

The Effect of Emergency Level and Response Time on Patients' Length of Stay in the Emergency Room of Muhammadiyah Hospital Kediri

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ABSTRACT

Background: Emergency services are medical actions needed by emergency patients. Overcrowding in the Emergency Room that happen with increasing number of patient which has an impact on length of stay and lead to patient dissatisfaction.

Purpose: The aim of research was to analyze the effect of emergency level and response time on length of stay in the emergency room of Muhammadiyah Hospital Kediri.

Method: The research design uses analytic observational with a cross sectional approach. The independent variables are level of emergency and response time. The dependent variable is Length of Stay. The population was all patients in the ER of Muhammadiyah Kediri Hospital at August - October 2022 as much as 142 patients. Samples taken used Simple random sampling technique as many as 105 respondents. Data collected used observation sheets and analyzed with multiple linear regression.

Results: The results showed that partially and simultaneously of independent variables (Emergency Level and Response time) had a p-value less than 0.05 so that affected the length of stay.

Conclusion: The results showed that emergencies level of patients caused experience a worsening of their condition or it will get worse if there are complications in patient's if they are not treated immediately, in addition to that, the officers respond quickly in services in the emergency room from the time patient arrives until treated will affect length of stay in the emergency room. This showed that's there is an influenced of Emergency Level and Response Time on the Length of Patient's Stay.

Keywords: emergency level, length of stay, response time

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BACKGROUND

Emergency services are medical actions needed by emergency victims/patients immediately to save lives and prevent disability (Ministry of Health, 2016). One of the stages that must be passed by patients who come to the emergency room is triage. Triage selection is the process of selecting patients to determine the level of urgency and priority for patient care. Determination of triage in the process and handling is carried out based on determining the color which is determined according to the emergency level of the patient's health problem which also determines the accuracy and speed of treatment (response time) in patients (Ministry of Health, 2017). Kediri Muhammadiyah Hospital is one of the private hospitals that provides Emergency Installation facilities. The number of visits to the emergency room at Muhammadiyah Hospital Kediri has increased which has led to patient overcrowding in the emergency room, which has an impact on the length of stay in the emergency room, which can lead to patient dissatisfaction with the services provided.

The National Hospital Ambulatory Medical Care Survey 2019 reports around 130.353 million visits to the emergency room in America. Up 14% from reported visits in 2018 or an average of 1.64 million visits per year, and it was reported that 23.8% spent more than 4 hours in the emergency room and 35.4% waited more than 1 hour to see a doctor (Eliawati and Permanasari, 2020). The results of research conducted by (Nassar et al., 2020) stated that this study was conducted at the Zagazig Hospital in Egypt for 11,906 patients who visited and received services at the hospital's emergency room, which was defined as a total time exceeding eight hours from the time the patient arrived. in the ER to be transferred to another room and hospitalized LOS. The results revealed that 7.7% of the 11,906 patients experienced a long waiting time for services in the emergency room to be transferred to other service rooms. Every year the number of patient visits to the emergency room continues to grow. One of the world's hospitals that experiences a Length of Stay that extends > 6-8 hours is Alnoor Mecca Hospital in Saudi Arabia, 44% of patients wait at the emergency department for 59 minutes, 32.6% spend 1-4 hours, 15.2% spent 4-8 hours, and 8.2% spent >8 hours. There was an increase of about 30% in all emergency room hospitals in the world.

Data on patient visits to the emergency room in Indonesia in 2018 were 4,402,205 patients (13.3%) of the total visits to public hospitals. Based on previous research, medical record data from the emergency department Dr. Soetomo Surabaya during 2016 recorded 56,452 visits to the emergency department, of which 19,239 were hospitalized. Supervision data for the emergency department for August 2017 noted that around 47.2% spent more than 6 hours in the emergency room, where 28.1% waited for more than 12 hours and 5.1% died within the time span of the emergency room treatment (Delinda et al., 2021).

Based on a preliminary study conducted by the largest number of patients at Muhammadiyah Kediri Hospital were patients with cases of heart disease and pneumothorax. The results of the researcher's interview with one of the nurses as the head of the emergency room stated that the standard Length of Stay at Muhammadiyah Hospital took about 6 hours, but in fact the patient had experienced a Length Of Stay that was prolonged due to insufficient room to transfer patients to other unit rooms so making the patient have to wait in the emergency room, as well as during observation, 2 patients were found waiting to be transferred to another unit with green triage conditions.

