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Original Research

Analysis Implementation of Medication Timeline (ME TIME) on the workload of clinical pharmacy services in inpatient care: A randomized controlled trial

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Abstract

Background: The role of hospital clinical pharmacists is to minimize, if not eliminate, errors in drug administration. However, the number of clinical pharmacists employed in a hospital is often limited, which results in a high workload. Visual media assistance can help these professionals track medication timelines, hence reducing their cognitive load. **Objective:** This study aims to analyze the impact of using medication timelines (ME TIME) on clinical pharmacy workload, i.e., average work time and the ratio of clinical pharmacists to patients. **Methods:** This study is randomized controlled trial in single center, with single-blind design. Patients are grouped into two: standard and ME TIME. Workload is measured using the work sampling method to determine the time required for clinical pharmacy activities. This requires trained observers to observe experienced clinical pharmacists in their work. Meanwhile, the average workload per patient and the ratio are calculated quantitatively. Statistical analysis of difference tests was carried out to compare the workloads between the two groups. **Results:** The average time required for a clinical pharmacist to do their job with a medication timeline is 34'15" (9'28") with a ratio of 14 patients/clinical pharmacy/day. The use of ME TIME did not make any differences between the standard and ME TIME groups in service time and patient ratios (P>α). The time required by the standard and ME TIME groups in the medication and disease history tracing stage was 7'30" (1'55") and 9'12" (2'33") respectively (P= < 0.0001). The time to trace the prescription review, and SOAP documentation were 10'22" (2'51") (standard) and 8'44" (3'37") (ME TIME) (P= 0.0007). Excessive polypharmacy prescribing patterns and geriatric patients are the factors that contribute to the increased workload. **Conclusion:** ME TIME can be an alternative educational media in clinical pharmacy services. It can save work time in reviewing prescriptions and SOAP documentation. This study also found that the more drugs prescribed to inpatients, the higher the workloads of clinical pharmacists are.

Keywords: clinical pharmacy; health policy; medication timeline; polypharmacy; quality of health care; workload

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INTRODUCTION

The current development of health services is heading into patient-oriented and personalized therapy.[1] All healthcare professions, including pharmacy, are heading in the same direction. Pharmaceutical professions per se continue to branch out and have now engendered the clinical pharmacy.[2] Its role is vital in the healthcare system, so it has received much global attention recently.[3] On a hospital level, services provided by pharmaceutical units positively influence the overall quality of services, which suggests the importance of the professions in the hospital healthcare system.[4,5]

One of the key roles of clinical pharmacy services is to achieve target outcomes for patients with chronic diseases.[6,7] Counseling services from clinical pharmacists can also increase patients' knowledge and positive emotions.[8] For example, the involvement of clinical pharmacists in patient care services can increase patients' compliance and behavior toward

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treatment.[6,9] Aside from its role in treatment effectiveness and education, clinical pharmacy services also help guarantee safety, among other things, by identifying drug-related problems and decreasing medication errors by up to 50%.[10,11]

However, the number of employed pharmaceutical staff in hospitals is often insufficient, so their workload tends to be excessive.[12,13] Evidence from the implementation of national regulations shows that the ideal ratio between pharmacists and inpatients, *i.e.,* 1:30, has never been achieved.[14] A high ratio will lead to an excessive workload, so a pharmacist will try to meet unrealistic expectations or work targets, which will have a negative impact on health and performance.[13] Heavy workloads can also reduce the quality of pharmaceutical services, indicated by undetected medication errors, drug interactions, and dispensing errors.[15,16]

Medication errors occur most frequently, caused by errors in administration times and omissions of drug preparation and administration.[17–19] These medication errors can be prevented by clinical pharmacists.[20] Timeline of treatment is a visualization of treatment time to reduce the temporal and cognitive burden on patients and healthcare providers. Timeline of medication can help identify the disparity between drugs prescribed and drugs consumed and track the history of treatment.[21,22]

Knowledge of the therapy plan is an integral component of patients' education.[23] Effective planning is a critical success factor of patients' therapies and will be easier if the workload of clinical pharmacists is ideal. However, research on pharmacist work activities in hospitals has not been well-defined. Therefore, this study aims to test the workload in a hospital's clinical pharmacy by implementing a medication timeline visualization, Medication Timeline (ME TIME). As an intervention, ME TIME can help educate patients and assist clinical pharmacists in carrying out medication searches and reviews. The analysis in this study focuses on the difference in the average time of clinical pharmacy services for a patient in drug assessment and education activities using medication timeline tools and without medication timelines.

