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How to Improve Clinical Pharmacy Practice Using Key Performance Indicators

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Abstract-- Key performance indicators (KPIs) are measurable tools to keep track of progress on a specific performance objective of an institution. By selecting the proper KPI, we can identify the area of improvement in structure, process and outcome. KPIs should be SMART (Specific, Measurable, Attainable, Relevant, and Time bound). In addition, KPIs should be easy to understand, evidence based, reliable, acceptable and feasible. Clinical pharmacy key performance indicator (cp KPI) is a standard quantitative measure of progress for a specific activity performed by clinical pharmacists. The clinical services provided might be upon patient admission, during admission and at discharge in addition to outpatient services. Medication reconciliation at admission, as well as pharmaceutical care plan and patient counseling at discharge are examples for process cpKPI, while rate of adverse drug reaction and patient re admission are examples of outcome cpKPI. In conclusion application of cpKPI and quality metric is a great opportunity to give the general public a valuable insight into the contributions of clinical pharmacists to improve the overall quality of clinical care. This could help the profession demonstrate how pharmacists' knowledge and skills are used to deliver patient outcomes rather than the supply of medicines. Measurement through selection of suitable cpKPI is critically important both in identifying where quality and safety is compromised and in monitoring quality improvement processes.

Keywords: clinical pharmacy, key performance indicators, best practice.

1. Introduction

The changes in global pharmaceutical market to address the population's healthcare needs are making pharmacy practice more challenging. The priority of health policymakers worldwide is to improve patients' quality of life with safe and cost-effective medicine. Within this context, in order to promote quality use of medicine, pharmacists need to be knowledgeable about basic pharmaceutical sciences as well as the basics of clinical therapeutics and practice. The American College of Clinical Pharmacy (ACCP) defines clinical pharmacy as an area of pharmacy concerned with the science and practice of rational medication use. Clinical pharmacists possess the knowledge, skills, attitude and behaviors necessary to deliver comprehensive medication management. They provide patient care that optimizes medication therapy and promotes health and disease prevention. The entire focus of clinical pharmacy practice is to promote the rational use of drugs, while the primary focus of clinical pharmacy is patient care. Hence, the association between clinical pharmacy, medication optimization and the concept of pharmaceutical care is of great clinical significance [1-3].

Key performance indicators (KPIs) are measurable tools used by an institution to keep track on progress of a specific performance objective. KPIs by themselves are not intended to be a direct measure of quality, instead they act as alerts to warn of opportunities for improvement in the process and outcome of patient care. The most performance to measure is quality and outcome. Clinical pharmacy key performance indicator (cp KPI) is a standard quantitative measure of progress for the activities performed by clinical pharmacists [4,5].

2. Role of Clinical Pharmacists

Clinical pharmacists have different roles that could be divided into clinical and non-clinical roles. The clinical role includes being an active member of the multidisciplinary team attending the rounds with physicians, ensure the prescribed medications are optimally meeting the patient's need and goal of therapy, evaluate the appropriateness and effectiveness of medications, counsel the patient on how to best take medications, educate patients on other important steps to improve health such as life style changes and exercise, provide assistance to patients with polypharmacy to help simplify medication regimens, as well as develop pharmaceutical care plans, evaluate and monitor medications. On the other hand, the non-clinical role consists of educating healthcare

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professionals, developing guidelines and policies, conducting research and ensuring medication availability. Clinical pharmacy services include different specialties such as oncology, internal medicine, infectious and intensive care [6].

3. Measuring the Quality of Clinical Pharmacy Services

Improving quality of care is always a priority in healthcare and recently considered as a key driver with the acronym QIPP (quality, innovation, productivity, prevention). Quality has been defined in the context of three domains: safety, effectiveness and patient experience. Metrics for evaluating internal improvement are commonly called key performance indicators (KPIs). Performance measures play a role in specialty practice. They allow providers to track their own performance over time. These internal metrics provide bench marks for continuous quality improvement initiatives [7].

Quality is defined as the degree to which a system or process meets customer needs or expectations and a quality metric is a quantitative measure of the degree to which the system or process possesses a given quality attribute. A quality metric should represent how well a service is delivering its care. It should measure patient outcomes rather than activity and reflect added value in meeting healthcare priorities rather than monitoring the delivery of standard care. The quality metric presented for e.g. improving the number of patients having their medicines reconciled within 24 hours of admission, delivering measurable improvement in health outcomes as a result of medicines use review. This would reflect the added value of pharmacy services and could thus form the basis of a quality metric. Quality metric should be evidence based, reflect changes in practice, clear and easy to measure. In addition, the impact of the metric on patient outcomes should be easily understandable to patients and clinicians. Another challenge is to distinguish between a performance indicator which reflects the structure and process of a service and the quality metric. For example, a performance indicator might be the average time taken to supply discharge medicines, while the associated quality metric should reflect a patient outcome, for example, the number of patients with discharge medicines who were satisfied with the medicines' information they received [8].

