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Monitoring Cleaning and Disinfection in a Respiratory Syndrome Unit Amid the SARS-CoV-2 Pandemic

Monitoramento da limpeza e desinfecção em unidade de síndrome respiratória em meio à pandemia de SARS-CoV-2

Monitoreo de la limpieza y desinfección en una unidad de síndrome respiratorio en medio de la pandemia de SARS-CoV-2

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ABSTRACT

Introduction: This study aimed to monitor the cleaning and disinfection processes of surfaces in a respiratory syndrome unit. **Design**: A cross-sectional study conducted in a respiratory syndrome unit specialized in the treatment of COVID-19. High-touch surfaces were monitored using the following methods: Adenosine Triphosphate (ATP), Colony-Forming Units (CFU), and Visual Inspection. Monitoring lasted for 30 days, with samples collected both before and after the team performed the cleaning and disinfection procedures. **Results**: The results showed that most surfaces had microbial counts above 2.5 CFU/cm² both before and after cleaning, thus failing the test. Only one surface showed significant differences in relation to the adenosine triphosphate method: the patients' chair (P=0.014). Regarding visual inspection, it was observed that defects in the structure of the monitored surfaces impacted non-compliance rates. Additionally, a lack of standardization in the use of cleaning products was noted. **Implications**: The study highlighted the need for improvements in the process to meet the values proposed in the literature, ensuring a safe environment in all healthcare services. It also underscored the complexity of patients with respiratory syndrome.

DESCRIPTORS

Infections; Concurrent Disinfection; Health Care; Cleaning Service.

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INTRODUCTION

Increasingly, studies and discussions have expanded on the impact of contaminated environments on the occurrence of infections. The spread of Healthcare-Associated Infections (HAIs) is linked to several factors, including the failure of healthcare professionals to use aseptic techniques.[1] HAIs are recognized as a global health problem, causing significant impacts such as prolonged hospital stays, physical complications, and even death. In developing countries, the impact can be up to 20 times greater.[2]

Contaminated surfaces contribute to cross-transmission, as healthcare professionals' hands become mechanisms of spread when they touch patients during care, increasing the likelihood of transmission to other patients or surfaces.[3]

SARS-CoV-2 can persist for extended periods on various surfaces, making it a significant mode of transmission.[4-5] The European Centre for Disease Prevention and Control explains that the virus can remain on surfaces for varying durations, ranging from several hours on surfaces like copper and cardboard to several days on plastic and stainless steel. Coronaviruses can survive for 2 to 9 days on certain surfaces and remain infectious.[6]

To evaluate the cleaning and disinfection (C&D) of healthcare environments, various monitoring methods can be used. Among these, the most notable are visual inspection, adenosine triphosphate (ATP) bioluminescence, and Colony-Forming Units (CFU).[7]

In emergency care services, due to the complex, intense, and rapid dynamics of the work, failures in aseptic measures often occur, especially during invasive procedures performed in emergency care settings.[8] Additionally, there is a noticeable lack of studies focusing on units exclusively dedicated to treating patients with Respiratory Syndrome.[9]

Therefore, this study aims to monitor the C&D processes of surfaces in a Respiratory Syndrome Unit, which serves as a reference for patients with COVID-19.

METHOD

Study Type

This is a cross-sectional and correlational study.

Study Location

The setting of this study is a Respiratory Syndrome Unit (RSU), connected to an Emergency Care Unit (ECU) in the city of Três Lagoas/MS, Brazil. The unit provides outpatient and emergency/urgent care services of medium and high complexity, operating 24 hours a day and linked to the public Unified Health System (SUS) of Brazil.[10]

With the advance of the COVID-19 pandemic and the urgent need to implement prevention and control measures, it became necessary to readjust the ECU's facilities. Municipal Decree No. 86, dated April 17, 2020, from the City Hall of Três Lagoas, established a specific sector to attend suspected and confirmed cases of infection by the novel coronavirus (SARS-CoV-2) at the ECU, with retroactive effect from April 1 of the same year.[11]

Chosen Surfaces and Description of the Material of Each Surface

The selection of surfaces to be monitored was based on a non-probabilistic intentional sampling method, strategically and carefully selecting locations deemed critical in the literature, considering the specifics of the environment and the study being conducted. This approach is justified by the need to focus on areas with a higher potential for contamination or where the risk of pathogen transmission, such as SARS-CoV-2, is elevated.[12]

This sampling technique allowed the study to focus on high-risk areas, increasing the relevance of the data collected and ensuring that the results reflect the real challenges of disinfection in critical environments. It also allowed for adjustments to the study based on the specific characteristics of the environment and identified microbiological risks, without the need to generalize to lower-risk areas.

