

RESEARCH ARTICLE

EVALUATION OF HOSPITAL BED UTILIZATION PATTERN AT A TERTIARY CARE HOSPITAL

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..... Manuscript Info

Manuscript History Received: 20 April 2020 Final Accepted: 25 May 2020 Published: June 2020

Key words:-Hospital Statistics, BOR, BTI, BTR

Abstract

..... 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 Efficient bed management is most important for better utilization of hospitals.

Objective: To study the pattern of hospital bed utilization from July to September 2018 in General Medicine Department of Gandhi Hospital.

Methodology; Record based observational study done with the retrospective data of inpatients of General Medicine wards collected from the Medical Records Section of Gandhi hospital.

Results and Observations: The study shows that the institute is catering to the services of more number of patients than the beds sanctioned in the medical wards. In the study, as the **BOR** is more than 100% in the months of August and September, it clearly indicates that there is over utilization of beds. The Average Length of Stay (ALOS) in the study is found to be 4.30, 4.35, 4.30 days respectively for the months (July – September). The BTI in the study was found to be 0.04, -0.14, -0.14 days respectively. Hence negative BTI clearly shows us the picture that there is scarcity of beds to cater the needs of patients getting admitted. BTR in the study was 7.08, 7.36, 7.17 respectively. Conclusion: By studying the different indices (BOR, ALOS, BTR, BTI), it was found that hospital utilization is more than the optimum. Being a government tertiary care hospital more number of patients seek health care and also large proportion of cases are being referred from neighbouring places as well as from private and corporate hospitals within the city.

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Introduction:-

Hospital Bed:

WHO defines hospital bed as bed that is regularly maintained and staffed for the accommodation and full time care of a succession of inpatients and is situated in wards or a part of the hospital where continuous medical care is provided. Total number of beds excludes bed compliment of the hospital for normal, healthy newborn babies in maternity wards but includes incubators used for premature babies.

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Sanctioned Bed:

It is the official bed capacity of a hospital.

Functional Bed:

This is the actual functional status of beds in a hospital.

Bed days / Patient Days:

A bed day is a day during which a person is confined to a bed and in which the patient stays overnight in a hospital. It is the unit of measure denoting the services rendered to one inpatient day in the hospital.

Utilization:

Defined as the manner in which a certain community makes use of its available hospital resources. Utilization of a Hospital can be measured by:

Volume of Hospital Utilization: This is calculated according to number of discharges (patients) of a hospital, Days of hospital care (service days) and Average length of stay (ALS) the mean.

Character of Individuals Utilizing Hospital: Use according to age, sex, procedure, diagnosis (through international classification of disease).

Efficiency of Hospital Utilization: An efficient hospital is one that is capable of achieving these results with no or minimal waste.

Efficient bed management is most important for better utilization of hospitals.Dynamics of utilization of beds was studied retrospectively for a period of 3 months (July – September 2018) by observing the trend of bed complements; bed occupancy rates (BOR), average Length of stay (ALS) Bed Turn Over Interval (BTI) and bed turn-over rates (BTR). Hospital utilization indices are sensitive indicators to find pressure areas and thus help in proper allocation and utilization of resources. Bed utilization efficiency and hospital resource utilization are of prime importance to remove the "Hospital Bottlenecks" which in turn reduces the length of stay of in-patients. The hospital utilization statistics are also known as "patient movement statistics" and also reflects the performance of the hospital itself in relation to its patient care services being rendered.

Hospital Statistics:

The information that is obtained from the hospital outpatient, in patient and other facilities regarding quality of care, utilization of services, quantity of services delivered, work load and other hospital related administrative and logistic services is called Hospital statistics.

Objective:-

To study the pattern of hospital bed utilization from July to September 2018 in General Medicine Department of Gandhi Hospital.

Materials And Methods:-

Study Design:

Record based observational study done with the retrospective data of inpatients of General Medicine wards collected from the Medical Records Section of Gandhi hospital.

Study Setting:

Gandhi Hospital (A Tertiary Care Teaching Hospital), Secunderabad, Telangana.

Study time period:

From July to September 2018.

Gandhi Hospital has grown into tertiary care teaching Hospital started in 1958, now with present bed strength of 2000, covering of about 36 departments.

