

Original article

Percent Bed occupancy rate in a selected specialized tertiary care hospital in Dhaka city

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Abstract

Background and Aims: Providing a necessary care for a sick person outside home 'in hospes or hospital' dates back to nearly 300 century BC. In the present day hospital care facilities has been taken an institutional shape both in public and private sector. A hospital bed is both a scarce and expensive commodity in healthcare. Administrators running hospitals are in a dire need of objective measures and methods for efficient management of their limited financial resources. Bed utilization rates can be of immense help in realistic and effective decision making. The present study was undertaken to explore utilization of bed in a specialized tertiary care hospital in the Dhaka city. **Methods:** Hospital records of the year were reviewed- age, gender, disease profile, duration of hospital stay, outcome of treatment were recorded and bed occupancy rate was calculated. Data were presented as number, percentage and/ or mean SD, as appropriate. The data were managed by Statistical Package for Social Science (SPSS) for Windows Version 10. **Results:** The results showed in the year 2001 total number of admissions were 13,305 of which 9953 (74.8%) were male and 3352 (25.2%) female. Average monthly admission was 1109. Maximum number of admissions (1304) was observed in the month of September of that year. Male admission rate was higher than female admission throughout the year. Among all the admission 27.2% were of road traffic accident cases. Among the admitted patients there was 57.3% discharge with advice, 1.9% death, 14.6% discharge on request bond, 12.7% discharge on request. Of all the admission there 12.5% found to be absconded. Bed occupancy rate was 79.75% and average length of stay in the hospital 18.47 days. **Conclusions:** The present data suggest that (i) in terms of bed occupancy rate the NITOR found to run in optimal capacity which, however, might be attributed to the relative high rate of ascendance and discharges on requests; (ii) average length of stay of patients appeared to be relatively longer and (iii) the management need to look into the issue and take appropriate measures to reduce patients unwanted long duration of stay and make the tertiary care hospital improve the quality of services.

Introduction

Care of a sick person outside home was initially linked to religious place which later has taken the shape organized institution like the present day over the course of hundred of years¹. However, in early sixties of the past century a definition was suggested by a WHO Expert Committee as 'A hospital is a residential establishment, who provider short term and long term medical care consisting of observational diagnostic therapeutic and rehabilitation'². Healthcare is accepted as the basic rights of the citizen to ensure perfect functioning of body and mind³.

Healthcare service in a country spans as primary,

secondary and tertiary care level⁴. In addition to that there are specialized care centre(s) like cardiac, thoracic and neurosurgery specialties. Healthcare structure in Bangladesh outlined as (i) Home and community level field workers; (ii) Union level: H and F. W.C/U.S.C- this is the first static health facility; (iii) Thana health complex (THC)- the primary referral hospital; (iv) District Hospital- the secondary referral level hospital (5) Medical College Hospitals and Specialized Institutes- constitutes tertiary referral level hospitals⁵. A functional referral system belied to be necessary for obtaining maximum benefit of the healthcare system, which, however, is observed to be lacking so far.

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In evaluating the utilization of a hospital its bed occupancy rate is generally calculated. A number of investigators have attempted to work out bed occupancy in different tiers of hospitals of Bangladesh. Wide variations in the rate of bed occupancy in Upozilla (Thana), District and Medical College Hospitals were observed ^[5,6]. The lowest, 50% bed occupancy was observed in the Upozilla hospitals and the highest, 100 percent, in Medical College Hospitals ^[5,6]. This observation suggested that Medical College Hospitals are extremely burdened in the face of underutilization of primary level hospitals in the Upozillas.

Specialized hospitals were understood to serve as the referral centers and help achieve the goal of dealing with special cases. There are five specialized tertiary level of public hospitals in Bangladesh which is 250 to 600 bedded. National institute of Traumatology, Orthopedics and rehabilitation is 500-bed hospital which deals with huge number of patients with orthopedic problems all over the country. The present study was undertaken to evaluate bed occupancy of the NITORE in a year and explore the disease profile it dealt for that particular time.

Materials and Methods

This retrospective descriptive type of study evaluated patients' records of National Institute of Traumatology, Orthopedics and Rehabilitation (NTTOR), Dhaka-1207, for the period of January to December 2001 after obtaining permission from the respective authority.

