

# Descrição de prática para a gestão da farmácia hospitalar

## *Description of hospital pharmacy management practice*

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### RESUMO

As instituições de saúde, especialmente hospitais, são caracterizadas como estruturas complexas que precisam de administradores com uma visão global da instituição e de suas relações com o ambiente externo. A farmácia hospitalar é uma unidade estratégica, que colabora com a administração institucional e integra a equipe multiprofissional no processo que tange a aquisição, provisão e controle de insumos essenciais para o processo do atendimento do paciente internado. Este estudo tem como objetivo demonstrar a aplicabilidade, no contexto da saúde hospitalar, de um sistema de medição de desempenho da farmácia.

**Método:** Trata-se de um estudo descritivo, longitudinal, sobre a evolução do indicador chave Taxa de Falta de Medicamentos Padronizados na assistência do paciente internado, no período de março de 2004 a dezembro de 2013. Esse indicador foi empregado para monitoramento do impacto de mudanças que a Divisão de Farmácia vem implementando, como primeira etapa do ciclo de assistência farmacêutica dentro do modelo da abordagem de gestão por processos, em um hospital público universitário. Foram usados métodos de coleta de dados qualitativos, incluindo a observação e análise documental, bem como coleta de dados quantitativos.

**Resultados:** Após a aplicação do modelo, um ponto de mudança no indicador chave de desempenho, foi detectado no 10º mês, quando o modelo de gestão baseado em processo foi implementado na farmácia.

**Conclusões:** A abordagem de gestão baseada em processos foi eficaz para a farmácia hospitalar. A premissa adotada é que as mudanças administrativas (interferências), com foco na melhoria dos processos e seleção e acompanhamento de indicadores, têm influência sobre os processos, reduzindo a variabilidade e melhoria da qualidade.

**Palavras-Chave:** Serviços de Saúde. Serviço de Farmácia Hospitalar. Gestão da Qualidade. Indicadores.

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## ABSTRACT

Health institutions, particularly hospitals, are characterized as complex structures that need managers with a global view of the institution and its relations with the external environment. The hospital pharmacy is a strategic unit, which cooperates with the institutional management and integrates the multi-professional team in the process related to the acquisition, provision and control of essential inputs for the inpatient care process. The objective in this study is to demonstrate the applicability, in the context of hospital-based health, of a performance measuring system at the pharmacy.

**Method:** A descriptive and longitudinal study was undertaken on the evolution of the key indicator Absence Rate of Standardized Drugs in inpatient care between March 2004 and December 2013. This indicator was employed to monitor the impact of changes the Pharmacy Division has been implementing, as the first step of the pharmaceutical care cycle in the model of the process-based managed approach at a public university hospital. Qualitative data collection methods were used, including observation and documentary analysis, as well as quantitative data collection.

**Results:** After the application of the model, one point of change in the key performance indicator was detected in the tenth month, when the process-based management model was implemented at the pharmacy.

**Conclusions:** The process-based management approach was effective for the hospital pharmacy. The premise adopted is that the administrative changes (interferences), focused on the improvement of the processes and the selection and monitoring of indicators, influence the processes, reducing the variability and improving the quality.

**Key-words:** Health Services. Pharmacy Service, Hospital. Quality Management. Indicators.

## Introduction

The search for quality and efficiency in health service care is no longer an isolated attitude but a technical and social imperative. Society is increasingly demanding the quality of the services it receives, mainly from public health institutions. This requirement makes it fundamental to create standards and mechanisms to assess and control the quality of care.<sup>1</sup>

Among the different health organizations, hospitals, clinics, outpatient and emergency services, among others, can be highlighted.<sup>2</sup> Health institutions, especially hospitals, are characterized as complex structures that need administrators with a global view of the area and the hospital's relations with the external environment.

