

Jurnal Info Kesehatan

Vol. 22, No. 2, June 2024, pp. 289-299

P-ISSN 0216-504X, E-ISSN 2620-536X

DOI: [10.31965/infokes.Vol22.Iss2.1542](https://doi.org/10.31965/infokes.Vol22.Iss2.1542)Journal homepage: <https://jurnal.poltekkeskupang.ac.id/index.php/infokes>**RESEARCH****Open Access****Nurses Experience of Prone Position in The Absence of Positioning Tool, and Suggestion of Prone Position Tool: A Phenomenology Study****Sriyono^{1*}, Hakim Zulkarnain¹, Erna Dwi Wahyuni¹, Wikan Purwihantoro Sudarmaji², Jujuk Proboningsih³, María Pilar Mosteiro-Díaz⁴**¹ Faculty of Nursing, Universitas Airlangga, Surabaya, East Java, Indonesia² Universitas Airlangga Hospital, Surabaya, East Java, Indonesia³ Department of Nursing, Health Polytechnic of Ministry of Health Surabaya, Surabaya, East Java, Indonesia⁴ Faculty of Medicine and Health Sciences, University of Oviedo, Oviedo, Spain^a Email address: sriyono@fkip.unair.ac.id^b Email address: hakim.zulkarnain@fkip.unair.ac.id^c Email address: erna-d-w@fkip.unair.ac.id^d Email address: wikan-p-s@staf.unair.ac.id^e Email address: jujukproboningsih111970@gmail.com^f Email address: pilarmosteiro@gmail.com

Received: 29 May 2024

Revised: 20 June 2024

Accepted: 29 June 2024

Abstract

During the COVID-19 pandemic which is a non-natural disaster, the ARDS cases (Acute Respiratory Disease Syndrome) rocketed. Despite the advantages of prone positioning for ARDS care, ICU staff seldom use it due to the unavailability of positioning tools, making it a challenging task for nurses. This study aims to investigate nurses' experiences with manual prone positioning and propose ICU-friendly prone position tools. This research method used a qualitative phenomenology theory study to 15 ICU nurses who were experienced in prone positioning at least 10 times to intubated patients and had complaints about the intervention. The experience was gathered using structured questions and recorded. The data was analyzed following Colaizzi's thematic method, and all the emerged themes were collected and reported. The research results show that fifteen interviewed nurses noted that prone positioning is physically demanding and requires a coordinated team with a minimum of three staff, 2 handle patient positioning, and 1 leader securing the intubation tube. Before starting, the team assesses the difficulty level. Recommended tools include a slide sheet with handles, a modified Vollman prone positioner, and a crane-like prone harness. The conclusion is nurses find tools highly beneficial for prone positioning but will improvise with available resources like underpads as a ring-shaped pillow if tools are unavailable.

Keywords: Acute Respiratory Distress Syndrome, Critical Care, Prone Position, ICU, Intensive Care Unit, Nursing, Non-Natural Disaster.***Corresponding Author:**

Sriyono

Faculty of Nursing, Universitas Airlangga, Surabaya, East Java, Indonesia

Email: sriyono@fkip.unair.ac.id

©The Author(s) 2024. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated.

1. INTRODUCTION

Nurses in the ICU can perform prone position on ARDS (Acute Respiratory Disease Syndrome) patients to increase SpO₂ from 85% to 95%, reduce dyspnea, decrease mean hospitalization up to 4.8 days, and significantly reduce mortality (Chui & Craen, 2016; Moghadam et al., 2020). Nurses along with the team can perform prone position on every patient who needs it and does not have any contraindications, regardless of whether the patient is attached to mechanical ventilation or not (Ovayolu et al., 2014), however mechanically ventilated patients are more susceptible to complications during position change (González-Seguel et al., 2021; Wotiye et al., 2022). Scott, et al (2022) said that in addition to the many benefits of prone positioning, complications due to this action can be well mitigated (Scott et al., 2022). However, complications for nurses or staff handling prone positions are sinking from attention due to research too focused on the point of view of patient benefits. Unfortunately, there are barriers for nurses to perform this action related to the nature of the intervention that involves heavy maneuver, loads of manpower, and not all ICU has the specialized tools to perform prone position (Chui & Craen, 2016; González-Seguel et al., 2021; Ovayolu et al., 2014).

