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IMPLEMENTATION OF THE IMPROVEMENT PROJECT TO REDUCE LOWER RESPIRATORY INFECTIONS

IMPLEMENTAÇÃO DO PROJETO DE MELHORIAS PARA REDUÇÃO DE INFECÇÕES RESPIRATÓRIAS INFERIORES

IMPLEMENTACIÓN DEL PROYECTO DE MEJORA PARA REDUCIR LAS INFECCIONES RESPIRATORIAS INFERIORES

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ABSTRACT
The study aims to implement the improvement project to reduce lower respiratory infections associated with MV, with team training, as well as continuous assessment of the impact of this intervention and on service indicators. Practices such as performing oral hygiene, assessing sedation, measuring cuff pressure and using an angle meter in bed for elevated headboards in patients on mechanical ventilation were carried out. From October 2022 to the present date, in a systematic way. The checklist, assessment in PDSA cycles and the use of the resource calculator were used as a data collection instrument. The partial results showed that ventilation-related infection affects the length of stay in the use of health resources and service management. In the first analysis, without the actions implemented, in 2022, a cost of R$554 thousand was calculated, while in the project period in 2023, a cost of R$284 thousand reais, a reduction of 49%. This made it possible to perceive the impact of health practices in the ICU, for patients as well as for the financial scenario of the service.
Keywords: *Financial Management; Pneumonia; Mechanical Ventilation; Health Unic System*.

RESUMO
O estudo tem como finalidade implementar o projeto de melhorias para reduzir as infecções respiratórias inferiores associadas à VM, com treinamento da equipe, como também avaliar, de forma contínua, o impacto dessa intervenção nos indicadores do serviço. Foram realizadas práticas como realização de higiene oral, avaliação da sedação, medição da pressão do cuff e uso de angulômetro no leito para cabeceira elevada em pacientes na ventilação mecânica. Foi realizado no período de outubro de 2022 até a presente data, de forma sistematizada. O checklist, a avaliação nos ciclos de PDSA e a calculadora de recursos foram usados como instrumentos de coleta de dados. Os resultados parciais mostraram que a infecção relacionada à ventilação interfere no tempo de internamento, no uso de recursos de saúde e na gestão do serviço. Na primeira análise, sem as ações implementadas, em 2022, foi calculado um custo de R$ 554mil; enquanto no período do projeto, em 2023, o custo foi de R$ 284mil reais, uma redução de 49%. Assim, foi possível perceber o impacto das práticas em saúde na UTI para pacientes, como também para o cenário financeiro do serviço.
Descritores: *Gestão Financeira; Pneumonia; Ventilação Mecânica; Sistema Único de Saúde*.

RESUMEN
El estudio tiene como objetivo implementar el proyecto de mejora para reducir las infecciones respiratorias inferiores asociadas con la ventilación mecánica (VM), con la capacitación del equipo, así como la evaluación continua del impacto de esta intervención y en los indicadores del servicio. Se llevaron a cabo prácticas como la realización de higiene oral, la evaluación de la sedación, la medición de la presión del manguito y el uso de un medidor de ángulo en la cama para elevar los cabeceros en pacientes con ventilación mecánica. Desde octubre de 2022 hasta la fecha actual, de manera sistemática. Se utilizaron la lista de

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verificación, la evaluación en ciclos PDSA y el uso de la calculadora de recursos como instrumentos de recolección de datos. Los resultados parciales mostraron que la infección relacionada con la ventilación afecta la duración de la estancia en el uso de los recursos de salud y la gestión del servicio. En el primer análisis, sin las acciones implementadas, en 2022, se calculó un costo de R$554 mil, mientras que en el período del proyecto en 2023, se calculó un costo de R$284 mil reales, una reducción del 49%. Esto permitió percibir el impacto de las prácticas de salud en la UCI, tanto para los pacientes como para el escenario financiero del servicio.
Descriptores: *Gestión Financiera; Neumonía; Ventilación Mecánica; Sistema Único de Salud*.

INTRODUCTION

The baseline for the construction of effective public policies are management instruments and health information systems that effectively contribute to the evaluation, control and monitoring of health determinants, in addition to introducing measures that reach the daily practice of health care and professional patient care[4].

Health management in hospital services is based on the institutionalization of routines for monitoring and evaluating indices and data based on indicators. These indicators are essential data for the permanent evaluation of the service provided to critically ill patients in the intensive care unit (ICU).

