Implementation of Neonpass OR for digital communication and process automation in the operating room

Implantação do Neonpass OR para comunicação digital e automação de processos no centro cirúrgico

Implementación de Neonpass OR para comunicación digital y automatización de procesos en el quirófano

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ABSTRACT: Objective: To report the implementation process of a digital solution for communication between the operating room and support areas, integrated with the automation of room turnover processes. **Method:** Experience report on the implementation of the digital solution Neonpass OR® in a private philanthropic hospital in São Paulo, conducted in two phases: (1) implementation on August 12, 2024, and (2) follow-up until November 30, 2024. **Results:** The solution was used in 25 operating rooms, totaling 74,088 activations, involving professionals from nursing, radiology, hygiene, hemotherapy, clinical engineering, and pharmacy. The most frequent requests were directed to pharmacy (24.3%), clinical engineering (17.5%), and the circulating nurse (15.4%), with a median response time of 15 minutes. **Conclusion:** The experience with the implementation of Neonpass OR® demonstrated potential to improve communication between the surgical center and support areas, as well as to facilitate the reorganization of workflows related to room turnover, with positive feedback from the involved teams.
Keywords: Digital technology. Perioperative nursing. Operating rooms. Hospital communication systems. Automation.

RESUMO: Objetivo: Relatar o processo de implantação de uma solução digital para comunicação entre a sala de cirurgia e as áreas de apoio, integrada à automatização do processo de giro de sala. **Método:** Relato de experiência sobre a implementação da solução digital Neonpass OR® em um hospital privado e filantrópico de São Paulo, conduzido em duas fases: (1) implantação, realizada em 12 de agosto de 2024, e (2) acompanhamento até 30 de novembro de 2024. **Resultados:** A solução foi utilizada em 25 salas cirúrgicas, totalizando 74.088 acionamentos, com a participação de profissionais da enfermagem, radiologia, higiene, hemoterapia, engenharia clínica e farmácia. As solicitações mais frequentes foram direcionadas à farmácia (24,3%), engenharia clínica (17,5%) e enfermeira de sala (15,4%), com tempo mediano de atendimento de 15 minutos. **Conclusão:** A experiência com a implantação do Neonpass OR® demonstrou potencial para qualificar a comunicação entre o centro cirúrgico e as áreas de apoio, além de favorecer a reorganização dos fluxos relacionados ao giro de sala, com percepções positivas por parte das equipes envolvidas.
Palavras-chave: Tecnologia digital. Enfermagem perioperatória. Salas cirúrgicas. Sistemas de comunicação no hospital. Automação.

RESUMEN: Objetivo: Relatar el proceso de implementación de una solución digital para la comunicación entre el quirófano y las áreas de apoyo, integrada con la automatización del proceso de rotación de quirófano. **Método:** Relato de experiencia sobre la implementación de la solución digital Neonpass OR® en un hospital privado y filantrópico de São Paulo, conducido en dos fases: (1) implementación, realizada el 12 de agosto de 2024, y (2) seguimiento hasta el 30 de noviembre de 2024. **Resultados:** La solución fue utilizada en 25 quirófanos, con un total de 74.088 activaciones, con la participación de profesionales de enfermería, radiología, higiene, hemoterapia, ingeniería clínica y farmacia. Las solicitudes más frecuentes se dirigieron a farmacia (24,3%), ingeniería clínica (17,5%) y enfermería de quirófano (15,4%), con un tiempo medio de atención de 15 minutos. **Conclusión:** La experiencia con la implementación de Neonpass OR® demostró potencial para mejorar la comunicación entre el centro quirúrgico y las áreas de apoyo, además de favorecer la reorganización de los flujos relacionados con la rotación de quirófano, con percepciones positivas por parte de los equipos involucrados.
Palabras clave: Tecnología digital. Enfermería perioperatoria. Quirófanos. Sistemas de comunicación en hospital. Automatización.

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INTRODUCTION

Processes and care within the operating room demand close attention to patient safety and effective communication among team members, both of which are critical for optimal collective performance[1]. Nevertheless, communication failures are common and can result in adverse events, with up to 30% of operating room interactions potentially compromising patient safety[2]. Such failures may involve the absence of key personnel, dissemination of inaccurate information, unresolved issues, and delays in communication[3], all of which are exacerbated by the typically noisy environment[4].

Nursing involves repetitive and complex processes, which can lead to stress and potentially compromise the quality of care[1]. Digital tools that facilitate direct communication among teams have been shown to enhance safety, effectiveness, and trust in digital health[5].