METHODS

Study Design

This study is a parallel-group, single-blind, randomized controlled trial conducted at a secondary educational hospital in Surabaya, Indonesia. The hospital was chosen because it has received international accreditation for healthcare services, including clinical pharmacy practices. Data was collected using a cross-sectional approach. Participants were randomly divided into two groups: the ME TIME group and the standard care group. The former received services with medication timelines, and the latter received common clinical pharmacy services according to accreditation standards. The grouping of the participants uses stratified randomization with a 1:1 ratio. There were no changes in methods throughout the research, as the intervention was deemed safe based on an ethical committee review. The research protocol has been approved by the local ethics commission with number 045/KEP/2022. All participants have provided consent by signing an informed consent. The study also adhered to the CONSORT guidelines.

Study Participants

The participant selection criteria were inpatients with chronic diseases, aged $\geq$ 18 years, receiving therapy of $\geq$ five medications, and with or without the company of family or healthcare providers. Meanwhile, the research exclusions were patients with a treatment period of < 3 days. This research was conducted in the inpatient unit of Airlangga University Hospital Surabaya, Indonesia, from May to October 2022.

Sample calculation with an 80% confidence level resulted in a minimum sample of 620 observations. The observation time was determined based on five-minute intervals from clinical pharmacy services. An interim analysis was conducted by the research team when total observations reached approximately 50% to evaluate the potential success of the intervention provided.

Randomization was performed by the observer, starting with estimating the total of working days and then inputting the estimation results into a random team generator application to determine the days of patient data collection from the ME TIME and standard care groups. The observer subsequently distributed the day schedule of clinical pharmacy services to the involved clinical pharmacists. The participant allocation into groups using stratified randomization followed an equal ratio for each group (1:1). This RCT did not allow blinding of the intervention providers, researchers, and observers who assisted in assessing and collecting time data. The blinding was implemented only for the patients to ensure they had never visited a clinical pharmacy from the same hospital before, so they did not know the standard routine of clinical pharmacy services in the inpatient ward.

Trial Procedure

Before initiating the research, an introduction and information session about the implementation of the research were conducted for healthcare professionals in the hospital, especially those in the clinical pharmacy department. Furthermore, the pharmaceutical clinic recruitment process was carried out by the research team by considering the following pre-determined criteria. The participating clinical pharmacists were licensed practitioners with at least a master's degree in clinical pharmacy, a minimum of five years of experience, accustomed to carrying out clinical pharmacy activities for inpatients with chronic diseases, and agreed to participate in the research. Tasks to provide education on ME TIME and standard care were then assigned to the clinical pharmacists. This step aimed to ensure no treatment bias among patients in the same pharmacy unit.

By following the randomization technique, the patients' eligibilities were assessed on the second day of treatment. Patients who met the research criteria were asked to sign a consent form indicating that they agreed to participate in the research. On the third day of treatment, the patients received clinical pharmacy services according to the pre-determined

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group allocation. In recording the time workload, the clinical pharmacists were accompanied by an observer in their activities to provide the clinical pharmacy services. Only one observer attended the clinical pharmacy activities throughout the study to reduce the subjectivity factor in understanding the classification of activity time between patients. This method ensures that the time workload between patients obtained in this study is consistent and reliable. In addition, a preliminary study with a similar method was carried out for two weeks before the data collection to reduce the Hawthorne effect in clinical pharmacists, which could shift their performance levels during the study.[24]

A modified stopwatch was used in the workload observation with the work sampling method. This stopwatch was adapted to the types of clinical pharmacy activities being observed. The activities included reviewing and serving prescriptions; recording the subjective, objective, assessment, and plan (SOAP); tracing the history of medications and the currently used medications; creating a treatment timeline during hospitalization; tracing the patient's illness history in the hospital medical record; drug reconciliation; drug information services (DIS); counseling; visitation; drug therapy monitoring (DTM); adverse drug reaction (ADR) monitoring; and confirmation from doctors and nurses. The outcomes from these observed activities were the clinical pharmacy activity time per patient and the ratio between clinical pharmacy pharmacists and patients. The time in both the standard and ME TIME groups was measured similarly.

