

Original Article

SARCASM OF QUALITY AND EFFICIENCY: AN EVALUATION OF PEDIATRICS INPATIENT BED UTILIZATION IN SERVICES HOSPITAL, LAHORE, PAKISTAN

Muhammad Ashraf Majrooh, Najam ud Din, Muhammad Naeem, Saeed Ahmed Khan, Muhammad Tauseef Javed, Waqar Butt, and Jumana Fatima

Objective: To determine inpatient bed utilization in the Pediatrics Ward of Services Hospital, Lahore as average daily census and Bed Occupancy Rate.

Methods: A cross sectional study was conducted in the Pediatrics Medicine Ward of Services Hospital Lahore which is a tertiary care hospital attached with Services Institute of Medical Sciences Lahore, Pakistan. A 'midnight census' was conducted by 4th year MBBS, Medical Students for the children admitted from 6 to 12 May, 2015. The data for inpatient service utilization was analyzed for estimation of average daily census and bed occupancy rate.

Results: The average daily census was 69 patients per day and the Bed Occupancy Rate was found to be 137.7%. This rate was higher than 100% that shows the over-utilization of beds leading to quality compromise for the provided services.

Conclusion: High bed occupancy rate indicates a scarcity of beds in the Pediatric Ward which highlights a disparity between the supply and demands of pediatric medical services. A change in policy and increase in number of beds would help provision of quality health services to the children.

Key words: Average Daily Census, Bed Occupancy Rate, inpatient service utilization, ,cross-sectional study, Services Hospital, Pediatrics,

Introduction

Bed occupancy rates have been proposed to reflect the ability of a hospital to provide safe and efficient patient care but it always remains the dilemma between the quality and efficiency of health services generally in developing countries where there is scarcity of the resources. In order to accommodate the large number of patients in a limited capacity inpatient wards the quality of care is often compromised. The Daily Inpatient Census is usually carried out at mid-night because at this time there is least reshuffling and changeover of the patients. The census consists of the number inpatients present at official census taking time (mid-night) each day and this also includes the patients admitted and discharged on the same day. The Average Daily Census is the average number of inpatients treated during a given period of time. The general formula for computing the Average Daily Census is.²

$$\frac{\text{Total number of inpatient services for a given period of time}}{\text{Total number of days in the same period}}$$

In a research study in Denmark, the National Health Database consisting of 322 departments of 72 hospitals was analyzed for bed occupancy and infection rates. It was found that there was 9 percent increase in hospital mortality and thirty-day

mortality rates with high bed occupancy rates in the two million admissions from 1995 to 2012 in Denmark.³ A study in Honolulu also concluded the significant quantifiable negative influence of high hospital bed occupancy on Emergency Department(ED) throughput affecting both hospitalized and discharged patients. There were increases in the odds of either a patient leaving without being seen (odds ratio 1.21; 95% CI 1.12 to 1.31) or being treated in a hallway bed (odds ratio 1.18; 95% CI 1.15 to 1.22).⁴

High bed occupancy rates not only affect the patient care but also negatively affect the health care providers. An article published in The American Journal of Psychiatry published in November 2008 revealed that an average increase of 10% bed occupancy in excess of the recommended limit for 6 months was associated with use of new antidepressant treatment among the health care provider staff. The pattern of association was dose response so that increase in bed occupancy was associated with increased likelihood of the use of antidepressants. So it was concluded in the study that overcrowding in hospital wards may have an adverse effect on the mental health of staff.⁵

In Brazil, a hospital assessment tool was initially developed and field-tested with involvement of local professionals and concurrent assessment and

planning of identified improvements as average daily Census of children was made. This tool was the prototype for subsequent hospital pediatric department assessments in countries such as Cambodia, Indonesia, Kazakhstan, Kenya, Solomon Islands and Timor Leste, where the findings were the basis for initiating pediatrics department improvement activities.⁶ The hospital with a high average occupancy rate may not necessarily be running more efficiently than the hospital with a low average rate. Hospitals with bed occupancy rates of above 85 percent are generally considered to have bed shortages. Little attention has been paid to the impact of these shortages on patients' outcomes. The availability of beds is perhaps the single most important factor in determination of the hospital utilization in a country. This overcrowding of the pediatric ward in hospitals is a major managerial and medical problem, common to the whole world and every country is equally affected with it.⁷

