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The Anxiety of Patients with Hand Fixation (Restrain) in Intensive Care Unit

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ABSTRACT

Background: Treatment of patients with agitation and attempts to remove IV tubes, mechanical ventilators, nasogastric tubes, and catheter urine, the health worker will perform fixation on the hand, often called restraint. This action needs attention because it has several impacts on the patient, one of which is anxiety. **Objective:** The purpose of this study was to analyse differences in anxiety in patients with restraint or conventional hand fixation with hand fixation or modified restraints. **Methods:** The research method uses a quasi-experimental post-test design by comparing the final results of anxiety. The population is patients who are hospitalised in the Intensive Care Unit (ICU) at Kediri Baptist Hospital. The research sample was 54 respondents using a purposive sampling technique. The inclusion criteria were total care patients, patients who received restraints and had a RASS value > +1, and patient exclusions were patients receiving care less than twice in 24 hours. The independent variable is conventional restraint and modified restraints. Control group with restraint or conventional hand fixation with the intervention group using hand fixation or modified restraints. The dependent variable is anxiety using FAS (Face Anxiety Scale). Research has obtained ethical clearance. Statistical test using Mann Whitney ($a < 0.05$). **Results:** The experimental group had 22.2% not anxious, 33.3% mildly anxious, 44.4% moderately anxious, and no severe cases, while the control group had 3.7%, 48.1%, 11.1%, and 37.0%, respectively, showing the intervention use modified restraints reduced severe anxiety. The results of statistical tests were found that the *Z* value was -1.976 (> ± 1.96). It indicates that there was a difference in anxiety between the patient with hand fixation experimental group and the control group. The *p*-value, which was obtained, was 0.039, indicating that the difference between the experimental group and the control group was significant. **Conclusion:** There is a significant difference in the use of hand fixation or conventional restraints with modifications, it is necessary to continue to develop restraint devices that are safe and can reduce patient anxiety in the inpatient room.

Keywords: Anxiety; Hand Fixation; Inpatient Room; Restrain

INTRODUCTION

Nursing services inpatients are expected to be able to perform good nursing actions, but some patients have a worsening prognosis due to the condition of the cardiovascular system and also metabolic conditions, which make patients require further action. The patient is agitated and requires total care, and the patient resists and removes gastric tubes, ventilators and infusions. The nurse took the initiative to bind the extremity area to reduce the patient's risk of pulling the gastric tube, ventilator or infusion tube. Patient anxiety can occur

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because of the prognosis of the disease, the machine that rings every time, and the invasive measures that are performed (Dodok *et al*., 2022; Sunaringtyas, Sulistyorini & Fernanda, 2023). Anxiety is an aggravating factor in vital signs, directly affecting the patient's disease condition (Ain, 2021; Musslifah, 2022; Shirasaki *et al.*, 2024). Binding the uncomfortable extremity may have a relationship with the increased anxiety in the patient. The nursing room is a very complex and stressful environment in the form of actions and emergencies (Hubaybah *et al*., 2022; Sriwana, 2019). ICU is associated with significant psychological morbidity for patients, families and caregivers. Cuff restraint is provided if the patient loses consciousness and tries to remove the attached medical device (Anasulfalah, Faozi & Mulyantini, 2020; Muslimah, Awaludin & Kurniawan, 2019; Sher *et al*., 2024). The authors attempted to determine whether salivary cortisol, a physiological measure of acute stress, was associated with subsequent psychological distress among the patient's family members in the treatment room, such as the intensive care unit.

ICU patients reported more than 30% reporting symptoms of anxiety, about 16% reporting symptoms of depression, and about 15% reporting symptoms of posttraumatic stress. American data from one study have estimated the prevalence of physical restraint to be 50 per 1000 patients in 40 ICUs in the United States and found 10% to 76% of patients with conditions in Canada. In hospital data in Taiwan, the use of physical restraints or limb fixation in the ICU has been reported that between 39.1% and 69.9% of patients underwent limb fixation. One study in Turkey said that more than 90% of nurses carried out interventions and applied physical restraint (Anasulfalah, Faozi & Mulyantini, 2020; Latronico *et al*., 2024; Muslimah, Awaludin & Kurniawan, 2019).

