

# CUIDADO É FUNDAMENTAL

Escola de Enfermagem Alfredo Pinto – UNIRIO

RESEARCH

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## BIOSAFETY AND PATIENT SAFETY IN COVID-19: PERCEPTION OF SURGICAL CENTER HEALTH PROFESSIONALS

*Biossegurança e segurança do paciente na covid-19: percepção dos profissionais de saúde de centro cirúrgico*  
*Bioseguridad y seguridad del paciente en covid-19: percepción de los profesionales de la salud del centro quirúrgico*

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### ABSTRACT

**Objective:** to analyze the perception of health professionals in the operating room regarding their biosafety and patient safety behaviors in the context of COVID-19. **Method:** qualitative study carried out through semi-structured interviews with health professionals from a surgical center, from March to June 2021. Bardin was used for data analysis. **Results:** 36 health professionals participated, including nursing technicians, nurses and doctors. Data analysis resulted in 2222 units of records and 191 units of meaning distributed in the following categories: “Knowledge/importance of the theme”; “Biosafety and patient safety in professional practice”; “Perception of professionals in relation to their conduct aimed at biosafety and patient safety” **Conclusion:** the strengthening of biosafety and patient safety measures was evidenced due to the concern of contamination by COVID-19.

**DESCRIPTORS:** Containment of biological hazards; Patient safety; Coronavirus infections; Surgical centers; health personnel.

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## RESUMO

**Objetivo:** analisar a percepção dos profissionais de saúde em centro cirúrgico com relação as suas condutas voltadas à biossegurança e à segurança do paciente no contexto da COVID-19. **Método:** estudo qualitativo realizado por meio de entrevistas semiestruturadas com profissionais de saúde de um centro cirúrgico, no período de março a junho de 2021. Utilizou-se Bardin para análise dos dados. **Resultados:** participaram 36 profissionais de saúde, contando com técnicos de enfermagem, enfermeiros e médicos. A análise de dados resultou em 2222 unidades de registros e 191 unidades de significação distribuídas nas seguintes categorias: “Conhecimento/importância da temática”; “Biossegurança e segurança do paciente na prática profissional”; “Percepção dos profissionais em relação as suas condutas voltadas à biossegurança e segurança do paciente” **Conclusão:** evidenciou-se o fortalecimento das medidas de biossegurança e segurança do paciente decorrente à preocupação da contaminação por COVID-19.

**DESCRITORES:** Contenção de riscos biológicos; Segurança do paciente; Infecções por coronavírus; Centros cirúrgicos.

## RESUMEN

**Objetivo:** analizar la percepción de los profesionales de la salud en el quirófano sobre sus comportamientos de bioseguridad y seguridad del paciente en el contexto de la COVID-19. **Método:** estudio cualitativo realizado a través de entrevistas semiestructuradas con profesionales de la salud de un centro quirúrgico, de marzo a junio de 2021. Se utilizó Bardin para el análisis de datos. **Resultados:** participaron 36 profesionales de la salud, entre técnicos de enfermería, enfermeros y médicos. El análisis de datos resultó en 2222 unidades de registro y 191 unidades de significado distribuidas en las siguientes categorías: “Conocimiento/importancia del tema”; “Bioseguridad y seguridad del paciente en la práctica profesional”; “Percepción de los profesionales en relación a su conducta encaminada a la bioseguridad y seguridad del paciente” **Conclusión:** se evidenció el fortalecimiento de las medidas de bioseguridad y seguridad del paciente ante la preocupación por la contaminación por COVID-19.

**DESCRIPTORES:** Contención de riesgos biológicos; Seguridad del paciente; Infecciones por coronavirus;; Centros quirúrgicos; Personal sanitario.

## INTRODUCTION

Health in Brazil and worldwide has been radically impacted due to the emergence of coronavirus disease 2019 (COVID-19), caused by the SARS-CoV2 virus. This virus was identified, in December 2019 and quickly spread to other countries, given the ease of contagion and transmission.<sup>1</sup> Transmission occurs through respiratory secretions through particles that are airborne by close contacts between people and/or contaminated contact surfaces.<sup>2</sup>

Generally, symptoms can be mild such as fever, dry cough, myalgia, sore throat, and diarrhea, but some cases, depending on underlying diseases, advanced age, and impaired immune status, can evolve to a more severe form such as respiratory distress syndrome, requiring intensive care in intensive care units and leading to lethality.<sup>3</sup>

