

Lean Approach of Pharmaceutical Installations At Hospital ABC Purbalingga to Increase Pharmacy Service Efficiency

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Abstract

A good pharmacy quality services are intended to the pharmaceutical product which is well prepared, stored, distributed, dispensed and discarded. However, these days services are assessed through medication availability, waiting time and user satisfaction. Therefore, hospitals need to make continuous quality improvements to the process of service, facilities, utilities, and health workers. This research aims to propose improvements to hospital pharmacy services quality by using Lean approaches in reducing services waiting time of concoction medicine. A case study was at Hospital ABC at Central Java, conducted in February-April 2019. There is a crucial problem was the prescription drug waiting time of concoction medicine. This study begins with process flow analysis and waste identification by interviewing with stakeholders of the hospital. Non-value added and value-added activities been divided, then time measurement in each activity is carried out with a time study method, to get the actual time of compounding the drug. Current state flow was mapped using value stream mapping tools, and future state flow map was recommended. Using lean tools, value-added activities have been identified and process time in future state map optimized to 47%. By using 5-why's root cause analysis, problems identified and improvement of visual management were recommended.

Keywords : pharmacy, services, waiting time, concoction medicine, lean hospital

INTRODUCTION

Healthcare services are a complex system (Sujatno, Pinzon, et al., 2017). It is focusing on reducing all types of services cost meanwhile increasing patient safety, quality, reduce response and lead time (Jovicic, 2016). Healthcare cost has escalated in a few decades in most developed countries, which is inefficiency perceived as the contributing factor (Worthington, 2004)(Hamzah & See, 2019). Efficiency and productivity measurements are being widely discussed concerning the health system, including in pharmacy services. As a critical component, pharmaceutical service delivery contributes to enhancing the quality of healthcare and health outcomes (Hamzah & See, 2019)(Lintya, Karima, et al., 2016). As the population increases based on the Indonesian Health Profile Data 129/Menkes/SK/II/2008 (2008), public awareness towards health also increases. According to Undang-undang No. 129 of 2009 states that hospitals are health facilities supported by promotive, preventive, curative, rehabilitation services that provide inpatient, outpatient and emergency services (Arifiyanti, 2017). Pharmacy services as an inseparable part of the hospital service, including clinical pharmacy services, is expected to meet minimum service standards as Minister of Health Regulation Number 1333/Menkes/SK/XII/1999 stated to provide medicines affordable for all levels of society (Menkes, 2008).

Quality is an important benchmark in the competition in the health industry to increase the credibility of hospital service, including pharmacy services. According to Ziegel et al (2006), the definition of quality is a conformity with the purpose or benefits (fitness for use). In addition, Voelkel & Ishikawa (2006) states that quality is a match between market needs or consumers of a product was created. Service quality is measured by five dimensions according to the order of relative importance (Parasuraman, A., Zeithaml, V., Berry, 1988), namely reliability, responsiveness, assurance, empathy, and tangibles. It was traditionally referring to a medical product that well prepared, stored, distributed, dispensed dan discarded, yet the current one is a patient-centered service (Hamzah & See, 2019). Four major categories of pharmacy services in general, which are drug dispensing, counseling, pharmaceutical care, and sterile and non-sterile preparation. The quality of pharmacy services can be assessed by waiting time, medication availability and user satisfaction. Therefore, all healthcare providers as hospitals are required to improve their services to generate more value for the customer (Santos, 2014)(Krisnanto, Wicaksono, et al., 2018).

One of the concepts has been proposed to overcome inefficiency in healthcare is lean hospital (rahmani putri & Susanto, 2018) (Mira, Sari, et al., n.d.). It is a strategy that increase efficiency by reducing waste (*muda*) to focus on the patient's service process (Leslie, Hagood, et al., 2006). Lean approach has been used by many hospitals and resulted in many advantages (Mira et al., n.d.). Lean hospital is a management system or a philosophy that can change the perspective of the hospital to be more orderly and organized to improve the quality of services for patients by reducing errors and reduce the waiting time (Grabau, 2009). Lean aims to transform waste into value from a customer perspective in a sustainable manner, lean is the most suitable systematic approach that focuses on improvement, error proofing and reducing waste (Kim, Spahlinger, et al., 2006), and increasing customer value through continuous improvement between the value-to-waste ratio (Gaspersz, 2007). Implementation in Indonesia also has been carried out, as Hermina Depok Hospital in 2017 found that non-value-added activities reduced from 90% to 78.3% (Noviani, 2017). Other research at the Bethesda Private Hospital in Yogyakarta which had added the value of 55% and 45% of waste to outpatient pharmacy installations (Nancy, Marchaban, et al., 2013). This conclude that lean approach provides a good impact in identifying waste and increase efficiency.

