Implementation of billing process automation in the perioperative period

Implantação do processo de automatização da cobrança no perioperatório

Implementación del proceso de automatización de la facturación en el perioperatorio

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ABSTRACT: Objective: To describe the implementation of an automation process for charging equipment use and procedures in the perioperative period. **Method:** Experience report on the implementation process with automation of charging for equipment use and procedures in the perioperative period through electronic medical records, carried out in April 2020 in a large, philanthropic hospital, located in the city of São Paulo. **Results:** The pieces of equipment were associated with automated billing in the electronic medical record, and the billing of procedures was associated with the nursing prescription and annotation of admission in the anesthetic recovery room. The creation of this automated process for equipment involved an audit, screen presentation with checkboxes, and automatic calculation of hours. **Conclusion:** The implementation of billing process automation was successfully completed and contributed to a 13% increase in the unit's revenue, being expanded to other units of the institution.

Keywords: Automation. Electronic health records. Perioperative nursing. Nursing audit.

RESUMO: Objetivo: Relatar a implantação de um processo de automatização de cobrança de uso de equipamentos e procedimentos no perioperatório. **Método:** Relato de experiência sobre processo de implantação com automatização de cobrança de uso de equipamentos e procedimentos no perioperatório com uso do prontuário eletrônico, realizada em abril de 2020 em um hospital de grande porte, filantrópico, localizado no município de São Paulo. **Resultados:** Realizou-se a inserção de equipamentos com associação de cobrança automatizada no prontuário eletrônico, bem como a cobrança de procedimentos associada à prescrição de enfermagem e anotação de admissão na recuperação anestésica. A construção desse processo automatizado para equipamentos envolveu revisão com auditoria, apresentação da tela com *checkbox* e cálculo de horas automático. **Conclusão:** A implantação da automatização do processo de cobrança foi concluída com sucesso e contribuiu para o aumento de 13% da receita da unidade, o que levou à ampliação da estratégia para demais unidades da instituição.

Palavras-chave: Automação. Registros eletrônicos de saúde. Enfermagem perioperatória. Auditoria de enfermagem.

RESUMEN: Objetivo: Relatar la implementación de un proceso de automatización para el cobro del uso de equipos y procedimientos en el período perioperatorio. **Método:** Relato de experiencia sobre el proceso de implementación con automatización del cobro por uso de equipos y procedimientos en el período perioperatorio con el uso de la historia clínica electrónica, realizado en abril de 2020 en un gran hospital filantrópico, ubicado en la ciudad de São Paulo. **Resultados:** Se realizó la inserción de equipos con asociación de facturación automatizada en la historia clínica electrónica, así como la facturación de procedimientos asociados a prescripción de enfermería, y anotación de ingreso en la recuperación anestésica. Esa construcción para equipos involucró revisión con auditoría, presentación de pantalla con *checkbox* y cálculo automático de horas. **Conclusión:** La implementación de la automatización del proceso de cobranza se completó con éxito y contribuyó para un aumento del 13% en los ingresos de la unidad, lo que llevó a la expansión de la estrategia para otras unidades de la institución.

Palabras clave: Automatización. Registros electrónicos de salud. Enfermería perioperatoria. Auditoría de enfermería.

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INTRODUCTION

Disallowances or glosses consist of cancellation of hospital bill remuneration by the operator's auditor and occur when the auditor is unable to clarify doubts raised by the rules and practices of health institutions[1]. Thus, these can be administrative or technical. When technical, they are related to the presentation of services' values directly linked to care provided to patients and to drugs used[2].

In a study on disallowances in eight hospitals from Paraná (PR, Brazil), when analyzing by sector, 96% of the technical glosses were related to the surgical center (SC) unit, followed only by the obstetrics department[3].

For an auditor, what is written is valid; so if no record exists, it is assumed that the procedure was not carried out. The analysis by this professional is influenced by the quality of care, as well as the billing of expenses[4].

Nursing care follows a methodological instrument called the nursing process. In the perioperative period, it is called systematization of perioperative nursing care (SPNC)[5].

The SPNC promotes the interaction of care between pre-, intra- and postoperative periods, enabling planning and control in each stage of the surgical care, and allows the recording of actions performed that consequently impact in the quality of care provided[5].

Thus, the records made by the nursing team is a form of communication between the health team and becomes the documentation describing procedures performed. And sometimes, in the perioperative period, they correspond to charging for the use of equipment, services and procedures.

