EFFICIENCY ANALYSIS OF INPATIENT ELECTRONIC MEDICAL RECORD SERVICE BASED ON BARBER JOHNSON GRAPH IN MELATI ROOM OF X HOSPITAL IN BANDUNG CITY

[1] Annisa Ulfah, [2] Hanifah Alawiyah S

[1] Study Program Record Medical & Health Information
[2] Medical Records & Health Information Study Programs,
[1.2] Polytechnic PiksiGanesha, Jl. Gen. Gatot Soebroto No. 301 Bandung.
E-mail: [1] annisaulfah33@gmail.com [2] hanifahalawii22@gmail.com

Abstract: *The Daily Inpatient Census (SHRI) is conducted to collect data on the number of inpatients receiving services over a single twenty-four hour period (1 x 24 hours) in the hospital, starting at 00:00 and ending at 24:00. Based on the data from the efficiency indicators of inpatient services at Hospital X from April to May 2023, it appears that several indicators have not met the Barber-Johnson standards. The purpose of this report is to analyze the efficiency of regular inpatient services based on the Barber-Johnson indicators at Hospital X from April to May 2024 and to evaluate the factors affecting inpatient efficiency. The results of the report indicate that the Barber-Johnson Graph depicting bed utilization at Hospital X is mostly in the efficiency area. Indicators of inpatient care, such as the attitude and communication of staff, can affect patient satisfaction, such as the availability of beds not being proportional to the number of patients, or direct promotions not being conducted again, along with many competitors in the area.*

Keywords: *Bed efficiency, Barber Johnson, Inpatient care*

Introduction

Health development is implemented as an effort to increase awareness, willingness, and ability to live healthily for everyone in order to realize the highest level of public health, as an investment for the development of socially and economically productive human resources. Furthermore, as a form of effort to realize the goals of health development, it is necessary to organize health efforts. Based on Article 49 of Law No. 36 of 2009 concerning health, it is stated that the government, regional government and community are responsible for organizing health efforts. The implementation of health services is carried out responsibly, safely, with quality, and evenly and non-discriminatory. Thus, according to the Health Law, the implementation of health services must prioritize the safety of patient lives over other interests. The logical consequence of this is that the implementation of health efforts is more oriented towards the social and humanitarian aspects as a means of devotion to the interests of the community. The interests of the community in this case are to obtain quality and affordable health services.

Medical records are files containing notes and documents about patient identity, examinations, treatments, actions and other services that have been provided to patients, as stated in the explanation of Article 46 paragraph (1) of Law no. 29 of 2004 concerning Medical Practice. The development of digital technology needs to be utilized as much as possible in organizing medical records. The government through the Ministry of Health has issued Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 concerning Medical Records which requires every health service facility to organize electronic medical records.

Hospital statistics are statistics that use and process data sources from health services in hospitals to produce information, facts and knowledge related to health services in hospitals (Sudra, 2010). Inpatient statistics produce data collected daily to monitor patient care with daily, weekly, monthly and other periods that will be used as reports. One of the hospital statistics is the inpatient indicator. The inpatient indicator is a description that aims to determine the level of utilization, quality, efficiency of inpatient services and efficiency of bed use in hospitals.

Therefore, to measure this, an inpatient indicator is needed, consisting of BOR (Bed Occupancy Rate), ALOS (Average Length Of Stay), TOI (Turn Over Interval), BTO (Bed Turn Over), NDR (Net Death Rate), GDR (Gross Death Rate). The ideal value of the inpatient service indicator according to the Indonesian Ministry of Health, namely BOR between 60% -85%, ALOS between 6-9 days, TOI between 1-3 days, BTO between 40-50 times, NDR between <25‰, GDR between <45‰.

Inpatient services are one of the indicators used to assess the level of efficiency of hospital management (Utari, 2019). The efficiency of inpatient indicators can measure the impact of the performance of all hospitals and is used as a determination of existing resources to achieve goals more quickly. Efficiency changes an individual's perspective on the health services they receive. In addition, to determine the level of efficiency of ongoing services, it is not enough to just use raw data, but it needs to be processed first using inpatient indicators. (Melasoeffie & Irmawati, 2018).

