Disease Profile and Death Pattern Among Children Admitted in a Medical College Hospital

M SHAMEEM HASAN[1], SANAT KUMAR BARUA[1], M NASIRUDDIN MAHMUD[1], AHM KAMAL[2], M ENAYETULLAH[1], M REZAUL KARIM[3]

Abstract

Background: *An understanding of epidemiological trend in hospital admissions, including diseases and death pattern, is critical for health care planning, appropriate resource allocation & improving existing services facilities.*

Objectives: *To evaluate the disease and death pattern of children admitted in the department of Child Health, Chittagong Medical College Hospital (CMCH), Chittagong.*

Materials and Methods: *This was a retrospective study. The case records of all patients admitted in the department from Jan 1, 2008 to Dec 31, 2010 were analyzed.*

Result: *Total 38,692 children were admitted during this study period; among them total 1897(4.9%) patient died. Infant and under five age groups constitute 45.2% and 75.9% respectively, total admission whereas deaths from the same groups were 43.7% & 79.3% respectively. Bronchopneumonia (22%), acute watery diarrhea (15%), hereditary hemolytic anemia (12%), and bronchiolitis (10%), topped the first four positions in each of the three years of admission. Septicemia and encephalitis, with a case fatality rate of 24% and 35% respectively, were found as top two causes of death. Highest case fatality rate was found in hepatic encephalopathy (54%). Other common causes of death include meningitis (19%), severe malaria (21%), leukemia (22%), severe malnutrition with complications (11%), and congenital heart diseases (12%)*

Conclusion: *Comprehensive evaluation of admission and death related findings of this study will help to determine possible gaps in patient care and planning for more effective case-management strategies.*

Key words: *Admission, Death, Chittagong Medical College Hospital (CMCH).*

Introduction

Morbidity and mortality among children are merely estimated in developing countries, because of the difficulties in obtaining data accurately. Useful information on this regard can easily be obtained from periodic review of morbidity and mortality in medical institutions as it reflects what is occurring in a community.[1] Such understanding of epidemiological trend in hospital admissions is critical for health care planning and appropriate resource allocation[2,3]. Childhood mortality is a reliable indicator of health care facilities of a country and its development.[4] Hospital death records statistics are considered reliable and used all over the world.[5] Moreover; evaluation of characteristics of children who dies in hospitals gives an insight into main medical illness in children and measures to overcome those[6]. Therefore, review of such information help to draw attention to the pattern of childhood illness in the community.

1. Assistant Professor, Department of Child Health, Chittagong Medical College, Chittagong, Bangladesh.
2. Associate Professor, Department of Biochemistry, Southern Medical College Chittagong, Bangladesh.
3. Associate Professor and Head, Department of Child Health, Chittagong Medical College, Chittagong, Bangladesh.
Correspondence: Dr. Mohammad Shameem Hasan. email: dr.shamim_hasan@ymail.com

Almost one fourth children born in developing countries die before their fifth birthday, in sharp contrast to only 2% in developed countries[7,8]. More than one third of under five children die in neonatal period. In Bangladesh there has been shown a dramatic improvement in childhood death from 2007 to 2009. The under-five mortality rate of 65, Infant mortality rate (IMR) of 52 and neonatal mortality of around 71 has been changed to 52, 41, and 30 respectively in 2009[9,10]. The country is currently on target for achieving the MDG-4 relating to child mortality.

Chittagong, second biggest city and an administrative Division of Bangladesh, having a land area of 5283 SqKm[9]. 1000 bedded Chittagong medical college hospital is serving the population of the surrounding six districts covering an area of 21988 sq km[9] for its unique location. Analysis of admission & death in this hospital should therefore give better evaluation of patients caring service of these region.

Materials and Methods

Study type: This was a retrospective observational study. **Settings:** Department of child Health, CMCH; Chittagong, Bangladesh. **Period:** 1st Jan 2008 to 31st Dec 2010. **Population:** All the admitted children aged >28 days to 12 years (upper age limit for admission in pediatric ward), in the Department of Child Health, CMCH over a period of 3 years. **Sample size:** 38,692. **Exclusion criteria:** Neonatal (up to 28 days) cases are managed in a separate unit under the same department, hence were excluded in this study. A patient who left the hospital after an admission of their own (Discharge on request or Discharge on risk bond), or left the hospital unnoticed (absconded), or was transferred to other discipline was also excluded from the study. Patient without adequate clinical records were also excluded from the study. This exclusion criterion was also set for those cases where final outcome remained unknown. **Data Collection:** Data was collected from hospital register, patient file records; death certificates. Data extracted from the records included total number of admissions and deaths, age, gender, month wise admission, income group of parents, mean duration of hospital stay before death, provisional diagnosis and cause of death. Final diagnosis was based on the final assessment by the managing unit. It was based on the presenting clinical features, with or without the results of laboratory tests. The cause of death as documented after weekly mortality reviews was considered as the final cause of death. Group comparison was done by Chi sq test. Descriptive statistics was used to analyze the obtained data.

