

REDUCING ELECTIVE SURGERY WAITING TIME AT PUBLIC HOSPITAL IN BANDUNG

Muhammad Fachry Nindyo Yuwono and Mursyid Hasan Basri

School of Business and Management, Institut Teknologi Bandung, Indonesia

Email: fachry.nindyo@sbm-itb.ac.id

Abstract. A public hospital in the city of Bandung plan to evaluate its elective surgery service performance on the managerial areas using the guideline issued by the Ministry of Health of the Republic of Indonesia. The hospital use waiting time as the indicator of evaluation as stated in the guideline. From January until June 2018, it is discovered that the elective surgery waiting time surpassed the standard, and control chart shows that special-cause variations exist. But the key actors of the elective surgery service agreed that fundamental change of pathway to eliminate common-cause variations is the first thing to do. The elective surgery process is then depicted with BPMN, and then assessed using value-added analysis. The result shows that the elective surgery process is not efficient and it contains activity that does not give value to the patient. So the process work steps sequence is reconstructed, unnecessary steps are eliminated, and some steps are consolidated as an improvement effort to eliminate non-value-added activities and simplify the process. Thus this paper intend to create a to-be process diagram as a proposed solution to make the elective surgery process more efficient, reduce waiting time, increases patient satisfaction, and potentially reduce cost.

Keywords: Hospital; Elective Surgery; Waiting Time; BPMN; Value-Added Analysis

INTRODUCTION

The "Direktur Jenderal Bina Upaya Kesehatan" of the Ministry of Health of the Republic of Indonesia issue performance appraisal guideline for hospital managers to measure and evaluate hospital quality based on its health service performance, and to ensure the quality of service and patient satisfaction. The guideline state the operational definition, calculation formula, and other definition of each service performance indicator. A public hospital in the city of Bandung plan to evaluate its health service performance on the managerial areas using the guideline. One of the services that the hospital plan to evaluate is its elective surgery service, using waiting time as the indicator of evaluation as stated in the guideline. Elective surgery is one of the two major categories of surgery based on timing that can be scheduled in advance to be performed on a future date (Erdogan, Denton, & Fitts, 2010), because it is not involved a medical emergency and it is a subject to choice by the patient or doctor (Shiel Jr., 2018). The waiting time is calculated from when the patient enter hospitalization until the surgery is carried out, that is when the first surgery incision performed. The elective surgery waiting time standard stated in the guideline is ≤ 48 hours. The elective surgery waiting time data that was received from the hospital from January until June 2018 shows that the month of January, February, March, April, and June of 2018 have average waiting time of 65:18, 57:29, 62:56, 60:14, 53:27, 51:18 hours respectively. Which suggest that every month waiting time has surpassed the standard. To determine what caused it, the data is analyzed using control chart. It is discovered that the process is not stable and out-of-control data point exist, which indicate the presence of special-cause variation and common-cause variation that contribute to the long waiting time. Since the elective surgery service doesn't have a written flowchart of process, a Focus Group Discussion with the key actors in the elective surgery service is held to get deeper understanding of the process, and it is determine that fundamental change of pathway of the elective surgery service that would eliminate the common-cause variation issue is the first thing to do. The fundamental change of the elective surgery process is not only limited to fixing the process from the step where the calculation of the waiting time starts until it ends, but the whole elective surgery process from patients comes until patients undergo surgery are also evaluated whether they have added value to patients so that patient satisfaction increases. The elective surgery process is then depicted with BPMN, and the assessed using value-added analysis.

LITERATURE REVIEW

1. Business Process Management

Business Process Management (BPM) is defined as a body of methods to identify, analyze, redesign, execute and monitor business process (Dumas, La Rosa, Mendling, & Reijers, 2013). Business process is a combination of linkages between events, activities, and decision points that involve a number of actors and objects, and that collectively lead to an output that are valuable to at least one customer. (Dumas, La Rosa, Mendling, & Reijers, 2013). So, understand that business processes are a major part of BPM and how BPM involves different phases and activities in the business process cycle. To analyze any process, the process performance measures/metrics needs to be clearly defined so that we can find out how the condition of the business process, whether in accordance with the goal or not. Measurement that related to cost, related to time, related to quality, and failure rates are

measuring class of BPM. After successfully identifying the business process and the performance measures, the next step is to create the existing process models that show the knowledge that people in the organization have of how a process is carried out. The use of diagrams are a common practice in modelling a business process since it makes it more easily to comprehend the process, and the use of notation complemented with textual descriptions will minimize the chance of misunderstanding by the stakeholders. Now, the standard commonly used in portraying business processes is BPMN which stands for Business Process Modelling & Notation, and the current version of it is called BPMN 2.0.

