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Original Article

Community Medicine Section

Pattern and Trend of Morbidity in the Infectious Disease Ward of North Bengal Medical College and Hospital

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ABSTRACT

Background: In spite of experiencing a large decline in the spread and burden of infectious diseases, the Global Burden of Disease Project suggests that about 30% of the disease burden in India is attributable to infections. The hospital data constitute a basic and primary source of information for continuous follow up of this changing pattern of morbidity and mortality.

Aim: To identify the pattern and trend of different infectious diseases among admissions in the Infectious Disease ward of North Bengal Medical College and Hospital.

Materials and Methods: Retrospective analysis of inpatient hospital database over 5 years period (January 2008 – December 2012) of Infectious Disease ward of North Bengal Medical College & Hospital.

Results: Among 3277 admissions in the Infectious Disease ward during 2008-12, diarrhoeal diseases (84.3%) were most common. The highest mortality was recorded for rabies cases (83.9%), followed by tetanus (32.6%) and diphtheria (27.3%). The majority cases of diphtheria (78.9%) and measles (53.1%) belonged to below 9 years age. Except the year 2010, there was a gradual rise in admissions from 2008 to 2012.

Conclusion: Review of hospital records provided information regarding the pattern of diseases but no definite trend among admissions in the infectious diseases ward.

Keywords: Life expectancy, Retrospective analysis

INTRODUCTION

Over the years, the world has experienced a substantial decline in mortality due to infectious diseases and an increase in life expectancy owing to epidemiological transition from infectious diseases to chronic diseases [1,2].

Since independence, there has been a steady decline in the spread and burden of infectious diseases in India, as in many developing countries which may be attributed to a set of complex factors fundamentally linked to development, such as improved sanitation and large population based vaccination programmes [3,4]. However, the recent estimates by the Global Burden of Disease Project suggest that about 30% of the disease burden in India is still attributable to infections [5]. A systematic review to summarize current evidence on diarrhea based on prediction modeling concludes that diarrheal diseases are still responsible for most under-five child deaths beyond neonatal age [6].

The public health significance of infectious diseases is mostly related to the menace of epidemic/pandemic events, the emergence of new diseases and re-emergence of old diseases, the threat of imported diseases or pathogens, and the appearance of multidrug or pan-drug resistant organisms [7].

In India, notification of infectious diseases is extremely inadequate and secondary hospital data constitute a basic and primary source of surveillance data that can indicate changing healthcare requirements [8]. Regular surveillance data by Integrated Disease Surveillance Programme reveal that because of the existing environmental, socioeconomic and demographic situation, many areas in the country are still affected by epidemics/outbreaks. 553 outbreaks were reported and responded to by states in 2008, 799 outbreaks in 2009, 990 in 2010, 1675 outbreaks in 2011, 1584 outbreaks in 2012, 1964 outbreaks in 2013, 1562 outbreaks in 2014 and 311 outbreaks have been reported till 15th March 2015 [9].

Community based surveillance act as the best indicator to detect changes in occurrence of diseases. However, in India, tremendous disease burden, sheer size of the country and population, and wide inter and intra state variability in health infrastructure all contribute to difficulties in monitoring disease burden. In this scenario, secondary hospital data can serve as a proxy indicator. Literature search revealed few studies in India and other countries employing retrospective hospital data analysis which are generating useful information [10-12].

In this context, the present study was done in North Bengal Medical College & Hospital to identify the pattern and trends of morbidity among patients admitted in the infectious disease (ID) ward which may provide evidence for structural and organizational changes in healthcare delivery for patients suffering from infectious diseases.

