Original Research Article

The efficient of beds used based on graphic Barber Johnson at Semen Padang Hospital in 2017

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ABSTRACT

Background: Quality of hospital services can be seen from the bed usage. Statistical analysis of efficiency bed usage can be mesured based on inpatient medical records. To determine the efficiency requires four parameters namely bed occupancy rate (BOR), average length of stay (ALoS), turnover interval (TI), and bed turnover (BTR). parameters can be presented using Graphic Barber Johnson. This study aims to determine the efficiency of bed usage at Semen Padang Hospital in 2017.

Methods: This research was conducted at Semen Padang Hospital, West Sumatera, Indonesia from January to December 2017. The study used a descriptive method with a qualitative approach. The data was collected from medical records department. The population is all abstraction data of in-patient medical record in 2017, 9796 medical record used total sampling technique. Data analysis was performed by calculating the values of ALoS, BOR, BTR, and TI. Data will be presented based on graphic Barber Johnson. Excel 2010 and graphic Barber Johnson method were applied for data analysis.

Results: Number of daily inpatient censuses in 2017 are 31227 and number of service days are 31362. Number of beds 144. Statistical analysis results obtained total BOR 60%, BTR 67 times, TI 2 days and ALoS 3 days. The highest value of bed occupancy rate is 66% on August.

Conclusions: Based on statistical, value of bed occupancy rate (60%) and turnover interval (2 days) are efficient at Semen Padang Hospital in 2017. Average length of stay (3 days) and bed turnover rate (67 times) are not efficient.

Keywords: Graphic Barber Johnson, Hospital, Medical record, Statistic of efficiency bed usage

INTRODUCTION

The quality of health services is important in realizing the satisfaction of the community as consumers, this is related to the life of a person. An increasingly competitive environment requires hospitals to be aware of to provide the best quality of service for their consumers. Patients are the most important part in development of health sector. Therefore, hospitals are required to provide quality services in accordance with established standards.[1,2]

According to Indonesian Republic law No. 44/2009 about hospitals, hospitals are health care institutions for the community with their own characteristics that are influenced by the development of health science, technological advancements, and the socio-economic life of the people who must be able to improve quality services and affordable by the community in order to realize the highest degree of health.[3] The quality of hospital services can be seen from the use of available beds in hospitals using hospital statistical analysis based on inpatient medical records. To determine the efficiency of the bed usage in hospitals requires parameters namely

bed occupancy rate (BOR), average length of stay (ALoS), turnover interval (TI), and bed turnover (BTR).[4]

The bed utilization parameters can be presented used graphic Barber Johnson. BJ graphics are very necessary because hospital management can monitor activities within a certain time, develop plans to improve hospital service efficiency.[4] Preliminary survey results at Semen Padang Hospital revealed that the number of inpatient visits in 2017 was 9797 patients. Researchers are interested in analyzing the efficiency of bed use based on the graphic Barber Johnson at Semen Padang Hospital in the 2017 period. This study aims to determine the efficiency of bed utilization at Semen Padang Hospital in 2017.

METHODS

This research was conducted at Semen Padang Hospital, West Sumatera, Indonesia from January to December 2017. The study used was a descriptive method with a qualitative approach. The data was collected from the medical records department. The population is overall object of research. The population is all abstraction data of medical record file in 2017, namely 9796 medical record files, used total sampling technique. Data analysis was performed by calculating the values of ALoS, BOR, BTR, and TI. The calculation value of ALoS, BOR, BTR and TI will be presented based on graphic Barber Johnson (GBJ) as efficiency indicator bed usage. Excel 2010 and Graphic Barber Johnson method were applied for data analysis.

Average length of stay

This measure refers to the average number of days that a patient is admitted in a hospital. It is calculated by dividing inpatient days by the number of admissions.

Bed turnover

BTR is a measure of the productivity of hospital beds and represents the number of patients treated per bed in a specified period of time (usually 1 year).[5]

Bed occupancy rate

The percentage of official beds occupied by hospital inpatient for a given period of time.[6]

Turnover interval

This measure is related to BTR. It measures the average time that beds are unoccupied between successive inpatients, and was calculated as TI=(365/BTR)-AloS.[5]

Efficiency

In this study, efficiency measures used graphic Barber Johnson. Method of graphic Barber Johnson uses four indicators (BTO, BOR, AloS and TI). In this graph there

is an area called an area efficient. The efficient area is used for help the reader determine whether with the values of these four parameters, the use of a bed in a hospital already efficient or not. Graphic Barber Johnson has efficiency indicators same with indicator that has been determined by the Indonesian Ministry of Health but have different standard.[6] According to the Indonesian Ministry of Health, efficiency BOR 60-85%, ALOS 6-9 days, TI 1-3 days, and BTR 40-50 times. Barber Johnson's graph as one indicator of efficiency hospital processing is useful for compare the level of efficiency bed used, monitor target progress efficient use of beds and compare the level of efficiency of use bed between units. The value of efficiency is very important to be measured and known by management hospital.[4]

