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Original Research Article

SEDATION ASSESSMENT IN MECHANICAL VENTILATED PATIENTS: THE LEVEL OF KNOWLEDGE ASSESSMENT AMONG CRITICAL NURSES IN A PUBLIC TERTIARY CARE HOSPITAL LAHORE

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Abstract: *By appropriately evaluating and controlling sedation in patients on mechanical ventilation, nursing problems can be prevented. However, critical care nurses in public tertiary care hospitals with limited training and resources continue to lack certain expertise. Critical care nurses need to assess and manage sedation. Patients are at significant risk from both over and insufficient sedation. Critical care nurses must possess adequate expertise in sedation assessment and management.* ***Objective:*** *The study's objective is to evaluate critical care nurses' knowledge in sedation management for patients on mechanical ventilation at Pakistan's public tertiary care hospitals.* ***Method:*** *A cross-sectional study with a descriptive design was carried out at the public tertiary care hospital in Lahore. Convenience sampling techniques were used to recruit study participants from the critical care unit. Knowledge levels were divided into three categories: poor, fair and good. Data was collected through questionnaires, which were evaluated using descriptive statistical analysis.* ***Results:*** *The result showed that 36% had fair knowledge, just 16% of the nurses had a strong understanding of sedation management, and 48% of the nurses had low knowledge.* ***Conclusion:*** *The study highlighted a significant lack of sedation management knowledge among critical care nurses in public tertiary care hospitals. Addressing these gaps through targeted training and standardized sedation protocols is essential for improving patient safety in critical settings.*

Keywords: Critical Care Nurses, Knowledge, Public Tertiary Care Hospital, Sedation Management. Mechanical Ventilation

Introduction

Patients in critical care units may require invasive mechanical ventilation. Critical care nurses administer sedatives to reduce anxiety, improve tolerance, and facilitate breathing because agitation is common in ventilator-dependent patients (1). Intensive care units worldwide provide specialized care, including sedation, for 92% of ventilated patients. Sedation levels impact patient outcomes, with higher sedation levels associated with increased mortality, prolonged ventilator use, and a higher risk of delirium. The management of sedation by intensive care unit nurses influences these outcomes. Nearly 50% of intensive care unit staff globally use both subjective and objective techniques to measure sedation levels. Neurological exams improve when sedation is regularly discontinued (2). Over 300 patients were hospitalized in the critical care and emergency units of Assiut University Hospital, with more than 50% of them requiring mechanical ventilation (3). The mortality of patients in the first 48 hours of mechanical ventilation is influenced by early sedation levels. Shifting towards lighter sedation early on can improve clinical outcomes, with bedside nurses playing a crucial role in monitoring sedation levels for critically ill patients (4). The Pakistan Registry of Intensive Care (PRICE) supports a network of forty-three intensive care units recording approximately two thousand critical care admissions monthly. Most critical care units are supervised by registered nurses with general training, and the availability of 1:1 nursing varies between provinces (5). The Indian Registry of Intensive Care (IRIS) tracks patient interactions in adult and pediatric intensive care units providing valuable data on critical care practices (6). Weaning off invasive mechanical ventilation is a crucial milestone in a critically ill patient's recovery. Nurses must assess sedation levels during mechanical ventilation as increased drowsiness can complicate extubation (7). Critical care nurses play a vital role in continuously assessing, monitoring, and adjusting sedative medications for mechanically ventilated patients. Developing an individualized sedation plan requires a comprehensive understanding of commonly used medications (8). Effective sedation administration by critical care nurses is essential for optimal patient outcomes. Inadequate sedation can lead to adverse effects such as aggressive behaviour, self-extubation, physical harm, tube removal, and disruption of patient-ventilator synchronization. Sedation assessment aims to reduce intensive care unit stays and improve patient outcomes while assisting medical staff in maintaining safe practices (9). Insufficient sedation can present with signs such as restlessness, rapid heart rate, high blood pressure, low oxygen levels, high carbon dioxide levels, and difficulty in ventilator use. Over-sedation can result in low blood pressure, slow heart rate, unconsciousness, shallow breathing, kidney damage, and weakened immune function. Prolonged sedation might increase the likelihood of developing ventilator-associated pneumonia. Slow patient

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recovery can lead to extended periods of mechanical ventilation, longer stays in intensive care, and ultimately increased hospital expenses (10).

This study evaluates critical care nurse's sedation management knowledge for mechanically ventilated patients at a public hospital in Lahore. The goal is to pinpoint knowledge gaps and suggest improvements for patient safety and outcomes.

