

Supplement

Factors Contributing to Length of Stay Prolongation among Emergency Room Patients during the Covid-19 Pandemic: A Study at Persada Hospital

Faktor yang Berperan dalam Pemanjangan Length of Stay Pasien IGD di Masa Pandemi Covid-19: Studi pada Persada Hospital

Sylvia Kitty S¹, Holipah², Aryo Dewanto³, David David⁴

¹Hospital Management Study Program Faculty of Medicine Universitas Brawijaya Malang

^{2,3,4}Department of Master Hospital Management Faculty of Medicine Universitas Brawijaya Malang

ABSTRACT

Extended length of stay (LOS) in the Emergency Department (ED) results in crowding, potentially causing adverse events and patient dissatisfaction. The Covid-19 pandemic has forced hospitals to implement screening procedures that can extend the LOS of patients in the ED. This study aimed to provide an overview of changes in ED LOS during the pandemic and its contributing factors. This study used a descriptive approach through observation and interviews. LOS observations were conducted using the time & motion study method to determine the average time in each ED stage. The observation results identified the differences in the average LOS during the Covid-19 pandemic, which was 2 hours 39 minutes 52 seconds, and the longest time was on laboratory examination (2 hours 59 minutes 27 seconds). A lengthy laboratory examination duration is due to the additional laboratory examination procedure (serology) for SARS COV-2, suboptimal screening team, and the absence of notification in the hospital information system.

Keywords: Covid-19, emergency room, laboratory, length of stay, time and motion study

ABSTRAK

Pemanjangan Length of stay LOS di Instalasi Gawat Darurat (IGD) mengakibatkan kepadatan (crowding) yang berpotensi menimbulkan kejadian tidak diharapkan (KTD) dan ketidakpuasan pasien. Pandemi Covid-19 membuat rumah sakit (RS) menerapkan prosedur penapisan sehingga berpotensi pemanjangan LOS pasien di IGD. Tujuan dari penelitian ini adalah memberikan gambaran perubahan LOS IGD selama pandemi dan faktor-faktor yang berkontribusi. Penelitian menggunakan pendekatan deskriptif melalui observasi dan wawancara. Observasi LOS menggunakan metode time & motion study untuk mengetahui waktu rata-rata pasien di setiap tahapan IGD. Hasil observasi mengidentifikasi selisih rerata LOS dimasa pandemi Covid-19 adalah 2 jam 39 menit 52 detik dengan waktu terpanjang pada pemeriksaan laboratorium (2 jam 59 menit 27 detik). Panjangnya waktu pemeriksaan laboratorium karena penambahan prosedur pemeriksaan laboratorium (serologi) SARS COV-2, belum optimalnya tim penapisan dan belum adanya notifikasi pada sistem informasi RS.

Kata Kunci: Covid-19, Instalasi Gawat Darurat, waktu tunggu

Correspondence: Sylvia Kitty S. Hospital Management Study Program Faculty of Medicine Universitas Brawijaya Malang, Jl. Veteran, 65145, Malang Tel. 08111987070 Email: sylviakitty_66@yahoo.com

DOI: <http://dx.doi.org/10.21776/ub.jkb.2021.031.02.4s>

INTRODUCTION

Emergency Department (ED) is a critical facility in the hospital since ED is the hospital's frontline to respond to the need for health services of the public that requires immediate treatment (1). Patient deaths, which often occur within 24 hours of patient admission, can be prevented if health personnel acts immediately and starts the treatment process after the patient arrives at the health facility. The implementation of triage and a short length of stay (LOS) in the ED has an influential role in preventing death (2,3).

Globally, patients' length of stay in the ED has been a concern due to its impact on patient safety and satisfaction (4). Each patient's LOS is measured from the patient's initial arrival to the transfer to the other department, and it is used as a key to assessing the efficiency of improving management and clinical performance (5). From a managerial point of view, prolonged LOS can reduce patient satisfaction levels. On the clinical side, prolonged LOS has contributed to service delays, which can reduce patient safety or even cause death (6). Long waiting time or prolonged LOS in the ED indicates a low quality of service in a hospital (7). The Joint Commission Accreditation recommends that emergency services should not exceed four hours (8).