For this reason, it was necessary to reserve hospital beds to meet the demand generated by the pandemic and, therefore, elective surgeries were suspended, keeping only urgent and emergency surgical anesthetic procedures. The operating room (OR), as well as the entire health institution, were challenged to develop and implement new protocols and promote adaptations in the environment, as well as in the care practice of these professionals.<sup>4</sup>

Moreover, biosafety, beyond the pandemic, is relevant in order to encourage and improve the safety of health environments, aiming at preventing injuries and promoting health. To this end, it covers good practice guidelines for activities with risky biological agents and their derivatives with the necessary

safety, without causing harm to human, animal, plant, and environmental health.<sup>5</sup>

For this study, considering the context of COVID-19, it is worth highlighting goal 5 of the World Alliance for Patient Safety, which corresponds to hand washing.<sup>7</sup>

With the manifestation of COVID-19, the World Health Organization (WHO) instituted essential measures for the prevention and confrontation of the pandemic, having hand hygiene with soap and water or 70% alcohol gel as the basic and determining means to combat the transmission of COVID-19.<sup>8</sup>

Given the above, the objective of this study was to analyze the perception of health professionals in the operating room regarding their conduct related to biosafety and patient safety in the context of COVID-19.

## METHOD

This is a descriptive-exploratory study, conducted through a qualitative approach with methodological guidance based on content analysis, thus enabling an understanding of subjective data.<sup>9</sup> Due to the qualitative approach, we used the criteria of the Consolidated Criteria for Reporting Qualitative Research (COREQ): a 32-item checklist for interviews and focus groups.<sup>10</sup>

The study site was the surgical center of a large public university hospital linked to the Unified Health System (SUS). The center performs about 40 surgical procedures daily, in conventional, video and robotic modes in several medical specialties. It has a team of about 200 professionals, including nurses, nursing technicians, surgeons, anesthesiologists, and support staff.

The study participants were 36 health professionals, who had direct and frequent contact with patients with COVID-19; nursing technicians, nurses and doctors were included.

Inclusion criteria were: being a health professional working in the OR; having worked in the OR during the period from March to September 2020. As exclusion, we considered the professionals who were on vacation or leave during the period of data collection.

We conducted 36 individual interviews, considering the purposive sampling, in the period from March to June 2021. The interviews were carried out in a reserved environment in the study setting itself, ensuring the privacy and comfort of the participants, being recorded using a cell phone by means of flash drive support and later transcribed manually in full. Field notes were taken after the interviews for non-verbal observations. The average duration of the interviews was 12 minutes, with the shortest taking about 6 minutes, and the longest taking about 32 minutes. The transcripts were reviewed simultaneously with the audios for certification and to ensure flawless content.

A pre-defined data collection instrument was used, and the interviews were classified as semi-structured;<sup>11</sup> it was composed of nine questions focused on the objective of the study, seeking to understand the way professionals conceptualize biosafety/patient safety, the measures in daily practice, and the influence of COVID-19 in these actions. These questions guided the data collection instrument. Besides the specific questions to the object of this study, the instrument also included questions about the participants' profile, age, gender, professional category, period of work in the HS and in the health area. Data collection was completed when the repetition of the participants' speeches was noticed, leading to data saturation.

To organize the data and build the corpus of the study, all the interviews were transcribed in full using a text editing software (Microsoft office word), by the main researcher and reviewed by another researcher. The interviews were identified by the initial of the professional category, followed by the number corresponding to the order in which each one was carried out – nursing technicians (TE), physicians (M), and nurses (N).

For data analysis, content analysis was considered, with Laurence Bardin as reference, including: pre-analysis, material exploration and data interpretation.<sup>12</sup> In this study, pre-analysis was characterized by reading the transcripts; in the exploration of the material, a deeper study of the corpus was obtained, so that the codification was built in registration units (UR), meaning units (US), pre-categories and categories; and in the last stage characterized by the interpretation of the data, the findings of the literature were sought, with the objective of substantiating and comparing the interpretation of the results, articulating the discussion.

The study was reviewed and approved by the ethics and research committee (CEP) under opinion number 4,505,113, on December 16, 2020. Participants were oriented about the study and about the informed consent form (ICF) and voice recording.

## RESULTS

Thirty-six health professionals participated in the study, with the medical category being the most frequent with 16 (44%) physicians, followed by nursing technicians with 11 (31%) and nurses, with nine (25%) professionals.