Methodology

This research used a descriptive cross-sectional study design at a public tertiary care hospital in Lahore. The research was conducted at the critical care unit of Jinnah Burn and Reconstructive Surgery Centre, affiliated with Jinnah Hospital in Lahore. The study included critical care nurses with over six months of intensive care unit experience at a public tertiary care hospital. A convenience sampling technique was used to enrol eligible participants. The sample size of 69 nurses was determined using the Raosoft sample size calculator, considering a total population of 83 critical care nurses. The data collection instrument for this study was adopted from a previous study (Masih et al 2020) with established validity and reliability. The questionnaire comprised three sections: Section A collected demographic information, Section B focused on the intensive care unit sedation protocol and assessment scale, and Section C assessed general knowledge of sedation management, including medication handling and sedation level assessment. Knowledge levels were categorized as poor (≤60%), fair (61%–79%), and good (≥80%). Each item was scored as true (1), or false (0). Participants were instructed to fill out the data collection forms and submit them at the designated reception and in case of need more time they can drop by before the end of September 2024. Alternatively, they could contact the researcher directly for collection. The principal of the Department of Nursing at Superior University in Lahore granted ethical approval including relevant hospital authorities. All participants provided informed consent after being briefed on the study objectives and assured of the confidentiality of their responses. Participants were free to withdraw from the study at any time without any consequences. Descriptive data were analyzed using the statistical package for social science version 21. Frequency calculations were used to summarize categorical responses.

Results

Table 1 shows that 54 out of 69 critical care nurses participated in the study, resulting in a response rate of 90.0%. The majority of respondents were female. Half of the participants had less than 2 years of intensive care unit experience, and only 5% had a diploma in nursing in ICU specialization. Most nurses had diplomas in nursing, with few holding a bachelor's degree and none having a master's degree. In terms of overall experience, more than half had over 9 years of experience, while the fewest had less than a year. In terms of age, the majority of respondents fall within the 31-35 age group, accounting for 37%. Conversely, the smallest percentage was represented by nurses ages 45 and above, comprising only 3.7% of the total respondents.

Table 2 illustrates the level of awareness among nurses regarding sedation assessment scales and protocols in the intensive care unit. A significant 90.7% of the nurses stated that there is no formal sedation protocol in place, while 9.3% admitted to being did not know about any sedation scale. Moreover, 74% of nurses reported not receiving formal training on sedation management, with only 26% having undergone specific training in this area.

Table 3 shows that only 20% of nurses had a good understanding of sedation management. A somewhat bigger group 30% has a fair knowledge. But most of the nurses 50% of them showed poor understanding.

Table 4 indicates that a mere 10% of nurses controlled a good, 40% of nurses fair and 50% of nurses had a poor understanding of assessing under and over sedation.

Table 5 shows that just 20% of nurses had a good understanding of handling sedative drugs, and 40% of the somewhat larger group had fair and poor knowledge.

Figure 4 reports on the general knowledge about sedation and its management. Just 16% of critical care nurses have a good understanding of sedation and its management, compared to 48% had poor knowledge and 36% had fair knowledge.