For quality health care, it is imperative to establish health planning that, together with permanent monitoring and education of the professionals involved, causes changes in the determinants of health promotion and prevention of sequelae or clinical conditions that increase the probability of less favorable outcomes for patients, whether in the outpatient or hospital setting[7].

Routines and protocols in health services offer more safety in patient health care, as well as improved financial management for the decision to allocate resources in a more effective and equitable manner, especially in the context of the Unified Health System[1].

Prevention in the context of the intensive care unit encompasses several practices, such as prevention of lower respiratory infections (IRIS) associated with mechanical ventilation (MV), prevention of pressure ulcers, prevention of corneal ulcers for sedated patients, among others[5].

The harmony between the specialized workforce of the work team and the knowledge of the manager's success factors should maintain the balance and provide a quality service, through competent health practices, as well as minimize risks inherent to the critical clinical condition of patients, correctly applying resources[6] tag.

Due to the complexity of actions, the direct impact on the patient's life and technological advances, hospital organizations increasingly need effective management. They are complex organizations due to their ambiguous objectives, the nature of their activities, the use of multiple and complex technology, the shared power and the plurality of professionals who work in them. It is decisive for the management group to analyze the factors that contribute to its results, whether positive or negative. In order for actions to be taken in order to address the gaps found, which correspond to the difference between the expected result and the result obtained, it is necessary to seek answers.

Since 2005, the hospital where this study was carried out has been going through a long process of maturation when it comes to providing quality care to the society of Ceará. Based on the report of the maintenance visit of the National Accreditation

Organization (ONA), the Center for Patient Management and Safety (NUGESP) presented the challenge of a new experience through the Improvement Project model.

For adult ICUs, one of the greatest risks of morbidity and mortality in the unit is IRIS and MV. These infections are one of the major factors that generate a high impact on the care of critically ill patients, leading to an overall increase of around 30% in mortality, as well as an increase in the length of stay and resources related to them[2].

In this context, the Improvement Project, through the application of the quality tools presented, analysis of contractual management and result indicators associated with the hospital profile, observed that it is directly impacted by the increase in the number of IRIS, formalizing, here, the beginning of the journey of the adult ICU for the deployment of good health practices.

In the ICU setting, there are some indicators, such as the occurrence of MV-associated pneumonia, which, when present, is associated with a worse outcome in critically ill patients. Therefore, the present study aims to implement the project of improvements to reduce lower respiratory infections associated with MV, with training of the team, as well as the continuous evaluation of the impact of this intervention on the indicators of the service. An important point is the management of financial resources, given the development of health practices with continuous applicability and their applicability with useful financial life in the SUS.

In this scenario, this project also has the specific objective of using strategic planning with the ICU management group, in order to identify the main problems related to the care of critically ill patients and, from there, develop control and problem-solving actions, implement a protocol based on the identification of the key problem, implement the proposed prevention protocol with evaluation after intervention.

METHODS

In the strategic planning proposed by the NUGESP of the hospital, the adult ICU is part of the Improvement Project through some indicators, which are impacted by the occurrence of respiratory infection related to mechanical ventilation, namely: length of stay, standardized mortality, ICU discharge, according to cost efficiency. Therefore, the objective of the proposed study is in full alignment with the strategic planning of the participating health institution.

The present study is being developed in an adult ICU of a secondary hospital in Fortaleza, starting in October 2022, with the identification of problems in the sector by the unit's management group.

The type of study is cross-sectional observational. During the meetings, the management team identified weaknesses in care practices, with IRIS associated with MV being an important problem, with negative impacts on critically ill patients. The meetings took place weekly, on Wednesdays, in the morning in the ICU itself, with the participation of the medical coordinator, nursing coordinator, medical cleaners, pharmacist, speech therapist, psychologist, nursing technician and oral health technician. Health management methodologies were used, such as the *Plan do Study Act* (PSDA), through which a significant incidence of MV-related infections was observed, and a study protocol was elaborated.

In the first phase, weekly meetings were held with the management team to participate in group workshops, called Team Improvement Sessions (SAT), dealing with topics that qualified managers and employees for the development of the improvement project. These workshops were composed of theoretical and practical classes that worked on planning. Thus, in one week, the leader should encourage, guide and train the team members on what was identified and, thus, in the next meeting, actions to reduce IRIS should be presented. Each SAT took place 1 time a week, in the ICU coordination, lasting 1 hour, from May to October 2022.