Currently, the whole world is facing the Corona Virus Disease (Covid-19) pandemic that directly impacts hospital services. Until recently, the prevalence rate has reached more than 183 million people and has caused almost 4 million deaths (9). Covid-19 can be transmitted through liquids (droplets), respiratory tract, indirect contact, and air (airborne transmissions), thus causing very fast transmission (10,11). The ease of transmission of this disease has forced hospitals to change procedures for receiving and handling patients in hospitals, especially in the ED, by adding procedures in the form of Covid-19 screening (12). One of the screenings carried out is the SARS COV-2 laboratory examination that takes up to three

hours, so the patient's LOS is potentially prolonged in the ED (13).

Persada Hospital, a private hospital that provides health services in Malang City, has also made some service adjustments or adaptations. Based on hospital quality indicators related to customer complaint reports, the number of complaints about waiting time in the ED is increasing. Long waiting time can compromise patient safety. This study aimed to provide an overview of changes in LOS during the pandemic and identify the factors that cause the prolonged length of stay of ED patients. The study results are expected to add evidence from the case study and serve as a basis for hospitals in designing strategies to deal with the long-term Covid-19 pandemic.

METHOD

This study was conducted at the Emergency Department of Persada Hospital in August 2020 using a descriptive approach based on medical record data and observations. From medical record data in 2019 consisting of 100 patients, 16 patients were selected as the research sample, comprising 10 inpatients and 6 outpatients. The researchers did direct observations and recorded the duration of each emergency service activity, starting from the patient's arrival, entering the registration and triage clinic, and being referred to the other service unit using a stopwatch. From a total of 99 patients, 21 patients were taken as the sample, consisting of 17 inpatients and 4 outpatients. Observations were made on three different shifts on each day of observation. There were 5 inpatients as respondents in the observation on September 29 (night shift), 6 inpatients and 2 outpatients on October 1 (afternoon shift), and 6 inpatients and 2 outpatients on October 2 (morning shift). A comparison of the LOS of patients before the pandemic (medical record data in 2019) and during the Covid-19 pandemic was carried out in selected case samples.

Table 1. Average length of stay of ED Patients (Pro Inpatient)

No	Before Covid-19		During Covid-19 Pandemic	
	Diagnosis	Total Duration	Diagnosis	Total Duration
1.	<i>Atherosclerotic heart disease</i>	01:30:00	<i>Atherosclerotic heart disease, heart failure unspecified</i>	04:41:11
2.	<i>Atherosclerotic heart disease</i>	02:07:00	<i>Atherosclerotic heart disease, heart failure unspecified</i>	05:02:43
3.	<i>Atherosclerotic heart disease</i>	01:30:00	<i>Atherosclerotic heart disease, heart failure unspecified</i>	05:36:59
4.	<i>Atherosclerotic heart disease</i>	02:07:00	<i>Atherosclerotic heart disease, heart failure unspecified</i>	04:55:52
5.	<i>Atherosclerotic heart disease</i>	00:50:00	<i>Atherosclerotic heart disease, heart failure unspecified</i>	05:08:10
6.	<i>Atherosclerotic heart disease</i>	02:14:00	<i>Atherosclerotic heart disease, heart failure unspecified</i>	06:11:41
7.	<i>Fever, unspecified</i>	02:26:00	<i>Atherosclerotic heart disease, heart failure unspecified</i>	05:46:05
8.	<i>Fever, unspecified</i>	00:50:00	<i>Chest pain, unspecified</i>	03:06:09
9.	<i>Fever, unspecified</i>	02:26:00	<i>Burn of second degree of hip and lower limb, except ankle and foot</i>	04:44:04
10.	<i>Malignant neoplasm of endometrium</i>	02:47:00	<i>Malignant neoplasm of cervix uteri, unspecified</i>	03:15:31
11.	<i>Nausea and vomiting</i>	03:01:00	<i>Corns and callosities</i>	03:22:07
12.	<i>Malaise and fatigue</i>	02:13:00	<i>Gastroenteritis and colitis of unspecified origin</i>	06:07:05
13.	<i>Malaise and fatigue</i>	02:13:00	<i>Mental disorders and disease of the nervous system complicating pregnancy, childbirth, and the puerperium</i>	05:18:47
14.	<i>Non-insulin-dependent diabetes mellitus with peripheral circulatory complications</i>	03:15:00	<i>Observation for suspected nervous system disorder</i>	03:36:56
15.			<i>Anemia, unspecified</i>	05:07:47
16.			<i>Unspecified contact dermatitis due to other agents</i>	04:32:22
17.			<i>Dizziness and giddiness</i>	04:43:17
Average Length of Stay of ED Patients (Before the Covid-19 Pandemic)		02:07:00	Average Length of Stay of ED Patients (During the Covid-19 Pandemic)	04:46:52

