Hospital Surgical Indicator Panel: Case Report

Painel de Indicador Cirúrgico Hospitalar: Relato de Caso
Tablero de Indicador Quirúrgico Hospitalar: Reporte de Caso

RESUMO
Objetivo: Descrever e Analisar a implantação de um painel de indicadores do fluxo cirúrgico para a gestão hospitalar. **Método:** Estudo observacional, descritivo, do tipo relato de caso, realizado em um hospital privado de São Paulo, SP, Brasil. Foram analisados 360 procedimentos cirúrgicos. **Resultado:** Os dados foram extraídos do prontuário eletrônico, organizados em oito indicadores da admissão à alta hospitalar. A espera para internar (90 minutos; DP = 152), preparo cirúrgico (191,4 minutos; DP = 209), uso da sala cirúrgica foi de 146,4 minutos e a permanência hospitalar (13 horas; DP = 7 horas). **Conclusão:** O painel de indicadores demostrou ser eficaz para a gestão da cirurgia e da permanência hospitalar, para visualização em tempo real, para apoiar as decisões.
DESCRITORES: Procedimento cirúrgico; Gestão hospitalar; Tempo de internação; Tecnologia da informação em saúde; Indicadores.

ABSTRACT
Objective: To describe and analyze the implementation of a surgical flow indicator panel for hospital management. **Method:** Observational, descriptive, case report study, conducted in a private hospital in São Paulo, SP, Brazil. 360 surgical procedures were analyzed. **Result:** Data were extracted from the electronic medical record, organized into eight indicators from hospital admission to discharge. Waiting time for admission (90 minutes; SD = 152), surgical preparation (191.4 minutes; SD = 209), operating room use was 146.4 minutes, and hospital stay (13 hours; SD = 7 hours). **Conclusion:** The indicator panel proved to be effective for managing surgery and hospital stay, for real-time visualization, and to support decision-making.
DESCRIPTORS: Surgical procedure; Hospital management; Length of stay; Health information technology; Indicators.

RESUMEN
Objetivo: Describir y analizar la implementación de un panel de indicadores de flujo quirúrgico para la gestión hospitalaria. **Método:** Estudio observacional, descriptivo y de casos clínicos, realizado en un hospital privado de São Paulo, Brasil. Se analizaron 360 procedimientos quirúrgicos. **Resultado:** Se extrajeron datos de la historia clínica electrónica, organizados en ocho indicadores desde el ingreso hasta el alta hospitalaria. El tiempo de espera para el ingreso fue de 90 minutos (DE = 152), la preparación quirúrgica de 191,4 minutos (DE = 209), el tiempo de uso del quirófano de 146,4 minutos y la estancia hospitalaria de 13 horas (DE = 7 horas). **Conclusión:** El panel de indicadores demostró ser eficaz para la gestión de la cirugía y la estancia hospitalaria, para la visualización en tiempo real y para apoyar la toma de decisiones.
DESCRIPTORES: Procedimiento quirúrgico; Gestión hospitalaria; Duración de la estancia; Tecnologías de la información en salud; Indicadores.

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INTRODUCTION

In the contemporary global landscape, the healthcare sector faces complex challenges that demand increasingly efficient and innovative management[1] . The pressure to improve the quality of care provided, promote patient satisfaction, and simultaneously control operational costs drives healthcare institutions to continuously review their internal processes. In this context, the surgical workflow and the management of hospital stays emerge as crucial elements in hospital administration, offering fertile ground for significant improvements that impact both the institutions' work processes and the quality of care[2] .

The surgical process, in particular, is an area of great importance in hospital operations, as it is one of the most complex and resource-intensive aspects. From patient admission to discharge, each stage of the surgical process requires careful attention to minimize risks and optimize effectiveness. Issues such as delays in surgeries, operating room downtime, and inadequacies in the management of medical teams represent opportunities to restructure each stage of the process[2-3] .

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The management of hospital stays is equally under scrutiny, as prolonged hospital stays tie up valuable hospital resources and affect the institution's ability to care for patients with urgent or critical conditions. Optimizing the organization and supervision of surgery scheduling ensures that hospitals can efficiently handle variations in demand and peaks in admissions without compromising the quality of care[3,5] . For the effective management of hospital beds, it is essential to develop policies and practices that promote safe discharge and shorter hospital stays[6] .

Despite advances in hospital management and the use of information technology, there are still gaps in the standardization of indicators linked to electronic medical record systems for operating room management and decision-making. Therefore, this article aims to describe and analyze the implementation of a surgical workflow indicator dashboard for hospital management.