4. Clinical Pharmacy Key Performance Indicators

Although hospital pharmacy services indicators have been available since the 1980s, they did not measure quality of clinical pharmacy services delivery. However, they focused on workload and distribution measures. Clinical pharmacy key performance indicator (cpKPI) is a standard quantitative measure of progress for a specific clinical activity performed by clinical pharmacists. These cpKPIs serve as objective indicators to measure the efficiency of delivery in evidence-based patient care processes. CpKPIs should [9,10]:

- Reflect the objectives and targeted quality of practice of clinical pharmacists.
- Link to direct patient care.
- Be supported by high quality evidence.
- Be pharmacist or pharmacy sensitive and specific to a pharmaceutical care process.
- Be feasible to measure.
- Be an accepted disease-based quality indicator.
- Be efficient to measure.
- Be a valuable quality measure.
- Be associated with a relevant impact on clinical important outcomes.
- Be generalizable to all hospital pharmacy clinical pharmacists.
- Be a reflection for the role best suited clinical pharmacists.

The collaborative of Canadian hospital pharmacists agreed about 8 consensus cpKPIs to advance clinical pharmacy and improve the quality of patient care. This consensus focuses on patient journey upon admission to reduce morbidity, hospital readmission and improve patient outcomes. Using the cpKPIs as a tool will help clinical pharmacists to provide the best patient care within the available resources. The agreed cpKPIs are [11,12]:

1- Patient admission cpKPI:

a. Medication reconciliation is a formal process to verify that a patient's list of medication is not unintentionally changed when patient newly admitted or moves from one care setting to another. Upon patient admission, patient medications should be reviewed to ensure an accurate medication history for clinical appropriateness and to identify patients in need for further interventions. Medication reconciliation should be done as soon as possible, ideally within 24 hours of hospital admission to prevent unintentional changes to medication. The list of the patient's home medications should be compared by pharmacist with the prescriber's admission medication orders. Any discrepancies should be discussed with the prescriber to justify the changes made to the order if appropriate.

2- Patient stay in hospital cpKPI:

a. Pharmaceutical care plan: Pharmaceutical care plan involves patient's drug related problems. This will occur through assessment of the patient medical problems and drug therapies, then to develop a care plan followed by follow up evaluation. The pharmaceutical care plan can resolve and prevent drug therapy problems, help pharmacists establish goals for therapy, decide for possible interventions and evaluate outcomes.

b. Resolving drug therapy problems: Drug therapy problems are the undesirable events or possible risk experienced by patient that might be related to drug therapy, interfere with achievement of the desired goal of therapy and require professional judgment to resolve. The drug therapy problems are identified by evaluating the appropriateness of the prescribed drugs, its effectiveness and safety as well as patient adherence to medications.

c. Multidisciplinary patient care rounds: Pharmacists actively participate in multidisciplinary patient care rounds by making interventions, providing information to improve medication management and influence patient care. Clinical pharmacists monitor/review patients' prescriptions for appropriateness or mistakes and then provide recommendations to doctors, help prescribers to choose the right medicines, doses, administration method, adjust the dose as needed, pharmacokinetic and drug level consultations for drugs with narrow therapeutic index, advise on blood level request and its result interpretation, advise nurses on proper way of drug administration.

d. patient education during hospital stay.

3- Patient discharge cpKPI:

a. Patient education at discharge: Patient education at discharge will be specific for disease or drug and involves providing comprehensive information to patients and caregivers to ensure effective and safe use of medications as well as improvement of patient adherence to treatment plan.

b. Medication reconciliation at discharge and patient care interventions: medication reconciliation at discharge involves comparing the patient's home medications with the patient's current hospital medications and with the prescriber's discharge medication orders. Any discrepancies are to be discussed with the prescriber to justify the changes if appropriate.

Other evaluation activities performed by clinical pharmacists are medication error reporting and resolution to prevent errors from being repeated, adverse drug reaction reporting including avoidable and unavoidable reactions to drugs, implementation of antimicrobial stewardship to promote and monitor appropriate use of antimicrobial drugs, lead the initiative of medication safety, train and educate healthcare professionals and ensure the appropriate, safe and secure handling of medication within the hospital and conduct research for patient care improvement [13].

5. Key Performance Indicators

1- Importance of KPIs selection:

- Monitor and improve the performance.
- Measure the improvement.
- Set and achieve goals within timelines.
- Pay attention to real world status.
- Improve quality of patient care.
- Improve patient satisfaction and outcome.
- Prioritize the area of improvement.
- Recognize success.
- Determine value of money [10]

2- KPIs selection criteria:

KPIS are selected based on following criteria:

- High Volume
- High Cost
- High Risk
- Problem prone

KPI can be selected in structure, process and outcome but in order to assess and improve the quality of clinical pharmacy services provided to patients, we should select outcome KPI measure which will reflect the quality of care provided by the clinical pharmacist [10].

3- Characteristics of good KPIs (SMART):

- Specific.
- Measurable.
- Achievable.
- Relevant.
- Time bound.