Technological solutions have demonstrated effectiveness in reducing communication failures and optimizing repetitive tasks, thereby contributing to a safer and more efficient environment[6]. Automated tools help eliminate operational noise, enhance coordination among teams, and improve overall operational efficiency[7,8].

This study describes the implementation of Neonpass OR®, a digital solution developed by the healthtech company Hoobox®, designed to facilitate interaction among operating room teams. The system enables rapid communication, real-time monitoring of requests, and automation of room turnover processes. As a result, nurses are able to concentrate more fully on patient care and support for the medical team, while minimizing unnecessary departures from the operating room.

The relevance of this study lies in its focus on identifying solutions that optimize communication, enhance operational efficiency, and improve the quality of care, patient safety, and perioperative management. The limited number of publications addressing the implementation of technologies to support communication between the surgical center and ancillary areas, particularly those involving the automation of room turnover, underscores the importance of disseminating such innovations.

OBJECTIVE

To report the process of implementing a digital solution for communication between the operating room and support areas, integrated with the automation of the room turnover process.

METHOD

This experience report describes the implementation of the Neonpass OR® digital solution in a large private hospital in São Paulo, which comprises 25 operating rooms and 30 post-anesthesia care unit beds.

The hospital performs approximately 1,700 surgeries per month. The implementation was carried out in two phases:

1. Start on August 12, 2024; and
2. Follow-up until November 30, 2024.

Before implementation, communication relied on telephone calls via landlines and cell phones, or on leaving the operating room to retrieve materials or personnel. The digital solution, comprising three interfaces, securely stored requests in the cloud with encryption and integrated the data with a Business Intelligence (BI) tool for descriptive analysis.

The pursuit of a digital solution originated from the hospital's automation project, which aimed to enhance communication and operational efficiency. Healthtech Hoobox was selected following a 30-day proof of concept. This hospital was the first to implement the solution in its surgical center.

Data collection was conducted once in January 2025, analyzing variables such as the number of requests, involved departments, and Service Level Agreement (SLA) times, using descriptive statistics via the BI platform. This study is part of the research project titled "Neonpass OR: Operational Efficiency and Digital Communication Integrated with Process Automation in the Surgical Center" (*Neonpass OR: eficiência operacional e comunicação digital integrada à automação de processos no centro cirúrgico*), which was approved by the institution's research ethics committee (approval number 7.294.677, December 13, 2024).

Neonpass OR® utilized operational data without collecting any personal patient information, in compliance with the General Data Protection Law (Law No. 13.709/2018), thereby ensuring security, confidentiality, and adherence to ethical and legal standards.

RESULTS

Digital solution

The proposed digital solution comprises three distinct interfaces. The first, designed for the nursing team in the

surgical room, is accessed via a tablet running the Neonpass OR app, installed near the circulating nurse. This interface facilitates submission of requests and supports active chat as long as there is an open demand. Automation of room turnover is based on the timing and progression of the patient's journey: when the end of surgery is recorded, the sterile processing department (SPD) is automatically notified; upon entry of the patient's exit time, the hygiene team is alerted to begin cleaning. The nursing interface is illustrated in Figure 1.

The second interface is designed for support teams and is accessible via web browsers, tablets, and smartphones, allowing them to receive and respond to requests. The third interface is intended for the nurse in the operating room, providing real-time access to the room map, monitoring capabilities, and the ability to submit requests. The request routing flow is illustrated in Figure 2.

The tool includes panels in each department to monitor the progress of requests. On the SPD panel, shown in Figure 3, it is possible to identify the responsible employee and track the status of requests, indicated by colors: blue (open), purple (received), and yellow (in progress). This system optimizes care, reduces unnecessary nursing movements and interruptions, and enhances patient safety.