The most expressive age group was 25 to 30 years old (31%). Most of them have been working for less than five years, both in the OR and in the health area, respectively 61% and 33%. There was a predominance of 19 female professionals (53%), including one physician, nine nurses and nine nursing technicians. Table 1 presents the sociodemographic characteristics of the health professionals in the OR.

The categories that emerged from the content analysis from the interviews are expressed by the percentage referring to the quantity of UR, as shown in Figure 1.

From the analysis of the reports, three categories emerged, which will be described below:

### Category I – Knowledge/importance of the theme

This category involves issues related to the theoretical knowledge of health professionals in the OR, and is composed of two pre-categories: "Concept of biosafety" and "Concept of patient safety".

Among the USs referring to the concept of biosafety, we highlight those that were named as "Biosafety: Process/practices/measures for patient safety" with 65 URs and "Biosafety: Process/practices/measures for professional safety" with 75 URs, which translates an idea that for most participants, biosafety is about practices for the safety of both the professional and the patient. This is portrayed in the speeches of the professionals:

*Biosafety I believe that it is a process of safety forms of safety care, both with the patient, as well as with the professional, I believe that is it (TE02).*

*Biosafety, to me, is a way to ensure the safety of all individuals who work in the medical field from situations of health risk (M32).*

Regarding the pre-category "Concept of patient safety", it was noted that the professionals related the concept of patient safety to harm reduction and the items of the safe surgery checklist, and the US with the highest quantitative relevance was: "Patient safety: do not cause/minimize harm" with 22 RUs, followed by "Patient safety: items of the safe surgery checklist" with 17 Urs:

*Patient safety is you making sure that what is being done instead of causing harm, is going to be at the very least, something that can help, it's the "primum non nocere". Do no harm (M29).*

*It includes all those items of patient identification, risk of falling, no phlebitis, everything about safe surgery, the 10 items of the checklist... for me this is patient safety (E10).*

**Table 1** – Distribution of sociodemographic characteristics of health professionals in the operating room. Rio de Janeiro, RJ, Brazil, 2021

Variables	Frequency	%	
Professional Category	Doctor	16	44%
	Nursing Technician	11	31%
	Nurse	9	25%
Age	25 to 30	11	31%
	31 to 40	9	25%
	41 to 50	7	19%
	51 to 62	9	25%
Gender	Female	19	53%
	Male	17	47%
Period of performance in the OR	< or equal to 5 years	22	61%
	6 to 10 years	5	14%
	11 to 20 years old	5	14%
	21 to 28 years old	4	11%
	< or equal to 5 years	12	33%
Period of performance in the health area	6 to 15 years old	8	22%
	16 to 24 years old	7	19%
	25 to 35 years old	9	25%

**Table 2** – Distribution of categories and pre-categories, based on the speeches of the participants. Rio de Janeiro, RJ, Brazil, 2021

Categories	Pre-categories	n (%)
<b>Importance of the theme</b>	Biosafety concept	34 (14,58%)
	Patient Safety Concept	144 (6,48%)
	Hand hygiene	181 (8,14%)
<b>Biosafety and patient safety in professional practice</b>	Use of adornments	245 (11,02%)
	Use of PPE	321 (14,44%)
	Risks associated with the practice	78 (3,51%)
<b>Perception of the professionals in relation to their conduct aimed at biosafety and patient safety</b>	Influence of COVID-19 on the daily practice of health care professionals	681 (30,64%)
	Influences of COVID-19 on theoretical knowledge of biosafety and patient safety	83 (3,73%)
	Biosafety/patient safety measures in the pre-pandemic	92 (4,14%)

### Category II – Biosafety and patient safety in professional practice

The second category sought to group units of meaning referring to the use of biosafety measures, as well as patient safety measures in the daily routine of professionals. There are five pre-categories. For the purpose of description, we chose to present the three most representative: Hand hygiene, use of adornments and use of personal protective equipment (PPE).

Regarding hand hygiene, the participants reported that they have this practice as a habit, and the most prevalent US is "Hand hygiene as a habit/ several times a day" with 34 US, highlighting the use of alcohol. However, it is relevant to say that many revealed hand hygiene as a function of procedures performed, having the US "Hand hygiene before/after performing procedures" with 21 URs.

*Currently I do it all the time, at least with 70% alcohol that we have in the room, but I already had this habit before the pandemic, I already had this habit of sanitizing my hands with alcohol (M16).*

*Usually after I do some procedure... I know it is wrong, there are moments, right (E8).*

As for the use of adornments, the most frequent US was "Does not use adornments" with 44 URs, while the US "Resistance in removing adornments" had 31 URs. Among the types of adornments, the most used among the participants was the earring.