METHOD

This is an observational study with a quantitative and descriptive approach using a case report, conducted from October to November 2023. Conducted at a medium-sized private hospital located in the city of São Paulo, SP, Brazil. It was guided by the SQUIRE 2.0 (*Standards for Quality Improvement Reporting Excellence)* tool from the EQUATOR Network (*Enhancing the QUAlity and Transparency of Health Research*), recommended for studies aimed at improving quality and safety in health systems[12] .

The sample consisted of 360 surgical admission records selected by simple probability sampling, based on random extraction from the institution's daily surgical log. Inclusion criteria included adult and pediatric patients undergoing elective procedures with complete medical records. Patients with incomplete hospitalizations, cancellations, or transfers to other hospital units were excluded.

Data were extracted from the institution's electronic patient record system (*MV Soul*). The variables collected were service code; name of the surgery; date and times of each stage of the process—arrival at the hospital, admission, entry into and exit from the operating room, start and end of surgery, recovery from anesthesia, and discharge; type of procedure performed; and duration of each stage, thereby enabling the structuring of process-marker indicators.

Continuous variables were expressed as mean and standard deviation; categorical variables, as absolute and relative frequencies. The data were analyzed using SPSS version 20.0. No inferential comparisons between subgroups were performed, as the focus of the study was the descriptive evaluation of surgical process times.

The study was submitted for review to the Research Ethics Committee (CEP) via Plataforma Brasil and approved under number 60945722.2.0000.5505a.

RESULTS

The study showed that among the 360 patients who underwent a surgical procedure, 56.1% were female and 43.9% were male. Regarding age, the mean was 45.5 years (SD = 20.6 years).

Figure 1. Distribution of patients by type of procedure, São Paulo, SP, Brazil, 2023.

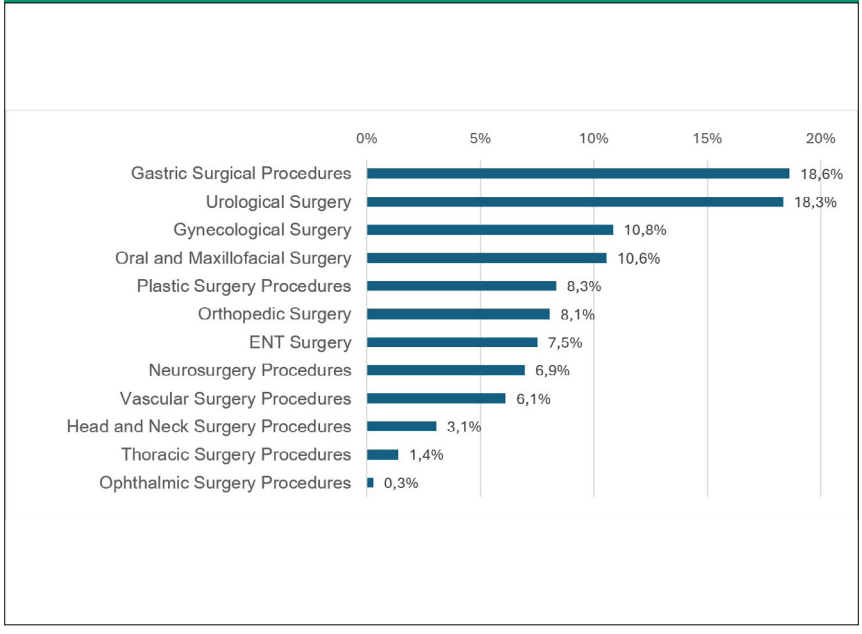

Figure 1 presents the distribution, by procedure, of the number of patients who underwent surgical procedures, with the highest prevalence being 18.6% for gastric surgery and 18.3% for urological surgery. The most common procedures are cholecystectomy, umbilical and inguinal herniorrhaphy, and kidney stone removal.

The total surgical times for the procedures are listed in Table 1 using continuous and dependent variables.

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TABLE 1: Panel of Surgical Flow Process Indicators, São Paulo, SP, Brazil, 2023.

Flow Location	Flow Action	Indicator Name	Representation	Measures	
				Mean	Standard Deviation (SD)
Central Reception	Admit to the Hospital	Time to admit	Time of admission – End time of admission	90 min.	152 min.
Pre-surgical	Prepare patient according to the surgical plan	Time required for surgical preparation	Start time of preparation – End time	191 min.	209 min.
Patient transport	Transfer for surgery	Time required for surgical transport	Start time of transport – End time	13 min.	16 min.
Operating Room	Performing surgery	ORE (Operating Room Effectiveness)	Start time of surgery - End time	30.6 min.	93.6 min.
	Cleaning the operating room	Operating room cleaning time	Start time of cleaning - End time	10 min.	25 min.
	Recovery from anesthesia	Time spent in the recovery room	Time of admission to the PACU - Time of discharge	61 min.	90 min.
Inpatient unit/Intensive Care Unit	Continue postoperative clinical care	Length of hospital stay	Date/Time of admission to the unit - Date/Time of hospital discharge	1:00 p.m.	7 hours

Source: The authors (2026)

The analysis of times in the different phases of hospital care for surgical patients allowed us to identify the efficiency and critical points of the care process. The waiting period for admission showed significant variability, suggesting differences in the speed of initial processes, such as registration and bed availability. The time between registration and admission itself showed less variation, indicating greater control and standardization in this phase.