MATERIALS AND METHODS

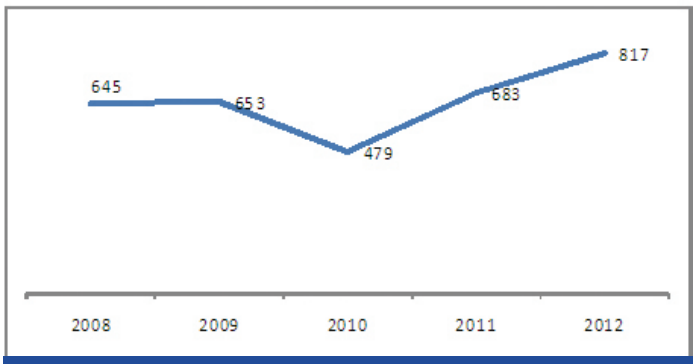
North Bengal Medical College & Hospital is the most important tertiary care centre in the northern West Bengal, catering to patients from a very large area of North Bengal and adjoining states and countries as well. Infectious diseases are usually admitted in infectious diseases (ID) ward. Retrospective analysis of inpatient hospital database over 5 years period (January 2008 – December 2012) was done during January-July of 2013 reviewing all the hospital registers available in the ID ward. The data was collected in a pre-designed schedule. Information retrieved from the records included patient demographics, diagnosis, duration of stay in the unit and outcome. The first listed diagnosis in the records was used for coding each of the diagnoses. The morbidity that co-existed with the primary diagnosis during stay in the hospital or complication developed during management of the case was not considered in deciding the diagnosis. Outcome was classified as recovery, discharge on request and death. Data analysis was done in IBM SPSS 20 (Chicago Inc.). Before conduction of the study permission was obtained from hospital authorities.

RESULTS

A total of 3277 records of patients admitted in ID ward during 2008-2012 were analysed. The mean number of annual admissions was 655.4 ± 120.5. Except the year 2010, there was a gradual rise in admissions with a steep rise during the year 2012 when there were maximum admissions [Table/Fig-1,2]. In total, there were 1935

Year	Diagnosis							Total (%)
	Diarrheal Disease (%)	Chicken Pox (%)	Tetanus (%)	Suspected rabies (%)	Measles (%)	Diphtheria (%)	Others (%)	
2008	515(79.8)	29(4.5)	42(6.5)	31(4.8)	22(3.4)	1(0.2)	5(0.8)	645(100)
2009	535(81.9)	41(6.3)	29(4.4)	30(4.6)	11(1.7)	4(0.6)	3(0.5)	653(100)
2010	417(87.1)	13(2.7)	18(3.8)	16(3.3)	8(1.7)	7(1.5)	0(0)	479(100)
2011	590(86.4)	31(4.5)	14(2)	19(2.8)	18(2.6)	2(0.3)	9(1.3)	683(100)
2012	705(86.3)	33(4.0)	32(3.9)	22(2.7)	5(0.6)	19(2.3)	1(0.1)	817(100)
Total	2762(84.3)	147(4.5)	135(4.1)	118(3.6)	64(2)	33(1)	18(0.5)	3277(100.0)

[Table/Fig-1]: Distribution of the admitted patients for different infectious diseases over last five years



[Table/Fig-2]: Year wise trend of patient admissions in the ID ward

Morbidity	Mean duration of stay (days)	Out come			Total admissions (%)
		Recovery (%)	Death (%)	Discharge on request (%)	
Diarrhoeal diseases	1.90	2473 (89.5)	17 (0.6)	272 (9.8)	2762 (84.3)
Chicken pox	4.50	131 (89.1)	2 (1.4)	14 (9.5)	147 (4.5)
Tetanus	5.21	65 (48.1)	44 (32.6)	26 (19.3)	135 (4.1)
Rabies	2.31	0(0.0)	99 (83.9)	19 (16.1)	118 (3.6)
Measles	3.12	58 (90.6)	0 (0)	6 (9.4)	64 (1.9)
Diphtheria	3.64	19 (57.6)	9 (27.3)	5 (15.2)	33 (1.0)
Others	2.44	13 (72.2)	1 (5.6)	4 (22.2)	18 (0.6)
Total	2.21	2759 (84.2)	172(5.2)	346 (10.6)	3277(100.0)

[Table/Fig-4]: Morbidity, mean duration of hospital stay and outcome of the diseases

