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The Effect Of Prescription Service Flow Optimization On Medication Waiting Time At Pharmaceutical Supplies Distribution Unit Of Regular Outpatient Dr. Moewardi Hospital

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Abstract.

Introduction
Medication waiting time is one of the minimum pharmaceutical service standards in hospitals, which, if not achieved, can lead to patient dissatisfaction. Based on a field observation, several things hinder prescription services at the Pharmaceutical Supplies Distribution Unit of the regular outpatient of Dr. Moewardi Hospital. Optimization is carried out to reduce medication waiting times for drug services. Objective: To analyse the effect of optimization to medication waiting time at Pharmaceutical Supplies Distribution Unit of regular outpatient in Dr. Moewardi General Hospital

Method
The research method was conducted by comparing the average medication waiting time before and after optimization. Before a comparative test, a normality test was carried out with Kolmogorov – Smirnov. A T-test would be conducted if the data were distributed normally, if the data were not distributed normally, the Mann-Whitney test would be performed.

Results
The results showed a decrease in the waiting time for compounded medicines, both the time from the doctor ordering the prescriptions to the pharmacy validating the prescriptions (p=0.044), and the time from the pharmacy receiving the prescriptions until the medicines were ready (p=0.000). There was a decrease in the average waiting time for non-compounded medicines, the waiting time from the pharmacy receiving the prescriptions until the medicines were prepared, which was originally 45.54 minutes to 36.9 minutes after the service optimization was conducted. However, the decrease in time was not significantly different, both for the time from the doctor ordering the prescriptions to the pharmacy validating the prescriptions (p=0.386), and the time from the pharmacy receiving the prescriptions until the medicines were ready (p=0.305).

Conclusion
There is an effect of optimizing the flow of prescription services on waiting time of the compounded medicines at the UDPF of Regular Outpatient of Dr. Moewardi Hospital.

Keywords: ***medication waiting time, outpatient pharmacy services, prescription service flow optimization***

Introduction

Hospital is a health service institution that provides comprehensive individual health services that provide inpatient, outpatient, and emergency services. Pharmaceutical services in hospitals are an inseparable part of the hospital health service system that is oriented towards patient care, providing quality and affordable pharmaceutical preparations, medical devices, and disposable medical materials for all levels of society including clinical pharmacy services.(AT et al., 2019) Waiting time is one of the minimum standards for pharmaceutical services in hospitals. The waiting time for prescription services is the time period from when the patient submits the prescription until the patient receives the medicine from the pharmacist. Average of the medication waiting time at Pharmaceutical Supplies Distribution Unit of Regular Outpatient in the period of January

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2023 – December 2023 for non-compounded medicines was 37 minutes and for compounded medicines was 75 minutes. Minimum standard waiting time for non-compounded medicines set by the Ministry of Health is ≤30 minutes, while the waiting time for compounded medicines is ≤60 minutes. (Amalia & Ramadhan, 2021) The results exceeded the minimum standards set by the health ministry.

Based on the results of our observations, there were several things that hindered the flow of outpatient pharmacy services, including no marker on the ticket or prescription brought by the patient from the polyclinic regarding the types of prescriptions (compounded, fast track, regular) so that the patients mistakenly chose the type of queue number on the pharmacy Self-Registration Booth machine; only one counter available to submit the prescriptions so pharmacists need a certain amount of time to sort prescriptions according to the type and the queue number; uninformative service flow layouts and instructions often confused patients. For example, there was a fast-track counter that functioned as a prescription reception counter with therapy protocols, and a prescription verification counter that functioned as a medicine information counter for patients whose medicines were delivered using courier services; queues accumulated at the Self-Registration Booth machine, prescription reception point, and information counter for patients whose medicines were delivered using courier service; unavailability of special seats for patients so that the queue of patients was unorganized and accumulated at the place where prescriptions were submitted and information for patients was not optimal.

There are several factors that influence waiting time, including those related to human resources (lack of number and competence of human resources, workload), related to available infrastructure, related to methods (lack of understanding of service flows and SOPs), and related to management (procurement of drugs that are not appropriate so that stocks are empty, incompatibility of drug stocks with the system).

In a study conducted by (Taufiq & Rahmatiah, 2020), it was also stated that several factors that affect drug waiting time are equipment and facilities or infrastructure. The layout of the room is not in accordance with the service flow, because from the beginning the room was not adjusted to the prescription service flow.

The next factor is the patient. The behavior of patients who are less orderly and disciplined affects the increase in waiting time. The next factor is the registration process, meaning the process of how the prescription system enters the pharmacy installation for service. The next factor is the number of prescriptions. The more prescriptions prescribed, the higher the percentage of prescriptions whose waiting time does not meet the established standards. (Alam et al., 2021)

Based on this background, it is necessary to optimize the flow of prescription services which includes pharmaceutical relayout and information dissemination using print and digital media, which is expected to affect the medication waiting time at the Pharmaceutical Supplies Distribution Unit of the regular outpatient of Dr. Moewardi Hospital so that it can increase patient satisfaction with the services provided. The interventions that will be conducted through this study are by providing markers by doctors or polyclinic nurses using *fast track* and compounded stamps on the tickets carried by patients, separation of prescription reception shelfs according to the types of prescriptions (BPJS; general, *fast track* and compounded; and prescriptions with medicines to be delivered by courier service), *relayout* of the position of prescription *entry* and verification officers, information officers and medicine dispensing counters, as well as providing information to patients about the flow of prescription services through print and digital media.

