Original Article

Infectious Diseases in hospitalized Children of Central Iran

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ABSTRACT

Objective: Despite dramatic progress in their treatment and prevention, infectious diseases remain a major cause of death and debility around the world. We planned this study to determine the epidemiologic features of infectious diseases in children (0 to 12 years) admitted to the Fatemieh Hospital in Qom, Central Iran.

Methodology: In this retrospective descriptive study the data were collected from medical records of 892 patients with infectious diseases admitted to the Fatemieh Hospital in Qom during summer 2007 (22 June through 22 September). The epidemiologic features were analyzed using SPSS software.

Results: Eight hundred ninety two out of 2105 (42%) admitted cases to the Fatemieh Hospital during summer 2007 (22 June through 22 September) were infectious diseases. The most frequent infections were gastroenteritis, pneumonia and urinary tract infection; 57.6%, 11% and 7.1%, respectively. Mortality rate of infectious diseases was 0.3%.

Conclusion: This study confirms the continuing importance of pediatric infectious diseases in central Iran especially gastroenteritis and pneumonia. Improvement of hygienic conditions of water supply and routine use of pneumococcal and Haemophilus influenzae vaccines are suggested.

KEY WORDS: Infectious Diseases, Hospitalized children.

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INTRODUCTION

Despite decades of dramatic progress in their treatment and prevention, infectious diseases remain a major cause of death and debility and are responsible for worsening the living conditions of many millions of people around the world.[1]

Of the estimated 54 million deaths world-wide in 1998, about one fourth to one –third was due to infectious diseases, most of them in developing countries and among children globally.[2] Child mortality continues to be a public health priority worldwide.[3] An estimated 10.5 million younger than the age of 5 years died in the year 2002 from largely preventable diseases, such as infectious, parasitic and perinatal causes.[4] Pneumonia and diarrhoea are the diseases that most often associated with child deaths.[5]

Acute respiratory infections continue to be the leading cause of acute illnesses worldwide and remain the most important cause of infant and young

children mortality.[6] Most cases of pneumonia occur in India (43 million), China (21 million) and Pakistan (10 million), with additional high numbers in Bangladesh, Indonesia and Nigeria (6 million each).[7] Infectious diarrhoea is a leading cause of morbidity and mortality worldwide.[8] Control of paediatric diarrhoeal disease would lead to considerable healthcare cost savings in all countries.[9]

Infectious disease epidemiology supports prevention and better understanding of child health. Epidemiology could contribute to more effective approaches to saving children's lives.[5,10]

Little is known about the epidemiology of pediatric infectious diseases in Iran. As Qom is a multinational province in central Iran that hosts many pilgrims from other parts of Iran and neighbouring countries especially in summer, we planned this study to determine the epidemiological features of infectious diseases in children aged 0 to 12 years admitted with infectious diseases at the Fatemieh Children Hospital in Qom in summer 2007 (22 June through 22 September).

METHODOLOGY

This study was conducted retrospectively at the Fatemieh children hospital in Qom, Iran during summer 2007 (22 June through 22 September). The Fatemieh Children Hospital is main paediatric referral hospital in Qom. Qom has a population of approximately one million. The study population included 892 patients, comprising all infants and children (0 to 12 years old) admitted to Fatemieh Children Hospital with infectious diseases during summer 2007 (22 June through 22 September). Classification of infectious diseases was done according to the World Health Organization international classification of diseases.[11]

The medical records of the patients were reviewed and a questionnaire was used to obtain information about age, gender, district of patient's residence, final diagnosis, incidence of death and length of hospital stay. For patients who were residents of Qom four districts (1 to 4) were considered according to urban classification.

The systems involved included urogenital tract, central nervous system, digestive tract, skin and osteoarticular system, respiratory tract and miscellaneous group according to final diagnosis. Miscellaneous group included brucellosis, peritonitis, septicemia and viral infections. Statistical analyses were performed using SPSS software (Version 11.5) and chi-square test.

RESULTS

Two thousand one hundred five (2105) patients were admitted to Fatemieh Children Hospital and among them 892 patients (42%) were hospitalized with final diagnosis of infectious diseases during summer 2007 (22 June through 22 September). The mean age of the patients with infectious diseases was 2.29 years (range, 7 days-12 years). Four hundred seventy nine (53.7%) patients with infectious diseases were males. Total hospitalizations were 2209 days with a mean age of 2.47 days (range 1-23 days). Mortality rate of infectious diseases was 0.3% (three patients) that was due to pneumonia, shigellosis and whooping cough. The most frequent infectious diseases were gastroenteritis (57.6%), pneumonia (11%) and urinary tract infection (7.1%), respectively. Characteristics of patients with these three diseases are presented in Table-I.

Fourteen neonates (0 day to 28 days) were admitted with UTI (5 cases), pneumonia(four cases), pyoderma(one case), cellulitis (one case), septicemia(one case), viral intestinal infection(one case) and bacterial intestinal infection(1 case) during the study period. Neonatal age group (0 day to 28 days) had the lowest frequency among different age groups.

No-significant difference was observed between males and females in frequency of gastroenteritis (p=0.22). There was a significant difference between males and females in frequency of pneumonia and urinary tract infection (p=0.02 and p<0.001, respectively).A significant difference in frequency of

Table-I: Characteristics of admitted patients with gastroenteritis, pneumonia and UTI *at the Fatemieh Hospital, Qom, Iran (Summer 2007).