Source: ED time-motion study, 2020

No	Before Covid-19		During Covid-19 Pandemic	
	Diagnosis	Total Duration	Diagnosis	Total Duration
1	<i>Iron deficiency anemia, unspecified</i>	00:40:00	<i>Pneumonia, unspecified</i>	01:38:34
2	<i>Scleritis</i>	00:20:00	<i>Pneumonia, unspecified</i>	01:23:43
4	<i>Acute pharyngitis, unspecified</i>	00:25:00	<i>Acute pharyngitis, unspecified fever</i>	02:56:50
3	<i>Nausea and vomiting</i>	02:00:00	<i>Dyspepsia</i>	01:59:59
5	<i>Other cholelithiasis</i>	01:27:00		
6	<i>Fever, unspecified</i>	02:34:00		
Average Length of Stay of ED Patients (Before the Covid-19 Pandemic)		01:14:00	Average Length of Stay of ED Patients (During the Covid-19 Pandemic)	01:59:47

Source: Persada Hospital Medical Record Unit, 2020

RESULTS

The results of the time-motion study analysis show that during the pandemic, the average LOS of ED patients who will be hospitalized is 4 hours 46 minutes 52 seconds. The longest time required is in the cases of atherosclerotic heart disease (5 hours 20 minutes 23 seconds). This duration is longer than before the Covid-19 pandemic, which was 2 hours 7 minutes with a time difference (2 hours 39 minutes 52 seconds). The activities of outpatients in the ED also show the time difference between before and after the Covid-19 pandemic. The average time needed by outpatients in the ED in 2019 was shorter (1 hour 14 minutes) than the observation results in 2020 (1 hour 59 minutes and 57 seconds) with a gap of 45 minutes 57 seconds.

Table 3 shows that the longest waiting time is waiting for the laboratory results (2 hours 59 minutes 27 seconds). Studies in the laboratory department showed that the prolongation was due to the addition of SARS-CoV serology examination, which has become the standard for patients undergoing hospitalization at Persada Hospital during the pandemic. Several factors affecting the delay in the process in the laboratory were 1) the centrifuge process in the serologic examination sampling separation process for the SARS-CoV2 antibody test that takes approximately 2 hours and 2) the rearrangement of the emergency room and the laboratory due to the Covid-19 pandemic that has made the emergency room and laboratory separated by a building. In addition, there was no notification of the examination results in the Hospital Management Information System, so the emergency room staff had to check the finished results manually. The other contributing factor is the addition of a screening system that is the approval from the Covid screening team before hospitalization, which adds 14 minutes 13 seconds.

DISCUSSION

The results show that LOS in the ED during the Covid-19 pandemic among patients undergoing hospitalization is twice longer. The longest process is in the laboratory examination due to the additional procedure for examining the SARS CoV2 antibody using ECLIA and the approval of the doctor in charge for hospitalization. Although the LOS difference was shorter (45 minutes), it showed 30% LOS prolongation in outpatient ED patients. The duration of the ED LOS is a problem that often occurs in hospitals in Indonesia and overseas (4,14-16). Research in hospitals in Taiwan showed that the average LOS in Taiwan hospitals was 2.6-4.7 hours (4), as well as a study in Yogyakarta that 39.8% LOS occurred in more than 4 hours (17).

Length of Stay (LOS) prolongation becomes a concern because it has impacts on patients and hospitals. Patients perceive LOS prolongation or long waiting time as barriers to obtaining proper care. In addition, the long waiting time also causes tension in the workforce in the hospital and can disrupt the service rhythm, the number of patients, and reputation in public (2). LOS prolongation in the ED is also associated with increased mortality and morbidity. There is an increase in mortality from 2.5% to 4.5% in patients discharged from the ED after 12 hours or more (6).

