



ANALYSIS OF LENGTH OF STAY FOR OUTPATIENT PEDIATRIC DENTAL POLYCLINIC IN XYZ HOSPITAL

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Abstract. In healthcare services, the Indonesian Ministry of Health has regulated the minimum standard that all hospitals in Indonesia must serve. Every hospital also has an operational standard established by the hospital management. This study focuses on the Length of Stay (LOS) of pediatric dental outpatient polyclinic and a private hospital in Bandung, XYZ Hospital, as the subject. LOS is the total time a patient spends in a hospital from arrival at the administration until the time he/she leaves the hospital. XYZ Hospital management set 2 hours as the maximum duration of time that an outpatient spends in the hospital. Preliminary data showed that pediatric dental polyclinic's average outpatient LOS (OLOS) has exceeded the standard. Hence, this study aimed to find a solution to this issue. To analyse this issue, secondary data was further analysed to determine which sub-process contributes the longest time from the whole process. A control chart comprehends the maximum time in each sub-process during their best performance. Value-added analysis from the BPMN then showed some activities that need to be minimised or removed. In conclusion, a maximum time for each sub-process and business process improvement in the registration process will be suggested to XYZ Hospital. The suggestion is expected that the pediatric dental polyclinic will attain the hospital management's standard, enhancing patient satisfaction.

Keywords: Outpatient length of stay, BPMN, value-added analysis, business process improvement.

1 Introduction

The Indonesian government has established a universal social security administration agency called Badan Penyelenggara Jaminan Sosial (BPJS), intending to improve the welfare of society, as stated in Indonesian Law no. 24 (2011)¹. Despite efforts to enhance the healthcare system, many Indonesians, ranging from 600 thousand to 1 million individuals, seek medical treatment abroad annually, predominantly in Southeast Asian countries such as Singapore, Malaysia, and Thailand. The factors contributing to this issue include high medical expenses in Indonesia due to taxes on medicine and medical devices, societal concerns regarding the competence of doctors, and the quality of services provided by health facilities².

In response, the Ministry of Health recognises the need to improve the quality of Indonesian hospitals, particularly in addressing major diseases that cause high mortality rates, such as stroke, heart disease, diabetes mellitus, cirrhosis, and tuberculosis³. Building public trust in Indonesian healthcare facilities is crucial to reducing the number of citizens seeking treatment abroad, and cost, quality, and location are the significant factors in choosing healthcare services, particularly in the outpatient department⁴. Patient satisfaction, measured by the extent to which hospitals meet patient expectations, plays a vital role in this preference⁵.

To establish standards in this regard, the Indonesian Ministry of Health has issued Regulation Kepmenkes no. 129 (2008)⁶, which outlines the Minimum Service Standards (SPM) for hospitals in Indonesia. This regulation ensures a consistent understanding of operational standards and performance indicators. Hospital waiting time is one of the discussed indicators, with a maximum limit of 60 minutes. However, the regulation does not currently address Length of Stay (LOS), which refers to the total time a patient spends in a hospital from admission to discharge⁷. LOS is an important aspect of improving hospital efficiency and is associated with cost reduction. Therefore, Indonesian hospitals need to pay attention to this aspect as well.

This research focuses on XYZ Hospital, a private hospital in Bandung, to become a prominent healthcare service provider in the region within five years of its establishment. The hospital is currently facing issues related to LOS, as the preliminary data reveals significant variances and an average of OLOS that exceeds the hospital's standard. XYZ Hospital is a general hospital with various services in its outpatient clinic, which is divided into four services, including Center of Excellent, Mother & Children Center, Executive Polyclinic, and JKN or BPJS Polyclinic. The superior outpatient service in this hospital was Mother & Children Center, which houses three polyclinics: Obstetrics & Gynaecology, Pediatric Dental, and Pediatric. As the hospital already provides health practitioners with expertise in this service, they strive to provide a good service in service time, which can generate patient satisfaction. Therefore, an evaluation regarding OLOS is conducted.

The preliminary data gathered from the XYZ Hospital was the tracking time report of arrival and other related medical processes that patients go through until leaving the hospital. From the data, OLOS is calculated by reducing the patient discharge time by the registration time. As for OLOS' standard, the hospital management stated that 2 hours was the desired time that XYZ Hospital wanted to achieve. Figure 1 below shows the average of LOS in 3 polyclinics under the mother & children centre.