Many ICU rooms lack tools for prone positioning, making it a physically demanding task for nurses who must manually position patients, often risking injury (Callihan & Kaylor, 2021; González-Seguel et al., 2021; Wiggermann et al., 2020). Nurses perform the prone position by placing a sheet under the lower part of the patient's body and pulling it to turn the patient from a supine to a prone position (Wiggermann et al., 2020). Nurses need to reposition patients every 2 hours to prevent pressure ulcers and address discomfort, and must quickly return patients to a supine position in case of complications such as bleeding, tubing detachment, or emergencies like prolonged desaturation and hemodynamic instability (Binda et al., 2021; Callihan & Kaylor, 2021). Prone positioning requires a team of 5-8 trained staff, including anesthesiologists, pulmonologists, or respiratory therapists, highlighting the importance of proper training (Bamford et al., 2020; Scott et al., 2022). Despite training, staff shortages and high ICU nurse workloads exacerbate the challenges, especially when untrained or unrelated health workers are involved (Dewi et al., 2019; Scott et al., 2022; Wiggermann et al., 2020).

ICUs often lack specialized prone positioning tools due to cost and limited accessibility. Hospitals face challenges in investing in tools like RotoProne, with a return on investment taking years. Global disparities in access to these resources further compound the issue (Scott et al., 2022; Wiggermann et al., 2020). While solutions exist, such as manual maneuvers or specific machines, they're not universally applicable due to manpower constraints, complications, and financial limitations (Astua et al., 2021). This problem, highlighted over two decades, is underscored by the COVID-19 pandemic (Astua et al., 2021; Berhan, 2020; Chatte et al., 1997; Chui & Craen, 2016; Moghadam et al., 2020; Teklu et al., 2020; Vollman, 1997). According to all data problem, the aim of this study is to explore the nurse experience of manual prone position and suggestion of prone position tool design in ICU.

2. RESEARCH METHOD

This phenomenological study explores nurses' experiences, challenges, and tool recommendations for prone positioning (Chung et al., 2021; Jeffery et al., 2017; Tong et al., 2007; Wirihana et al., 2018). The interviewer consisted of three people, two of them was masters and the other one is PhD. The interviewer and the participant do not have any close relation. The study happened in November – December 2022.

The research was conducted to an ICU nurse of a secondary hospital in Surabaya city Indonesia. This hospital was chosen because during the COVID-19 pandemic, the ICU was full

of patients and the prone positioning was a routine activity. All the participants fulfil the requirements of at least had the experience of performing 10 prone positions to non-intubated and intubated patient.

The participants recruited by contacting the ICU nurse unit manager and requested the population size which was 50 nurses. The target participants were 15 with the consideration of data saturation achieved (Tong et al., 2007). The simple random sampling conducted to the eligible participants and recruited privately to avoid bias related to work hierarchy. All the participant explained the research and filled the informed consent. The interview conducted using virtual meeting software, recorded, and notes were taken. The interview designed for 30 minutes to 1 hour. The transcript was agreed by the participant.

Instrument and data collection. The experience was gathered using structured questions and recorded using a laptop. Each participant asked these questions:

1. What is your experience performing prone positioning?
2. How you do it?
3. Do you have health complaints during the prone positioning?
4. What is your suggestion about a modification tool for the prone positioning?

Additionally, the participants were asked follow-up questions if the answer was new saturation information. The instrument was pilot-tested to nurses of different hospitals and not included in the study.

