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# Lean Consumption Implementation for Acceleration Improvement in Executive Outpatient Wait Time over Hermina Hospital Bekasi

Barlian Susanti<sup>1,\*</sup>, Tantri Yanuar Rahmat Syah<sup>1</sup>, Ketut Sunaryanto<sup>1</sup>

<sup>1</sup>Management Department, Faculty of Economic and Business, Esa Unggul University, Jakarta

The implementation of “lean hospital” has been conducted in several countries. The most implementation resulted in the service acceleration and cost efficiency there are still few hospitals in Indonesia that implement “lean consumption” in their services. Thus, this study aimed to test the lean consumption at the hospital with “Lean Consumption Map” (LCM) method and using “Define, Measure, Analyze, Improve, and Control” (DMAIC) instrument. This empirical study is expected to give insight to the management in the hospital to make acceleration improvement of the outpatient service wait time by comparing the wait time length before and after the test with LCM method was conducted. The analysis in this study used Time Plot Series, Value Added Assessment, FMEA and LCM, with an inductive qualitative method. The final result shows that the lean consumption implementation is applicable through the DMAIC instrument and LCM method in the acceleration improvement of the executive outpatient wait time in Hermina Hospital Bekasi. Furthermore, the result shows the illustration of the time acceleration of the outpatient wait time on the customer’s side is improved from 95 minutes to 65 minutes; whereas, on the provider’s side, the time acceleration is improved from 137 minutes to 90 minutes.

**Keywords:** Lean Consumption, Lean Hospital, DMAIC

## 1. INTRODUCTION

According to the Republic of Indonesia Minister of Health Decree No. 340/MENKES/PER/III/2010, hospital is defined as a healthcare institution providing complete health treatment for every patient including inpatient care, outpatient care, and emergency care. According to the Republic of Indonesia Minister of Health Decree No. 1165/MENKES/SK/X/2007, outpatient care covers several activities: observation, diagnosis, treatment, rehabilitation, and other treatments. The average of outpatient care wait time is less than or equal to ( $\leq$ ) 60 minutes, starting from the registration process until being admitted or treated by a specialist. The further step is to queue for medicines in a hospital pharmacy; it takes less than 30 minutes. The outpatient care wait time has become a problem that occurs frequently in many health services. Both phenomenon and demand are the challenge

\*Email Address: [santy.barlian@gmail.com](mailto:santy.barlian@gmail.com)

the healthcare providers need to face, so they should keep improving their services by making the outpatient care wait time shorter as good as they can be. Accordingly, this issue comes under the “waste” category within the whole process time plot. Hermina Hospital Bekasi has a set service quality standard to maintain work performance. An example of a quality standard set by the Hermina Hospital Board of Directors (BOD) is an executive outpatient care wait time length, which should be less than or equal to ( $<$ ) 1 hour and 30 minutes. The outpatient care time plot series consist of some steps described as follows: the patient’s arrival at the hospital and putting his or her information into a record at the registration locket (front office) and proceed it to the polyclinic; the record is processed by nurses at the nurse station; scheduling appointment with a specialist for consultation and treatment; processing prescription in the pharmacy (studying the prescription and pricing);

paying for the prescription bill at the outpatient cashier; picking up the prescription at the pharmacy by making the appointment through mobile apps or the call center beforehand, so the patient will receive it on schedule. Based on the observation (pre-research), it was found that the congestion always occurred in the pharmacy queue. As mentioned before, the pharmacy is where each patient's prescription is both studied and priced. Then, the patients have to complete the transaction twice, which is viewed as the process time plot that has no added value (waste). Within the three-month observation from February to April 2019, it was found that the executive outpatient care waiting list in Hermina Hospital Bekasi had not achieved the standard set by the hospital. The average time plot completion is described as follows: in February, it was 02 hours 25 minutes and 42 seconds; in March, it was 03 hours 19 minutes and 9 seconds; in April, it was 02 hours 53 minutes and 34 seconds.

