

## Response Time, Decision Time, and Delivery Time in Pediatric Emergency Unit of West Java Top Referral Hospital

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### Abstract

**Background:** The number of visitors at pediatric emergency unit has increased around 25 million per year. This condition caused overcrowded in these units which would disrupt health care process. Waiting time is one indicator of health care quality. Prolonged waiting times is related to patient's dissatisfaction and poor outcome. The aim of this study was to identify response time, decision time, and delivery time of Pediatric Emergency Unit in Dr. Hasan Sadikin General Hospital.

**Methods:** This was a descriptive cross sectional study. Data from medical records of pediatric patients who attend Pediatric Emergency Unit, Dr. Hasan Sadikin General Hospital from August to September 2015 were collected. The data included sex, age, day of admission, time of admission, insurance status, triage status, disposition of care, response time, decision time, and delivery time. The collected data were analyzed and presented in percentage and performed in tables.

**Results:** A total of 201 data were collected during study period. The geometric mean of total waiting time in pediatric emergency department was 346.65 minutes (5 hours 46 minutes). Response time had a geometric mean of 4.07 minutes, meanwhile decision time and delivery time had geometric mean of 46.77 minutes and 181.97 minutes, respectively.

**Conclusions:** Total waiting times of pediatric emergency department exceeds the standard time (4 hours). Meanwhile response time and decision time have already met the standard.

**Keywords:** Decision time, delivery time, pediatric emergency unit, response time, waiting time

### Introduction

The number of visitors at pediatric emergency department increases around 25 million per year.<sup>1</sup> Globally, there are approximately 30 billion of children under 18 years old visit emergency departments each year, which is equal to 25% of total emergency departments visit.<sup>2</sup> High utility of emergency departments make these departments often face problems and pressure, for instance, abundant of the patients and limited of sources than other departments in the hospital.<sup>3</sup> Overcrowding is the main problem which faced by health care provider recently which would disrupt health care delivery process.<sup>4</sup>

Waiting time is one indicator of health care quality in emergency department that divided into several interval times such as Response time, Decision time and Delivery time. Response time is the time needed since

the patient arrive in emergency department until triage process is done then patient can meet and examined by physician. Decision time is the time needed since patient examined by physician until the physician give the disposition of care. Delivery time is the time needed since the disposition of care is made until the patient discharge from emergency department.<sup>5</sup>

The average waiting time of patient treated by health workers in emergency departments, from 2003 to 2009, increased about 25%, from 46.5 minutes to 58.1 minutes.<sup>6</sup> Prolonged waiting times have been associated with patient's dissatisfaction and poor patient's outcome, for instance increase of mortality and morbidity among emergency department patients and prolong length of stay in hospital.<sup>7</sup>

In Indonesia, unfortunately there is a lack of publication data about waiting time in emergency department, especially pediatric

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emergency department. Therefore, this study was aimed to discover response time, decision time, and delivery time of Pediatric Emergency Department in Dr. Hasan Sadikin General Hospital.

## Methods

This was a descriptive cross sectional study which has been approved by health research ethics committee Faculty of Medicine Universitas Padjadjaran (LB.04.01/A05/EC/297/VII/2015). The total population

of completed medical records of pediatric patients aged under fourteen years old and attended Pediatric Emergency Department at Dr. Hasan Sadikin General Hospital from August to September 2015 were included in this study.

An exclusion criterion was patients who attended surgery emergency department. Data was retrieved from medical record included sex, age, day of admission, time of admission, insurance status, triage status, disposition of care, response time, decision time, and delivery time.

**Table 1 Characteristics of Patients in Pediatric Emergency Department**

	Frequency	Percentage (%)
<b>Sex</b>		
Male	121	60.2
Female	80	39.8
<b>Age</b>		
Toddler (0–5 year)	127	63.2
Children (6–11 year)	53	26.4
Adolescent (12–14 year)	21	10.4
<b>Day of Admission</b>		
Weekday	153	76.1
Weekend	48	23.9
<b>Time of Admission</b>		
Morning (7.00-14.00)	48	23.9
Afternoon (14.00-21.00)	85	42.3
Night (21.00-7.00)	68	33.8
<b>Referral Status</b>		
Yes	119	59.2
No	82	40.8
<b>Insurance</b>		
Government	75	37.3
Private	28	13.9
No insurance	98	48.8
<b>Triage</b>		
Non-Urgent	35	17.4
Urgent	136	67.7
Emergency	30	14.9
<b>Disposition of Care</b>		
Discharge	63	31.3
Hospitalized	138	68.7

**Table 2 Waiting Time in Pediatric Emergency Department (in minutes)**

	Geometric Mean	SD*	Median	Range
Response Time	4.07	2.08	4.00	1-34
Decision Time	46.77	3.89	50	3-734
Delivery Time	181.97	5.37	232	2-4.333
Total	346.65	3.01	355	13-4.357

\*SD:Standard Deviation

The collected data were analyzed using descriptive statistical analysis. Mean, standard deviation, frequency distribution and percentage of the mentioned variables were calculated.

