

# Nursing knowledge and practices regarding placing patients in the prone position: a descriptive study

Saberes e práticas da enfermagem no manejo do paciente em posição prona: estudo descritivo

Conocimientos y prácticas de enfermería en la gestión del paciente en posición prona: estudio descriptivo

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## ABSTRACT

**Objective:** to describe the knowledge and practice of nursing workers providing intensive care to COVID-19 patients in prone position. **Method:** descriptive and qualitative study addressing the nursing staff of an intensive care unit (ICU) from a public hospital located in Niterói, Rio de Janeiro, Brazil. **Results:** knowledge was grouped into three thematic categories: Nursing care provided before placing a patient in the prone position; Nursing procedures while patients are in the prone position; and Nursing care after patients return to the supine position. **Conclusion:** the knowledge and practices of nursing professionals concerning the care provided to COVID-19 patients while in the prone position indicate that workers focus on preventing complications and ensuring the patients' wellbeing, recovery, and improved quality of life during hospitalization.

**Descriptors:** Nursing Care; Coronavirus Infections; Pronation.

## RESUMO

**Objetivo:** descrever os saberes e as práticas dos profissionais de enfermagem que prestam assistência na Unidade de Terapia Intensiva (UTI) ao paciente em posição prona, acometido pela COVID-19. **Método:** estudo descritivo, qualitativo, realizado com uma amostra constituída por integrantes da equipe de enfermagem de uma UTI de um hospital público em Niterói, Rio de Janeiro. **Resultados:** os saberes foram agrupados em três categorias temáticas: Assistência de enfermagem antes do procedimento de pronação; Procedimentos de enfermagem durante o período em posição prona; e Cuidados de enfermagem após o retorno para a posição supina. **Conclusão:** os saberes e as práticas dos profissionais de enfermagem, correlacionados aos cuidados ao paciente acometido pela COVID-19 em posição prona, apontam para abordagens focadas na prevenção das complicações, cuja finalidade pauta-se no bem-estar, recuperação, e na melhor qualidade de vida durante o período de internação.

**Descritores:** Cuidados de Enfermagem; Infecções por Coronavírus; Pronação.

## RESUMEN

**Objetivo:** describir los conocimientos y las prácticas de los profesionales de enfermería que prestan asistencia en la Unidad de Terapia Intensiva (UTI), al paciente en posición prona, afectado por el COVID-19. **Método:** estudio descriptivo y cualitativo, realizado con una muestra constituída por integrantes del equipo de enfermería de una UTI de un hospital público en Niterói, Rio de Janeiro. **Resultados:** los conocimientos fueron agrupados en tres categorías temáticas: Asistencia de enfermería antes del procedimiento de pronação; Procedimientos de enfermería durante el período en posición prona; y Cuidados de enfermería después del retorno a posición supina. **Conclusión:** los conocimientos y las prácticas de los profesionales de enfermería, correlacionados con los cuidados al paciente afectado por el COVID-19 en posición prona, apuntan para abordajes enfocados en la prevención de las complicaciones se guía por el bienestar, recuperación y la obtención de la mejor calidad de vida durante el período de internación.

**Descritores:** Cuidados de Enfermería; Infecciones por Coronavirus; Pronación.

## INTRODUCTION

On December 31<sup>st</sup>, 2019, the World Health Organization (WHO) was warned about various cases of pneumonia in Wuhan city, Hubei Province, China. It was a new strain of coronavirus that had not been previously identified among humans<sup>(1)</sup>. The disease spread quickly and became a concern due to the high number of infected people and deaths worldwide, with 19,266,406 cases and 718,530 deaths confirmed up to August 7<sup>th</sup>, 2020<sup>(2)</sup>. In Brazil, 19,419,437 cases and 544,180 deaths had been confirmed by July 20<sup>th</sup>, 2021<sup>(3)</sup>.

The virus is transmitted through droplets expelled when speaking, coughing, or sneezing; through direct transmission (when speaking, coughing, and/or sneezing close to another person), or indirectly, after having contact with surfaces contaminated by droplets and bringing hands to the eyes, nose, or mouth. Clinical manifestations may range from asymptomatic to the most severe form of the disease, which in many cases involves respiratory complications and the need to be admitted to an intensive care unit (ICU) and use mechanical ventilation<sup>(2)</sup>.

People infected with the disease's mildest form may present diarrhea, fever, or cough, while complications include dyspnea and often rapidly progress to Severe Acute Respiratory Syndrome (SARS). The incubation period is assumed to be about five days, and symptoms may start from the 11<sup>th</sup> day onwards. For safety reasons, social isolation is recommended for 14 days in case of suspicion<sup>(4)</sup>.

