



Impact of Lateral Positioning in Bed Bath on Icu Patient's Noninvasive Hemodynamic Status: A Literature Review

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KEYWORDS

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ABSTRACT

Introduction: Critical patient is known as intensive care should get extra care when it comes to regular bathing. Positioning left and right sides will be used during the bathing procedure. Lateral position increases upper lung pressure compared to basal.

Method: Search for articles using electronic databases such as EBSCO, Google Scholar, IJSR, PubMed, and Science Direct. The search for articles used has been ongoing for the last 10 years. Keywords used include "lateral position," "personal hygiene," "ICU," and "hemodynamic status."

Results: Based on ten studies that looked at the effect of lateral posture on patients' non-invasive hemodynamic status during patient bathing in intensive care units.

Conclusion: Changes in non-invasive hemodynamic are affected by the use of lateral positioning when bathing

1. INTRODUCTION

Critical patients are defined as high-risk individuals who experience actual or potentially life-threatening health problems; the more severe the patient's condition, the more unstable the patient (Firdaus, 2018). Patients in critical condition will receive treatment in the Intensive Care Unit (ICU), a nursing service specifically designed for individuals with acute or chronic illnesses facing emergency and critical situations that demand the monitoring of vital functions (Ananta Tanujjarso and Fitri Ayu Lestari, 2020). The World Health Organization (WHO) reports that every year, 9.8–24.6% of the world's population suffers from critical illness and is treated in intensive care; even 1.1–7.4 million patients fail in the treatment room due to critical illness (WHO, 2019). In America, 20% of patients die in the ICU due to critical illness, while globally, about 25% of patients are treated in the ICU (Ananda, 2017). The prevalence of critical patients and ICU needs worldwide is stated to have doubled along with the COVID-19 pandemic (Brvata et al., 2021).

In 2020, the prevalence of ICU use increased throughout Indonesia, and the bed occupancy rate (BOR) soared to 80% (Ministry of Health, RI, 2020). The elevated occurrence of critically ill patients corresponds to several

challenges present in the ICU that need addressing. These challenges include a heightened risk of infection stemming from various factors, such as airway instrumentation, alterations in skin integrity due to vascular access for monitoring and treatment, surgical and traumatic injuries, and disruptions in compensatory mechanisms to combat infection. In instances where a critically ill patient acquires an infection, it exacerbates the already compromised system and increases the likelihood of complications, including the risk of nosocomial infection. Nosocomial infections, or those acquired within the hospital, manifest after more than 72 hours of the patient's admission rather than upon entry to the facility (Hospital Accreditation Standard, 2022).

While only a small percentage of all hospitalized patients, approximately 5–10%, are admitted to the Intensive Care Unit (ICU), this group contributes to about 25% of all hospital-acquired infections (HAIs). The incidence of HAIs in the ICU is notably higher, ranging from 5–10 times, compared to what is observed in standard hospital wards. ICU nurses play a crucial role in the prevention and control of HAIs due to their involvement in fundamental hygiene care and their leadership and implementation of quality improvement initiatives (Blot et al., 2022). One way to reduce the



incidence of infection in the ICU is to meet the needs of personal hygiene, namely by bathing patients who are treated in the ICU. The process of bathing patients in the ICU is different from that of patients who are treated in ordinary wards because in the ICU, patients are installed with a multiple assist device and there is hemodynamic instability. Particular emphasis should be given to the regular bathing of patients in the intensive care unit, considering that gram-negative infections represent the primary cause of mortality in this context (Goldenhart, A. L., & Nagy, H. 2022). As per the World Health Organization (WHO), hygiene encompasses conditions and behaviors aimed at preserving health and preventing the transmission of diseases (Rehab et al., 2022). The process of bathing patients in the ICU is in accordance with predetermined Standard Operating Procedures (SPO). ns (HAIs). The incidence of HAIs in the ICU is notably higher, ranging from 5–10 times, compared to what is observed in standard hospital wards. ICU nurses play a crucial role in the prevention and control of HAIs due to their involvement in fundamental hygiene care and their leadership and implementation of quality improvement initiatives (Blot et al., 2022). One way to reduce the incidence of infection in the ICU is to meet the needs of personal hygiene, namely by bathing patients who are treated in the ICU. The process of bathing patients in the ICU is different from that of patients who are treated in ordinary wards because in the ICU, patients are installed with a multiple assist device and there is hemodynamic instability. Particular emphasis should be given to the regular bathing of patients in the intensive care unit, considering that gram-negative infections represent the primary cause of mortality in this context (Goldenhart, A. L., & Nagy, H. 2022). As per the World Health Organization (WHO), hygiene encompasses conditions and behaviors aimed at preserving health and preventing the transmission of diseases (Rehab et al., 2022). The process of bathing patients in the ICU is in accordance with predetermined Standard Operating Procedures (SPO).

