The Role of Key Performance Indicators in Improving the Performance of Clinical Pharmacist in Hospitals

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Abstract

Key performance indicators are a way to improve performance, including in the hospital sector. In this study, the hospital used was private hospital, Central Java, especially in the field of Clinical Pharmacy services. This research is motivated by the low achievement of clinical pharmacy services. The purpose of this research is to measure the performance of the clinical pharmacy service before and after the intervention with the application of clinical pharmacy Key Performance Indicators (cpKPI). This study is an observational study by observing differences in the achievement of clinical pharmacist performance indicators before and after the implementation of cpKPIs. This studywas conducted using clinical pharmacist visit data for all inpatients at the hospital in September 2019-February 2020. Data analysis used a paired t-test.The use of cpKPI was able to significantly improve the performance of clinical pharmacists ($p<0.05$) related to drug reconciliation indicators, drug therapy services, pharmacist participation in patient management, patient education during hospitalization, and comprehensive direct pharmacists' care. The result proves that cpKPI can improve the performance of clinical pharmacists at Private hospital so that this method can be used by other hospitals to improve the performance of clinical pharmacy services.

Keywords: *KPIs, cpKPIs, Clinical Pharmacy Hospital.*

Introduction

Pharmacy has been a core specialty in the medical field for many years. Clinical pharmacy is defined by the American College of Clinical Pharmacy (ACCP) as "a health science discipline in which pharmacists provide patient care that optimizes medication therapy and promotes health, wellness and disease prevention. Clinical pharmacy practice is well known to be able to reduce the incidence of medication errors, incidence and cost of treatment. However clinical pharmacy is currently still struggling to be recognized by other health professionals, and until now there is still little clear evidence regarding the application of performance indicators of clinical pharmacy, especially in Indonesia[1].

Key performance indicators (KPIs) are measures or metrics that evaluate performance in relation to several objectives to achieve a strategic goal. The currently popular method used in indicator selection is the Balanced Score Card (BSC) where indicators are a measure of several factors in business[2]. Clinical pharmacy services are part of direct and responsible pharmaceutical services to patients to achieve the desired results and improve the patient's quality of life[3]

Previous studies that have been conducted to measure the performance of clinical pharmacy have shown that there is a positive impact on the implementation of cpKPI on clinical pharmacy services[4,1,5,6,7,8]. However, no research has yet revealed the extent to which clinical pharmacist performance increases between before and

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after using the CPI KPI performance indicators so it is important measured in this study.

To improve the performance of clinical pharmacy services, can be used Canadian pharmacy clinical consensus on key performance indicators (cpKPIs of Canada) where this method measure indicators include:Medication reconciliation on admission, pharmaceutical care plan, drug therapy problem, inter professional patients care round, patient education during hospital stay, patient education at discharge, education reconciliation discharge, comprehensive direct patient care bundle.These indicators are important factors in the quality of clinical pharmacy service at the hospital[5].

Literature Review

1.Key performance Indicators (KPIs)

Key performance Indicators (KPIs) are measures or metrics that evaluate performance in relation to several objectives to achieve a strategic goal. The currently popular method used in indicator selection, for example is the Balanced Score Card (BSC) where indicators are a measuring tool for several factors in business, used to measure financial and non-financial performance in order to achieve effective organizational business processes[2,9]. Key Performance Indicators(KPIs)is a collection of knowledge and the methods to discover the best way to achieve organizational goals. Many studies have been carried out to find the best KPIs that are done manually, automatically or semi-automatically which are applied in various fields, as well as to measure the effectiveness of an innovation implemented by a company[10,11,12,13]. KPIs are also a tool to support the achievement of the goals of the preparation of Human Resources (HR) to fit the *strategic planning* company[14]. KPIs are a tool to see whether an organization is on the right path or not, therefore in managing the performance of an organization it is important to use KPIs[15]. Several studies have shown that KPIs have a positive impact on improving performance in the fields of health services, hospitals and health insurance[16,17,18]

2.Clinical Pharmacy Services Clinical

Pharmacy services are direct services provided by pharmacists to patients. In order to improve *outcomes* therapeuticand minimize the risk of side effects due to drugs for patient safety purposes so that the patient's quality of life is guaranteed[19,20]. The services provided by the clinical pharmacy generally include:

a. Patient Medication History

Is an activity to record and collect information on drugs that have been used or are currently being used by patient.

b. Patient Review Profile

Activities in the evaluation of a patient's medical condition by clinical pharmacy

c. Adverse Drug Reaction Management

Activities consisting of:

· Efforts to prevent the potential side effects of drugs

· Efforts to identify the incidence of drug side effects

· Efforts in the treatment on the incidence of side effects of drugs

· Attempts to document the incidence of drug side effects.

d. Therapeutic Drug Monitoring (TDM)

Activities in monitoring the effectiveness and toxicity of drugs

e. Drug Information Management

Activities that involve the assessment, collection, use and presentation of drug-related information[16,19,3].

