Original Article

Disease Profile and Death Pattern among the Children Admitted in Rajshahi Medical College Hospital

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Abstract

Background: Rajshahi medical college hospital is a tertiary care teaching and referral center in the North-West part of Bangladesh. To assess the epidemiological trend in hospital admission, including morbidity and mortality pattern of illness in the pediatric population, it needs to develop effective health care planning, appropriate resource allocation, and integration of existing health care service facilities.

Objective: To evaluate the diseases and deaths of children admitted in the department of pediatrics, Rajshahi medical college hospital, Rajshahi.

Materials and methods: This is a retrospective study. The collected case records of all patients admitted in the department of pediatrics from 1st January 2017 to 31st December 2019 (3 years) were analyzed.

Result: A total of 62000 children were admitted during the mentioned study period. All the patients were distributed into three age groups infant, under five, and more than five, contributing 22%, 27.5%, and 19%, respectively. Acute watery diarrhea (21%), hereditary hemolytic anemia (18%), bronchopneumonia (10.4%), acute gastritis (9.4%), and acute bronchiolitis and wheezy child (7.17%) were the top five diseases in each of the three years of admission. Among the total admitted patients, 1003 (1.61%) patients died. Infant, under five, and more than five age groups constitute 61.3%, 28.1%, and 15.1%, respectively. Encephalitis and fulminant hepatic failure found the top two diseases causing death with a case fatality rate was 61% and 43%, respectively. The next highest case fatality rate was found in acute leukemia *(15%)*. Other common causes of death include meningitis, cerebral palsy with complications (7.5%), bronchopneumonia with complications (3.8%).

Conclusion: An admission-related comprehensive evaluation of this study will help to understand the diseases and death patterns of a hospital, leading to the development of more effective planning and case management strategies.

Keywords: Disease, epidemiology, mortality, morbidity and fatality, Rajshahi Medical College Hospital (RMCH).

Introduction

Rajshahi Medical College is one of the largest tertiary health care centers in the Northern districts of Bangladesh. It covers directly five districts and extended three districts. Analysis of child admissions and deaths in the hospital should

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therefore give a better evaluation of patients covering services of these regions.

Obtaining data from hospital pediatric admissions and review of morbidity and mortality in medical institutions reflects the health situation of covering areas people.[1] Such understanding of epidemiological trends in hospital admissions is critical for health care planning and appropriate resource allocation.[2,3] During the last decade, Bangladesh has made significant improvements in achieving Millennium Development Goals (MDG) to reduce child mortality and is now in the sustainable phase. According to UNICEF data 2019, per thousand live births, the under-five mortality rate in Bangladesh was 30, infant mortality 25, and neonatal mortality rate 17.[4]

Bangladesh is an overpopulated country. Total 161376708of which age structures of 0-14 years constitute one-fourth of the total population (43508819) and M: F was 1.04, with overburdened health care services. Physician's density is 0.53/1000 and hospital bed density 0.8/1000 people Bangladesh Demographic Health Survey (BDHS)/19. Child health in Bangladesh has faced significant challenges largely as a result of poverty, overburdened health care services related to the huge pediatric population. Pneumonia, diarrhea, measles, malaria, malnutrition, injuries, drowning, and the high number of neonatal deaths and poor healthcare-seeking behavior all contribute to high child mortality levels of child mortality.[5] The types of pediatric patients requiring hospitalization may be changing. Healthy children with acute illnesses are more often require hospitalization than children with common chronic conditions.[6]

Materials and Methods

This was a retrospective observational study carried out in the department of pediatrics at Rajshahi Medical College Hospital over a period of three years from 1st January 2017 to 31st December 2019. The sample size was 62000 children who were admitted during the mentioned period aged from >28 days to 13 years (Upper limit for pediatric ward admission). All the patients with admission age >28 days to 13 years were included. Neonate (up to 28 days of birth), Patients who left the hospital with request bond and unnoticed (absconded) or were transferred to other disciplines, and Patients with inadequate clinical records were excluded in this study. The details of each case were taken from the patient's case records, e.g., register, patients file records, death certificates, etc., including age, gender, month-wise admission, locality, and provisional diagnosis. The final diagnosis was based on the clinical and laboratory investigations correlated by individual units and death reviews. The data were analyzed using descriptive statistics. Group comparison was made by Chi sq test, and level of significance was set at 0.05.

