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Original Article

Nursing staff's perception of the surgical safety checklist's sign-out stage*

Percepção da equipe de enfermagem sobre a etapa do sign out do checklist de cirurgia segura

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ABSTRACT

Objective: to analyze the nursing staff's perception of the factors that influence the surgical safety checklist's sign-out stage. **Methods:** this is a quantitative-qualitative study. The setting was a Surgical Center and an Obstetrics Center of a large private hospital. The sample consisted of nursing technicians and nurses, with 70 participants in the first stage and 19 in the second. Data collection was carried out in two stages: survey and focus group. Quantitative data were analyzed descriptively and qualitative data through content analysis. **Results:** the staff observed a 58.62% adherence rate to the time-out process, contrasting with only 1.72% compliance with the sign-out procedure. Barriers hindering adherence to the sign-out process included lack of technical knowledge, organization, haste, resistance to change, and shift changes. Training, routine standardization, safety culture strengthening, and multi-professional engagement stand out for improving compliance, with an emphasis on valuing the nursing staff. **Conclusion:** adherence to the sign-out process is a critical point due to a lack of standardization and resistance from the staff. Effective implementation requires engaged leadership, nursing staff empowerment, active listening, and continuing education. **Contributions to practice:** it provides support for the development of strategies that promote greater staff engagement.
Descriptors: Patient Safety; Checklist; Surgicenters; Organizational Culture.

RESUMO

Objetivo: analisar a percepção da equipe de enfermagem sobre os fatores que influenciam a etapa do *sign out* do *checklist* de cirurgia segura. **Métodos:** trata-se de pesquisa quanti-qualitativa. O cenário foi um Centro Cirúrgico e um Centro Obstétrico de um hospital privado de grande porte. Amostra constituída por técnicos de enfermagem e enfermeiros, 70 participantes na primeira etapa e 19 na segunda. Coleta de dados realizada em duas etapas: *survey* e grupo focal. Dados quantitativos analisados de forma descritiva e os qualitativos pela análise de conteúdo. **Resultados:** a equipe percebe uma adesão ao *time out* de 58,62%, contrastando com apenas 1,72% de cumprimento no *sign out*. Identificadas, entre as barreiras que dificultam a adesão ao *sign out:* falta de conhecimento técnico, organização, pressa, resistência à mudança, e troca de plantão. Destacam-se as seguintes estratégias para melhorar a conformidade: capacitação, padronização de rotinas, fortalecimento da cultura de segurança e engajamento multiprofissional, com ênfase na valorização da equipe de enfermagem. **Conclusão:** a adesão ao *sign out* é um ponto crítico devido à falta de padronização e resistência da equipe. A implementação efetiva exige liderança engajada, empoderamento da enfermagem, escuta ativa e educação permanente. **Contribuições para a prática:** oferece subsídios para o desenvolvimento de estratégias que promovam maior adesão da equipe.
Descritores: Segurança do Paciente; Lista de Checagem; Centros Cirúrgicos; Cultura Organizacional.

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Introduction

Patient safety in surgical settings is an unquestionable global priority, as adverse event prevention is a fundamental pillar of healthcare, a premise widely highlighted by the World Health Organization (WHO). This commitment to safety was significantly reinforced in 2007 with the launch of the Second Global Patient Safety Challenge: Safe Surgery Saves Lives[1].

In response to this challenge, the WHO surgical safety checklist was established and quickly became a crucial tool for minimizing risks in the perioperative period. This checklist consists of three phases applied at different times during surgery, namely: sign-in (before anesthetic induction); time-out (before surgical incision); and sign-out (before a patient leaves the surgical center)[1-2]. Subsequent research following its introduction has shown significant improvements in surgical outcomes, with a reduction in postoperative complications and mortality rates[3-4].

The retention of surgical instruments and materials in a patient's body is considered a "never event", an event that should never occur, as it can cause serious harm to patients and negative impacts on the staff and the institution. The retention of surgical items is an avoidable event; therefore, when it occurs, it causes significant impacts on human costs[5] and hospital costs[6]. Although the effectiveness of the surgical safety checklist is recognized, full adherence and its correct application in practice still face significant barriers, such as resistance from staff members, work overload, lack of institutional support, and resistance to change, which hinder its complete implementation. Furthermore, the absence of training and physician engagement compromises the effectiveness of the tool, which is frequently administered solely by nursing staff[7].