RESULTS

Table 1, present the inpatient BOR in 2017 is 60%. The BTR is 67.72 x, the interpretation is that, on average, each hospital bed had 67 occupants during 2017. ALoS is calculated from the total length of stay. Base on the data, ALoS value is 3 days. The Turnover Interval (TI) is 2 days. Figure 1 illustrates the graphic Barber Johnson at Semen Padang Hospital 2017. In "x" axis is turnover interval and "y" axis is average length of stay. According to Indonesian Ministry of Health turnover interval (2 days) and bed occupancy rate (60%) are efficient, average length of stay (3 days) is not efficient.[7]

Table 1: Statistic utilization of bed in Semen Padang Hospital in 2017.

Indicator	Total
Number of bed count	143 beds
BOR	60%
BTR	67.72 times/year
ALoS	3 days
TI	2 days

The data obtained from medical record abstraction in 2017. The data consist of: Number of inpatient service day: 31362 days. Number of patients admitted: 9686 patients. Number of patient discharge (including deaths): 9752 patients. Total of length of stay: 31538 days. Number of bed count: 143 beds. Period 1 year (2017): 365 days.

The 12-month statistic utilization of bed in hospital are shown in Table 2. There are 8 months (February, March, April, May, July, August, September, and October) for bed occupancy rate above 60%. The average bed turnover rate is 5 times/month. It is mean, each hospital bed had 5 occupants for period January to December 2017. Average length of stay is 3 days in each month and the highest of turnover interval is 3 days on June and December. According to Indonesian Ministry of Health, bed occupancy rate in 8 month and turnover interval in every month is efficient.[7] Figure 2, performance interval bed occupancy rate during the period January to December 2017 ranged from 45-66%. The highest bed occupancy rate is showed in august (66%).
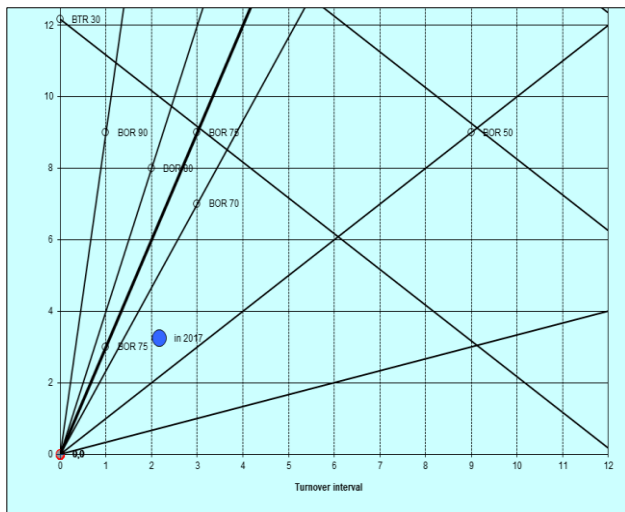
Figure 1: Graphic of Barber Johnson at Semen Padang Hospital in 2017.

Table 2: Statistic utilization of bed in Semen Padang Hospital period January-December 2017.

Month	BOR (%)	BTR, (times/month)	ALoS (d)	TI (d)
January	52.46	5.02	3.15	2.93
February	60.54	5.19	3.27	2.13
March	63.06	5.94	3.23	1.93
April	65.81	5.90	3.41	1.74
May	62.68	5.85	3.36	1.98
June	49.70	4.61	3.32	3.27
July	65.88	6.35	3.18	1.66
August	66.31	6.31	3.23	1.65
September	61.37	5.40	3.37	2.15
October	64.72	6.33	3.22	1.73
November	56.67	5.41	3.19	2.40
December	46.75	5.40	2.94	3.06
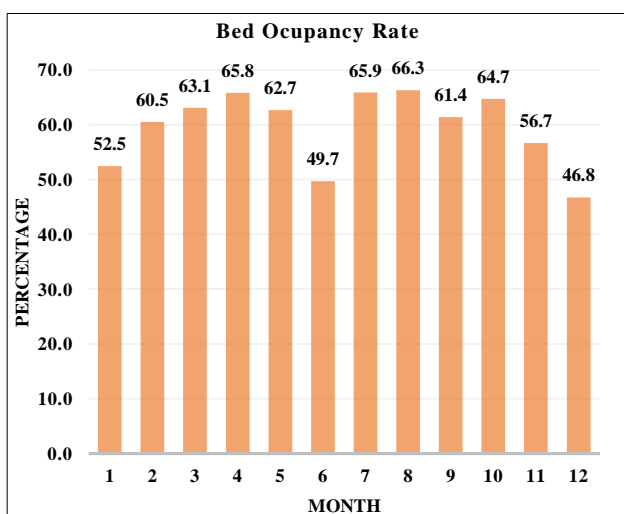
Figure 2: Graphical representation of bed occupancy rate.