When testing is not available, ground-glass opacity, observed on computed tomography, associated with a patient's clinical condition, is a strong indication of the disease; the more significant the lung impairment, the more severe the disease. In addition, studies report bronchial wall thickening and traction bronchiectasis, among other pulmonary dysfunctions, thus characterizing acute respiratory distress, requiring rapid medical and hospital intervention, including endotracheal intubation and mechanical ventilation<sup>(5)</sup>. Currently, early intubation of COVID-19 patients is recommended, especially among those with severe hypoxemia, characterized by a PaO<sub>2</sub>/FiO<sub>2</sub> ratio<sup>(6)</sup>.

In order to improve the breathing pattern among patients with SARS, the prone position is indicated to make ventilation more homogeneous, decreasing ventral alveolar distention and dorsal alveolar collapse, by reducing the difference between dorsal and ventral transpulmonary pressures, in

addition to decreasing compression on the lungs, improving its perfusion<sup>(7)</sup>.

COVID-19 patients need to be closely monitored as various complications may arise from the prone position, including accidental extubation, cardiorespiratory arrest, severe bradycardia and hypotension. Hence, blood gas response must be periodically assessed, and cushions placed under strategic points (face, chest, wrists, pelvis, and anterior region of the legs) to prevent pressure injuries. Thus, the prone position is recommended when patients "have Severe Acute Respiratory Syndrome and severe abnormal gas exchange, represented by an association between partial pressure of oxygen in arterial blood and inspired oxygen fraction (PaO<sub>2</sub>/FiO<sub>2</sub>) below than 150 mmHg"<sup>(8)</sup>.

Therefore, the nursing staff plays a crucial role in the care and procedures performed among patients in the prone position. For example, nursing workers are responsible for pausing the enteral diet and setting the nasoenteric tube to drain, caring for the sheet not to loosen up while rotating the patient; and placing cushions under strategic places to prevent pressure injuries after rotation<sup>(2)</sup>.

This study's objective is to describe the knowledge and practices of nursing workers providing care to COVID-19 patients in the prone position. SARS is the most severe complication of COVID-19, progressing with considerable mortality rates due to complex inflammatory and infectious phenomena in various organs, especially the lungs.

## METHOD

A descriptive, explanatory study with a qualitative approach is intended to describe a phenomenon expressed through beliefs, values, opinions, representations, forms of relationship, symbologies, uses, customs, behaviors, and practices<sup>(9)</sup>. A convenience sample was addressed; that is, participants were recruited according to their availability. Hence, the nursing team of the ICU of a public hospital located in Niterói, Rio de Janeiro, Brazil, took part in this study. Inclusion criteria were: having a nursing background (i.e., undergraduate degree, or a technical and/or nursing assistance training), being a member of the nursing staff of the selected ICU, regardless of professional experience in the health field or intensive care. Exclusion criteria were: Nursing workers with an administrative position or absent at the time of data collection, due to vacation or leave, and

those withdrawing at any stage of data collection. The participants were addressed in person, and in general, everyone provided significant contributions. Only two individuals reported being unavailable to participate. Researchers with an undergraduate, Master's, or doctoral degree conducted the survey. Note that some of the researchers were employees of the institution under study; however, those individuals not familiar with the participants collected data to prevent any influence on the results. The interviewees received training before data collection to achieve the effectiveness and efficiency of this procedure.

Data were collected and audio recorded from July to September 2020. A semi-structured questionnaire containing 20 open questions addressing the object of study was used. It also contained questions to characterize the informants. A pretest was previously implemented to make potential adjustments to the instrument. Saturation of data determined when data collection ceased, which happened with interview No. 14, i.e., the main criterion was not numerical. Data collection ceased when the primary elements that concerned the phenomenon under study were obtained<sup>(9)</sup>.

Content analysis was used to interpret data. The sequential procedure included a verbatim transcription of the audio-recorded material, organization of texts, pre-analysis based on floating readings, analysis after identifying the most prevalent themes, and finally, inference and interpretation of data<sup>(10)</sup>. The participants are identified as "Technical (T)" or "Nurse (N)" followed by the number corresponding to the order of the interview, e.g., T1, N2, etc., to ensure confidentiality of the participants' information.

In compliance with all ethical guidelines regulating research with human subjects, the project was approved by the Institutional Review Board at the Fluminense Federal University (University Hospital Antônio Pedro/Medical School), CAAE No. 32208820.0.0000.5243, and approved under No. 4,146,784. The informed consent form clarified the study's objectives and procedures and ensured confidentiality of information, according to the ethical and legal principles established by Resolution No. 466/ 2012<sup>(11)</sup>.

## RESULTS

This study included 17 nursing workers: eight nurses and nine nursing technicians, aged between 26 and 53; most were women of mixed race or Afro-descendant. Regarding religion, seven reported

being Catholic, six reported being Evangelic, two reported religions of African origin, and two reported no religion. Most were married or were in a stable union and had children. Predominant family income was four times the minimum wage. As for education, three nursing technicians had a bachelor's degree, and two reported some undergraduate studies. One of the nurses reported a Master's degree. Professional experience ranged from seven months to 20 years.