Although surgical counting is undoubtedly important for preventing adverse events such as object retention, the staff may fail to maintain focus on the count, and this distraction can lead to an increase in the occurrence of intraoperative item retention[8]. However, there is a gap in the in-depth understanding of the factors that influence the nursing staff's adherence to the checklist's sign-out stage.

This research aimed to analyze the nursing staff's perception of the factors that influence the surgical safety checklist's sign-out stage.

Methods

Study design

This quantitative-qualitative research was conducted in two stages: a survey and a focus group. The focus group is a data collection technique used in qualitative research that focuses on group interaction and discussion on a specific topic. This research followed the procedures[9], which establish clear guidelines for planning, conducting, and analyzing. The Consolidated criteria for reporting qualitative research (COREQ) guide was used for conducting and reporting.

Period and location

The research was conducted from June to November 2024 in the surgical and obstetric centers of *Hospital Moinhos de Vento*, a large private hospital located in Porto Alegre, Rio Grande do Sul, Brazil.

Population, sample, inclusion and exclusion criteria

The sample was a convenience sample, with the participation of nurses and nursing technicians who had been working in these two sectors for at least six months at the institution. All included participants continued in the research. Professionals who were absent from their activities for any reason, coordinating nurses, and supervisors were not included. In the first stage, 70 professionals participated, 61 of whom were nursing technicians and nine were nurses, and in the

second stage, 19 professionals participated, 15 nursing technicians and four nurses.

Data collection

Data collection in the first stage was carried out through a questionnaire, structured in Google Forms®, via a link and QR Code made available on the sector notice boards, as well as in the WhatsApp® groups, containing Informed Consent Form, sociodemographic data, questions about the work process, and questions about the safe surgery process. Similarly, an invitation to participate in the focus group was also disseminated on the notice boards, as well as in the WhatsApp® groups, with a QR Code provided for registration. The inclusion of all registered participants in this phase was chosen in order to maximize the generation of ideas, based on the assumption that a larger group provides a greater richness of perspectives. Additionally, the staff's high motivation and mobilization to discuss the topic and contribute to the improvement of their professional practice was considered.

In the second stage, data collection took place through a focus group held in a meeting room, with chairs arranged in a circle to encourage interaction among participants. The focus group was led by the principal researcher and a research assistant.

The focus group meeting began with a presentation of the study's objectives to participants and clarification of doubts, with the completion and acceptance of an Informed Consent Form. Following this, the discussion was guided by key questions addressing both challenges and solutions: What factors do you believe hinder adherence to the sign-out stage? What strategies do you think can improve adherence to the surgical list verification protocol, especially at the time a patient leaves the surgical center (sign-out)? To ensure active and collaborative participation, sticky notes were used, where participants wrote down their ideas. Subsequently, the second stage of the meeting continued the use of sticky notes, but focused on proposing solutions to the challenges raised. In the concluding phase, the group selected and prioritized the proposals considered most effective and feasible for implementation.

The focus group was audio-recorded using a recording application on an iOS® device, a tool chosen for its portability, audio quality, and ease of use. The audio file was subsequently transferred to a computer and transcribed in full by an undergraduate research fellow. The transcription and the notes on sticky notes were compiled into a single file for analysis. The transcripts were not returned to participants for review and validation.

Data analysis and processing

For quantitative data analysis, the RStudio software was used. Categorical variables were described using absolute (n) and percentage (%) frequencies. The Shapiro-Wilk test was used to determine the distribution of numerical variables. Variables with a normal distribution were presented as mean and standard deviation, and those with an asymmetrical distribution were expressed as median and interquartile range. Qualitative data consisted of sticky notes and focus group discussions. Content analysis[10] followed three phases: material text skimming resulting from the transcription and sticky notes, allowing for initial contact with the material and the emergence of first impressions; an exhaustive reading of the material with identification of recording units and context units, seeking a deeper understanding of the emerging topics; and categorization through grouping by similarity, presenting meaning and relevance, clarifying the objective proposed in the research. Participants' identities were preserved by using codes in the transcripts and recorded audio. The excerpts were identified by "Participant" (P) followed by a number (e.g., P1, P2, P3…) corresponding to the order in which they spoke at the time of the meeting.