One very important indicator in determining the quality of service in the emergency room is shortening the patient's Length of Stay (LOS). Length of Stay (LOS) or length of stay is the time spent by patients while receiving treatment in the emergency room which is calculated from the time the patient arrives until the patient is discharged or transferred to another unit (Bashkin et al., 2018). The long waiting time for hospitalization in patients who

enter from the ER which reflects the effectiveness of the flow process in the ER is caused by various factors. Several studies state that the factors that affect the length of time for hospitalization from the emergency room or boarding time include the level of emergency, ways of arriving, supporting examinations, nurse response time, disease diagnosis and examination by doctors in the emergency room (Weir. 2006 in (Eliawati & Permanasari, 2020) Fenny Virgin (2000) in (Abdul Wahab et al., 2021) explains the causes of length of stay in the emergency room are patient arrival patterns, types of cases and level of emergency, financial capability, response time, speed of service, availability of equipment, availability of drugs, procedures for emergency services and other units related to emergency services.

One of the factors that influence the length of stay or length of stay in the emergency room is the level of emergency or triage. IGD triage is the process of determining or selecting patients who are prioritized to receive treatment first in the Emergency Room (IGD) in a hospital. This determination process is carried out to obtain a sequence of treatments according to the patient's emergency level, such as minor injuries, serious injuries that can be life threatening within minutes or have died. The longer the service in the emergency department will worsen the patient's condition, worsen the patient's condition resulting in increased mortality and further disability. The more severe the patient's condition, the more costs will be borne by the patient and also the length of stay in the emergency room (Darma et al., 2021). Another factor that affects the length of stay in the emergency room is the nurse's response time. The length of response time in the emergency room (response time) is the time from the patient coming to the emergency room until the patient is handled by a doctor or nurse. The length of time the patient responds to the emergency room is an indicator of the quality of service in the emergency department. According to the standards in force in Indonesia, namely the service standard for patient response time in emergency departments is ≤ 5 minutes (Ministry of Health, 2017). Response time can be calculated in minutes, but response time can be influenced by several factors, namely: 1) the number of staff available in the emergency room, 2) facilities and infrastructure, 3) education, and other supporting factors.

It is said to be timely if the response time required to provide a response does not exceed the specified average or standard time. The implementation of an adequate response time in Indonesia still requires further evaluation and an indicator of the success of an emergency patient response time is the speed in providing assistance to patients in routine daily situations as well as during disasters and the assistance provided to save lives or prevent disability (Darma et al., 2021).

Efforts that can be made by hospital management to improve services in the emergency room include improving the flow of services in the emergency unit so that it is more efficient and speeding up the waiting time for hospitalization (boarding time) by implementing a split flow & fast track system, forming a triage team, not just the appointment of a triage officer which has so far been carried out by nurses, but also involves the doctor on duty in the emergency room.

The aim of research was to analyze the effect of emergency level and response time on length of stay in the emergency room of Muhammadiyah Hospital Kediri.

METHOD

The research design uses analytic observational with a cross sectional approach. The independent variables of the research are the level of emergency and response time. The dependent variable is Length Of Stay. The study population was all patients who visited the

ER of Muhammadiyah Kediri Hospital in August - October 2022 with an average number of patients of 142 patients. Samples were taken using Simple random sampling technique as many as 105 respondents. Data were collected using observation sheets and analyzed using multiple linear regression analysis.

RESULTS

Univariat Analysis

Table 1 shows that the characteristics of respondents based on age are mostly 41-50 years old with 56 respondents (53.3%), and a small proportion aged 31-40 years with 24 respondents (22.9%). Characteristics based on the gender of the respondents showed that the majority of respondents were male, 54 respondents (51%) and a small proportion were female, 51 respondents (49%).

Based on the level of severity, it was found that most of the respondents included in the criteria for the yellow emergency level as many as 49 respondents (46.7%) and a few in the red emergency level category as many as 12 respondents (11.4%). Based on Response Time, it was found that most of the respondents received a response 89 respondents (84.8%) received officer response time in the fast category and a small portion received 16 respondents (15.2%) officer response time in the long category. Based on Length of Stay, almost all of the length of stay respondents in the IGD were in the category fast as many as 99 respondents (94%) and a small portion of length of stay respondents in the emergency room in the old category as many as 6 respondents (6%).