Intervention group

In the intervention group, a ME TIME visualization was added to the standard clinical pharmacy services, as shown in Figure 1. The timeline provides information for the administration of medicines based on the type and regimen, with the method of administration being color-coded. This note was written by the clinical pharmacist by integrating the medication notes in the medication chart and the integrated patient progress note (*catatan perkembangan pasien terintegrasi*/ CPPT) sheet to help simplify each patient's daily medication schedule. This tool was created to assist in recording the patient's medication at each time of administration and educate the patients about the name, interval, dose, and administration time during the visit.

In the intervention, the clinical pharmacist first notes drug use on the medication timeline sheet. This is done during the tracing of the patient's history of drug administration and illnesses, the review and provision of prescription services, and the SOAP writing. The medication timeline is established before conducting ward rounds. When administering medications, the clinical pharmacist shows the timeline to the patient as an illustration to help them understand the process.

Statistical analysis

All statistical analyses were performed using GraphPad Prism software. The test analysis for different criteria of the characteristic data between the standard group (n=64) and the medication timeline group (n=64) was carried out using a two-sided Mann-Whitney U test. The detection power was at 95% with a significance level of 0.05.

The main objective of this research is to measure the workload of clinical pharmacists according to the workload sampling method. The quantitative analysis begins by calculating the average productivity percentage and determining the upper and lower control limits for each group to test the uniformity of the data. Next, the data collected is ensured to have exceeded the adequacy requirement. Once the data is confirmed uniform and adequate, normal working time can be determined. In this study, the performance evaluation factor is 1 because the clinical pharmacist is given a sample collection schedule one

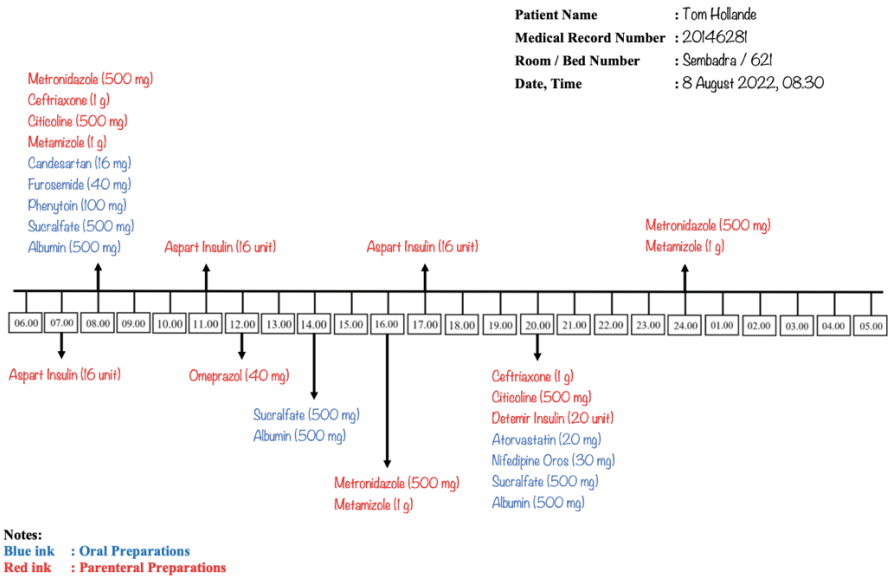

Figure 1. ME TIME example of an inpatient's treatment

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day before collecting the data. The next step is calculating time standards, the time allocated based on individual needs, unavoidable delays, and reduced efficiency due to fatigue. The final step is calculating the number of patients a clinical pharmacy can serve daily.