### Results

During this study period, there were 703 patients admitted in pediatric emergency department. From those all, 502 data were excluded from this study because of

uncompleted medical record. Of 201 data, 121 medical records were on male patients and 80 were on female patients. Toddler was the most frequent visitors in emergency department (63.2%). The majority of patients (69.2%) who visited pediatric emergency department were patients who were referred by other health care facility and around 67.7% patients arrived in urgent triage status (Table 1).

The emergency department crowding was most seen in the afternoon (Table 1), with peak time at 13.42. The geometric mean of waiting time pediatric emergency department was

**Table 3 Pediatric Emergency Unit Waiting Time According to Day of Admission, Time of Admission, Insurance, Triage and Disposition of Care**

	Geometric Mean(SD*)		
	Response Time (in minutes)	Decision Time (in minutes)	Delivery Time (in minutes)
Day of Admission			
Weekday	4.35(2.04)	45.56(3.99)	204.55(4.86)
Weekend	3.37(2.10)	51.92(3.64)	120.03(6.64)
Time of Admission			
Morning	3.69(2.01)	44.84(3.90)	183.82(4.89)
Afternoon	3.99(2.23)	44.10(4.14)	148.08(5.83)
Night	4.55(1.91)	52.62(3.64)	226.62(4.98)
Insurance			
Government	4.11(2.12)	40.95(3.86)	171.83(4.99)
Private	3.98(2.26)	41.35(4.13)	199.89(2.68)
No insurance	4.12(1.99)	54.18(3.90)	181.17(5.86)
Triage			
Non-Urgent	4.96(2.17)	45.12(4.96)	119.97(5.54)
Urgent	4.26(2.00)	47.69(3.67)	182.47(5.11)
Emergency	2.73(2.01)	46.13(3.96)	272.58(5.77)
Disposition of Care			
Discharge	4.25(2.1)	70.50(4.21)	84.25(6.40)
Hospitalized	4.03(2.04)	39.06(3.62)	254.74(4.31)

\*SD:Standard Deviation

**Table 4 Mode of Discharge Patient with Hospitalized Disposition of Care**

	<b>n</b>	<b>Percentage (%)</b>
Enter inpatient ward	92	66.7
Not enter inpatient ward	46	33.3
Discharge with doctor's approval	9	6.5
AMA*	20	14.5
Death	13	9.4
Transfer to other facilities	4	2.9
Total	138	100

\*AMA: Against Medical Advice

346.65 minutes with median 355 minutes (5 hours 55 minutes), minimum of waiting time was 13 minutes and maximum of waiting time was 4357 minutes. Delivery time contributed the most of emergency department waiting times with the geometric mean of 181.97 minutes (3 hours 1.97 minutes) (Table 2).

Table 3 showed the response time, decision time, and delivery time of patients in pediatric emergency department based on patient's characteristics. Patient who attended emergency department on weekday had prolonged response and decision time. The same thing occurred in patients who visit emergency department at night and without insurance. Prolonged delivery time occurred in patient who were hospitalized. Meanwhile, patient with emergency status had shorter response time but longer in delivery time.

Out of 138 patients who suggested by physicians to be hospitalized, only 66.7% entered inpatient ward. Meanwhile, 6.5% had approved to discharge by the physician after all, 14.5% were Against Medical Advice (AMA), 2.9% were transferred into other health care facility, and the rest (2.9%) died while waiting for inpatient ward. (Table 4)

## Discussions

According to this study, the emergency department crowding was most seen in the afternoon. This result was in line with other literature which indicated that this crowding is probably due to patient who could not visit outpatient clinic.<sup>8</sup> The total of waiting time in pediatric emergency department is longer than other previous study,<sup>8,9</sup> and with the 4 hours maximal standard waiting time of emergency department.<sup>10,11</sup>

Total waiting time was determined mostly from delivery time. This study found that

delivery time had not meet the 2 hours median recommendation which assigned by Council for the Accreditation of Educator Preparation (CAEP).<sup>12</sup> In contrast, response and decision time have been better than previous study and met the standard of good hospital care (5 minutes and 120 minutes).<sup>13</sup> However, in reality, there were patients who waited for more than 10 hours to get a disposition of care decision. This matter was caused by multifactorial factors such as prolonged time needed to other supporting examination (laboratory, radiology) and consulted with other specialist.<sup>3,12</sup>

