



Research Paper

# Improving the Quality of Hospital Clinical Pharmacy Services as a Result of the Implementation of Key Performance Indicators (KPIs) in the Pharmaceutical Sector

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## ABSTRACT

One way to improve company performance is by setting key performance indicators (KPIs) which in various business sectors have been proven to be positive in improving company performance. Likewise, in the health care sector in the hospital sector, it is known that especially in the clinical pharmacy service sector there are instruments in improving the performance of clinical pharmacy services called clinical pharmacy key performance indicators (cpKPIs). This study is an observational study by looking at the differences in the achievement of clinical pharmacist performance indicators before and after the application of cpKPI. This study was conducted using clinical pharmacist visit data for all hospitalized patients in September 2019-February 2020. Data analysis used paired t-test. The use of cpKPI was able to significantly improve the performance of clinical pharmacists ( $p < 0.05$ ) related to indicators of drug reconciliation, drug therapy services, pharmacist participation in patient management, patient education during hospitalization, and comprehensive direct pharmaceutical care. The results of the study prove that cpKPI can improve the performance of clinical pharmacists in private hospitals so that this method can be used by other hospitals to improve the performance of clinical pharmacy services.

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

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## I. INTRODUCTION

Medication errors, near misses and drug side effects are events that occur in all drug use processes, for example at the prescribing, administering and monitoring stages. The problem begins with drugs, so it should be necessary for practitioners who are authorized in all ins and outs regarding drugs to have standards, guidelines, guidelines and standard operating procedures, regarding certain services that ensure the use of drugs that are adequate, safe, effective, comfortable to use by patients. This is the beginning of the Pharmaceutical Care philosophy<sup>1</sup>. Key performance indicators (KPIs) are measures or metrics that evaluate performance in relation to several objectives to achieve a strategic goal. The method that is currently popularly used in the selection of indicators for example is the Balanced Score Card (BSC) where the indicator is a measuring tool for several factors in the business. Clinical pharmacy services are part of pharmaceutical services that are directly and responsibly to patients to achieve the desired results and improve the patient's quality of life<sup>2</sup>. To improve the performance of clinical pharmacy services, the Canadian Consensus on clinical pharmacy key performance indicators (cpKPIs from Canada) can be used where this method measures indicators in the form of:

- Medication reconciliation on admission
- Pharmaceutical care plan, drug therapy problem
- Intraprofessional patients care round
- Patient education during hospital stay
- Patient education at discharge
- Medication reconciliation discharge

- Comprehensive direct patient care bundle. These indicators are important factors in the quality of clinical pharmacy services in hospitals<sup>3</sup>.

## II. LITERATURE REVIEW

Key performance indicators (KPIs) are a collection of knowledge and methods to explore the best way to achieve organizational goals. Many studies have been conducted to find the best KPIs that are carried out 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<sup>4</sup>. 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<sup>5</sup>. Several studies have shown that KPIs have a positive impact on improving performance in the field of health services, hospitals, and health insurance<sup>6,7,8</sup>.

Clinical pharmacy services are direct services provided by pharmacists to patients. In order to improve therapeutic outcomes and minimize the risk of side effects due to drugs for the purpose of patient safety (patient safety) so that the patient's quality of life (quality of life) is guaranteed<sup>9</sup>. Canadian consensus on clinical pharmacy key performance indicators (cpKPIs) are indicators 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 services in hospitals as described in table 1<sup>3,10</sup>.

**Table 1.** Canadian consensus on clinical pharmacy key performance indicators (cpKPIs)

No.	Clinical Pharmacy KPI	Description
1.	Drug reconciliation when the patient is admitted to the hospital	Proportion of patients receiving documented patient medication reconciliations (as well as resolution of identified discrepancies) performed by a pharmacist
2.	Drug therapy service plan	Proportion of patients whose pharmacy treatment plan has been developed/initiated by the pharmacist
3.	Drug therapy problems	Number of drug therapy problems handled by a pharmacist per inpatient
4.	Interprofessional patient care round	Proportion of patients for whom pharmacists participate in interprofessional patient care rounds to improve medication management
5.	Patient education during hospitalization	Proportion of patients who received education from pharmacists about illness and medications during their hospital stay
6.	Patient education when the patient can go home	Proportion of patients who receive drug education by pharmacists when patients can go home
7.	Drug reconciliation when the patient can go home	Proportion of patients receiving medication reconciliation documented at discharge (as well as resolution of discrepancies identified by pharmacists)
8.	Bundled patient care interventions	Proportion of patients receiving comprehensive direct patient care from pharmacists in collaboration with other health care delivery teams.

## III. METHOD

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 numbers reconciliation 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 care monthly amounts. Furthermore, the percentage of achievement indicators is measured. Statistical analysis used a paired t-test to 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 the stage was post-test carried out after the cpKPIs method was implemented, namely December 2019-February 2020.

## IV. RESULT AND DISCUSSION

**Table II.** 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 therapeuticaldose	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%

Table II shows the types of DRPs monitored in clinical pharmacy services at hospitals in the period September 2019 to February 2020.

**Table III.** Clinical Pharmacy Visits Report September 2019-February 2020.

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

Based on table III 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.

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 cpKPIs, 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.

The lower the treatment problem, the better. After implementing cpKPIs, 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 cpKPIs 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.

After implementing cpKPIs, 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 management 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 be able to increase pharmacy participation in patient management.

Patient education activities during hospitalization have increased by an average of 24.27% ( $p < 0.05$ ) after implementing cpKIPs. The average number of patient education during hospitalization 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 patient education during hospitalization were obtained before the implementation of cpKIPs. After the implementation of cpKIPs, it is known that the average number of patient education during hospitalization 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 CpKIPs is 24, 27%. Thus, the application of cpKIPs is known to be able to improve patient education. On the other hand, patient education when leaving the hospital 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%. On another aspect, namely reconciliation when leaving the hospital, before and after implementing cpKIPs, the reconciliation rate when leaving the hospital was still 100%.

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 direct care 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 comprehensive pharmacist direct care were obtained before the implementation of cpKIPs. After the implementation of cpKIPs, it is known that the average number of comprehensive pharmacist direct care 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 CpKIPs is 24, 27%. Thus, the application of cpKIPs 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. 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.

## V. 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.

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