Ethical aspects

This manuscript was prepared from the use of Artificial Intelligence (AI) tools. Gemini® was employed to improve sentence structure, ensuring greater clarity and fluency of the text, while the Napikin.ai® tool was used to generate the figures presented. It is essential to emphasize that all content and generated figures underwent rigorous review and validation by the authors, who take full and exclusive responsibility for the final content, the accuracy of the data, the analyses presented, and compliance with ethical and scientific standards.

This research was conducted in accordance with the required ethical standards, and was approved by the *Hospital Moinhos de Vento* Research Ethics Committee, under Opinion 6,887,290/2024 and Certificate of Presentation for Ethical Consideration 79687824.2.0000.5330.

Results

Of the 70 professionals who participated in the survey phase, 56 were from the surgical center and 14 from the obstetrics center, with 61 (87.1%) being nursing technicians. The mean age was 39.3 years (± 9.1). The median length of service was 12 years (P25: 4; P75: 15 years), and 20 (28.6%) had another employment relationship.

Table 1 presents data regarding respondents' perceptions of how they use the checklist in surgical and obstetric centers. Although the center's staff uses the surgical safety checklist, adherence is partial, being more frequently used during the time-out phase compared to the sign-out phase. Nursing technicians are the professionals who adhere most to the checklist, while surgeons and anesthesiologists are the least likely to use it.

Table 1 – Participants' perception of the checklist (n=70). Porto Alegre, RS, Brazil, 2024

Variables	n (%)
Is the surgical staff adhering to the surgical safety checklist?	
No	1 (1.4)
Partially	44 (62.9)
Completely	25 (35.7)
Which stage is most adhered to? (n=58)	
Sign-in	23 (39.7)
Time-out	34 (58.6)
Sign-out	1 (1.7)
Which stage is least adhered to by the staff?	
Sign-in	11 (15.7)
Time-out	12 (17.1)
Sign-out	47 (67.2)
Which professional is most adhered to? (n=66)	
Nursing technician	56 (84.8)
Nurse	5 (7.6)
Surgeon	3 (4.6)
Anesthesiologist	2 (3.0)
Which professional is least likely to adhere to it?	
Nurse	3 (4.3)
Surgeon	44 (62.9)
Anesthesiologist	23 (32.8)
Is the surgical center staff adhering to the "sign-out" stage?	
No	3 (4.3)
Partially	52 (74.3)
Completely	15 (21.4)

According to the data, 46 (65.7%) participants experienced some situation of non-compliance in the application of the checklist at sign-out. On the other hand, 41 (58.6%) participants have witnessed a situation in which the application of the checklist at sign-out prevented an adverse event. According to the study, the checklist is verbally checked by the surgical center staff for 66 (94.3%) participants, with 45 (64.3%) stating that the entire staff is present in the surgical center and attentive during the check.

Of the 19 participants in the focus group, 13 were nursing technicians and six were nurses, with an average age of 39 (± 7.9) years and an average professional experience of 8.93 (±6) years. Six thematic categories emerged from participants' reflection on the factors that hinder adherence to sign-out, as shown in Figure 1.

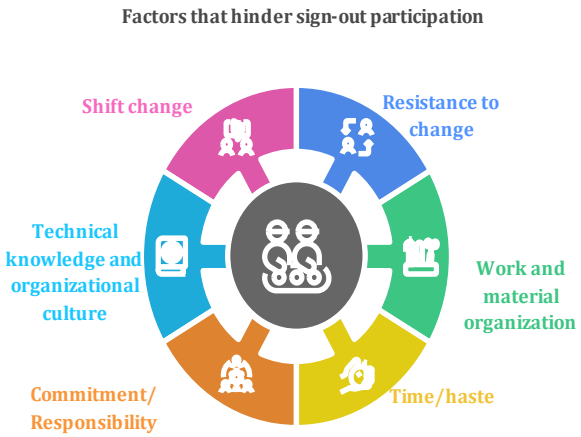

Figure 1 – Categories that emerged regarding the factors that hinder adherence to the sign-out stage. Porto Alegre, RS, Brazil, 2024

The excerpts presented in Figure 2 illustrate the categories that emerged and reflect the staff's main perceptions. The statements highlight that technical knowledge and organizational culture are gaps that compromise process safety and new employees' learning in their daily practice. Lack of organization among professionals during sign-out, as well as non-compliance with protocols by the staff, are primary obstacles. Adherence to safe practices depends on active involvement and a sense of responsibility, especially from nursing staff, who face the challenge of a lack of empowerment. Finally, when the surgical count is left until the end of the procedure, failures in shift handover and communication between shifts are identified as factors that compromise material continuity and traceability.