Table 1. Frequency Distribution of Respondents in the Emergency Room of Muhammadiyah Kediri Hospital February 2023 (n=105)

Univariat Analysis	Amount (n: 105)	Percentage (%)
Age		
31 – 40 Years	24	22,9
41 – 50 Years	56	53,3
>51 Years	25	23,8
Gender		
Male	54	51
Female	51	49
Emergency Level		
Red	12	11,4
Yellow	49	46,7
Green	24	22,9
Black/Grey	20	19,0
Respon Time		
Fast	89	84,8
Long	16	15,2
Length Of Stay		
Fast	99	94,3
Long	6	5,7

A. Parcial Analysis

Tabel 2. Parcial Analysis (*t-test*) The Influence of Emergency Level and Response Time on the Length of Stay of Patients in the Emergency Room of Muhammadiyah Hospital Kediri Februari 2023 (n=105)

Criteria	t test Value	P value
Emergency Level	5,267	0.000
Response time	5.065	0.038

Based on the results in table 1, it shows that the p values of the two independent variables (emergency level and response time) are less than 0.05 so that partially or independently the independent variables (emergency level and response time) affect the length of stay of the respondents

B. Simultaneously Analysis

Based on the results in table 3 it shows that the significance value shows a value = 0.000 which means less than 0.05 so that it can be stated simultaneously or simultaneously that the independent variables (emergency level and response time) affect the length of stay of respondents in the emergency room.

Tabel 3. Simultaneously Analysis of the Influence of Emergency Level and Response Time on the Length of Stay of Patients in the Emergency Room of Muhammadiyah Hospital Kediri Februari 2023 (n=105)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	25.888	2	12.944	24.703	.000 ^b
Residual	53.446	102	.524		
Total	79.333	104			

a. Dependent Variable: *Length of Stay*

b. predictors: (constant), response time, triage

C. Determination Coefficient Analysis

Tabel 3. Determination Coefficient Analysis Of The Influence of Emergency Level and Response Time on the Length of Stay of Patients in the Emergency Room of Muhammadiyah Hospital Kediri Februari 2023 (n=105)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.571 ^a	.326	.313	.724	1.995

Table 3 explains that the R Square (R²) value is 0.326 or 32.6% which shows the contribution of the independent variables (emergency level and response time) while the remaining 67.4% is influenced by other factors that are not in this research model. Multiple correlation coefficients are used to measure the closeness of the relationship between the independent and dependent variables. The multiple correlation coefficient is indicated by a value (R) of 0.571 or 57.1% which indicates that the independent variables (emergency level and response time) to the patient's length of stay have a fairly close relationship

DISCUSSION**Emergency Level at Emergency Room of Muhammadiyah Hospital Kediri.**

The results of research conducted on patients in the IGD Muhammadiyah Kediri General Hospital obtained data that most of the respondents included in the yellow

emergency level criteria as many as 49 respondents (47% and a small proportion in the red emergency level category as many as 12 respondents (11%).

The results of this study are in line with research conducted by (Apriani, 2017), where out of 30 respondents, 22 respondents (73.3%) were included, which were included in priority 2.5 respondents (16.7%) were included in priority 1, and 3 respondents (10%) are included in priority 3 in patients with heart disease. Where for the speed, 23 respondents (76.7%) got a very fast response time, while 7 respondents (23.3%) got a fast response time.

Triage comes from the French word "trier" which means choosing/determining priority colors. Triage is a system of patient selection and selection to determine the level of emergency and priority for patient treatment (Ministry of Health, 2016). Triage is a fast and focused assessment concept in a way that allows the most efficient use of human resources, equipment and facilities with the aim of selecting or classifying all patients who need help and prioritizing their treatment based on health problem criteria by selecting color placement (Oman et al. al., 2018).