From November 2022 to February 2023, in the adult ICU, samples were collected every two weeks and sampled 20 medical records, through which the following adherence points were observed: evaluation of sedation interruption, elevation of the bedside, revision of the circuit, performance of oral hygiene, identification of mechanical ventilation interruption, and monitoring of cuff pressure. The first collections were carried out in all periods (morning, afternoon and night). However, it was observed that, in fact, most of the non-conformities were associated with the night shift. The greatest weaknesses were the items related to oral hygiene and elevation of the head. Once the clear and evident opportunity for improvement was visualized, the PDSA tool was worked on to test and implement the changes and, finally, to understand if, factually, improvements occurred and if they were sustainable.

Implementing protocols may not solve the problem, as other factors can contribute to errors. Therefore, understanding the multiple factors requires the use of elaborate methods so that all probable causes are perceived[8].

Among these methods, the collaborative quality improvement approach disseminated by the *Institute for Healthcare Improvement* (IHI) stands out. Such a model involves three fundamental issues that are combined with PDSA cycles for planning actions and achieving measurable improvements. Thus, the PDSA method used in the project was based on some questions such as: *What are we trying to accomplish? How do you know if the change has resulted in improvement? What change can result in improvement?*

In this scenario, after acknowledging that IRIS associated with MV is an indicator of the quality of the service provided in the ICU and that its prevention can reduce morbidity and mortality, as well as the reduction of costs and financial resources in the ICU, the management group met at that time to develop protocols.

After this phase of acknowledging the problem and the actions for the implementation of IRIS prevention measures related to MV with the management team, the care team, formed by health workers (nurses, nursing technicians, physicians, oral health technicians, speech therapists and physiotherapists) was qualified and trained to work.

Thus, it was established that 02 nursing technicians, on a daily basis, would be responsible for checking the actions: oral hygiene at a fixed time with the use of disposable toothbrushes 3 times a day, cuff pressure measurement, evaluation of sedation interruption and angulometer in bed to keep the head of the bed elevated between 30 and 45 degrees. Measures have already been proven in studies as practices for the prevention of lower respiratory infections associated à VM. On the unit studied, these actions were

already performed, but there were no standardized protocols or instruments to evaluate these practices.

Subsequently, the tools were applied to identify the risks, mark the safety barriers and map the problem. Thus, it was designed with the support of the Google Sheets application, the tool with the bundle of adherence to the IRIS prevention protocol to perform the collections.

MV-related infections are defined as infections that arise after 48 hours of intubation. The risk factors studied in this study were modifiable and, based on this, care packages. The use of this methodology is already recommended in the literature in the ICU[9].

It is important to consider that the unit already worked with the bundle, however, collections were not carried out at night and on weekends. Therefore, the proposal, in a more reliable way, was to extend the collection period to work on the points of greatest weaknesses and ensure sustained results.

Regarding oral hygiene, night schedules were set for the performance of the task, as well as the replacement of spatulas with gauze by disposable brushes for the oral cleanliness of MV patients. Regarding the elevation of the headboard, angulometers were acquired and the team was trained for proper use and correct measurement.

The Research Ethics Committee approved the study under protocol No. 6,619,867.

RESULTS

During the November 2022 period, actions to prevent MV-related respiratory infections were initiated. It is important to emphasize that the health care professionals were trained for a more reliable data collection. When difficulties were observed in practice, the management team performed a new training review.

Elevation of the head of the bed to 30° and 45° is one of the main recommendations to reduce bronchoaspiration. It is mandatory in patients with enteral nutrition, being a simple action without additional costs, but sometimes with low adherence. Therefore, the use of the angulometer was important for the effective implementation of the routine[10].

According to the document "Measures for the Prevention of Pneumonia Associated with Health Care", produced by ANVISA in 2017, the causes include a decrease in the level of consciousness, caused by drugs or by the underlying disease, which predisposes to aspiration and, consequently, to IRIS associated with MV. The strategy of evaluating sedation and daily awakening has been associated with a reduction in MV time and, consequently, in the rate of infections. In this context, the present study followed the implementation of the protocol, with partial results in a significant decrease in the density of infections.