*I take off the adornments, watch... all that (M30).*

*I wear it. I wear earring. I always wear earrings, it is difficult for me to take them off. Earrings in fact are very difficult (E10).*

It is also pointed out that there is a resistance in removing adornments on the part of health professionals, revealing in some reports, like the ones in the statements, the idea of absence of risks.

*The only thing I wear is the cord, and I find it absurd to forbid me to wear a cord because first of all I don't go into the surgical field, I stay outside. Second, because the cord bathes with me, I don't take it off for anything... so if I have it contaminated, the cord will also be contaminated (M19).*

With regard to the use of PPE, it can be observed that the most used by the participants is the mask, characterizing the US "Use of PPE: mask" with 34URs. In this pre-category, meaning units such as "Difficulty of access/availability/bad quality of PPE with 33Us"; "Refers to use of PPE according to what is necessary for the procedure/practice" with 28Us; "Recognizes that he/she should make more and better use of PPE in professional practice" with 26Us.

*Sometimes, yes... other times, for structural reasons, right, for lack of sometimes in a public hospital, in a needier hospital, we are not always protected as we should be... we are not always totally protected, but as far as possible, everything we can do to protect ourselves we do (M20).*

*I confess that I don't use as I should use because of negligence on my part... I don't worry so much about this... at least with me (M18).*

We also highlight, in the context of COVID-19, reports of difficulty in using face shield because of the discomfort, especially to perform certain procedures.

*I used for a while the face shield... I don't use it anymore, it is very bad for us to use the face shield.... it disturbs... it really disturbs a lot, but the others, we use everything (M3).*

### **Category III – Perception of the professional in relation to their conduct aimed at biosafety and patient safety**

The last category was directly linked to the objective of the study, being composed of three pre-categories. Considering the most relevant ones, the pre-categories "Influence of COVID-19 in the daily practice of the HS health professionals with 36USs and 681URS" and "Influence of COVID-19 in the theoretical knowledge of health professionals with 3USs and 83URS" are presented.

Among these, the most relevant USs to the objective are "Influence of COVID-19 on practical biosafety/patient safety measures – more judicious/intense/cautious" with 171URs, being the most expressive US of the study and "Influence of COVID-19 on acquisition/modification of biosafety/patient safety knowledge with 45UR".

*The issue of adornments, now in the pandemic we really decreased the use (TE1)*

*No doubt about it. In this part, we noticed a change. There was much more care, much more caution with biosecurity in general. Use of PPE, understand that there is PPE, like the face shield (...) (M29).*

*The use of masks in all environments, which before was only in the room, and now we have to wear masks in all environments (E8).*

*So, biosafety is something that is growing, with this pandemic... we will talk more about it (E27).*

## **DISCUSSION**

As for the profile of health professionals in the OR of the study, such as age, time working in health care and time working in the OR, it is observed in the results found a typical characteristic of a university hospital, with a number of recently graduated professionals, seeking specialization in the form of residency. Moreover, it is also worth mentioning the predominance of female professionals, which can associate nursing, nurses and nursing technicians, as a mostly female profession.<sup>13</sup>

Regarding category I – knowledge/importance of the theme, it was observed that the theoretical understanding of health professionals related to the concept of biosafety is in line with what is established by the Ministry of Health, which defines biosafety as "a safety condition that seeks to prevent risks to human, animal, plant and environmental health related to biological agents and derivatives".<sup>6</sup>

It can also be said that the concept of patient safety is in accordance with the WHO, which treats patient safety as the "absence of potential or unnecessary harm to the patient associated with health care and the adaptability of health institutions to the human and operational risks inherent in the work process.

However, it is worth noting that since the surgical environment is the setting in which the concept of safe surgery is most present, it is necessary to have a broader look at patient safety, also paying attention to other international safety goals.<sup>6</sup>

Based on the premise of identifying the prior knowledge of health professionals about the subject,<sup>14,15</sup> it is shown that this category revealed a theoretical knowledge on the part of the study subjects about the subject, being valid to highlight the expansion of these concepts for health care as a whole, even if the emphasis is on the operating room.