According to the researchers' assumptions, most of the respondents in the Emergency Room (IGD) Muhammadiyah Kediri General Hospital were in the yellow triage or emergency level category. According to the researchers, the determination or enforcement of the category of emergency level or patient triage is based on the patient's condition from the results of the patient's examination and assessment. The category of emergency level or red triage is a patient's condition that requires immediate help and is life-threatening because it must be done with immediate help and can be transferred to an intensive room such as the ICU for further observation. The emergency level category with a yellow label indicates the patient's condition that is potentially life threatening, and/or the limbs and their functions, and requires immediate medical intervention (patient waiting time – 15 minutes), while the green emergency level or green triage indicates the patient's condition is in an emergency condition. or not serious but not emergency, the patient comes with minor disturbances or disorders that tend to recur. The patient was observed, given medication and went straight home or was hospitalized. Therefore, the red and green triage were less than the yellow triage.

Response time at Emergency Room of Muhammadiyah Hospital Kediri.

The results of the response time research for officers at the Muhammadiyah Hospital Kediri emergency room which was carried out using a stopwatch which shows the response time or response of nurses when patients come to the emergency room, obtained data that most respondents received officer response time in the fast category as many as 89 respondents (85%) and some 16 respondents (15%) received response time from officers in the old category. The slow nurse response time may be due to the fact that there are still nurses who respond slowly to patients, the quality of services provided by nurses to patients is still lacking by patients, and the limited hospital facilities and infrastructure are inadequate compared to the number of patients who arrive at the same time at the emergency room so that Nurses prioritize the most life-threatening problems.

When the patient arrives at the emergency room door, it is recorded as the start of the response time for nursing action, after a working diagnosis and emergency category are determined based on the triage category, the recording continues according to the existing format. To avoid loss of overlapping time data, a timepiece and timekeeper in the form of a clock are used, using western Indonesian time as the basis for calculations. The observer records by following the patient from the time he is served and records all types of nursing actions in the emergency room according to the instructions in the observation format with the results of observing nursing actions using time records in minutes.

Response time is very important because it relates to the speed or length of time the patient gets health services. The success of the response time or response time is highly dependent on the available speed and quality of assistance to save lives or prevent defects from the scene of the incident, on the way to hospital assistance, so that a fast and precise response time is one of the determinants of patient satisfaction with home services. sick (St. Nashrah Azia et al., 2020). The officer's response time is calculated when the patient is at the door of the hospital until the treatment time needed by the patient is < 5 minutes (Ministry of Health, 2017).

This is supported by research conducted by Simandalahi et al. (2019) which states that the response time can be affected by the limited number of nurses, changing shifts and inadequate infrastructure with the number of patients who enter, as well as several patients who arrive at the same time, so that nurses prioritize the most urgent patient problems. According to Aprillia (2021), response time is the speed in handling patients, calculated from the time the patient arrives until there is a response from the nurse. A good response time for patients is ≤ 5 minutes (Ministry of Health, 2017). The speed of nurses in providing response time is influenced by several factors, namely internal factors and external factors. Internal factors are found in a nurse or other officers such as nurses who are proficient in carrying out nursing and triage actions, and speed in responding to patients. External factors, namely where nurses are more concerned with emergency patients so that patients who are not in an emergency department are not prioritized, or there are not enough health workers, nurses who have to take patients to other rooms because they do not have special officers to mobilize patients (Rumampuk and Katuuk, 2019).

According to the researcher's assumption, response time is very important to be carried out by officers because it relates to handling patients in the fast or slow category, which in this case can have a direct impact on the patient's health condition. The speed of response given by the officer depends on the facilities or facilities available in the room, especially in the emergency room, where most patients come in an emergency condition. according to their respective professions so that the treatment carried out on patients can be carried out quickly and precisely. The existence of respondents who received officers' response time in the old category occurred because when patients arrived there was an accumulation of the number of patients in the ER while there were only a few ER staff so that officers carried out treatment based on the severity of the patient and those who were life threatening would be treated first rather than patients who in a non-critical and non-emergency situation.

At Emergency Room of Muhammadiyah Hospital Kediri

The results of research conducted at the Muhammadiyah Hospital Kediri Emergency Room related to the length of stay in the emergency room (Length Of Stay) obtained data, namely that almost all of the length of stay respondents in the emergency department were in the fast category as many as 99 respondents (94%) and a small portion of the length of stay respondents in IGD in the old category as many as 6 respondents (6%).