In this context, the sample definition considered areas with the highest exposure and direct contact, including surfaces near patients, shared medical equipment, and surfaces that are difficult to clean. These included doorknobs, handrails, light switches, countertops, bedside tables, bed rails, vital sign monitors, and other medical equipment, selected due to the high probability of contamination through direct and indirect contact.

Another key factor in the selection of analyzed surfaces was the frequency of touch. The Centers for Disease Control and Prevention (CDC), following guidelines published in 2003 and last updated in 2019, regarding infection control and environmental surfaces, recommends that surfaces for cleaning be divided into two groups: those that are less frequently touched, like floors and ceilings, and those with frequent contact, such as doorknobs, bed rails, tables, control panels, among others.[13]

Cleaning and Disinfection Process Carried Out in the RSU

Team and C&D **Process**

The team consisted of one nurse specialized in emergency care, two nursing technicians, one general practitioner, and one cleaning professional. Nursing professionals (NP) and doctors worked 6-hour shifts on-site, with the remaining 6 hours on-call, as per Municipal Decree No. 88, dated April 17, 2020.[14] The Cleaning and Disinfection Team (CDT) followed a 12-hour on/36-hour off rotating schedule.

Although team training on cleaning practices across different shifts and teams is essential for ensuring consistency and effectiveness in cleaning routines, this study was based on the unit's technical routine manual. This manual standardizes cleaning techniques and ensures that all professionals follow the same procedures, regardless of shift or team. In this context, the CDT is responsible for cleaning fixed surfaces, as well as walls, ceilings, furniture, and equipment, which must be cleaned daily with neutral detergent. Additionally, disinfection is done using a cloth moistened with 70% alcohol or quaternary ammonium, allowing it to air dry. In observation rooms, surfaces such as furniture, equipment, sinks, floors, and walls must be cleaned at the beginning of each shift and as needed during the shift (water and soap for surface cleaning, followed by disinfection with 70% alcohol, quaternary ammonium, or hypochlorite).

During data collection, it was observed that surfaces such as countertops were cleaned by the NP. Both the mattress and chair underwent concurrent cleaning by the NP, while terminal cleaning was performed by the CDT, and doorknobs were cleaned exclusively by the CDT. Another noteworthy point is that there was no standardization regarding the frequency of cleaning or the products to be used.

Products Used

The following products were used:

- **Quaternary Ammonium:** composed of Alkyl Dimethyl Benzyl Ammonium Chloride (benzalkonium chloride) 5.2%, PHMB (polyhexamethylene biguanide) 3.5%, non-ionic surfactant, solvent, and water.

Usage: Disinfection of fixed surfaces: Dilute at a concentration of 0.5% (5 mL of product in 995 mL of water). Apply the product to the surface, leaving it in contact for 10 minutes. No rinsing is required.

- **70% Alcohol**: Recommended for disinfection of metals, glass, and marble. It should not be used on surfaces with organic matter, as this may inactivate or reduce the product's effectiveness. The effectiveness of alcohol occurs through evaporation, which should not be accelerated. Improper use of this product can damage optical equipment, expand and harden rubber, and certain plastics.

- **1% Sodium Hypochlorite**: Recommended for disinfection of plastics, glass, rubber, and acrylics (not recommended for metal materials due to its corrosive nature). *Usage Instructions*: Validity – 24 hours; Immersion time for articles – 30 minutes; Dilution – Dilute 1 liter of the product in 5 liters of water.

Procedures

The surfaces were monitored in relation to the C&D process using the ATP, CFU, and Visual Inspection methods. The monitoring lasted for 30 days, and participants were not informed about the study's objective to avoid the Hawthorne effect, which could influence their professional practices. Samples were collected both before and after the team performed the C&D process.[15-19]

Monitoring Parameters

In this study, three methods were defined for monitoring: visual inspection, the ATP method, and CFU counting, which are frequently used to assess the efficiency of C&D in healthcare settings, such as in a respiratory syndrome unit. The combination of these methods provides a comprehensive approach to ensuring the safety and effectiveness of C&D routines.