Method

The researchers measured the medication waiting time for patients who underwent examinations and obtained prescriptions from polyclinics before the intervention, which is from January to December 2023. Subsequently, the researchers conducted several interventions starting in July 2024 in the form of Providing a marker in the form of a stamp inscribed with "compounded/fast track prescription" on the registration tickets or prescriptions brought by the patient from the polyclinic in collaboration with the prescriber doctors and/or polyclinic nurses; Preparing 3 baskets at the prescription reception counter,

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namely the BPJS prescriptions basket, the general patient prescriptions basket, the *fast track* and compounded prescriptions basket, and one more basket for the prescriptions with medicines delivered using courier services; Updating the pharmacy layout by changing the title of the pharmacy counter according to the function of the counter (prescription reception counter, medicine information counter for medicines delivered by courier service, prescription counter with therapy protocol) and changing the position of computers and officers for prescription data entry, medicine information officers for patients whose medicines are delivered using courier services, medicine dispensing counter and providing brochures, printing *x-banners,* and posting QR code link for the information *video* regarding the service flow of UDPF of Regular Outpatient for patients or patients' families.

The researchers measured the medication waiting time for patients who underwent the examinations and obtained a prescription from the Regular Outpatient polyclinic after the intervention in September 2024 and compared the data with the medication waiting time in the period from January to December 2023.

The data required in the analysis of medicine waiting time were obtained from the Hospital Management Information System, including data on the number of *prescriptions* (types of medicines) per prescription sheet, the time the doctor ordered the prescriptions through the Hospital Management Information System for prescription, the time the pharmacy validated the prescriptions, and the time the prescription was ready for non-compounded and compounded medicines. The sampling technique used is the purposive sampling method, sampling selected based on certain criteria, including inclusion and exclusion criteria.

The correlation test of the time from the pharmacy receiving a prescription until the medicine was ready, with the number of *recipes* in the prescription sheet, was conducted using the Spearman test. To test the difference in waiting time between non-compounded medicines and compounded medicines, a comparative test was conducted which aimed to test the difference in the two means. Before a comparative test was conducted on the waiting time data, a normality test was carried out with Kolmogorov – Smirnov. A t-test would be conducted if the data were distributed normally; if the data were not distributed normally, the Mann-Whitney test would be performed.

Results

After being given repeated numbering, the data is sorted to take those that have the same numbering according to the calculation above. The sample size used in the study was calculated based on the Slovin Formula with a significance level of 90% or 0.1.

The data samples are used for data analysis using statistical testing as follows:

- Correlation Test of Time of the Pharmacy Receiving the Prescription until the Medicine was ready with the Number of Recipes in the Prescription Sheet.

A correlation test was performed on the waiting time data, first a normality test was performed with Kolmogorov - Smirnov. The results of the normality test showed that the data was not normally distributed, so the correlation test was performed with Spearman. The results of the analysis obtained a Spearman correlation value of -0.072 with a P value = 0.308. The P value is greater than 0.05, it is concluded that there is no relationship between the Recipe in the Prescription Sheet and the Length of Time for the Pharmacy to Receive the Prescription Until the Medicine is Finished.

- The Difference Test of Waiting Time for Non-Compounded Medicine.

A normality test was performed on the waiting time data for non-compounded medicines before a difference test was carried out. Based on the test, the difference test was carried out with the Mann Whitney Test because the data was not normally distributed. Based on the test results, it can be concluded:

The Average Length of Time for Doctors to Order Prescriptions via the Hospital Management Information System until the Pharmacy Receives the Prescription in 2023 was 33.3 minutes while in 2024 it was 39.4 minutes. Based on the results of the difference test, it was concluded that there was no difference in the Length of Time from the Doctor to Order a Prescription via the Hospital SIM Until the Pharmacy Receives the Prescription between 2023 and 2024 for Non-Compounded Drugs with a P value of 0.386; The average

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length of time from the Pharmacy to Receive a Prescription until the Drug is Finished in 2023 was 45.54 minutes while in 2024 it was 36.9 minutes. Based on the results of the difference test, it was concluded that there was no difference in the Length of Time from the Pharmacy to Receive a Prescription until the Drug is Finished between 2023 and 2024 for compounded drugs with a P value of 0.305.

- The Difference Test of Waiting Time for Compounded Medicine.

