Original Article

Factors for Infectious Diseases

Prevalent Risk Factors for Infectious Diseases in Children under 5 Years at a Tertiary Care Hospital in Karachi

Tehseen Iqbal[1], Muhammad Ahsan[1] and Naseem Ahmed[2]

ABSTRACT

Objective: Aim of the study was to determine the risk factors that leads to various infectious diseases (pneumonia, diarrhea, meningitis etc.) in young children at Civil Hospital Karachi. The study identifies the link between the infections and other factors like previous medical history, unhygienic conditions etc. and its impact on the health of under-five children.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at the Pediatrics Unit in Civil Hospital Karachi from March 2014 to August 2014.

Materials and Methods: A sample size of 384 was achieved. Patients of aged 6 months to 5 years with infectious diseases were randomly selected and their mothers were asked questions related to it in a local language. Data was analyzed on SPSS version 16.

Results: Pneumonia 115 (29.9%), Acute gastroenteritis 60 (15.6%) and meningitis/encephalitis 49 (12.7%) were most common diseases. 228 (59.4%) children were born premature, 234 (60.9%) had weight less than or equal to 2.5 kg. Only 74 (19.3%) of children were fully vaccinated. 239 (62.2%) had large family size with 222 (57.8%) claiming to have disease vectors present in their homes.

Conclusion: Prematurity, low birth weight, non-vaccination and poor living conditions around child is linked with occurrence of infectious disease in children under 5 in our scenario.

Key Words: Infectious diseases, pneumonia, meningitis, gastroenteritis

Citation of articles: Iqbal T, Ahsan M, Ahmed N. Prevalent Risk Factors for Infectious Diseases in Children under 5 Years at a Tertiary Care Hospital in Karachi. Med Forum 2018;29(4):15-19.

INTRODUCTION

In 2012, 6.6 million children died before reaching 5 years of their age with pneumonia, diarrhea and malaria being among the leading causes. 99% of these deaths were in low and middle income countries[1] and similar situation was there in 2013, in which Southern Asia constitutes about 25% of the under 5 mortality secondary to pneumonia, diarrhea and malaria[2]. In 2014, UNICEF ranked Pakistan On 26th among the countries with highest under five mortality rate and previously it shared half of total burden of these deaths globally along with few other countries[3,4].

Nearly 4 in every 10 deaths in low income countries are among children under 15 years and death due to infections comprises one third of the total in these countries[1]. Pneumonia solely had a mortality of 1.2 million children globally in 2011[4] 27% of mortality in children under 5 in Pakistan is due to those infectious diseases which can be prevented by immunization and other interventions[5,6]. 19.4 % million of infants worldwide did not have their routine vaccination and Pakistan was among those 10 countries where 60% of these infants live[7].

Weather changes, poor living conditions, presence of pets, inadequate ventilation, overcrowding, malnutrition and lack of vaccination are among major risk factors attributable to respiratory tract infections[8,9]. More than 17% of infectious diseases are vector borne with the most common known disease vectors being mosquitoes and flies[10]. Malnourished children are at more risk of getting infectious diseases and it leads to death in 45% infectious disease (ID) pediatric patients[11]. More than half of emerging infectious diseases are caused by zoonotic pathogens which are spread by poor handling of food and increase interaction between humans and animals[12].

Common practices that are seen in Pakistani rural areas like bottle feeding, early weaning are linked to diarrhea in these children[13]. Preventive measures include vaccination, adequate nutrition, exclusive breastfeeding and proper sanitation and hygiene[11]. Identification of most prevalent risk factors for infections is important and will help and guide to develop strategic measures to reduce its incidence and will help to reduce the

[1.] Department of Biochemistry / Pathology[2], Dow medical college, DUHS, Karachi.

Correspondence: Dr. Muhammad Ahsan, Assistant Professor of Biochemistry, Dow Medical College, Karachi.
Contact No: 0307-2472006
Email: muhammad.ahsan@duhs.edu.pk

Received: July, 2017; Accepted: December, 2017

mortality and morbidity associated with communicable diseases in Pakistan.

MATERIALS AND METHODS

This is a cross-sectional study conducted on children admitted to Civil Hospital Karachi to analyze the prevalence of most common infectious diseases in children with the age limit of 5 years but older than 6 month of age. Mothers of (these children who are suffering from infectious diseases are invited to participate in this research work with the assurance of their information to be kept exclusive.

Civil Hospital Karachi have three pediatrics unit. Each pediatric unit was covered for this study. The participants included the mothers of pediatric patients who were admitted in these pediatrics units in Civil Hospital Karachi due to any infectious diseases. A written consent was obtained from mothers of the children.