Visual inspection is a simple, quick, and low-cost technique that allows for the identification of visible residues, such as dirt, dust, and stains, which, when present, may indicate inadequate cleaning. Although it is not capable of assessing microbiological contamination, this technique is essential for ensuring that basic cleaning standards are met and should be combined with additional microbiological and biochemical parameters.[20-22] In this study, a surface was deemed "failed" if it contained any of the following elements: dust, grease, stains, fingerprints, moisture, structural defects, or organic matter.

The ATP method was selected as a quick and efficient technique for measuring the presence of biological material on contact surfaces. It is a commonly used technique in hospital environments that measures bioluminescence generated by the reaction of ATP with an enzyme, allowing for the assessment of contamination indicators, providing rapid results, and enabling immediate corrective actions.[2,3]

For CFU counting, this study utilized a standard microbiological method to determine the number of viable bacteria and fungi on a surface. This process involves collecting samples and cultivating them in a culture medium to enable the precise identification and quantification of the microorganisms present. Unlike ATP, which detects all organic material, CFU counting focuses specifically on organisms capable of growing and replicating, which is crucial for identifying infection risks. It also provides an exact number of CFUs per area, allowing for the evaluation of whether disinfection has sufficiently reduced the microbial load to safe levels. Rodac Plates® were used, containing tryptic soy agar, with a 24 cm^2 surface area and a capacity of up to 20 mL. The plates were pressed onto the surfaces for 10 seconds and then stored in an incubator at 37°C. Readings were taken after 48 hours using a stereomicroscope under reflected light.[2,4]

Regarding the criteria for defining normal values for the C&D process, these were based on various studies (Table 1).[22,25-29]

Table 1. Monitoring of surface cleaning/disinfection according to different methods

Cleaning assessment	Result	Interpretation
ATP* bioluminescence	<250 RLU†	Acceptable
	>250 RLU	Unacceptable
Total aerobic colonies	<2.5CFU‡/cm^2	Acceptable
	>2. 5CFU‡/cm^2	Unacceptable

*ATP(adenosine triphosphate); †RLU (relative light units); ‡CFU (colony-forming units).

Data Analysis

The data were entered into duplicate spreadsheets in Excel to ensure proper data coding, and were later transferred to the Statistical Package for Social Sciences (SPSS), version 21.0, for analysis based on the principles of descriptive and inferential statistics.

The Wilcoxon test was used to compare ATP quantification and microbial counts before and after cleaning on each of the evaluated surfaces. The Mann-Whitney test was applied to compare variations in microbial counts and ATP quantification on each surface. Spearman's correlation was employed to observe possible correlations between ATP quantification and microbial counts. Fisher's exact test for two proportions was used to observe differences in surface evaluation by visual inspection. A ROC curve was generated to determine which quantitative method was most effective in assessing surface cleanliness compared to the visual inspection method (gold standard). All analyses were performed at a 5% significance level ($p<0.05$).

Ethical Considerations

The study followed the recommendations of Resolution No. 510, dated April 7, 2016, and Resolution No. 466, dated December 12, 2012, of the National Health Council (CNS), which outline the guidelines and regulatory standards for research involving human subjects.[30-31] The study was approved under opinion number 4.317.394 and CAAE: 36621220.5.0000.0021 by the Research Ethics Committee of the Federal University of Mato Grosso do Sul (UFMS).

RESULTS

The analysis using the bioluminescence method revealed significant differences in RLU scores before and after C&D of the patient chairs (P=0.014), showing that ATP quantification was reduced after cleaning. For the other surfaces, no significant differences were identified in the cleaning process, nor in microbial counts.

Similarly, the analysis of ATP (RLU) and CFU variation did not indicate significant differences, suggesting the absence of a significant difference between ATP quantification and microbial count methods when applied to surface evaluation before and after C&D. Table 2 presents the quantification of parameters used to compare pre- and post-cleaning conditions of the surfaces evaluated in the study. Additionally, it shows the results of the variation in quantitative variables to compare the methods employed.

