

Hospital Acquired Diarrhoea in Children: A Study in a Tertiary Care Hospital in Sylhet

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Abstract

Background:

Children hospitalized for diseases other than diarrhoea can be infected with an enteric pathogen during their stay at hospital, which may complicate and prolongs the course of illness and hospital stay. Hospital acquired diarrhoea are defined as those occurring more than 72 hours after admission to hospital. Nosocomial diarrhoea second to nosocomial respiratory tract infections in causing morbidity among hospitalized children.

Objectives:

The study was designed to find the rate of hospital acquired diarrhoea, their risk factors and to observe the clinical features.

Method:

This cross-sectional observational study was conducted in the inpatient department of Pediatrics in Jalalabad Ragib-Rabeya Medical College, Sylhet over a period of 3 months between July to September 2018. A total number of 274 children aged from 1 month to 5 years were admitted in inpatient department other than diarrhoea were included in the study. During their hospital stay, all patients were followed up daily for development of diarrhoea.

Results:

Out of 274 children 80 patients developed diarrhoea 72 hours after admission, the rate of occurrence of hospital acquired diarrhoea was 29.2%. Patients who developed hospital acquired diarrhoea, were initially admitted due to pneumonia accounted for about 65% followed by 12.5% due to malnutrition. Patients aged below two years and staying in hospital for longer duration developed diarrhoea more. Presence of any diarrhoeal patient in a bed close the patient's bed ($p=0.00001$), hand washing by mother's during handling baby ($p=0.00001$), hand washing by doctors ($p=0.00001$), and sharing the bathroom with diarrhoeal patient ($p=0.000061$), were statistically associated with the development of nosocomial diarrhoea. Diarrhoea was mostly watery in nature (80%) having pus (80%) and RBC (100%) on stool microscopy and patients suffered from milder dehydration (80%).

Conclusions:

Hospital acquired diarrhoea is common in admitted patients, which may complicate the disease course, prolonged the hospital stay.

Keywords: Hospital acquired diarrhoea, Rate, Children

Introduction:

Hospital acquired diarrhoea among the children who are admitted with diseases other than diarrhoea is responsible for increased costs, prolonged hospital stay and also important cause of morbidity and mortality.¹ Nosocomial diarrhoea are defined as those occurring more than 72 hours after hospital admission and shown to be second most to respiratory tract infections in causing

morbidity among hospitalized children. One in five children admitted into hospital without an enteric infection is at risk of developing a nosocomial gastrointestinal infection, with rotavirus being the most common etiological agent.² According to WHO about 525000 children under five years worldwide die due to diarrhoeal disease every year.³ Children under the age of three years in developing countries experience on

an average of three times of diarrhoea every year. On each episode of diarrhoea, it contributes deprivation to significant nutrition which is necessary for child growth.⁴ Nosocomial diarrhoea can occur as a sporadic or an epidemic illness and it can be due to infectious as well as noninfectious causes. As infectious diarrhoea is definitively diagnosed only when bacterial or viral agent is identified, some cases of diarrhoea are never fully diagnosed.⁵ Nosocomial diarrhoea had less frequency of stools which resulted in mild dehydration. Transmission of health care associated pathogens takes place through direct and indirect contact, droplets, air, and a common vehicle. Transmission through contaminated health care workers (HCW) hands are the most common patterns.

Method:

A hospital based, cross sectional study was conducted in the inpatient department of Paediatrics Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet over a period of 3 months between July to September 2018. About 274 patients were admitted at child ward other than diarrhoea and the age range was 1 month to 5 years. The study included children of both sexes. On admission patient’s age, sex, nutritional status, date of admission, diagnosis of patient, contact with diarrhoeal patient and feeding history were recorded. During the hospital stay, the patient was followed up daily especially regarding the development of diarrhoea. After 72 hours of admission, when patient gave any history of passage of loose stool, data were collected reviewing the history, physical and laboratory findings. Structured questionnaire was set to collect the data. Statistical analysis of data was performed by using computer based statistical programme SPSS version 22 for windows. Categorical variables were expressed as means (standard deviation). Appropriate statistical tests were done. Tables and figures were constructed according to the findings.

Result:

Out of 274 patients, 80(29.19%) patients developed hospital acquired diarrhoea (Figure-1). Among 80 patients, 70 patients (87.5%) were under 2 years of age and 10 patients (12.5%) were between 2-5 years of age. Number of male 52 (65%), was higher than the number of female

28(35%) and the male female ratio was 1.8:1 (Table-I & II).