Results

The total number of patients was 62000and 1003 deaths shown 1.6% case fatality during the study period. There is a gradual rising in the number of patients from January 2017 to December 2019, and the number of deaths remained almost the same in all three years though a slight decrement was observed in 2018. The average male-female ratio on admission was 1:0.95, which is closed to BDHS/19 data of the general pediatric population under 14 years (1.04). This gender distribution means both males & females were equally affected.
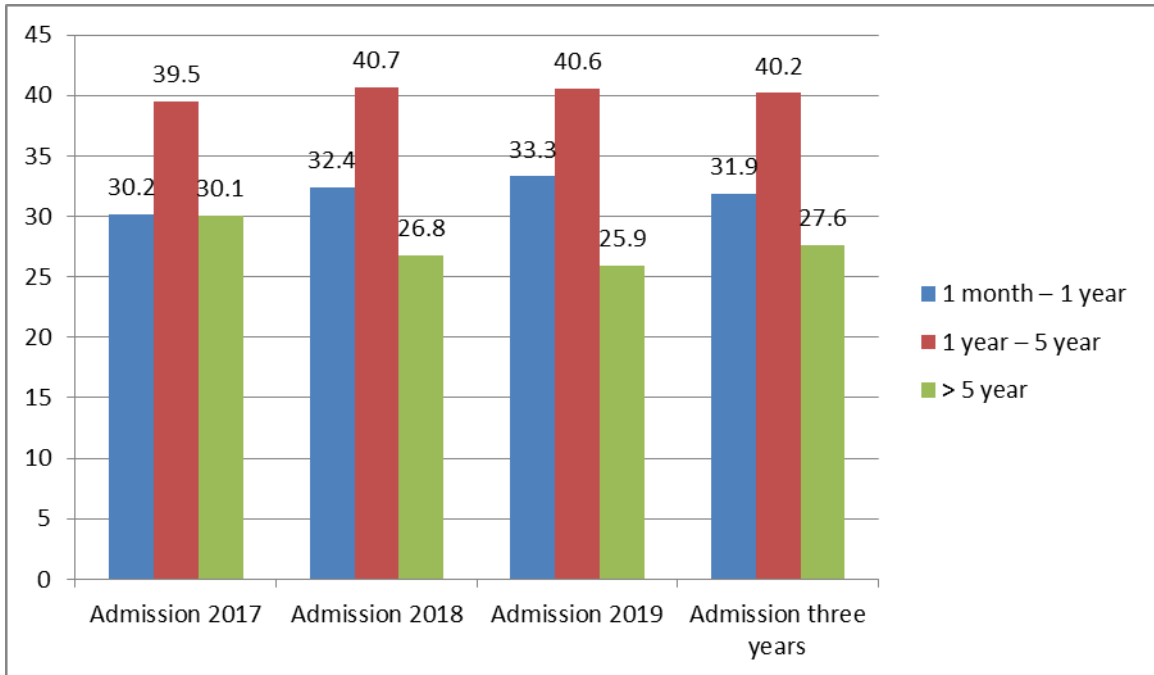
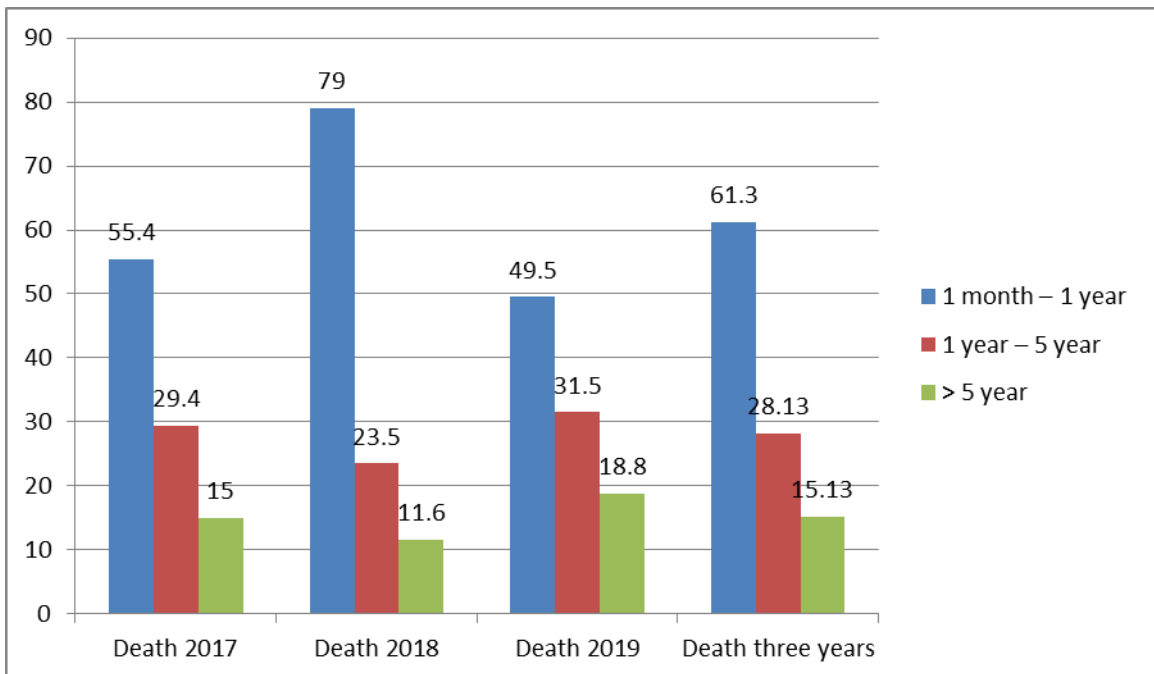Fig-1: Percentage of the admitted patient in different year