In the process of bathing the patient, the patient will position the left and right sides to clean the back of the patient and replace dirty linen with new linen. A left tilt can increase airflow by utilizing the placement of the heart on the left side, which is located in the middle of the upper and lower lung areas. This position increases lung pressure, thus lowering arterial pressure at the top of the lung compared to the basal part. Reduced arterial

pressure at the apex leads to decreased blood flow to the capillaries in the region, while the capillaries at the base undergo dilation, thereby increasing blood flow. (Yuswandi et al., 2020). The lateral position is a nursing intervention commonly employed in early mobilization and is the standard practice to avert complications arising from immobility. However, the effects of positional changes on hemodynamics, as indicated by non-invasive blood pressure values (NIBP) derived from mean arterial pressure (MAP), are of significance (Setiawan 2016). Hemodynamic monitoring needs to be considered. Monitoring is an assessment technique in critical patients, knowing the patient's developmental condition and anticipating the patient's worsening condition (In et al. 2020). d right sides to clean the back of the patient and replace dirty linen with new linen. A left tilt can increase airflow by utilizing the placement of the heart on the left side, which is located in the middle of the upper and lower lung areas. This position increases lung pressure, thus lowering arterial pressure at the top of the lung compared to the basal part. Reduced arterial pressure at the apex leads to decreased blood flow to the capillaries in the region, while the capillaries at the base undergo dilation, thereby increasing blood flow. (Yuswandi et al., 2020). The lateral position is a nursing intervention commonly employed in early mobilization and is the standard practice to avert complications arising from immobility. However, the effects of positional changes on hemodynamics, as indicated by non-invasive blood pressure values (NIBP) derived from mean arterial pressure (MAP), are of significance (Setiawan 2016). Hemodynamic monitoring needs to be considered. Monitoring is an assessment technique in critical patients, knowing the patient's developmental condition and anticipating the patient's worsening condition (In et al. 2020).

So the right technique is needed when bathing patients in lateral positions. The purpose of this study is to examine the right techniques to maintain stable hemodynamic status when patients are bathed, namely using pillows on the head during lateral positions.

2. METHOD

The article was composed using a systematic review design, employing the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines as a framework. The summarized data originates from randomized control trials (RCTs)



assessing the impact of lateral positioning during bed baths on ICU patients' non-invasive hemodynamic status.

Additionally, the study aims to identify the types of mHealth interventions and the populations involved. It seeks to categorize the available evidence and analyse knowledge gaps within this subject (Munn et al., 2018). In September 2022, an electronic search was conducted using strategies based on population/problem/patient, intervention, comparison, outcome, and study design. The primary repositories of articles accessed included online databases such as Google Scholar, IJSR, EBSCO, PubMed, and Science Direct.

2.1 Search methods

A scoping review involves a series of five stages, encompassing (1) formulating the research question, (2) identifying pertinent studies, (3) selecting studies, (4) organizing and extracting data, and (5) compiling, summarizing, and presenting the findings. This study used the Population/Participant, Concept, and Context (PCC). The search phrases used for the literature search in the study were "Lateral position", "personal hygiene", "ICU", and "Hemodynamic Status". Articles pertinent to this study were chosen from online databases in accordance with the inclusion criteria and scrutinized for

duplications using Mendeley. Full-text articles were acquired and information was extracted utilizing a standardized data form to capture details such as authorship, publication year, study location, study design, setting, interventions, participants, measurement timing, and primary outcomes. The following inclusion criteria were applied: studies are patients in the ICU, articles with a research period of 2013 to 2023 and in English. The exclusion criteria in this article are articles with problem topics not related to the lateral position of patients in the ICU at the time of bathing and articles that are not accessible and not available full text.

