Response time, waiting time and service quality in emergency department

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Article Info	ABSTRACT
	Response time and waiting time were key performance indicators in the emergency department of a hospital. This study will shed light on important factors contributing to service quality in emergency department of Indonesian public hospital by utilizing a cross-sectional design. About 117 patients were selected by simple random sampling techniques. Data observation sheets and a modified service quality instrument were used to measure health services in this department. Findings revealed that 83.8% patients felt satisfied with the services provided by emergency staff. Based on Kendall's Tau test, waiting time had a significant relationship with service quality ($p<0.05$) compared to response time ($p>0.05$). The results of logistic regression test showed that waiting time had a higher value for Exp(B)= 3.522. In conclusion, waiting time was the most important factor affecting service quality in emergency department of Indonesian public hospital. *This is an open access article under the <u>CC BY-SA</u> license.*

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1. INTRODUCTION

Hospital service quality was defined as patient judgment concerning overall service excellence in the hospital. It described the gap between patient perceptions and expectations towards the provided health services [1-2]. Perceived service quality had a positive correlation with hospital preferences, reference sources, sex differences, educational attainment, health quality, and wait times in the health services ($p>.05$) [3]. Other factors, such as sociocultural and patient background information affected patient satisfaction and patient retention as well [4]. Therefore, health care institutions should optimize its benefits and reduce the risks by providing continuity of care, and improving service outcomes, leading to increased patient's satisfaction as well as hospital profits [5-7]. Many factors have been shown to improve service quality in emergency department. Among these were response time, waiting time, health care costs, hospital facilities, and health care staff competence [8-10].

Response time and waiting time were key performance indicators in the emergency department of a hospital. Response time was the time needed for health care staff to arrive at the patient's location to give health services; on the other hand, waiting time was the period of time that patient spends waiting for emergency services. The total average of waiting time in emergency department was around 210 minutes, which consist of time spent from for triage 5 minutes, doctor assessment for 6 minutes, and clinical

evaluation for leaving this department about180 minutes [11-14]. Ideally, emergency response time was less than 8 minutes, as this will improve the odds of patient survival (adjusted OR= 1.3, 95% CI= 1.00-1.69) [15]. Improving response time and waiting time was related to better patient satisfaction, shorten length of stay, increased life expectancy, decreased mortality rates, and overall hospital service quality [16-18].

The majority of people nowadays used public hospitals because their payment for health services comes from national health insurance. Yet, patient felt that the care provided by Indonesian public hospitals was less than they expected. Longer waiting time, health care staff shortages, complexities in health care facilities, and incompetent health care staff were recorded as factors related to service quality in Indonesian public hospital. These factors also influenced patient satisfaction and patient values on health services [19, 20]. Emergency department as the first part of hospital patient management should improve the quality of patient service by minimizing average response time and waiting time. Indonesian public hospital could also negotiate with national health insurance to offer a wide range of care services including prescribed various drugs so health care provider could manage patient conditions more effectively. Previous studies presents relatively limited data on this frontline unit of the hospital. This study therefore will shed light on important factors contributing to service quality in emergency department of Indonesian public hospital. Providing better service quality in the public hospital influences patient satisfaction and overall patient experience in hospitals.

2. RESEARCH METHOD

A cross-sectional design was utilized to explain important factors contributing to service quality in emergency department of Indonesian public hospital. About 117 patients in emergency department were selected by simple random sampling techniques. Data was collected before patient left the department, in one public hospital (January-February 2020) which was located in Central Java. Respondents received all information regarding the study and signed a consent form.

Data observation sheets and a modified service quality instrument based on standard operating procedure in the hospital were used to measure health services in emergency department. Confounding factors in this study were controlled by employing as simple random sampling to select representative samples from a population; and logistic regression was used to adjust other co-variants in this study. A research ethical approval was obtained from Ethical Board of General Hospital in Kudus, Central Java (No.003/EP/01/2020). Analysis of data used Kendall's Tau test and logistic regression to describe factors related to service quality in emergency department.