Nowadays, one of the advanced methods to improve a system and efficiency of a public service is "lean". This term refers to an activity to reduce excessive usage of things (waste) within the whole process time plot, as pointed out by [1]. The other term for waste is "Non-Value-Added Time" (NVA Time). In the beginning, lean was only implemented in manufacturing industries; now, it has been implemented in service-based industries. Furthermore, the implementation of "Lean Six Sigma" has developed in many sectors: "Lean Government", "Lean Hospital", and "Lean Service". The lean is applied through five steps: first, defining a value from the perspective of the customers; two, identifying the "Lean Consumption Map"; third, making the map "flow" from the beginning to end; fourth, letting the customers "pull" products/services as needed; and fifth, do the best to achieve perfection [2]. The improvement methodology within Six Sigma for the existing process is called DMAIC, which consists of five phases: Define, Measure, Analyze, Improve, and Control [3].

The implementation of lean has been conducted in several countries. These countries have proved that positive outcomes were obtained by implementing lean. The positive results in the implementation of lean hospital in the healthcare services [3, 4, 5]. The positive results in the implementation of lean six sigma in other public sectors in Indonesia are pointed out in the previous studies [5, 6, 7]. One of hospitals in Indonesia that has implemented "lean management" is Pelni Hospital, in which the success is achieved by the reduction of customer's complaints on wait time within the whole of healthcare services. The length of wait time now in Pelni Hospital is 30% shorter in the outpatient care and 50% shorter in inpatient care. There are a lot of positive results obtained by implementing the lean and six sigma concepts in public sectors, as proved by many countries. Nevertheless, the implementation of lean hospital in hospitals in Indonesia is still few.

Based on the background of the study, problem identification, and previous studies, the aim of this study is to identify and reduce waste on the time plot of the executive outpatient care wait time in Hermina Hospital Bekasi. Lean Consumption Map (LCM) is implemented in either "current state" or "future state" condition; and DMAIC is implemented to improve the performance on the executive outpatient care wait time in Hermina Hospital Bekasi.

## 2. METHODOLOGY

In this study, we applied a qualitative research method, in which the data was obtained through observation, document and notes analysis, or report analysis. The qualitative research characteristic is inductive, as the process to gather the data was directly on the site, i.e. empirical research. The source of data came from primary and secondary data. The primary data was obtained from the on-site observation on the outpatient care process time plot of the Hermina Hospital Bekasi. The secondary data was obtained from the records made by the related service unit in the hospital and the study of the other documents.

The selected informants (correspondents) for this study are service staff in each unit over polyclinic and the executive outpatients in the care center. The sampling was conducted from February to April 2019. The data collection process focused on the identification of the service unit that illustrated the patient's wait time duration and the congestion in the queue; it is manifested in Value Added Assessment. The other data that was obtained during the service process would be used as supporting data. The observation was conducted during the open hour of the polyclinic, from 8 a.m. to 9 p.m. Indonesia Western Standard Time (WIB).

The lean consumption concept was applied here as a guide to identify the problems, e.g. the excessive usage (waste) and the other core problems. Next, with the same guide, each problem was classified into the total time of service as a whole (macro) and the analysis of more detailed activities (micro) in each service unit.

The measurement instrument applied in the analysis of the study is "Define, Measure, Analyze, Improve, and Control" (DMAIC). This instrument refers to the outpatient care process flow, in which starts from the patient's arrival at the hospital and putting his or her information into a record at the registration locket (front office) and proceed it to the polyclinic; the record is processed by nurses at the nurse station; scheduling appointment with a specialist for consultation and treatment; processing prescription in the pharmacy (studying the prescription and pricing); paying for the prescription bill at the outpatient cashier; picking up the prescription at the pharmacy. The "Define" stage was conducted to define the success factors in measure the implementation process and the limitation. The success standard in this stage is the average time completion of

the outpatient care service, which is based on the “checklist” guide on the documents and notes. The tool to measure success in this stage is “Supplier, Input, Process, Output, and Customer” (SIPOC) and “Time Series Plot”. The “Measure” stage was conducted to define the focus problems by studying the “Current Process Map” based on interview and observation guidelines. This method used several tools: Lean Consumption Map (LCM), “process map”, “cross function flowchart” and “value added assessment” (VAA). The mapping was designed by the researcher to measure the “total consumer time” and “total provider time”. Furthermore, the measurement of “total value added time” and “total non-value added time” from both consumer and provider sides were also conducted. The “consumer” refers to the outpatients, and the “provider” refers to the staff who are in charge for services in the polyclinic of the Hermina Hospital Bekasi.