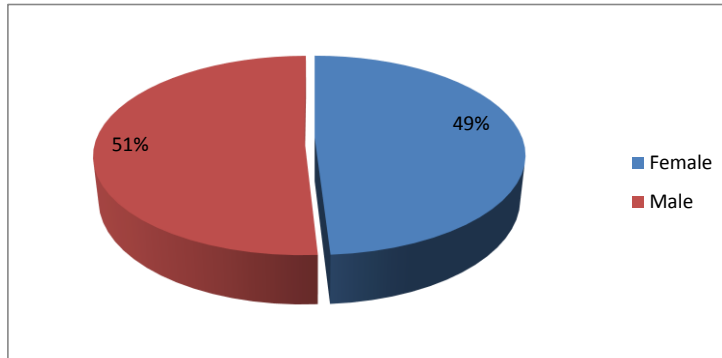Fig-2: Percentage of death of the patient in different year

Fig-3: Sex distribution of patients

The total admitted patients were segregated into three age groups. Age and year-wise distributions of patients in admission and death were shown in Fig.1 and 2. Fig.3 shows the sex distribution of patients. The male-female ratio was 51:49. Infants, children from 1-5 years of age and >5 years have represented 31.9%, 40.2%, and 27.6%, respectively. Among the death cases, three groups represented 56.03%, 28.51%, and 15.45%, respectively. So, total under-five mortality was found 33.3% in this study. The most frequent 12 diseases from admission are shown in Fig.4, and the top 10 diseases causing deaths are shown in table 1. Among the admission cases (Acute Watery Diarrhea (AWD) (20.8%), Thalassemia (17.8%), Bronchopneumonia (10.4%), Acute gastritis (9.4%), Acute Bronchiolitis(7.1%) took in the first five positions in each of the three years. They accounted for 66% of total admission in the study period. There was a varied frequency of distributions in both admission and death of other diseases.
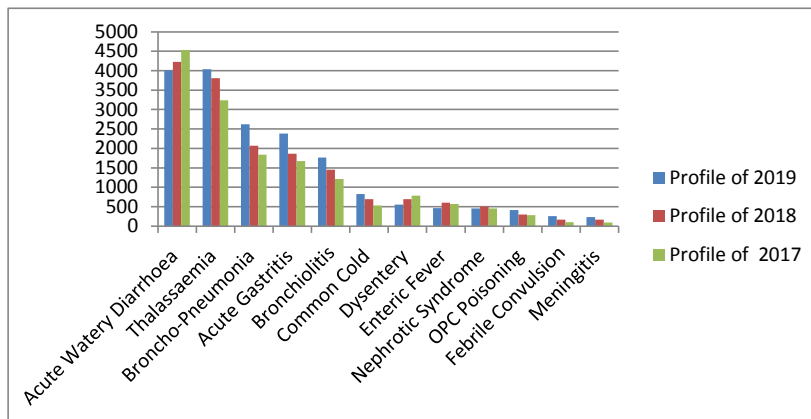