All the hospital admission records were accessed, counted the number and cross checked with hospital records. A total number of 13305 hospital records were reviewed, variables compiled and finally ana-

lyzed. Only complete records were considered for evaluation.

Variables considered were age, gender, disease profile and duration of hospital stay, outcome of treatment and bed occupancy rate of the hospital.

Month wise duration (days) of hospital stay of patients was the aggregate of number of days spent by them during the course of treatment. Bed occupancy rate was calculated as following ^[7]:

$$\text{Hospital bed occupancy rate} = \left[\frac{\text{No of in-patients hospital beds occupied}}{\text{Average number of hospital beds}} \right] \times 100$$

Statistical methods

Data were presented as number, percentage and/ or mean SD. The data were managed by Statistical Package for Social Science (SPSS) for Windows Version 10.

Results

A total of 13305 patients were admitted from January to December for the year 2011. Month wise total number of admission found to swing around the mean value through out the year. Number of patients admitted during May to November, 2001 were higher than that of the mean. Male admission was higher than female through out the year (Table I). Proportion of admitted male patients were 74.8% (9953 out of 13305) compared to female 25.2% (3352).

Mean SD duration of hospital stay in days was 12801 714. Month wise aggregate days of hospital stay in May to August showed upward trend (Table I).

Table I: Month wise distribution of admission and duration of hospital stay and outcome of hospitalization by gender in 2001 in NTTOR

Month	Number of admission			Duration (days) of Hospital stay		
	Male	Female	Total	Male	Female	Total
January	739	249	988	8665	2919	11584
February	705	237	942	4868	2853	11321
March	745	251	996	9092	3062	12154
April	754	254	1008	8289	2792	11080
May	836	281	1117	9768	3291	13059
June	871	294	1165	9357	3152	12509
July	966	326	1292	9894	3334	13229
August	898	303	1201	9480	3194	12674
September	976	328	1304	9276	3125	12401
October	899	303	1202	9134	3078	12212
November	844	284	1128	9075	3057	12132
December	720	242	962	8368	2819	11187
Total (%)	9953 (74.8)	3352 (25.2)	13305 (100)	105266	36676	145542
Mean±SD	829±95	279±32	1110±128	8772±1325	3056±179	12128±709

Results were expressed as number, number (%) and mean±SD.

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Age wise distribution of admitted patients for the year was shown in table II. It was shown that 46.6% of the admitted patients for the year were between age group 25 to 40 year. The proportion of patients for both male and female were almost similar for the three clusters from 25-38 years (Table II).

Table II: Distribution of indoor patients by age and sex in NITOR for the year of 2001

Age (year)	Male N (%)	Female N (%)	Total N (%)
0-4	488 (4.90)	165 (4.91)	653 (4.9)
5-9	486 (4.88)	166 (4.94)	652 (4.9)
10-14	489 (4.91)	162 (4.82)	651 (4.9)
15-19	776 (7.79)	262 (7.80)	1038 (7.8)
20-24	189 (1.90)	64 (1.91)	253 (1.9)
25-29	2319 (23.28)	781 (23.26)	3100 (23.3)
30-34	1065 (10.69)	359 (10.69)	1424 (10.7)
35-39	1254 (12.59)	422 (12.57)	1676 (12.6)
40-44	388 (3.89)	131 (3.90)	519 (3.9)
45-49	578 (5.80)	194 (5.78)	772 (5.8)
50-54	387 (3.88)	132 (3.93)	519 (3.9)
55-59	578 (5.80)	195 (5.81)	773 (5.8)
>60	965 (9.69)	325 (9.68)	1290 (9.8)

Results were expressed as number (percentage).

Month wise bed occupancy of the year 2001 was shown in the table III. Mean (SD) bed occupancy for the studied year was 79.76 4.26. In the month of May the rate was the highest (84.25%) in the face of lowest in December (72.17). Number of admission and bed occupancy for the year 2001 was explored on the basis profile of the clinical conditions and gender (Table III).