The next disparity test was carried out on the value of time required for each category of clinical pharmacy activities between the standard and the ME TIME groups. This stage uses the same statistical analysis tests used in the characteristic and time workload tests. In addition, tests were also carried out for secondary purposes, namely to determine the odds ratio of the relationship between the incidence of increased workload and polypharmacy prescription and other factors, such as the prescription to geriatric patients, gender (male), diagnosis, university education status, and status of having a partner. Workload time that exceeds or is equal to 75% is categorized as high. Meanwhile, polypharmacy prescription is divided into two groups, namely patients with polypharmacy prescriptions <10 and patients with excessive polypharmacy prescriptions >10 drug items. This risk factor is tested using simple (binary) logistic regression analysis.

RESULTS

Participant Characteristics Data

During the five months of data collection from May to October 2023, 144 eligible participants met the inclusion criteria (Figure 2). From the initial data, 9% of participants were excluded because they did not agree to take part in the research. After carrying out the randomization process (1:1), three participants were excluded because the data was incomplete. At the analysis stage, data consisted of 128 participants, with 64 participants in the medication timeline group and 64 others in the standard group, as shown in Figure 2. All participants were included in the main objective analysis.

Table 1 shows the participant characteristics, which indicates no significant differences in demographic or clinical aspects between the two groups, i.e., gender, age, education, occupation, marital status, disease by department, number of medications, and number of actual and potential drug-related problems (p>0.05). This study found that the majority of patients treated with polypharmacy were elderly > 60 years old, graduated from junior high school, married, and unemployed/

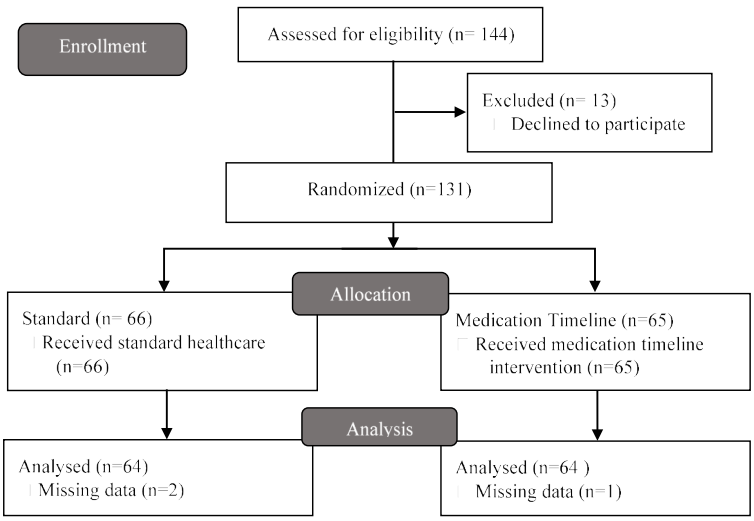

Figure 2. Flow diagram of the impact of the ME TIME implementation on the workload of clinical pharmacy services in the inpatient department

Table 1. Patient Characteristics Data

Characteristics	Clinical Pharmacy Intervention			P-value
	All Patients (n=128)	Standard (n=64)	Medication timeline (n=64)	
Gender, n (%)				
Male	68 (53.1)	36 (56.3)	32 (50.0)	0.5954
Female	60 (46.9)	28 (43.7)	32 (50.0)	
Age, n (%)				
19 – 44	22 (17.2)	10 (15.6)	12 (18.8)	
45 – 59	43 (33.6)	30 (46.9)	13 (20.3)	
60 – 69	41 (32.0)	15 (23.4)	26 (40.6)	0.0879
≥ 70	22 (17.2)	9 (14.1)	13 (20.3)	
Mean ± (SD)	57.1 ± (12.3)	56.0 ± (12.3)	59.5 ± (14.4)	