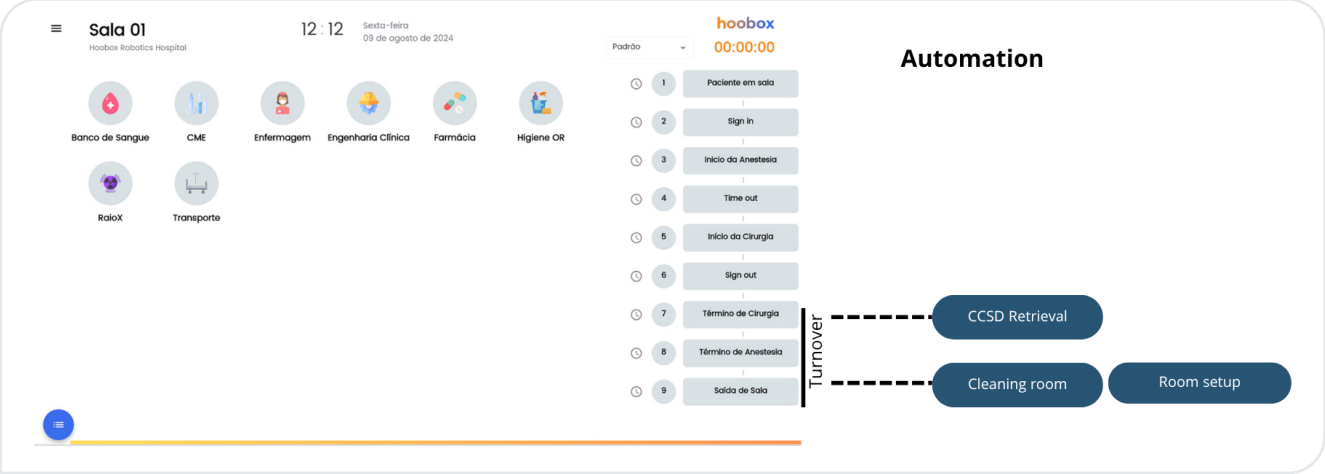

Figure 1. Nursing interface with automation process in time and motion studies in Neonpass OR®.

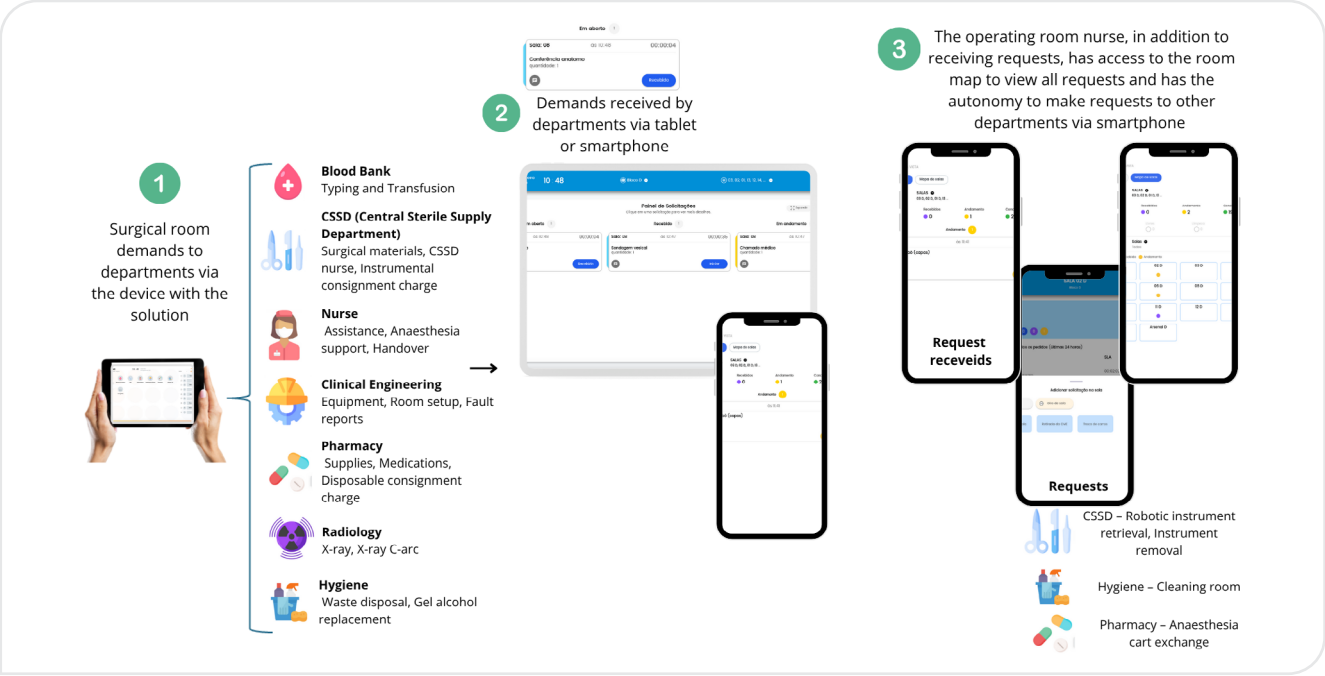

Figure 2. Workflow of the Neonpass OR® tool.