Table III: Month wise distribution of patients admitted, number of days patients stayed in bed and bed occupancy rate in NITOR for the year 2001

Month wise admission		Duration (days) of hospital stay of patients	Bed occupancy (%)
Month	No		
January	988	11584	74.74
February	942	11321	80.86
March	996	12154	78.41
April	1008	11081	73.87
May	1117	13059	84.25
June	1165	12509	83.39
July	1292	13228	85.34
August	1211	12674	81.76
September	1304	12401	82.67
October	1202	12212	78.78
November	1128	12132	80.88
December	962	11187	72.17
Mean±SD	1110±128	12128±709	79.76±4.26

Results were expressed as number, number (%) and mean±SD.

Mean SD occupancy on the basis of clinical profile was 5.6 5.1. Of the total 79.75 (average) month wise occupancy bony fractures constitute about 47.22%, Club foot and others 7.33%. Patients of road traffic accidents attributed to about 21.69 of total 79.75 occupancy (Table IV).

Table IV: Distribution of bed occupancy rate by type of orthopedic problem by gender and their bed occupancy in NITOR in 2001

Diseases	Number of days patients stayed in beds			Bed occupancy rate%		
	Male	Female	Total	Male	Female	Total
RTA	29611	9976	39587	16.22	5.47	21.69
Fracture of Pelvis	4246	1430	5676	2.33	0.78	3.11
Fracture trochanter	10559	3558	14117	5.79	1.95	7.74
Fracture neck femur	9471	3191	12662	5.19	1.75	6.94
Fracture patella	6314	2127	8441	3.46	1.17	4.63
Fracture Tibia and Fibula	10559	3558	14117	5.79	1.97	7.74
Fracture Ankle joint	4246	1430	5676	2.33	0.78	3.11
Fracture Suprachondyler	7403	2493	9897	4.05	1.37	5.42
Fracture Shaft humorous	1088	367	1455	0.59	0.21	0.80
Fracture lower end humorous	3156	1064	4220	1.73	0.58	2.31
Fracture radius-ulna	703	2494	9897	4.05	1.37	5.42
Collies fracture	2068	697	2765	1.13	0.38	1.51
Club foot	7403	2494	9897	4.05	1.37	3.42
Others	5334	1798	7132	2.92	0.99	3.91
<i>Mean±SD</i>	<i>7297±7200</i>	<i>2620±2340</i>	<i>10396±9286</i>	<i>4.3±3.8</i>	<i>1.4±1.3</i>	<i>5.6±5.1</i>
Total	108865	36677	145542	59.65	20.10	79.75

Results were expressed as number and mean±SD as appropriate.

Number of days occupied by one patient was worked out. Number of discharges were 646 77 in the year 2001 (Table V). Month wise the distribution was found to vary between 569 in December to 772 in August 2001. The distribution was appeared to be normally distributed. Table IV also demonstrated month wise total number of days patients stayed in the hospital bed and yearly mean (SD) was 12128 709. Monthly distribution of total hospital stay (days) was also normally distributed except relatively lower in April (Figure I). Mean SD number of days a patient in the hospital was 18.66 1.4. The distribution of values was also found to be consistently similar through out the year (Table V).

Table V: Month wise distribution of number of day one patient stayed in NITOR in 2001

Month	Number of discharges and death	Number days patients stayed in the hospital	Number of days on patient stayed in the hospital
January	585	11584	19.8
February	556	11321	20.36
March	573	12154	21.21
April	598	11081	18.50
May	661	13059	19.76
June	688	12509	18.18
July	766	13228	17.26
August	711	12674	17.82
September	772	12401	16.06
October	712	12212	17.15
November	667	12132	18.18
December	569	11187	19.66
Mean±SD	646±77	12128±709	18.66±1.4

Results were expressed as number and mean±SD as appropriate.

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Number of discharge with advice and deaths, total duration (days) of those patients stayed in the hospital and number of days one patient stayed in the hospital were demonstrated in the table VI. Total number (Mean SD) of deaths and discharge was 563 503. Total number of discharges and deaths in male was three times compared to those of female counterpart.

Duration (Mean SD) of total hospital stay for all the clinical conditions was 10396 9286. Mean total duration of hospital stay of male patients was almost three times of the female counterpart. Mean SD duration (days) of hospital stay of one patient was 18.5 0.1 (Table VI).