2. Business Process Modelling & Notation

An input-process-output approach is the common approach that almost all language of process modelling take. Processes are consist of activities and activities could consist sub-activities. Every activity uses inputs that will be transformed into outputs, this relationship is defined as the sequence of work. According to (White, 2004) as cited by (Aagesen & Krogstie, 2015), to be understandable for all participants in the process, is the original goal of BPMN that incorporate notation in the process diagram. The creation of business processes and the structuring components of BPMN will allow the viewer to be able to distinguish and understand different part of a BPMN Diagram using notation such as groups, pools, or lanes.

3. Value-Added Analysis

According to (Dumas, La Rosa, Mendling, & Reijers, 2013), value-added analysis is a technique whereby an analyst examine a process model, draw out every step in the process. The main goal is to optimize the value-added steps, which contribute directly to creating a product or service a customer wants, and minimize or eliminate non-value added steps. The three criteria that an action have to meet to be considered as value added action are that customer is willing to pay for it, it have to be done right the first time, and somehow change the product or service in some way. This technique also classifies these steps into one of three categories, which are: 1.) Value-adding (VA): Value where customer is willing to give their money for is generated by this step. 2.) Business value-adding (BVA): It's a complementary step where the business will operate very well, either it is really needed or it is required for administrative status reason. 3.) Non-value adding (NVA): This step is not classified as value-adding nor business value-adding. According to (Montgomery, 2009) reconstruct the sequence of work steps, revamp work methods, clearer identification of process function to all employees, seek to eliminate unnecessary steps, and seek to consolidate steps are some ways to eliminate non-value-added activities and simplify the process.

4. Control Chart

(Shah, Shridhar, & Gohil, 2010) explained that control chart is a statistical process control (SPC) tool, that was initially developed by Walter Shewhart in the 1920s that help determine stability and predictability. A control chart is capable to acquire, keep, and process information, and display result in clear and simple, understandable graphs. An unusual event occurrence, such as higher or lower observation than normal process performance, can also be detected by control chart which then can be brought back into control with further actions. All processes have kinds of form of variations, which can exist either by common cause or special cause. Variation that is caused by inbuilt fault in the design of the system leading to dissimilarity in the process is called common cause variation, while special cause variation is caused by employees or by unusual circumstances or events outside of the system. A stable process is a process that features only common variation, or variation that come from built-in system limitations. A stable process is a key requirement for process improvement efforts, and one of the most common approach used to achieve this goal is the quality control chart.

METHODOLOGY

There is a need to monitor and control the healthcare performance so that unwanted events that contribute to the longer waiting time can be minimized. To do that, according to (Suman & Prajapati, 2018) control chart is the right tool in monitoring hospital performance, and helps determine the source of errors by identifying special and common causes of variation. It is commonly used for monitoring and improvement of on-going process. To begin quality and productivity improvement initiative, we cannot simply rely on judgment, but with facts, and data (Montgomery, 2009). Once the cause of problem is identified, further improvement in the process (how the elective surgery service is carried out) can be made. The first step in this data analysis is to determine whether the current process of elective surgery is a stable process that is within the acceptable area of deviation of UCL and LCL (in control), which is the key requirement for process improvement efforts. The control chart analysis will be done using a computer application called Minitab. Minitab is statistical analysis software that is relatively easy to use. The advantages of using computer application for statistical analysis are more accurate, reliable, faster than computing manually by hand. The data that were collected are continuous and individually observed, so the I-MR will be used to detect any out of control points. The selected test in this analysis is 1 point >3 standard deviation from the center line (either side). This is the most basic test chosen to confirm the presence of special-cause variation(s) that will be detected by points that fall outside of the control limits. *Then*, the information of the elective surgery process flow that was collected from the Focus Group Discussion will be transformed into a graphical version as an as-is business process diagram. Business Process Modelling is great way to help comprehend the whole process and share that comprehension with the people involved, by portraying the process in the form of diagrams that incorporate notation which will allow the viewer to be able to distinguish and understand different part of the BPMN diagram. This will help ensure the quality improvement initiative will be easily understandable by every staff. The common practice to do it is by using Business Process

Modelling & Notation. This will be done by using a BPMN program called Bizagi. Bizagi is one the leading digital transformation platform that enable business and IT collaboration. *Finally*, value-added analysis help in defining what customer want. It is done by doing Value-added analysis that will determine the category of each activity within the business process, either it is categorized as value-adding, or non-value adding. By knowing which activity is classified as value-adding and which are not, the process could be redesigned to create more efficient business process that will deliver maximum value for customer by eliminating the non-value adding activity. It will ultimately reduce the waiting time in the elective surgery service process. After finished analyzing the waste in the process, potential remedies have to be identified in order to recommend the to-be process diagram, the redesigned version of the as-is process.

