RITUAL Project: Reducing Urinary Catheter-Associated Urinary Tract Infection in Internal Medicine Wards

Projecto RITUAL: Reduzindo a Infecção Urinária Associada a Cateter Vesical em Enfermarias de Medicina Interna

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Introduction

Healthcare associated infections (HAI) are an important and global health issue with great impact in morbidity, mortality[1,2] and healthcare costs[3,4] all over the world. Urinary tract infections (UTI) are recognized as the most common and preventable HAI outside the Intensive Care Units, as most of it are device use related.[5]

A cohort study performed in the Internal Medicine Ward of Hospital de Cascais[6] showed that one in four admitted patients underwent the placement of a bladder catheter, 36.5% of which in the absence of clinical criteria for that procedure. The CAUTI density rate found (14.5 infections/1000 catheter-days) was considered very high[6], when compared with data of similar wards found in the literature. Most infections (72.1%) occurred in patients who did not meet criteria for device placement. That means that a significant part of CAUTI could have been avoided. At that time, Portugal was the European country with the highest rate of HAI (10.6%; CI 95%: 10.1% -11.0%)[7] which turned urgent to develop Quality Improvements initiatives. At a national level, it was developed the "Desafio Gulbenkian STOP infecção Hospitalar!", a quality improvement (QI) collaborative initiative promoted by Calouste Gulbenkian Foundation in partnership with the Ministry of Health aligned with the National Program of Infection Control and Antimicrobial Resistance (PPCIRA). Due to the lack of knowledge in these subjects in our country (breakthrough collaboratives, model for improvement, implementation science, etc) associated with the large international experience in this field of the Institute for Healthcare Improvement, Gulbenkian Foundation did an agreement with IHI in order to get their technical and methodological support. Twelve NHS hospital centers, a total of nineteen hospitals, other than hospital de Cascais, were included in this project that aimed to reduce by 50% four main hospital acquired infections in a 3-year period.The national and local context allowed internal medicine physicians to recognise CAUTI

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as a preventable problem in their wards and, therefore, to propose to the hospital management team a local QI project that was called RITUAL (***R**edução da **I**nfecção do **T**racto **U**rinário associada à **AL**galiação - catheter-associated urinary tract infection reduction)*.

RITUAL Project

The RITUAL project was designed to be a value-based QI initiative, led by clinicians, supported by scientific evidence, to promote the involvement of peers and the adherence to good clinical practices.

The main objective was to reduce by 50% catheter-associated Urinary Tract infection (CAUTI) density rate in each phase of the project (October 2017-October 2018 – phase 1/RITUAL 1.0; September 2019-September 2020 – phase 2/RITUAL 2.0). To achieve the main goal defined, we designed a QI initiative using the Model for improvement of Institute for Healthcare Improvement.[8]

1. Forming the Team

A multidisciplinary team composed of highly motivated elements was formed. In addition to members of the Internal Medicine Department, we also decided to include elements from the urgency department as it was the local were urinary catheter insertion occurs. Thus, nurses from urgency and internal medicine department as well as doctors from internal medicine department (seniors and residents) that also worked in the urgency department were included. As the team was not familiarized with the chosen methodology, we considered to be mandatory the inclusion of an academic external leader with that expertise.

2.Setting Aims

Improvement requires setting aims.[9] An organization will not improve without a clear and firm intention to do so. The main aim of this project was already described in the previous section. Four main drivers were defined for this project and several technological support instruments were developed to accomplish it (Fig. 1). For each primary driver we defined secondary drivers and then, for each one, interventions to be tested. It is important to highlight that the project had 2 major phases: RITUAL 1.0 (manual data collected, processes evaluation and training) and RITUAL 2.0 (technological support).