The total census for the months from July to September 2018 of General Medicine wards was found to be 18020 with 10912 males and 7108 females. The total numbers of admissions were 4121 with 2547 males and 1591 females. The total numbers of discharges were 2403 in male wards and 1502 in female wards with a total of 3905 discharges. Total numbers of deaths were 248 with 182 in male wards and 66 in female wards

Table 1:-

July to September	Male	Female	Total
Admissions	2547	1591	4121
Discharges	2403	1502	3905
Deaths	182	66	248



Fig 1:- Monthly Admission pattern.



Fig 2:- Monthly Discharges plus Deaths Pattern.

Hospital utilization indices provide trends and pattern of hospital utilization. These are:

- 1. Average length of stay (ALOS)
- 2. Bed occupancy rate (BOR)
- 3. Bed turnover interval (BTI)

4. Bed turnover rate (BTR)

These indices not only provide data of the services being provided, but also give lot of inputs and required information to take up necessary measures to improve the quality of services and also help in proper planning to implement the requirements for better services.

Indices:

1. Bed Occupancy Rate $(BOR) = (N / B) \times 100$:

N = Daily average number of beds occupied. 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 or hospitalized bed days in a year/month. (D + d) = Number of discharges and deaths in the same year/month.

4. Bed turn over interval (BTI) = B-N/(D+d):

Bed Occupancy Rate reflects the quality of services of the hospital. The level of BOR also varies with the size and scale and types 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 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 Centres. It is considered that the BOR from

80-85% is ideal for good quality of patient care.15-20% beds are vacant for emergency, isolation, disaster and intensive care (Dead Space Beds).100% occupancy means over utilization. Occupancy less than 80% is uneconomical.

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 BTOR indicates that only simple type of treatment is being provided. Too small 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 centres where the level of treatment in general is lower, the average length of stay is likely to be less.

The Bed Turn over Interval is the average length of time that elapses between the discharge of one inpatient and the admission of the next in patient to the same bed. It is the average period in days that a bed remains empty. Negative BTI indicates scarcity of beds and over utilization. Long positive BTI indicates under utilization because of defective admission procedures or poor quality medical care. Short positive BTI indicates optimum utilization. BTI is zero when Bed Occupancy Rate is 100%

Month	ALS (days)	BOR (%)	BTI (days)	BTR
July	4.30	99	0.04	7.08
August	4.35	103	-0.14	7.36
September	4.30	103	-0.14	7.17

Results:-

Discussion:-

The study shows that the institute is catering to the services of more number of patients than the beds sanctioned in the medical wards. In the study, as the **BOR** is more than 100% in the months of August and September, it clearly indicates that there is over utilization of beds. The BOR is less than 100% that is 99% in the month of July which leads to a positive BTI in that month.



Fig 3:- Monthly Distribution OfBor.

The Average Length of Stay (**ALOS**) in the study is found to be 4.30, 4.35, 4.30 days respectively for the months (July – September). Thapa V et al reported very low ALOS $(2.7 \text{ days})^5$. The ALOS is often used as an indicator of efficiency. The shorter the ALOS, cost per discharge will get reduced. The average duration of hospital stay is variable and highest in departments dealing with chronic diseases. There is need to concentrate on these and patients may be discharged if found fit. Here the ALS is less because floor beds are used over and above the formally sanctioned beds. So the actual ALS will be more if the sanctioned beds only are used.

The BTI in the study was found to be 0.04, -0.14, -0.14 days respectively. Hence negative BTI clearly shows us the picture that there is scarcity of beds to cater the needs of patients getting admitted. Also from the data observed it has been found that major share of admissions are into the General Medicine Wards with cases varying from poisoning, snake bite, malaria, Ascites, Asthma, jaundice, CVA cases etc. It's a common finding that daily census exceeds the total number of beds in the wards. Hence as stated earlier that the hospital is catering to more than sanctioned, there are floor beds too which are functional almost throughout the year especially in this department.