Before conducting a difference test on the waiting time data for compounded drugs, a normality test was first conducted with Kolmogorov – Smirnov. Based on the normality test, the difference test was conducted with the Mann Whitney Test because the data was not normally distributed. Based on the test results, it can be concluded:

The average length of time from the doctor ordering a prescription through the hospital Management Information System until the pharmacy receives the prescription in 2023 was 79.9 minutes while in 2024 it was 62.09 minutes. Based on the results of the difference test, it was concluded that there was a difference in the length of time from the doctor ordering a prescription through the hospital Management Information System until the pharmacy receives the prescription between 2023 and 2024 for compounded drugs with a P value = 0.044; The average length of time from the pharmacy receiving the prescription until the drug was finished in 2023 was 56.53 minutes while in 2024 it was 32.43 minutes. Based on the results of the difference test, it was concluded that there was a difference in the length of time from Pharmacy Receiving a Prescription to the Finished Drug between 2023 and 2024 for compounded drugs with a P value of 0.000.

Discussion

Based on the data analysis, it can be seen that there was a decrease in the waiting time for compounded medicines (both for the time from the doctor ordering the prescriptions to the pharmacy validating the prescription, and for the time from the pharmacy receiving the prescription until the drug was ready). The average time for medicine preparation from the pharmacy receiving prescriptions until the compounded medicines were ready was in accordance with the minimum standard set by the Ministry of Health, which is ≤60 minutes. (Amalia & Ramadhan, 2021) It was due to the optimization of the prescriptions service flow conducted by the researchers, which was at the stage of giving markers of "Compounded" and "Fast track" stamps, as well as separating baskets for compounded and fast track prescriptions to accelerate and prioritize the services. The results of this study support the previous study conducted by (Mulya et al., 2023), which states that there is no effect of the types of prescriptions toward the medication waiting time for compounded and non-compounded prescriptions since there is no separation of the queue numbers, however the data on service delays for compounded prescriptions is quite influential for the calculated total waiting time. Optimizing the prescriptions service flow by separating the compounded and fast track prescriptions baskets in this study proves that prioritizing several types of prescriptions that require a longer service process can reduce the waiting time; Updating the pharmacy layout by changing the title of the pharmacy counter according to the function of the counter, changing the position of the computer and the officer for prescription data entry, drug education officers for patients whose drugs are sent using expedition services and adding drug delivery counters have an impact on reducing the incidence of patients going to the wrong counter and eliminating a number of ineffective times because the pharmacy needs to explain and direct patients if the patient chooses the wrong counter. This is in accordance with research conducted at Medical City located in Riyadh, Saudi Arabia, the way to improve efficiency of outpatient pharmacy waiting times based on the problems that have been observed using quality management tools and techniques is to modify the pharmacy room which will help reduce waiting times and increase patient satisfaction which will lead to increased pharmacy efficiency. (Alodan et al., 2020)

Providing brochures, printing *x-banners,* and posting QR code link for the information *video* regarding the service flow of UDPF of Regular Outpatient for patients or patients' families can improve patient understanding of the outpatient pharmacy service flow so that errors do not occur. Errors in implementing the service flow have an impact on wasted

time for the pharmacy to explain to the patient or the patient's family. In addition, according to previous research, patient knowledge of the prescription service flow is one of the factors that influences waiting time, so researchers carried out this intervention as an effort to shorten the waiting time for drugs. (Yani et al., 2022)

Meanwhile, there was a decrease in the average waiting time for non-compounded medicine (only for the time from the pharmacy receiving the prescriptions until the medicines were ready) after service optimization was conducted, however, based on the results of the Difference Test, the time difference was not statistically significant. The obtained average waiting time was not in accordance with the minimum standard set by the Ministry of Health because it exceeded 30 minutes. It was due to the increased number of prescriptions in September 2024 compared to the average number of prescriptions from January to December 2023. The increased number of prescriptions is one of the factors that affect the prolonged medication waiting time because it takes a longer time for the pharmacy to screen prescriptions, prepare medicines for patients, and the workload of each personnel increases due to more prescriptions to be processed.

Conclusion

Based on the results of the optimization conducted by the researchers by providing stamp markers on tickets, separating the prescription type baskets, changing the *layout* of the UDPF of Regular Outpatient counter of Dr. Moewardi Hospital and disseminating information on the new prescription service flow using print media in the form of brochures, posters, and digital media in the form of videos, it can be concluded that there is an effect of optimizing the flow of prescription services on waiting time of the compounded medicines at the UDPF of Regular Outpatient of Dr. Moewardi Hospital.

Recommendations

Adjustment of the study timeline so that the time for data collection after optimization is more adequate; Separate tests are required to assess which intervention gives the most effect on reducing the medication waiting time, whether it is the effect of stamp markers on tickets, basket separation of prescription types, changing *the layout* of the UDPF of Regular Outpatient counter, or the information dissemination of the prescription service flow; Information dissemination is conducted intensively and massively to patients or patients' families regarding the flow of prescription services for UDPF of Regular Outpatient at Dr. Moewardi Hospital; Performing optimization of the pharmacy service flow after pharmacy prescription validation and arrangement of medicines storage layout at UDPF of Regular Outpatient to facilitate obtaining the medicines needed for services; Creating a system in the hospital Management Information System in which the prescriptions are directly sent to the pharmacy after patients undergo examinations at the polyclinic, and there is no need to take a queue number (the service is carried out on the principle of First In First Out).

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