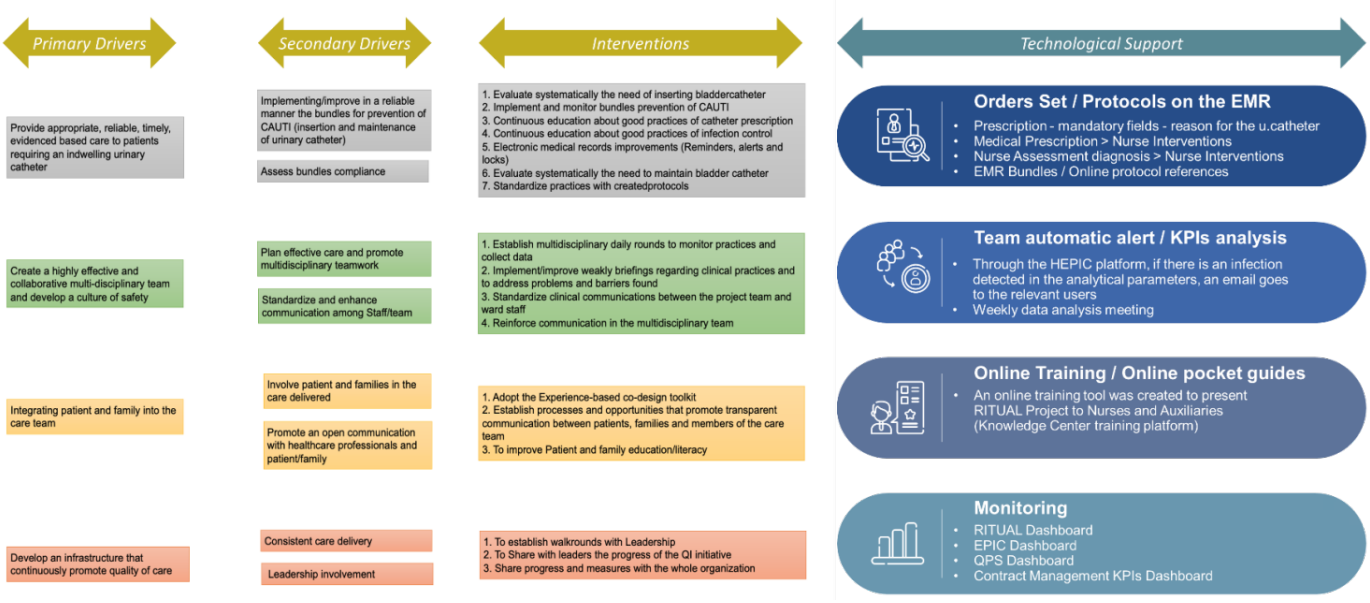


Figure 1. Drivers, interventions and technological support instruments developed for RITUAL Project

3. Establishing Measures

Measurement is a critical part of testing and implementing changes, as it can inform the team whether the changes they are making actually lead to improvement.[10] Thus, a set of KPI were defined to be monitored over time: i) CAUTI cumulative incidence rate (Result KPI); ii) Incidence density of CAUTI (Result KPI); iii) Number of patients with bladder catheter (Process KPI); iv) Number of bladder catheter–days (Process KPI); v) bundles of care adhesion rate (Process KPI), vI) Number of patient/families involved in care (Process KPI), vii) Number of leadership visits (Process KPI). For this purpose, we used CDC CAUTI case definitions and metrics.

3.1 Initial Project Monitoring

In the first phase of the project (RITUAL 1.0), we collected data manually on a daily basis, for project KPI calculation. For that purpose, we created an instrument that we used in wards daily rounds. It was the best way of both observing and identifying improvement areas as well as collecting information for KPI calculation. The multidisciplinary team met weakly to discuss KPI results, share difficulties and generate new improvement ideas for testing in PDSA (Plan-Do-Study-Act) cycles.

3.2 RITUAL 2.0 Technological /EMR developments

Systems main developments focused on the nurse electronic records, either through the creation of discrete data in the assessment, automatic interventions after medical prescription of catheterization and introduction urinary catheter bundles. A mandatory justification was created in medical prescription order entry with closed fields (Figs. 2 and 3).