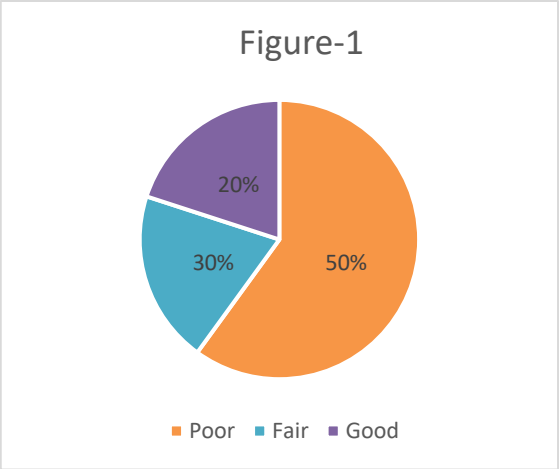

Figure-1 General Knowledge Levels of Sedation Management

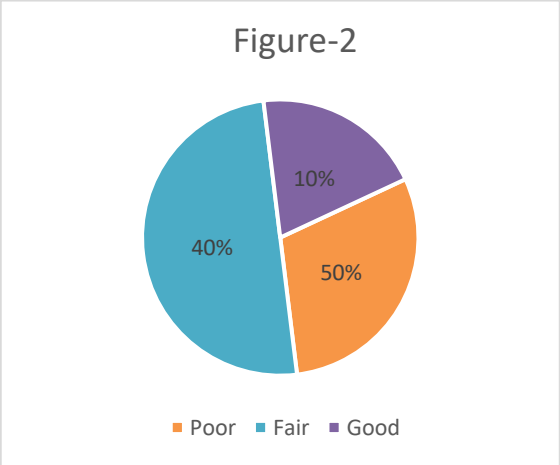

Figure-2 Knowledge Levels of Assessing Under and Over-sedation

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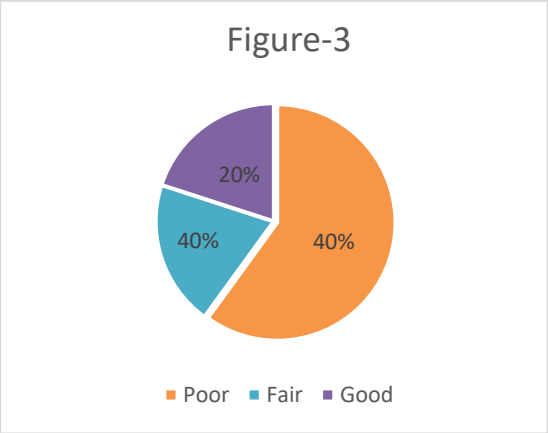

Figure-3 Knowledge Levels of Managing Sedative Drugs

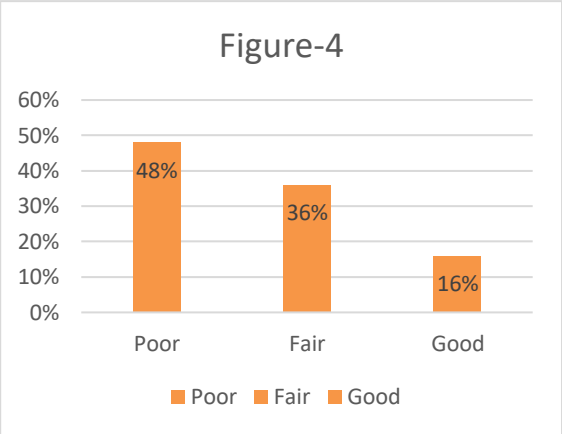

Figure-3 General Levels of Knowledge about Sedation And it's Management:

Table 1 Demographic Profile of Nurses

Demographics		Frequency (n)	Percentage (%)
Total Nurse		69	100
Participants		54	78
Gender	Female	54	100
	Male	0	0
Experience as a Registered nurse	< 2 years experience	27	50.00
	2-4 years	13	24.1
	4-7 years	10	18.5
	> 7 years	04	7.4
Diploma in ICU specialization		3	5.6
Diploma in Nursing		42	78
Bachelor's Nursing Degree		12	22
Master in Nursing		0	0.0
Age	25-30 years	15	27.7
	31-35 years	20	37
	36-40 years	10	18.5
	41-45 years	07	13.0
	>45 years	02	3.7

Table 2 Nurses, awareness about sedation assessment scale and protocol in ICU

Existence of sedation protocol in ICU	Frequency (n)	Percentage (%)
No	49	90.7
Yes	0	0
I don't know	5	9.3
Existence of sedation scale in ICU	49	90.7
	0	0
	5	9.3
Training/education on sedation	14	26

Table 3 Responses on Statements Related to General Knowledge of Sedation Management

Questions	Correct		Incorrect	
	f	% (%)	f	% (%)
Sedation is essential for the comfort of mechanically ventilated patients.	54	100%	0	0
Sedation requirement varies among mechanically ventilated patients.	35	65%	19	35%
Deciding the choice of sedative to be administered should be based on the assessment of the patient's needs.	52	96%	02	4%
Sedation reduces the risk of developing ICU delirium.	19	35%	35	65%

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All intubated patients should be sedated because being on the ventilator is stressful for patients.	34	63%	20	37%
Moderate sedation indicates that the patient is not easily aroused but purposely responds to physical stimulation.	12	22%	42	78%
All intubated patients should be sedated because caring for patients on ventilators is uncomfortable for nurses.	30	56%	24	44%
Sedation given through a standard protocol assists nurses in determining sedation effectiveness.	5	9%	49	91%
A nurse-regulated sedation protocol helps to decrease the length of mechanical ventilation.	25	46%	29	54%
Interruptions in sedative infusions daily indicate a reduction in the length of a mechanical ventilator.	33	61%	21	39%

Table 4: Reply on Knowledge of Assessing Under and Over Sedation

Questions	**Correct**		**Incorrect**	
	f	% (%)	f	% (%)
Patients on ventilators are under sedation if they are reaching for their endotracheal tube or lines.	28	52%	26	48%
Intubated patients are under sedation if they are spontaneously moving such as their hands and /or feet.	40	74%	14	26%
Under sedated patients may have increased heart rate or blood pressure.	42	78%	12	22%
Mechanically ventilated patients are considered under sedation if they move their truck or lift their legs off the bed.	29	54%	25	46 %
Intubated patients are considered under-sedated if a ventilator alarms frequently due to patient-ventilator dysynchrony.	41	76%	13	24%
Intubated patients can be tachypneic because of under-sedation.	44	81%	10	19%
Duration of mechanical ventilation can be prolonged with over-sedation.	30	56%	14	26%
Mechanically ventilated patients are over-sedated if they do not have a cough reflex with suctioning.	41	76%	13	24%
Mechanically ventilated patients are over-sedated if they respond only to nail bed pressure.	28	52%	26	48%
Mechanically ventilated patients are considered over-sedated if they do not follow simple commands.	26	48%	28	52%