The data was analyzed using thematic analysis by Colaizzi, all the emerged themes collected from the data and reported (Wirihana et al., 2018). The experience of performing prone position, how the nurse did it, and the health complaints was reported narratively. The data is coded by one coder. The data was triangulated by confirmed the interview finding with available prone position SOP, and expert comment on the finding.

The ethical clearance granted by the Universitas Airlangga Hospital, Indonesia by the record of UA-02-22135

3. RESULTS AND DISCUSSION

The study successfully recruited 15 eligible ICU nurses and consented to join the study, with no participant dropout. The data saturation was achieved on the 14th participants.

The participant's characteristics

Table 1 shows that had a 100% response rate from 15 ICU nurses, with an equal distribution of males and females. The mean age was 29 years, with most holding diplomas or being registered nurses, and one having a master's in nursing. The average ICU experience was 4.3 years, with most having less than 5 years of experience; only one had over 10 years. Participants conducted an average of 82 prone positioning cycles, with half having more than 50 cycles of experience. All had experience with intubated patients and HFNC, 67% with spontaneous breathing, and 20% with NIV. The most common prone cycle duration was 12 hours (47%), and none lasted ≥ 16 hours. Common complaints were waist pain (60%), back pain (47%), shoulder pain (33%), and hand pain (27%), but no knee pain. Most did not report complications (57%), but some reported pressure ulcers (27%), facial edema (27%), accidental extubation (20%), cardiac arrest (7%), and desaturation (7%). Nearly all nurses believed prone positioning is beneficial (93%), though 60% were unsure about its use for non-COVID-19 ARDS patients.

Table 1. The participants characteristics

Demographic Criteria (n = 15)		Frequency	Mean	Percentage (%)
Gender	Male	8		53%
	Female	7		47%
Age	21 - 30	10	29 years	67%
	31 - 40	5		33%
Education	Diploma	7		47%
	Registered Nurse	7		47%
	Master	1		7%
Work in ICU period (years)	< 5 years	9	4,3 years	60%
	5 – 10 years	5		33%
	> 10 years	1		7%
Prone positioning experience (in cycle*)	< 50 cycle	8	82 cycles	53%
	50 – 100 cycle	3		20%
	> 100 cycle	4		27%
Experience to patient breathing with	Spontaneous	10		67%
	NIV (Non Invasive Ventilation)	3		20%
	HFNC (High Flow Nasal Canula)	15		100%
	ETT (Endo Tracheal Tube)	15		100%
Duration of one cycle	1 hours	2		13%
	2 hours	2		13%
	6 hours (Schifino, 2020)	4		27%
	12 hours (Munshi, 2017)	7		47%
	16 hours (Bamford et al, 2022)	0		0%
	> 16 hours (González-Seguel, 2021)	0		0%
Health complaints	Back pain	7		47%
	Knee pain	0		0%
	Shoulder pain	5		33%
	Waist pain	9		60%
	Hand pain	4		27%
Complications	Extubated	3		20%
	Pressure ulcer	4		27%
	Facial Oedema	4		27%
	Arrest	1		7%
	Desaturation	1		7%
	No complications	7		47%
Belief to the benefit of prone position	No	0		0%
	Maybe	1		7%
	Yes	14		93%
Perform to non-COVID ARDS patient	No	1		7%
	Maybe	9		60%
	Yes	4		27%

*Cycle defined as the period of positioned the patient into prone until repositioned into supine (Binda et al., 2021)

Table 2. Emerged themes

Theme	Participants
Nurse experience	
Heavy Maneuver	P1, P5, P6, P7, P9, and P12
Well-coordinated team	P1, P4, P8, P11, P12, P13
Standard procedure of prone position	
Technique for manual prone	P1 – P15
Recommendation Tools	
Special design for prone positioning	P1, P2, P3, P5, P6, P8, P9, P10, P12, and P13

Table 2 shows that at least 3 staff required to handle and flip the patient and an additional 1 staff needed to hold the endotracheal tube. All the nurses suffer complications such as muscle stress after performing prone positions without proper preparation. The patient was susceptible to complication and good preparation is necessary in which participants express the need of briefing prior to prone positioning.