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Education, n (%)				0.1773
No school	1 (0.8)	0 (0.0)	1 (1.6)	
Elementary	21 (16.4)	12 (18.8)	9 (14.1)	
Junior high-school	8 (6.2)	3 (4.7)	5 (7.8)	
Senior high-school	74 (57.8)	42 (65.6)	32 (50.0)	
University	24 (18.8)	7 (10.9)	17 (26.6)	
Occupation, n (%)				0.7076
Unemploy / Housewife	52 (40.6)	26 (40.6)	26 (40.6)	
Enterpreneur	46 (35.9)	25 (39.1)	21 (32.8)	
Private Employees	16 (12.5)	7 (10.9)	9 (14.1)	
Government Employees	14 (11.0)	6 (9.4)	8 (12.5)	
Marital Status, n (%)				>0.9999
Single	9 (7.0)	5 (7.8)	4 (6.2)	
Married	106 (82.8)	52 (81.3)	54 (84.4)	
Widowed	13 (10.2)	7 (10.9)	6(9.4)	
Disease (based on department), n (%)				0.2368
Internal Medicine	56 (43.7)	30 (46.9)	26 (40.7)	
Surgery	39 (30.5)	21 (32.8)	18 (28.1)	
Cardiology	18 (14.1)	8 (12.5)	10 (15.6)	
Neurology	15 (11.7)	5 (7.8)	10 (15.6)	
Number of medications, n (%)				0.4095
5-9	97 (75.8)	51 (79.7)	46 (71.9)	
>10	31 (24.2)	13 (20.3)	18 (28.1)	
Mean ± (SD)	8.2 ± (2.5)	7.9 ± (2.4)	8.4 ± (2.7)	
Number of DRP actual and potential, n (%)				0.2700
1 – 5	36 (28.1)	19 (29.7)	17 (25.6)	
6 – 10	65 (50.8)	33 (51.6)	32 (50.0)	
>10	27 (21.1)	12 (18.7)	15 (23.4)	
Mean ± (SD)	7.6 ± (3.2)	7.4 ± (3.3)	7.8 ± (3.1)	
DRP: Drug Related Problem				

housewives. From the clinical aspect, the majority of patients were treated for internal diseases, the average number of drugs was eight items, and the average number of potential and actual DRPs was eight.

Service Distribution to Each Clinical Pharmacist

The selection and recruitment process resulted in four clinical pharmacists involved in this study. Using the randomization technique, two clinical pharmacists were appointed to the standard group and two others to the ME TIME group. The distribution of clinical characteristics of the patients served by each clinical pharmacist is presented in Figure 3. The results show that age, average distribution of diagnoses, average number of treatments, and average number of actual and potential DRPs were similar across the board. The average age of the patients was 57 years, and the most common diagnosis was internal medicine (range <2), with an average number of treatments between standard and ME TIME groups of 8.

Daily Productivity of the Clinical Pharmacists and the Uniformity Test

Figure 4 shows the data in the ME TIME group. The observed productivity values obtained are in the range of 96.92 and 100%, with an average productivity level of 99.44%. The observed unproductive time is 4 minutes 53 seconds. Based on this data, it can be concluded that the clinical pharmacists in the ME TIME group in charge were fully deployed during the observations. Meanwhile, in the standard group, the range is 96.92 and 100%, with an average productivity level of 99.48%. The value of unproductive time obtained is 3 minutes 28 seconds. Likewise, the data shows that the clinical pharmacists in the standard service group were fully deployed during the observations.

The data uniformity test shows a confidence level of 95% and an accuracy level of 5%. The data is uniform in both groups, considering that no data exceeded the upper limit range (1.024)

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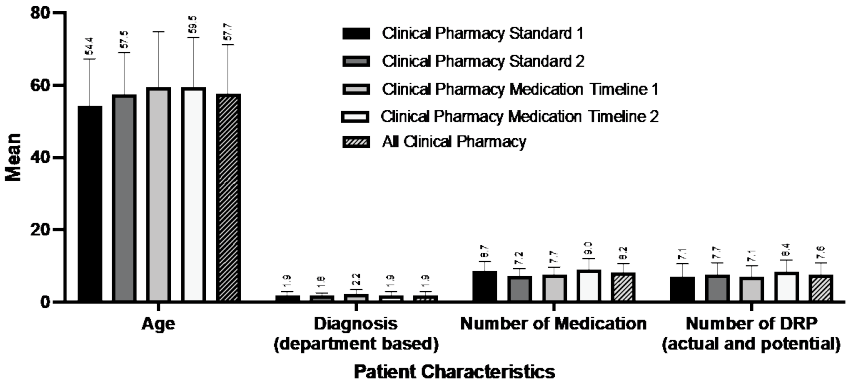