This study identifies that the longest time in the ED LOS is the time needed for laboratory examinations due to the additional SARS CoV 2 antibody test. Antibody tests must be carried out due to management policies in Covid-19 screening, which are considered more accurate. Laboratory and other supporting examinations are often the main problems in LOS prolongation. Research in Saudi Arabia showed that 88.8% of the prolonged time in the ED was due to delays in laboratory examinations (16). Response and emergency laboratory waiting times for 656 patients in Australian hospitals show that an average waiting time to receive laboratory test results is 66

No.	Activity	Average time	No	Activity	Average time
1	Patient comes to Triage clinic	0:02:33	8	Nurse perform radiology examination	0:06:01
2	Screening by nurse	0:03:45	9	Completed radiology results	0:15:08
3	The doctor examines the patient and gives instructions for further examination	0:04:38	10	Send the examination results to the Covid screening team	0:04:32
4	Nurses place the patient according to the level of urgency & sample taking	0:07:02	11	Covid screening team approval	0:14:13
5	The patient's family registers in the ED registration desk	0:02:57	12	Consultation with the doctor in charge of patients	0:08:59
6	Completed laboratory test results	2:59:27	13	Doctor gives the hospitalization explanation	0:06:50
7	ED obtains the laboratory results	0:17:55	14	Family chooses the room (Patient Registration Central)	0:20:40

minutes (15). In addition, several studies have also shown that reducing time in laboratory tests in the emergency department has a significant impact on reducing overall patient waiting time (14,18,19). One of the reasons for the delay in response and preparation of test results in this study is the absence of a separate laboratory in the ED. An increase in the workload of emergency personnel can reduce or delay the delivery of emergency patient samples and the technical problems that occur in sample handling (20). In this study, the sample centrifuge process took up to 2 hours, and the laboratory was moved to a building separated from the emergency room.

This study found an approximately 14-minute extra time needed to wait for the decision of the doctor in charge of the of the Covid-19 screening results. Research in Iran showed that the waiting time for a consultation with a specialist is 99.3±32.8 minutes (95% CI: 34.9, 163.6), which is much longer than the findings of this study. Consultations between doctors in the ED and specialists require quite a long waiting time because the specialists are not in the ED, so it takes longer (20). Although only 14 minutes, the addition of this process is likely to affect patient satisfaction.