Table 2. Median results (minimum; maximum) for stage I of the samples obtained from the surfaces evaluated in the study

		Monitoring							
Method of analysis	Cleaning	Countertop	P	Mattress	P	Patient bathroom door handle	P	Patient chair	P
ATP (RLU)[1]	Before	400 (101;2929)	0.441	1444 (27;4361)	0.834	690 (268;2623)	0.107	2088 (296;9733)	**0.014**
	After	263 (134;905)		1379 (40:3064)		357 (224;779)		291 (71;7116)	
Bacteria (CFU/cm^2)[1]	Before	31.5 (6;95)	0.673	62 (1;86)	0.141	41.5 (5;110)	0.205	57 (16;110)	0.183
	After	28.5 (9;103)		22.5 (5;83)		12.5 (1;44)		30 (5;110)	
Variation analysis (%)[2]	RLU	-5.8 (-85;131)	0.874	39 (-99;7152)	0.563	-33 (-91.5;50.4)	0.563	-60 (-97.6;-6)	0.189
	CFU	-21.7 (-56.3;483)		-42.3 (-77.1;400)		-34.6 (-98.4;40)		-40.8 (-89.1;312)	

Note: CFU: Colony-Forming Units; ATP: Adenosine Triphosphate; RLU: Relative Light Unit. 1P-value refers to the Wilcoxon signed-rank test at P<0.05. 2P-value refers to the Mann-Whitney test at P<0.05. Bold values indicate significant differences at P<0.05.

Table 3 describes the proportions found on each of the evaluated surfaces according to visual inspection. The comparison before and after cleaning did not show differences in the proportions of surfaces approved by the visual test. An important point to mention is the low approval rate of surfaces even after C&D. In the case of the bathroom doorknob, countertops, and patient chairs, no surfaces were approved after C&D. For the mattress, only one surface, which was disapproved before cleaning, was considered approved after intervention. Thus, the analysis of surface conditions by visual inspection was not effective, as it did not result in an increase in the number of approved surfaces after C&D, and when there was an increase, it was not significant.

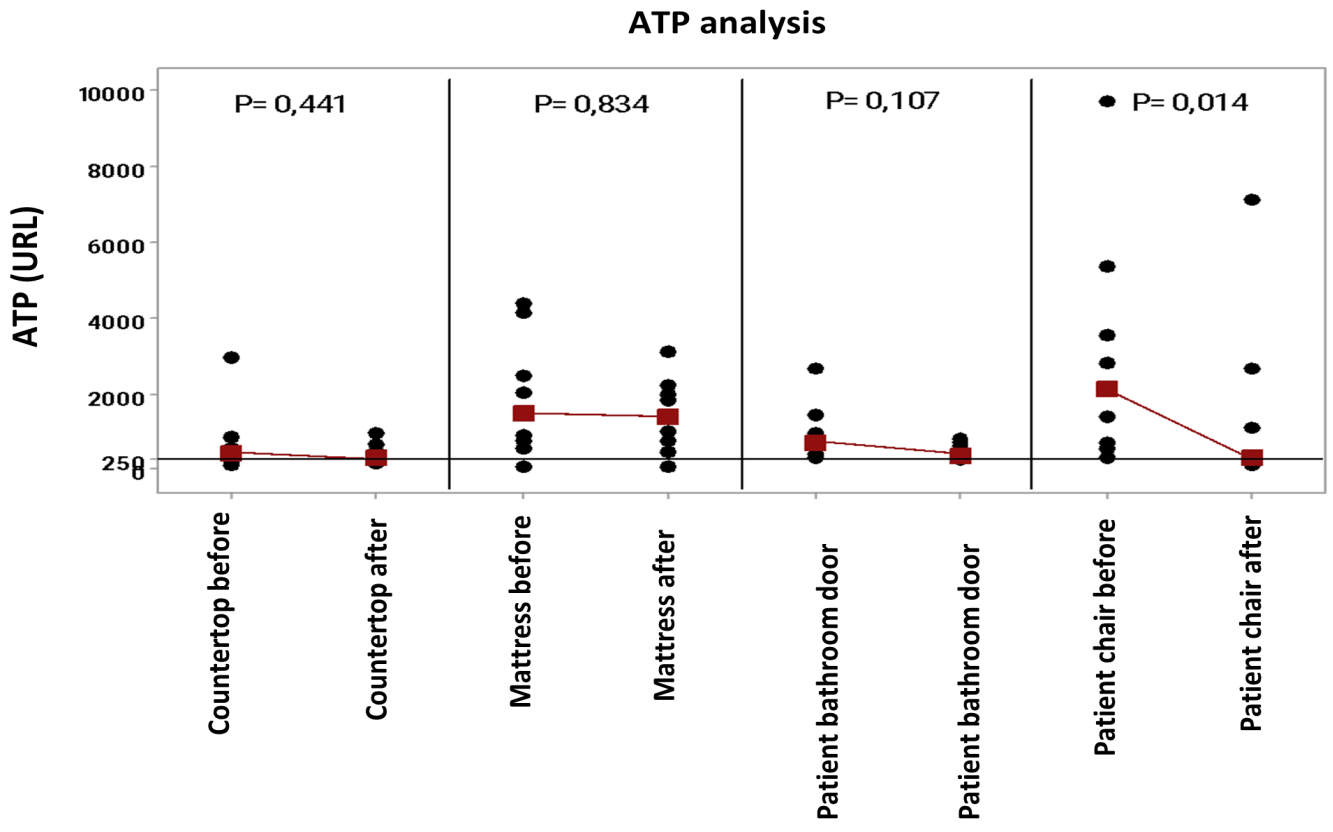
Table 3. Proportions of surfaces with visual inspection approval before and after C&D of hospital surfaces