Category	Statements
Technical knowledge and organizational culture	*There are technicians who don't even know the basics. Then, when the time comes, we have to teach them* (P1). *Many are learning on the job because they didn't have adequate training* (P2). *We learn from our colleagues. When there's goodwill, we teach* (P6). *I really learned through day-to-day experience. The university didn't show that* (P7). *A lot of things we only learn when they happen. There's no specific training* (P9). *There's a lack of updates. There are older technicians who don't know the new protocols* (P17).
Work and material organization	*Everyone does it their own way. There's no standard. This is very disruptive* (P1). *Sometimes the material isn't in the right place. Time is wasted looking for it* (P5). *Each shift has a different routine. This confuses whoever is rotating* (P10).
Time/haste	*We get in and it's already high-energy. It doesn't stop* (P1). *There's barely time to register everything in the system* (P4). *The pressure is so intense that you forget to write it down* (P7). *There's not always time to do everything calmly. The priority is what's urgent* (P16).
Resistance to change	*This new way of taking notes is confusing. I prefer how it was before* (P3). *They changed the routine and didn't explain. We were left in the dark* (P6). *They want us to follow this new model* (P1). *We've always done it this way. It's never been a problem. Why change?* (P5). *Some people don't accept help, even when they're making mistakes* (P10). *I prefer to do it the way I've always done it. It's never been a problem and it's faster* (P19).
Commitment/ responsibility	*Even in a hurry, I try to explain everything clearly* (P4). *We help each other. When I see that someone is overwhelmed, I go there* (P6). *I've stayed late several times because I didn't want to leave things poorly done* (P2). *I don't leave the shift messy for the next person. I try to deliver it perfectly* (P1). *We take care of them as if they were family. It's not just work* (P12). *I'll come back to check if everything is alright* (P18).
Shift change	*During the exchange, sometimes the colleague doesn't pass on everything and we get lost* (P5). *It would be good to have more time just for shift changes. It's always hectic* (P3). *We needed to standardize how to do this transition. Everyone does it differently* (P4). *Everyone handles their shift differently. There should be a fixed schedule* (P13). *Haste hinders progress. Critical information is forgotten in the process of passing through* (P15).

Figure 2 – Categories and excerpts of factors that hinder adherence to sign-out. Porto Alegre, RS, Brazil, 2024

Strategies to improve adherence to sign-out were presented in the form of anonymous sticky notes on the mural by 19 professionals (six nurses and 13 nursing technicians). The analysis revealed five categories, presented in Figure 3. A "lighthouse" shape was chosen because it metaphorically represents "the light that guides the actions" listed by participants to improve the sign-out stage, with the aim of ensuring patient safety. To this end, the absolute frequency of each category was identified. The priority action cited by 84.2% (16) of participants was "training and education". "Clear communication" and "routine standardization" were mentioned by 63.15% (12) of participants. "Leadership involvement" was mentioned by 47.4% (9) of participants, and "safe patient practice" was mentioned by 15.8% (3) of participants.

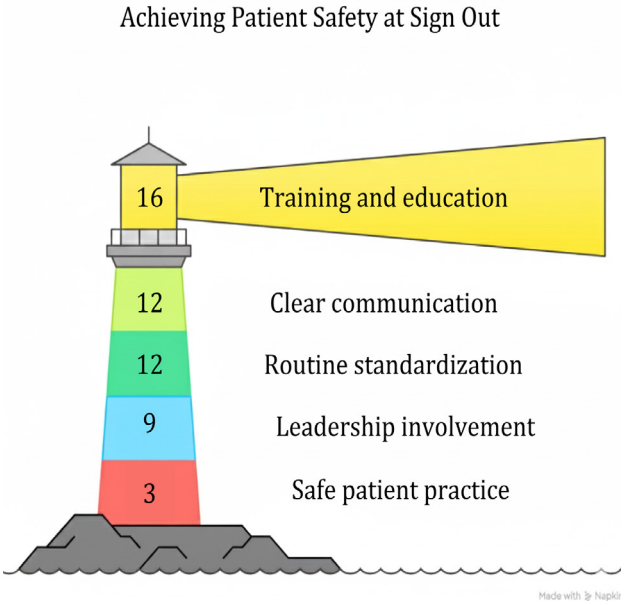

Figure 3 – Strategies for joining the sign-out stage. Porto Alegre, RS, Brazil, 2024