ABC Hospital Purbalingga serves two types of medicines, namely concoction and non-concoction drugs. Pharmacy services are responsible for the pharmaceutical installation that works 24 hours. The problems in outpatient pharmacy services at ABC is the long waiting time experienced by patients when prescribing drugs, affecting patient satisfaction. According to the Minimum Service Standards regulated by the Ministry of Health No.129 / Menkes / SK / II / 2008 regarding prescription medicines for less than 60 minutes for concoction medicine. Based on the description above, a study was carried out concerning lean hospital approach to increase efficiency in prescribing concoctions medicines of non-BPJS patients at ABC Hospital Purbalingga pharmaceutical installations.

METHODS

This study uses action research methods with qualitative and quantitative approaches. Quantitative approaches conducted by field observations and time study measurements. As a qualitative approach, data were obtained with in-depth interviews from informants who have various levels of management in pharmacy installation. The objects of this research are value added, non-value-added, non-value added but necessary activities related to the pharmaceutical services process flow and the time-of-service process for prescribing non-BPJS outpatient concoction medicine at ABC Hospital, Purbalingga. Takt time is the standard time determined to do a job. The formula for calculating takt time is as follows (Lintya et al., 2016):

$$\text{Takt Time} = \frac{\text{Available Production Time per day}}{\text{Customer demand per day}} \quad (1)$$

Cycle Time is the processing time from the beginning to the end that is needed to complete an output which includes the time necessary but non value added, non-value-added activities (Abdelhadi & Shakoor, 2014). The cycle time is obtained from the measurement of the processing time from the beginning to the completion of actual production.

This study took place at the Outpatient Pharmacy Installation in ABC Hospital, Purbalingga, and was conducted in February - April 2019. The population in this study were all prescription drugs for patients from each outpatient polyclinic who entered the ABC Outpatient Pharmacy Installation. There are two types of drugs made in pharmaceutical installations because the compounding time of concoction drugs is much longer than non-concoction drugs. Then there are two patient status, namely BPJS (with government insurance) patients and non BPJS patients. This research focuses only on the service process of non BPJS patients. Informants for depth interviews in this study used a purposive sampling method which is based on the following characteristics:

- a. Job description is adjusted based on previous research (Lintya et al., 2016): head of pharmaceutical installation, Pharmacist, Pharmaceutical Technician
- b. Minimum 1 year working experience because is enough time for workers to have time to know and adapt to their work environment (Rumengan & Rahayu, 2014).

RESULTS

Based on the observation results, the process flow of prescription drug service process in pharmaceutical installations is adjusted to the standard operating procedure for outpatient prescription services under Hospital Policy (example in Table 1), namely the preparation and delivery of drugs following the legislation and professional practice (RSE, 2017).

Tabel 1. Non-BPJS Patient Prescription of Non-Concoction Medication Service Activities

Activity	Description
Transcription	<ul style="list-style-type: none"> • Recipe numbering • Pharmacy staff input the patient's name, Number Medical Record (RM), drug name, number, rules of use, dosage, dosage, drug strength and drug price • Confirm to the doctor if there is a problem with the prescription via telephone • Performing prescription scanning and printing administration paper • Making drug etiquette. • Fill in the completion time of the recording and sign on the recipe review form • Deliver administrative paper to the cashier • Incorporate etiquette and recipes into embalage • Stacking embalage • Delivering embalage to the pharmacy

Normality test in this study is used to carry out sample testing of observational data whether the data is normally distributed or not (Sarwono, 2012). The results show that only drug collection activities are normally distributed (*N*), while outlier (*TN*) will be eliminated and iteration using the normality test using a plot box (Figure 1a) to eliminate outlier samples, which are normal or extreme distributed sample values (Ghozali, 2011). Uniformity Test is a test that aims to find out the homogeneity of the data measured from a system is still within certain control limits (Sutalaksana, 2006). The Figure 1b shows the results that are not uniform, with an average data of 859.83 seen from several samples whose values are above the value 2104.36 as the upper limit value (UCL), and then the control limit value below (LCL) with a value of -385,3.