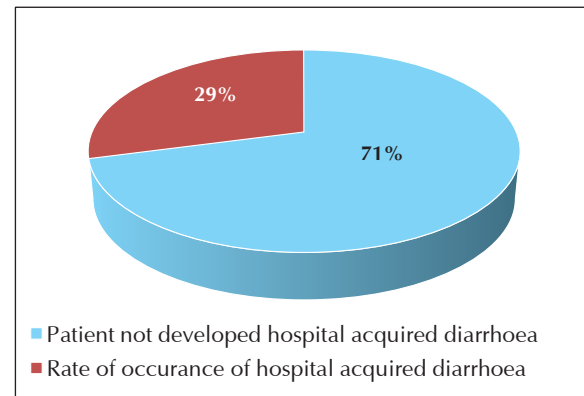


Figure-1: Percentage of patient who developed hospital acquired diarrhoea (n=274)

Among the 80 patients with nosocomial diarrhoea, 70 patients (87.5%) were under 2 years of age and 10 patients (12.5%) were between the age of 2-5 years. The number of male 52 (65%) which is higher than female 28(35%). The male and female ratio was 1.8:1. (Table-I, II)

Table-I: Distribution of the studied population by age and sex (n=274)

Age (years)	Sex		Total no.(%)
	Male no.(%)	Female no.(%)	
<24 months	154(56.2)	72(26.2)	226(82.4)
>24 months	32(11.6)	16(5.8)	48(17.5)

Table-II: Distribution of patients acquiring nosocomial diarrhoeaby age and sex (n=80)

Age (years)	Sex		Total no.(%)
	Male no.(%)	Female no.(%)	
<24 months	48(60)	22(27.5)	70(87.5)
>24 months	4(5)	6(7.5)	10(12.5)

Hospital acquired diarrhoea were more common among long duration hospital staying patients. Out of 32 patients staying for longer time (8- 14 days) in hospital, 87.5% patients (28) developed nosocomial diarrhoea. (Table-III)

Table-III: Correlation between duration of hospital stay and occurrence of nosocomial diarrhoea (n=80)

Duration (days)	Total study population	Patient acquiring nosocomial diarrhoea	p-value
3-7 days	162	52	0.00075 ^s
8- 14 days	32	28	

S=Significant

In Table-IV, patients with nosocomial diarrhoea were distributed according to diagnosis at admission. Patients initially diagnosed as Pneumonia 52(65%) and then with severe acute malnutrition 10(12.5%) and 8 (10%) patients admitted due to meningoencephalitis were developed nosocomial gastroenteritis respectively.

Table-IV: Distribution of the patients with nosocomial diarrhoea according to diagnosis on admission (n=80)

Diagnosis on admission	no. (%)
Bronchopneumonia	52(65)
Malnutrition	10(12.5)
Meningo encephalitis	8(10)
UTI / NS	6(7.5)
Febrile convulsion	4(5)

Table-V revealed that, presence of any diarrhoeal patient in a bed close the patient's bed, hand washing by mother's during handling baby, hand washing by doctors and sharing the bathroom with diarrhoeal patient were statistically associated with the development of nosocomial diarrhoea.

Table-V: Distribution of the studied patients according to risk factors (n=274)

History	Patients developed nosocomial diarrhoea (n=80) no. (%)	Patients not acquiring nosocomial diarrhoea (n=194) no. (%)	X ²	p-value
History of Rotavirus vaccine				
Yes	1(0.5)	2(1)	0.025	0.87NS
No	79(99.5)	192(99)		
Bottle feeding				
Yes	22(27.5)	52(26.8)	0.0139	0.906NS
No	58(72.5)	142(73.2)		
Presence of diarrhoeal patient beside bed				
Yes	26(32.5)	52(26.8)	37.11	0.00001S
No	54(67.5)	142(73.2)		
Hand wash by mother during handling baby				
Yes	22(27.5)	124(64)	6.31	0.00001S
No	58(72.5)	70(36)		
Hand wash by medical personal during handling				
Yes	66(82.5)	193(99.5)	31.57	0.00001S
No	14(17.5)	1(0.5)		
Sharing same bathroom with diarrhoeal patients				
Yes	50(62.5)	70(36)	16.05	0.000061S
No	30(37.5)	124(64)		

S=Significant, NS= Not Significant

In the current study, patients with nosocomial diarrhoea 75% had less frequency of stool, 80% of patients had watery stool, 35% had vomiting, 30% of patients had fever and on stool R/E pus cell and RBC was found in 60% and 100% of patients respectively. (Table-VI)

Table-VI: Distribution of the patients with nosocomial diarrhoea according to clinical features and stool R/E findings (n=80)

Clinical features	no. (%)
Frequency of stool	
<10 times / day	60(75)
>10 times / day	20(25)
Stool character	
Watery	64(80)
Mixed with mucus	16(20)
Vomiting	28(35)
Fever >39°	24(30)
Abdominal pain	4(5)
Abdominal distention	8(10)
Dehydration	
No	16(20)
Mild	64(80)
Stool R/E Pus cell	
<10/HPF	30(37.5)
>10/HPF	10(12.5)
No pus cell	40(50)
RBC	80(100)
Macrophage	0(0)

Discussion:

Hospital acquired diarrhoea is an acute diarrhoea defined by the place of infection and the time of onset after 72 hours, to exclude micro-organisms the 3 days cut off period is used which may be acquired from the community and stay dormant in the body without clinical evidence.⁶ The current study was conducted to measure the rate of hospital acquired diarrhoea I infection in children. This study demonstrated the rate of occurrence of hospital acquired diarrhoea in children was 29.2%.