Fig-4: Diseases profile of study patients

Seasonal variations were seen in some of the diseases like Bronchopneumonia, Bronchiolitis, Asthma, and AWD, having two peaks in a year. Respiratory illnesses were more in February to April and in September to November period. AWD (Acute Watery Diarrhea) also presented with two peaks, one in February to March and another in October to December.

Encephalitis and acute leukemia were responsible for only 0.54% and 1% of total patients, but the case fatality rate was 61% and 15%, respectively, in this study. They were found as common two causes of death in all the three years profile. In this study highest case fatality rate was found in encephalitis (61%) though considering the cause of death, it represented <17% of total deaths. We also observed that 1.2% of the total admitted patients died within the first 24 hours of admission.

Diseases	Profile of 2017 Total Admission: 18658 Total Death: 339			Profile of 2018 Total Admission: 20178 Total Death: 293			Profile of 2019 Total Admission: 23164 Total Death: 371			Three Years Total Death (N= 1003)
	Total Admission of a Disease	Total Death from that disease (% of total death)	Case fatality rate (%)	Total Admission of a Disease	Total Death from that disease (% of total death)	Case fatality rate (%)	Total Admission of a Disease	Total Death from that disease (% of total death)	Case fatality rate (%)	Total No of Death of a disease (Mean case fatality rate)
Broncho-pneumonia with complications	1835	55 (16%)	3%	2065	72 (24%)	3.5%	2617	134 (36%)	5%	261 (3.8%)
En Encephalitis	61	35 (10%)	58%	90	54 (18%)	60%	124	82 (22%)	66%	171 (61%)
Meningitis	90	13 (4%)	14%	164	29 (10%)	18%	231	26 (7%)	11%	68 (14%)
D Different types of heart co diseases with complications	588	64 (19%)	11%	524	41 (14%)	8%	486	18 (4.8%)	3.7%	123 (7.5%)
Ac Acute leukemia	152	27 (8%)	18%	198	41 (14%)	21%	254	16 (4.3%)	6.2%	84 (15%)
Po Poisoning (Different types)	585	18 (5%)	3%	605	12 (4%)	2%	764	12 (3.2%)	1.5%	41 (2%)
Br Bronchiolitis with complications	1215	12 (3.5%)	1%	1452	13 (4%)	0.8%	1766	12 (3.2%)	0.67%	37 (0.82%)
CP with complications	38	3 (0.7%)	7%	46	4 (1.2%)	8%	41	4 (1%)	10%	11 (8.3%)
Fu Fulminant Hepatic Failure	7	4 (1%)	56 %	11	5 (1.5%)	42%	9	3 (0.8%)	33%	12 (43%)
Nephrotic syndrome with complications	456	4 (1%)	0.8%	502	2 (0.8%)	0.5%	458	3 (0.8%)	0.65%	9 (0.65%)

Table-1: Most common diseases found among the total death cases (Arranged as per the number of deaths)

Discussion

There were gradual increases in admission observed over the three years. All the patients were distributed into three age groups. Infant, under five and more than five years which comprise 31.9%, 40.2%, and 27.6% respectively. The majority of the patients fall in the under-five age group, which is also found in Benin, Abuja, and rural India studies.[2,7,8,9,10] Susceptibility to infection in this age group is maybe due to incomplete immunization, feeding, and dietary problem leading to the development of poor immunity.