Oral hygiene was a measure implemented in the study, since the colonization of the oral cavity, especially by microorganisms associated with IRIS associated with MV, is present in more than 60% of the secretions of patients on MV in the 24 hours[11]. The participation of oral health technicians was extremely important in the applicability of the bundles, as well as in the central focus of the project aimed at reducing the density of IRIS, corroborating what is recommended in the literature.

Care management with the ventilator circuit is also a practice in the ICU related to the reduction of infections[1]. These actions were also implemented in the study and associated with improved quality of care.

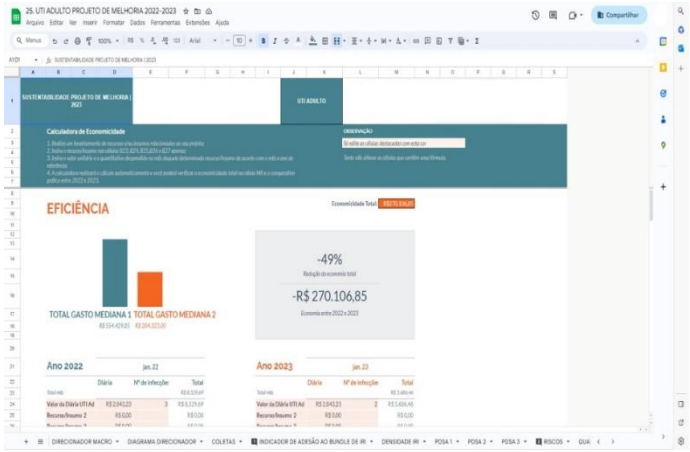
The measurement of cuff pressure, a cylindrical cuff that protects the airway of patients on mechanical ventilation, was also routine in the bundle for the study. The check was performed 2 x day in the participating patients, with the maintenance of an ideal pressure of 20 to 30 cmH_2O.

It was necessary to develop a Resource Calculator to offer a prospected percentage result of the quantity that the unit reduced or did not reduce the waste of resources, by making an estimated comparison between the previous period and the interim specified by the project.

It was defined by the unit that the development of IRIS interferes with the increase of the length of stay by at least 5 days, which is the cut-off point for the calculation. In the first median, for the same period in 2022, a cost of approximately R$ 554,000.00 was calculated, while in the second median, referring to the project period in 2023, a cost of approximately R$ 284,000.00 was accounted for.

These values represent a reduction of around 49% compared to the same period last year, which corroborates a study conducted by the National Program for the Prevention and Control of Healthcare-Associated Infections from 2021 to 2025 [(1).] In this document, it was estimated that the daily costs of a patient with HAI were 55% higher than those of a patient without HAI, corroborating the result verified in our Resource Calculator (Figure 1).

Figure 1: Resource Calculator.



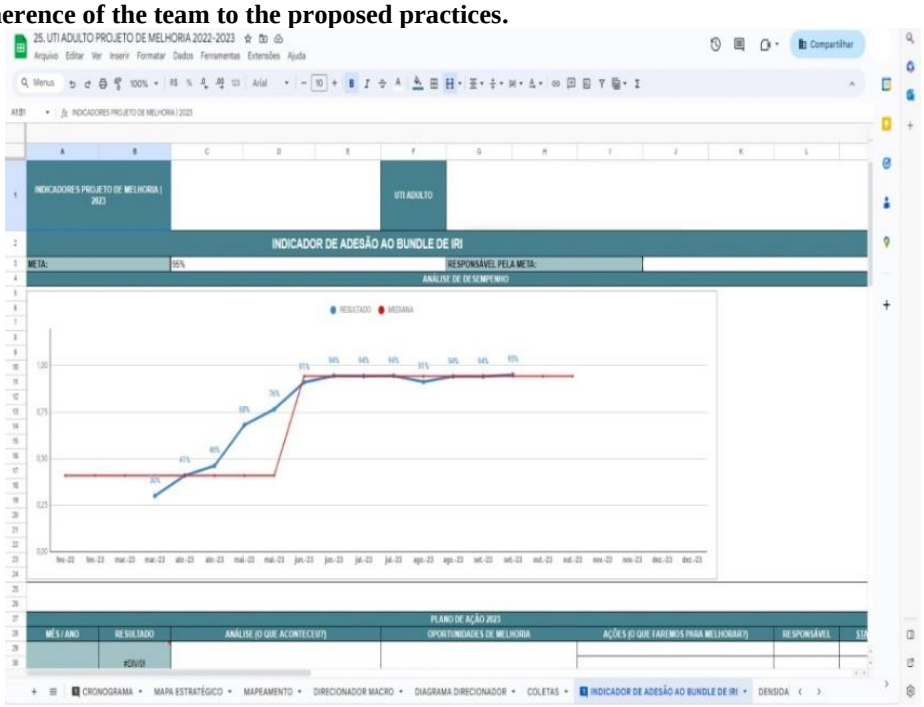
Source: Produced by the authors (2024).