Nurse experience

1) Heavy maneuver

The experience of ICU nurses during manual prone positions requires a lot of energy, especially in patients with more weight. So, it is necessary to pay attention to the ergonomics of the body during the process of prone.

P6: ... We will shift the load, e.g., the patient's load of >90kg and the massive strength used during the actions...

P7: ... especially overweight patients, because it is difficult, usually pain in the back ...

P5: ... we squat causing pain, the bed should level at the waist so that the hands more easily reach the patient's body...

Nurses feel vulnerable to injury during the process of shifting and lifting, so coordination between teams is needed. Because injuries often occur when the process is not coordinated properly.

P9: ... When lifting or moving because it is not right or not ready is usually cause problem in my back, if I flip patient, it's still okay, if I lift the patient, it is a bit difficult.

2) Well-coordinated team

Patient with ETT risk of extubated and desaturated, a team with high precaution is needed. The challenge is to prepare a team with loads of manpower. Multidiscipline team consisted of nurse, doctor, and specialist resident resulted in a safer prone position. The nurses also expressed the needs of advice from anesthesia consultant doctor for special case patients.

P11: The challenge is that nurses can't do it alone, we definitely need a lot of nurses

P8: ETT cannot be alone must be with the team, it is there from the consultant team or specialist residence, anesthesiologist, and the team from the nurse...

P12: if ETT was assisted by PPDS anesthesiologist or consultant anesthesiologist

The nurses categorize the patient based on the clinical status, comorbidities, and overall medical history. Additionally, the team also categorize the needs of manpower according to the patient condition and availability staff.

P4: employed at least 3 people (1 anesthesiologist in the airways, 1 head, 1 side of the patient's body, 1 in the area next to the legs)

P13: ETT 3-4 people, 5 people safer, 1 person to focus area above head, 2 people right and left (shoulders and legs).

P1: 6 and 1 anesthesiologist (who will control airway breathing), nurse 7 on the left and right.

Standard procedure of prone position

1) Technique for manual prone

There is an unwritten standard operational procedure between the nurses to measure the difficulty level of the patient for prone positioning, if it is easy 3 people is needed, normal 3 – 4, and difficulty hard needs 5 – 7 people. The difficulty was measured according to the staff and patient factors.

Staff factors were

1. Experience of the procedure/ work experience
2. Body size, bigger and taller is more prominent
3. Anesthesiologist present

Patient factors were related to the patient's clinical status, comorbidities, and overall medical history, i.e.:

1. Body size
2. Level consciousness
3. Age
4. Head characteristics related to the risk of tube kinked
5. Risk of displaced or accidental extubated
6. Risk of apnea/desaturation
7. Risk of cardiac arrest

Nurses, in coordination with anesthesiologists, assess the difficulty of prone positioning in ICUs. The case manager organizes the team, briefs them on the difficulty and required maneuvers, and assigns staff positions. If a consultant is present, they handle airway tube fixation. For higher-difficulty cases, anesthesiologist consultants are consulted to determine the necessity of prone positioning. The recommended team size is 3-5 personnel for patients of average body weight; however, for overweight patients, 6 or more personnel are recommended. The essential team typically includes 1 intensivist or anesthesiologist and 2 nurses, with additional personnel as needed. This process was highlighted by participants P1, P2, P4, P6, and P8. In detail the step is listed below:

1. Minimum 3 – 5 staffs involved, 1 intensivist or anesthesiologist, and 2 – 4 nurse staff / doctors / health care assistants
2. Staff position:
 - 1) 1 staff is above the head, namely a specialist intensivist or anesthesiologist;
His duties as a leader
And to maintain airway patentability and be ready for reintubation
 - 2) 1 – 2 staff are on the right side of the patient
His job is to pull the patient to slide to the right
Monitor observations and notify the team when vital sign changes are found
 - 3) 1 – 2 is on the right side of the patient
His job is to logroll the patient (positioning the patient supine - lateral - prone)
3. Ensure that all clear, both infusions, other hoses, and ETT are ensured not to shift