Regarding biosafety in professional practice, referring to category II, the pre-categories are discussed: hand washing, use of adornments and use of PPE. It was noticed in relation to the first that the five moments recommended in the guidelines are not yet in practice.<sup>4,6</sup> As for the second pre-category, named "biosafety concept", it is pointed out that even though most professionals refer to the removal of adornments, there is still a certain resistance. This resistance to the removal of adornments

may be related to the idea of what is held about these objects, which are often used in an intricate way for self-affirmation, status display, protection, among other demands. However, it is worth noting the associated biological risks due to the possibility of adherence of microorganisms.<sup>15,16</sup>

Regarding the pre-category concerning the use of PPE, it was noted that, because it is a private environment, the OR professionals are already used to wearing caps and masks, in addition to the use of private clothes. Also showing that there is a difficulty in access/availability of quality PPE.<sup>17</sup>

PPEs are considered physical barriers responsible for preventing contact and the spread of agents that bring risk. However, adherence in professional practice becomes a challenge. Studies show that factors such as lack of information, haste, inconvenience, unavailability corroborate the lack of adherence, which can also be observed in this study, especially regarding the use of the face shield.<sup>16,18</sup>

Biosafety measures in professional practice are challenging, considering hand hygiene, removal of adornments, and the use of PPE, among others. The dichotomy between theoretical knowledge and the applicability of practices in daily life is frequent, bringing into vogue a need to stimulate adherence, given the risk factors present in health environments.<sup>19,20</sup>

The third category provided an identification of the influence of COVID-19 on professional practice. It is based on the principle that it is a highly transmissible disease that has affected all parts of the world, with protocols and recommendations by health organs evidenced on a large scale to be implemented in the services, aiming at patient safety and the protection of the worker, who is directly exposed to contamination.<sup>21</sup>

Among the recommendations in guidelines<sup>4</sup>, the need for professional training through training, simulations, and protocols is emphasized, especially regarding the dressing and disrobing of PPE, reinforcing that personal objects should not be taken into the surgical environment and the use of cell phones should be done very carefully.

Considering the influence of COVID-19 in the use of PPE, it is noteworthy in this study, the considerable increase in the use of masks by professionals of the HS, highlighting reports on the use of this PPE beyond the operating room, which was an uncommon practice in the pre-pandemic. It is also noteworthy the influence on the use of the N95/PFF2 mask, since the surgical mask has become questionable in this context, for not protecting efficiently the aerosol transmission, only the droplet transmission. Since the OR is a sector where there is a high propagation of aerosols through intubation/extubation, use of electric scalpel, among other practices, the use of N95/PFF2 was strongly recommended.<sup>4,21</sup>

This change in the behavior of professionals facing these issues was also mentioned in the literature, putting into question the risk to which they have always been exposed, reflecting that the trivialization of issues related to patient safety and biosafety may expose professionals to acquire diseases that could lead them to death in the long term, as is the case of acquired immunodeficiency

syndrome (AIDS), hepatitis B, tuberculosis, among others. It also shows that the greater caution regarding COVID-19 is justified by the fear of exposure to a virus with a high speed of propagation and high mortality rates in a short time.<sup>22,23</sup>

Although this study shows the perception of the influence of COVID-19 characterizing an increase in biosafety measures, it is valid to highlight the challenges for the adoption of these practices found in the literature, such as unsafe situations to which many professionals were exposed, the high demand for PPEs for the protection of health workers that resulted in insufficient care for all professionals and the need for rationing of PPEs. In addition, inadequate practices at the time of dressing or undressing, which can increase the risk of contamination.<sup>23</sup>

## CONCLUSION

The study allowed an understanding of the perception of health professionals in OR about their conducts aimed at biosafety and patient safety. There is an understanding of the influence of COVID-19 in the daily lives of the professionals involved in the study, especially because of the fear generated by the highly transmissible and at the time still unknown virus. The study also made it possible to understand how the health professionals who work in the OR understand and practice biosafety and patient safety.

It is hoped that this study will contribute to the professional practice, in order to sensitize the professionals who are in the health area and exposed to risks, about the importance of care with biosafety and patient safety in the search for the guarantee of a safe and quality surgical assistance.

Besides, to offer subsidies for new researches, suggesting the identification in the post-pandemic of the maintenance of these measures of biosafety and patient safety that were intensified with the pandemic of COVID-19.

This study is limited by the small number of publications focused on the objective, i.e., that deal with some elements associated with biosafety, patient safety, operating rooms, health professionals and COVID-19, besides the fact that it involves a OR for data collection, limiting the number of participants.

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