In an integrative review on the analysis of glosses, the low quality of nursing records is evidenced as an impacting factor. In 11 studies, authors reported a lack of systematization in the registration process and absence of information on procedures other than care activity[6].

In the United States, surgical care accounts for one-third of the cost of health care; the operating room is the second highest cost of surgical care[7]. In California hospitals, operating room minute was calculated at US$ 37.45[8]. The use of various equipment, resources and procedures performed in the perioperative period contributes to the high cost, which makes the recording of procedures by nursing essential to cover part of these costs. However, the care demand for nursing at the surgical moment, for example, to meet the requests of the medical and anesthetic teams while assisting the patient, managing the movement of the room, controlling the use of resources and documenting each task with precision becomes exhausting.

This fact is repeated in the Post Anesthesia Care Unit (PACU). The demand of several patients, with concomitant admissions and discharges, the circulation of different medical teams, the performance of procedures, application of medications, and management of anesthetic and postoperative effects require a simpler administrative process for these professionals.

Process automation aims to reduce human intervention in the execution of procedures and, consequently, to save time and costs, as it allows for greater work performance, reducing costly labor and making error-prone tasks safer and more efficient[9].

Electronic medical record is a resource available to assist in this demand. In addition to containing care information for the analysis of quality of care and evidence on the execution of procedures, it brings effectiveness in charging and, when associated with system automation, reduces the time spent on this activity, optimizing processes.

Therefore, a single record that lists resources used or procedures performed and, at the same time, automatically includes the values corresponding to each item can help the perioperative nursing teams, reducing workload and providing greater accuracy in the hospital bill.

OBJECTIVE

Report the implementation of fee collection automation process in a surgical center.

METHOD

This is an experience report. The electronic medical record implementation period began in January 2020 and, as one of the steps in the process, the construction of the electronic billing process started in April 2020.

The study site was a SC of a large private, philanthropic hospital in the city of São Paulo, with 24 operating rooms, 26 PACU beds, care for low to high complexity procedures and an average of 1,500 procedures/month. However, during the study, due to the COVID-19 pandemic, there was a decrease in procedures.

The rates for the use of hospital equipment within the SC are based on hours or sessions and were posted directly to the hospital accounting system by the nurses through barcode scanning. In the PACU, procedures and charges related to permanence were entered at discharge through barcode scanning.

It was an audit requirement to document these uses in healthcare records as evidence for the health care provider. Thus, the nursing team, in addition to executing billing entry, should manually record these items.

Little evidence was produced manually. Sometimes, an equipment was documented without the need to charge (the lending), and there was no record of the equipment into the account. In this case, the nurse saw an opportunity for improvement, since, in one of the areas of the electronic medical record, there are tabs for equipment, material and rate insertion and a stopwatch that could calculate hours. It was a field to be explored and applied to healthcare records.

So the automation process began: understanding the functionality of the system within some time after the implementation of electronic medical record, development of the function for subsequent months, and its implementation in April 2020.

While the institution's information technology team was learning the functionality with Philips, the work process was reviewed. An alignment with the audit nurses was proposed to determine the necessary annotation items and billing process.

The charges arising from commercial negotiations with health operators were presented by the audit. After this was defined, they liaised with an information technology business analyst to determine the rules of the system, and a file with the charges for each item (hourly or per session) was sent, long with the code of each fee to activate the functionality in the system.

Charges related to equipment include: monitoring, use of anesthetic gases and anesthesia equipment; use of electrosurgical unit (ESU), bronchoscope, fiberscope, laparoscopy trolley, x-ray, surgical and ultrasonic aspirator, craniotome, microscope, neuronavigation system, photophore, dermatome, lipoaspirator, vibrolipo, intra-aortic balloon, thermal mattress, defibrillator, Flyte Steri-Shield Hood, pneumatic tourniquet, drill, Phacoemulsification Systems, ultrasound machine, laser, morcellator and Versapoint®; instruments for arthroscopy, cystoscopy, hysteroscopy, nephroscopy, ureterolithotripsy and light retractor.

To give more autonomy to the system, some materials associated with the rate were listed, for example, holmium laser fiber, coming from the Central Sterile Services Department (CSSD). It has a usage fee until the end of its useful life, but it was common for the nursing team to forget adding it, as they associated the material with the CSSD and considered the additional charge unnecessary. In this way, the laser fiber was automatically associated with the equipment: as soon as the holmium laser was selected, the cost of the fiber would be released along with the charge for equipment use.

For the PACU field, the permanence rate was associated with the admission template, so once the PACU admission note is released, the permanence rate is entered in the bill.