3.Canadian consensus on clinical pharmacy key performance indicators(cpKPIs)

Canadian consensus on clinical pharmacy key performance indicators(cpKPIs) is an indicator used to assess the performance of clinical pharmacy services. This method is carried out by applying 8 KPIs which are critical areas of clinical pharmacy service in hospitals. Measurement of this indicator is carried out in the following manner[6]. Other studies have shown that the

implementation of cpKPIcan significantly increase the efficiency, effectiveness of drug use and improve the quality of patient care in the hospital[1,5,8].In addition, the existence of a pharmaceutical evaluation of treatment by clinical pharmacy is even known to improve the quality of treatment and treatment follow-up[4,7].

Table 1. Canadian Consensus on Clinical Pharmacy Key Performance Indicators(cpKPIs)

No.	Clinical Pharmacy KPI	Description
1.	Drug reconciliation at admission to hospital	Proportion of patients receiving documented patient drug reconciliation (as well as resolving identified differences) performed by a pharmacist
2.	Drug therapy service plan	Proportion of patients that have been developed / initiated by the pharmacist plan pharmaceutical care
3.	Drug therapy	Problems number of drug therapy problems handled by a pharmacist per inpatient
4.	Interprofessional patient care rounds	Proportion of patients for whom pharmacists participate in interprofessional patient care rounds to improve treatment management
5.	Patient education during hospitalization at home sickness	Proportion of patients receiving education from pharmacists about diseases and medicines during their stay in the hospital
6.	Patient education when the patient can go home	The proportion of patients who receive drug education by the pharmacist when the patient is allowed to go homewhen the patient is discharged
7.	Drug reconciliationdischarged	Proportion of patients who received drug reconciliation documented at discharge (as well as resolution of differences identified by pharmacists)
8.	Bundled patient care interventions	Proportion of patients receiving comprehensive direct patient care from pharmacists working with other health care providers.

The table above is the components in the cpKPIs and ways of assessing each indicator[21,6]

Methods

This study is an observational study by observing differences in the achievement of clinical pharmacist performance indicators before and after the implementation of cpKPIs. This research was conducted at a private hospital in Wonosobo district Central Java with a capacity of 122 beds and has received five-star accreditation from KARS.The research was conducted using clinical pharmacist visit report for all inpatients at the hospital in September 2019-February 2020. The pharmacy installation in the hospital consists of 10 pharmacists where one of the jobs is to provide clinical pharmacy services. Clinical pharmacy visits reports contain numbersreconciliation when admitted to hospital, drug therapy service plans, medical problems, participation of pharmacy in patient, patient education during hospitalization, patient education on discharge from hospital, reconciliation on discharge from the hospital, and comprehensive direct pharmacist caremonthly amounts. Furthermore, the percentage of

achievement indicators is measured.Statistical analysis used a paired t-testto measure differences in clinical pharmacist performance before and after application of cpKPIs. The pretest stage was carried out before this method was implemented, namely September-November 2019, while thestage was post-test carried out after the cpKPIs method was implemented, namely December 2019-February 2020.

Results

After observing clinical pharmacy services at Private hospital before and after the application of cpKPIs the following results are obtained.

Tabel 2. Clinical Pharmacy Visits Report September 2019-February 2020

No	Aspect	The number of clinicalPharmacy Services							
		Sept 2019	Oct 2019	Nov 2019	mean	Dec 2019	Jan 2020	Feb 2020	mean
		Before using cpKPIs				After using cpKPIs			
1	Reconciliation when admitted to hospital	0	0	0	0	88	386	418	297,33
	Total patient	784	988	920	897,33	341	880	827	682,66
2	Drug therapy service plans	422	538	648	536	281	761	692	578
	Total patient	784	988	920	897,33	341	880	827	682,66
3	Medical problems	34	38	46	39,33	30	32	14	25,33
	Total patient	422	538	648	536	281	761	692	578
4	Participation of pharmacy in patient	422	538	648	536	281	761	692	578
	Total Patient	784	988	920	897,33	341	880	827	682,66
5	Patient education during hospitalization	422	538	648	536	281	761	692	578
	Total Patient	784	988	920	897,33	341	880	827	682,66
6	Patient education on discharge from hospital	784	988	920	897,33	341	880	827	682,66
	Total patient	784	988	920	897,33	341	880	827	682,66
7	Reconciliation on discharge from the hospital	784	988	920	897,33	341	880	827	682,66
	Total patient	784	988	920	897,33	341	880	827	682,66
8	Comprehensive direct pharmacist care	422	538	648	536	281	761	692	578
	Total patient	784	988	920	897,33	341	880	827	682,66