- Prone to the left of the patient
4. The nurse on the right slides the patient to the right (right side of the patient) by holding the patient's linen / bed sheet
 5. Once the patient is on the far-right side of the bed, the patient is tilted 90o from the supine towards the left lateral
Position the patient's left leg and hand straight while the patient's right leg flexes
 6. After the position of the left lateral patient, place a pillow in the chest area, under the abdomen (around the perineum)
This opportunity can be used to simultaneously replace the patient's linen and under pad
 7. Position the pillows appropriately and well organized
Can use a donut pillow for the patient's head / use a round shaped under pad
 8. Then turn the patient 90o from the left lateral to prone
Beware that the patient's position is too on the left side of the bed, then the nurse on the right side of the patient must slightly pull the patient to the right so that the patient's position is right in the middle of the bed
 9. Continue by making sure all hoses are in position and functioning properly (CVC, IV Line, Infuse set, Catheter tube, Nasogastric Tube, ETT, etc.)
 10. Turn the patient in a prone position and face tilted to the left / turned to the right depending on the position of ETT fixation. When using a donut pillow, the patient's head is facing down

Recommendation Tools

- 1) Special design for prone positioning
The nurses suggest three tools design for prone position.
 1. A slide sheet that has holder to help hold the patient during the flip.
P2: like the slide pad is more elastic so that it is easier to pull from the left side is not too heavy, like a long linen is used to make the prone easier ...
 2. A modification of Vollman prone positioner with a round base
P12: like block 2 shape letter W, later the tool sleeps, the thigh is lifted, the tool is inserted then the patient is tilted it is easier than we have to position..... lifted 1 side
P3: The first one is needed like a neck pad in a car, to position it on the face when prone so that the tool is not bent or squeezed by the patient, more precisely we put it on the face of the letter c, the connection can be fitted on the ETT, so it will not bend the ETT
P5: a board that can be fixed and can turn the patient over is placed underneath.
P6: idler to support the body, to tilt given like a bolster that can be deflated.
P9: the base is rigid like a slide pad, ... guarantees fixation of the head like a collar brace but the mouth has a hole for ETT
P10: Tools that can fix the neck and head
 3. A harness to hold the patient to the air and flip over
P1: 4 pieces of pipe, stand the end of the bed, above the pipe there is a box pipe then above the box pipe there is a hook that can hook the bed sheet that can slide to the right left, top down, then there is a strong type of bed sheet, the edge has a hole to hook the bed sheet to the pipe
P8: Then also pulleys for up and down,
P13: I once imagined a crane, if for example on a container for big ship,

DISCUSSION

Qualitative findings highlight ICU nurses' experiences with manual prone positioning, emphasizing physical demands and the need for coordinated teamwork. This labor-intensive process, particularly challenging with overweight patients, necessitates a complete team including one anesthesiologist and two nurses to ensure safety. Manual positioning methods align with existing literature, incorporating additional safety measures such as positioning the patient's head in one direction or using a donut-shaped underpad. Recommended tools like the Vollman modification and overhead harness resonate with previous studies, though nurses favor the cost-effective slide pad for its accessibility in hospitals (Vollman, 1997; Wiggermann et al., 2020). This study illuminates crucial aspects of prone positioning in ICUs, impacting both practice and tool selection.

Nurses underscore the importance of physical fitness, especially when handling overweight patients, echoing prior studies on the physical demands of prone positioning (Callihan & Kaylor, 2021; Chui & Craen, 2016). Maintaining ergonomic positions during manual positioning is crucial to prevent discomfort and injury. Effective team coordination, driven by ICU leadership and culture, is essential to mitigate difficulties (Klaiman et al., 2021). Nurses appreciate leaders who communicate the benefits of prone positioning and allocate tasks effectively, stressing the need for collaboration and communication (Elmer et al., 2023). A multidisciplinary team with sufficient manpower is vital, with anesthesiologists or intensivists playing a crucial role in airway management, ultimately leading to better patient outcomes (Cassano et al., 2022; Klaiman et al., 2021; Rezoagli et al., 2021). The study highlights the complex dynamics that influence successful prone positioning in the ICU.