For procedures, the following were determined: measurement of capillary blood glucose, bladder irrigation, relief probing, performance of dressings by complexity (simple, medium and complex). With the exception of the relief probe (as it is a private procedure for nurses, does not originate from the nursing prescription, but from the checkbox), all other procedures derive from the nursing prescription.

The nurse writes the nursing prescription and generates an immediate schedule. When this item is checked by the nursing technician, an automatic charge is entered for this procedure.

It is, then, possible to associate the recording of equipment use its charging in the hospital bill. This optimization aims to contemplate the items needed for the bill to be collected.

A pilot test was not deemed necessary for this strategy. The first launches were tracked, from execution to billing, by the project nurse and the systems analyst to evaluate the process and possible needs for system corrections.

The nursing teams of the three periods were aided by an electronic guide and trained by the project nurse to perform the process in their work period and to fill out the electronic medical record.

RESULTS

The process to build business rules for automating collections in the system took about 20 days and was applied to any surgical procedure. The variation in items entered was due to the size and usage of equipment corresponding to each surgery or procedure performed during post-anesthesia recovery.

In the month of implementation, the first wave of COVID-19 pandemic was happening, which resulted in a drop in surgical procedures—only 350 in the month of implementation.

For recording and charging of equipment in the electronic medical record, the icon "equipment" was used in the division of the perioperative record. A list of equipment by specialty was created for easy access to information, resulting in nine specialties, although a search tool is also available. These icons are selected by flag (Figure 1).

For each item, it was determined in parentheses whether the charge should be per session or hourly. For devices with charge per session, after its selection, one can select a different device. When the charge is hourly, after its selection, a prompt will open so one can determine the start and end time of equipment use (Figure 2).

When you finish selecting the equipment and clicking "OK", the system asks if you can release the information. Upon release, the system calculates the hours of use and billing charges after the time is recorded and the room release is marked (Figure 3).