Professionals are needed who are prepared to negotiate among multiple interests and demands through systemized management learning,<sup>3</sup> professionals who are trained with a cognitive, analytical, behavioral and action background for the administrative responsibilities of planning, organization, coordination, assessment and monitoring, in a continuous cycle.<sup>4,5,6</sup>

The systemic view suggests that, to understand the way the work is done, formalized and structured processes are needed. A process is a complete, coordinated, dynamic set of logically related activities or tasks that need to be executed to deliver value or comply with other organizational objectives.<sup>7</sup>

Process-based management is focused on organizational activities. This management approach makes it possible to identify, design, execute, document, measure, monitor, control and improve the processes to achieve results aligned with the organization's strategic targets.<sup>8</sup>

In an organization, the medication practice can be considered a system, being defined as a combination of independent processes that share a common objective. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has identified five processes in this system: selection and obtainment of the drug, prescription, preparation and dispensation, medication administration, and patient monitoring in relation to the effects of the drug. These processes basically define the pharmaceutical care cycle at the institution,<sup>9</sup> in which the pharmacy plays a central role.

Besides the design and control of processes, performance indicators need to be created, a key element in a quality program, which serves to evidence the need for improvement actions and verify whether the actions put in practice are producing the desired effects, as well as their trends.<sup>10</sup> Performance indicators (also known as KPI) are quantifiable quality measures for a pharmacy that aims to improve its practices and to deliver better care to the patients.<sup>11</sup>

As perceived, the hospital (complex) as an institution influences the complexity of its hospital pharmacy. The hospital pharmacy is interrelated and establishes relations with other hospital parts. The hospital can be considered a subsystem in a larger and complex service system/network.<sup>3</sup>

The hospital pharmacy is a strategic unit, which is responsible for purchasing, storing, dispensing and controlling inputs that are essential for hospital care. Its inclusion in quality programs is fundamental for the hospital to achieve its care targets.

Like the hospital, the hospital pharmacy, preserving due proportions, is part of a health system, which is structured – organization and functioning – according to the assumptions of universality, integrality, equality, participation and social control. As part of a broad context, the pharmacy of the hospital or the specialized and general primary care network participates in the changes in the model of practical activities and of the profession.

Many factors external to the health system pharmacy have exerted important influence on the professional model, with a growing trend in their influence as from 2010.<sup>12</sup> In that publication, the author indicated the relevance of external determinants of the pharmacy sector and factors like the “national economy, national policies, national debt, global megatrends, health care reform and trends in the development and use of medication”, which influence and will influence the pharmacy planning.

In view of the SUMMIT consensus, Zellmer<sup>12</sup> told that pharmacists and pharmacy technicians working in the health system should get to know the determinants of changes in the profession’s practical model and act to achieve appropriate changes.

In that sense, this study intends to discuss, in the health context, the process-based management approach as a management practice, which

involves a performance measuring system and the use of quality tools. The premise is adopted that administrative changes (interferences) focusing on the improvement of processes and the use of tools, can influence inventory management, reducing the variability and improving the quality of pharmaceutical dispensation functions.

The objective in this study is to demonstrate the applicability, in the context of hospital-based health, of a performance measuring system at the pharmacy.

## Material and Method

A descriptive and longitudinal study was undertaken about the evolution of the key indicator Absence Rate of Standardized Drugs in inpatient care between March 2004 and December 2013. This indicator was employed to monitor the impact of changes the Pharmacy Division has been implementing as the first step of the pharmaceutical care cycle,<sup>13</sup> within the process-based management model, at a public university hospital.

The Hospital das Clínicas de Ribeirão Preto (HCRP), where the study was undertaken, is a state-run self-governed public service, administratively affiliated with the São Paulo State Health Secretary and associated with the University of São Paulo for Teaching, Research and medical-hospital service purposes. Regulated by Decree 13.297, issued on March 05<sup>th</sup> 1979, it has been part of the Unified Health System – SUS since 1988. The Pharmaceutical Care Division is subordinated to the Health Care Department, in line with HCRP Decree 154/2013.