Manual methods for prone positioning are consistent, differing only in patient flipping. The intensive care society recommends strategic pillow placement to prevent displacement and as injury prevention (Bamford et al., 2020). SOPs, crucial for error prevention, detail pillow placement variations in Indonesian settings: head to shoulder, head-only, under diaphragm to iliac crest, and thin side pillows for the abdomen (RS Tasikmalaya, 2011; RSI Sultan Agung, 2020; RSUP Sanglah, 2021). Lower body support involves knee to heel pillows and firm foot support, avoiding upper arm pillow placement to prevent shoulder flexion (RSI Sultan Agung, 2020). Integrating such details into tool design can enhance prone positioning efficacy while minimizing risks.

Nurses in the study use donut-shaped pillows for patient face support, but recent updates advise against it due to increased pressure injury cases (Morata et al., 2023). Alternatives include cushions, inflatable devices, fluidized positioners, and gel pads to distribute body load (Fourie & Beckman, 2020). Guidelines avoid donut shapes, favoring sideways patient face positioning for better airway monitoring, despite the pressure injury risk. Indonesian SOPs vary on face positioning: to the most comfortable side, left side, or no specific regulation (RS Tasikmalaya, 2011; RSI Sultan Agung, 2020; RSUP Sanglah, 2021). With no consensus, nurses adapt available resources, prioritizing patient safety during manual prone positioning.

The strength of this research is the development of recommendation tool to improve the nurse care in the ICU setting. This study is known to be the first in the context of suggestions of nurse of hospital in developing countries. The limitation is present in the single centered study setting. The nurse experience does not represent other hospital. This might affect the difference in the detail of SOP used.

In the absence of prone positioning tools, ICU nurses modify available resources, requiring at least three staff members, ideally five, depending on patient difficulty. Nurses recommend specific tools like a slide sheet with handles, a modified Vollman prone positioner,

and a crane-like harness to ease the process and reduce complications for intubated patients. Research to develop a tool that according on the prone positioning steps expressed by nurses.

4. CONCLUSION

To be concluded, the nurse experience manual prone require lots of energy and needs highly coordinated team. Before the positioning started the nurse assess the patient difficulty level according to staff factor and patient factors, including patient risk of complication. Each prone positioning led by a consultant, anesthesiologist, residence, doctor, or nurse case manager and accompanied by minimum 2 other staffs. The recommended tool design is a sheet to flip the patient modified with a holder, a modification of Vollman prone positioner, and a prone harness. The nurse expressed the present of tool is greatly help the prone position, but if there is no tool at hand then the nurse will modify the available resources such as under pad as a ring-shaped pillow.

ACKNOWLEDGEMENT

The research team thank you to the Universitas Airlangga Hospital management to give the permission for this research and thank you to the ICU nurses to join the study.

