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Research Article

Hospital utilization pattern at a tertiary care hospital in tribal area of Central India

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ABSTRACT

Background: A hospital bed is both a scarce and expensive commodity in healthcare. The efficient bed management is most important for better utilization of hospitals. Hospital utilization indices are sensitive indicators to find pressure areas and thus help in proper allocation of hospital resources and forming better healthcare policies for hospitals. The objective of the study was to study the pattern of hospital bed utilization in last five years; seasonal and department-wise variation in hospital utilization indices.
Methods: It is a record based observational cross-sectional study conducted at a tertiary care hospital. Concerned data was collected from the medical record section and entered in a pre-designed proforma. Trends of various hospital indices were analysed.
Results: There were no much fluctuations in bed occupancy rate (BOR), Average length of stay (ALOS), bed turnover rate (BTOR) and turn over interval (TOI) from 2009 to 2013. For the year 2013, overall BOR of hospital is 75.71%, highest in the rainy season. The ALOS in hospital is 5.39 days and is around 5 days in all the months. BOR is highest in Surgery, obstetric-gynecology and ophthalmology department and lowest in skin department while ALOS is more in surgery and orthopedics followed by skin and obstetric-gynecology departments. ALOS is lowest in the department of Ophthalmology.
Conclusions: By studying the different indices, it was found that hospital utilization is optimum for this institution. The study findings will help in formulation of new health care policies for hospital.

Keywords: Hospital utilization, Bed occupancy rate, Average length of stay, Bed turnover rate, Turnover interval

INTRODUCTION

Tertiary care hospitals consume a large proportion of the healthcare budget. Their needs have been steadily rising over time given the spurt in newer technologies and rising public expectations. Administrators running these hospitals are in a dire need of objective measures and methods for efficient management of their scarce financial resources.

A hospital bed is both a scarce and expensive commodity in healthcare.[1] The availability of beds is perhaps the single most important factor in determination of the hospital utilization in a country.[2] The overload in hospital ward and shortage of hospital beds is a huge problem in India, the average bed population ratio being 9 per 10,000 population in comparison with the world average of 27 per 10,000 during 2000-2009.[3] This situation is further deteriorated by population explosion, increasing the flow of patients and rising demand for hospitalization. A possible way to minimize the problem of scarcities of beds is to look for variation in bed utilization according to geography, gender, age group, season and specialty department; so that resources can be allocated and services can be provided accordingly. Thus efficient bed

management is most important for better utilization of hospitals.

The term "hospital utilization" devotes the manner in which a certain community makes use of its hospital resources. However, the concept of "hospital utilization statistics" is relatively less known in our country. The hospital utilization statistics are also known a "patient movement statistics".[4] Hospital utilization indices will provide trends and pattern of hospital utilization. These are:

1. Average length of stay (ALOS)
2. Bed occupancy rate (BOR)
3. Bed turnover interval (TOI)
4. Bed turnover rate (BTR)

These indicators not only reflect changes in the service provided by any hospital but also provide necessary data of seasonal variations. By these indicators, we can suggest necessary measure to improve the quality of services and prepare our self to meet the requirement of the community.

Objectives

1. To study the pattern of hospital bed utilization in last five years.
2. To study the seasonal variation in hospital utilization indices.
3. To study the department-wise variation in hospital utilization indices.

METHODS

Study design: Record based observational cross-sectional study.

Study setting: Shri Vasantrao Naik, Govt. Medical College, a tertiary care hospital, Yavatmal (Maharashtra)

Study period: 1st April 2014 to 31st May 2014.

Shri Vasantrao Naik, Govt. Medical College is 594 bedded only tertiary care hospital located in tribal area of Yavatmal district, Maharashtra. It caters to the urban, rural as well as tribal population. Data concerning inpatient admission, duration of stay, discharge, bed occupancy, deaths and hospitalized patient days for the years from 2009 to 2013 was collected from the medical record section of the college which is under the control of Community Medicine Department and was entered in a pre-designed proforma. Trends of various indices over last five year period (2009-2013) were analysed.