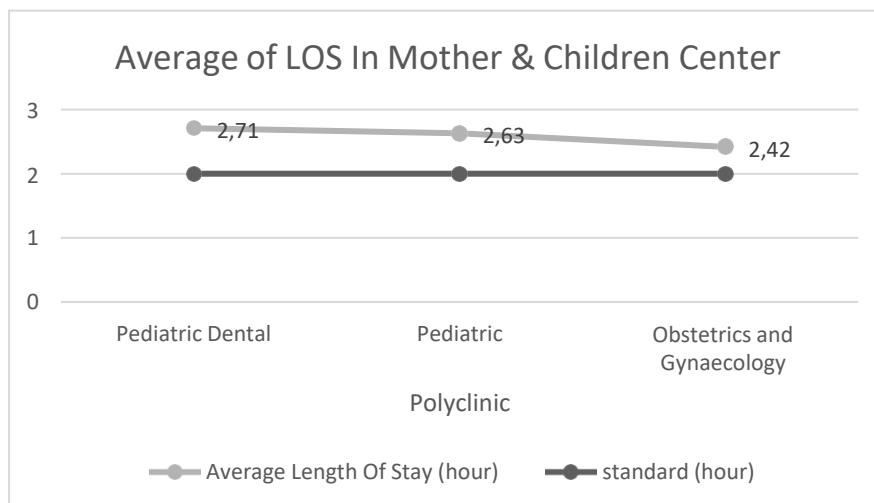


Fig. 1. Average Length of Stay by Polyclinic in XYZ Hospital

As shown in Figure 1, all polyclinics exceeded the 2-hour standard and pediatric dental placed the longest average of LOS with 2.71 hours. Hence, the pediatric dental polyclinic is chosen as the research subject since it has the most significant gap among the other polyclinics in the mother & children centre. The gap between

the current situation and the standard means that there is a target that XYZ Hospital has not achieved. Further research is needed to discover which sub-process has the longest time and affects LOS that exceeds the standard in specific polyclinics. Thus, a solution can be proposed after the specific sub-process is identified.

Reducing LOS is crucial for patient satisfaction, along with minimising waiting time, medical errors, and costs. Considering this issue, XYZ Hospital must prioritise this problem as shorter hospital stays contribute to higher patient satisfaction. Improving their services can also enhance customer loyalty, especially as they plan to expand their branches until 2025. Therefore, XYZ Hospital needs to focus on enhancing the operational system in their existing branches to improve effectiveness and prevent the recurrence of similar problems in the future. This research then constructed with a research question, "How can the outpatient department in the Pediatrics Dental Polyclinic improve its LOS to meet the hospital management's standard?" and 3 research objectives, which are to identify the business processes associated with LOS, to analyse the sub-process that contribute as the longest time, and to propose recommendations to enhance the LOS of the outpatient department in the Pediatrics Dental Polyclinic.

2 Method

This research utilises two types of data: primary data and secondary data. The primary data is collected through the author's observations and discussions with stakeholders from XYZ Hospital to validate the process flow. On the other hand, the secondary data is obtained from internal sources within XYZ Hospital.

Table 1. Research Methodology and Data Collecting

Stage	Method	Data Collecting	Data Analysis
"Analysing the quantitative data"	Tracking time report	Secondary data	Process capability, control chart and analysis of variance
"Constructing current BPMN"	Hospital's standard operational procedure	Secondary data	BPMN
"Assessing current BPMN"	Value-added analysis	Secondary data	Value-added analysis
"Proposed new BPMN"	BPMN	Secondary data	BPMN

3 Result and Discussion

3.1 Quantitative Data Analysis

- Process capability

According to the process capability test, the mean of OLOS is 2.49 hours. Meanwhile, the PPM in the capability plot section indicates the number of defects per one million opportunities (DPMO) based on OLOS data. This means that the pediatric dental polyclinic has a probability of defect of more than five hundred thousand every one million processes (54% of process). There are also multiples of data exceeding the USL (2) according to the histogram. Moreover, a process is considered capable if the Ppk value is at least 1.0¹⁰. The outpatient pediatric dental clinic still possesses -0,04 Ppk, which means the process is quite far from capable.

- The longest sub-process

To identify which sub-process contributes the most extended time within a whole process of OLOS, the author utilised the Pivot Table in Ms. Excel to break down the average time of each sub-process (Table 2). The OWT is obtained by subtracting the start time of the doctor's examination from the registration time. In contrast, the doctor's examination and pharmacy are the result of subtracting the finish time from the start time of each process.

Table 2. Average Time of Each Sub-Process

Polyclinic	Average of OWT	Average of Doctor's Examination	Average of Pharmacy
Pediatric Dental	1,08	0,45	0,97

- Sub-process analysis

Control charts are employed to identify opportunities for process improvement by eliminating special causes and reducing common cause variation¹¹.

1. Outpatient Waiting Time

From the statistical summary report, the confidence interval for the mean in the most stable process is between 0,57704 and 0,76785. Thus, the pediatric dental polyclinic has accomplished a maximum outpatient waiting time of 0,76785 hours (46 minutes) within their best performance.