	Morbidity							Total (%)
	Diarrhoeal Disease (%)	Chicken Pox (%)	Tetanus (%)	Rabies (%)	Measles (%)	Diphtheria (%)	Others* (%)	
Age group(years)								
0-9	61 (2.2)	15 (10.2)	20 (14.8)	14 (11.9)	34 (53.1)	26 (78.7)	2 (11.1)	172 (5.4)
10-19	376 (13.6)	38 (25.9)	21 (15.6)	27 (22.9)	16 (25)	4 (12.1)	4 (22.2)	486 (14.8)
20-39	1248 (45.2)	59 (40.1)	52 (38.5)	35 (29.7)	12 (18.8)	0 (0)	7 (38.9)	1413 (43.1)
40-59	694 (25.1)	27 (18.4)	29 (21.5)	31 (26.3)	1 (1.6)	3 (9.0)	4 (22.2)	789 (24)
≥ 60	383 (13.9)	8 (5.4)	13 (9.6)	11 (9.3)	1 (1.6)	0 (0)	1 (5.6)	417 (12.7)
Gender								
Male	1607 (58.1)	87 (59.2)	88 (65.2)	87 (73.7)	39 (60.9)	17 (51.5)	10 (76.9)	1935 (59.0)
Female	1160 (41.9)	60 (40.8)	47 (34.8)	31 (26.3)	25 (39.1)	16 (48.5)	3 (23.1)	1342 (41.0)
Place of residence								
Rural	2440 (88.3)	130(88.4)	126 (93.3)	113 (95.8)	55(85.9)	33 (100)	16(88.9)	2914(88.9)
Urban	322 (11.7)	17 (11.6)	9 (6.7)	5 (4.2)	9 (14.1)	0 (0)	2 (11.1)	363 (11.1)
Total	2762 (100)	147 (100)	135 (100)	118 (100)	64 (100)	33 (100)	18 (100)	3277 (100)

[Table/Fig-3]: Distribution of the morbidities according to patient demographics
* mumps, dengue, meningitis **figure in parentheses indicate percentage

(59%) males and 1342 females (41%); with a mean age of 34.84 ± 18.11years; mean hospital stay was 2.21 days. Majority of them (88.9%) hailed from rural areas [Table/Fig-3].

Diarrhoeal diseases were the major cause of admission (84.28%), followed by chicken pox, tetanus, suspected rabies, measles and diphtheria. Trends of admission of diarrheal diseases increased during the first three years and remained almost constant over the next two years. Tetanus, measles and rabies were decreased over the years but the proportion of diphtheria and chicken pox cases increased [Table/Fig-1]. However, no definite trend of admissions for any disease was observed over the reference period.

By far the highest number of admissions (43.1%) was seen in 20-39 years age group. Measles (53.1%) and diphtheria (78.7%) were more common in children below 9 years, whereas tetanus and rabies were mostly seen in 20-39 years. Diphtheria and measles were also reported in older age groups [Table/Fig-3].

[Table/Fig-4] shows that among all admitted patients, 84.2% recovered from their illnesses, 10.6% were discharged on request and 172 (5.2%) patients died during their stay in the hospital. The cases of tetanus accounted for the longest length of stay in the hospital followed by chicken pox. Besides rabies cases (83.9%), substantial proportion of deaths was noted in cases of tetanus (32.6%) and diphtheria (27.3%). No death was seen among patients suffering from measles.