REFERENCES

- Astua, A. J., Michaels, E. K., & Michaels, A. J. (2021). Prone during pandemic: development and implementation of a quality-based protocol for proning severe COVID-19 hypoxic lung failure patients in situationally or historically low resource hospitals. *BMC Pulmonary Medicine*, *21*(1), 25. <https://doi.org/10.1186/s12890-021-01401-0>
- Bamford, P., Bentley, A., Dean, J., Wilson-Baig, N., Dean, J., & Whitmore, D. (2020). *ICS Guidance for Prone Positioning of the Conscious COVID Patient 2020*. Intensive Care Society.
- Berhan, Y. (2020). Will Africa be Devastated by Covid-19 as Many Predicted? Perspective and Prospective. *Ethiopian Journal of Health Sciences*, *30*(3), 459–467. <https://doi.org/10.4314/ejhs.v30i3.17>
- Binda, F., Galazzi, A., Marelli, F., Gambazza, S., Villa, L., Vinci, E., Adamini, I., & Laquintana, D. (2021). Complications of prone positioning in patients with COVID-19: A cross-sectional study. *Intensive and Critical Care Nursing*, *67*, 103088. <https://doi.org/10.1016/J.ICCN.2021.103088>
- Callihan, M. L., & Kaylor, S. (2021). Proning Pains: Recognizing the Red Flags of Body Mechanics for Health Care Workers Involved in Prone Positioning Techniques. *Journal of Emergency Nursing*, *47*(2), 211–213. <https://doi.org/10.1016/j.jen.2021.01.001>
- Cassano, G., Ingrassia, S., Belotti, M., Marchetti, A., Merletti, L., Iaci, G., Villa, P., & Brambilla, A. M. (2022). Awake self-prone positioning. *Italian Journal of Emergency Medicine*, *10*(3). <https://doi.org/10.23736/S2532-1285.21.00117-8>
- Chatte, G., Sab, J. M., Dubois, J. M., Sirodot, M., Gaussorgues, P., & Robert, D. (1997). Prone position in mechanically ventilated patients with severe acute respiratory failure. *American Journal of Respiratory and Critical Care Medicine*, *155*(2), 473–478. <https://doi.org/10.1164/AJRCCM.155.2.9032181>
- Chui, J., & Craen, R. A. (2016). An update on the prone position: Continuing Professional Development. *Canadian Journal of Anesthesia*, *63*(6), 737–767. <https://doi.org/10.1007/s12630-016-0634-x>
- Chung, L. Y. F., Han, L., Du, Y., & Liu, L. (2021). Reflections on volunteer nurses' work and caring experiences during COVID-19: a phenomenological study. *Journal of Research in Nursing*, *26*(5), 457–468. <https://doi.org/10.1177/17449871211007529>