Preparation for surgery stood out as the most time-consuming and variable phase, revealing an important opportunity for intervention and standardization, especially regarding the organization of the team, materials, and the surgical environment. Transport to the operating room was highly standardized, with little variation, indicating a well-structured workflow.

The duration of the surgical procedure showed moderate variation, consistent with the complexity and diversity of the procedures performed.

In contrast, the total time the operating room was in use was significantly longer than that of the surgical procedure itself, due to the inclusion of stages such as anesthesia, positioning, and initial recovery. Recovery from anesthesia showed a balanced distribution, with most patients remaining within a standard range, although some cases required longer monitoring times.

DISCUSSION

The implementation of the surgical flow indicator panel in this study allowed for the identification of critical points in the care process that directly impact hospital efficiency. Studies on surgical care indicators have also identified critical points in the care process that directly impact hospital efficiency, validating the importance of identifying operational bottlenecks in surgical processes[13] .

Information on times as a marker for each process demonstrates the importance of monitoring these stages to enhance the evaluation of each process.

Studies focused on performance analysis involved the evaluation of surgical processes, where each stage was monitored to identify bottlenecks and potential for improvement. Analysis of preoperative preparation time, operating room utilization, and staff organization were observed, resulting in corrective actions when necessary. Predictive simulations complemented these analyses, allowing for the prediction of how changes in processes could impact overall performance even before they were implemented[3].

Previous studies have also demonstrated that the preoperative preparation stage is one of the main bottlenecks in hospital operational workflows. Studies have highlighted that the lack of standardization in preoperative preparation prolongs the length of hospital stay and increases the risk of surgical delays. These findings corroborate the results of this study, in which variability in preparation time was high, reinforcing the need to review clinical and logistical protocols[14] .

Another relevant point was the identification of low variability in transport to the operating room, which indicates that simpler and well-defined logistical processes tend to result in better operational control. Studies have highlighted that interventions focused on patient transport and circulation between departments positively impact operating room efficiency, which aligns with the observations of this analysis[3] .

The adoption of *BI* systems for monitoring operational indicators was identified as an essential practice in leading institutions[4] . In the present study, the implemented dashboard enabled the visualization of workflow inefficiencies in real time, supporting data-driven decision-making. The implementation of dashboards contributed to raising team awareness and to the development of proposals for continuous improvement in the surgical admission workflow.

Hospital stay management, analyzed

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in this study, proved to be a central pillar of hospital efficiency. The observed variability in discharge timing indicates that pre-discharge planning and coordination of postoperative care must be improved[6,10] . studies have shown that structured transition care strategies help reduce readmissions and length of stay, aspects that can be incorporated into future phases of this improvement project.

In contrast, hospitals that had not systematized these practices faced constant delays and cancellations of surgeries, leading to dissatisfaction among patients and medical staff. The lack of communication and coordination between the departments of anesthesiology, nursing, and administration was identified as one of the main causes of these problems[9,11] . This lack of integration often led to prolonged idle time in operating rooms and inefficient use of available beds, resulting in unnecessary operational costs and overburdening of hospital resources[15] .

The analysis focused on optimizing bed utilization revealed a series of critical factors that directly influence a hospital's ability to adequately manage its resources and meet service demand. Bed occupancy is one of the most visible indicators of hospital efficiency, and effective management of this resource can lead to significant improvements in the quality of patient care and the financial viability of institutions[14-16] .

Finally, the analysis of anesthetic recovery times revealed a relatively symmetrical distribution, though still with considerable variation. The organization of post-anesthetic recovery protocols, with early assessment for discharge from recovery, can contribute to optimizing the total operating room utilization time.

Thus, the results of this study reinforce the need for integrated actions among the surgical team, anesthesiology, nursing, and hospital management aimed at standardizing process times, reducing waste, and ensuring surgical patient satisfaction. The continued use of the implemented indicators will allow for continuous and sustained monitoring of improvements.

CONCLUSION

Based on the data collected and transformed into indicators, it is demonstrated that the improvement of surgical processes is directly linked to the strategic use of information technology and integrated management. The analysis of the average times for the different stages of the surgical process revealed significant variations in waiting times, transport, preparation for surgery, and length of hospital stay. These variations point to opportunities for operational improvement through the implementation of care protocols at each stage of the process. The use of *BI* tools and interactive *dashboards* is fundamental for data-driven decision-making, and the integration of these technologies allows for greater visibility of the processes.