Discussion

The analysis of results allows us to reflect on the challenges and potential in implementing the safe surgery checklist, especially in the sign-out phase. This is despite regulatory advancements and established protocols, such as those recommended by the Brazilian National Patient Safety Program[11]. Healthcare practice still faces significant obstacles related to adherence, institutional culture, and staff routines.

The sample profile indicates experienced nursing professionals, as evidenced by the median length of service. This data is important because the staff's experience is essential for identifying and mitigating unintentional object retention events[12]. Although length of service is a factor in experience, greater staff familiarity is associated with better operational efficiency[13].

The length of service by itself does not guarantee compliance. Therefore, continuing education is an essential strategy to ensure adherence to safe practices, as periodic updates for the staff on counting procedures are a critical factor for patient safety[14]. Gaps in technical knowledge and familiarity with updated protocols reinforce concerns about the false sense of security attributed to years of experience and older professionals' adherence to practices.

Low sign-out adherence may be related to organizational and behavioral barriers, such as staff resistance, time pressure, and a lack of a consolidated surgical safety culture. This increases the risk of preventable adverse events, such as foreign body retention[7]. To reverse this scenario, it is essential to strengthen the staff's training, promote greater engagement from surgical leaders, and adapt the protocol to the institutional reality[8,15], ensuring that the final stage of the checklist is properly executed and valued in the healthcare context.

Factors such as lack of nursing staff empowerment, failures in institutional communication, and unpreparedness to deal with structural changes contribute to exacerbating this resistance to change. These elements, combined, show that the weakness in the sign-out process is not limited to a lack of technical knowledge, but involves an organizational culture that is still not very sensitive to the importance of the final stage of the checklist. In this scenario, the need for structured actions involving continuous training, support from medical leadership, and nursing professional empowerment to ensure the effectiveness of the pro-

cess and, consequently, patient safety becomes evident.

The lack of organization and standardization in counting during the procedure was recognized as paramount to ensuring a smoother and safer process. Counting items on the operating table is considered the basis for preventing the unintentional retention of surgical materials. However, discrepancies in counting continue to be a frequent occurrence, highlighting the complexity and challenges inherent in this process[4]. A lack of discipline in the initial process of organizing the operating table, with standardization of intraoperative counting, may be the main reason for counting errors at the end of the procedure.

Another relevant factor is time pressure and the fragility of an institutional culture focused on safety. Staff resistance combined with productivity-driven environments can contribute to non-compliance with sign-out counting routines. Inadequate counting practices at the end of surgery significantly increase the risk of surgical material retention[16]. These obstacles are compounded when communication is ineffective or ignored by authority figures, such as when surgeons disregard warnings from nurses and anesthesiologists about potential errors, opting not to perform complementary tests that could have prevented incidents[12]. Such attitudes not only compromise patient safety, but also highlight the urgent need to promote a collaborative, non-punitive culture where all professionals can perform their role with autonomy and shared responsibility.

Communication failures among staff members, especially during procedure closure, are critical factors in the occurrence of adverse events, such as the retention of foreign bodies[17]. In many cases, there is a lack of a safe space for professionals from different categories to express their concerns, contributing to the ineffectiveness of the final verification.

The tradition of centralizing authority in the surgeon, known as "surgeon primacy", can inhibit the active participation of other staff members, hindering the collaborative dynamic that the checklist proposes[7,18], while the engaged use by the surgeon in charge has the potential to improve teamwork[18-19]. The rejection of formal protocols by some surgeons – who prefer to rely on their personal experience – creates a gap between what is taught (theory) and what is actually practiced. This behavior, coupled with a lack of appreciation for the sign-out process, reinforces the perception that this stage is merely a bureaucratic formality, when, in fact, it is fundamental to ensuring patient safety and preventing critical errors.