- Dewi, Y. S., Hargono, R., & Rusdi, A. (2019). Factors Correlated to Job Stress among ICU Nurses in Surabaya Indonesia. *Jurnal Ners*, 14(1), 23–27. <https://doi.org/10.20473/JN.V14I1.12125>
- Elmer, N., REIBHAUER, A., Brehm, K., Vockeroth, C., & Liebl, M. E. (2023). Long-term complications of prone position ventilation with relevance for acute and postacute rehabilitation: a systematic review of the literature. *European Journal of Physical and Rehabilitation Medicine*, 59(1), 111–121. <https://doi.org/10.23736/S1973-9087.22.07529-3>
- Fourie, A., & Beckman, D. (2020). PRONect Practical guidance document: Skin Care Considerations for the Patient in Prone Position. *Skin Integrity Research Group*.
- González-Seguel, F., Pinto-Concha, J. J., Aranís, N., & Leppe, J. (2021). Adverse Events of Prone Positioning in Mechanically Ventilated Adults With ARDS. *Respiratory Care*, 66(12), 1898–1911. <https://doi.org/10.4187/RESPCARE.09194>
- Jeffery, A. D., Kennedy, B., Dietrich, M. S., Mion, L. C., & Novak, L. L. (2017). A Qualitative Exploration of Nurses' Information-Gathering Behaviors Prior to Decision Support Tool Design. *Applied Clinical Informatics*, 8(3), 763. <https://doi.org/10.4338/ACI-2017-02-RA-0033>
- Klaiman, T., Silvestri, J. A., Srinivasan, T., Szymanski, S., Tran, T., Oredoko, F., Sjoding, M. W., Fuchs, B. D., Maillie, S., Jablonski, J., Lane-Fall, M. B., & Kerlin, M. P. (2021). Improving prone positioning for severe acute respiratory distress syndrome during the covid-19 pandemic an implementation-mapping approach. *Annals of the American Thoracic Society*, 18(2), 300–307. https://doi.org/10.1513/ANNALSATS.202005-571OC/SUPPL_FILE/DISCLOSURES.PDF
- Moghadam, V. D., Shafiee, H., Ghorbani, M., & Heidarifar, R. (2020). Prone positioning in management of COVID-19 hospitalized patients. *Brazilian Journal of Anesthesiology (English Edition)*, 70(2), 188–190. <https://doi.org/10.1016/j.bjane.2020.05.001>
- Morata, L., Vollman, K., Rechter, J., & Cox, J. (2023). AACN Practice Alert Manual Prone Positioning in Adults: Reducing the Risk of Harm Through Evidence-Based Practices. *Critical Care Nurse*, 43(1), 59–66. <https://doi.org/10.4037/ccn2023174>
- Ovayolu, O., Ovayolu, N., Genc, M., & Col-Araz, N. (2014). Frequency and severity of low back pain in nurses working in intensive care units and influential factors. *Pakistan Journal of Medical Sciences*, 30(1), 70–76. <https://doi.org/10.12669/pjms.301.3455>
- Rezoagli, E., Mariani, I., Rona, R., Foti, G., & Bellani, G. (2021). Difference between prolonged versus standard duration of prone position in COVID-19 patients: a retrospective study. *Minerva Anestesiologica*, 87(12), 1383–1385. <https://doi.org/10.23736/S0375-9393.21.15864-X>
- RS Tasikmalaya. (2011). *SOP Gives Prone Position* (Issue 103/KEP/2011). RS Tasikmalaya.
- RSI Sultan Agung. (2020). *SOP Adjusting the prone position*. 791.1/SPO/RSI-SA/II/2020.
- RSUP Sanglah. (2021). *SOP Prone Position*.
- Scott, J. B., Weiss, T. T., & Li, J. (2022). COVID-19 Lessons Learned: Prone Positioning With and Without Invasive Ventilation. *Respiratory Care*, 67(8), 1011–1021. <https://doi.org/10.4187/RESPCARE.10141>
- Teklu, S., Sultan, M., Azazh, A., Worku, A., Redae, B., Walelegn, M., Tefera, M., Argaw, R., Waganew, W., Yifru, S., Amogne, W., Tssema, N., Bekele, A., Gebregziabher, Y., Araya, H., Birhanu, A., Demoz, G., Tadesse, B., Seman, Y., & Abayneh, A. (2020). Clinical and Socio-demographic Profile of the First 33 COVID-19 Cases Treated at Dedicated Treatment Center in Ethiopia. *Ethiopian Journal of Health Sciences*, 30(5), 645 – 652. <https://doi.org/10.4314/ejhs.v30i5.2>

- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, 19(6), 349–357. <https://doi.org/10.1093/intqhc/mzm042>
- Vollman, K. M. (1997). Prone positioning for the ards patient. *Dimensions of Critical Care Nursing*, 16(4), 184–193. <https://doi.org/10.1097/00003465-199707000-00002>
- Wiggermann, N., Zhou, J., & Kumpar, D. (2020). Proning Patients With COVID-19: A Review of Equipment and Methods. *Human Factors*, 62(7), 1069–1076. <https://doi.org/10.1177/0018720820950532>
- Wirihana, L., Welch, A., Williamson, M., Christensen, M., Bakon, S., & Craft, J. (2018). Using Colaizzi's method of data analysis to explore the experiences of nurse academics teaching on satellite campuses. *Nurse Researcher*, 25(4), 30–34. <https://doi.org/10.7748/NR.2018.E1516>
- Wotiye, A. B., Shimber, E. T., & Ayele, B. A. (2022). Factors Associated with ICU Mortality at Hawassa University Comprehensive Specialized Hospital (HUCSH). *Ethiopian Journal of Health Sciences*, 32(3), 505–512. <https://doi.org/10.4314/ejhs.v32i3.5>