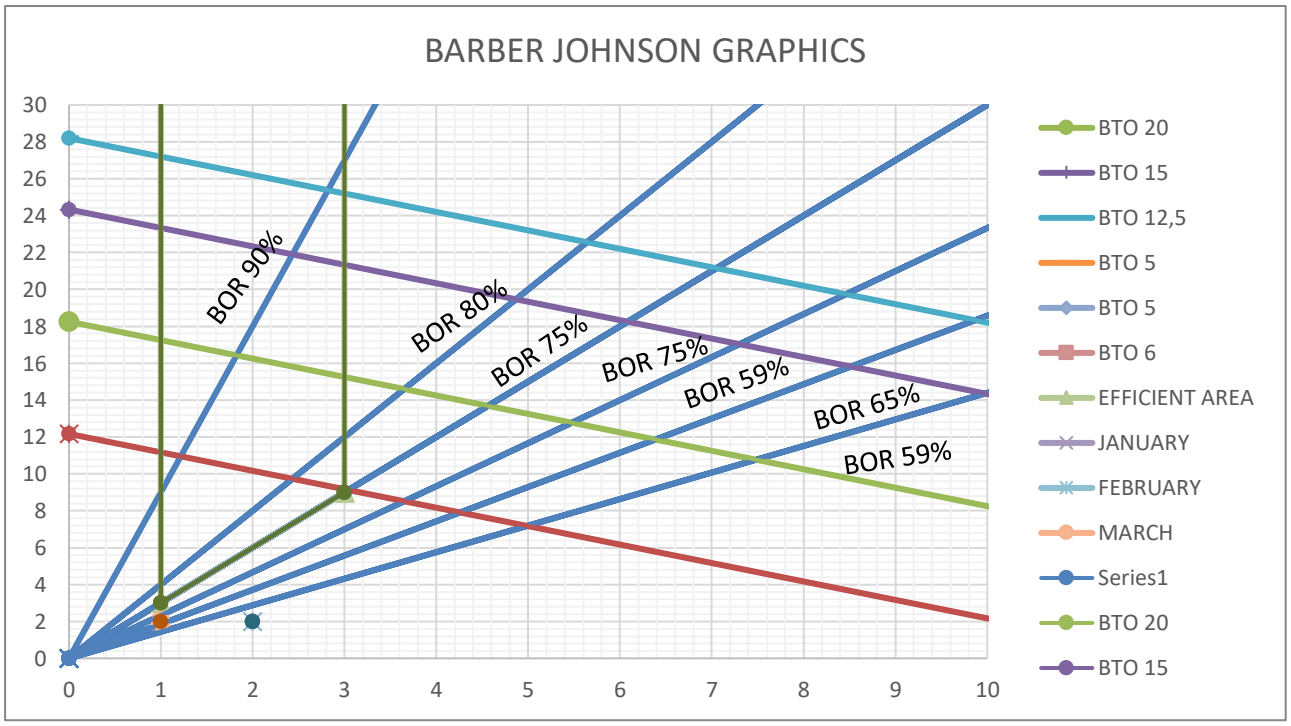

Figure 1. Graphic Image of Barber Johnson in the First Quarter of 2024

Literature Review

This study uses a descriptive qualitative approach. The population studied is internal data on inpatient care in the Melati treatment room. The sampling method used is total sampling, which means that the entire population is taken as a sample. This allows researchers to get a comprehensive picture of the characteristics and patterns of inpatient data in the Melati treatment room.

