were Hispanic (19), in this study results (2%) cases of tuberculosis were reported.

Seven hundred and eight-four patients with measles admitted to the Institute of Child Health, Kabul (Afghanistan) between April 1980 and March 1982 were studied. Almost three-quarters (73.6%) of children (4 months to 12 years) with measles below the age of 3 years. The maximum number of cases occurred in the 1 to 2 years age group (43.1%). Eighty-nine patients (11.3%) contracted the disease before 1 year of age whereas only 13 infants had developed measles before the age of 7 months. Measles occurred throughout the year and there was no significant seasonal variation (20). In developed countries ≥90 percent of children acquired measles by age 15 (21). Following

implementation of routine childhood vaccination at age 12 to 15 months, the age of peak measles incidence during epidemics in the United States shifted to six months of age (22). But in current study there is no case of measles found due to seasonal variation. Developed regions account for 11.6% of the worldwide burden from all causes of death and disability, and account for 90.2% of health expenditure worldwide. Communicable, maternal, perinatal, and nutritional disorders explain 43.9% (23). In 2000–03, six causes accounted for 73% of the 10.6 million yearly deaths in children younger than age 5 years: pneumonia (19%), diarrhoea (18%), malaria (8%), neonatal pneumonia or sepsis (10%). Four communicable disease categories account for more than half (54%) of all child deaths (2), current study results (49.5%) patients successful after treatment, (2%) death and (48.5%) went without treatment, it may be lack of education, careless behaviour of medical staff, or overcrowded hospital setting which discourage the patients.

Conclusion

Infectious diseases are common causes of presenting in emergency having severe signs and symptoms. Having significant mortality and morbidity are on the rise in Pakistan. This data is taken in winter season that is why Pneumonia is most common infectious disease, second most common infectious disease is meningitis, and others are acute watery diarrhoea, enteric fever, malaria and tuberculosis in our patients. The awareness of risk factors amongst the public is low. Thus, there is an urgent need to create more and more awareness about the preventive aspects and healthier life style behaviour in our community.

References

1. Holgate ST, Arshad HS, Roberts GC, Howarth PH, Thurner P, Davies DE. A new look at the pathogenesis of asthma. *Clinical Science*. 2010;118(7):439-50.
2. Bryce J, Boschi-Pinto C, Shibuya K, Black RE, Group WCHER. WHO estimates of the causes of death in children. *The Lancet*. 2005;365(9465):1147-52.
3. House D, Wain J, Ho VA, Diep TS, Chinh NT, Bay PV, et al. Serology of typhoid fever in an area of endemicity and its relevance to diagnosis. *Journal of clinical microbiology*. 2001;39(3):1002-7.
4. Misra S, Diaz PS, Rowley AH. Characteristics of typhoid fever in children and adolescents in a major metropolitan area in the United States. *Clinical infectious diseases*. 1997;24(5):998-1000.
5. Lynch MF, Blanton EM, Bulens S, Polyak C, Vojdani J, Stevenson J, et al. Typhoid fever in the United States, 1999-2006. *Jama*. 2009;302(8):859-65.
6. Levine MM, Lepage P. Prevention of typhoid fever. *Hot Topics in Infection and Immunity in Children II*: Springer; 2005. p. 161-73.
7. Rudan I, Boschi-Pinto C, Biloglav Z, Mulholland K, Campbell H. Epidemiology and etiology of childhood pneumonia. *Bulletin of the world health organization*. 2008;86:408-16B.
8. Ho M-S, Glass RI, Pinsky PF, Anderson LJ. Rotavirus as a cause of diarrheal morbidity and mortality in the United States. *The Journal of infectious diseases*. 1988;158(5):1112-6.
9. Duggan C, Santosh M, Glass R. The management of acute diarrhea in children: oral rehydration, maintenance, and nutritional therapy. Centers for Disease Control and Prevention. *MMWR Recommendations and reports: Morbidity and mortality weekly report Recommendations and reports*. 1992;41(RR-16):1-20.
10. Thigpen MC, Whitney CG, Messonnier NE, Zell ER, Lynfield R, Hadler JL, et al. Bacterial meningitis in the United States, 1998-2007. *New England Journal of Medicine*. 2011;364(21):2016-25.
11. Marais BJ, Schaaf HS. Tuberculosis in children. *Cold Spring Harbor perspectives in medicine*. 2014:a017855.
12. Schumacher R-F, Spinelli E. Malaria in children. *Mediterranean journal of hematology and infectious diseases*. 2012;4(1).
13. Lerman SJ, Gold E. Measles in children previously vaccinated against measles. *JAMA*. 1971;216(8):1311-4.
14. Fulginiti VA, Eller JJ, Downie AW, Kempe CH. Altered reactivity to measles virus: atypical measles in children previously immunized with inactivated measles virus vaccines. *Jama*. 1967;202(12):1075-80.
15. Barson W, Kaplan S, Torchia M. Epidemiology, pathogenesis, and etiology of pneumonia in children. *Up to Date Versión*. 2008;15.
16. Imhoff B, Morse D, Shiferaw B, Hawkins M, Vugia D, Lance-Parker S, et al. Burden of self-reported acute diarrheal illness in FoodNet surveillance areas, 1998-1999. *Clinical Infectious Diseases*. 2004;38(Supplement_3):S219-S26.
17. Olsen S, Bleasdale S, Magnano A, Landrigan C, Holland B, Tauxe R, et al. Outbreaks of typhoid fever in the United States, 1960-99. *Epidemiology and infection*. 2003;130(1):13.
18. Snow RW, Guerra CA, Noor AM, Myint HY, Hay SI. The global distribution of clinical episodes of *Plasmodium falciparum* malaria. *Nature*. 2005;434(7030):214.
19. SNIDER JR DE, Rieder HL, Combs D, Bloch AB, Hayden CH, Smith MH. Tuberculosis in children. *The Pediatric infectious disease journal*. 1988;7(4):271-8.
20. Arya L, Taana I, Tahiri C, Saidali A, Singh M. Spectrum of complications of measles in Afghanistan: a study of 784 cases.