FINDINGS AND ARGUMENT

From the secondary data of monthly elective surgery waiting time record over the course of January until June 2018, it is found that every month, the waiting time record surpassed the standard of the guideline. So the waiting time data record of each month was analyzed using control chart to indentify the presence of special-cause variation that could be the cause of long waiting time. The result shows that the process where the waiting time calculation starts until it ends is not stable, and out-of-control data are detected which indicates special-cause variation does exist. Interpreting the result of control chart can also be the basis of determining strategy and scope for improvement initiative in the future by identifying variation, understanding the cause of variation, then taking action for improvement, either to focus on problems related to a specific patient (special-cause variation) or fundamental change of care pathway (common-cause). Since this research used past data, the cause of special-cause variations cannot be traced back. It is then agreed that fundamental change of pathway is the first thing to do to eliminate common-cause variations, and it begins by evaluating the elective surgery service process. Then the existing elective surgery service process described in the Focus Group Discussion is depicted in the form of diagram using BPMN. The counting points of the waiting time in the process diagram are highlighted with green box color.

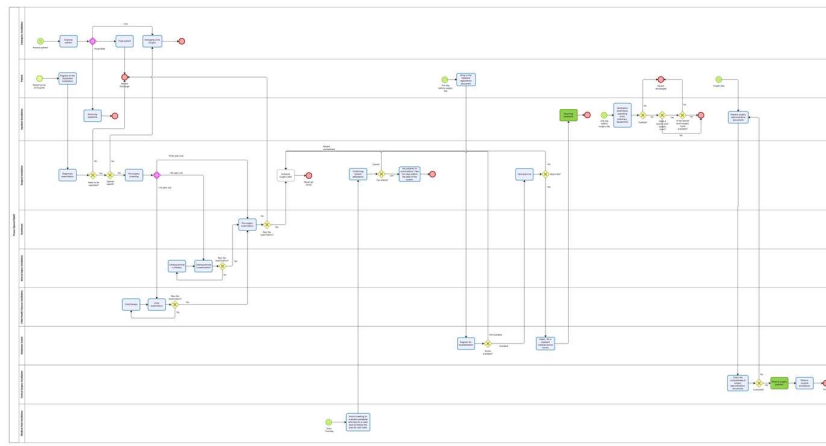


Figure 1. Existing Elective Surgery Service Process

Then each activity will be analyzed whether it gives value to the customer or not, based on the 3 criteria mentioned in the literature review, then be classified into either value added, business value added, or non-value added. The fundamental change of the elective surgery process is not only limited to fixing the process steps where the elective surgery waiting time is recorded, but the whole elective surgery process since the patient arrived until surgery performed are also evaluated whether they have added value to patients or not so that patient's satisfaction increases. Activities such as patients enrolling in Outpatient Departments, patients carrying inpatient care lists, Inpatient Departments preparing surgery administration, Surgical Departments confirming patients, Surgical Departments ask patients to arrive before 11am on two days before surgery, Admission Center registering inpatient care, Admission Center makes inpatient medical record books, Central Surgical Department accepts patients, *Departemen Bidang Medik* held meeting to evaluates surgery activities a week back & finalizes next week's surgery plan, and Inpatient Department receive inpatients is a complementary activity so that afterwards activities run smoothly and are needed for administrative reasons. So the activities mentioned above are categorized as Business Value-Added (BVA). Activities such as the Surgical Department pre-surgery screening, the Anesthesia section performing a pre-surgery examination, the Central Surgical Department checking the administrative completeness, are activities categorized as Non-Value-Added (NVA). The Inpatient Department verifies on one day before the day of the surgery (anesthesia, surgery room, pharmacy, equipment), Surgical Department performs diagnostic enforcement, Surgical Department schedules the surgery date, Surgical Department care approval, *Departemen Penyakit Dalam* conducts cardiopulmonary examination, *Departemen Penyakit Dalam* provides therapy, *Departemen Ilmu Kesehatan Anak*

By using this to-be process, the benefit that the hospital will get is: 1. Reduced waiting time. Simpler process of when the patient enter hospitalization (rawat inap) until the patient undergo surgery resulted from value-added analysis, make the number of steps in the process less. So that it can reduce the time needed to complete the process but it is required for each activity to be done right at the first time. 2. Increase Patient's Satisfaction. The potential for discharge of patients due to unpreparedness of hospital facilities is minimized because the availability of facilities will be ensured before patients can be scheduled to undergo surgery. Thus increase patient's satisfaction. 3. Cost Saving. Based on the explanation of key actors at the time of the FGD, BPJS does not cover the costs of screening, so when BPJS patients need to re-test because the previous screening results expired, the costs for the screening resource charged to the hospital will increase. This happens because the distance between the day of screening and the surgery date is quite far. By conducting screening activities when approaching the date of the surgery, the possibility that the test results will expire is eliminated and the hospital will not bear the costs of re-testing, in the cases of BPJS patients. So the hospital cost for screening would be decreased. The recommendation for further research is to evaluate the process of each type of surgery in the elective surgery service to identify whether there are different process step needed for each type of surgery and how improve it, and further research must also carry out capacity planning to determine how much resources are needed to facilitate the request for surgery so that the patient waiting list will not be as much, and can be more controlled.

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