[1] annisaulfah33@gmail.com

[2] hanifahalawii22@gmail.com

Based on Figure 1, it can be seen that the meeting point of the four parameters of the Melati ward in the first quarter of 2024 is included in the efficiency area. The BOR value (16%) has not reached the ideal value, namely (75% - 85%). The BTO value of the Melati ward (17 times) has not reached the ideal area, namely (≥ 30 times). The AvLOS value of the Melati ward (5 days) has reached the ideal value, namely (3-12 days). The TOI value of the Melati ward (18 days) has reached the ideal value, namely (1 - 3 days). From the four parameters, the intersection point on *the Barber Johnson Graph* is not in the efficiency area.

Based on the results of the research conducted, it can be seen that the use of beds in the Melati treatment room at Hospital X in Bandung City in the first quarter of 2024 was not yet efficient.

1. The percentage of bed utilization (BOR) in the first quarter of 2024 in the Melati treatment room at Hospital X in Bandung City was 16%. These results indicate that the BOR value is still low and not yet efficient because it has not reached the ideal value, namely (75% - 85%).

   If the BOR approaches the "Y" axis, the BOR value is higher, conversely, if the BOR graph moves away from the "Y" axis, the BOR value is lower. A low BOR value results in a high TOI value. According to the theory, it supports the results of the study on the analysis of the efficiency of managing inpatient services in the Melati room at Hospital X in Bandung City. The results of the study showed that the lower the BOR value obtained, the higher the TOI value. Conversely, if the BOR value obtained is high, the TOI value is lower (Rustiyanto, 2018).

   The BOR value in the first quarter of 2024 was 16%. The BOR value is still far from efficient. This is due to the low use of TT. It is known that there are 78 TTs used from January to the end of March, with this number of TTs, there are still some TTs that are not filled. This needs to be done to increase the BOR value, namely by making the use of existing TTs more efficient, the hospital must also promote the care facilities it has and provide maximum service to patients in order to increase the BOR value. For the BOR value in the first quarter of 2024, it is necessary to improve inpatient services for patients by increasing the promotion of care service facilities and improving inpatient services.

   Therefore, if the BOR value is statistically higher, the higher the use of existing beds for patient care, while the burden of health workers' work in the unit is heavier. An increase in BOR that is too high actually reduces the quality of medical personnel's performance and reduces patient satisfaction and safety. Conversely, the lower the BOR value, the more difficult it is for patients to use beds compared to available beds. In other words, low bed use causes difficulties in the aspect of economic income for the hospital.

2. Frequency of bed utilization (BTO) in the first quarter of 2024 in the Melati treatment room at Hospital X in Bandung City. The BTO value is 17 times. These results indicate that the BTO value has not entered the efficient area where the ideal value is (≥ 30 times).

   The lower the BTO value means that less TT is used to treat patients compared to the number of TT provided. This, the small number of patients can cause economic income

difficulties for the hospital. With this theory, it supports the results of the study on the efficiency analysis of the management of inpatient services in the Melati room at Hospital X in Bandung City that the comparison of TT use with the number of patients is not too much (Sudra, 2010).

The BTO value is less than the minimum limit set. This is because the number of available beds is used by many patients alternately, this condition can be economically beneficial for the hospital because the TT provided generates income. It needs to be maintained and improved like this, only tightened regarding patient safety to avoid nosocomial infections.

3. Average length of stay (AvLOS) in the first quarter of 2024 in the Melati ward at Hospital X in Bandung City.

   The AvLOS value in 2023 and 2024 at Hospital X in Bandung City is 5 days. These results indicate that the AvLOS value has reached efficiency because it has reached the ideal value, namely (3 - 12 days).

   The condition at Hospital X in Bandung City can be overcome by educating patients about the disease they are suffering from so that treatment can be maximized. With maximum treatment, patients can recover well and minimize the recurrence of the patient's disease.