Inclusion Criteria: This study conducted under following parameters.

a) Pediatric wards of Civil Hospital Karachi would be covered to fill the questioners of this study.

b) Age restriction for children which is greater than 6 month but less than 5 years is mandatory.

c) Only mothers of the child who is a diagnosed case of any infectious disease will be interviewed.

Exclusion Criteria: The following points are avoided while conducting a study.

a) Children diagnosed with non-infectious diseases.

b) Attendant, Other than mother.

With Open EPI version 3.038 keeping prevalence of 50%. The margin error was kept 5% and confidence at 95%. The calculated sample size was 384. Sampling technique was non probability convenient sampling. Pediatric patients with infectious diseases admitted in CHK were randomly selected and their mothers were interviewed. Out of 384 mothers, 26 mothers were unwilling to participate in the research, therefore the cumulative response rate came out to be 93.2% to overcome this. We increased our sample size from 384 to 410.

The data for this research was collected using a survey questionnaire. Since the questionnaire was created using suitable questions modified from related research and individual questions formed by the researcher. 12 trial questionnaires other than sample size of 410 were filled to validate it. The questionnaire consists of 23 questions which were related to risk factors of infectious diseases in children. Mostly questions were in yes or no format. Participants were assured that their information will remain confidential and will only be used for research purposes. As mothers of the pediatric patients were interviewed and the information given was entered in questionnaire carefully by the researchers themselves, therefore no forms were incompletely or inappropriately filled.

RESULTS

Table no. 1 shows the biophysical parameters of pediatric patients. There were nearly equal percent of 188 (49%) male and 196 (51%) female pediatric patients suffered from infectious diseases and were admitted in hospital. Most commonly, 182(47.4 %) children of age group 6 months-12 months suffered from infectious disease and the second most common age group to be affected was 13 months-24 months 83 (21.6%).

Table No.I: Gender and age distribution of the study participants:

Demographic features of patients	Frequency (n:384)	%age
Gender of Patient		
Male	188	49
Female	196	51
Age of Patient:		
6 months- 12 months	182	47.4
13 months -24 months	83	21.6
24 months - 36 months	56	14.6
37 months - 48 months	29	7.6
49 months- 60 months	34	8.9

Table No. 2 showed that among the admitted patients most common diseases seen were pneumonia 115 (29.9 0/6), acute gastroenteritis 60 (15.6%), meningitis/ encephalitis 49 (12.7%)

Table No.2: Most common infectious diseases of the study participants:

Sr. No.	Most Common Diagnosed Cases	Frequency (n:384)	%age
1	Pneumonia	115	29.9
2	Acute Gastroenteritis	60	15.6
3	Meningitis/Encephalitis	49	12.7
4	Dengue/Malaria	47	12.2
5	Gastro enteric fever	23	5.9
6	(Typhoid)	16	4.1
7	Tuberculosis	11	2.8
8	Measles	10	2.6
9	Acute Respiratory tract	07	1.8
10	infection Urinary tract infections Hepatitis	05	1.3

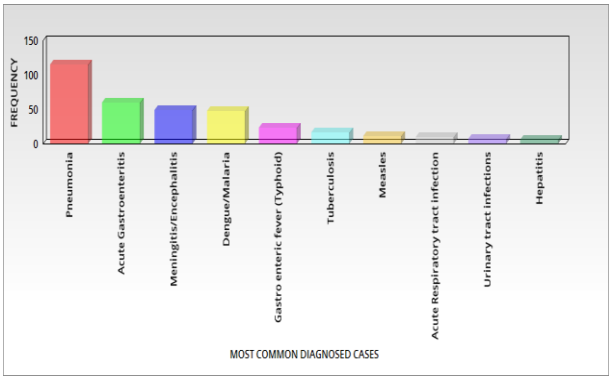

Figure No. 1: Most common infectious diseases of the study participants.

Information regarding past medical history of child is displayed in Table no. 3. 228 (59.4 %) were born premature, 234 (60.9%) were low for birth weight, 250 (65.1 %) were exclusively breastfed up to 6 months, 167 (43.5 %) were partially vaccinated 212 (55.2 %) had their weight appropriate for current age, 150 (39.1%) had chronic illness present along with current infectious disease, 131 (34.1%) had history of recent hospital admission, 116 (30.2 %) had recently travelled to another city 145.2 (37.8%) of mothers reported to had infectious disease history in family in previous 2 months.