Visual Inspection		C&D		*P value*[1]
		Before	After	
(n=8)	Countertop	1 (12.50%)	1 (12.50%)	1.000
	Mattress	1 (12.50%)	2 (25.00%)	0.516
	Patient bathroom door handle	0 (0.0%)	0 (0.0%)	1.000
	Patient chair	0 (0.0%)	0 (0.0%)	1.000

[1]P-value refers to Fisher's exact test for two proportions at P<0.05.

In **Graph 1**, the behavior of ATP (RLU) values and aerobic bacterial counts (CFU) was analyzed by surface and phase. Values below 250 RLU and 2.5 CFU/cm² were considered indicative of surface approval. **Figure 1** shows a reduction in ATP values after C&D; however, this reduction was not statistically significant, except for the patient chair, which showed a significant decrease in ATP values in the post-intervention phase.

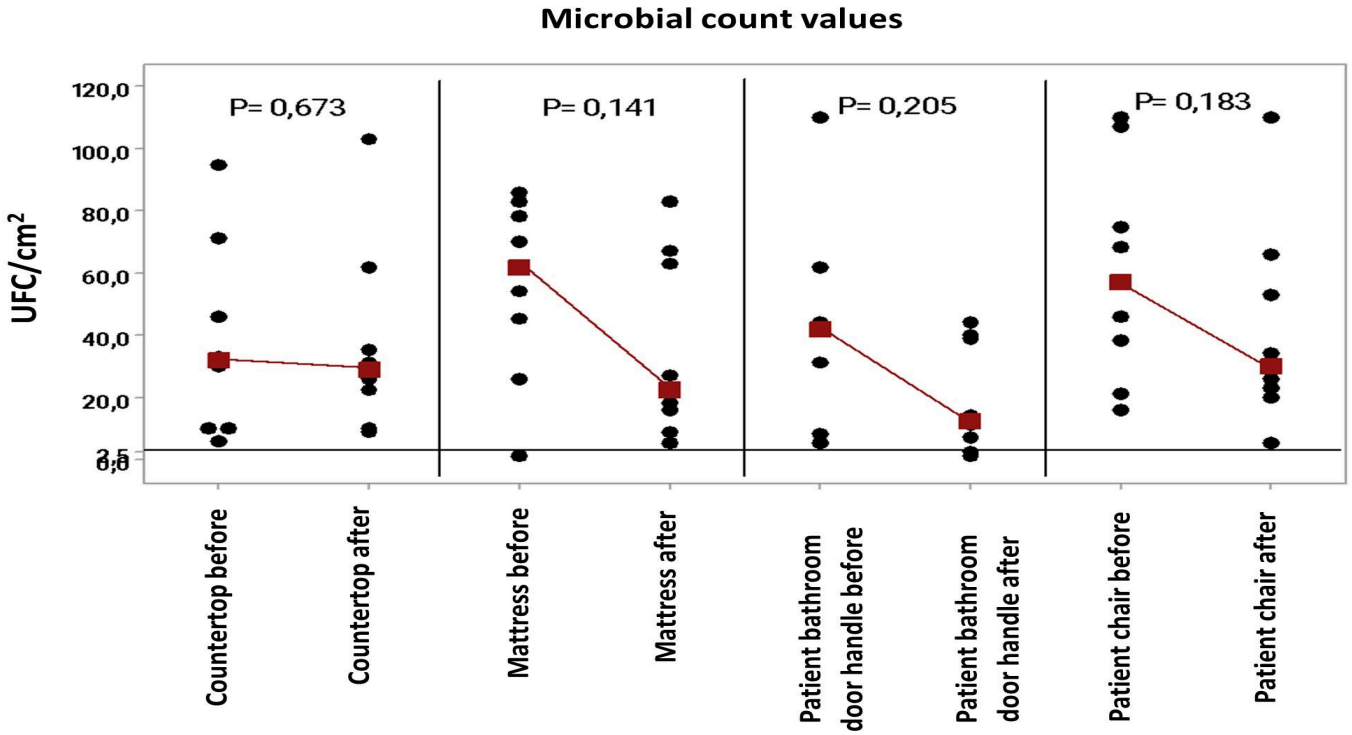
Figure 1. ATP values in RLU for surfaces in Phase I