3. RESULTS AND DISCUSSION

Findings showed the characteristics of respondents based on age, sex, education, occupation, heath financing and triage level that can be seen in Table 1. Additionally, Table 2 illustrated the results of Kendall's Tau test to explain the correlation between response time, waiting time, and service quality in the hospital. Table 3 described the analysis of logistic regression test.

3.1. Characteristics of respondent

As can be seen in Table 1, almost half of respondents aged over 60 years old (47%), more than half of respondents were female (52.1%), about one third of respondents had completed junior high school (32.5%) and senior high school (37.6%). In addition to this, 60.7% of respondents worked as private employees, and 88% of respondents used national health insurance. Commonly, emergency patients were in 2nd priority (39.3%) and 3rd priority (44.4%) triage level respectively.

Older adult was found as frequent users of emergency department (OR= 1.5, 95%CI=1.4-1.7) as they have issues regarding the continuity and coordination of care. Previous study showed that 59% of respondents were in green level or 3rd priority and 39% of elderly were in red code or 2nd priority of triage level [21]. In line with another study, female, private employees, and senior high school education level were also reported as the largest proportion of emergency patient status [22]. Most emergency patients used national health insurance to help cover their medical care costs and almost half of respondents (48%) recognized their health rights and obligations [23]. National health insurance was known as the most favorable health insurance used in the public hospital which covered a variety of medical benefits for all Indonesian citizens [24].

3.2. Correlations between response time, waiting time and service quality

This study found that 52.1% of respondents dissatisfied with the response time in emergency department as shown in Table 2. On the other hand, most patients felt satisfy with the average waiting time (70.9%). However, most patients felt satisfy with overall service quality provided by emergency staff.

Findings revealed that 83.8% patients felt more satisfied with the emergency services. This suggests that some conditions stated by 16.2% of 117 patients have to be improved upon to ensure that the public hospital achieved total satisfaction for all their patients. Based on Kendall's Tau test that can be seen in Table 3, waiting time had a significant relationship with service quality (p<0.05) compared to response time (p>0.05).

Table 1. Characteristics of respondent

Categories	Distribution of Frequency (N=117)	
	n	%
Age		
>20-40 years old	32	27.4
41-60 years old	30	25.6
>60 years old	55	47.0
Sex		
Male	56	47.9
Female	61	52.1
Education		
Elementary	30	25.6
Junior High School	38	32.5
Senior High School	44	37.6
Bachelor	5	4.3
Occupation		
Unemployed	28	23.9
Private employee	71	60.7
Public employee	13	11.1
Entrepreneur	5	4.3
Health financing		
Self-funded	14	12.0
National health insurance	103	88.0
Triage level		
1st Priority (P1)	9	7.7
2nd Priority (P2)	46	39.3
3rd Priority (P3)	52	44.4
4th Priority (P4)	10	8.5
5th Priority (P5)	0	0

Table 2. Distribution of frequency response time, waiting time and service quality

Categories	Distribution of Frequency (N=117)	
	n	%
Response time		
Not satisfy	61	52.1
Satisfy	56	47.9
Waiting time		
Not satisfy	34	29.1
Satisfy	83	70.9
Service quality		
Not satisfy	19	16.2
Satisfy	98	83.8

Table 3. Kendall's tau test results

Relationships between variables	Correlation Coefficients	P value
Response time and service quality	0.004	0.963
Waiting time and service quality	0.229	0.014

Studies showed that public hospital had a poor response time due to health care staff shortages, incompetent staff, and unhealthy hospital environment. Health care staff also felt overloaded at work and they had to overcome considerable challenges within the hospital, in addition to this lack of competent health care staff and hospital facilities caused additional burden [25, 26]. Response time was a fundamental indicator in emergency department, and this could be achieved by adequate triage knowledge and skills as well as accessing to appropriate information and technology in emergency department [27]. Response time in emergency services had a correlation with patient's survival after cardiac arrest [28]. However, in another study by Weiss et al. stated that response time less than 8 minutes did not affect morbidity and mortality rates in cardiac arrest patients as this period of time only applicable to patient complaining of chest discomfort, breath problems, open wound/trauma, and accidents [29]. In another study, response time which was less than 17 minutes in pre hospital area could increase 87% chance of patient's survival. Factors related to increased patient's survival include patient's responsiveness and response of time in pre-hospital

care<17 minutes [30]. A study by Mutiasari et al. explained that with an ideal response time in emergency department of Indonesian hospital<5 minutes, there was a significant relationship between response time and patient satisfaction with p value<0.05. Patient satisfaction was described as an important indicator in hospital service quality [31].