4- KPIs development:

After selection of KPIs based on the previously mentioned criteria, each KPI must be comprehensively explained in a KPI form/card, which will include all the following:

1. KPI name
2. Performance Measure Description
3. Data source
4. Type of measure (structure/ process/ outcome)
5. Dimension of Performance
6. Data collection method
7. Frequency of data collection
8. Rationale
9. Operational definition (numerator and denominator/ number/ average/ ratio……)
10. Benchmarking type (internal/external) [14, 15].

5- Characteristics of effective KPIs:

To have effective KPIs you need to:

- Have clear definitions.
- Ensure the data collected is of high quality.
- Enhance the validity and reliability of the KPIs.
- Set guidelines to assist in the process of developing KPIs and examine the impact of collecting data required for selected KPIs [15].

6- Examples of KPIs:

- General.
- Disease related: e.g. incidence of neuropathy or nephropathy in diabetic patients.
- Drug related: e.g. incidence of neutropenia related to chemotherapy administration.
- Patient related: e.g. waiting time in outpatient pharmacy.
- Communication related: e.g. patient satisfaction.
- Financial related: cost of treatment per specific disease.
- Internal: training per department.
- Care: medication errors or patient follow up [15-18].

7- Problems affecting evaluation of KPIs:

Avoid falling into these pitfalls when choosing your KPIs:

- Choosing irrelevant or meaningless indicators.

- In adequate team or committee structure to accomplish the scope of activities.
- Insufficient resources such as staff, database and analytical support.
- Lack of commitment and involvement of other related departments.
- Lack of tracking and reporting.
- Lack of staff education on prioritizing and selecting a process.
- Inadequate frequency for the task committee meeting [14,15].

8- Indicator identification:

Each indicator should be identified as structure / process / outcome based on the following [14]:

- Structure relates to the resources of the healthcare system that contribute to its ability to meet the healthcare needs of the population. Structural indicators refer to the resources used by an organization to deliver healthcare and include buildings, equipment, the availability of specialist personnel and available finances.
- Process relates to what is actually done for the service user and how well it is done. Process indicators measure the activities carried out in the assessment and treatment of service users and are often used to measure compliance with recommended practice, based on evidence or the consensus of experts.
- Outcome relates to the state of health of the individual or population resulting from their interaction with the healthcare system. It can include lifestyle improvements, emotional responses to illness or its care, alterations in levels of pain, morbidity and mortality rates, and increased level of knowledge.

6. Relationship between Quality Goals and Performance Measures

The following are examples for performance improvement goal and performance measures [10] (Table 1).

7. Key Points to Consider

- If the assigned cpKPI was chosen for inpatients, do not include patients that have not been admitted to the hospital as patients treated in outpatient clinics or emergency department.
- It is important to consider the number of patients admitted as the denominator for calculating cpKPI as this value reflects the potential number of patients who could have received the clinical pharmacy interventions.
- Measuring cpKPI does not take into account the degree of patient case complexity.
- It is highly recommended to measure cpKPI on a continuous basis e.g. daily. This will optimize the quality care improvement and clinical services advancement. In case it is difficult to measure on daily basis, data might be collected for a 2-3 weeks as sample measurement per quarter.
- Documentation in patient record and pharmacy records is essential for quality assurance and best practice. Documentation provides evidence for the plan, what has been done, and the outcome.
- It is important to differentiate between cpKPI for pharmaceutical care plan and drug therapy problems. The pharmaceutical care plan cpKPI metric measures completion of the care plan whether the drug therapy problem has been resolved or not while drug therapy problems cpKPI identify the drug therapy problems have been resolved by a pharmacist.
- If several pharmacists are involved in e.g medication reconciliation, completion of a pharmaceutical care plan, provides education, regardless of the number of pharmacists involved in the comprehensive direct patient care bundle, the bundle is counted only once [10, 11].

Table 1 - Examples for performance improvement goal and performance measures

Performance improvement goal	Performance measures
Reduce over utilization of an immunotherapy	Percentage of patients who receive immunotherapy for appropriate indications
Develop and implement clinical guidelines to manage lung cancer patients	Percentage of cases in which oncologists followed guidelines or documented their rational for deviating from the guidelines
Calculate how much a patient diagnosed with breast cancer costs to your institution	Average treatment costs per breast cancer patients
Hospital readmission rate	How many patients coming back to emergency after discharge
Increase patient satisfaction by decreasing waiting time in outpatient pharmacy	Average waiting time in outpatient pharmacy.

8. Conclusion

In healthcare, concerns about quality usually revolve around the ability of organizations to achieve desired outcomes using processes that have been demonstrated to achieve those outcomes. Even though quality can be improved without measuring it, for example through the use of clinical practice guidelines and specialist education, it is only through measurement that we can be sure that improvements are being made. Measurement is therefore critically important both in identifying where quality and safety is compromised and in monitoring quality improvement processes. Application of cpKPI as quality metrics is a great opportunity to give the general public a valuable insight into the contributions of clinical pharmacists to improve the overall quality of clinical care.

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