The details of the year 2013 (January- December) was obtained department wise and compiled. The data collection was restricted to Medicine (147 beds), Surgery (110 beds), Orthopaedics (60 beds), Gynecology-Obstetrics (120 beds), Pediatrics (80 beds), Ophthalmology (36 beds), Ear Nose Throat (30 beds), Skin (15 beds) and Emergency (24 beds) wards. The information of entire hospital in toto was also collected and hospital bed utilization indices were calculated for those selected ones. The departments with very high and very low occupancy were compared. The seasonal variation in hospital utilization indices for year 2013 was also studied. The indices studied are:

1. Bed Occupancy Rate (BOR) = (N / B) x 100
   N = Summation of daily census in year
   B = Total number of beds
2. Bed Turnover Rate (BTOR) = (D + d) / B
   (D + d) = Number of discharges + deaths for year/month
   B = Total number of beds
3. Average length of stay (ALOS) = H / (D + d)
   H = Total number of inpatient bed-days in a year/month
   (D + d) = Number of discharges and deaths in the same year/month

Bed occupancy rate reflects the popularity of the hospitals in terms of inpatients. The level of BOR also varies with the type of facilities available in the hospital. Usually larger the number of beds, the larger is the number of doctors also. As a result more facilities are provided and the level of medical care tends to be of a higher magnitude. Given this, it is normally the case that the BOR in District Hospitals is higher than the BOR in the Area and Community Health Centers. It is considered that BOR above 85% have a negative impact on the safe and efficient operation of a hospital.[5]

The bed turnover rate essentially defines the period for which a bed is occupied. The BTOR indicates the speed with which patients on any bed are rotated. Obviously the more complicate the case dealt with by the hospitals, the smaller the BTOR. Too large a BTOR indicates that only simple type of treatment is being provided. Too small a BTOR would indicate fewer people utilizing the hospital and patients being unnecessarily retained on the premises. Both are not desirable.

The average length of stay represents the time the patient is retained in the hospital. As in the case of the turnover rate, a longer ALOS is to be expected in the case of hospitals having better facilities such as the District Hospitals. In the case of Community Health Centers where the level of treatment in general is lower, the average length of stay is likely to be less.

Statistical analysis

Collected data was compiled on Microsoft excel worksheet. Data was analysed using frequency, mean, simple proportion & percentages.

RESULTS

The ALOS for the entire hospital in last five years was highest in 2009 (5.56 days) and lowest in year 2013 (5.39 days) with no much variation from 2009 to 2013 whereas BOR was highest in 2013 (75.71%) and lowest in 2011 (69.09%). The BTOR was lowest in 2009 (39.2%) which increases to 46.5% in the year 2011 and again decreased to 42.7% in 2013. So, it is obvious from Table 1 that all the three indices were nearly constant in all years (2009-2013) with no much variation.

Table 1: Distribution of hospital indices from 2009 to 2013.

Sr. No.	Year	BOR (%)	ALOS (days)	BTOR (%)	TOI (days)
1	2009	71.22	5.56	39.2	2.27
2	2010	72.27	5.37	41.1	2.18
3	2011	69.09	5.43	46.5	2.3
4	2012	69.26	4.97	42.6	2.3
5	2013	75.71	5.39	42.7	1.73

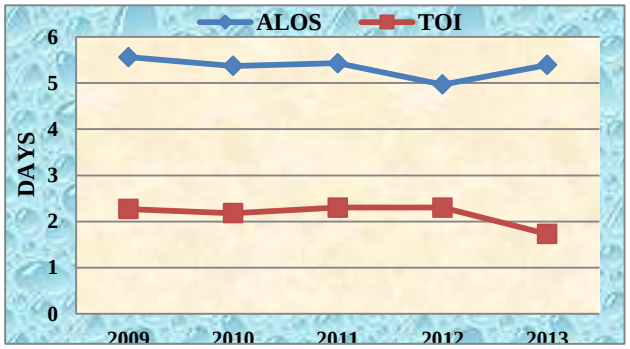

Figure 1: Trend in ALOS and TOI for the hospital (2009-2013).

Table 2: Month-wise distribution of hospital indices in year 2013.

Month	BOR (%)	ALOS (days)	BTOR (%)
January	65.10	5.24	38.5
February	69.50	5.34	36.5
March	69.12	5.47	39.2
April	73.49	5.75	38.4
May	75.39	5.53	42.3
June	69.16	5.59	37.1
July	77.59	5.84	41.2
August	83.72	5.20	49.9
September	88.74	5.14	51.8
October	83.18	5.05	51.1
November	73.69	4.93	44.8
December	79.24	5.84	42.1
Average	75.71	5.39	42.7

The details of the year 2013 (January- December) was obtained daily department wise and compiled. Overall BOR of hospital for the year 2013 was 75.71%. Table 2 shows BOR was highest from August to October i.e. in the rainy season. The BTOR was also highest in the month of August to October. This is justifiable because in rainy season water borne diseases are more prevalent in the community so more patient come to hospital and get admitted. So, the BOR was highest in the rainy season. Similarly, the recovery is fast in these diseases. That's why the BTOR is also high in these months. The average length of stay in hospital is 5.39 days and is around 5 days in all the months.