Based on table 2, if presented in the form of a clinical pharmacist performance percentage are as follows:

Table 3. Results of cpKPIs Assessment at Clinical PharmacyServices at Private hospital In Wonosobo

No	Aspects	% of Clinical Pharmacy Services								
		Sept 2019	Oct 2019	Nov 2019	mean	Dec 2019	Jan 2020	Feb 2020	mean	p
		Before using cpKPIs				After using cpKPIs				
1	Reconciliation when admitted to hospital	0%	0%	0%	0%	25,8%	43,8%	50,6%	40,06%	0.006
2	Drug therapy service plans	53,8%	55,6%	70,4%	59,93%	82,4%	86,5%	83,7%	84,2%	0.011
3	Medical problems	8,1%	7,1%	7,1%	7,4%	10,3%	4,2%	2%	5,5%	0.483
4	Participation of pharmacy in patient	53,8%	55,6%	70,4%	59,93%	82,4%	86,5%	83,7%	84,2%	0.011
5	Patient education during hospitalization	53,8%	55,6%	70,4%	59,93%	82,4%	86,5%	83,7%	84,2%	0.011
6	Patient education on discharge from hospital	100%	100%	100%	100%	100%	100%	100%	100%	-
7	Reconciliation on discharge from the hospital	100%	100%	100%	100%	100%	100%	100%	100%	-
8	Comprehensive direct pharmacist care	53,8%	55,6%	70,4%	59,93%	82,4%	86,5%	83,7%	84,2%	0.011

In this study it is also known that the types and numbers of occurrences of drug related problems that occur are as follows:

Tabel 4. Type and percentage Drug Related Problems (DRPs)

No	Type of DRPs	Month					
		September 2019	October 2019	November 2019	December 2019	January 2020	February 2020
1	Drug interactions	3%	0%	0%	0%	9,4%	0%
2	Indication without therapy	38%	36,8%	31,3%	70%	34,4%	33,3%
3	Overdose	9%	2,6%	9,4%	3,3%	9,4%	8,3%
4	Improper drug selection	21%	5,3%	3,1%	6,7%	9,4%	8,3%
5	Sub therapeutical dose	24%	52,6%	53,1%	16,7%	37,5%	33,3%
6	Not receiving drugs	3%	2,6%	0%	0%	0%	0%
7	Drug use without indication	0%	0%	0%	0%	0%	8,3%
8	Adverse drug reaction	3%	0%	3.1%	3,4%	0%	8,3%

Discussion

Based on table. It can be seen that there has been an increase in clinical pharmacy performance at Private hospital. Except for indicator 3 (treatment problem), indicator 6 (Patient education when leaving the hospital) and Indicator 7 (Reconciliation when leaving the hospital) which did not change because it had previously been done well at Private hospital:

Reconciliation when admitted to the hospital

Before applying the cpKPIs method there is no documentary evidence of drug reconciliation. After applying the cpKPIs method, it was found that there was an average increase of 40.06% ($p < 0.05$). This result is obtained from the average number of drug reconciliations performed by pharmacists is 297.33 divided by the average number of inpatients of 682.66. Thus, the application of cpKPIs is known to be able to increase compliance in carrying out drug reconciliation when entering the hospital.

Drug Therapy Service Plan

After implementing cpKIPs, it is known that the drug therapy service plan activity has increased by an average of 24.27% ($p < 0.05$). The average number of Drug therapy service plans for September-November 2019 was 536 divided by the average number of patients for September-November 2019 of 897.33, so that 59.93% of Drug therapy service plans were obtained before the implementation of cpKPIs. After the implementation of cpKPIs, it is known that the average number of Drug therapy service plans December 2019-February 2020 is 578 divided by the average number of patients in December 2019-February 2020 of 682.66 so that 84.20% is obtained, so that the difference in the percentage before and according to the implementation of CpKPIs is 24, 27%. Thus, the application of cpKPIs is known to increase compliance in carrying out drug therapy service plans.