Data analysis identified that the participants' practices related to the phenomenon expressed through beliefs, values, opinions, representations, relationships, symbologies, uses, customs, behaviors, and practices<sup>(9)</sup>. Hence, the material was read for the authors to comprehend the participants' reports. Next, data were organized into three thematic categories: Nursing care provided before placing the patient in the prone position; Nursing procedures during the prone position; and Nursing care after the patient returns to the supine position.

### **Nursing care provided before placing the patient in the prone position**

This category includes nursing care the participants perform before placing patients in the prone position. Various actions were reported and the most frequent concerned protecting bony prominences and enteral nutrition:

*Before placing a patient in the prone position, we must care for bony prominences to prevent injuries, placing cushions on patients (T1).*

*It is important to observe bony prominences and place protections to prevent pressure injuries (N9).*

The previous reports show that care is not restricted to placing patients in a new position but also taking precautions to prevent iatrogenic events. Regarding enteral nutrition, the participants also reported that some nursing care actions are necessary to prevent complications arising from the prone position:

*We must interrupt the enteral diet for 30 minutes (T12).*

*It is very important to pause the diet two hours before the procedure (N13).*

## **Nursing procedures during the prone position**

In this category, we sought to assess the nursing care actions provided to patients in the prone position. The care actions most frequently mentioned were alternating the swimmer's position, assessing invasive devices, and verifying the presence of injuries caused by devices:

*It is important to be careful when moving the lower and upper limbs and head, positioning them correctly to prevent pressure ulcers (T3).*

*Some of the main body parts need to be cared for, such as turning the head to one side, putting a device between legs to prevent pressure ulcers (T6).*

Assessing invasive devices enables rapid and assertive decision-making to prevent harm. Hence, another care action required by a patient in the prone position is to assess invasive devices, as the following excerpts show:

*You have to be careful not to dislodge the tube and device (T3).*

*A way to prevent injuries is to monitor the ventilator, especially the tube, connections, invasive devices (N5).*

Regarding potential skin lesions, the workers are concerned with monitoring patients in the prone position to prevent unfavorable outcomes, as the following reports show:

*You have to be careful not to have any device under the skin, prevent injuries, and always pay attention to the devices' position because some devices can cause severe skin injuries (T3).*

*You have to pay attention and check areas under pressure to avoid injuries (N10).*

## **Nursing care after the patient returns to the supine position**

This category emerged from nursing care that is necessary to return the patient to the supine

position. The care actions most frequently reported in this category were assessing the patient's hemodynamic stability and invasive devices. Hence, the reports show the workers monitor hemodynamic stability:

*At this point, you have to be very attentive because of the possibility of bronchoaspiration. It is important to properly position the patient and pay attention to see if there won't be any complications, keeping an eye on the monitor's hemodynamic parameters (T4).*

*It is strongly recommended to observe vital signs and see no hemodynamic instability occurs. It is essential to monitor patients continuously and assess their respiratory function (N13).*

Regarding invasive devices, this item is mentioned again, however, as a risk factor for complications when returning to the supine position:

*When returning a patient to the previous position, we must change the electrodes again, check the position of devices, make the change and monitor how the patient progresses to see if there will be any decompensation (N7).*

*You have to check the devices, see what you can connect and disconnect. Then, change everything back when returning the patient to the previous position; it's very complicated, and you have to be really careful with the devices (T8).*

The participants report many difficulties are found when handling patients in the prone position, among which, the lack of human resources stands out:

*The biggest problem here in the ICU is proper staffing. Since we work at night, placing a patient in the prone position is complicated when there are few workers; more workers need to be hired. Generally, there are two technicians and one nurse to do many tasks; so, we are a bit overwhelmed (T6).*

*Nursing is available 24 hours to do the process, but we depend on other workers*

*to do the process; people are not always available when we need them (N17).*

## DISCUSSION

The participants reported that strategies need to be implemented before placing a patient in the prone position to promote comfort and ensure skin integrity. Reports concerning the use of devices intended to promote comfort and protect patients against pressure injuries stood out, in addition to the care required by enteral nutrition. Hence, the literature recommends that cushions be strategically positioned to support the face, chest, wrists, pelvis, and the thighs anterior region, and bony prominences, to decrease injuries resulting from the position<sup>(12)</sup>. Still, the patients' skin must be periodically assessed, checking for moisture, friction, or shear<sup>(13)</sup>.