Qualitative data collection methods were used, such as observation and documentary analysis, and quantitative data collection.

The data source was the Pharmaceutical Care Division (DAF), which publishes the activities and reports in the Hospital’s computer system.

This study received approval from the Institutional Review Board at the Ribeirão Preto Hospital das Clínicas – HCFMRP-USP, Opinion 431.604/2013.

The first step was the elaboration of the process diagram, which displays a simple form of the basic work flow process.<sup>14</sup> This tool is necessary, as it shows the processes developed.

The SIPOC (Supplier, Input, Process, Output, Customer) tool was used to demonstrate the inputs and outputs of the process, its suppliers and clients.<sup>15,16</sup>

To monitor the result, the key performance indicator used was: "Absence rate of standardized drugs requested through medical prescriptions".

$$\frac{\text{N}^{\circ} \text{ of standardized drugs requested and not attended to} \times 100}{\text{N}^{\circ} \text{ of standardized items requested}}$$

In addition, the indicator "Inventory turnover" was used, which represents the number of times the inventory rotates during the month to assess the management of drug purchase planning.

$$\frac{\text{Book value of drugs consumed in one month}}{(\text{Book value of initial} + \text{final inventory}/2)}$$

The indicators were monitored after the implementation of administrative process-based actions and interventions in specific aspects, as well as to assess the new management practice. The rates between March 2004 and December 2013 were calculated based on the Information System of the HCRP, permitting the adjustment of a Bayesian times series regression model, considering a change point<sup>17,18</sup> and a first-order autoregressive parameter. It was considered an informative prior categorical distribution for the change point parameter and non-informative prior normal distribution for the others. The software OpenBUGS 3.2.2. was used.<sup>19</sup>

## Results

The Pharmaceutical Care Division is subdivided in two services: the Industrial Activity Service and the Dispensation and Distribution Service. The DAF activities involve all steps of the Pharmaceutical Care cycle, including the selection of the necessary drugs, through the pharmacist's active participation in the Pharmacy and Therapeutics Commission, the programming, purchasing and appropriate storage and handling of the drugs needed and/or unavailable in the market and the medication dispensation and distribution.

At the end of 2005, the Pharmaceutical Care Division undertook an internal audit, following the management model adopted by the Hospital, which was working to get the compliance mark with the CQH – Compromisso com a Qualidade Hospitalar [Commitment to Hospital Quality], supported by the São Paulo Association of Medicine.

The goal was to verify compliance with the Decrees, Standards and Resolutions in force concerning the activities of the hospital pharmacy. Next, each sub-process was strictly analyzed to redesign it, minimizing the risks and contributing to patient safety.

The first step was the identification of the primary and support processes, identifying six primary processes: management of medication distribution and dispensation, fractioning and labeling, preparation of parenteral nutrition, manipulation of antineoplastic drugs, outpatient pharmacy and industrial activity service and three further support processes: equipment management, human resource management and material management. The correct functioning of each of the sub-processes should contribute, then, to the proper functioning of the Pharmacy.

The DAF process diagram, developed in the execution of the project, was represented in Figure 1.

For each sub-process, a responsible was defined and the activities the employees were expected to perform were described in the form of operating procedures. In addition, the assessment points and performance indicators were proposed.

In the first assessment, it was detected that the support process: Material management was a critical process, as the lack of medicines interferes directly in the quality of care delivery and in the safety of the patients the hospital attended.

An action plan was elaborated, defining the targets and setting the guidelines for the execution of each step. The first action was the creation of Cost Centers to control to control the medicine inventory at each Section or satellite pharmacy,<sup>20</sup> followed by an inventory.