REFERENCE

- Ismail A. *Analisis Faktor yang Mempengaruhi Length of Stay Pasien di Instalasi Gawat Darurat Menggunakan Pendekatan Time Frame Guide Emergency Model of Care*. [Essay]. Universitas Airlangga, Surabaya. 2017.
- Deli H, Hasanah O, Novayelinda R, and Purwanti E. *Analisis Faktor-faktor yang Mempengaruhi Length of Stay (LOS) Pasien Anak di Instalasi Gawat Darurat (IGD)*. LINK. 2020; 16(1): 59–65.
- Pitang Y, Widjajanto E, and Ningsih DK. *Pengaruh Peran Perawat Sebagai Care Giver terhadap Length of Stay di IGD RSUD DR.T.C.Hillerris Maumere dengan Pelaksanaan Triage Sebagai Variabel Moderasi*. 2016; 4(2): 240–255.
- Li ST, Chiu NC, Kung WC, and Chen JC. *Factors Affecting Length of Stay in the Pediatric Emergency Department*. Pediatric Neonatology. 2013; 54(3): 179–187.
- Ardiyani VM, Andri MT, and Eko R. *Analisis Peran Perawat Triage terhadap Waiting Time dan Length of Stay pada Ruang Triage di Instalasi Gawat Darurat Rumah Sakit Dr Saiful Anwar Malang*. CARE: Jurnal ilmiah Ilmu Kesehatan. 2015; 3(1): 39–50.
- Singer AJ, Thode HC, Viccellio P, and Pines JM. *The Association Between Length of Emergency Department Boarding and Mortality*. Academic Emergency Medicine: Official Journal of the Society for Academic Emergency Medicine. 2011; 18(12): 1324–1329.
- Driesen BEJM, Van Riet BHG, Verkerk L, Bonjer HJ, Merten H, and Nanayakkara PWB. *Long Length of Stay at the Emergency Department is Mostly Caused by Organisational Factors Outside the Influence of the Emergency Department: A Root Cause Analysis*. PLoS One. 2018; 13(9): 1–15.
- Theryoto and Nadjib M. *Penerapan Lean Thinking untuk Mereduksi Waktu Boarding Pasien IGD ke Rawat Inap di RSUD Koja Tahun 2017*. Jurnal ARSI (Administrasi Rumah Sakit Indonesia). 2017; 4(1): 69–84.
- Morfi CW, Junaidi A, Elsesmita, et al. *Kajian Terkini CoronaVirus Disease 2019 (COVID-19)*. Jurnal Ilmu Kesehatan Indonesia. 2020; 1(1): 1–8.
- World Health Organization. *Modes of Transmission of Virus Causing COVID-19: Implications for IPC Precaution Recommendations*. (Online) 2020. <https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>
- Gurzawska-comis K, Becker K, Brunello G, Gurzawska A, and Schwarz. *Recommendations for Dental Care during COVID-19 Pandemic*. Journal of Clinical Medicine. 2020; 9(6): 1-15.
- Burhan E, Susanto AD, Nasution SA, et al. *Pedoman Tatalaksana Covid-19 Edisi 2 Agustus 2020*. (Online) 2020. <https://www.papdi.or.id/download/938-pedoman-tatalaksana-covid-19-edisi-2-agustus-2020>
- Kocher KE, Meurer WJ, Desmond JS, and Nallamotheu BK. *Effect of Testing and Treatment on Emergency Department Length of Stay Using a National Database*. Academic Emergency Medicine: Official Journal of the Society for Academic Emergency Medicine. 2012; 19(5): 525–534.
- Lee-Lewandrowski E, Nichols J, van Cott E, et al. *Implementation of a Rapid Whole Blood D-Dimer Test in the Emergency Department of an Urban Academic Impact on ED Length of Stay and Ancillary Test Utilization*. American Journal of Clinical Pathology. 2009; 132(3): 326–331.
- Li L, Georgiou A, Vecellio E, et al. *The Effect of*

- Laboratory Testing on Multihospital Longitudinal Study Applying a Cross-Classified Random-Effect Modeling Approach*. Academic Emergency Medicine: Official Journal of the Society for Academic Emergency Medicine. 2015; 22(1): 38–46.
16. Bukhari H, Albazli K, Almaslmani S, et al. *Analysis of Waiting Time in Emergency Department of Al-Noor Specialist Hospital, Makkah, Saudi Arabia*. Open Journal of Emergency Medicine. 2014; 2(4): 67-73.
 17. Kusumawati HI, Magarey J, and Rasmussen P. *Analysis of Factors Influencing Length of Stay in the Emergency Department in Public Hospital, Yogyakarta, Indonesia*. Australasian Emergency Care. 2019; 22(3): 174–179.
 18. Holland LL, Smith LL, and Blick KE. *Reducing Laboratory Turnaround Time Outliers Can Reduce Emergency Department Patient Length of Stay: An 11-Hospital Study*. American Journal of Clinical Pathology. 2005; 124(5): 672–674.
 19. Hashemi SMEF, Asiabar AS, Rezapour A, Azami-Aghdash, Amnab HH, and Mirabedini SA. *Patient Waiting Time In Hospital Emergency Departments of Iran: A Systematic Review and Meta-Analysis*. Medical Journal of the Islamic Republic of Iran. 2017; 31: 1-8.
 20. Blick KE. *Providing Critical Laboratory Results on Time, Every Time to Help Reduce Emergency Department Length of Stay: How Our Laboratory Achieved a Six Sigma Level of Performance*. American Journal of Clinical Pathology. 2013; 140(2): 193–202.
 21. Karaca Z, Wong HS, and Mutter RL. *Duration of Patients' Visits to the Hospital Emergency Department*. BioMed Central Emergency Medicine. 2012; 12: 1-15.