The “Analyze” stage was conducted to validate and determine the core problems that could affect the problems in question. The process in this stage was carried on based on interview guidelines, observation guidelines, document guidelines, and other tools. The tool used in this stage is “Failure Mode and Effect Analysis” (FMEA); this tool is aimed to identify the core problems that contain “Risk Priority Number” (RPN), which can risk the problems in question. The “Improve” stage was conducted to determine any suggestion for improvement on the core problems by developing the potential improvements; every potential improvement itself can be adapted from the previous studies, related references on “Lean”, interview guidelines, and observation guidelines. Then, these potential improvements were validated by the “Impact and Effort Matrix” (IEM) tool. Any potential improvement that obtains score in Zone I, Zone II, and Zone III were proposed as recommended improvements; each of the improvements was validated within the improvement simulation process. This process used 40 sample data, which were applied as references whether each recommended improvement is effective or not. Also, this simulation helped the researcher to observe the effect of time improvement in every process by applying “Lean Consumption Map” (LCM). In addition, “Value Added Assessment” (VAA) was applied in this study to examine the effect of “value added activity” on “waste” (excessive usage of things). The “Control” stage is where the decisions to organize were adapted from the result of the “improve” stage; accordingly, the positive effect in the “improve” stage can be maintained and consistently conducted by the outpatient service staff. The outcome of the “Control” stage is the “Change Management Plan” document, which contains of the change in Standard Operational Procedure (SOP), the training and education for the employees, the decisions to arrange key parameter, the decisions to design process indicator or control indicator, “Out of Control Action Plan” (OCAP), and the checklist or audit. This study was only conducted until the “analyze” stage. The role of the top management is the key to continue to the further stage.

### 3. RESULT AND DISCUSSION

#### A. Define

Based on the observation, this stage illustrates the current condition in which the outpatient care time completion takes 149 minutes. Based on this data, the researcher points out that the executive outpatient care wait time is supposed to be shorter than the current condition; the wait time can be managed into less than (<) 90, as has been decided by the Board of Directors (BOD). Accordingly, the researcher determines the improvement target of the wait time duration at 90 minutes long.

#### B. Measure

The concerned problem in this study was able to be identified through understanding the “Current Process Map” of the outpatient care plot. Based on the outcome of lean consumption mapping from the user’s side, the total time needed for the service completion is 95 minutes with 34 minutes total of “value added” or 35.79%, and 61 minutes total of “non-value added” or 64.21%. Furthermore, based on the outcome of the lean consumption mapping from the provider’s side, the total time needed for the service completion is 137 minutes with 47 minutes total of value added or 34.31%, and 90 minutes total of non-value added or 65.69%. According to the results, besides the finding of high non-value added activities, there is also repeated process time plot in the pharmacy unit and wait-time activity or queuing by the users; these activities create time waste.

#### C. Analyze

In order to perform further action to solve the identified problems, this study applied the FMEA table. The aim of using this tool was to find the core problem of a series of task processes. Furthermore, in this study, the FMEA tool was also useful to predict failure in a process so the recommended improvements can proceed immediately.

The first step in FMEA table analysis was to find the process with the high Risk Priority Number (RPN) value at more than (>) 100 as the general standard; the improvement is needed for the process with high RPN value. The next step is to observe the “severity” value; when the severity value is high, the improvement in the process is recommended. Based on FMEA analysis there are some processes with high RPN value. According to the user’s side, there are some processes with very high RPN value, e.g. queuing for the consultation with the specialist; queuing for the e-press of the prescription pricing at the pharmacy including the prescription study; paying at the outpatient cashier, and queuing at the pharmacy to pick up the prescription. Whereas, according to the provider’s side, the example of processes with high RPN value are: asking the patients to wait to be called into the exam room with asking them to go the pharmacy for the prescription study (by the pharmacist); asking them to repeat the input based on the e-press and get the pricing, and managing the

prescription preparation and packaging for the patients. Furthermore, the analysis of the severity process was not conducted because it is already covered within the high-RPN-value processes.