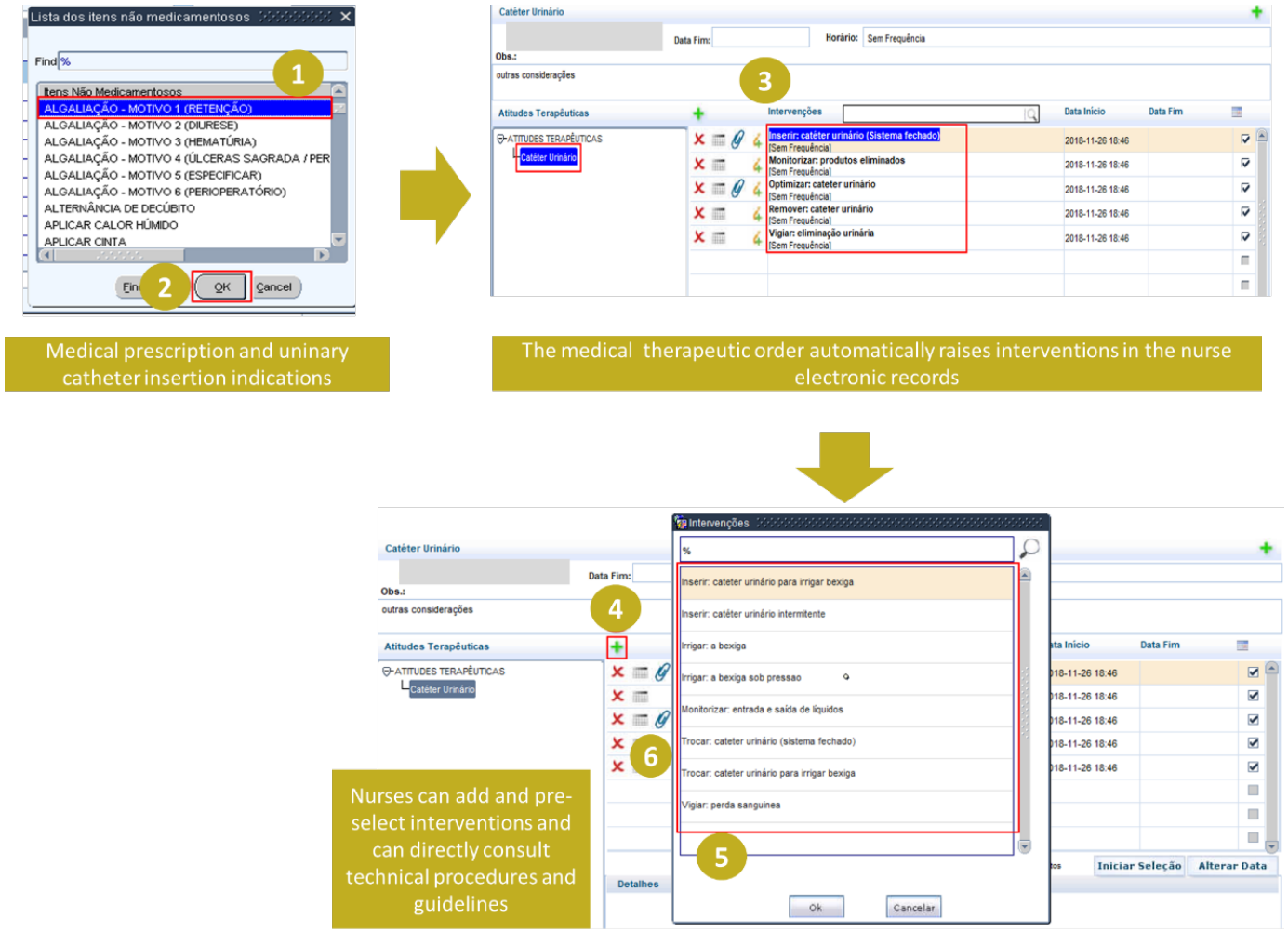


Figure 2. Orders Set / Protocols on the EMR (Medical and Nursing Process) – steps of interaction