The surgical map interface for the reference nurse displays all rooms along with recorded times, enabling prioritization based on need. Incoming requests are marked with a red icon and assigned a priority number (1 to 3), as illustrated in Figure 4.

Implementation

The implementation was carried out in three stages. Initially, the tablet interface was introduced to the involved areas, and the departments were configured according to local needs. Digital communication was established between nursing and support staff (SPD, pharmacy, clinical engineering, radiology, blood bank, hygiene team, and room nurses). Requests could be tracked and followed up via chat while active.

Device distribution was determined based on the specific needs of each team: tablets were allocated to the SPD and pharmacy, smartphones to other professionals, and a web-based version was made available at the nursing station. Training for 180 employees was conducted by Hoobox in small groups over a two-week period, with 30-minute sessions held in a simulated environment across morning, afternoon, evening, and night shifts. The solution was officially launched on August 12, 2024. A reference professional was assigned to provide on-site support, and a 24-hour customer service channel was made available by the development team.

Follow-up

During the monitoring period, the system was utilized in 25 operating rooms, with a total of 74,088 requests recorded across teams (including nursing, radiology, hygiene, hemotherapy, clinical engineering, and pharmacy), covering all work shifts. The median time reflects the interval between the initiation

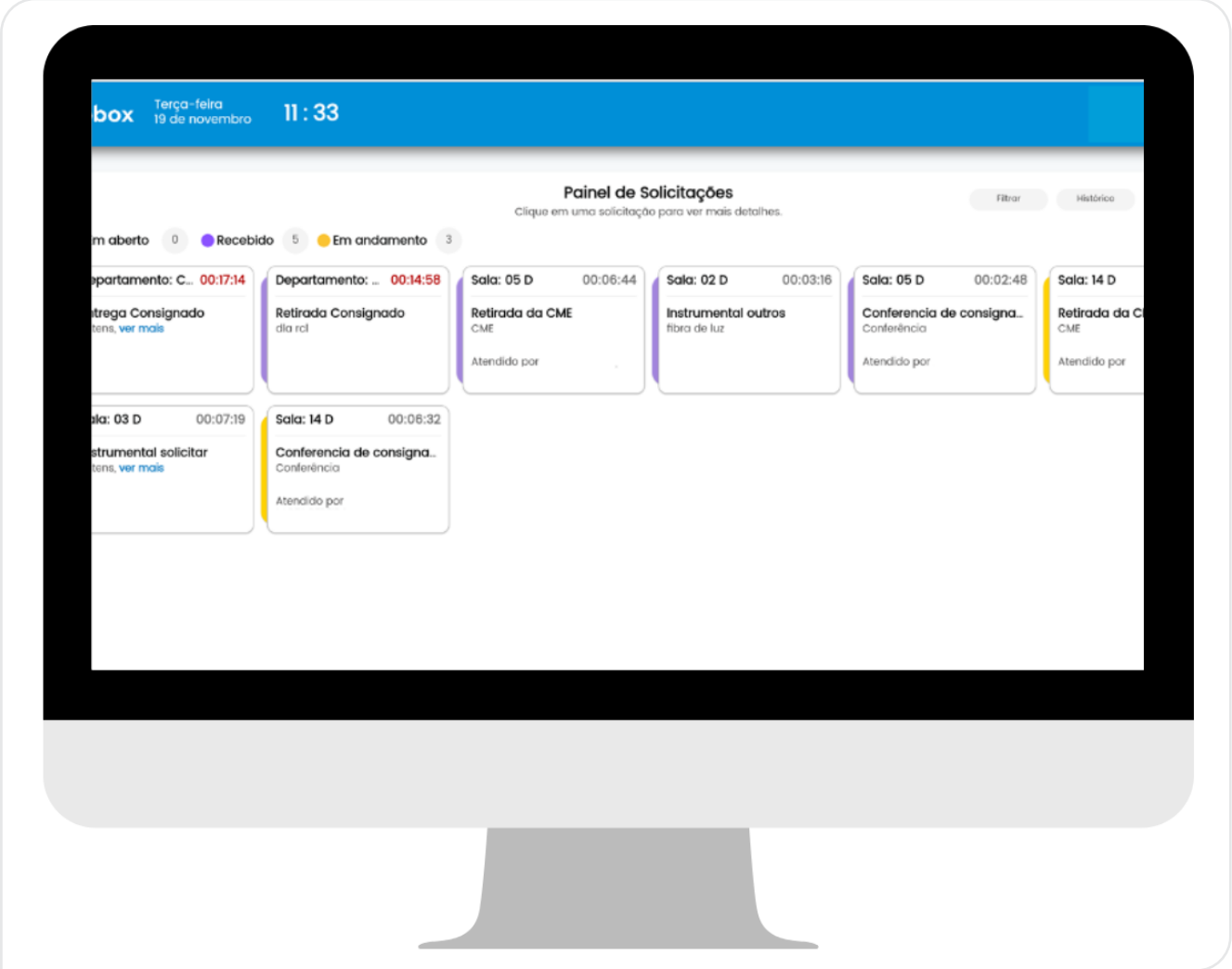

Figure 3. Screen view of the Sterile Processing Department interface displaying all real-time requests in Neonpass OR®.

and completion of each request. The system replaced telephone communication and reduced the need for nursing staff to leave the operating room. Table 1 presents the distribution of requests by department and the corresponding median service times.

Pharmacy requests included medications and a variety of materials. Clinical engineering received requests related to equipment, DVDs, room setup, and surgical robots. The room nurse provided support to the anesthesiologist, surgeon, and pathology services. The hygiene team was

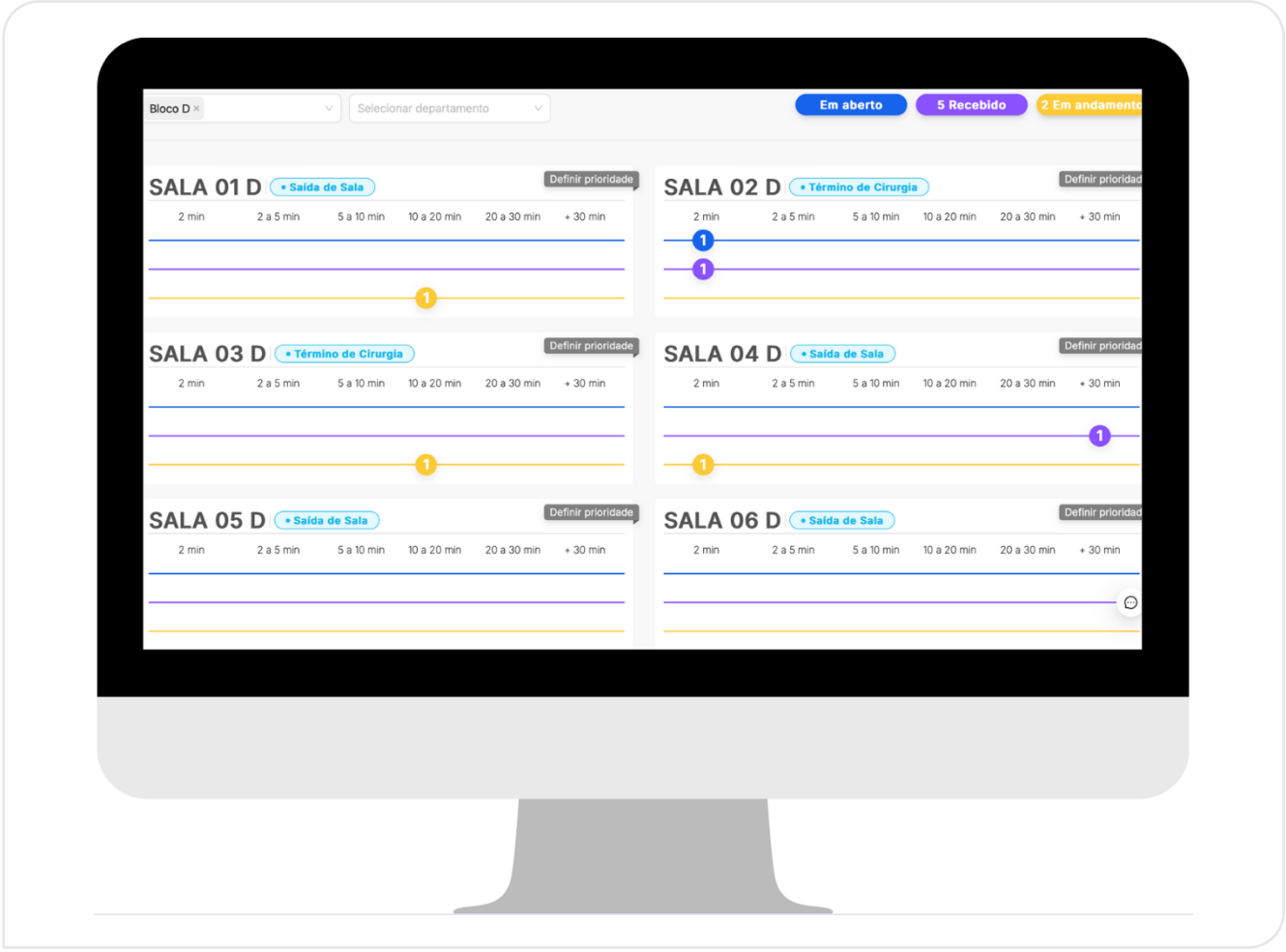

Figure 4. Screen view of the nursing station interface in the surgical center, showing rooms, requests, time and motion data, and priority setting icon in Neonpass OR®.