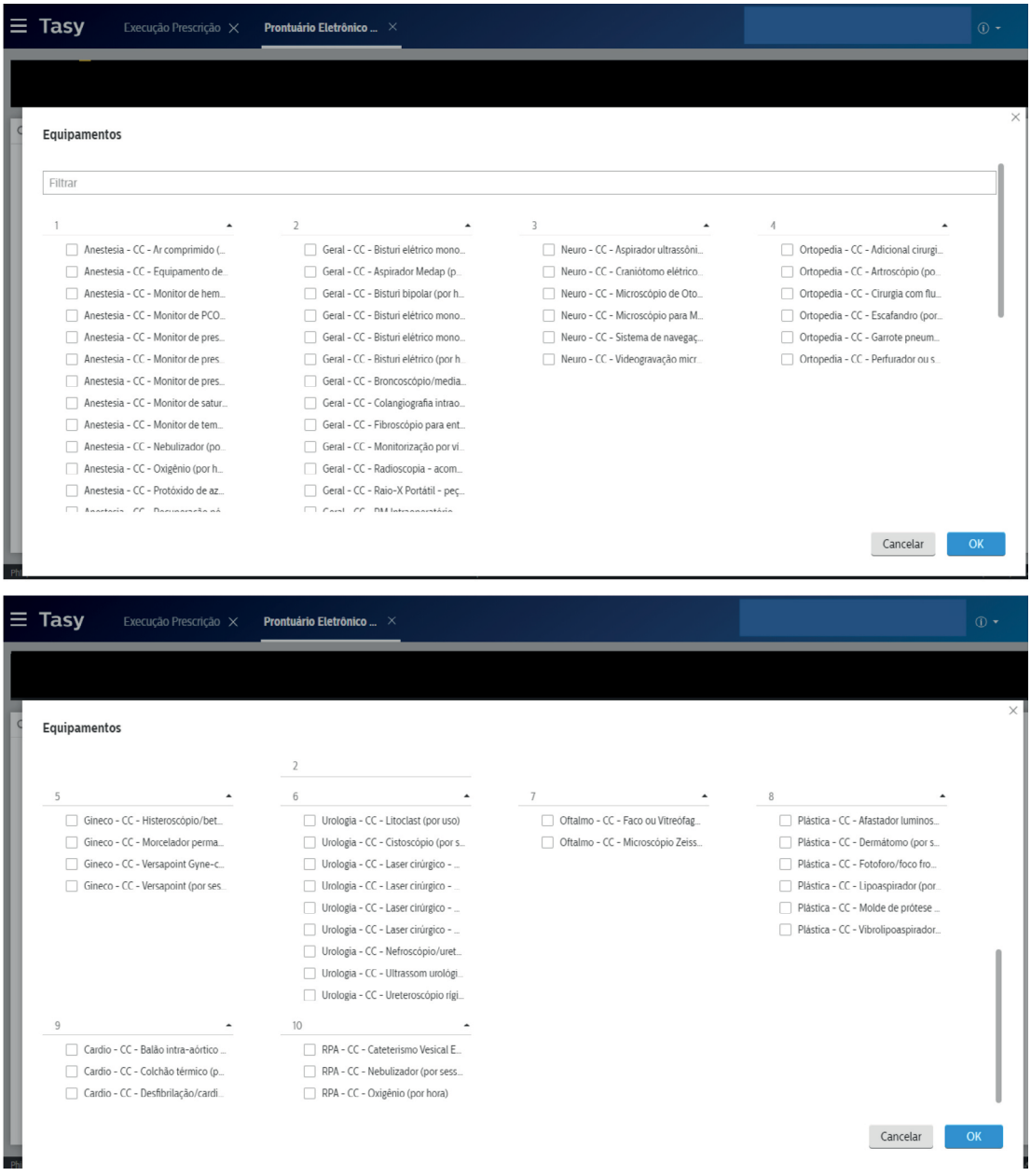

Figure 1. System screens showing equipment by specialty. Given the configuration of the system, the full name is only displayed when one hovers the mouse over an item.

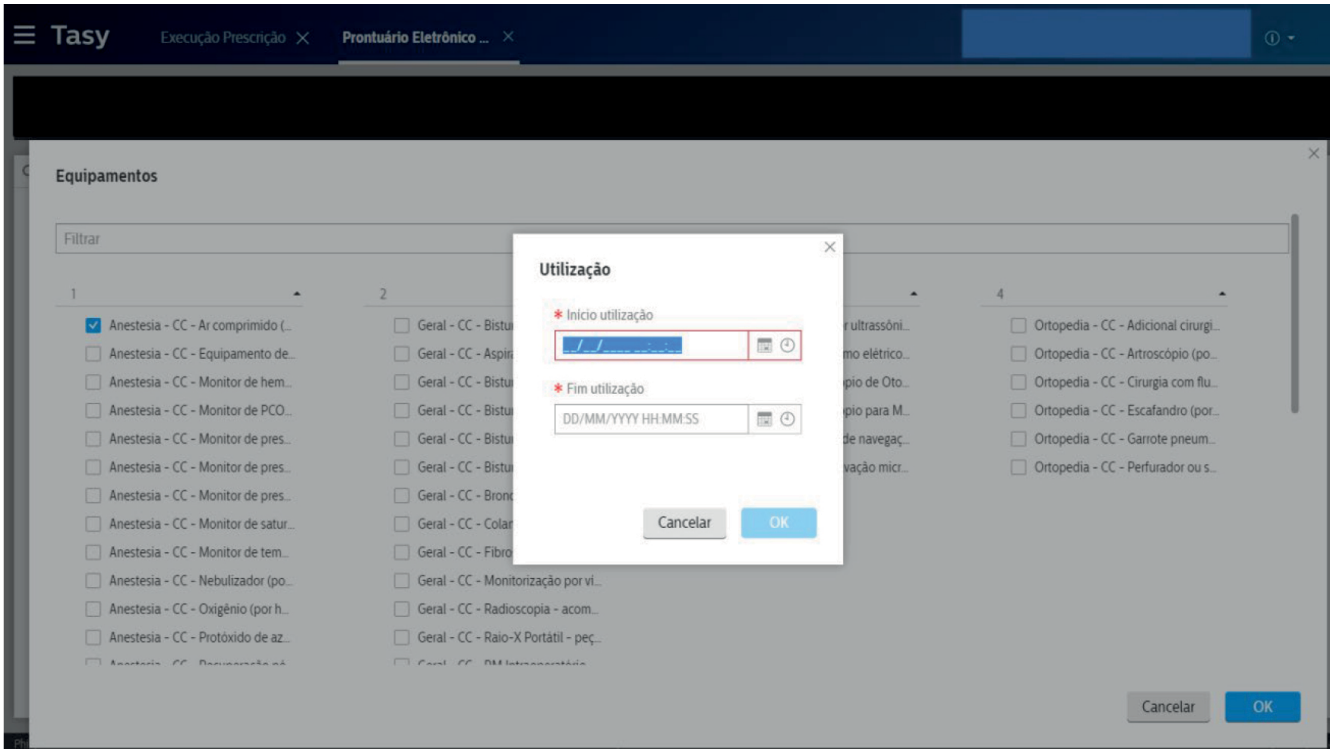

Figure 2. Equipment list screen showing prompt window and selection for entering the start and end time of use.