DISCUSSION

It is known that the process of change is not easy to accept and implement, according to Kubler Ross[3]. Despite some resistance from the multidisciplinary team in relation to routine changes, the format of the Improvement Project facilitated this process. Bringing quality knowledge and tools to the assistance employees was essential to support the manager in the implementation of the change. Adherence to the study is described in the table in figure 2. Sales emphasizes the importance of a multidisciplinary team in tune

with a single objective to optimize and accelerate the clinical responses expected by the manager[13].

Figure 2: Adherence of the team to the proposed practices.

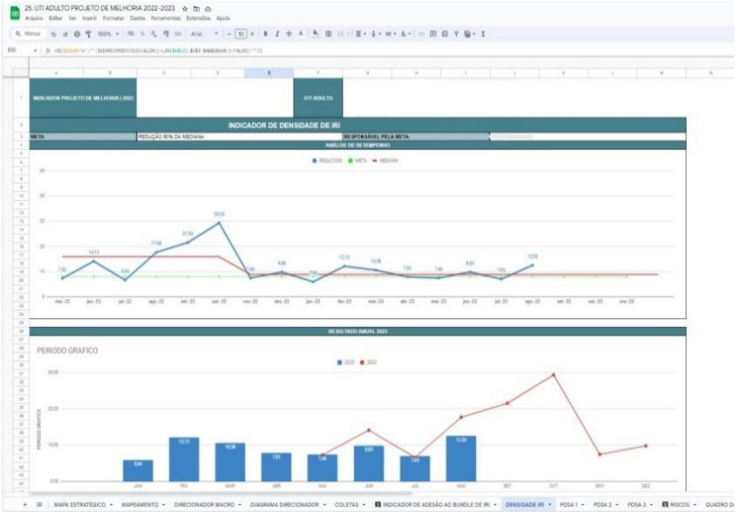


Source: Produced by the authors (2024).

Finally, another limitation of the study was the reduction of resources for the implementation of these changes. Here, the situation was transposed by means of a financial feasibility study on the replacement of the gauze spatula with disposable brushes for the oral cleanliness of patients on mechanical ventilation and the acquisition of angulometers.

To analyze the results, a baseline of the IRIS density indicator for the last 6 months preceding the project was drawn. The result of the first baseline was 15.9 and, over the next 6 months of follow-up of the indicator, a sustainable reduction of the median to the value of 8.86 was observed, representing a decrease of approximately 45% in comparison with the initial value of density between the periods evaluated (figure 3), confirming the study by Lim, who used hundlle in his hospital environment to identify improvements for patients using mechanical ventilation[12].

Figure 3: IRIS density indicator for the last 6 months preceding the Improvement Project.



Source: Produced by the authors (2024).

It should be noted that, as it is a hospital environment with 100% SUS service, the result of the Improvement Project is not related to the generation of savings, but essentially to the optimization of care to users, as well as to the direction of the best use of public resources.

The present study is still in progress, because the data presented in this project are partial, but we have already noticed how beneficial the implementation of IRIS prevention practices associated with MV was.

CONCLUSION

It can be said that, throughout this period, there were many projects and programs for learning and developing managers. However, it is essential to consider that a structured project format for working with the team does not fully reflect the essence of the unit as a single organism.

This differentiated view, in which the leadership, through participatory management, puts itself in the situation of working on change together with the care team, was essential for the team's involvement, for the sustainability of the results and the success of the Improvement Project model.

The study has shown us that, in addition to the health education process and the quality of multidisciplinary care in the ICU, it is essential to supervise and manage health practices in critically ill patients, since protocols, although already established in the services, are not always incorporated into clinical practice by the multidisciplinary team. Thus, we perceive the importance of the management team and its ability to identify, evaluate and develop actions aimed at a better practice in health with financial viability.

It is imperative to maintain the promotion of studies of management techniques to avoid waste of financial and structural resources for the implementation of practices and protocols in the ICU aimed at improving the quality of care, along with the financial health of the service.

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