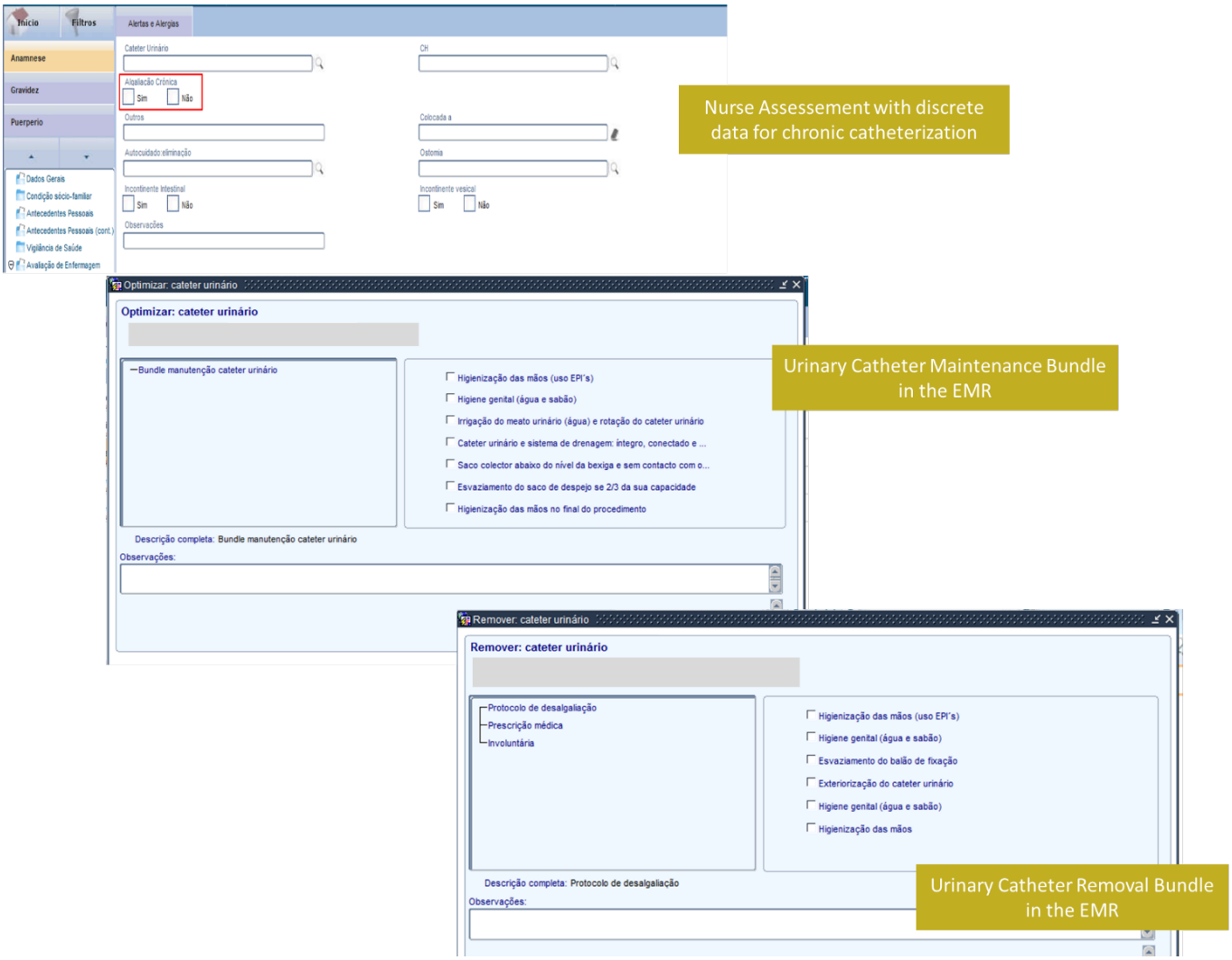
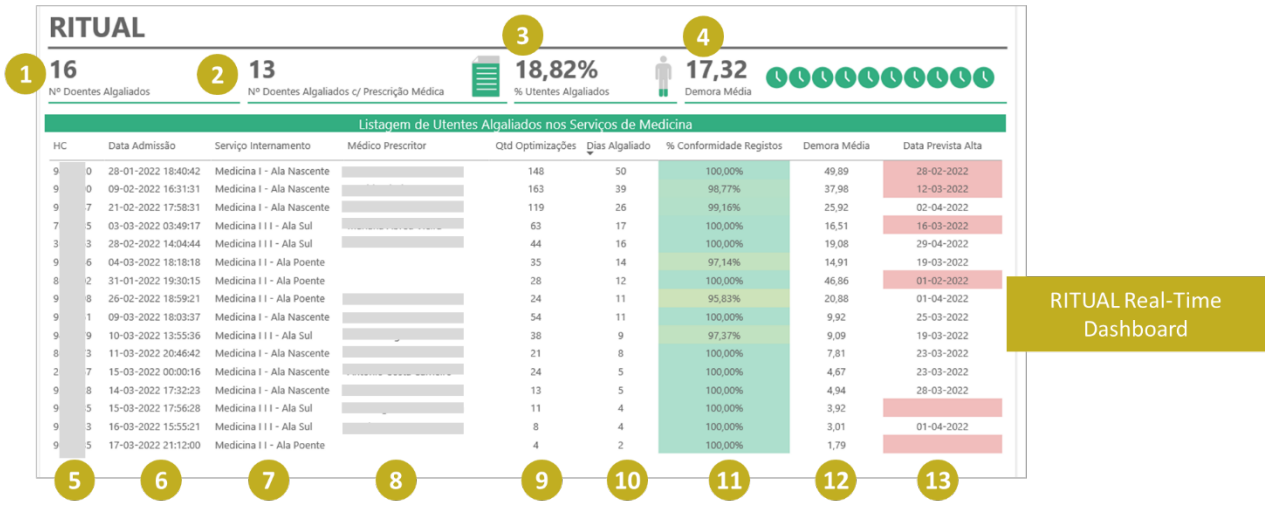