The male-female ratio was 1:0.96, and boys were a bit more affected (51%)than girls (49%) in this study. Male preponderance was also found in other studies in Nigeria.[1,2] This could be due to education and a change of mentality in gender discrimination. Of the total admissions, two-thirds (66%) accounted for the top five common diseases like AWD (20.8%), Thalassemia (17.8%), Bronchopneumonia (10.4%), Acute gastritis (9.4%), Acute Bronchiolitis and wheezy child (7.1%). This scenario is a bit different from other studies in this country. The altered proportion of these top diseases.[11,12] But totally different from other countries like Nepal.[13,14] Hereditary hemolytic anemia contributed a major portion (17.8%) of total admissions could be due to multiple admissions of the same patients. A seasonal variation with two peaks in a year is seen in some diseases like AWD, acute bronchiolitis and wheezy child, asthma, bronchopneumonia in this study, which consistent with the global epidemiological trend.

Several studies in Africa reported infectious diseases as the leading causes of childhood death.[15,16,17] Different studies carried out in developing countries in hospitals have shown a fatality rate ranging from 5-14%.[18] In India, the case fatality rate was 6.2%[10] and 8.2% in Kanya.[19] Various mortality patterns ranging from 2.6-5.4% have existed in different tertiary hospitals of Bangladesh.[11] In our study, mean mortality was found 5%, which is consistent with those data. This higher mortality in this study could be due to

difficult communications from remote areas, especially from the basin, reflections of cumulative factors like higher number of moribund patients during admission, more patients load in the context of logistics, a late referral from remote centers, lack of pediatric ICU facilities at random, lack of isolation cubicle and lack of round the clock laboratory facilities in this hospital. Though Bangladesh is a malaria-endemic zone and especially Rajshahi is recognized as Kala-azar endemic zone, and therefore related admissions were expected, but there was no admission of these diseases might be due to malaria and kala-azar control programs were effectively applied, resulting in a significant reduction of cases.

Respiratory tract illness, especially pneumonia, is one of the five major pediatric illnesses causing under-five death. In this study, bronchopneumonia was one of the most frequent (third) causes of childhood mortality and morbidity requiring hospital admission representing 6517 (50.1%) out of 12999 respiratory illnesses followed by a wheezy child (bronchiolitis and asthma) 4433 (34.1%) and others 2049 (15.7%). This is similar to the study done in Lumbini zonal hospital [19]. Acute respiratory tract illness (ARI) account for about 20% or more than two millions of death making it the leading cause of death in children aged less than five years.[20,21,22] In Bangladesh, 90000 children > 1 month and <5 years of age die from pneumonia every year.[23] Only 3.8% death was found in this study despite the highest number of admissions from bronchopneumonia which may be due to early referral and parenteral awareness regarding cold and respiratory distress. Globally 18% & in Bangladesh 20% of childhood death occurs from acute watery diarrhea (AWD).[24] But in this study, death due to diarrheal diseases are nil that may be too early intervention in treatment available everywhere as well as increased awareness and effective use of ORS (Oral Rehydration Salts). Infections have been studied to be responsible for nearly 70% of infant mortality[25], where pneumonia, meningitis, and septicemia were three major contributors.[26] Here the leading causes of death in order of frequencies are encephalitis, fulminant hepatic failure, and

acute leukemia, which are similar to other centers of the country. Encephalitis showing the highest case fatality rate (61%) and death from hepatic failure (43.6%) next to encephalitis is also a sad back of our country.

Conclusion

The institutional trend of pediatric admission and death patterns are essential for regional health sector planning, including effective case management strategies. Under-five children are more vulnerable to diseases, and preventable diseases still contribute to the major cause of morbidity and mortality. Health sector development, strategic planning, regular and scheduled training to increase skilled health personnel may improve the quality of health services and well-being of our pediatric population.

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