The Journal of tropical medicine and hygiene. 1987;90(3):117-22.

21. LANGMUIR AD. Medical importance of measles. American Journal of Diseases of Children. 1962;103(3):224-6.

22. Papania M, Baughman AL, Lee S, Cheek JE, Atkinson W, Redd SC, et al. Increased susceptibility to measles in infants in the United States. Pediatrics. 1999;104(5):e59-e.

23. Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. The lancet. 1997;349(9063):1436-42.

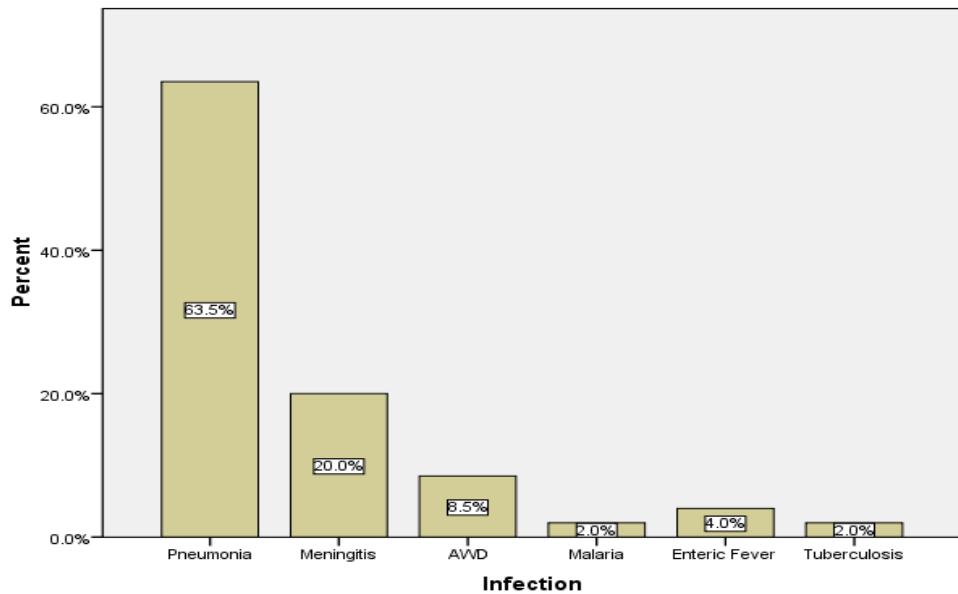


Figure 1. Prevalence of different infectious diseases in Children

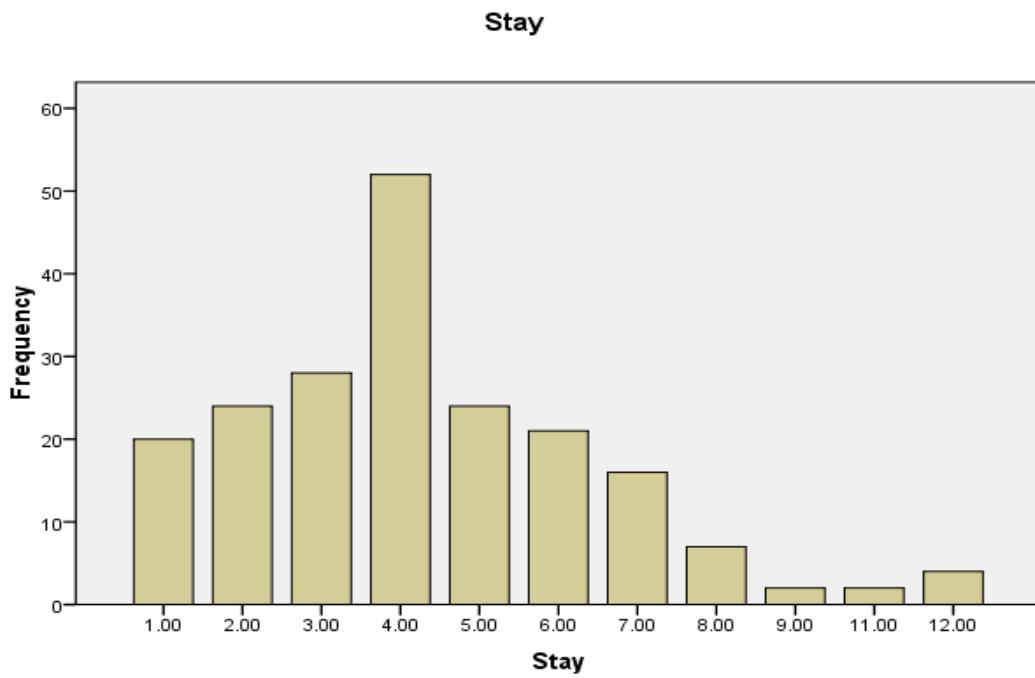


Figure 2. Frequency of Hospital Stay of Patients

Table 1. Descriptive Statistics of Study Population's age

Age in Months	Frequency	Percentage
1 – 3	85	42.5
3 – 6	57	28.5
6 – 12	24	12
12 – 24	13	6.5
24 – 60	9	4.5
60 – 120	8	4
120 – 144	4	2
Total	200	100

Table 2. Gender Distribution in Study Population

Gender	Frequency	Percentage
Male	124	62
Female	76	38
Total Number	200	100

Table 3. Frequency of Infectious Diseases in Study Population

Infectious Diseases	Frequency	Percentage
Pneumonia	127	63.5
Meningitis	40	20
Acute Watery Diarrhea	17	8.5
Malaria	4	2
Enteric Fever	8	4
Measles	0	0
Tuberculosis	4	2
Total Patients	200	100

Table 4. Distribution of infectious diseases in Urban and Rural Population

Area	Frequency	Percentage
Rural	109	54.5
Urban	91	45.5
Total	200	100

Table 5. Outcome of Infectious Diseases in Study Population

Outcome	Frequency	Percentage
Discharge	99	49.5
Death	4	2
Others	97	48.5
Total Patients	200	100

Supplementary File 1:**PERFORMA****“Prevalence of common infectious diseases in pediatric age group admitted in children’s hospital”**

Name: _____ MR# _____

Father Name: _____ Age: _____

Date of admission: _____ Gender: Male Female

Address: _____

➤ **Type of Infection:**

- Pneumonia
- Pyomeningitis
- Acute Watery Diarrhea
- Enteric Fever
- Tuberculosis
- Measles
- Malaria

➤ **Final outcome:** Discharged Expired Other**Date of discharge:** _____