Note: Black dots indicate the absolute ATP values for each surface. Red dots indicate the medians of the data distribution.

Microbial quantification (CFU/cm²) was also evaluated according to the cutoff point of 2.5 CFU/cm². **Figure 2** shows that the vast majority of surfaces had microbial counts above 2.5 CFU/cm² both before and after C&D, indicating that there was no significant effectiveness in reducing microbial counts on all evaluated surfaces when comparing pre- and post-C&D results.

Figure 2. Microbial count values for surfaces in Phase I.



Note: Black dots indicate the absolute microbial count values for each surface. Red dots indicate the medians of the data distribution.

The ROC curve presents the results of the evaluation of the ATP and CFU quantification methods in relation to the gold standard of visual inspection (approved and disapproved) (Table 4). The results indicate the absence of a comparative relationship between the ATP quantification and microbial count methods with the gold standard of visual inspection. However, by analyzing the ROC curve parameters, it can be inferred that the sensitivity of the microbial count method is superior to the ATP quantification method, indicating that the probability of the microbial count technique correctly identifying a clean surface is 66.7%, whereas the probability of correct identification of a clean surface by the ATP quantification technique is 33.3%.

Table 4. ROC curve parameters of the ATP quantification and microbial count methods in relation to the gold standard of visual inspection

Parâmetros ROC	Métodos	
	Quantificação do ATP	Contagem microbiana
Sensibilidade	33,3%	66,7%
Especificidade	100%	82,8%
VPP[1]	100,00	79,49
VPN[2]	59,98	71,31
Ponto de corte	<=40 URL	<=53 UFC/cm²
Valor P	0,913	0,335

[1]Positive Predictive Value; [2]Negative Predictive Value.

DISCUSSION

In this study, although a reduction in median values before and after the C&D process was observed for all surfaces evaluated using the ATP and CFU monitoring methods, significant differences were only evident for the patient chair. The remaining surfaces failed to meet the criteria, highlighting the need for improvement in the process to achieve the indicators proposed in the literature and ensure a safe environment in all healthcare services, particularly given the complex nature of patients with respiratory syndromes and COVID-19, which were the focus and setting of this investigation.

Similar results were observed in another study conducted in an emergency unit, where surfaces such as the medication preparation counter and door handles did not show statistically significant reductions after the C&D process performed by the team. However, the authors of that study reported substantial improvements following an educational intervention with the cleaning staff. After the intervention, ATP method approval rates reached 100% in the final phase of the study.[32]

This finding reinforces the urgent need to improve cleaning protocols and practices to meet the recommended indicators in the literature and ensure a safe environment in all healthcare services. In units treating patients with respiratory syndromes, the complex nature of these patients and the high risk of transmission demand rigorous, standardized, frequent, and effectively monitored protocols.

The fact that only the patient chair showed a significant reduction highlights the need to review current practices and strengthen staff training, ensuring that high-touch surfaces, such as beds, bedside tables, and medical equipment, also reach appropriate levels of cleanliness.