Table No.3: Demographic data of past medical history of the children suffering from infectious diseases:

Medical history of patients	Frequency (n:384)	%age
premature at birth	59.4	40.6
Birth weight of less than or equal to 2.5	60.9	39.1
Exclusive breastfeeding for 5 months	34.9	65,1
Current weight of child appropriate for his age	55.2	44.8
Presence of any) associated chronic illness	39.1	60.9
History Of recent hospital admission	34.1	65.9
Recent travel history outside the city	30.2	69.8
History of any infectious disease in family in previous 2 months	37.8	62.2
Current vaccination status Of Child:		
Fully vaccinated		19.3
Partially vaccinated		43.5
Not at all		37.2

Figure No. 2: Was the child exclusively breastfed up to 6 months?

DISCUSSION

In Our study out of most common top 10 diseases, 5 diseases were vaccine preventable with pneumonia being leading cause of hospital admission in pediatric ward, followed by acute gastroenteritis and meningitis/encephalitis (Table 2 & figure 1). Similar finding was reported in annual report of Child health of Pakistan in which most common causes of mortality in age group of more than 1 month to 59 months are pneumonia (29%) and diarrhea (20%)[14.] Incidence of vaccine preventable diseases in our setup is a reflection of poor immunization coverage in Sindh province (29.1%) after Baluchistan (16.4%) as depicted in Pakistan Demographic Household Survey 2012-2013 15)[5]. Pneumococcal vaccination has been proven to be effective in reducing hospitalization

Secondary to community acquired pneumonia in children [(15)]. Majority of research patients were partially vaccinated that have missed vaccinations from their EPI vaccination schedule. (Table 3)

Premature Children are susceptible to acquire severe respiratory infections along with other risks [(16)]. 59.4% of children in Study population were born premature (Table 3). In our study there was a significant association between incidences of infectious diarrhea in under 5 years of children born with low birth weight[17]. Our research participants suffering from infectious disease were mostly had low birth weight that is less than or equal to 2.5 kg (Table nö, 3). Children living in overcrowded house were at risk to suffer from respiratory viral infections[16] and those living with family of greater than 7 members were more prone to experience diarrhea[17]. In Sindh average members per household is 6.13[18]. However 62.2% children in our research lived with more than 7 family members and therefore are at increased chance of getting infections. Large family size leads to overcrowding and this leads to easy transmission of various microbes. Mortality risks are higher in infectious disease patients with coexisting malnutrition. This is for respiratory infections, diarrhea and malaria[19]. In our data, majority were observed to have appropriate weight for their current age (Table 3).

There was reduction in infant infection when exclusive breast feeding continued up to 6 months[20]. Also, inadequate period of breastfeeding is linked to diarrhea and pneumonia[20,21]. In our study, most mothers were found to exclusively breastfed their child for period of less than 6 months. This is either due to lack of education, awareness or due to social stigma regarding breast feeding (Table 3).

Respiratory Tract Infections, Gastrointestinal Tract Infections and Urinary Tract Infections were found to be the most common nosocomial acquired infections in age group > 1 month and < year [(22)]. Most pediatric

patient of this study had a history of recent hospital admission (Table 3).

Being male is identified as a non-modifiable risk factor of acquiring infectious diseases and Infectious disease mortality among infants. This is explained on context that females have a strong immune system when compared to males, but in our study we failed to find any such findings as percentage of males and females pediatric patients were nearly equal (Table 1). In a study, it was found that in infections of different systems, 32% have underlying previous pathology like immunodeficiency that can be either primary or due to chronic illness[23]. However, only less than half of our research study had any previous chronic illness before hospital admission for current infection (Table 3).

Children of average age 4.4 years with recent travel history especially in South Asia were diagnosed with Salmonella typhi, pyogenic abscess and malaria more frequently. Travel history was negative in most of the patients of our study (Table 3).

CONCLUSION

Prematurity and low birth Weight are among the major risk factors for infectious diseases among children less than five years. Exclusive breastfeeding for up to 6 rnonths and recommended immunization have the potential to reduce the frequency of incidence of infectious diseases. The study concludes that improvement in room ventilation and sanitary conditions in and around house are important factors in the elimination of various pathogens culprit of infectious diseases. Knowing these factors that are prevalent in our setup will help in early diagnosis and it's timely management and indirectly will cause a decrement in mortality due to Infectious diseases.

Acknowledgements: We are very thankful to Aisha Aslam, Fizzah Arif, Bilal Abdul Haque Ahsen Niazi, Mutiba Haseeb Abbas Naviwaia, AmnaWiquar, Bushra Jawed, Khadija Pasha, Marium Aon Balagamwala, Sherbano Khan, Yusra Irfan, Ahmed Awan, Mumal Anwer, Yumna Shahid final year students of Dow medical College for their active and enthusiastic participation in the research.