#### D. Improve

Based on the FMEA analysis, there are nine recommendations for the improvement to reduce the "Risk Priority Number" (RPN) according to Process Map, Cross Functional Flowchart and LCM. The recommendations are to establish doctor disciplinary rule, produce bridging system between e-press and pharmacy modules, issue doctors' medical practice schedule; outpatient patient process flow revision, hold training for pharmacy and chasier officers, determine the service time standard for the outpatient care, upgrade HIS (Health Information System), produce cover-uncover insurance or any company integrated HIS, and issue the use of DOS (Standard Medicine List) policy.

In the "Improve" stage, all of the improvement recommendations would be selected by applying the Impact and Effort Matrix method.

#### E. Control

The "Control" stage was conducted to determine the new SOP in the flow of executive outpatient care service to maintain the consistency of the improvement that has been executed. Based on the discussion and the result analysis, the illustration of the lean consumption implementation is promising to bring about the time acceleration improvement during the outpatient care wait time. The improvement is manifested by eliminating the "waste", in which it includes the e-press queuing for the prescription pricing in the pharmacy, prescription study and pricing, and receiving a sheet from the pharmacy. Thus, the patient can pay for the prescription directly at the outpatient cashier without doing two transactions at the pharmacy. The improvement also illustrates the reduction of the total time needed, either from the user's side or the provider's side. The total time needed by the users has been improved 31.57%, in which the user needs 65 minutes in total, compared to 95 minutes of the total time needed before the lean consumption. The total time needed by the provider has been improved 34.30%, in which the provider needs 90 minutes in total, compared to 137 minutes of the total time needed before the lean consumption. The idea to implement the lean consumption on the executive outpatient care plot can be demonstrated in three steps: first, initiating the Lean Consumption program; second, executing and managing the Lean Consumption program; and third, maintaining the continuity of the Lean Consumption.

#### F. Initiating Lean Consumption program in the outpatient polyclinic

Lean Consumption program is implemented one at a time in a particular order to let all team members learn and accept it as a new culture at work. It starts with forming Lean thinking team, planning, training, defining the improvement focus, and finally determining the communication media.

#### G. Executing and managing Lean Consumption program

There are three stages to execute and manage Lean Consumption program. As the first stage, the program planning ensures that the Lean Consumption program is planned wisely by studying the scope and human resources. The second stage focuses on how to keep the Lean Consumption program execution continues by providing facility, supervision, and the highly-committed team's hard work. The third stage, the analysis and the evaluation of the Lean Consumption program after it has been completed, is the key stage to complete the remaining actions or organizing the program handover to the team who managed the outpatient care process.

#### H. Maintaining the continuity of Lean Consumption in the organization

When a body/organization/institution has much success in completing one Lean consumption project, the following analysis and evaluation are needed to maintain the continuity of the improvement. Moreover, every team member should distribute the Lean Consumption spirit to the whole organization.

## 4. CONCLUSION

During the improvement process, the plot acceleration within the executive outpatient care service in Hermina Hospital Bekasi through Lean Consumption implementation with DMAIC and LCM methods, have much success significantly. Therefore, the Lean Consumption can be implemented widely on the organizations with similar model and characteristics, by applying similar implementation steps. Furthermore, the Lean Consumption was advantageous in this study, e.g. to organize the identification problems, to measure the problematic areas, to analyze the problem, to select the improvement recommendation, and to continue the implementation of the recommendation consistently. The Lean Consumption is also able to illustrate the whole Value Added Time and Non Value Added Time (waste) on both customer and provider's side very well. In addition, LCM is also advantageous to display the information of the plot value for the administration process or service. Based on the FMEA analysis on the "improve" stage within the executive outpatient care wait-time

acceleration in Hermina Hospital Bekasi, there are nine recommendations proposed for the improvement. The further recommendation is on the “control” stage. Here, the new SOP needs to be established. Furthermore, “Change Management Plan” and “Out-of-Control Action Plan” (OCAP), “Checklist” or “Audit” has to be set to maintain the consistency of the improvement. In this study, the researcher only focuses on the outpatient care plot in the executive polyclinic for the executive patients. Therefore, it is recommended that further studies would investigate the plot in other units, e.g. inpatient care, growth and development clinic, and so forth. Moreover, this study focuses on one hospital. Thus, it is recommended for further studies to investigate similar problems in other hospitals, where the study is plausible to be demonstrated.

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