In this investigation, most surfaces had microbial counts above 2.5 CFU/cm^2 both before and after the C&D process, demonstrating that the CFU microbial count criterion is a more sensitive indicator compared to the ATP method. While ATP measures the presence of organic material quickly, CFU counting offers a more precise assessment of viable microbial load, identifying the actual presence of microorganisms on surfaces.[32]

Studies in the literature support these findings. A study conducted in an emergency department found that even after an educational intervention, CFU values did not remain at acceptable levels, reflecting the greater sensitivity of this method in detecting failures in the C&D process. Factors such as the lack of standardization in practices and the use of products with different active ingredients were noted as contributors to the unsatisfactory results.[33]

The ATP method, used in this study, may involve different brands, models of devices, and reference values. This variation can make it difficult to compare results across different studies, as each device may use specific criteria to determine acceptable levels of cleanliness, and cutoff values are not always uniform. This lack of standardization across devices can compromise the comparability of findings in research and the reproducibility of results in different clinical settings.[3]

Moreover, the ATP method does not differentiate between the microbial load present on surfaces, nor does it indicate the exact quantity of viable microorganisms. Instead, it detects the presence of organic matter such as cell debris, bodily fluids, and other detritus. Despite these limitations, this technique has proven useful in monitoring cleaning effectiveness, primarily due to its rapid execution. It also allows cleaning teams to receive immediate quantitative feedback on the effectiveness of the cleaning process, making it an important tool in hospital settings where efficiency and quick decision-making are crucial for ensuring patient safety.[1]

Given the results obtained, it is essential to conduct a thorough analysis of the products used in the C&D process. During data collection, it was

observed that professionals used different products on the same surfaces, and there was no clear standardization in the use of cleaning agents[32]. This lack of uniformity can compromise disinfection effectiveness and, consequently, the safety of the hospital environment.[33]

Regarding visual inspection, it was noted that only the mattress surface showed a slight improvement, with approval rates increasing from 12.5% before cleaning to 25% after the C&D process. However, this approval rate remains very low, suggesting that the cleaning was not entirely effective even after it was performed. This result may be influenced by the physical conditions of the monitored surfaces, as various instances revealed physical problems, including scratches and rust.

Compromised physical conditions of surfaces, such as mattresses with damaged coverings or corroded metal surfaces, present challenges for contaminant removal and facilitate the accumulation of microorganisms. These defects can harbor bacteria and viruses that are not eliminated by conventional cleaning methods, undermining the effectiveness of the C&D process.[35,16-18]

These results confirm that visual inspection is a weak indicator of process quality. Although it is a widely used method in healthcare settings, it is inherently subjective and unable to provide an accurate assessment of the presence of microorganisms or organic residues. Approving a surface based solely on its visual appearance can lead to false perceptions of safety, as the method does not detect microbial loads invisible to the naked eye.[1,32,35]

Thorough environmental cleaning plays a crucial role in reducing the risk of HAIs.[33] Contaminated hospital surfaces act as reservoirs for pathogens, and proper C&D are essential in breaking the chain of transmission of these infectious agents. Effective surface cleaning thus becomes one of the most valuable and efficient methods for minimizing the spread of HAIs.[3]

Given the SARS-CoV-2 pandemic and its implications for public health, it is clear that actions focused on surface cleaning in healthcare units play a crucial role in preventing HAIs. Environmental contamination by SARS-CoV-2 has been widely reported in various parts of the world, highlighting the vulnerability of healthcare environments to the spread of the virus. Despite this, there remains a significant lack of systematic environmental assessments, which compromises the effectiveness of infection control measures.[35-36]

Study Limitations

A limitation of this study is that the monitoring of the C&D process was conducted in a single healthcare facility, and no microbiological analysis of the species found in the CFUs was performed. However, during the pandemic, access to Respiratory Syndrome Units was limited, mainly due to a shortage of personal protective equipment and the high risk of contamination by SARS-CoV-2.

CONCLUSION

This study monitored the surface C&D process in a respiratory syndrome unit, which served as a reference for treating COVID-19 patients. The study showed that there were no significant differences in cleaning indicators before and after the process when evaluated using the ATP method, except for the patient chair surface. Additionally, most surfaces showed microbial counts above the levels recommended in the literature.