Author's Contribution:

Concept & Design of Study:	Tehseen Iqbal
Drafting:	Tehseen Iqbal, Muhammad Ahsan
Data Analysis:	Muhammad Ahsan, Naseem Ahmed
Revisiting Critically:	Tehseen Iqbal, Muhammad Ahsan
Final Approval of version:	Tehseen Iqbal

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. World Health organization WHO Report, Major causes of death, updated on January 2017 (cited on 08 February 2017). http://www.who.int/media centre/factsheets/fs310/en/
2. UNICEF Report. Levels and trends in Child Mortality. 2014. (Cited on 08 February 2017). https://www.unicef.org/media/files/Levels_and_Trends_in_Child_Mortality_2014.pdf
3. UNICEF Report, The state of the world's Children 2014 In Numbers: Every Child Counts; Revealing disparities, advancing children's rights. 20 January. (Cited on 08 February 2017). https://www. unicef.org/publications/index_71829.html.
4. World Health Organization, WHO Report, Global Heath observatory Data 2000 to 2010. (Cited on 08 February 2017). http://www.who.int/gho/child_ health/mortality/mortality_causes_text/en/
5. Official website of The & Expanded Program on Immunization (EPI) of Pakistan. (Cited on 08 February 2017). http://epi.gov.pk/
6. Mehnaz A. State of children in Pakistan: confronting reality. J Pak Med Assoc 2011;61: 518-9.
7. World Health Organization, WHO Report, Immunization Coverage. Updated on September 2016. (Cited on 08 February 2017). http://www. who.int/mediacentre/factsheets/fs378/en/
8. Ramani VK, Pattankar J, Puttahonnappa SK. Acute Respiratory Infections among Under-Five Age Group Children at Urban Slums of Gulbarga City: A Longitudinal Study. J Clin Diagnos Res 2016; 10(5): LC08-LC13.
9. Islam F, Sarma R, Debroy A, Kar S, Pal R. Profiling Acute Respiratory Tract Infections in Children from Assam, India. J Glob Infect Dis 2013; 5:8-14.
10. World Health Organization WHO Report. Vector-borne diseases. February 2015. (Cited on 08 February 2017). http://www.who.int/mediacentre/ factsheets/fs387/en/
11. World Health Organization WHO Report, Children: reducing mortality. updated, on September 2016. (Cited on 08 February 2017). http://www.who.int/mediacentre/factsheets/fs 178/en/
12. Siddiqui SA. The challenge of emerging infectious diseases; high time for integrated global response. J Pak Med Assoc 2011;61(12):1165-7.
13. Aziz N, Rauf S, Ashraf M. Determinants of childhood diarrhea in a Pakistani village. J Fatima Jinnah Med Coll Lahore 2007;1(3-4):76-9.
14. World Health Organization. WHO Report. Pakistan-neonatal and child health profile. (Cited on 08 February 2017). http://www.who.int/

maternal_child_adolescent/epidimeology/profiles/neonatal_child.pak.pdf

15. Sterky E, Bennet R, Lindstrand A, Eriksson M, Nilsson A. The impact of pneumococcal conjugate vaccine on community acquired pneumonia hospitalization in children with comorbidity. Eur J Pediatr 2017;176(3):337–342 .
16. Bulkow LR, Singleton RJ, Karron RA, Harrison LH. Risk factors for severe respiratory syncytial virus infection among Alaska Native children. Pediatr 2002;109 (2 I):210-216.
17. Oloruntoba EO, Folarin TB, Ayede AI. Hygiene and sanitation risk factors of diarrhoeal disease among under-five children in Ibadan, Nigeria. Afr Health Sci 2014;14:1001–1011.
18. Official website of Pakistan bureau of Statistics. Government of Pakistan. (Cited on 8 February 2017). Available from http://www.pbs.gov.pk/
19. Rice AL. Sacco L, Hyder A, Black RE. Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries. Bulletin of the world Health organization 2000;78(10):1207-1221.
20. Quigley MA, Carson C, Sacker A, Kelly Y. Exclusive breastfeeding duration and infant infection. Eur J Clin Nutr 2016;70: 1420–1427.
21. Ujunwa Ezeonu C. Risk factors for acute respiratory tract infections in under-five children in Enugu southeast Nigeria. Ann Med Health Sci Res 2014;4(1):95-9..
22. Rahuma N; Ghenghesh KS; Ben Aissa R; Elamaari A. Carriage by the housefly (Musca domestica) of multiple-antibiotic-resistant bacteria that are potentially pathogenic to humans, in hospital and other urban environments in Misurata, Libya. Ann Trop Med Parasitol 2005;99(8):795-802.
23. Pourakbari B, Rezaizadeh G, Mahmoudi S, et al. Epidemiology of nosocomial infections in pediatric patients in an Iranian referral hospital. J Prev Med Hyg 2012;53:204–204.