DISCUSSION

Though surveillance data are always better indicator for monitoring the trends and patterns of diseases, in absence of that especially in a country like ours, secondary hospital data can serve the purpose as an alternative. This study shows, frequency of admission over the last five years in infectious disease ward is gradually increasing which corroborate with a study done in Queensland Public Hospitals [13]. The common causes for admission were diarrhoeal diseases (84.3%), followed by chicken pox, tetanus, suspected rabies, measles, diphtheria and others. According to Global Burden of Disease Project, diarrheal diseases contributed to 21.3% of the infectious diseases burden of India; the corresponding figures for tetanus and diphtheria was 1.7% and 0.1% respectively [5]. According to Zhang L et al., in a study done in China, the three

most described diseases were gastrointestinal disorders (41.9%), vector-borne diseases (30.8%) and vaccine-preventable diseases (21.1%) [14]. In West Bengal, during the year 2010 there were 19.45 lac admissions in government hospital due to diarrhoea and there were 250 deaths [15]. The corresponding figures in the years 2011, 2012 and 2013 were 18.51 lakhs, 19.97 lakhs and 18.08 lakhs respectively [16].

Although the comparative proportion of admissions for various diseases remains almost similar over the years, no definite trend was observed. The proportions of measles admissions were a mere 2%. In a study done by Murhekar et al., in two districts of West Bengal, it was found that most of the measles patients were managed by private practitioners in the village or stayed at home and formal treatment was reserved for complications arising out of it [17].

The most striking change was the tenfold increase in hospital admissions for diphtheria from 0.2% of all hospital ID admissions in 2008 to 2.3% in 2011. This may be due to the changes in the clinical characteristics of the disease with respect to severity and increased case reporting. Evidence from around the country and state have also suggested that diphtheria is re-emerging as a threat and there is an age shift in the occurrence increasingly over 5 years of age [18-21].

In this study the highest admissions were seen in 20-39 years (43.1%) followed by 40-59 (24%), the economically productive age groups. The findings are concordant with Alghamdi et al., where the age group of 26-45 years had the highest admission rate (39.8%) [11]. Similar observation was also noted among native people of Alaska; the median age for ID hospitalizations being 28 years [22].

The case fatality rate (CFR) in this study during the period of 2008-12 was found to be the highest for suspected rabies cases (83.9%), followed by tetanus (32.6%) and diphtheria (27.3%). A national report suggests that the estimated number of animal bites in India is about 17.5 million annually with about 20,000 deaths suspected due to rabies [23].

For diarrheal diseases CFR was 0.6% and for measles it was nil compared to 0.036% and 0.112% for gastrointestinal diseases and vaccine preventable diseases respectively during 2004-08 in a study in China [14]. The published data from Infectious Diseases hospital, Kolkata reported case fatality rate for diarrhoeal diseases as 0.54%, 0.63% and 0.51% in 2011, 2012 and 2013 respectively [16].

The case fatality for diphtheria was quite high in the present study compared to studies in Andhra Pradesh (3%) and Kolkata (12.1%) [24,25]. Both the studies also reported cases of diphtheria among adolescent and adult age groups, in concordance with the present study. Outbreak investigations in Borborooah block of Assam and Dabela village of Gujarat has reported a case fatality rate of 3.3% and 5% respectively [26,27]. A retrospective analysis of hospital records from 1985 to 2002 in Gujarat revealed decline in diphtheria morbidity from 1985 to 1997 and an increase thereafter and case fatality rate showed steady decline over time [28].

The present study is one of very first studies of its kind to be done in this region of the country. The use of secondary data in form of records has enabled the investigators to analyse huge amount of data in a very short time.

LIMITATIONS

The inherent limitation of the study is that the use of secondary data analysis may compromise the data quality because the researchers did not know exactly the process of primary data collection. Another limitation is that the findings of the current study may not reveal the actual picture of the entire infectious diseases burden of this hospital because the patient of malaria, HIV/AIDS, pneumonia and tuberculosis were generally admitted in the General Medicine and Paediatrics ward.

CONCLUSION

This study demonstrates the pattern of infectious diseases admissions in a tertiary care hospital in the northern region of West Bengal. Although no specific trends could be established, in the wake of new emerging and re-emerging infectious diseases like nipah virus, avian influenza, Ebola, novel H1N1 influenza, this study can act as a useful source of information. However, a longitudinal, large scale, population-based surveillance study may be necessary to know the exact trend and pattern of every infectious disease in this part of the country.

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