Various recommendations can be proposed to improve C&D routines in this context, especially when microbial counts remain high after cleaning processes. These include reviewing the efficacy of the cleaning products used, regular monitoring, prioritizing critical areas, improving cleaning techniques, and increasing cleaning frequency, particularly on frequently touched surfaces. Furthermore, staff training is necessary to ensure the correct use of products, proper application of contact

time, and identification of critical areas.

Therefore, this study provides relevant evidence in the field of investigation, and based on the research data, it is possible to recommend continuous education interventions to improve C&D processes in the unit. Additionally, the study emphasizes the importance of standardizing the correct products for each surface and material type. Studies of this nature can support institutional protocols focused on patient safety, risk management, and reducing the impacts associated with HAIs.

RESUMO

Introdução: Esse estudo teve como objetivo monitorar o processo de limpeza e desinfecção de superfície em uma unidade de síndrome respiratória. **Delineamento:** Estudo transversal, realizado em uma unidade de síndrome respiratória referência para atendimento a Covid-19. As superfícies com alta frequência de toque foram monitoradas com o uso dos métodos: Adenosina Trifosfato (ATP), Unidade Formadora de Colônias (UFC) e Inspeção Visual. O monitoramento teve duração de 30 dias e as amostras foram coletadas sempre antes e após a equipe realizar o processo de limpeza e desinfecção. **Resultados:** Os resultados demonstraram que a maioria das superfícies apresentou valores de contagem microbiana acima de 2,5 UFC/cm2 tanto antes como depois, sendo assim reprovadas. Apenas uma superfície demonstrou diferenças significativas em relação ao método de adenosina trifosfato: poltrona dos pacientes (P=0,014). Quanto à inspeção visual observa-se que os defeitos na estrutura das superfícies monitoradas impactaram nas taxas de não conformidade. Observou-se ainda a falta de padronização no uso dos produtos. **Implicações:** O estudo evidenciou a necessidade de melhoria no processo, para o atingimento dos valores propostos na literatura, garantindo um ambiente seguro em todos os serviços de saúde, ressalvando-se ainda a natureza complexa dos pacientes portadores de síndrome gripal.

DESCRITORES

Infecções; Desinfecção Concorrente; Assistência à Saúde; Serviço de Limpeza.

RESUMEN

Introducción: Este estudio tuvo como objetivo monitorear el proceso de limpieza y desinfección de superficies en una unidad de síndrome respiratorio. **Diseño**: Estudio transversal, realizado en una unidad de síndrome respiratorio de referencia para la atención del COVID-19. Las superficies con alta frecuencia de contacto fueron monitoreadas utilizando los siguientes métodos: Adenosina Trifosfato (ATP), Unidades Formadoras de Colonias (UFC) e Inspección Visual. El monitoreo duró 30 días y las muestras se recogieron siempre antes y después de que el equipo realizara el proceso de limpieza y desinfección. **Resultados**: Los resultados mostraron que la mayoría de las superficies presentaron valores de conteo microbiano por encima de 2,5 UFC/cm² tanto antes como después, siendo por lo tanto rechazadas. Solo una superficie mostró diferencias significativas en relación con el método de adenosina trifosfato: la silla de los pacientes (P=0,014). En cuanto a la inspección visual, se observó que los defectos en la estructura de las superficies monitoreadas impactaron en las tasas de no conformidad. También se observó una falta de estandarización en el uso de los productos. **Implicaciones**: El estudio evidenció la necesidad de mejorar el proceso para alcanzar los valores propuestos en la literatura, garantizando un entorno seguro en todos los servicios de salud, teniendo en cuenta además la compleja naturaleza de los pacientes con síndrome gripal.

DESCRIPTORES

Infecciones; Desinfección Concurrente; Atención en Salud; Servicio de Limpieza.

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COLLABORATIONS

Rigonato EM and Santos Júnior AG: substantial contributions to the study design and data collection. Gonçalves VP, Angeloni NLN, Rigonato EM, Santos Júnior AG, Lima HP and Valle LAR: analysis and interpretation of data. Gonçalves VP, Angeloni NLN, Rigonato EM and Santos Júnior AG: discussion of results. Maronesi MLP and Rocha, DM: writing and/or critical review of content and review and final approval of the final version. **All authors agree and are responsible for the content of this version of the manuscript to be published.**

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AVAILABILITY OF DATA

Data may be made available with the authors' authorization.

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CONFLICTS OF INTEREST

There are no conflicts of interest to declare.