This action established a routine of corrections between the physical and the computerized medicine inventories, making the care teams familiar with a new management culture of minimal in-

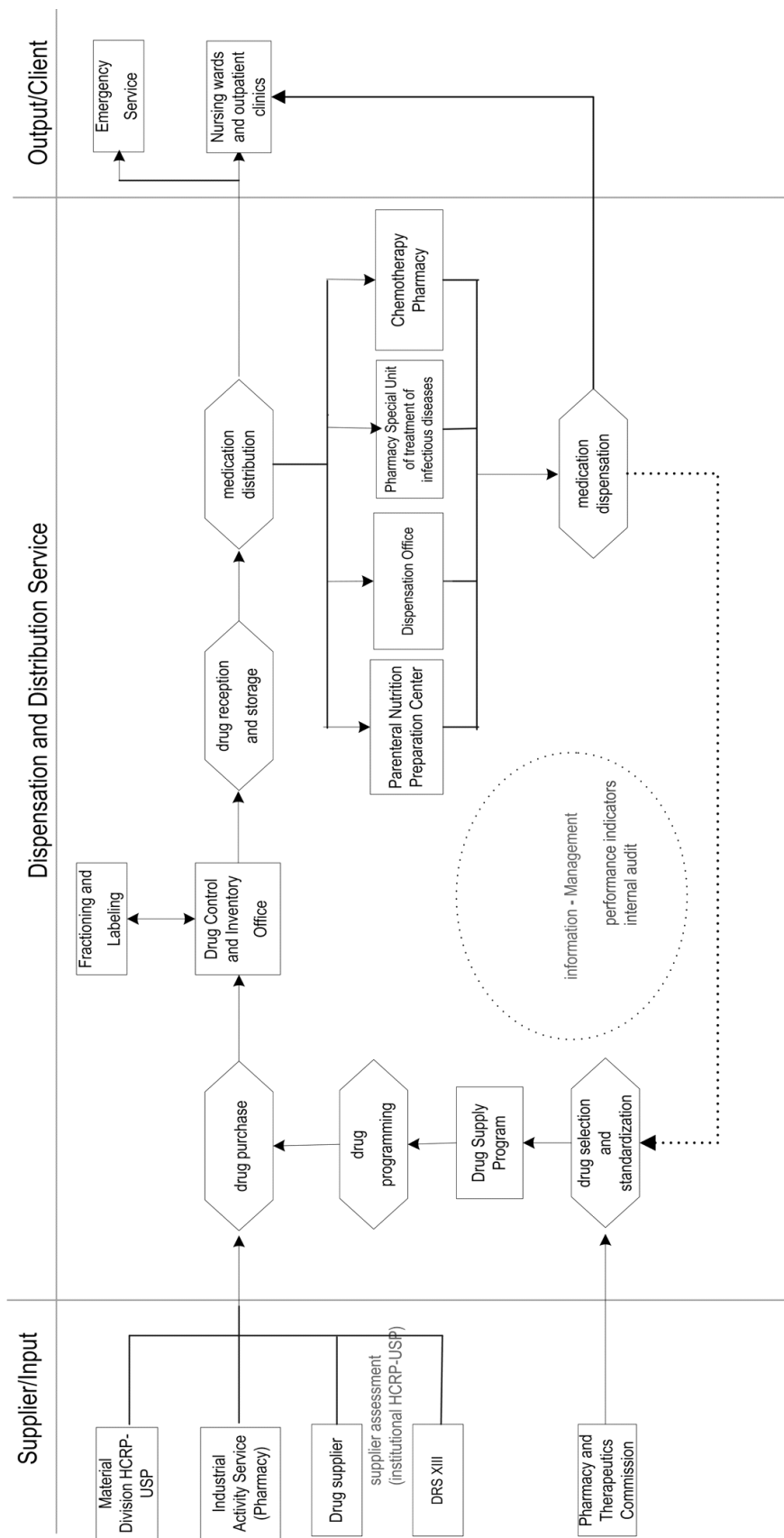


Figure 1: Process Diagram of Pharmaceutical Care Division at University of São Paulo at Ribeirão Preto and State Health Secretary Hospital das Clínicas, São Paulo, 2014.

ventory, without risks for the patient and with repercussions for the management of the Pharmaceutical Care Division (PCD).