There was no screen construction for PACU, only business rules for the system. Thus, as the admission note was released, the permanence rate was automatically entered into the bill. And the chargeable procedures were associated with the nursing prescription: as soon as the nursing team checked the prescription item, the procedure charge was added.

From the old process of scanning a fee menu to the new process of automated entry into the system, there was an increase of 13 billable items and a 22% increase in collection opportunities.

The automation process resulted in greater financial gain. An increase of 13% in the receipt of charges in the perioperative period was observed in the first months after implantation. In view of these results, the automation of billing was expanded to other units of the institution.

The nursing team considered the screens simple to handle and very practical, avoiding duplicates, and adding clarity and uniformity in the registration process and precision in the calculation of hours.

DISCUSSION

The use of electronic medical records favored the reading of notes and improved the understanding of the record. The evidence in medical records helped the internal audit to verify the hospital bill and could justify the payment of charges made by health operators.

In a study on records in the SPNC, only 61% of the records were completely filled out, which points to low adherence to the SPNC and lack of information about nursing care[5].

To improve the results in this project, audits of medical records were carried out weekly at the beginning of the implementation, and the guidance to the nursing team was reinforced, being later changed to monthly analysis. In the case of billing failures, a crosschecking was done at the operating room, a few hours after the end of the procedure in search of possible failures that were later communicated to the nursing team for correction. Thus, even if errors went unnoticed at this stage, the on-site audit communicated the potential failures to the nursing team.

In the process established, the registration of use and billing on the same screen facilitated the whole process for the perioperative nursing staff, as well as their work during the audit. The language was standardized with the addition of equipment list screen, and the records in medical charts were improved in the perioperative period.

In the PACU, the procedures required nursing prescription for collection, improving care records. The charge related to