A higher percentage of adherence to the time-out process compared to the sign-out process demonstrates a greater commitment to pre-incision checks and a worrying negligence in the final phase of the checklist. The high adherence to the time-out process suggests that professionals recognize the importance of this stage in preventing critical errors, such as surgeries on the wrong site or patient. Although professionals recognize the importance of the process, there is a discrepancy between perception and actual practice, reinforcing the need for an effective sign-out process to ensure that materials are properly accounted for before the start of patient closure[17]. Lower adherence to the final stage suggests institutional weaknesses in the implementation of this essential stage, which ensures the accurate counting of surgical materials and patient safety before leaving the surgical center.

Although the first stage of the checklist (time-out) is more culturally established, the final phase still faces significant practical and behavioral barriers, potentially compromising patient safety and material traceability. Without effective communication and consistent application of the checklist, the omission of crucial stages increases the risk of adverse events, compromising overall safety. To mitigate these risks and maintain the integrity of the sign-out process, it is vital to ensure continuous communication, as well as the provision of complete and accurate information during shift handover[7]. When shift handover is rushed or incomplete, it compromises continuity of care and the traceability of materials. Using standardized shift handover protocols reduces the omission of in-

formation and ensures continuity of patient care.

The lack of systematic training was identified as a barrier to implementing a counting culture, in addition to compromising the completeness of the process and patient safety. These observations reinforce the need for institutional policies that promote continuing education and the consolidation of an organizational culture focused on patient safety[14]. Clinical training and collaborative learning have positive impacts, aiding in the effectiveness of the checklist and ensuring that professionals not only understand the importance of safe practices but also know how to apply them correctly, thus improving staff performance and patient safety[8,20].

Adherence improves when there is leadership that supports safety protocols and encourages teamwork. This approach cultivates a positive work environment in which healthcare professionals feel empowered and motivated to follow safety practices. Furthermore, standardized routines ensure consistent application of the checklist, reducing hesitation and resistance from the staff. For all stages to reach their full potential, continuous efforts are essential, including a strong commitment from all stakeholders. Therefore, collaboration between leaders and the surgical staff is crucial to integrate workflows and ensure continuous monitoring, support, and clear communication[7,21].

Study limitations

The study, conducted at a single institution, may limit the generalizability of the findings to other contexts with different organizational cultures and surgical routines. Additionally, the use of a convenience sample restricts participant representativeness, potentially inducing selection bias. Another point of concern is the possibility of social desirability bias in participants' self-reported statements when addressing topics such as professional responsibility and adherence to protocols. Furthermore, the perception of checklist use was analyzed from the perspective of a single profession, which prevents a complete understanding of the multidisciplinary surgical staff's dynamics and experiences. Finally, qualitative data interpretation through content analysis depends on the researchers' sensitivity and theoretical framework, which can lead to different interpretations and, consequently, introduce interpretive bias.

Contributions to practice

The research offers healthcare staff and managers valuable insights into the teamwork dynamics and the conditions necessary for changes in institutional protocols related to the sign-out process in other surgical and obstetric centers.

Conclusion

In the staff's perception, the factors that influenced the safe surgery checklist's sign-out stage are gaps in technical knowledge and organizational culture, resistance to change among professionals, lack of commitment and responsibility, work and material organization, haste, and shift handover. To reverse this scenario, the staff suggested training and education, highlighting the need for clear communication, routine standardization, leadership involvement, and safe patient practice.

As a strategic stage in surgical care, the sign-out needs to be recognized and practiced collectively and interprofessionally so that the operating table count fulfills its preventive and critical role in patient safety. Full adherence therefore requires a strategic and multifaceted intervention to transform the checklist into a non-negotiable practice of excellence and patient protection.

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Authors' contributions

Conception and design: **Artioli RPS, Trevilato DD, Magalhães AMM**. Data analysis and interpretation; relevant critical review of intellectual content; final approval of the version to be published; agreement to be responsible for ensuring that all aspects of the manuscript related to the accuracy or integrity of any part are properly investigated and resolved: **Artioli RPS, Camatta MW, Caregnato RCA, Moriya GAA, Trevilato DD, Magalhães AMM**.

Data availability

The authors state that the data are available in full within the body of the article.

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