This research is supported by the results of Simandalahi et al. (2019), namely the length of stay of patients in the emergency department is an average of 442 minutes / 7.37 hours. The length of stay of patients in the emergency department in this study was the length of time the patient was in the emergency department since their status as a patient, that is, patients who were in the emergency department for more than 6 hours before being admitted to the hospital, referred, died and/or were sent home. One of the increasing length of stay of patients in the emergency department is the delay in patients getting inpatient rooms due to limited beds or the availability of beds that are full of other patients, an imbalance in the

number of patients and the availability of beds in the inpatient room can cause the length of stay of patients in Emergency departments.

Length of stay according to the Joint Commission is defined as the condition of holding a patient in the ER or temporary placement unit until hospitalization is decided or transferred to another unit, it is recommended that the length of stay is no more than 4 hours when in the ER for the benefit of patient safety and quality (Abdul Wahab et al., 2021). Length of Stay (LOS) is the length of time a patient is in a special area of a hospital. Emergency Department Length of Stay (EDLOS) is defined as the length of time the patient is in the ER, from registration until the patient physically leaves the ER (Radcliff, 2011 in (Ismail, 2017).

According to the researcher's assumption, the Length of Stay (LOS) that occurred in the Emergency Room at the Muhammadiyah Hospital in Kediri was in accordance with the standards set by the Ministry of Health so that patient care in the Emergency Room could be carried out quickly and accurately. The existence of patients who underwent Length of Stay (LOS) in the old category occurred due to the accumulation of patients in the emergency room when the patient arrived, due to an imbalance between the number of health workers and the number of patients who entered, so that all patients who entered the emergency department were not treated simultaneously. in a sense gradually and depending on the severity of the disease and also the level of emergency, where patients who enter with an emergency level that threaten life or disability must be treated first compared to patients who come in conditions that are not life-threatening. The length of stay of patients being treated at the Muhammadiyah Hospital Kediri Emergency Room is the number of medical staff on duty in Shift, not balanced with the number of patients visiting and adjacent visit times, specialist consultation time, fees for general pathway patients, and lab tests and tests. swab. During the study, there were conditions where patients came in large numbers at the same time and close in time or hours. What's more, patients who are still in the room still need treatment which is not for a while.

The medical workforce belonging to the emergency room is one of the officers who makes an important contribution because there are no specialist doctors on duty in the emergency room. The specialist doctor on duty in the emergency department is a specialist doctor who has duties in another room so that the specialist doctor does not stay in the emergency room and the officer must first contact the specialist doctor to communicate the patient's condition and consult regarding the treatment given to the patient so that this can cause the patient's Length of Stay to be long because they have to wait for a specialist doctor to provide an intervention while the specialist doctor does not stay in the emergency room.

The Influence of Emergency Level and Response Time on the Length of Stay of Patients in the Emergency Room of Muhammadiyah Hospital Kediri

The results of the research on the effect of emergency level and response time on Length of Stay of patients in the Emergency Room of Muhammadiyah Hospital Kediri obtained data in table 1 shows that the p value of the two independent variables (emergency level and response time) is less than 0.05 so that partially or independently independent variables (emergency level and response time) affect the length of stay of respondents. Meanwhile, simultaneously or simultaneously according to table 2 shows that the significance value shows a value = 0.000 which means less than 0.05 so that it can be stated simultaneously or simultaneously that the independent variables (emergency level and response time) affect the length of stay of respondents in the IGD. Based on the coefficient of determination, the results in table 3 show that the R Square (R²) value is 0.326 or 32.6% which indicates the contribution of the independent variables (emergency level and response

time) while the remaining 67.4% is influenced by other factors that are not exist in this research model. Multiple correlation coefficients are used to measure the closeness of the relationship between the independent and dependent variables. The multiple correlation coefficient is indicated by a value (R) of 0.571 or 57.1% which indicates that the independent variables (emergency level and response time) to the patient's length of stay have a fairly close relationship.