2. Doctor's Examination Time

According to the statistical summary report of the doctor's examination time, the confidence interval for the mean in the most stable process is between 0,46650 and 0,54675. This means that the pediatric dental polyclinic has achieved the maximum time of a doctor's examination for 0,54675 hours (32 minutes) during their best performance in March-May 2023. Further analysis using the ANOVA test will be conducted to investigate whether there is a difference in examination between each doctor.

3. Pharmacy Service Time

The statistical summary report shows that the confidence interval for the mean in the most stable process is between 0,23159 and 0,29767. Therefore, it means that during the best performance of the pharmacy, they have a maximum service time of 0,29767 hours (18 minutes). However, the author will not conduct a deep analysis of pharmacy service since this topic is being analysed by other researchers.

3.2 Value-Added Analysis

In value-added analysis, the OVA and NVA components are categorised based on whether the activity is deemed crucial for the customer and the company, or neither¹². The author performed this analysis by assessing the BPMN¹³, a task undertaken to depict the operations of a business to analyse the existing process and enhance it in the future¹⁴, without revealing it to the hospital's stakeholders, aiming to reduce the likelihood of biased opinions. The results of the value-added analysis for the current business processes at Edelweiss Hospital's pediatric dental outpatient clinic are outlined below:

- Pre-examination

The pre-examination stage was the activity that occurred during the longest sub-process (OWT), and the value-added analysis is presented in Table 3.

Table 3. Value-Added Analysis on Pre-examination Process

No	Activity	Organisational Value Added	Non-Value Added
1	Go to the Online Service Counter	✓	
2	Choose the online registration option.	✓	
3	Go to Self Service Counter	✓	
4	Go to the Registration Counter	✓	
5	Fill in your name and date of birth.		✓
6	Choose the type of coverage.		✓
7	Choose the poly/doctor the patient wants to go to.	✓	
8	Contact call center team		✓
9	Help the patient to solve the problem.		✓
10	Print the polyclinic queue number.	✓	
11	Print the registration queue number.	✓	
12	Go to the registration area.	✓	
13	Entering medical record number	✓	
14	Register patient	✓	
15	Print out the insurance file.		✓
16	Receive polyclinic queue number.	✓	
17	Go to the Mother & Children Polyclinic	✓	
18	Directing patient to the waiting room after anamnesis		✓

- Examination

The examination stage is the activity that occurs when the doctor is examining a patient in the examination room. Table 4 presents a value-added analysis for this stage.

Table 4. Value-Added Analysis on Examination Process

No	Activity	Organisational Value Added	Non-Value Added
1	Identify patients/parents	✓	
2	Take photos of the patient's teeth.	✓	
3	Provide a cover letter for hospitalisation.	✓	
4	Direct the patient to inpatient registration.	✓	
5	Record the results of examination and treatment into SIMRS.	✓	
6	Input the BMHP used into SIMRS.	✓	
7	Direct the patient to the payment waiting room.	✓	
8	Call the next patient.	✓	

- Post-examination

The post-examination stage occurs after the patient is examined, for instance, the payment process. The value-added analysis of the post-examination stage is presented in Table 5.

Table 5. Value-Added Analysis on Payment Process

No	Activity	Organisational Value Added	Non-Value Added
1	Go to the general cashier counter	✓	
2	Go to the insurance cashier counter.	✓	
3	Takes the cashier queue number	✓	
4	Call the patient queue number.	✓	
5	Submit registration card	✓	
6	Submit insurance file		✓
7	Confirms with the insurance provider		✓

3.3 Improved BPMN

Improving business processes has the potential to reduce costs and process durations while simultaneously enhancing customer satisfaction¹⁵. The proposed new BPMN will focus on the registration process, considering outpatient waiting time the longest sub-process. Hence, the author suggested XYZ Hospital reform their registration process, which seems ineffective as assessed in the value-added analysis of the pre-examination stage. In the new BPMN, patient arrival time should be automatically recorded by the system when the administration staff scan the barcode in the registration queue number. The registration will be divided into two types, which are online and offline, and all patients will have to visit the administration counter to reduce the confusion caused by 3 Kiosks.

4 Conclusion

Considering the longest sub-process time is the outpatient waiting time, it becomes the focus of the proposed improvement regarding outpatient length of stay (OLOS). The author then recommends that XYZ Hospital improve their business process, especially in registration. For the doctor's examination, it is already good enough since the average time is not more than 30 minutes. As it is discovered that during the best performance of pediatric dental polyclinic, they have achieved OLOS below the hospital's standard (2 hours), then the polyclinic can take the maximum time as a baseline to serve the patients. Moreover, the IT team must be more disciplined in recording the tracking time to minimise invalid data. For further research, the hospital can start to recap the diagnosis or action taken on each patient so that the correlation between diagnosis/action can be examined.

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