Figure 3. Nursing Assessment and Bundles Order Sets

3.2.1 RITUAL Dashboard

Daily data collection was considered a very hard and time-consuming task for the QI project team in RITUAL 1.0. Taking advantage the technological maturity of Cascais Hospital and the inclusion of part of the procedural fields in the structured EMR, it was developed a tool to allow the team to monitor RITUAL project in real time, to reduce time wasted in manual data collection and to increase QIP efficiency. The multidisciplinary project team defined which parameters would be important for the QIP motoring. The IT team then developed the real-time dashboard (Fig. 4) with the information that could be retrieved from the system. The dashboard was used daily by the team in the second phase of the project (RITUAL 2.0).



Legend:

1. *Number of internal medicine inpatients with a bladder catheter*
2. *Number of internal medicine inpatients with a bladder catheter prescription*
3. *Percentage of internal medicine inpatient with a bladder catheter*
4. *LOS of these patients*
5. *Patient identifier number*
6. *Date of admission*
7. *Internal medicine ward of admission,*
8. *Bladder catheter prescriber*
9. *Number of nursing catheter optimizations*
10. *Number of catheter-days*
11. *Percentage of compliance with maintenance bundles of care,*
12. *LOS of patients with a bladder catheter*
13. *Expected date of discharge*

Figure 4. RITUAL dashboard

4. Selecting, Testing, Implementing and Spreading Changes

While all changes do not lead to improvement, all improvement requires change.[11] A set of interventions were defined for RITUAL as described on Fig 1. Most of them were tested using fast small-scale PDSA cycles before general implementation as, for example, catheter removal protocol, pocket guideline for professionals, information sheets for patient and families. Continuous education of healthcare professionals (doctors, nurses and nurses' assistants) and monthly best practices awards were other ideas implemented to engage the clinical staff and guarantee good practices adherence. The main results of the project were available for consultation at a specific location of the ward created for this purpose.