The second action was the acknowledgement of the PCD's participation, through its technical team, in all phases of medication provisioning at the hospital: purchase requests, acquisition and control of the budget approved for this end.

The monitoring of consumption through the computer system in the previous twelve months for the future programming and updating of the list of standardized drugs are responsibilities of the PCD's technical team.

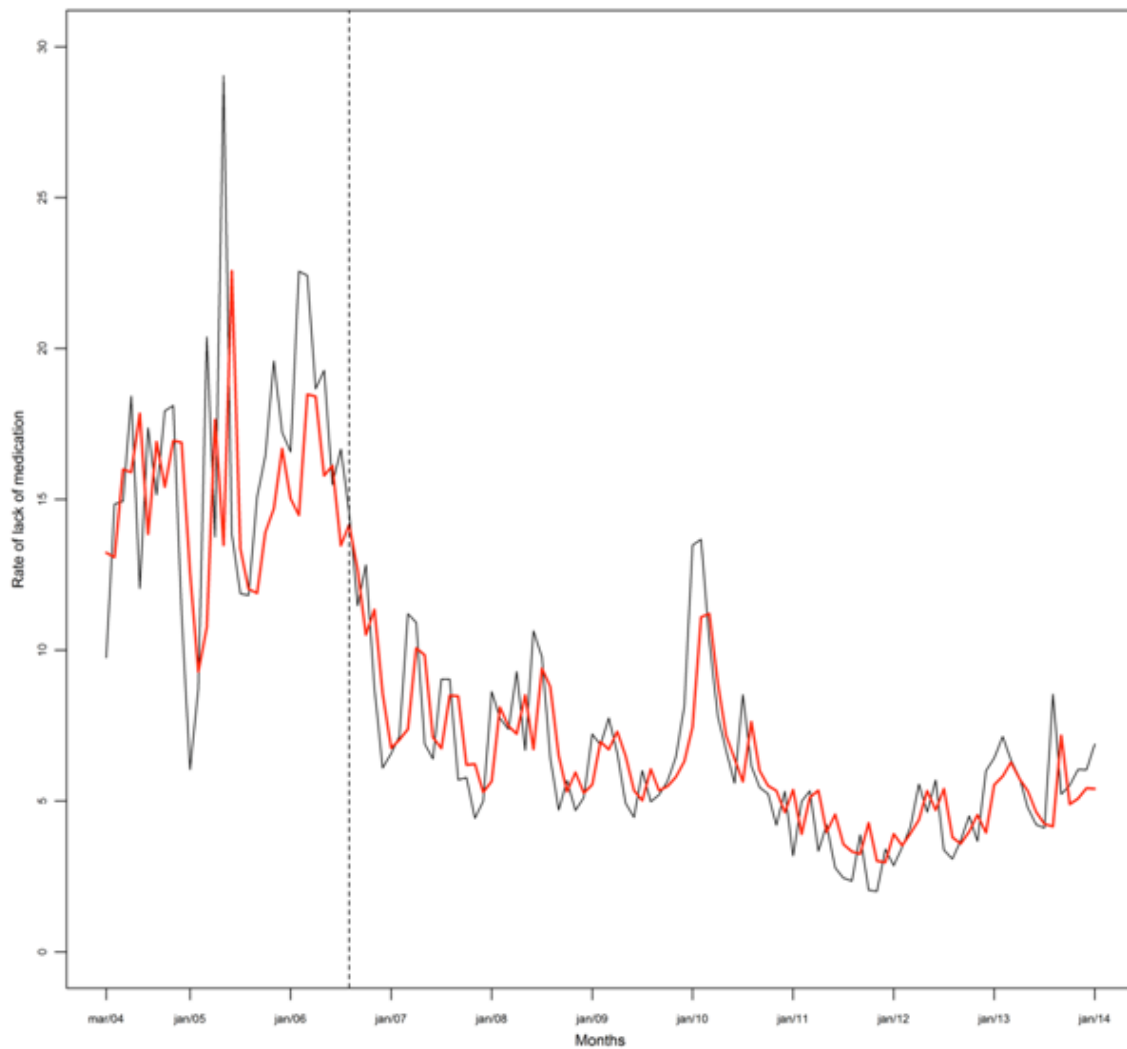
Next, the following management mechanisms were implemented: the non-compliance report, in which any PCD worker can register errors detected