Figure 3. Distribution of data on patient characteristics served by each clinical pharmacist in the standard and ME TIME groups

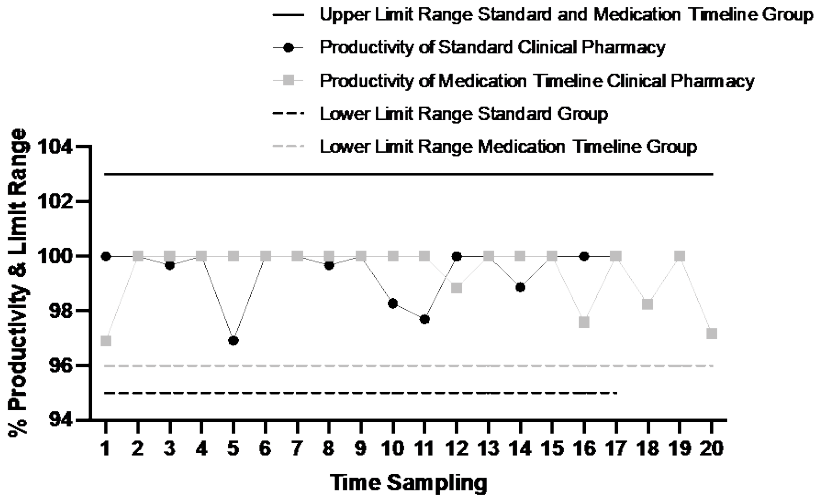

Figure 4. Distribution of characteristics of patients served by each clinical pharmacist in the standard and ME TIME groups

and lower limit range (0.967). The data collected is uniform, with no outliers that exceed the upper and lower limits.

Clinical Pharmacists' Workloads

The workloads of the clinical pharmacists in the two groups were measured from the three clinical pharmacy services: the tracing of patients' history of medication and illnesses, the tracing of prescriptions and SOAP documentation, and the visitations (Figure 5). The results show significant differences between the standard and ME TIME groups in the tracing of patients' history of medication and illnesses, as well as the tracing of prescriptions and SOAP documentation. Meanwhile, the visitation workloads are not different in the two groups. The use of ME TIME in the main clinical pharmacy services does not make a significant difference or help complete activity documentation more quickly.

Table 2 shows the value of time needed for each clinical pharmacy activity in the hospital's clinical pharmacy department using ME TIME and standard procedures. In this research, the performance evaluation factor (PEF) value is 1 because it was carried out by experienced professionals. Delivering clinical pharmacy services to each patient takes approximately 33 minutes and 27 seconds. In the standard and ME TIME groups, the time required is 32 minutes 40 seconds and 34 minutes 15 seconds, respectively. The range of clinical pharmacy activities in the standard group is between 17 minutes 11 seconds and 51 minutes 25 seconds. Meanwhile, in the ME TIME group, the time range is between 18 minutes 8 seconds and 56 minutes 50 seconds. In the visitation, the time needed to provide drug information is different in the two groups. In the ME TIME group, the clinical pharmacist needs time to explain the type, admission time, and frequency of oral and parenteral medication preparations.

The time difference needed to trace the patient's history of medication and illnesses, as well as to trace prescription and SOAP documentation, is less than two minutes. The difference in visitation time in the ME TIME group was only less than one minute longer. Apart from that, the time difference between the standard group and the ME TIME was only around one minute. Furthermore, one clinical pharmacist can only serve around 14 patients with polypharmacy treatment. In the standard group, even though the results showed a ratio of 14.7, they can only