References

1. Bhati D, Deogade MS, Kanyal D. Improving Patient Outcomes Through Effective Hospital Administration: A Comprehensive Review. Cureus. 2023 Oct 26;15(10):e47731. https://doi.org/10.7759/cureus.47731
2. Vladu, A.; Ghitea, T.C.; Daina, L.G.; T, îrt, , D.P.; Daina, M.D. Enhancing Operating Room Efficiency: The Impact of Computational Algorithms on Surgical Scheduling and Team Dynamics. Healthcare 2024, 12, 1906. https://doi.org/10.3390/healthcare12191906
3. Bernadino E, Sousa SM, Nascimento JD, Lacerda MR, Torres DG, Gonçalves LS. Cuidados de transição: análise do conceito na gestão da alta hospitalar. Esc Anna Nery. 2022;26:e20200435. https://doi.org/10.1590/2177-9465-EAN-2020-043
4. Williams H, Taylor S. Healthcare efficiency: a comprehensive framework. J Oper Manag Healthc. 2018;35(5):485-502. https://doi.org/10.1016/j.jomh.2018.03.002
5. Clark J, Edwards R. The power of integration: using data analytics for improved hospital performance. J Healthc Manag. 2020;65(3):210-22. https://doi.org/10.1097/JHM-d-19-00045
6. Fuentes LBEH, Gardim L, Silva TO, Moura AA, Bernardes A. Applying Lean Healthcare in the hospitalization and patient discharge process: an integrative review. Rev Bras Enferm. 2023;76(5):e20220751. https://doi.org/10.1590/0034-7167-2022-0751pt
7. Bernardino E, Sousa SM, Nascimento JD, Lacerda MR, Torres DG, Gonçalves LS. Análise do conceito cuidados de transição. Esc Anna Nery. 2022;26:e20200435. https://doi.org/10.1590/2177-9465-EAN-2020-0435
8. Stoumpos AI, Kitsios F, Talias MA. Digital transformation in healthcare: technology acceptance and its applications. Int J Environ Res Public Health. 2023;20(3407). https://doi.org/10.3390/ijerph2004340
9. Raffa C, Malik AM, Pinochet LHC. O desafio de mapear variáveis na gestão de leitos em organizações hospitalares privadas. Rev Gest Sist Saúde. 2017;6(2):124–41. https://doi:10.5585/rgss.v6i2.298
10. Stoumps AI, Kitsios F, Talias MA. Digital Transformation in Healthcare: Technology Acceptance and Its Applications. Int J Environ Res Public Health. 2023 Feb 15;20(4):3407. https://doi: 10.3390/ijerph20043407.PMID:36834105;PMCID:PMC9963556.
11. Kosiol J, Silvester T, Cooper H, Alford S, Fraser L. Revolutionising health and social care: innovative solutions for a brighter tomorrow - a systematic review of the literature. BMC Health Serv Res. 2024 Jul 12;24(1):809. https://doi.org/10.1186/s12913-024-11099-5
12. StataCorp. Stata statistical software: release 17. College Station, TX: StataCorp LLC; 2021.
13. Ogrinc G, Davies L, Goodman D, Batalden P, Davidoff F, Stevens D. SQUIRE 2.0 (Standards for QUality Improvement Reporting Excellence): revised publication guidelines from a detailed consensus process. J Contin Educ Nurs. 2015 Nov;46(11):501-7. https://doi.org/10.3928/00220124-20151020-02
14. Caldas ACSG, Araújo RS, Medeiros PJ, Freitas RR, Aledo VS, Gama ZAS. Validação de indicadores de qualidade do cuidado cirúrgico no Sistema Único de Saúde. Rev Saude Publica. 2023;57:27. https://doi.org/10.11606/s1518-8787.2023057004723
15. Kraus S, Schiavone F, Pluzhnikova A, Invernizzi AC. Transformação digital na saúde: analisando o estado atual da pesquisa. J Bus Res. 2021;123:557-67. https://doi.org/10.1016/j.jbusres.2020.10.030.
16. Maldonado RN, Savio RO, Feijó VBER, Aroni P, Rossaneis MA, Haddad MCFL. Hospital indicators after implementation of bed regulation strategies: an integrative review. Rev Bras Enferm. 2021;74(2). https://doi.org/10.1590/0034-7167-2020-0022
17. Sousa LR de,Mazzo A, Almeida ACF de, Tonello C, Lourençone LFM. Avaliação de indicadores de qualidade na gestão do centro cirúrgico de um hospital terciário. Medicina (Ribeirão Preto). https://doi.org/10.11606/issn.2176-7262.rmrp.2022.183676

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