Although the use of physical restraints is widespread, previous studies have identified other problems that can arise due to the use of restraints, such as circulation or cardiovascular problems, which are some of the complications that can be influenced by the duration of the use of restraints and the type of restraint used. Patients who experience certain conditions and are subjected to physical restraint as a Anasulfalah, Faozi & Mulyantini, 2020 result of several traumatic events, the disease experienced by the patient shows that acute physiological stress to anxiety can manifest in other conditions that make the patient uncooperative in carrying out nursing actions and can predispose a person to continuous psychological stress. Nurses need to implement risk management for the possibility of occurring (Hall-Melnychuk, Hopkins & Deffner, 2025; Khanafi, Ismail & Erawati, 2019; Suwardianto & Sari, 2019). Individual physical, emotional, and intellectual pressures are linked to alterations in the typical pattern of serum cortisone release, and patients displaying a stress response may show a modification of cortisone secretion.

One of the roles of nurses is to increase comfort by reducing points that can interfere with comfort so that patients can support nursing or medical interventions to make the best conditions for patients. One solution is to create a comfortable restraint device that can be used for hand and foot fixation in agitated patients in the inpatient ward. The use of restraints must also consider the safety of its use (Cusack *et al*., 2018; Murali *et al*., 2022; Nielson *et al*., 2021; Scarneo-Miller *et al*., 2020; Teece, Baker & Smith, 2020). It is necessary to use materials that are soft for the skin that do not irritate the skin and to know how to bind or tie techniques that are safe and strong for restrained patients. Restraints to fix the extremities need to be tried and evaluated to improve comfort and measures to improve the patient's condition for the better; this is the novelty of this study and what distinguishes it from previous studies.

METHODOLOGY

Study Design

This study utilized a quasi-experimental post-test design (Suwardianto, 2021).

Study Population

The study population consisted of inpatients at Baptist Hospital, Kediri, specifically critical patients admitted to the General ICU and ICU from June to July 2022.

Sample Size and Sampling Method

The sample size was 54 patients, determined through appropriate calculations. A purposive sampling was

used to select the participants.

Inclusion Criteria

Total care patients.

Patients receiving restraints and having The Richmond Agitation-Sedation Scale (RASS) value > +1.

Patients meeting the study conditions.

Exclusion Criteria

Patients receiving care for less than 48 hours.

Patients who died within 24 hours of admission.

Study Groups

The experimental group (27 patients) received modified hand fixation or restraints. The control group (27 patients) received conventional hand fixation or restraints.

Table 1: RASS Assessment

Score	Term	Description
+4	Combative	Overtly combative, violent, and an immediate danger to staff.
+3	Very agitated	Pulls or removes tubes or catheters aggressively; shows aggressive behaviour.
+2	Agitated	Exhibits frequent, non-purposeful movements and fights against the ventilator.
+1	Restless	Anxious, but movements are not aggressive or overly vigorous.
0	Alert and calm	Fully alert, calm, and responsive.
-1	Drowsy	Not fully alert but shows sustained awakening (eye -opening or eye contact) in response to voice (≥10 seconds).
-2	Light sedation	Briefly awakens with eye contact in response to voice (<10 seconds).
-3	Moderate sedation	Shows movement or eye opening in response to voice but does not establish eye contact.
-4	Deep sedation	Does not respond to voice but shows movement or eye opening in response to physical stimulation.
-5	Unarousable	No response to voice or physical stimulation.

Notes: Stimulus Categories: Verbal Stimulation: Applies to scores 0 to -3, where the patient can still respond to voice; Physical Stimulation: Applies to scores -4 and -5, where the patient only responds to physical stimulation or remains unresponsive. This scale is commonly used in critical care to evaluate and monitor a patient's level of sedation or agitation (Suhandoko, Pradian & Maskoen, 2014).