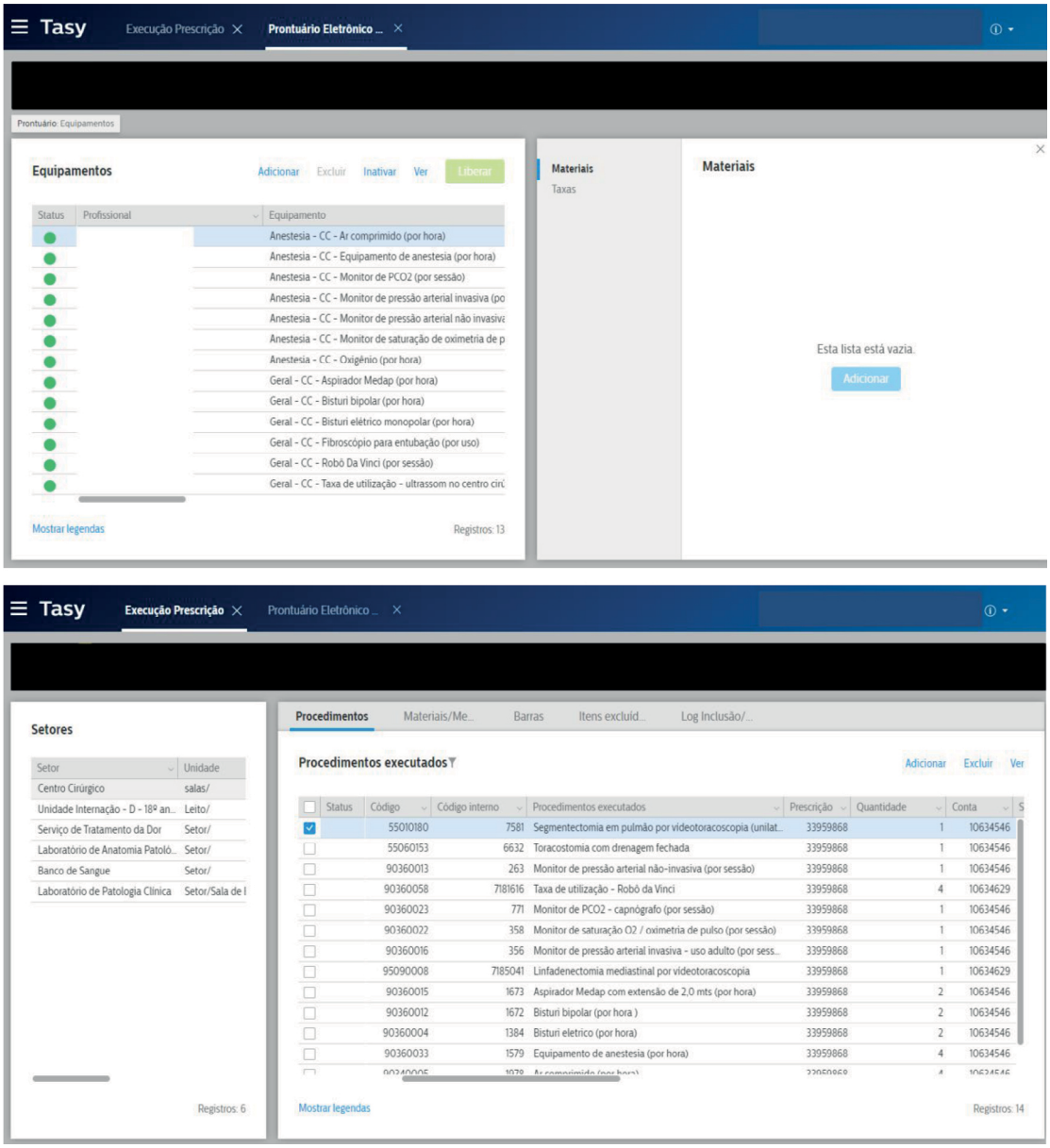

Figure 3. First screen: record of entry of fees and evidence of equipment use. Second screen: execution of hospital bill collection.

PACU stay was improved by robotic automation, not requiring human action, and resulted in less losses.

The SC nursing audit performed in the perioperative period evaluates the procedures to which the patient is submitted, so the auditor nurse must be attentive and able to perform accurate analyzes in the notes of the medical records and in the descriptions of surgical and anesthetic procedures[10].

Nursing notes are essential for the quality of nursing care, as they validate the care provided by the team, with a view to the continuity of individualized and planned care, as well as patient and nursing team safety[5].

Robotic automation emerges as a new technology focused on automating repetitive, routine and rule-based human tasks, aiming to bring benefits to organizations that decide to implement this solution[11]. Automating billing processes favors launch accuracy. The hourly billing equipment were entered more accurately, as it was based on an exact rather than approximate usage time, or incorrectly calculated by the nursing staff.

A study on the identification of failures in the auditing process of a SC showed that 90% of medical records with nonconformities in charges, causing disallowances by health insurers and impairing the institution's budget[4].

Another study pointed out that SC billings had 3.56% disallowances, with a total of 1,373 items not included. Of these, 67.0% were related to the materials accounting group, 13.2% to the medication group, 8.1% to equipment, 4.2% to gases and, finally, 6.8% to fees. In the equipment group, the item mostly not added to charges was capnography (31.35%), and, in gases, oxygen (31.30%)[10].

Another study on glosses concluded that they are indicators for institutions to check critical points to be improved and that managers' attention is needed on aspects that cause glosses, as a way of preventing greater losses[12].

Disallowance data were not measured for this study, but process and opportunity improvement and increase in gains were identified in subsequent months, with a 13% increase in the unit's revenue.

The nursing team was surprised with some charges that were not being added and were included for launch on the equipment screen. Along with system handling training, they were also informed of the importance of each step.

Staff training and billing verification steps are common strategies for hospital institutions to reduce financial losses. Staff awareness is necessary and should be maintained periodically. The automation of the process is a facilitator, but requires knowledge of the employee to signal in the system and commitment to a proper launch.

When it comes to limitations, few studies address the issue of disallowances/glosses or analysis of SC billable items, or even the implementation of robotic automation strategies in nursing. Gloss results studies need to be developed to better support the positive results of the automation process.

The implications of this study in professional practice are the sharing of knowledge about the use of robotic automation for routine and potentially administrative tasks performed by the nursing team, as the accuracy of the automated process reduced their workload in administrative activities and improved revenue.

CONCLUSION

The implementation of billing automation was successfully completed and contributed to facilitating the work of nursing teams and increasing the unit's revenue, which led to the expansion of this strategy to other units of the institution. Automation reduces nursing workload and improves launch accuracy, making electronic records more effective. In this sense, working in partnership with the nursing audit was essential.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

CSS: project management, formal analysis, conceptualization, data curation, investigation, methodology, writing — original draft, writing — review and editing, supervision, validation, visualization. AAA: project management, formal analysis, writing — original draft, writing — review and editing, supervision, validation.

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