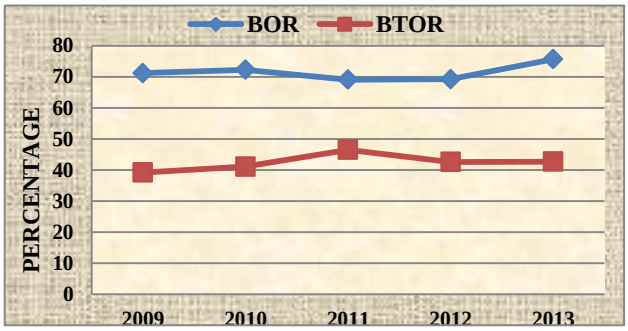

Figure 2: Trends in BOR and BTOR for the hospital (2009-2013).

Table 3: Department-wise distribution of BOR and ALOS in year 2013.

S. No.	Department	No. of beds	Total patient in IPD	BOR (%)	ALOS (days)
1	Medicine	147	6947	85	7
2	Surgery	110	1578	100	10
3	Orthopedics	60	618	80	10
4	Obstetrics-Gynecology	120	10926	100	2-8*
5	Pediatrics	80	4300	72.93	4.95
6	ENT	30	457	60	7
7	Ophthalmology	36	2068	100	2
8	Skin	15	101	17.58	9.53
9	Emergency	24	4922	100	1

*2days- for normal delivery, 8 days- for Cessarean section and major operation

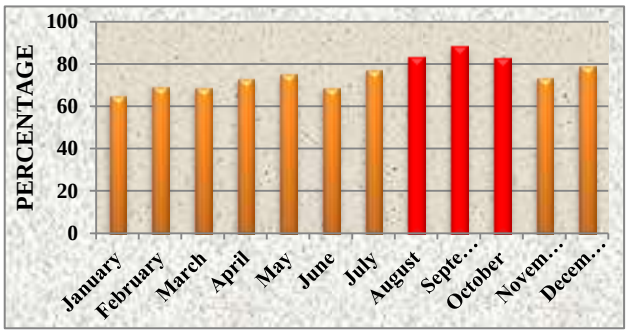

Figure 3: Month wise distribution of BOR for year 2013.

Table 3 shows department-wise distribution of hospital indices. BOR was 100 % in Surgery, Obstetric-Gynecology and Ophthalmology department, 85% in medicine department, 72% in Pediatrics department and is lowest in Skin department. The ALOS is more in surgical departments i.e. Surgery, Orthopedics and Obstetric-Gynecology. Department of Skin also has more ALOS (9.53 days) as skin diseases requires more duration to cure. ALOS is lowest (2 days) in department of Ophthalmology.

DISCUSSION

In the study we found that there were no much fluctuations in BOR, ALOS, BTOR and TOI from year 2009 to 2013. This indicates that utilization of hospital facilities was same in all years.

The study shows that institute is catering to more number of patients than it has been sanctioned. For the year 2013, overall BOR is 75%. Some of the departments have 100% BOR. Our findings are similar to Thapa V et al who also reported 75% of BOR in his study and higher than Ravi Kiran E et al and Vaz FS et al (60% each).[1,4,6] Anand TR in his treatise on hospital services and management considered BOR of 80-90% as optimal.[7]

In our study ALOS is 5 to 6 days with Surgery, Orthopedics, Obstetric-Gynecology, and Skin department has highest ALOS as these department deals with operative procedures and chronic diseases requiring more duration of hospitalization. Vaz FS et al also found ALOS of 6 days in his study while Thapa V et al reported very low ALOS (2.7 days).[1,6] Ravi Kiran E et al also reported higher ALOS in Surgery, Orthopedics and Skin department.[4] Anand TR in his treatise considered an ALOS of 6-10 days as optimum.[7] We also reported BTOR of 42.7% in the study. Haider S et al also reported 43% of BTOR while Dutta S et al reported only 13.8% in their study of the Gynaecology wards at a district hospital.[8,9]

Also regarding seasonal variation we found that BOR and BTOR is highest in months of rainy season (from August to October).This is obvious as in rainy season water borne diseases are more prevalent in the community so more patient come to hospital and also as these diseases recover fast, so BTOR is also high in these months. But Ravi Kiran E et al found BOR more in months from January to March while Haider S et al during May to July.[4,8] ALOS is constant (around 5 days) all over the year with no major fluctuations.

CONCLUSION

By studying the different indices (BOR, ALOS, BTOR), it was found that hospital utilization is optimum for this institution. Being a government tertiary care hospital people are coming to hospital for seeking health care and the hospital also providing good services to them. But in certain departments (Surgery, Obstetrics) where BOR is very high require allocation of extra beds. Also month by month department-wise analysis will help to find high patient load spots and better allocation of hospital resources for betterment of community health. Patient's satisfaction regarding health care provided by the hospital needs to be evaluated.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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