Table VI: Distribution of number of discharge and deaths, total duration of hospital stay by patients and duration of hospital stay on one patient by gender and total according to clinical profile for the year 2001 in NITOR

Diseases profile	Number of Discharge and Death			Number of days patients stayed in the hospital			Number of days one patient stayed in the hospital		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
RTA	1603	540	2143	29611	9976	39587	18.47	18.47	18.47
Fracture Pelvis	230	77	307	4246	1430	5676	18.46	18.57	18.49
Fracture Trochanter	272	192	764	10560	3557	14117	18.46	18.53	18.48
Fracture Neck femur	512	173	685	9471	3191	12662	18.49	18.44	18.48
Fracture Patella	342	117	459	6314	2127	8442	18.46	18.18	18.34
Fracture Tibia and Fibula	572	192	764	10560	3557	14117	18.46	18.52	18.48
Fracture Ankle joint	230	77	307	4246	1430	5676	18.46	18.57	18.49
Fracture suprachondyler	401	135	536	7403	2494	9898	18.46	18.47	18.46
Fracture shaft humorous	58	20	78	1089	366	1455	18.46	18.30	18.65
Fracture lower end humorous	171	57	229	3157	1064	4221	18.77	18.66	18.51
Fracture Radius-ulna	401	135	537	7403	2494	9897	18.46	18.47	18.46
Collies Fracture	112	38	150	2068	697	2765	18.46	18.83	18.43
Club foot	401	135	536	7403	2494	9897	18.46	18.47	18.46
Others	289	97	386	5335	1797	7132	18.46	18.52	18.48
Mean±SD	400±375	142±127	563±503	7776±6946	2620±2340	10396±9286	18.5±0.1	18.50±0.2	18.5±0.1

Results were expressed as number and mean±SD.

Outcome of admission of patients in NITOR in 2001 was shown in table VI. Only 57.3% admitted patients discharged with advice after recovery. Proportion of admitted patients were discharged on

request bond was 14.6%, discharge on request 12.7% and only 1% was referred to other institutes. It was observed that 12.7% of the admitted cases were absconded (Table VII).

Table VII: Distribution of admitted patients (n=13305) by outcome of hospitalization for the year of 2001 in NITOR

Outcome Of Hospitalization					
Discharge with advice	DORB	Referred	Absconded	DOR	Death
7624	1943	133	1674	1678	253
57.3%	14.6%	1.0%	12.5%	12.7%	1.9%

Results were expressed as number and percentage.

DORB, discharge on request bond, DOR, discharge on request

Discussion

A total of 13305 patients were admitted in 2001 of which 9953 were males (74.8%) and 3352 were females (25.2%). Male patients were more than female through out the year. The pattern was compared to a study conducted on a thana health complex (THC) in Abhoynagor⁸. The main bulk of admitted patients were the victim of different kind of injuries. The male female ratio of admission was 52.57% and 47.43% respectively⁵. The average monthly admission of patients in NITOR for the year 2001 was 1109 patients which appeared to be much higher compared to available data^{9,10}. In multidisciplinary district hospital average monthly admission was found to be 4850¹¹. The high rate may be attributed to the fact of focus of the NITOR as a specialized orthopedic hospital and also of the awareness of healthcare seeking population. The male female disproportion may have substantiated the view that men substantially travel more involved in outdoor risky jobs.

justifies the nearly similar proportion of male female among the admitted patients for the study period in particular 25- 39 years age range .

Bed occupancy rate (% , mean SD) was 79.76 4.26 which is very much within the suggested range, 70%-80%, mentioned in the book of hospital organization and management as an indicator for safe and effective care patients according to DGHs¹². The bed occupancy rate we have observed was much higher than that of the THC (45.09%)^{8,12}. There is, however, lacking of data regarding bed occupancy rate in any tertiary care hospital in Bangladesh perspectives. A Bangladesh Health Services Report in 1989, based on district hospitals, has shown that percent bed occupancy rate to approaching nearly hundred, however, according to operational definition a reasonable rate is around 80%^{9,12,13}.