4. Average bed days unoccupied (TOI) in the first quarter of 2024 in the Melati ward at Hospital X in Bandung City.

   The TOI value in the first quarter of 2024 is 18 days. These results indicate that the TOI value has reached the ideal value (1 - 3 days). TOI is used to determine the length of time a bed is empty or the average bed is not filled in a certain period. From the results of research conducted by researchers at Hospital X in Bandung City in the first quarter of 2024 was 18 days, these results have shown the ideal value. Ideally, empty beds based on the Barber Johnson Graph, this occurs because there is still a lack of promotional activities from the hospital, with research (Dharmawan, 2006) saying that the factors that cause high TOI values are due to poor organization, as well as lack of demand for beds by consumers. The higher the TOI number, the longer the bed is unoccupied by patients, this condition can be detrimental to the hospital because it does not generate income. If the TOI is getting smaller, it means that the beds are not filled properly, resulting in an increase in nosocomial incidents, an increase in the workload of the medical team, so that patient satisfaction and safety can be threatened (Zulva Fitriani, Fitria Aryani Susanti, Hedy Hardiana & Sudra, 2019).

5. Analysis of bed utilization efficiency in the first quarter of 2024 in the Melati treatment room using *the Barber Johnson Chart* at Hospital X in Bandung City.

   Of the four parameters, the intersection point *of the Barber Johnson Graph* in the first quarter of 2024 in the Melati treatment room at Hospital X in Bandung City was not in the efficient area, because the four did not reach the ideal value, the values that entered the ideal value were AvLOS and TOI.

   The AvLOS value at Hospital X in Bandung City has increased. The highest value achieved was 18 days. From a medical aspect, the longer the AvLOS number, it can

indicate poor medical quality performance because patients must be treated longer. From an economic aspect, the longer the AvLOS value means the higher the costs that patients will have to pay to the hospital. The treatment requires a balance between medical and economic perspectives to determine the ideal AvLOS value.

Therefore, efforts to maintain AvLOS values in accordance with *Barber Johnson's ideal* require a policy from hospital management. Hospitals need to demonstrate the expertise and skills of medical personnel that are in accordance with standards. Hospitals are advised to maintain and improve quality services.

Methodology

This research of Calculation of Inpatient Service Indicators (BOR, LOS, TOI, and BTO) at Hospital X in Bandung City in 2024.

Table 1. Utilization of Melati Room Treatment Unit in Quarter I of 2024

Indicator	Unit	JANUARY	FEBRUARY	MARCH
Number of days of treatment	Day	1,421	1,480	1,810
Number of patients discharged alive	Person	413	417	511
Died <48 hours	Person	0	0	0
Died >48 hours	Person	0	0	0
Total length of patient stay	Day	1,834	1,897	2,321
Number of beds	Amount	78	78	78

The table above shows the utilization of the Melati Care Unit in the first quarter of 2024, namely for the number of treatment days 4,711 days, the number of patients discharged alive 1,341 people, the number of patients who died <48 hours none, the number of patients who died >48 hours none, the total length of patient stay 6,052, and the number of beds as many as 78.

1. Bed occupancy rate (BOR) in the Jasmine room at Hospital X in Bandung City in the first quarter of 2024:

$$\textbf{DRILL} = \frac{Jumlah\ Hari\ Perawatan\ pada\ periode\ tertentu}{Jmlah\ Tempat\ Tidur\ x\ Jumlah\ Hari\ Periode\ yang\ sama}\ x\ 100\%$$

$$= \frac{4.711}{78\ x\ 365} x\ 100\%$$

$$= \frac{4.711}{28.470}\ x\ 100\%$$

$$= 0.16\% = 16\%$$

2. Frequency of bed utilization (BTO) in the first quarter of 2024 in the Jasmine room at Hospital X in Bandung City

$$\textbf{BTO} = \frac{Total\ Pasien\ Keluar}{Total\ Tempat\ Tidur\ Rumah\ Sakit}$$

$=\frac{1.341}{78}$

= 17.1 times = 17 times

3. Average length of stay (AvLOS) in the first quarter of 2024 in the Melati ward at Hospital X in Bandung City

AvLOS $=\frac{Total\ Lama\ Rawat\ Pasien\ Keluar}{Total\ Pasien\ Keluar}$

$=\frac{6.052}{1.341}$

= 4.5 days = 5 days

4. Average bed days unoccupied (TOI) in Quarter I of 2024 in the Melati ward at Hospital X in Bandung City

TOI $=\frac{Jumlah\ TT\ x\ Hari\ Periode\ \ Tertentu)-Total\ Hari\ Perawatan}{Total\ Pasien\ Keluar\ pada\ periode\ yang\ sama}$

$=\frac{(78\ x\ 365\ )-4.710}{1.341}$

$=\frac{(28.470)-4.710}{1.341}$

= 17.7 days = 18 days.