BTR in the study was 7.08, 7.36, 7.17 respectively. Hence it means that average of 7 patients are cared for a given bed during a given period. BTR gives the net effect of changes in occupancy rates and ALOS. High BTR negatively implies the quality of medical care and also projects the need for sanctioning of more beds. Barber & Johnson have evolved a convenient way of presenting the four performance indicators in a single diagram,

Barber & Johnson have evolved a convenient way of presenting the four performance indicators in a single diagram, which is named after them as B J Diagram or B J Chart

B Barber and D Johnson introduced the concept of BJ Chart in their article titled "The Presentation of Acute Hospital In- patient Statistics" in the Journal 'Hospital and Health Services Review', 1973 .This Chart is described well in the Book "Hospital Beds: A problem of Diagnosis and Management" by John Yates, Heinemann Publications, London 1982.

B J Chart can be prepared when we have the values for ALS and BTI only.

Barber &Johnson suggested drawing Isolines which they called BTR or 'Throughput' Isolines; which meant any point on the particular line would yield the same BTR.



Observations:-

- 1. Lack of adequate personnel
- 2. The equipments in the wards are not in adequate number like ECG machine, Glucometers.
- 3. At times equipment breakdown in the hospital.
- 4. Long waiting period for investigations like CT, MRI, Sonography for few cases resulting in the delay of appropriate treatment and long period of stay in the hospital
- 5. Sometimes Lack of reagents in the pathology lab, hence delay in the reports for few patients
- 6. At times delay in supply of medicines in the hospital.
- 7. No proper SOP's (standard operating procedures) in the admission process.
- 8. No proper training and information in the segregation and disposal of Bio medical Waste, which may lead to increase in hospital acquired infections.
- 9. Being an End point referral centre, Gandhi Hospital is being flooded with many complicated cases that have been treated and referred from various outside hospitals resulting in poor prognosis of the patients.
- 10. Sometimes there is Delay in transfer in and transfer out of patients from one ward/department to other ward/department causing problem in the timely intervention of the management of the needy patient.
- 11. Delay in Cross consultation.
- 12. Sometimes Repetition of investigations.
- 13. Increase in Hospital infections.
- 14. Accommodation problem for Attendants.

Inspite of the small gaps and lacunae in the regular services, the patient care services are very much satisfactory as the hospital indices being evaluated as a part of the observational study reflects better utilization of services.

Conclusion:-

By studying the different indices (BOR, ALOS, BTR, BTI), it was found that hospital utilization is more than the optimum. Being a government tertiary care hospital more number of patients seek health care and also large proportion of cases are being referred from neighbouring places as well as from private and corporate hospitals within the city.

It is specifically found that there are lot of cases with poor prognosis or in terminal stages are being referred to Gandhi Hospital and get admitted here and also the patients don't follow up regularly as advised by the physician and moreover many patients do not take prescribed medication on time or as advised and hence they get admitted again.

The study in General Medicine Department shows high BOR requiring allocation of extra beds. To overcome this, regular month wise analysis and evaluation will help to find high patient load spots so that a better allocation of hospital resources can be done leading to higher Patient's satisfaction.

By studying the pattern of hospital utilization, we can better plan hospital services with allocation of required resources which can be properly utilized. With the adequate resources in hand, we can identify the high pressure areas with provision of necessary requirements with regular monitoring of services will be very helpful. There is need to increase the no. of beds as per the requirement and laid down guidelines and to plan for the establishment of expansion of departments with super-specialty services by taking help of all the resources from state and central like PMSSY project.

Suggestions:-

Facility to be enhanced to cater the demand of investigations to be done on OPD basis.

The Diagnostic facilities should be well established on a priority basis to cater the needs of Inpatients in time for better patient care services.

Relocating the patients from the areas where BOR is high to the areas where the BOR is less than optimum to overcome the overutilization crisis.

To establish proper SOP's and Infection Control Committees to control the hospital acquired infections.

Appropriate measure to be taken to Increase the nursing staff to provide timely treatment as well as to timely follow the orders of treating physician when it comes to sending samples for diagnosis and drug indenting Appointment of adequate number of Patient Care Providers who are in charge of handling, shifting and transfer of the patients for all services

Day care to be encouraged:

Measures to be taken to initiate and establish proper Sop's for outpatient, Admissions and discharges with a regular monitoring on them.

Check on the time of cross referrals and referral protocols should be maintained.

Rescheduling of OPD timings and doctors availability.

Intermediate care could have an important role.

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