Treatment Problems

The lower the treatment problem, the better.After implementing cpKIPs, it is known that the problems that occur at the PKU Muhammadiyah Hospital Wonosobo have decreased by an average of 1.9% ($p > 0.05$). Before the implementation of cpKPIs, it was known that the average number of treatment problems was 39.33 cases divided by the average number of inpatients was 536 so that the percentage was 7.4%. After the implementation of the cpKPIs, it is known that the average number of treatment problems is 25.33 cases divided by the average number of inpatients is 578 so that the percentage is 5.5%, then the difference before and after the implementation of cpKPIs is decreased by 2.2%. This shows that applying the cpKIPs indicator is able to reduce treatment problems that occur even though they are not significantly different because the performance of clinical pharmacy in dealing with previous treatment problems has been good.

Pharmacy participation in patient management

After implementing cpKIPs, it is known that pharmacy participation in patient management has increased by an average of 24.27% ($p < 0.05$).The average number of pharmacy participation in patient management for September-November 2019 was 536 divided by the average number of patients for September-November 2019 of 897.33, so that 59.93% of pharmacy participation in patient management were obtained before the implementation of cpKPIs. After the implementation of cpKPIs, it is known that the average number of pharmacy participation in patient managementDecember 2019-February 2020 is 578 divided by the average number of patients in December 2019-February 2020 of 682.66 so that 84.20% is obtained, so that the difference in the percentage before and according to the implementation of CpKPIs is 24, 27%. Thus, the application of cpKPIs is known to be able to increase pharmacy participation in patient management

Patient education during hospitalization

After implementing cpKIPs, it is known that patient education activities during hospitalization have increased by an average of 24.27% ($p<0.05$). The average number of patient education during hospitalizationfor September-November 2019 was 536 divided by the average number of patients for September-November 2019 of 897.33, so that 59.93% of patient education during hospitalizationwere obtained before the implementation

of cpKPIs. After the implementation of cpKPIs, it is known that the average number of patient education during hospitalizationDecember 2019-February 2020 is 578 divided by the average number of patients in December 2019-February 2020 of 682.66 so that 84.20% is obtained, so that the difference in the percentage before and according to the implementation of CpKPIs is 24, 27%. Thus, the application of cpKPIs is known to be able to improve patient education.

Patient education when leaving the hospital

This activity has been carried out well by the Private hospital clinical pharmacy. Before and after implementing cpKIPs, the patient education rate when leaving the hospital was still 100%.

Reconciliation when leaving the hospital

This activity has been carried out well by the Private hospital clinical pharmacy. Before and after implementing cpKIPs, the reconciliation rate when leaving the hospital was still 100%.

Comprehensive pharmacist direct care

After implementing cpKIPs, it was found that the pharmacist's comprehensive care activities increased by an average of 24.27% ($p < 0.05$).The average number of comprehensive pharmacist directcarefor September-November 2019 was 536 divided by the average number of patients for September-November 2019 of 897.33, so that 59.93% of comprehensive pharmacist direct carewere obtained before the implementation of cpKPIs. After the implementation of cpKPIs, it is known that the average number of comprehensive pharmacist direct careDecember 2019-February 2020 is 578 divided by the average number of patients in December 2019-February 2020 of 682.66 so that 84.20% is obtained, so that the difference in the percentage before and according to the implementation of CpKPIs is 24, 27%. Thus, the application of cpKPIs is known to be able to comprehensively improve the quality of patient care by pharmacists and increase the collaboration between pharmacists and health workers who jointly care for patients.

The results of this study are in accordance with previous studies that have shown that the application of cpKIPs can advance clinical pharmacy services and improve the quality of patient care[4,1,6,7,8]. The weakness of this study is that it was conducted in a relatively short time and involved only a few pharmacists in 1 hospital so that in the future this research could be developed by involving more clinical pharmacists and more hospitals.

Conclusion

The Use of Canadian consensus on clinical pharmacy key performance. The indicators(cpKPIs) were able to significantly improve ($p < 0.05$) the performance of clinical pharmacy, namely related to drug reconciliation indicators, drug therapy services, pharmacy participation in patient management, patient education during hospitalization, and comprehensive pharmacist care. Meanwhile, indicators of treatment problems, education when leaving the hospital and reconciliation when leaving the hospital did not experience significant improvement ($p > 0.05$) because it had previously been carried out well at private hospital in Wonosobo districts Central Java.

Ethical Clearance: The Ethical Clearance was taken from research committee of University

Source of Fundings: This research is finaced by Independent financial from the researchers.

Conflict of Interest: The authors declare that there is no conflict of Interest or nil.

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