In this study, waiting time had a significant relationship with service quality and 70.9% stated that they satisfied with the period of waiting time in emergency department. A number of factors influenced waiting time such as rate of arrival, provided health services, period of time, and management quality [32]. This study is in line with Al-Harajin *et al.* which identified patient satisfaction with the period of waiting time (M±SD=38.4±6.63) and overall waiting time (p<0.01) [33]. Another study argued that it is difficult to overcome patient dissatisfaction, regardless of sufficient facilities and competent staff, therefore they recommend that health care providers should be more empathetic and show respect during interaction with patient. Being empathy improves healthy relationship between patient and health care staff which leads to increased patient satisfaction [34].

3.3. Logistic regression results

The results of logistic regression test showed that waiting time had a higher value for Exp(B)= 3.522 that can be seen in Table 3. Therefore, the most influencing factors related to service quality in emergency department was the waiting time. Umar et al. investigated that work shifting could be a solution to manage staff shortages and reduce the average waiting time by 2.13 h (Mean difference=-2.13h, 95%CI=-2.44:-1.82h, p<0.001) [35]. Previous study in an emergency department in Hongkong found that the average waiting time was about 2 hours. Longer waiting time was caused by the fact that people preferred to go to public hospital [36]. This condition also happened in Indonesia as most people are more likely to check their medical conditions in public hospital as they can use their national health insurance and received a subsidy for the prescribed medications.

Table 4 explained the equation of Y=constant+aX1+aX2, Y=0.946+(-0.194 response time)+ (1.268 the waiting time). The result of this regression logistic equation can also be used to calculate the distribution of the response time and the waiting time for patients in emergency department. For example, if the patient was given an initial 5 minutes assessment, patient whose clinical conditions was in 3rd priority (P3), and 30 minutes' waiting time. The regression equation modeling was as follow:

Y=constant+aX1+aX2
Y=0.946+(-0.194 response time) (5) +(1.268 waiting time)(30)
Y=0.946+-0.970+38.04
Y=38.016 minutes

Table 4. Logistic regression test results

		B	S.E.	Wald	df	Sig.	Exp(B)	95% CI for Exp(B)	
								Lower	Upper
Step 1[a]	The response time	-0.194	0.526	0.135	1	0.713	0.824	0.294	2.311
	The waiting time	1.268	0.527	5.792	1	0.016	3.552	1.265	9.973
	Constant	0.946	0.424	4.967	1	0.026	2.574		

a. Variable(s) entered on step 1: The response time, the waiting time

Service quality in public hospital was also affected by five components: responsiveness, reliability, empathy, tangibles, and assurance. The comparison scores of overall service quality between private and public hospital were -0.24 and -0.66. Reliability was the highest component of service quality showed in private hospital, while responsiveness had the largest score aspect in public hospital [37]. Improving service quality in the public hospital could be achieved by paying particular attention to enhancing staff competencies, advancing hospital technology and resources, providing effective communication, managing sufficient health funding [38-41]. Issues regarding the complexity of service quality in the public hospital need to be solved, consequently emergency department has a responsibility to reduce waiting time and ensure faster response time so patient will feel more satisfy with the provided services in public hospital.

4.   CONCLUSION

A correlation coefficients showed that more than half of respondents dissatisfied with the response time whereas most patients felt satisfy with the average waiting time in emergency department. On the other hand, most patients felt satisfy with overall service quality provided by emergency staff. Based on the logistic regression analysis, waiting time had a higher value for Exp(B)=3.522. In conclusion, waiting time was the most important factor affecting service quality in emergency department of Indonesian public hospital.

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