in the process; and the monitoring of performance indicators.

For this process, the rate of medication absence for inpatients and the Inventory turnover were defined as indicators.

Figure 2 shows the graph produced based on the adjustment of a Bayesian time series regression model for the rate of lack of medication from the Pharmacy (indicator). The black line represents the original time series and the red one was obtained based on estimated values.

After applying the model, a change point was detected in the 10<sup>th</sup> month, as from November 2005, when the process-based management model was implemented at the Pharmacy, marked by a vertical line.



**Figure 2:** Adjustment of a Bayesian time series regression model for the rate of lack of medication from the Pharmacy Division of the Ribeirão Preto Hospital das Clínicas, March 2004 till January 2014.

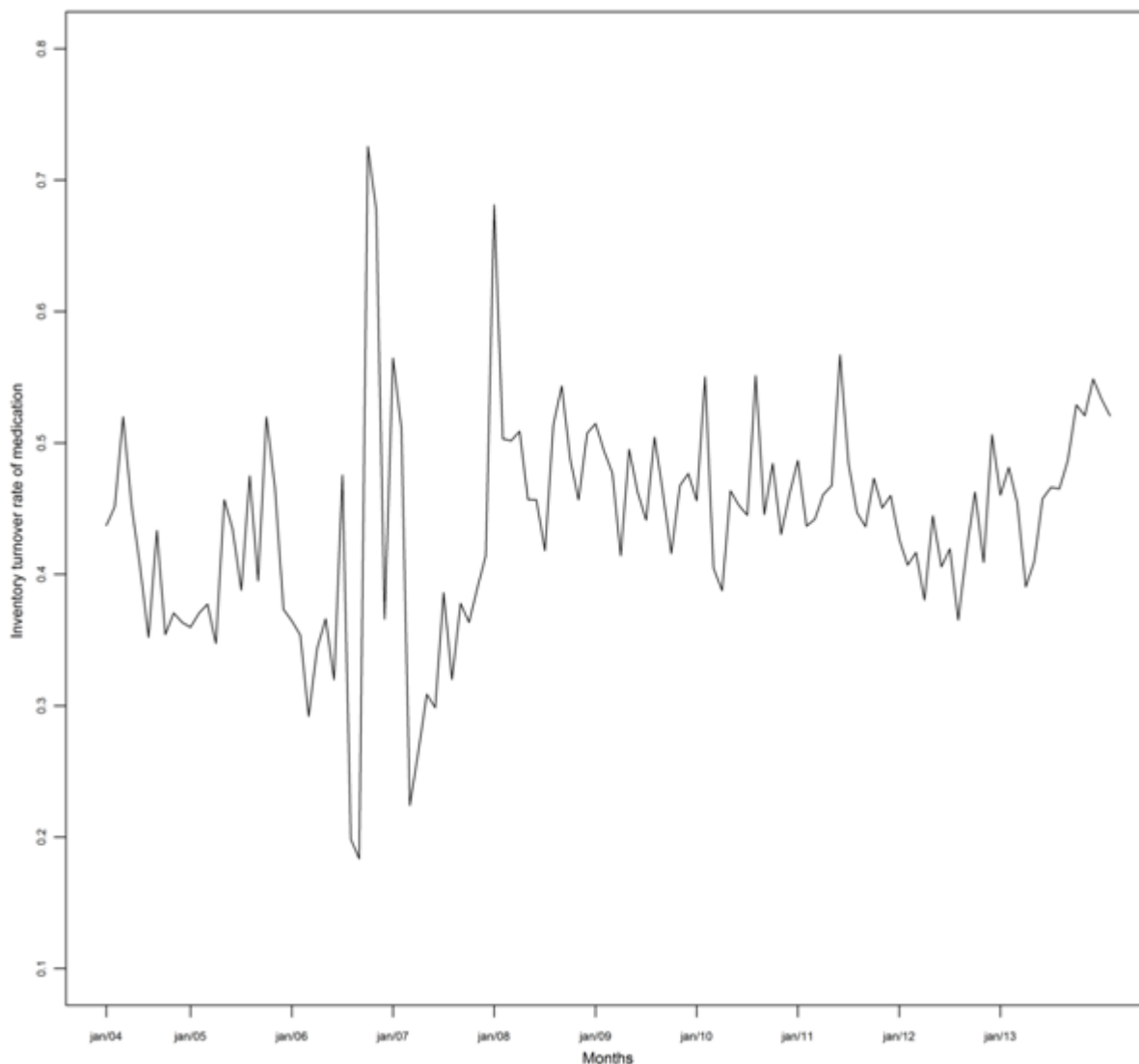
The same statistical model was adjusted for the inventory turnover data. The series does not suggest a change point, but merely shows greater volatility (variation) between 2006 and 2007 as shown in Figure 3.