Results

Over a span of three years, there were total 38,692 admissions and 1897 deaths showing 4.9% case fatality. A rise in the total number of patient admissions have been seen in 2010, but number of deaths remained almost same in all the three years. Average male female ratio on admission was 1.5:1. This gender distribution was found highly significant among admissions but found insignificant among those who succumbed. 93% of the admitted patient had their parental monthly income below taka 5000 per month.

All the patients were segregated into three age groups. This age wise distributions of patients in admissions and deaths were depicted in Figure-I & Figure-II. Among the admitted cases, Infants and Children from 1-5 years of age have represented 45.2% and 30.7% respectively. On the contrary, among the death cases, these age groups represented 43.7% and 35.6% respectively means total under five mortality was found 79.3% in the study.
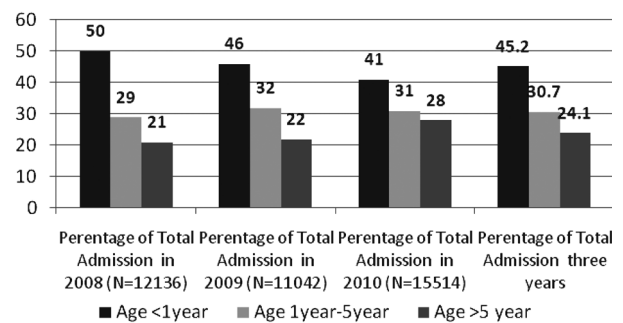

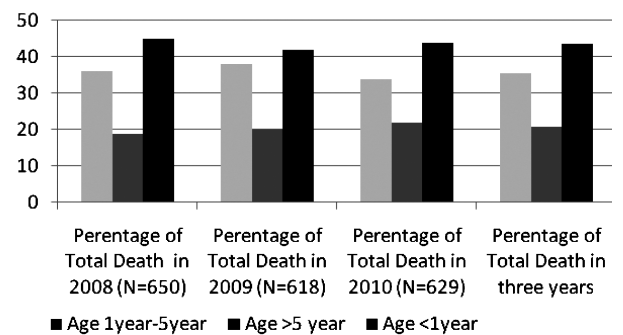**Fig.-1:** *Frequency distribution of the percentage of admissions.*

Fig.-2: *Frequency distribution of the percentage of deaths.*

Figure-III shows the basic data of total admissions & Table-I shows deaths and the case fatality rate during the study period. Diseases and Deaths were arranged in order of frequency, showing the number and percentage of each of the diseases in individual year. Table-I also shows the summated number of

admissions and deaths of a particular disease with their total percentage during the three year period.

Most frequent 16 diseases from admissions are shown in Figure-III and top 12 diseases causing deaths in Table-I. Besides these, diseases that had <1% frequency were categorized as "Others". Among the admitted cases, Bronchopneumonia (22%), Acute watery diarrhoea and a (15%), Hereditary haemolytic anaemia (12%) and Bronchiolitis (10%), topped the
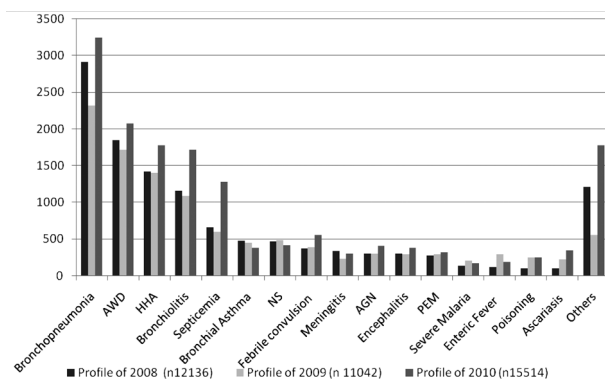
first four positions in each of the three years. They accounted for 60% of total admissions in the listed three years. Other diseases had varied frequency of distributions in both admission and death.

Seasonal variations were noticed in some of the diseases like Bronchopneumonia, Bronchiolitis, Asthma and AWD having two peaks in a year. Respiratory illness was more in September to December and in March-April period. Likewise, AWD also presented with two peaks, one in March-April and the other in Sep-December.

Septicemia and Encephalitis, was responsible for only 4.3% and 2.3% of the total admission but presented with a case fatality rate of 24% and 35% respectively in the 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 Hepatic encephalopathy (54%), though considering cause of death it represented <2% of total death. We also found that 33.15% of the total admitted patient died within first 24 hours of admission.

Fig.-3: *Disease Profile of Admitted Patients (N= 38,692)*

Table-I

Most common diseases found among the total death cases. Arranged as per number of deaths.(* Figure within parenthesis indicates the percentage).