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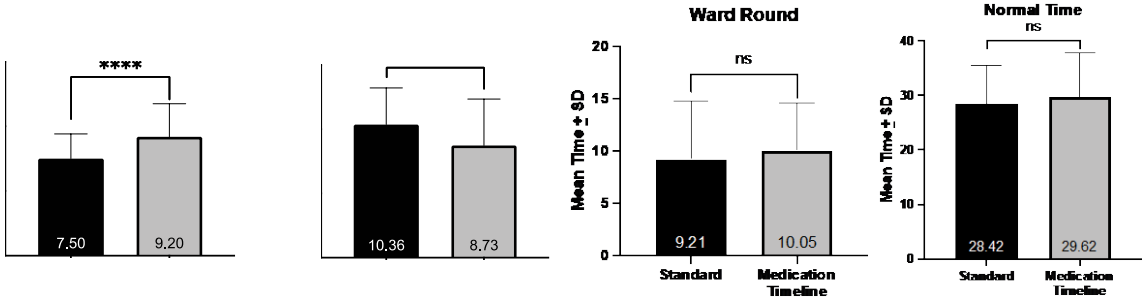

Figure 5. Differences in time needed to complete clinical pharmacy activities in the standard and ME TIME groups

Table 2. Time and service ratio of clinical pharmacy activities

Clinical Pharmacy Activity	Clinical Pharmacy Intervention				P-value
	All Patients Mean (SD) (n = 128)	Standard Mean (SD) (n = 64)	Medication Timeline Mean (SD) (n = 64)	Difference Time Mean (SEM)	
Review of patient's medication and disease history	8'21" (2'24")	7'30" (1'55")	9'12" ± 2'33"	1'42" ± 0'24"	<0.0001*
Review of prescription and SOAP documentation	9'33" (3'21")	10'22" (2'51")	8'44" ± 3'37"	(-)1'38" ± 0'35"	0.0007*
Ward round Reconciliation Drug information service Counseling Monitoring ADR Monitoring drug therapy	9'38" (5'02") 56" (45") 1'54" (1'11") 5'18" (4'11") 33" (24") 57" (28")	9'12" ± 5'31" 53" ± 34" 1'24" ± 1'00" 5'32" ± 4'46" 34" ± 22" 55" ± 31"	10'03" ± 4'31" 59" ± 54" 2'30" ± 1'07" 5'50" ± 3'31" 32" ± 27" 59" ± 24"	50" ± 53"	0.0550 0.8652 <0.0001* 0.9234 0.4899 0.1815
Normal time[a]	**29'01" (7'39")**	**28'25" ± 7'53"**	**29'37" ± 8'11"**	**1'12 ± 1'21"**	**0.726**
Allowance[b]	0,133	0,130	0,135		
Standard Time[c]	33'27" (8'49")	32'40" ± 8'09"	34'15" ± 9'28"	1'23" ± 1'34"	
Ratio[d] Patients: Clinical Pharmacist	**14,3 ~ 14**	**14,7 ~ 14**	**14,0 ~ 14**		

Time Unit x'xx" (x minutes xx seconds); SOAP: Subjective, Objective, Assessment, and Plan; ADR: Adverse Drug Reactions; [a]: average observed time × Performance Evaluation Factor (PEF = 1); [b]: total time allowance during the observation period / total work time; [c]: total normal time / (1 – allowance); [d]: total work time per day (8 hours) / standard time; *: There is a significant difference

serve 14 people because the clinical pharmacists cannot be asked to work overtime work every day.

A sub-analysis was also carried out in this study to determine the sociodemographic risk factors and the number of drugs prescribed to the inpatients, which increase the chance of excessive workload for the clinical pharmacists. This study found that excessive polypharmacy prescriptions increased the clinical pharmacy workload (OR= 5,400 [95% CI 2.25:13.33]; P= 0.0002). Geriatric patients (OR= 2.951 [95% CI 1.29:7.15]; P= 0.01) may also increase the workloads of the clinical pharmacists. Meanwhile, other factors do not have any impact on the workload, namely, male patients (OR= 0.510 [95% CI 0.22:1.14]; P= 0.1046), internal disease diagnosis (OR= 0.843 [95% CI 0.37:1.89]; P= 0.6801), surgery diagnosis (OR= 1.457 [95% CI 0.62:3.35]; P= 0.8783), heart disease diagnosis (OR= 0.8367 [95% CI 0.22:2.56]; P= 0.7693), neurological disease diagnosis (OR= 0.7241 [95% CI 0.16:2.48]; P= 0.6353), university education status (OR= 1.667 [95% CI 0.61:4.29]; P= 0.3072), and the status of having a partner (OR= 2.385 [95% CI 0.74:10.68]; P= 0.1540).