The information to construct the numerator for the main indicator in this study was obtained from a computerized report that does not register the reasons for the absence of the drugs. Therefore, Pareto's graph could not be constructed for this error, which could serve as a tool for a more detailed analysis of the process, optimizing the actions.

Another barrier the research faced was that, although its implementation was well planned, a series of problems were detected. Employees' resistance to training, characteristic of the organizational culture, and communication flaws were the main barriers found.<sup>21,22</sup>

## Discussion

After the assessment, it was detected that the support process: "material management" was a critical process, as it involves the purchasing, preservation and control of drugs at the Institution, as



**Figure 3:** Adjustment of a Bayesian time series regression model for the indicator "inventory turnover" of the medication at the Pharmacy Division, Ribeirão Preto Hospital das Clínicas, March 2004 till December 2013.

the base for all primary processes, demanding immediate intervention.

The pharmacy had a limited inventory control, whose method needed to be reconsidered. Then, the inventories were monitored through periodical counts, facilitating the identification and correction of differences between the physical inventory and the computerized inventory, permitting the use of the drug purchasing system developed by the hospital's Information and Analysis Center.

Effective inventory control directly influences the purchase management of these inputs. Hence, the importance of implementing systems is highlighted with a view to the continuous improvement of the control processes developed at the hospital pharmacy.

This evidences the importance of implementing the Quality Management System and its permanent assessment through tools that help to prevent divergences and effectively control the drug inventory.

These actions were necessary, as the absence rate of drugs for hospitalized patients directly influences the quality of care delivery and the safety of patients attended by the hospital institution.

In a study that investigated the relations between the use of the management control system, organizational learning, management decisions and organizational performance, Oyadomori, et al, suggests the improvement of the Diagnostic. Use, the monitoring of activities, with a view to assessing whether the objectives are being achieved and provide feedbacks to improve the performance so as to positively influence the Organizational Learning level (organizational competence, characterized by the way the organization acquires and disseminates new knowledge inside the Organization).<sup>23,24,25</sup>

The Quality trilogy of Juran and Gryna<sup>26</sup> establishes that quality planning actions, quality control and continuing improvement reduce the variation of the processes and the new quality zone. This tripod can inaugurate another cycle, in a continuing improvement process, given by the reduction in the process variation.