Disease	Disease Profile of Death among Admitted Patients (Admission N= 38,692; Death N= 1897)									
	Profile of 2008 Total Admission 12136 Total Death 650			Profile of 2009 Total Admission 11042 Total Death618			Profile of 2010 Total Admission 15514Total Death 629			Three Years Total Death (N=1897)
	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)
Septicemia	659	182(28)*	28	596	237(38)	40	1275	185(29)	15	604(24)
Encephalitis	300	100(16)	33	290	100(16)	34	372	141(22)	38	341(35)
Meningitis	330	66(10)	20	224	56(09)	25	297	37(6)	12	159(19)
Bronchopneumonia	2917	66(10)	2	2319	85(14)	4	3242	88(14)	3	239(3)
Severe Malaria	131	50(8)	38	202	25(4)	12	168	30(5)	18	105(21)
PEM with complications	269	33(5)	13	288	29(5)	10	315	31(5)	10	93(11)
Cong. Heart Disease	94	20(3)	21	105	06(1)	6	129	13(1)	10	39(12)
Leukemia	129	17(2)	13	136	39(6)	29	146	35(6)	24	91(22)
Cerebral palsy with complications	65	14(2)	21	71	05(1)	7	132	11(1.75)	8	30(11)
Bronchiolitis with complications	989	12(2)	1.2	1089	08(1)	1	1715	16(3)	1	36(0.009)
Heart Failure	51	08(1)	16	42	04(1)	10	43	05(0.80)	12	17(12.5)
Hepatic encephalopathy	13	07(1)	53	18	09(1)	50	30	17(3)	57	33(54)
Others	6189	75(12)	1.2	5662	15(3)	0.2	7650	20(3)	0.26	110(0.005)
TOTAL	12136	650(100)	—	11042	618(100)	—	15514	629(100)	—	1897

Discussion

An increase in the number of the total admissions was noticed in 2010 in comparison to other two years. This is because of an outbreak in respiratory illness and AWD during that time. CMCH has the tendency of higher number of admissions in comparison to other tertiary level hospitals of the country for its unique location. There are other factors, including socio-economic and parental education status and environmental factors which could influence admission patterns[11].

On admission male female ratio of 1.5:1 was found in this study. Similar male preponderance is found other studies done in Nigeria[1,2]. This finding may reflect a gender bias in health seeking behavior regarding their children[1]. Alternatively, there may be epidemiological reasons for male susceptibility to infections or other conditions requiring admission[3]. Kanna R showed in his study that, girls have higher mortality due to sex differentiation in dietary intake, nutritional status and health care,[12] but that was found statistically insignificant in this study. In this study 75.94% of the total admissions were from the under five age group, as in other study[8].

Two-thirds (60%) of the total admissions in all the three years were due to four common diseases like, Bronchopneumonia(22%), AWD(15%), HHA (12%) and Bronchiolitis(10%). Majority of admissions from Respiratory illness and AWD are also the common findings in other hospitals of the country. Hereditary hemolytic Anemia contributed a major portion (12%) of total admissions could be due to multiple admissions of the same patients. A seasonal variation in some of the diseases with Bronchopneumonia, Bronchiolitis, Asthma and AWD having two peaks in a year in this study is consistent with global epidemiological trend.

Different studies carried out in hospitals in developing countries have revealed a fatality rate ranging from 5 to 14%[13]. In India case fatality rate is 6.2%[8] and 8.2% in Kenya[14]. Various mortality patterns ranging 2.6%-5.4% have been existed in different tertiary hospitals of Bangladesh. In this study mean mortality was found 4.9% which is consistent with those data. This higher mortality in our study could be due to the reflections of cumulative factors like higher number of moribund patients at admission, more patient load in context of logistics, late referral from remote centers, lack of ICU facilities at random, lack of isolation cubicle, and lack of round the clock laboratory facilities in this hospital .

Bangladesh is a malaria endemic country where total thirteen districts including Chittagong, are recognized as malaria endemic zone[15]. Therefore more malaria related admissions were expected in our admissions. Fortunately the surrounding primary and tertiary hospitals at rural areas can handle this moribund disease well; therefore they refer only the complicated cases to this tertiary level hospital, reflected by only 1% malarial admission.

ARI account for about 20% or more than two million of deaths, making it the leading cause of deaths in children aged less than five years[16-18]. In Bangladesh, 90,000 children >1 month and <5 years of age die from pneumonia every year[19]. Only 3% death was found in this study despite the highest number of admissions from Bronchopneumonia which may be due to early referral and parental awareness about respiratory distress. Globally 18% & in Bangladesh 20% of childhood death occurs from AWD[20]. But our findings relating to diarrheal deaths are less in number, which may be due to the awareness & increased use of Oral Rehydration Solution (ORS).

Infections have been studied to be responsible for nearly 70% of infant mortality[21], and where pneumonia, meningitis and septicemia are the major contributors[22]. In our study the leading causes of death, in order of frequencies, included Septicemia and Encephalitis which is similar to other centers of the country. Death from Hepatic encephalopathy showing highest case fatality rate (54%) is also a sad back of our setting. Since Chittagong is an endemic zone, we face lot of near fatal patients from malaria each day reflected by the fifth common cause of the total mortality.

Conclusion

Findings of this study helps us to understand pediatric admission trend and death pattern of this institution, which are essential for health-sector planning, including effective case-management strategies. Comprehensive evaluation of admission and death related facts and findings of this study and then proper planning & strengthening the community based programs may reduce hospital load and mortality as well as help to achieve the MDG 4 by 2015.

Refereces

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