RASS Assessment Procedure (Ely *et al*., 2003; Sessler *et al*., 2002): Keep an eye on the patient: The patient is vigilant, agitated, or restless (scoring 0 to +4). If the patient is not awake, mention their name and instruct them to open their eyes and look at the speaker. The patient awakens with sustained eye opening and eye contact (score -1). The patient awakens with eye-opening and eye contact but not sustained (score -2). The patient responds to voice with any movement but no eye contact (score -3). When verbal stimulation fails to elicit a reaction, physically excite the patient by shaking the shoulder and/or touching the sternum. Any movement in reaction to physical stimulus (score -4), no response to any stimuli (score -5).

Figure 1: Face Anxiety Scale

The independent variable is, and the dependent variable is anxiety using FAS (Face Anxiety Scale) (McKinley & Madronio, 2008). Each of the anxiety subscale's six items is assessed on a 5-point scale (0-4) of

distress ranging from 'not at all (not anxious)' to 'extremely' (not anxious, mild anxiety, moderate anxiety, severe anxiety, extremely). The sampling technique used is purposive sampling. The intervention stage is when all patients receive restraint, and the researcher assesses the level of anxiety of the patients given the intervention. The independent variable is, and the dependent variable is anxiety using FAS (Face Anxiety Scale). Research has obtained ethical clearance. Statistical test using Mann Whitney ($a < 0.05$).

Ethical Considerations

This study received ethical approval from the Kediri Health Research Ethics Commission at STIKES Baptist Hospital, Indonesia, with reference number 047/13/EC/KEPK-3/STIKES RSBK/2022 on 13th June, 2022.

RESULTS

Table 2: Characteristics of Respondents

Characteristics	Total	Percentage (%)
Gender		
Male	19	35.2
Female	35	64.8
Age		
41-50 years old	10	18.5
51-60 years old	18	33.3
>60 years old	26	48.1
Occupation		
Civil servant	6	11.1
Employees	15	27.8
Self	13	24.1
Not working	20	37.0

The study included a total of 54 respondents. Gender distribution was predominantly female, with 35 respondents (64.8%), while males constituted 19 respondents (35.2%) in Table 2. In terms of age, the majority of respondents were over 60 years old, accounting for 26 respondents (48.1%). Respondents aged 51–60 years made up 33.3% (18 individuals), whereas those aged 41–50 years represented the smallest group, with 10 respondents (18.5%). Regarding occupation, a significant portion of respondents were unemployed, totalling 20 respondents (37.0%). This was followed by employees (15 respondents, 27.8%), self-employed individuals (13 respondents, 24.1%), and civil servants (6 respondents, 11.1%).

Table 3: Distribution Frequency of Anxiety Scale (FAS) Use

Variable	Experiment Group		Control Group	
	∑	%	∑	%
Not Anxious	6	22.2	1	3.7
Mild anxiety	9	33.3	13	48.1
Moderately	12	44.4	3	11.1
Severely	-	-	10	37.0

Note: Z value -1.976; p value 0.039

The results of statistical tests using Mann-Whitney with alpha < 0.05 showed that the Z value was -1.976 (> ± 1.96). It indicates that there was a difference between the experimental group and the control group. The *p*-value, which was obtained, was 0.039 (0.05), indicating that the difference between the experimental group and the control group was significant.

DISCUSSION

The comparison of anxiety levels between patients using conventional hand restraints and those with modified hand restraints highlights the importance of a more humane approach in patient care. Conventional restraints, while often employed for safety purposes, can exacerbate anxiety in patients, especially as they may be perceived as restrictive and less considerate of patient comfort. In contrast, the use of modified restraints has

been shown to mitigate negative emotional impacts, suggesting that innovations in care tools can improve the patient experience. From an ethical perspective, healthcare providers must consider not only safety but also the psychological well-being of patients. Interventions like restraint application should align with the principles of beneficence and non-maleficence, prioritising maximum benefit while minimising harm, including emotional distress. These findings underscore the need for medical equipment designs that prioritise patient-centred care, ensuring interventions are both effective and ethically sound. There is an ethical dilemma in the use of restraints because there are restraints, and when seen by other people or family, it looks as if it is inhumane, but on the other hand, it is necessary because of that; it is necessary to modify tools that are more humane (Agraharkar *et al.*, 2021; Roppolo *et al*., 2020; Teece *et al*., 2020).