The results of this study are in accordance with research conducted by (Nassar et al., 2020) which states that this study was conducted at the Zagazig Hospital in Egypt for 11,906 patients who visited and received services in the hospital emergency room, which is defined as a total time exceeding eight hours. from the beginning the patient arrived at the ER to be transferred to another room and hospitalized LOS. The results revealed that 7.7% of the 11,906 patients experienced a long waiting time for services in the emergency room to be transferred to other service rooms. Every year the number of patient visits to the emergency room continues to grow. One of the world's hospitals that experiences a Length of Stay that extends > 6-8 hours is Alnoor Mecca Hospital in Saudi Arabia, 44% of patients wait at the emergency department for 59 minutes, 32.6% spend 1-4 hours, 15.2% spent 4-8 hours, and 8.2% spent >8 hours. There was an increase of about 30% in all emergency room hospitals in the world.

One of the factors that affect the length of stay or length of stay in the emergency room is the level of emergency or triage. IGD triage is the process of determining or selecting patients who are prioritized to receive treatment first in the Emergency Room (IGD) in a hospital. This determination process is carried out to obtain a sequence of treatments according to the patient's emergency level, such as minor injuries, serious injuries that can be life threatening within minutes or have died. The longer the service in the emergency department will worsen the patient's condition, worsen the patient's condition resulting in increased mortality and further disability. The more severe the patient's condition, the more costs will be borne by the patient and also the length of stay in the emergency room (Darma et al., 2021). Another factor that affects the length of stay in the emergency room is the nurse's response time. The length of response time in the emergency room (response time) is the time from the patient coming to the emergency room until the patient is handled by a doctor or nurse. The length of time the patient responds to the emergency room is an indicator of the quality of service in the emergency department. According to the standards in force in Indonesia, namely the service standard for patient response time in the emergency department is ≤ 5 minutes (Ministry of Health, 2017).

According to the researchers' assumptions, the results of this study indicate that partially or separately, the emergency level and response time of officers can affect the length of stay of patients in the emergency room simultaneously or simultaneously, the two independent variables (emergency level and officer response time) also affect the length of stay patient. The results of this study indicate that the level of emergencies that occur in patients can cause patients to experience a worsening of their condition or will get worse if there are complications in the patient's condition and if treatment is not carried out immediately. Therefore it is very important to set patient emergency priorities according to triage because it will facilitate further action, besides that the quick response of officers in providing services in the emergency room from the time the patient arrives until they are treated will affect the patient's length of stay in the emergency department.

The results showed that the emergency level of patients can affect the patient's length of stay, where in patients with emergency conditions with red or yellow labels who come in life-threatening conditions, they must be treated immediately and also require quite a long

time so that when the patient is transferred to another room or will be referred to other health care facilities if there is no worsening of the condition. In the condition of patients who visit with the level of urgency with red and yellow labels in the Emergency Room of Muhammadiyah Kediri Hospital, all of them are treated with a fast response time by officers so that patients can be treated immediately and prevented from worsening conditions, but there are patients with long length of stay in hospital. Emergency Room due to other influencing factors such as administrative processes, filling in completeness of inpatient status by doctors and nurses on duty and availability of operating rooms, inpatient beds and necessary supporting equipment (ventilators).

The results of multiple linear regression tests performed on the research variables showed that there was a significant influence between the emergency level and the response time at the Muhammadiyah Kediri Hospital Emergency Room on the patient's length of stay either partially or simultaneously with a 95% confidence level and it was known that the ability of the independent variables in explaining the dependent variable was at a level of 32.6%, which means that only most of the length of stay can be influenced by other factors outside the variables studied. This shows that the emergency rate and response time are important variables that affect the length of stay of patients in the emergency department.

CONCLUSION

1. The level of emergency patients in the Emergency Room of Muhammadiyah Kediri Hospital shows that most of the respondents are included in the criteria for the yellow Emergency Level.
2. The response time of officers at the Muhammadiyah Kediri Hospital Emergency Room showed that the majority of respondents received officers' response time in the fast category.
3. Length of Stay at the Muhammadiyah Kediri Hospital Emergency Room shows that almost all of the length of stay respondents in the Emergency Room are in the fast category
4. There is a partial effect of the Emergency Level and Response Time on the Length of Stay of Patients in the Emergency Room of Muhammadiyah Kediri Hospital as indicated by a p value <0.05 .
5. There is a simultaneous effect of the Emergency Level and Response Time on the Length of Stay of Patients in the Emergency Room of Muhammadiyah Kediri Hospital as indicated by a p value <0.05 .

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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