5. Project Main Results

The incidence density of CAUTI of this project is represented graphically in Fig. 5. In RITUAL 1.0 we achieved a reduction of 74% of the infections per 1000 catheter-days, accomplishing the main objective of the project. These results highlight the importance of QI initiatives like this, where the engagement of healthcare professionals, patients and families seems to be an important determinant of success. Leadership commitment was vital. Recognizing the importance and patient benefits of this QI project, conditions for its implementation were created on the ground.

For many reasons, as such personnel turnover, the results were not sustainable in time. During RITUAL 2.0 we have noticed a new improvement that has brought us closer to the target set again (42% reduction CAUTI rate). CAUTI rates after the pandemic slightly worsened. This is difficult to interpret as while in pandemic context there was a reinforce of infection control healthcare professionals had less time devoted to this QI initiative to provide care to COVID-19 patients. Nevertheless, this data let us believe that technologic developments implemented were fundamental for the consistent results verified over time.

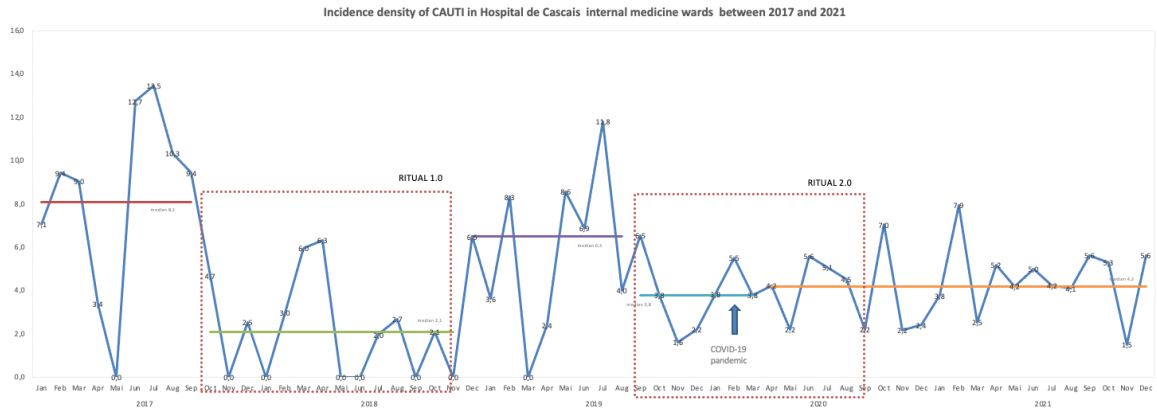


Figure 5. Incidence density of CAUTI in Hospital de Cascais Internal Medicine Ward between 2017 and 2021

Lessons Learned

This project is a good example of how investigation and data analysis led by clinicians can encourage multidisciplinary and multi-professional. QI initiatives that can be translated in better clinical outcomes for patients and more effective and efficient healthcare.

RITUAL was designed to be a value-based project, based on evidence, using a well-known methodology, led by clinicians, that engage their peers and promote adherence to good clinical practices. The designed tool (ritual dashboard) showed us that we can use creativity and multidisciplinary teams to co-design systems for patient safety. We believe that the real time information we could use to run this project was a very important contributor for its success, since it allowed QIP team to re-allocate time from manual data collection to other important projects tasks, as continuous education, for example.

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Presentations and Awards

This project was partially presented in the 2nd International Meeting on Patient Safety for New Generations of Healthcare Professionals as a poster, in 2019. The poster wined the prize Biojam Inovar. The technology and information systems innovations related to RITUAL dashboard development were presented as a poster in the 37th ISQUA Congress, in 2021.

Responsabilidades Éticas

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Declaração de Contribuição

MJ: Desenho do Projeto, recolha e análise de dados, redação do manuscrito, aprovação versão final

SS: Redação do manuscrito, aprovação da versão final

PS: Desenho do projeto, análise de dados, revisão crítica do manuscrito, aprovação da versão final

Contributorship Statement

MJ: Project design, data collection and analysis, manuscript writing, final version approval

SS: Writing of the manuscript, approval of the final version

PS: Project design, data analysis, critical review of the manuscript, approval of the final version

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