Average length of stay of patients in the hospital was 18.5 0.1 (mean SD, Table VI). Hospital bed occupancy rate in different training hospitals in Turkey was found to be around 82-85% and average length

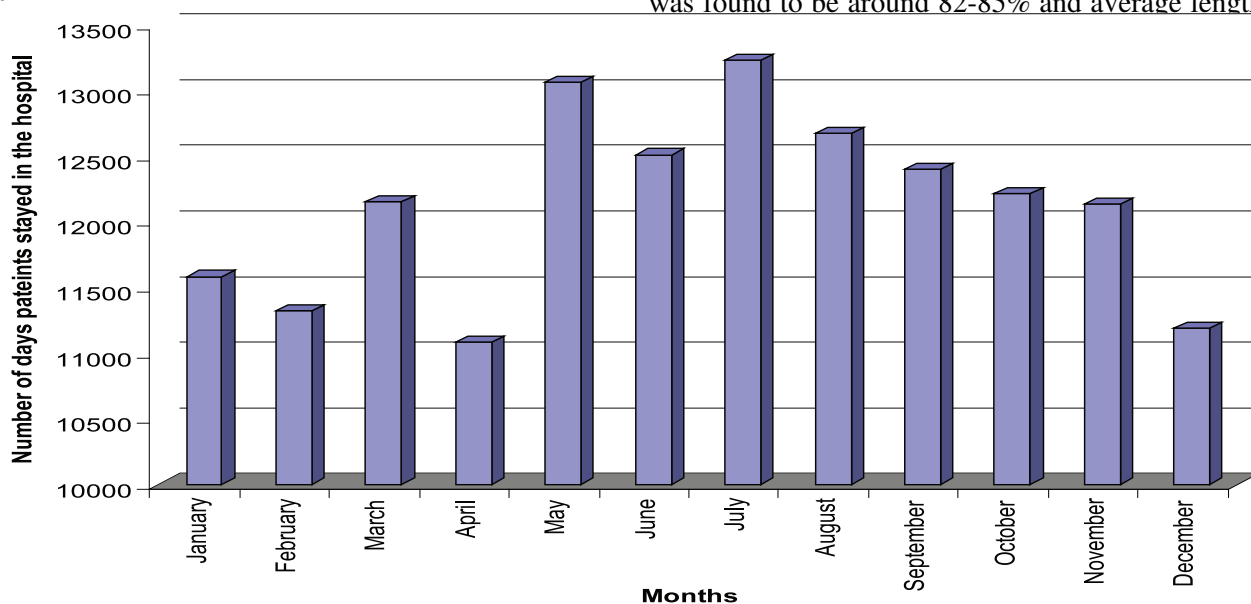


Figure I: Month wise total number of days patients stayed in the hospital for the year 2001 in NITOR.

Nearly fifty percent of admitted patients were between 25-39 years of age. Interestingly male female proportion of admission in the three age clusters of the range was similar (Table II). Patients from RTA accounted for 27.2% of admission for the studied year. Women in increasing are getting involved in jobs which mean they are also traveling more like that of male counterpart. Substantial number of hospital admission found to be the result of RTA then

of stay from 9-15 from 1990-1999^[14]. In different district hospital in Srilanka bed occupancy rate was found to be varying from 25% to 74%. In most of the cases it was between 50-60%¹⁵. In a tertiary care hospital in Goa, India bed occupancy rate in the Orthopedic Ward was found to be 97.4% where average length of stay in the hospital of a patient was 10.1 days¹⁶ which is much higher than the present study. However, percent bed occupancy rate in an orthopedic ward was about 68-76 from 2007 to 2009

^[17] that was almost similar to the present study. This strongly suggests that percent bed occupancy rate is ranging around the standard value with other hospitals which however might have contributed by high rate of absconding and cases and discharges on requests. The present data suggest that (i) in terms of bed occupancy rate the NITOR found to run in optimal capacity which, however, might be attributed to the relative high rate of ascendance and discharges on requests; (ii) average length of stay of patients appeared to be relatively longer and (iii) the management need to look into the issue and take appropriate measures to reduce patients unwanted long duration of stay and make the tertiary care hospital improve the quality of services.

Conclusions

The achievement and maintenance of more effective

bed utilization meant developing a better balance between beds and demand. Bed occupancy rate and average length of stay were found to be about 80% and 18.5 days average length of stay was not satisfactory, so turn over of the patients is not good and Bed occupancy rate 80%. There should be system of proper supervision, monitoring and evaluation of hospital performance by higher authorities and to determine the problems which in turn should solved for the effective and efficient utilization of hospital beds.

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