In 2006, a US based retrospective study was done over 39 freestanding, tertiary-care children's hospitals participating in the Pediatric Health Information System (PHIS) to know the relation between acute response and the bed occupancy of the pediatric hospitals. The results revealed that as a whole, PHIS hospitals were often at high occupancy (70% of all midnights above 85% occupancy and 42% of midnights above 95%). The patient safety, quality, and efficiency were adversely impacted by occupancy above 85-90%. The systems functioned well until 85-90% of capacity is utilized. Up to that point, service-delivery is maximized while allowing for natural fluctuations in patient volume. Above that point, "rejections" and delays mount, indicating a decreased acute response with high BOR.⁸

As very High bed occupancy rates affect the patient care & the staff, the low bed occupancy has its own implications. In Crain's analysis (2015), it was revealed that the American State of Chicago is

facing the plague of empty beds. According to report, pediatrics had the biggest decline of falling 8 percent in the six-county area. Only 92 of the state's 213 hospitals staff pediatric beds and the median occupancy rate was 20 percent, reflecting years of declining birthrates. Although, the median in the six-county area was higher i.e. 25 percent but 17 hospitals had rates under 20 percent. St. Bernard Hospital in Englewood was the lowest, with only 3 percent of its pediatric BOR.⁹

Pediatric medicine is in an initial stage in Pakistan as in other developing countries. Indeed, there is a great need of pediatricians to be trained in the care of critically ill or injured child in order to reduce the mortality rate. The beginning has been made but there is still long way to go. This field is full of opportunity and dynamism. Motivation and dedication towards providing care to ill children is the most important part in the development of pediatric medicine.

The rationale of the study was to find out the Bed Occupancy Rate in the Pediatric Ward of Services Hospital, Lahore.

Methods

A Cross sectional study was conducted in Services Hospital Lahore from 6 May, 2015 to 12 May, 2015 in Pediatric Medicine Ward. This is a tertiary care hospital having a 50 bedded Pediatrics Medical Unit attached with Services Institute of Medical Sciences Lahore, Pakistan. The study proposal was developed by the 4th Year Medical Students in the Department of Community Medicine Services Hospital Lahore under the supervision of the Head of the Department. A data collection tool was objectively developed and pre-tested in the Pediatrics Medical Ward. A data collection team consisting of 4th Year Medical Students was organized and trained for the data collection. Data collection team conducted midnight census of the Pediatrics Ward for inpatient services utilization from 6 to 12 May, 2015.

Data was compiled by using Microsoft Excel

Daily inpatient census report

Daily Inpatient Census Report of one day

Number of patients in the hospital at midnight at Day 1	Old Balance
Number of patients admitted on Day 2	Plus
Number of patient discharged, LAMA, Referrals and Deaths on Day 2	Minus
Number patients admitted and discharged, LAMA, Deaths and refereed on same day	Plus
Net Daily Inpatient Census	New balance

Worksheet and it was analyzed using formulas for Average Daily Census and Bed Occupancy Rate. For

Discussion

Diabetes mellitus is perhaps the fastest growing metabolic disorder in the world. As the condition Calculation of the daily census, number of patients admitted, number of patients admitted and discharged/LAMA and number of patients admitted and died on same day were added. Then, the number of patients previously admitted and discharged/LAMA and number of deaths were subtracted from that sum. The daily inpatient census report is given in table below. The average daily census was computed by dividing the total number of inpatient service days estimated by daily census in a given period of time divided by of number days during the same period.¹⁰

$$\text{Average Daily Census (C)} = \frac{N}{D}$$

Where

C= Average Daily Census

N= Number of inpatient service days

D= Number of days⁹

Bed Occupancy Rate (BOR) was calculated by using formula:¹¹

$$\text{BOR}^{12} = \frac{\text{Total number of inpatient service days for a given period}}{\text{Available beds} \times \text{Number of days in the period}} \times 100$$

Results:

The results are presented as total inpatient service days, average daily census and the Bed Occupancy Rates. The total inpatient service days as estimated by daily census were 482. The average daily census estimated was 69 patient days. The Bed Occupancy rate as estimated by using reference formula was found to be 137.7% which was marked above the recommended standards of 80 to 85%.