DISCUSSION

Work sampling is a technique that focuses on knowing the allocation of workers' time to various activities, measured by the percentage of time workers spend on each activity. This technique is often used in measuring the time workload of health workers.[25] Past studies have measured the percentage of pharmacists' activities in providing patient-centered services. This study found that the pharmacists need more time than those in previous studies.[26,27] This was because the observer had notified the schedule beforehand. Also, data was not taken at the time after clinical pharmacy services were provided because it would affect the workload, and not all clinical pharmacy services, such as medication reconciliation, could be redelivered.

This study also found that the clinical pharmacy workload is twice as much as in the previous research.[28] This could be attributed to the polypharmacy prescriptions and the clinical pharmacy activities. Previous studies did not record works in medical records and outward round activities, such as drug

education, counseling, and monitoring of therapeutic effects and drug side effects. Meanwhile, this study covers these activities because hospital accreditation requires such clinical pharmacy service standards.[29] Lack of documentation of drug-related incidents is a major challenge for hospitals. One solution is to ensure that the clinical pharmacy department provides education to patients.[30]

In this study, using ME TIME in clinical pharmacy services could not reduce workload. However, this research shows a reduction in the dominant activity in health services, namely documentation.[31] Treatment data visualization has been used in previous research. Unlike the findings in the previous study, the findings in this study show that the visualization did not reduce the time of health workers.[32] This is due to the obligation of the clinical pharmacists to describe the drug administration to the patients.

A past study has also shown that clinical pharmacy intervention positively benefits patients with excessive polypharmacy.[33] Patients with this prescription pattern are a priority for clinical pharmacy services due to the occurrence of medication errors, increased mortality rates, and rehospitalization incidents.[34,35] Meanwhile, excessive polypharmacy often results in a heavy workload because the clinical paperwork activities may take up 60% of the working time.[31] Previous research found that geriatric patients also increase the physical and mental workload of health workers.[36] The incidence of polypharmacy prescription in geriatric patients is almost twice as large as in younger people.[37] The aging process causes cells to experience a shortening process in the telomere phase, impaired autophagy, mitochondrial dysfunction, and inflammation, which develops into a multimorbidity process and requires polypharmacy treatment.[38,39]

CONCLUSIONS

This research proves that clinical pharmacy services with ME TIME do not impact the pharmacist's workload. The use of ME TIME results in differences in service time between the two groups in the deliveries of prescription services and SOAP recording, tracing the patient's history of medication and illnesses, and drug information services. In addition, the standard time is longer, and the clinical pharmacy's patient ratio is smaller in polypharmacy prescriptions. From this study, further research is needed to examine the benefits of ME TIME on other factors, such as satisfaction and cost savings.

ABBREVIATIONS

ME TIME: medication timeline; SOAP: subjective, objective, assessment and plan; DIS: drug information service; DTM: drug therapy monitoring; DRP: drug-related problems; ADR: adverse drug reaction; PEF: performance evaluation factor.

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AUTHORSHIP STATEMENT

All researchers met the ICMJE authorship criteria

AUTHOR RULES

Samirah: design of the methodology work, review and approval of published version; Hasbi As-Shiddiq: data curation, data analysis, writing, and editing; Mareta Rindang Andarsari: data interpretation; Agriawan Sudirman: data collection, design of the work; Lily Aina: data collection, design of the work; Yulistiani: approval of published version, review, and data interpretation; Satriyo Dwi Suryantoro: approval of published version, review, and data interpretation; Dinda Monika Nusantara Ratri: conceptualization, supervision, writing – original draft, review.

CONFLICTS OF INTEREST STATEMENT

All researchers declare that there is no conflict of interest in this research.

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