In developed countries the prevalence of nosocomial diarrhoea varies from 1 to 30%, whereas in developing countries the rate may be higher due to lack of supervision, infection

prevention practice is poor, limited resources with its inappropriate use and overcrowding of hospitals.⁷ In a Dhaka based study of Bangladesh, the rate of occurrence of hospital acquired diarrhoea in children was 16.3%.⁸ The prevalence of hospital acquired diarrhoea in South India was 20.1%.⁹ Hospital acquired diarrhoea constituted one fifth of the diarrhoea I diseases among hospitalized children in United kingdom.¹⁰ Prevalence of hospital acquired diarrhoea was reported to be 26.3% in Iran, 27.7% in Italy, 14.6% in Australia and 19.4% in France.¹¹ The result of above studies are more or less similar to the findings of present study.

The majority of the patients in my study were under the age of 2 years. Among the 80 patients, 70 patients (87.5%) were under 2 years of age and 10 patients (12.5%) were between the age of 2-5 years. The number of male 52 (65%) which is higher than female 28 (35%). The male and female ratio was 1.8: 1. Morsheda et al (2016), in Dhaka reported that among the hospital acquired diarrhoea patient 85% were below the age of 2 years and 15% patients were in between 2-5 years, which was similar that of current study.⁸

A correlation between duration of hospital stay and occurrence of nosocomial diarrhoea was also observed among the patient in the present study. Out of 32 patients staying for longer duration (8-14 days) in the hospital, 28 (87.5%) patients developed nosocomial diarrhoea. Hospital acquired diarrhoea were observed more common among patients staying longer duration in hospital. Morsheda K. et al showed that, relation between duration of hospital stay and occurrence of nosocomial diarrhoea was 71.4% in patients who stayed longer duration at hospital.⁸ The result is similar with the present study. Martin and co-workers in 2001 showed that hospital acquired diarrhoea was mildest in Austria but occurred within the shortest median duration of hospitalization, which is dissimilar with the present study.

Patients who developed hospital acquired diarrhoea were initially admitted due to Pneumonia accounted for about 65% followed by 12.5% were due to malnutrition and 10% due to meningitis, where in the Dhaka based study it was 45% due to Pneumonia and 30% were due to meningitis which is near similar with the present study.⁸ This picture also give the reflection of

diseases other than diarrhoea for which patients were admitted at our hospital.

In this study, only 0.5% patients were vaccinated against rota virus, which is statistically not significant as a risk factor, Anderson ET AL (2011) showed rota virus vaccination in infants decrease the number of community acquired diarrhoea follows rota viral infection, causing other hospitalized children reduced the exposure to rota virus. Thus implementation of rota virus vaccination, decrease the burden of hospital acquired rota virus infection. In our study 27.5% of the infected patient, who developed diarrhoea had history of bottle feeding. The result is similar with a study done in Iran according to Kordidarian, Kelishadi and Arjmandfar (2007), which was only 27.3%, showed no effect of bottle feeding on this prevalence.¹¹ But in a Dhaka based study in Bangladesh, stated that majority 57.5% of the infected patients had history of bottle feeding,⁸ which is dissimilar with the present study.

Few factors were observed to be statistically significantly associated to the development of hospital acquired diarrhoea. 32.5% of patients had presence of diarrhoeal patient beside bed, which developed diarrhoea ($p=0.00001$), 62.5% patient sharing of same washroom with the diarrhoeal diseases patient for washing and toileting ($p=0.000061$), hand washing by mother were not done during handling the baby in 64%, of cases ($p=0.00001$) in comparison to 99.5% of medical personal were practicing hand washing by Alcohol based hand rub ($p=0.00001$), for acquiring and not acquiring nosocomial diarrhoea respectively. Alcohol based hand rub may be superior to traditional soap-based hand washing and it requires less time, acts faster (Pittet, 2009).⁵ Cunliffe et al (2010) showed that rate of infection was reduced by hand washing organism is brought by diarrhoeal patient in hospital and usually spread via mothers. Environmental surface and fomites may also play an important role. Contaminated hands cause cross infection which is probably the most common transmission route.¹² Most of the nosocomial diarrhoea patients have mild dehydration 80% similar with study done at Dhaka in Bangladesh (2016) where 90% of the patients have mild dehydration.

In the current study, patients with nosocomial diarrhoea 75% had less frequency of stool, 80% of patients had watery stool, 35% had vomiting, 30% of patients had fever, Sherchan et al (2011),¹³

reported in their study nosocomial diarrhoea had milder dehydration which is similar to present study.

In our study, in stool R/M/E pus cell was found in 50% cases and antibiotics were given to treat those patients of invasive diarrhoea. Every patient was treated with ORS to correct dehydration, Zinc to reduce frequency of diarrhoea. All the patients improved with appropriate treatment.

Conclusion:

Diarrhoea is very important issue in children in developing country like Bangladesh. About 29% of patients admitted at hospital with other than diarrhoeal disease, developed nosocomial diarrhoea in this study. Patients aged below 2 years, staying longer duration at hospital, presence of diarrhoeal patients bed beside patient's bed, no hand washing by mother during handling, sharing the bathroom with diarrhoeal patient and malnutrition were significantly associated with the occurrence of hospital acquired diarrhoea.

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