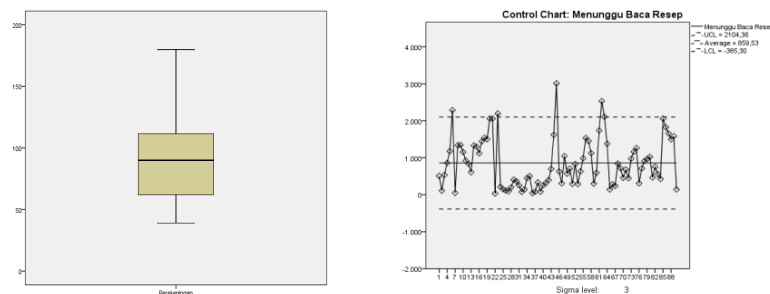


Figure 1. (a) Plotbox of transcription activity, and (b) Control chart transcription activity

Value stream mapping is a sequence of activities carried out by the organization to meet customer demand. more broadly, the value stream is a sequence of activities needed to design, produce, deliver goods or services, and that includes a double flow of information and material (Martin & Osterling, 2014).

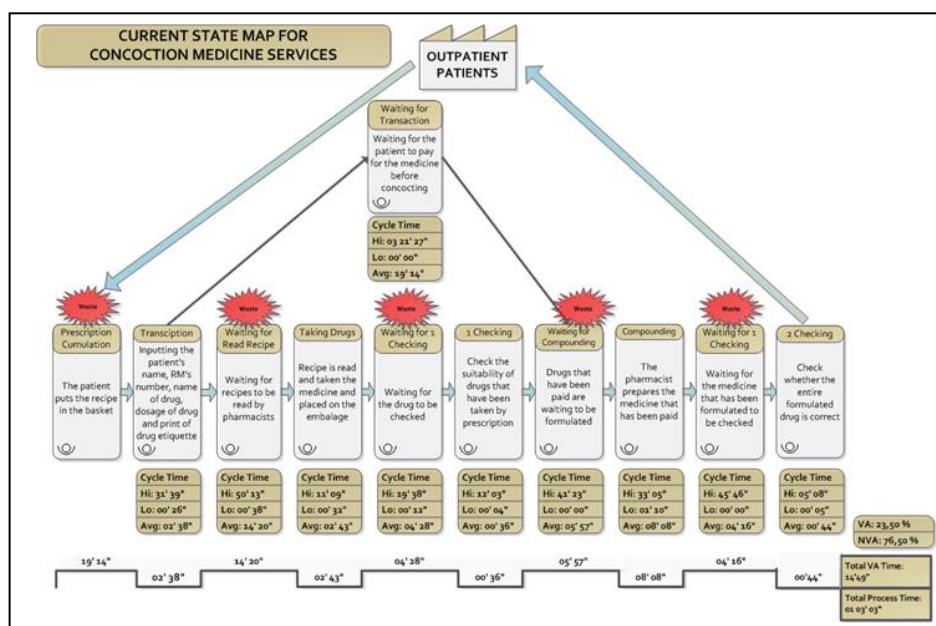


Figure 2. Current State Map Service for Prescription Medication for Non-BPJS

Identification of value-added activities that occur in outpatient pharmacy installations, namely: drug dispensing, drug collection, drug checking, compounding and checking the final drug. Non-value-added activities such as stacking recipes, waiting for recipe reading, waiting for checking, waiting for compounding, waiting and final checking; while necessary but non-value-added activities that are waiting for payment as seen in Figure 2.