Table 1. Distribution of requests by department and median response time, São Paulo (SP), Brazil, 2025.

Department	Total requests	%	Median response time (minutes)
Pharmacy	17,983	24.3	9
Clinical Engineering	12,951	17.5	11
Operating Room Nurse	11,399	15.4	19
Hygiene	6,949	9.4	33
Sterile Processing Department Arsenal	6,325	8.5	7
Anesthesia Cart Exchange	6,182	8.3	37
Sterile Processing Department Pickup	5,912	8	22
X-ray	2,174	2.9	56
Deduction billing	1,831	2.5	16

responsible for automated cleaning and intraoperative removals. The SPD arsenal supplied surgical instruments and disposable materials.

The replacement of anesthesia carts, performed by the satellite pharmacy, involved restocking supplies. Removals carried out by the SPD referred to the collection of used materials, as part of the automated room turnover process. Imaging requests primarily involved the use of the C-arm. The charge nurse was responsible for verifying Orthoses, Prostheses, and Special Materials (OPSM).

DISCUSSION

The implementation of digital tools in the surgical center is intended to enhance communication and optimize processes, thereby promoting efficiency and improving patient safety. The literature indicates that computerized systems accelerate data management and reduce risks, contributing to safer care[9]. However, a significant portion of the data generated is not adequately managed, and many studies focus solely on interactions within the operating room, often overlooking communication with other professionals. This gap hinders the evaluation of communication's impact on overall operational flow.

Measuring communication among all professionals involved in surgical care is essential for identifying workflow failures, delays, and sources of team stress. A previous study[2] identified errors including inefficiency, team tension, and delays, linked to communication failures such as inaccurate information and the absence of key team members. These issues negatively affect efficiency and service times, ultimately compromising the functioning of the surgical center.

In the operating room environment, constant stress and the necessity for rapid decision-making increase the risk of burnout, particularly among nurses[10]. Digital tools such as Neonpass OR® can reduce informal communication and minimize the need for nursing staff to leave the room to retrieve supplies, enabling them to focus more on patient care and alleviating stress.

Process automation also reduces reliance on staff to manually notify departments such as the materials center. Traditionally, this task required time-consuming telephone communication; automation contributes to greater efficiency and organization, although these benefits were not directly evaluated in this study.

Research on digital technologies in the surgical environment has demonstrated benefits such as enhanced traceability and increased efficiency. One study[11] involving an RFID-enabled smart cabinet improved logistics control and reduced material consumption, while another evaluated an automated distribution system that enhanced efficiency and team engagement[12]. These findings underscore the potential of Neonpass OR® to promote automation and improve communication within the surgical center.

Professional training and continuous monitoring are essential for successful technology implementation, alongside team acceptance. The absence of pre-intervention data and lack of integration with the hospital's electronic medical record system limit the critical analysis of results; however, the integration of the technology into existing workflows facilitated user adherence.

This study documents the implementation and monitoring process of Neonpass OR®, representing an innovative contribution given the scarcity of similar studies in the literature, and may serve as a reference for future digitalization initiatives in the surgical environment.

CONCLUSION

The experience with implementing Neonpass OR® demonstrated potential improvements in communication between the surgical center and support areas through clearer and more targeted messaging. Integration of the digital solution with automation of the room turnover process showed promise in reorganizing workflows and enhancing the perceived agility of team activities. Although objective outcomes were not measured, feedback from involved professionals suggests benefits in coordinating perioperative actions, underscoring the importance of technological initiatives in advancing efficiency and safety within the surgical environment.

FUNDING

None.

CONFLICT OF INTERESTS

The authors declare there is no conflict of interests.

AUTHORS' CONTRIBUTION

LCR: Project administration, Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing, Validation, Visualization. NBFM: Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing. CSS: Project administration, Formal analysis, Conceptualization, Resources, Writing – original draft, Software, Supervision.

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