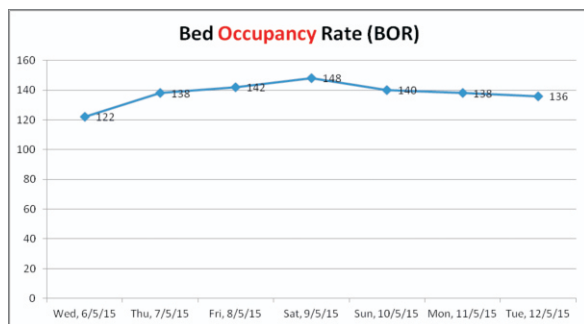


Fig-1: Trends in Bed Occupancy Rate at Pediatric Ward of Services Hospital, Lahore for one week period.

Discussion

Measurement of patient flow performance is an emerging field of research. We carried out the

midnight census of Children admitted daily in the Pediatric Ward of Services Hospital, Lahore for consecutive seven days by using a Performa as a data collection tool. The average daily census was 69 and BOR was 137.7% showing that there are 100 beds for every 137 children admitted in pediatric medicine ward of services hospital Lahore. A graph was plotted taking days at x-axis and BOR on y-axis to show the trends in BOR in Pediatric Ward of Services Hospital, Lahore during the 7-day period. It showed consistent high BORs (i.e. > 135%), with a peak of 148% on Saturday. The peak rise at weekends is indicative of the increased patient influx from suburbs and rural areas. It is indicative of overburdening because the basic health units and tehsil headquarter hospitals around Lahore are not fully functional and people don't prefer to avail health services in BHUs and THQs which ultimately lead to the increased patient influx in tertiary care level hospitals.

Bed Occupancy Rate (BOR) in a hospital is a sensitive indicator to assess the health care utilization of any hospital. It not only reflects changes in the service provided by any hospital but also provide necessary data of seasonal variations. It is of prime importance to remove the hospital bottlenecks which in turn reduces length of stay of in-patients. Over burdening of hospitals is a global issue, affecting even the Big Nations. In developed countries like United Kingdom and United States BOR is 88% and 90% respectively.⁶ The Denmark has the hospitals struck with very high Bed Occupancy Rate of 100%.

Bed occupancy rates above a safe threshold are associated with delays in admissions, which may divert resources from other processes in any department of hospital. Bed shortages might not result simply from a miss-match between supply and demand but might also involve factors such as a flawed approach in planning budgeting and leadership. There must be a self regulating mechanism that keeps occupancy rate around 80%-85% which may lead to relief of the physicians and the hospital staff.

The level of average whole hospital occupancy should not be the ultimate goal but rather what occupancy is appropriate to a bed pool of this particular size and function? The true challenge is to staff the patients rather than beds and to find out the supporting tools required to achieve this goal. Attempts to save both capital (and implied staff) costs may be seen in their true light and the full extent of the unanticipated consequences for staff and patients may be appreciated.¹³

Conclusion

Bed occupancy rate of Pediatric ward of Services Hospital Lahore in our study is 137.7%, which indicates that there are 100 beds available for 137 children. This reflects that the inpatient services are not sufficient to meet the pediatric disease burden of the population. Moreover the district referrals are not catering pediatric inpatient services leading to overburden to tertiary care facility. Hence it is recommended that the proportionate strengthening of the Pediatric inpatient services at tertiary care and

peripheral district levels may be ensured.

The recurring stress on capacity of pediatric medicine ward of services hospital Lahore has direct implications for disaster surge capacity. To cope with it, sanctioned number of beds should be increased as per WHO criteria.

*Department of Community Medicine
SIMS/Services Hospital, Lahore
www.esculapio.pk*

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