DISCUSSION

Efficiency of bed utilization (BOR, ALoS, BTR, and TI) at Semen Padang Hospital in 2017 base on Graphic Barber Johnson.

A hospital, like any facility or sub-facility providing services on an unscheduled basis, must balance the productivity of high utilization with the probability of being fully occupied and having to refuse service.[8] The administrator has essentially three controls upon these two measures: the bed complement, the admissions of elective patients, and the length of stay of patients within the hospital. The problems of management are complicated by various restrictions placed upon beds which prevent their use by all patients and thus increase the necessary number of beds. For example, use of beds is restricted by sex, age (pediatric, adult), service (medical, surgical, etc.), privacy (private, semi-private, ward), and other features (intensive care units, psychiatric, perinatal, etc.).[9]

Susilo and nopriadi observed an average length of stay of 8 days.[10] Ulum and soffie reported 2.9 days an average length of stay in an Islamic Gondanglegi Hospital, Indonesia in 2017.[11] Irmawati et al, reported an average length of stay in Bakti Wira Tamtama Hospital, Semarang is 4 days at anggrek room.[12] Shindu et al reported an average length of stay is 10 days.[9] From the results average length of stay in 2017 is 3 days it is not yet efficient. According to Indonesian Ministry of Health standard for average length of stay is 6-9 days.[7] From the medical aspect, the longer of length of stay number then it can determine the performance of medical quality is not good because patient must be service longer. From economic aspects, the longer of length of stay means patient should paid higher cost to hospital. So, it should be balance between a medical aspect and economical to determine the ideal length of stay value.[4]

Bed occupancy rate in 2017 is 60%. This value is efficient. According to Indonesia Ministry of Health Standard, efficiency of bed occupancy rate is 60-85%.[7] A bed in Semen Padang Hospital starts from the bed left by the patient until the bed is occupied again by other patients reach 2 days and this value is efficient. According to the Indonesian Ministry of Health Ideally, an empty bed should be in 1-3 day.[7] If the number of turnover interval is getting higher, it is means the beds are not productive and in economic aspect this situation is not profitable for management hospital, while the turnover interval getting smaller, it is means the bed is very productive and very beneficial for economic management hospital. As a result, the incidence of infection nosocomial may be increased so the medical team is getting increased to work.[4]

BTR is frequency of using a bed at one period, several times the bed was used in one unit of time. Ideal value of BTR ideal is 40-50 times.[7] Meanwhile according to

Sudra, BTR is the average number of patients who uses every bed in a certain period.[4] Logically, the higher the BTO number means each the available bed is used by many patients take turns. Certainly, beneficial for the hospital. From the results, bed turnover rate at Semen Padang Hospital in 2017 inefficient (67 times).

Graphic Barber Johnson (Figure 1), determine of efficiency indicator at Semen Padang Hospital in 2017. Bed occupancy rate 60%, BTR 67 times, ALoS 3 days and TI 2 days. BOR and TI values are efficient. ALoS and BTR inefficient. According to Rustiyanto, graphic Barber Johnson is used for monitor and assess the level of efficiency hospitalization and knowing the level of efficiency hospital services.[13]

Efficiency of bed utilization (BOR, ALoS, BTR, and TI) at Semen Padang Hospital Period January to December in 2017.

BOR period January to December is efficient on February, March, April, May, July, August, September, and October (The value above 60%). BOR on January, June, November and December is inefficient. The efficiency standard of BOR is 60-85%.[7] BTR period January to December are not efficient. The efficiency standard of BTR is 40-50 times/period.[6] Average length of stay in each month is not efficient. The value lower than 6 days. According to Indonesia Ministry of Health, efficiency of ALoS is 6-9 days. For Turnover Interval for all month in 2017 is efficient. The standard of efficiency turnover interval is 1-3 days.[7]

CONCLUSION

Based on statistical, the value of bed occupancy rate (60%) and turnover interval (2 days) are efficient at Semen Padang Hospital in 2017. Average length of stay (3 days) and Bed turnover rate (67 times) are not efficient.

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