Longer response time is seen on patients who arrived on weekday (Monday-Friday), likely due to a large number of visitors during that day. This is consistent with other study which stated that an increase in waiting time directly proportional to emergency department volume of visits.<sup>6,14</sup> Increasing in emergency department visits resulted in unavailability of emergency department resources to take care of patients; therefore, the patients must wait in unreasonable waiting time. American Academy Emergency declares that emergency physician is required to give health care to 2.5 patients per hours and nurse patient ratio should not excess 1:3.<sup>8</sup> Whereas in pediatric emergency department of Dr. Hasan Sadikin General Hospital, there are 2 doctors and 2 nurses with the average of patient's visit are 12 patients per day, which is much lower than requirement.

In addition, the same result is found in patients who visit during night. Meanwhile longer decision times are seen in patient who visited on weekend and night, probably due to time operation of other supporting examination and consultation.

Patients with hospitalized disposition of care had longer delivery time. Lack of inpatient bed capacities is the main cause prolonged of

delivery time.<sup>4,11,15</sup> The longer response and decision time also found in uninsured patients (poor patients or patients who do not have insurance). The result is consistent with other study which concluded that insurance status decides the quality of health care in community, include the waiting time in emergency,<sup>16</sup> yet contradict with the result of National Hospital Ambulatory Medical Care Surveys 2005 and 2006 in United States of America.<sup>17</sup>

Patients with non-urgent status have shorter decision time. This result consistent with other studies which related patients with non-urgent status to waiting time in emergency department.<sup>18,19</sup> Meanwhile, faster response time but longer delivery time are seen in emergency patients. This is consistent with other study which stated that patients with emergency status need more time to health care and treatment of critical condition, that contribute in prolonging delivery time in emergency department, particularly if the patients must wait for full inpatient bed.<sup>19</sup>

From all patients whom suggested by physician to be hospitalized, there were patients who did not enter in patient bed which in the end would cause prolonged delivery time. This condition caused by some factors such as no patient in bed, no money to pay the hospital fee, and the family of patient refuse patient to enter the inpatient bed.<sup>4</sup> This condition can increase patient's morbidity and mortality since patient must be treated in emergency department with minimal facility. It can be seen from out of 46 patients who did not entered inpatient bed, there were 13 patients deaths (28.3%) who had longer delivery time (701.45 minutes) than patients who still alive (163.90 minutes).

Meanwhile, transfer process to other health care facility is more difficult because Dr. Hasan Sadikin General Hospital, Bandung is a tertiary health care facility. Dr. Hasan Sadikin General Hospital gets many referred patient from other health care facility in West Java which do not have facility or space in inpatient bed, especially for Pediatric Intensive Care Unit (PICU) and Neonatal Intensive Care Unit (NICU).<sup>3</sup>

Based on the observation, Dr. Hasan Sadikin General Hospital did not have enough space to accommodate emergency department's entire patient so that many stretchers had been seen in corridor of emergency department, particularly when there was increasing of volume of patient's visits at afternoon and night. This finding is similar to condition in other tertiary health care facility.<sup>3,20</sup> This

condition can be resulted from prolonged delivery time from previous patient due to not enough space in inpatient bed which can block the flow of patients in emergency department and increase waiting time further.<sup>6,11</sup>

The limitation of this study is short duration of the study and the data which have been collected were handwritten medical record with less accurate of time documentation. The more collected and the better implementation of medical record writing system will make the data collected in the future more accurate; therefore simplifying policy in hospital could increase the quality of health care delivery.

In conclusion, the total waiting times and delivery time of pediatric emergency department exceeds the standard time (4 hours). Meanwhile response time and decision time already met the standard. Longer waiting times can be seen in patient who attended emergency department on weekday and afternoon until night, uninsured patient, and have been decided to inpatient care.

Additional inpatient bed in hospital is needed to decrease waiting time, especially delivery time. Increasing of emergency department capacities and number of health workers (doctors and nurse) are needed to overcome emergency department overcrowding in particular time (afternoon to night) when there are most emergency visitors. Coordination between emergency department, radiology, laboratory, and specialist's consultation should be improved to decrease decision time.

Further studies are needed to assess the relationship between variable used in this study with response time, decision time, and delivery time, especially in patients who have national health insurance (*Badan Penyelenggara Jaminan Sosial*, BPJS) or has not have BPJS insurance (private insurance or has no insurance). In Addition, the cause of the death of patient who did not enter inpatient bed needs to be more analyzed whether it is resulted from prolong waiting time or patient's condition itself.

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