Results & Discussion

1. The BOR value in the first quarter of 2024 in the Melati treatment room at Hospital X in Bandung City, the BOR value is 16%. The BOR value does not meet the ideal standard based on *Barber Johnson,* which is 75% - 85%.
2. The BTO value in the first quarter of 2024 in the Melati treatment room at Hospital X in Bandung City, the BTO value is 17 times. The BTO value does not meet the ideal standard based on Barber Johnson, which is ≥ 30 times.
3. AvLOS value in the first quarter of 2024 in the Melati treatment room at Hospital X in Bandung City, the AvLOS value is 5 days. The AvLOS value meets the ideal standard based on Barber Johnson, which is 3-12 days.
4. The TOI value in the first quarter of 2024 in the Melati treatment room at Hospital X in Bandung City, the TOI value is 18 days. The TOI value has met the ideal standard based on Barber Johnson, which is 1 - 3 days.
5. Based on *the Barber Johnson Graph* in the first quarter of 2024, the Melati treatment room at Hospital X in Bandung City is still not efficient because the Barber Johnson point is outside the efficient area.

References

Background, A Background, 'No Title', 2023, pp. 1–9

Ferniawan, Kelvin, 'Analysis of Bed Utilization Efficiency in Internal Medicine Service Unit in Mawar Ward

Based on Barber Johnson Chart at Dr. Soeroto Ngawi Regional Hospital', 2021, pp. 1–88

Fitriani, Zulva, Fitria Aryani Susanti, and Hedy Hardiana, 'Efficiency of Inpatient Bed Management Using Barber Johnson Charts at Hospital X in 2023', *JMIAK: Journal of Information Management and Health Administration* , 7.1 (2024), pp. 10–17 <http://journal.univetbantara.ac.id/index.php/jmiak-rekammedis/article/view/5058>

Jayanto, Antomi, Tri Purwanti, and Erlian Dwisnu, 'Health Services at the Community Health Center in Pelajau Village, Karang Tinggi District, Central Bengkulu Regency', 10.2 (2024), pp. 229–40

Lorena Sitanggang, Frince, and Yuyun Yunengsih, 'Analysis of Inpatient Bed Utilization Efficiency Based on Barber Johnson Chart to Improve Service Quality at Dr. M. Salamun Air Force Hospital', *Cerdika: Jurnal Ilmiah Indonesia* , 2.2 (2022), pp. 330–37, doi:10.36418/cerdika.v2i2.350

Introduction, CHAPTER, 'Chapter 1. Introduction 1.1', 2019, pp. 1–5

Serpong, Nuclear Area, 'Implementation of the Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 Concerning Medical Records Regarding the Results of Health Monitoring of Radiation Workers in the Serpong Nuclear Area', XIX.2 (2022), pp. 34–41

Simanjuntak, Esraida, Clara Angelia S, Lecturer of Study Program, D-iii Recorder and, Infokes Imelda, Jalan Bilal, and others, 'ANALYSIS OF INPATIENT CARE INDICATORS FOR THE PERIOD OF THE YEAR', 2, 2019, pp. 614–19

Study, Program, Medical Record, Health Information, Medical Record Department, Health Polytechnic, and Ministry of Health Malang, 'Analysis of Bed Needs Forecast Based on Barber Johnson Indicators at Sidoarjo Regional Public Hospital Thesalonic Kristianto, Hartaty Sarma Sangkot', *Journal of Medical Record and Health Information* , 5.2 (2024), pp. 102–11, doi:10.25047/j-remi.v5i2.4151