2.2 Search outcome

A total of 993 references and 39 full-text articles were screened and subjected to quality assessment, and 10 articles were found to meet the criteria (Figure 1). A summary of the chosen articles is shown in Table 1. Four studies were conducted in China, Dutch, America, Egypt, Indonesia and Australia. Two researchers in this study worked independently. For each included study, data were extracted, the validity and quality were assessed, and each researcher's work was verified. Disagreements between the two researchers were discussed and resolved to reach a consensus

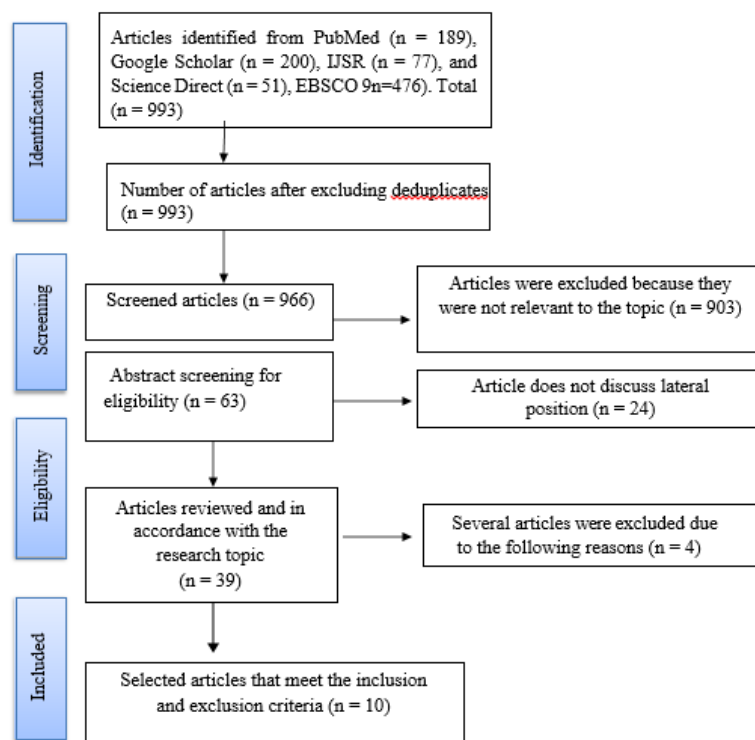


Figure 1. Article selection process using PRISMA



2.3 Quality appraisal

The quality of the papers included in this study was not assessed based on the nature of the scoping review methodology (Arksey & O'Malley, 2007).

2.4 Data abstraction

The literature that met the inclusion criteria was extracted using Microsoft Excel (Beggs, Koshy, & Neiterman, 2021). The data extracted from each paper included the authors' names, title of the paper, year of publication, study objectives, the method used, types of intervention, demographic data, the country where the study was conducted, and key findings.

2.5 Synthesis

This study used thematic analysis to identify the key

topics covered in the literature. Two researchers autonomously examined the articles to recognize the primary themes. This procedure persisted until an agreement on the coding themes was achieved. The identified key themes were incorporated into the extraction tool, and each paper was attributed a key theme along with sub-themes. Subsequently, the researchers deliberated on the ultimate results of the themes and sub-themes after completing the coding for all articles (Beggs et al., 2021). This scoping review included intervention RCTs and quasi-experimental studies. Furthermore, so we only included studies published from 2019 to 2022 to provide the most recent studies related to the topic