The total average time of value-added activities is 14 minutes 49 seconds, while for the total lead time average from the prescription to drug delivered to the counter is 1 hour 3 minutes 3 seconds. From the results of the Value Stream Map measurement for the whole process, the percentage of value-added activities was 23.50% compared to the percentage of non-value-added activities at 76.50%. This shows that the flow of the process of service for the concoction of non-BPJS patients currently underway at the ABC Hospital pharmacy installation is not yet lean. Waste that is identified as occurring in the whole process is waiting time. Based on the ABC Hospital Pharmacy Installation Quality Indicator Formula Report for March 2019, the following data are obtained in Table 2.

Table.2 Number of Prescription Medicines Served

Number of Prescription Medicines Served by Hospital ABC March 2019 (unit)				
Week 1	Week II	Week III	Week IV	Week V
320	282	346	276	109

Then the average prescription unit that can be served by outpatient pharmacy staff in March 2019 is calculated at 43 recipes per day to be adjusted to the data that has been observed by researchers in the second week of March 2018. The time the hospital pharmacy service is available in 24 hours, obtained by takt time (1) the service process for prescribing outpatient medicines is as follows:

$$Takt\ Time = \frac{Available\ Production\ Time\ per\ day}{Customer\ demand\ per\ day}$$

$$Takt\ Time = \frac{24\ hours \times 60}{43\ units}$$

$$Takt\ Time = \frac{1440\ minutes}{43\ units} = 33,49\ minutes/unit$$

Based on the above calculations it was found that the average takt time was 33 minutes 49 seconds, the value was smaller than the average cycle time of 1 hour 3 minutes 3 seconds that took place at the pharmaceutical installation so it was concluded that the production could not meet customer needs and resulted in frequent delay in the service of concocting non-BPJS patients.

DISCUSSIONS

The purpose of implementing lean hospital that has been done is to eliminate every activity that does not produce an added value that is considered as waste. Therefore, elimination of non-value-added or non-value-added activities such as stacking recipes, waiting for recipe to be read, waiting for drugs to be taken, waiting for checking, waiting for compounding and waiting for final checking and minimizing but necessary non-value-added activities, namely waiting for payment of drugs.

The time of activities used as a basis for improvement is obtained from the processing of statistical data, namely the time of value-added activities that have been eliminated from time that is extreme or abnormal (outlier), then calculated the average value resulting in from the time of repair. The total average time of non-value-added activities obtained was 10 minutes 24 seconds, while for the total lead time average i.e. the time from the prescription entered until the drug was delivered was 20 minutes 57 seconds. Based on calculations, Future State Map as Picture 4 has a percentage of value-added activities of 49.64% and non-value-added activities of 50.36%.

The results show the percentage of non-value-added activities is still greater than the value-added activities. This can be caused by the limitation of the room for reparation to minimize the waiting time. However, there was an increase in the efficiency of pharmaceutical services from a decrease of 26.14% in non-value-added activities. The concept of improvements that can be given to improve the efficiency of prescription medicine for non-BPJS patients is as follows:

- a. Applying visual management or pharmacy service flow instructions and outpatient floor plans for non BPJS patients to make it easier for patients to obtain information regarding outpatient services and patient prescription drugs.
- b. Realizing the application of an integrated information system to reduce the use of human power for prescription movements. Serves to speed up hospital services and improve hospital quality and reduce paper waste.

- c. Professional development of pharmaceutical practitioners in addition to pharmacists in the process of checking in order to improve their ability and knowledge on how to review prescription drugs.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that:

- a. Identification of value-added activities that occur in outpatient pharmacy installations namely drug harvesting, drug collection, drug checking, compounding and checking the final drug. While non-value activities are added such as stacking recipes, waiting for recipe reading, waiting for checking, waiting for compounding, waiting for the final and final checking, but necessary non-value-added activities that are waiting for payment.
- b. The average cycle time of 1 hour 3 minutes 3 seconds is greater than the average takt time of 33 minutes 49 seconds. So, it was concluded that the production results could not meet customer needs.
- c. There was an increase in the efficiency of pharmaceutical services from an increase in value added activities by 26.14%. In Current State Map, the percentage of value-added activities is 23.50%, while non value added activities are 76.50%. After eliminating non-value-added activities and minimizing non-value added but necessary activities on the Future State Map, the percentage of value-added activities was 49.64% and non-value-added activities were 50.36%.

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