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ANALYSIS OF BED USE EFFICIENCY WITH BARBER JOHNSON GRAPH AS AN EFFORT TO REDUCE THE WAITING TIME OF INPATIENTS IN THE EMERGENCY ROOM

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ABSTRACT

This study analyzed the efficiency of bed use using the Barber Johnson graph as an effort to reduce the length of waiting time for inpatients in the emergency room of Wava Husada Kepanjen Hospital. The research method used a mixed design with quantitative data collection to measure efficiency indicators such as BOR, LOS, TOI, and BTO, as well as qualitative interviews to explore the factors that cause long waits. The results showed high bed occupancy rates and bed turnover, which contributed to the length of patient wait times. This study suggests optimizing bed management and improving organizational processes to accelerate patient services. These findings provide practical implications for hospital management to improve patient flow and emergency service efficiency.

Keywords : bed, barber johnson graph, waiting time.

I. INTRODUCTION

Patient waiting times in the emergency department (IGD) are an important indicator of efficiency and satisfaction of health services. Long wait times can increase staff workload and delay patient care. In Indonesia, emergency room services are required to operate 24 hours, but the standard waiting time still varies. The Barber Johnson graph can be used to compare the level of bed use efficiency of a unit, hospital or ward over time in a certain period, monitor the progress of achieving a predetermined bed use efficiency target in a certain period, compare the level of bed use efficiency between units in a certain period, and check the correctness of the report of the calculation of four parameters of space use efficiency Sleep, that is, if the four lines of assistance intersect at one point, it means that the report of the calculation results is correct (Sudra 2014)

The level of utilization, quality, and efficiency of services in a hospital can be said to be efficient if the values of BOR, LOS, TOI and BTO are in accordance with the standard values set according to Barber Johnson. The standard values of the four indicators are BOR: 75% - 85%, LOS: 3-12 days, TOI: 1-3 days, BTO: 30 times (Soedjadi, 1996)(Novarinda and Dewi 2017).

Based on a preliminary study at Wava Husada Hospital, data on the waiting time of inpatients in the emergency room in July, August, and September 2023 was obtained with an average of 47.6% of patients waiting to move to an inpatient room > 8 hours. The results of the interview with the Emergency Room Coordinator regarding the length of waiting time for inpatients in the emergency room are due to the unavailability of the inpatient room desired by the patient or according to the patient guarantee class, this is supported by the BOR data of Wava Husada Hospital in July, August, September 2023 with an average of 83%, the ALOS (average length of stay) value in July, August, September averaged 3.1 days, the TOI value in those three months averaged 0.8 days, the BTO value in those three months reached 24 times, meaning the inpatient bed occupancy rate was quite high.

II. METHODS

The types of research used in this study are *Mix Method* Research is quantitative and qualitative. Research *Mix Method* It is a combination of quantitative and qualitative research methods. *Mixed Method* or the combination of quantitative and qualitative research methods is used together in a research so that more comprehensive, valid, reliable and objective data is obtained (Azhari et al. 2023)

Quantitative data were obtained from the daily census of hospitalizations and emergency room patient registers over a certain period, processed using four Barber Johnson graph indicators: Bed Occupancy Rate (BOR), Average Length of Stay (LOS), Turn Over Interval (TOI), and Bed Turn Over (BTO) (Sudra, 2014). Qualitative data was collected through interviews with the implementing nurse and emergency room coordinator to explore the factors that cause the long waiting time for patients (Syafrida, 2021).

This study uses a type of *sequential explanatory* design, which is a research design characterized by data collection and quantitative data analysis in the first stage, and followed by data collection and qualitative data analysis in the second stage, in order to strengthen the results of quantitative research conducted in the first stage. This study was used to analyze the efficiency of bed use with Barber Johnson graphs as an effort to reduce the waiting time of inpatients in the emergency room of Wava Husada Kepanjen Hospital. In phase I, quantitative research was carried out to provide an overview or explanation of the efficiency of the use of inpatient beds at Wava Husada Kepanjen Hospital. Meanwhile, for a qualitative approach to analyze what factors cause the long wait time for inpatients in the emergency room of Wava Husada Hospital.

III. RESULT

BOR (Bed Occupancy Rate) is the percentage of bed occupancy in a certain period of time. The BOR indicator is used to determine the level of efficiency regarding the utilization or use of beds in hospital inpatient services. ALOS (Average Length of Stay) is the average number of days a patient stays in the hospital. Quantitative data analysis shows an average BOR value of 80% (standard efficiency of 75-85%), LOS of 3.1 days (standard of 3-12 days), TOI of 0.8 days (ideal of 1-3 days), and BTO of 93 times (ideal of 30 times) in 2023, indicating that the efficiency of bed use is still not optimal, especially the TOI that is too short (faster than the standard) which can reduce the quality of bed preparation (Sudra, 2014). Barber Johnson's graph shows efficiency points that are outside the efficient area, especially in TOI and BTO.

The results of interviews with emergency room nurses revealed that the main cause of the long waiting time was the limitation of inpatient rooms that were in accordance with the patient's guarantee class so that patients had to wait for rooms to be available. Other factors include the presence of non-emergency patients entering the emergency room and administrative obstacles in the process of transferring patients (Interview results).

These results are consistent with previous research that stated that lack of bed availability and internal coordination are significant factors in extending inpatient waiting times in emergency departments (Bahar et al., 2023; Harahap et al., 2022).

IV. DISCUSSION

Based on the results of the study, the efficiency of bed use at Wava Husada Kepanjen Hospital still needs to be improved, especially by paying attention to the TOI indicator that is too short and the BTO is too high. A very short TOI indicates a change of bed that is too fast without optimal preparation, thus potentially reducing the quality of service and increasing the risk of nosocomial infection (Soedjadi, 1996).

Longer inpatient waiting times correlated with limited availability of inpatient rooms and suboptimal administrative processes in the emergency room. This also shows the need for better integration of complementary management systems, including the arrangement of infrastructure facilities and health workers to accelerate the process of transferring patients (Permenkes No. 47 of 2018; Bahar et al., 2023).

Improving the efficiency of bed use not only has an impact on reducing patient waiting times, but also on improving patient satisfaction and the effectiveness of the work of emergency room staff. Therefore, the application of strategies based on Barber Johnson chart analysis can be the basis for hospital management policy making (Sudra, 2014; Creswell, 2016).

V. CONCLUSION

The efficiency of bed use at Wava Husada Kepanjen Hospital based on Barber Johnson chart indicators has still not reached the optimal level, especially in TOI and BTO. The length of waiting time for inpatients in the emergency room is affected by the limitations of inpatient rooms and administrative processes that have not been maximized.

Strategies to improve the efficiency of bed use, such as improving adequate bed turnover and optimizing the coordination of patient transfer processes, are urgently needed to reduce patient waiting times in the emergency room. Regular application of Barber Johnson charts can help management monitor and improve bed utilization efficiency.

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