3. RESULTS

Table 1. Summary of the reviewed articles

Study	Methods	Intervention	Participants	Settings
Li et al.(2022)	Randomized controlled trial	Provision of right and left tilt exercises, 1 hour each	Patients with open abdominal surgery and using ETT	China
Zhang et al. (2023)	Randomized controlled trial	Provision of left-tilt exercises after intubation	Patients with thoracic surgery and using Double Lumen Tube (DLT)	China
Blok et al. (2023)	Randomized controlled trial	Implementation of fluid deresuscitation guided by Lung Ultrasound (LUS) once a day when the patient's hemodynamics are stable up to day 28 or patients who have not received treatment in the ICU room	Patients who receive treatment in the ICU and use mechanical ventilators for more than 24 hours	Dutch
Hamlin et al. (2015)	Randomized controlled trial	Lateral position exercises using pillows to minimize complications and carried out for 7 days	Critical patients receiving treatment on mechanical ventilators	Amerika
Wahdan et al. (2021)	Randomized controlled trial	Application of lateral position during intubation installation using Red light directive Video Rigid Intubation Stylet and laryngoscope assistance in the intervention group and application of lateral position during intubation installation using Fiber optic in patients undergoing laparotomy abdominal surgery	Patients undergoing abdominal surgery and attached mechanical ventilators	Egypt
Elamoudy et al. (2021)	Descriptive explorative	Routine position exercise treatment in each position for 30 minutes in 2 hours per day and carried out sequentially	Patients who experience acute or chronic respiratory problems	Egypt



		starting from the supine position, right sideways, left sideways, and half lying head and body with an angle of 30 o - 45o. Then, check the patient's hemodynamic status.	and receive mechanical ventilator treatment	
Girianda (2023)	Descriptive explorative	Progressive mobilization exercises for 3 meetings.	Post sectio caesarea patients with eclampsia in the ICU and receiving mechanical venntilator treatment	Indonesia
Sousa, Kapp, & Santamaria (2020)	a prospective, observational, feasibility study	Provision of mobilization exercises to lie on the side using pillows, foam pads and rolled towels. Each session is 1 hour long for 8 weeks	The patient is in critical condition and unable to move and at high risk of pressure injury.	Australia
Zhou et al. (2020)	Randomized controlled trial	Provision of prone position training (group A) and sideways position (group B) with a duration of 1 hour and provision of semirecumbent position in the control group	The patient was diagnosed with AHRF due to pneumonia or lung infection unrelated to COVID-19 and received HFNO therapy.	China
Kapp et al. (2023)	Randomized controlled trial	Provision of position exercises using tools in the intervention group and provision of position exercises using pillows, slide sheets and foam wedges	Critical patient in ICU	Australia

Based on the search for research articles that have been carried out by the author through the screening stage using PRISMA and the keywords applied as well as the selection process in accordance with the inclusion and exclusion criteria, the results of 10 articles were obtained for assessment and review of articles. The results of the review showed that the research subjects of the entire article were patients who were attached to mechanical ventilators and hemodynamic status monitors. The research locations were carried out in China, the Netherlands, America, Egypt, Indonesia and Australia. There are 7 articles with the Randomize Control Trial research design, namely in the article Li et al. (2022), Zhang et al. (2023), Block et al. (2023), Hamlin et al. (2015), Wahdan et al. (2021), Zhou et al. (2020) and Kapp et al. (2023). There are 2 articles with Descriptive explorative research designs, namely in the articles Elamoudy et al. (2021) and Girianda (2023). There is 1 article with a prospective, observational, feasibility study research design, namely in the Sousa, Kapp, & Santamaria (2020) article. After that, the entire research article was assessed the quality of the article using The

Joanna Briggs Institute (JBI).

4. DISCUSSION

ICU is one of the rooms or units in the hospital where patients receive intensive care and close monitoring (Anggraeni and Ismail, 2018). This means that nurses play an important role in providing critical care to patients with potentially life-threatening conditions and conducting continuous monitoring to maintain vital body functions (Chavez, 2023).

Patients who receive treatment in the ICU room are patients with critical conditions caused by failure or dysfunction in one or multiple organs and on average experience a decrease in consciousness (Hartoyo et al., 2017).. The average ICU patient has a high level of dependence because most of them are under anesthesia and installed mechanical ventilation (Annisa, 2020). Moreover, patients also relinquish their autonomy in engaging in self-care, encountering a sense of powerlessness in fulfilling fundamental needs, such as sustaining personal hygiene. For the most part, patients are unable to perform their duties independently so



patient self-care is entirely dependent on nurses (Toledo et al., 2020). Therefore, patients in the ICU are very at risk of infection (Setianingsih, Riandhyanita and Asyrofi, 2017).