The results showed that there was a difference in comfort with indicators of anxiety by giving restraint or fixation of the extremities of the control group using conventional restraints with the experimental group, where the restraint device or fixation device was made as comfortable as possible for the patient with good materials and fastening methods. The results showed that inappropriate restraint could result in physical and psychological injury to the patient, such as redness and discomfort. Inappropriate restraint can lead to serious physical and psychological discomfort for patients. Physically, restraints that are too tight can limit movement, disrupt blood circulation, and cause skin damage such as abrasions, irritation, or pressure sores, potentially leading to internal injuries or breathing problems. Psychologically, patients may feel trapped, anxious, or deprived of autonomy, worsening their emotional state. Physical restraint can also trigger trauma, especially in patients with a history of abuse or emotional distress. To address these issues, safer alternatives such as behavioural therapy, relaxation techniques, and intensive supervision by trained medical staff can be employed to minimise the need for restraint, create a sense of safety, and support the patient's physical and mental well-being.

Limb fixation or physical restraints aim to limit the patient's movement during treatment. For patients who need intervention for limb fixation or physical restraint, this technique can be done in a hospital care unit. Physical restraint, a contentious technique for managing the behaviour of agitated and delirious patients, tries to stop the patient from removing or pulling out any inserted medical devices, such as intravenous drips, urinary catheters, ventilators, and nasogastric tubes. Many effects result from patient restraints (Chieze *et al.*, 2019; Hammervold *et al*., 2019; Newton, 2020; Välimäki *et al.*, 2022). These medical devices (infusion, catheter tube, endotracheal tube) can be maintained in the correct position without physical restraints on the patient. New techniques are now being created to lessen the use of physical restraints. Because of the long-term effects of restraint or limb fixation, which include oedema, redness, numbness, restriction of movement, elevated temperature, changes in skin colour, and nerve damage (Burry *et al*., 2021; Perers *et al*., 2021). If neurovascular complications are not assessed and treated adequately, they can result in the development of ischaemia, necrosis, and neurologic deficits. Restraints that are not regularly checked and treated can lead to neurovascular complications. Restraint treatment must be carried out for at least 4 days and periodically evaluated.

The differences in anxiety levels between patients using conventional and modified hand restraints highlight the importance of an approach that prioritizes ethics and patient comfort. Conventional restraints, while effective in preventing risky behaviour, often increase anxiety due to their lack of consideration for comfort. In contrast, modified restraints demonstrate the ability to reduce negative emotional impacts, offering a more humane care experience. From an ethical perspective, the use of modified restraints aligns better with the principles of beneficence (doing good) and non-maleficence (avoiding harm) by ensuring both safety and minimising patient anxiety. This underscores the need for innovations in medical devices that balance clinical effectiveness with the psychological well-being of patients. The impact of inadequate use of restraints is where neurovascular complications occur (redness, increased pulse, inability to move, Cathode Ray Tube (CRT), oedema, skin colour and sensation and increased temperature) (Abraham *et al*., 2022; Anasulfalah, Faozi & Mulyantini, 2020).

Limitation

This study was limited to the Intensive Care Unit (ICU) and did not include other hospital units or departments. Future research should expand to multiple departments to provide a more comprehensive understanding of patient care across different settings.

CONCLUSION

The study found a significant difference in anxiety levels between the experimental group and the control group when extremities fixation or constraint was used. Modification and development of restraints must always be improved to increase comfort until a way is found for the patient to no longer use restraints so that the patient is cooperative and does not remove medical devices installed in the patient, such as endotracheal tubes, nasogastric tubes, urinary catheters and infusions. Future research should focus on the development of hand restraints designed specifically for critically ill patients experiencing agitation, emphasizing both comfort and adherence to ethical principles.

Conflict of Interest

The authors declare that there are no competing interests.

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