Diagnosis Variable	Gastroenteritis	Pneumonia	UTI *
Age group			
0 day to 28 days	0(0%)	4(4%)	5(8%)
29 days to less than 1 year	193(37.5%)	65(66.3%)	34(54%)
1 year to less than 4 years	235(45.7%)	24(24.5%)	15(23.8%)
4 to less than 9 years	72 (14%)	4 (4%)	8 (12.7%)
9 years and more	14 (2.7%)	1 (1%)	1 (1.5%)
Gender			
Male	285 (55.4%)	63 (64.3%)	16(25.3%)
Female	229 (44.6%)	35 (35.7%)	47 (74.7%)
Mean admission duration (Day)	1.69±	5.17 ±	3.72±2.06
± SD	1.21	4.22	

* UTI: urinary tract infection

gastroenteritis, pneumonia and urinary tract infection was observed among different age groups (p=0.001, p < 0.001 and p=0.002, respectively).

The most common systems involved were digestive tract (71.3%), respiratory tract (15.7%), urogenital tract (7.1%), Miscellaneous (3.4%), central nervous system (1.7%) and skin (0.9%), respectively. The most common intestinal protozoan infections were Amoebiasis (1.8%) and Giardiasis (0.4%), respectively.

The frequency of infectious diseases varied widely among the four districts of Qom. The highest frequency was observed in the District two (36%) and the lowest in the District four (10.9%). Sixty five cases were residents of other cities of Iran and 9 cases were pilgrims of neighboring countries including Iraq (one gastroenteritis, one UTI, one upper respiratory tract infection and one pneumonia) Bahrain (two gastroenteritis), Saudi Arabia (two gastroenteritis) and Pakistan (one gastroenteritis).

DISCUSSION

In this study, 42% of total hospitalizations were due to infectious diseases whereas Najib et al has reported the rate 21.3% in southern Iran.[12]

In our study, gastroenteritis was more frequent than pneumonia whereas pneumonia was more frequent than gastroenteritis in Najib et al's study in southern Iran.[12] We think it is due to seasonal difference in two studies because our study was done in summer but Najib et al's study has been done in the whole year including autumn and winter. Lower respiratory viral infections are much more common in the fall and winter.[13] On the other hands, high rates of gastroenteritis in our study may be due to unhygienic conditions of Qom water supply. Acute gastroenteritis is a major global problem, particularly in infants and children less than four years of age living in developing countries.[14] The incidence of acute diarrhoeal diseases has not decreased in Iran during the recent decade.[15]

In the present study, more than one half of infectious diseases hospitalizations were due to gastroenteritis and most cases were between one year and four years of age. Gouvea et al reported that children in the 12 to 35- month old group account for the highest proportion of acute gastroenteritis admissions which is in agreement with our study.[14] Barnes et al reported from Australia that the majority of children admitted with acute gastroenteritis are aged<24 months.[9] In the present study, there was no significant difference between males and females in

frequency of gastroenteritis that is similar to results reported by Kolahi et al. In children less than five years of age from Tehran.[15] In our study, the mean admission duration of gastroenteritis was 2.69 days whereas in kurugol et al's study in Turkey it has been 5.5 days for rotavirus gastroenteritis and 3.3 days for non-rotavirus gastroenteritis.[16] Community- acquired pneumonia is a common and potentially serious infection that afflicts children throughout the world. In the developing world, pneumonia is not only more common than it is in Europe and North America; it is also more severe and is the largest killer of children.[17] We found that the most frequent age group among pneumonia cases is less than four years old (95%). Michelow et al found that the most frequent age groups among pneumonia patients are six months to <2years and $\geq$ 5 years, each 31%.[18] As streptococcus pneumonia and Haemophilus Influenzae type b are two important pathogens of pneumonia in the four months to four years age group[17] and we don't use pneumococcal and Haemophilus Influenzae Vaccines routinely in Iran, children aged less than four years were the most frequent suffered in our study. In this study, pneumonia was more frequent in males than females which are in agreement with other studies.[18,19] We observed that the mean admission duration of pneumonia was 5.17 days. The same results were reported by Michelow et al. in the United States.[18] Neonates and infants are at higher risk for UTI, which coincides with their incompletely developed immunity.[20]

We found that the majority of UTI patients were in the 29 days to one year age group that is similar to results reported by Wu Cy et al from Taiwan.[21] In our study, prevalence of UTI was 7.1%. This rate reported 9% in febrile children in Tehran (Capital of Iran) and Nigeria.[22,23] Shaw et al reported that overall prevalence of UTI in febrile young children in the emergency department was 3.3%.[24] Prevalence rates of UTI varied by age, gender, race and circumcision status.[25] In present study, frequency of UTI was more in females than males that is similar to those reported by other researchers from Tehran and Nigeria.[22,23] It is contrary to the results reported by Wu CY et al from Taiwan.[21] Circumcision decreases the risk of UTI[26] as it is a religious duty in Iran. UTI is therefore less frequent in males than females in our study.

In our study, prevalence of Amoebiasis was more than Giardiasis that is contrary to those reported by other researchers.[27,28] The highest frequency of

infectious diseases was in the district two of Qom. Apparently, it is due to low socio- economic level and crowdedness of this district.

CONCLUSION

This study confirms the continuing importance of paediatric infectious diseases in central Iran particularly gastroenteritis, pneumonia and urinary tract infection. More studies are needed about etiology of these diseases to prevent them more effectively. In addition, improvement of hygienic conditions of Qom water supply is needed to decrease gastroenteritis and Amoebiasis. Routine use of pneumococcal and Haemophilus Influenzae Vaccines is also suggested.

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Authors Contributions:

1) Habibi HA contributed to design, collected data and drafted the manuscript.
2) Riahin A contributed to design, reviewed data and edited the manuscript.
3) Heidari A conducted statistical analysis and reviewed the manuscript.
4) Mahjourian F supervised whole study and edited the manuscript.