To overcome this, one effort is needed to reduce the spread of infection rates through the act of bathing patients. The act of bathing patients is one of the routine activities carried out by nurses in the ICU (Annisa, 2020). In addition, bathing patients with critical conditions is one of the interventions that must be done. However, there are some special cautions before doing so. Among them are must pay attention to hemodynamic stability and minimize or avoid side effects that arise.

Nurses bathe patients are generally done on mattresses that aim to improve hygiene conditions and increase patient comfort. Bathing patients can reduce the spread of microorganisms on the patient's skin (Tai, Hsieh, and Lee 2021). In addition, bathing patients also has benefits to provide relaxation, reduce fever, stimulate circulation and improve skin integrity (Coyer, O'Sullivan and Cadman, 2011).

When bathed, usually the patient will be positioned to tilt right and left by the nurse to clean the back or back. This position is synonymous with the designation lateral position. The lateral position is an oblique position leaning sideways resting on the shoulders and hips. According to Potter & Perry (2006), lateral positioning is used so that there is no emphasis on the spine, makes it easier to breathe, and frees the organs of the body. The lateral position is a good position to maintain airway patency. One of the effects of lateral position in critical patients is that it can help to smooth recovery. Because the position is included in a directed therapeutic position and is carried out routinely (Hewitt et.al 2016). Proper body position can help improve oxygen transport by harnessing the effects of gravity on lung and heart function (Patil & Nagarwala, 2015). This is in line with the statement of Mezidi & Guérin (2018) which states that lateral positions (right tilt and left tilt) can also increase lung expansion by increasing the elasticity of the chest wall.

Based on the results of the article review that has been carried out, lateral positions have been applied in different ways and times of implementation. In the article Li et al.(2022) explains that the intervention given is in the form of right and left tilt exercises, 1 hour each. The article Elamoudy et al. (2021) explains about providing routine position exercise treatments in each position for

30 minutes in 2 hours per day and carried out sequentially starting from the supine position, right sideways, left sideways, and half lying head and body at an angle of 30 o -45 o. Girianda's article (2023) explains the provision of progressive mobilization exercises for 3 meetings and Zhou et al.'s (2020) article explains the provision of prone position exercises (group A) and sideways position (group B) with a duration of 1 hour and the provision of semirecumbent positions in the control group.

In addition, lateral positioning is also given by modifying other tools as explained in Hamlin et al. (2015) article about providing lateral position exercises using pillows to minimize complications and carried out for 7 days. The article Sousa, Kapp, & Santamaria (2020) explains about providing mobilization exercises to lie on the side using pillows, foam pads and rolled towels. Each session lasts 1 hour for 8 weeks and the article Kapp et al. (2023) explains the provision of position exercises using tools in the intervention group and the provision of position exercises using pillows, slide sheets and foam wedges.

When the patient is being positioned, it should not be too steep and not too long or prolonged. It is feared that this will have an impact on the oxygenation status and hemodynamic status of patients who decline (Yuswandi, Warongan and Rayasari, 2020). This is evidenced by Uland's research which states that the process of changing from supine position to lateral position can increase the contents of a cup 44.1%, reduce heart rate and can increase cardiac output by 33.5% so that blood pressure values change (Latupeirrisa & Angkejaya 2020).

Lateral position has been shown to affect the hemodynamic status of critical patients undergoing treatment in the ICU. This has been explained in the research of Hamlin et al. (2015) that after being given exercise results in a significant increase in pulse rate, mean arterial pressure and blood pressure. In addition, Girianda's article (2023) also states that after being given exercise, significant changes were found related to oxygenation status, blood pressure, can improve blood circulation and increase respiratory muscle strength.

CONCLUSIONS

Several lateral position interventions affects non-invasive hemodynamic status changes when bathing ICU patients.



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