Considering that the invasive devices more frequently used in an ICU are the endotracheal tube, tracheostomy tube, central and peripheral venous catheters, nasogastric and indwelling vesical probes and drains<sup>(14)</sup>, checking these components implies minimizing the risk of pressure injuries. Therefore, strategies are needed to minimize these risk factors, such as having qualified workers using checklists and implementing nursing protocols<sup>(15)</sup>.

In addition to the care needed to ensure skin integrity, the participants reported the importance of care concerning enteral nutrition. Hence, one adverse event that may occur when handling a patient in the prone position is the nasogastric tube being accidentally disconnected. Regarding this event, the literature reports that the patient's diet needs to be paused two hours before the procedure and be gradually resumed one hour after the maneuver with the patient in the reverse Trendelenburg position, confirming the position is correct via an X-ray<sup>(16)</sup>.

Accidental extubation is also a potential complication in the prone position, facilitated by the risk of the endotracheal tube being displaced during facial decompression and when changing the swimmer's position every two hours, a procedure that is performed when the patient is in the prone position<sup>(17)</sup>.

This study showed that alternating the swimmer's position, monitoring invasive devices, and checking for pressure injuries are actions that decrease pressure on the facial region and upper

limbs, also preventing accidental displacement and injuries causing by these devices.

Note that the swimmer's position consists in placing a patient with one arm flexed up and the other extended down, with the face in the direction of the raised arm. The arms position must be alternated every two hours to prevent brachial plexus injury<sup>(18)</sup>. Therefore, the participants reported they monitor patients in the prone position, paying particular attention to their position on the bed and the position of invasive devices. Hence, the nursing team's periodical monitoring increases patient safety, decreasing the risk of adverse events arising from the maneuver and permanence in the prone position<sup>(17)</sup>.

The benefits of the prone position for patients with SARS also result from minimizing complications before, during, and after placing a patient in the prone position and implementing other preventive actions, hygiene care, hydration, and ocular occlusion; the latter is important to prevent injuries to the cornea while in the prone position<sup>(19)</sup>.

At least six health professionals are recommended to compose the team that places patients in the prone or supine position: a physician, a physical therapist, a nurse, and two nursing technicians, in addition to one professional responsible for the checklist. Additionally, to ensure patient safety, the team must be organized appropriately with the physician positioned on the patient's head to coordinate the maneuver and perform re-intubation in case of accidental extubation. Higher-level professionals are positioned on the trunk and mid-level workers on the lower limbs<sup>(16)</sup>.

It is important to note that continuous education is vital for nursing professionals working in ICUs, and regular training is recommended<sup>(20)</sup>. Therefore, training the nursing staff to manage patients in the prone position can significantly decrease the risk of accidents with invasive devices.

None of the participants reported any specific care concerning the COVID-19 pandemic, such as the need to wear personal protective equipment (PPE) before, during, or after placing a COVID-19 patient in the prone position.

## CONCLUSION

This study showed that particularities linked to the context of an ICU when facing emergencies and dealing with the severe conditions of COVID-19 patients require nursing workers with technical and

scientific knowledge, able to intervene in diverse events using quality care procedures intended to ensure patient survival.

This study's limitation refers to the fact that only one health setting, an ICU, was addressed, limiting the generalization of results.

We highlight that the nursing workers reported a shortage of human resources. Insufficient staffing hinders the care provided to patients in an ICU in the context of the COVID-19 pandemic. Having all the team members present is essential for the therapy's success and overcoming the biomedical model, valuing all actors in a broader context, which shows the importance of each actor involved in the care provided to patients in an ICU. We also highlight the relevance of the nursing team to the care provided to COVID-19 patients in the prone position.

This study was intended to describe the knowledge and practices of nursing workers providing care to COVID-19 patients receiving intensive care when in the prone position. The results showed that the knowledge and practices of the professionals providing care to patients within the pandemic context have multiple facets and demand that their skills are approached from different perspectives. Hence, complications can be prevented to ensure the patients' wellbeing, recovery, and improved quality of life during hospitalization.

Therefore, this study's objective was achieved, and the knowledge and practices of nursing profes-

sionals working in an ICU concerning the handling of patients in the prone position were described and are in agreement with the current literature.

Therefore, the prone position is a therapy that presents risks, and nursing care is crucial to prevent injuries and complications with the potential to compromise the treatment.

Nursing professionals working in the COVID-19 pandemic need to work for the therapy's success, providing care based on technical and scientific knowledge to promote the patients' recovery and minimize the risk of complications in a universe of many possibilities within an ICU. However, this study's results indicate that an ICU requires proper staffing, and nursing workers need to receive continuous education to provide nursing care before, during, and after placing patients in the prone position.

Finally, this study recommends that workers pay attention to preventive measures against Sars-CoV-2, such as wearing a disposable apron, N95 mask, and face shield, prioritizing patient safety and the safety of those looking after them.

#### **CONFLICT OF INTEREST**

The authors have declared that there is no conflict of interest.

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