To assess whether the change point detected is related to the change in the management model, another indicator was also assessed, the inventory turnover. The inventory turnover is one of the main inventory management indicators, and its continu-

ing monitoring permits the appropriation of the purchasing processes to the demand variations.<sup>27</sup>

The same statistical model was adjusted for the inventory turnover data, as shown in Figure 3. The series does not suggest a change point, but merely shows greater volatility (variation) between 2006 and 2007. Hence, it can be affirmed that, in the course of the study period, the pharmacy maintained the some inventory level in financial terms, evidencing that the change can be attributed to the adoption of management practices and the systemic model.

The process-based management approach showed to be effective for the hospital pharmacy, but comes with difficulties. Nevertheless, the resistance to change was the main barrier found, mainly observed among the leading functions (middle management).<sup>21,22</sup> These difficulties have been reported in the literature.<sup>28,29,30</sup>

Trust in the managers (agents of change) is a critical factor in an employee's trend to adopt the change program. A feeling of trust among the employees and managers strengthens the employees' commitment.<sup>31,32</sup>

Once this barrier has been overcome, the problem the organizations face is to link the process-based management approach with the quality tools, implementing an effective quality management system, as each of the tools is used to analyze the process with a view to identifying the cause of its variation, looking for evidence based on results obtained after the appropriate use of each tool.

To overcome yet another obstacle, the managers should always engage their managers in the projects as, due to the position they occupy, they can strongly contribute to the implementation of quality management by converting organizational targets, objectives and strategies into detailed departmental objectives and operational activities.

To maintain the quality of the service delivered and aim for the continuing improvement of processes, the top administration should work towards the motivation and valuation of its collaborators and heed the changes and clients' needs, who are looking for trustworthiness.

The objective of process-based management goes beyond the establishment of organizational targets, as it also permits understanding how they can be achieved effectively and efficiently, with a view



to gaining understanding and the agility needed to rapidly respond to changes.<sup>15,33</sup>

One strategy can be the implementation of a process office, facilitating the integration among the organizational processes and the monitoring of the key performance indicators' outcomes,<sup>34</sup> besides the systematic use of assessment and implementation tools and the monitoring of non-compliance reports, which can contribute to the minimization of errors and/or further difficulties through the study of causes and probable effects.

In addition, it can facilitate the dissemination of the management approach adopted and the quality management principles to the frontline employees and guarantee their commitment.

Messeder et al.<sup>35</sup> considered the influence of the hospital context in the performance of hospital pharmacies to apply a structure and process assessment process to classify hospitals. Thus, they observed that this approach was appropriate at Brazilian hospitals and satisfactory to identify hospitals that performed the services worst and best.

The Consensus of the Summit Model, as a result of a comprehensive questionnaire in a broad consultation round promoted by The American Society of Health-System Pharmacists Pharmacy Practice Model Initiative (PPMI), recommends that the pharmacy departments of the outpatient network and hospitals develop strategy to: innovate the list of activities (care, research and teaching), assume more responsibilities in results related to medication (pa-

tient safety) and participate in the decisions about the incorporation of medication use technologies.<sup>12</sup>

This method and the study results come with the limit of being focused on the Hospital Pharmacy division, without interaction with other hospital sectors, besides involving the context of a complex and tertiary teaching hospital.

The authors suggest further research to discuss the management actions of pharmacists in other hospital sectors and in the service network of the Unified Health System.

## Conclusion

The process-based management approach was effective for the hospital pharmacy. The premise adopted is that the administrative changes (interferences), focused on the improvement of the processes and on the selection and monitoring of indicators, influence the processes, reducing the variation and leading to quality improvements.

Therefore, all workers need to participate and gain in-depth knowledge on the activities in the core pharmaceutical care processes, such as the selection, programming, purchasing, storage and the medication distribution system the institution adopts.

This study is expected to contribute to the improvement of the service quality the hospital pharmacy delivers, indicating routes for decision making and management.

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