Table 5 Reply on Knowledge of Managing Sedative Drugs

Questions	**Correct**		**Incorrect**	
	f	% (%)	f	% (%)
Midazolam should be used cautiously because it can accumulate and extend sedative effects in obese patients.	22	41%	32	59%
Midazolam should be used cautiously because it can accumulate and prolong sedative effects in renal-compromised patients.	42	78%	12	22%
Opioids, benzodiazepines, and propofol have the potential to cause withdrawal effects after use of approximately 7 days of continuous therapy when administered in high doses.	34	63%	20	37%
Hypertension is a common side effect of propofol.	44	81%	10	19%
Effects of over-sedation can be reversed by Flumenazil.	24	44%	30	56%

Discussion

This is the first study in Public Tertiary Care Hospital in Lahore Pakistan, as far as the researcher is aware, that evaluated nurse's knowledge of sedation and its management. Additionally, the study offers a foundation of knowledge for upcoming research in Pakistan. This study points to serious inadequacies in critical care nurses to manage sedation in patients on mechanical ventilation at a public tertiary care facility in Lahore. According to overall findings, just 16% of the nurses had an excellent grasp of sedation management, compared to 36% who had a medium comprehension and 48% who had poor understanding. The lack of defined protocols results in uneven sedation procedures, with the majority of nurses depending more on doctor orders than on research-based recommendations. Just a few of the nurses had received any official training on sedation management, while a noteworthy of nurses noted that the intensive care unit lacked a written sedation procedure. Nurses use a sedation protocol instead of physician-led usual care, they can safely lower intensive care unit mortality and sedation-related adverse events in

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patients on mechanical ventilation (11). This disparity is concerning because sedation plays a crucial in patient outcomes, especially for those on mechanical ventilation. The findings about the nurse's proficiency in identifying over and under-sedation were equally alarming. Fifty per cent of nurses showed weak understanding and only ten per cent showed high expertise. These gaps in knowledge may lead to suboptimal sedation management, as patients are either over-sedated and require extended ventilation, or under-sedated may get agitated and attempt self-extubation. According to the study, preventing the occurrence of self-extubation requires the evaluation and ongoing monitoring of agitation and sedation levels (12).

The study also showed that the nurse's knowledge of how to handle sedative medications was lacking. This may also in unfavourable drug-related consequences, making the treatment of sick patients even more difficult (17). Nurses' combined knowledge was insufficient, and there were numerous misconceptions in a subtotal area that may lead to unsafe procedures and serious complications (13). The study finding is consistent with earlier research carried out in private hospitals, such as (14) investigation in Pakistan, which likewise discovered notable deficiencies in nurses understanding of sedation management in patients on mechanical ventilation. In a similar, research from various low and middle-income nations, including that done by (15) revealed increased death rates associated with insufficient sedative techniques (18).

Patient safety is at risk due to inadequate sedation management training and knowledge. According to (16) intubation rates are lower in nurse-led sedation procedures than in physician-led ones (19). Patient outcomes are impacted by nurse's competence to provide sedation, underscoring the importance of appropriate orientations and training. Standardized sedation techniques and ongoing training for intensive care unit nurses should be given top priority by nursing leadership, educational institutions, and governments, according to the study (20).

A single unit of the public tertiary care hospital critical care nurses participated in this study, which had a small sample size. As such, the results are limited to serving as a baseline for more research.

Conclusion

The study concluded that there are substantial gaps in critical care nurses, understanding of the treatment of sedation for patients on mechanical ventilation, underscoring the necessity of formal training and systematic sedation protocols. To increase nurse comprehension of sedation procedures and improve patient safety and results in intensive care units, focused educational interventions are required. For doctors and nurses to work together, sedation guidelines and scale availability must be guaranteed and standardized. To guarantee that very ill patients receiving care in public hospitals receive high-quality treatment, legislators and healthcare executives need to solve these shortcomings.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-SNU-011/23)

Consent for publication

Approved

Funding

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

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Coordination of collaborative efforts.
Study Design, Review of Literature.
SHAZIA BRUCE
Conception of Study, Development of Research Methodology Design, Study Design, manuscript Review, and final approval of manuscript.
Conception of Study, Final approval of manuscript.
ZUNAIRA AMIR (Nursing instructor)
Manuscript revisions, critical input.
Coordination of collaborative efforts.
SYEDA SIDRA TASNEEM (Director of Nursing)
Data acquisition, and analysis.
Manuscript drafting.
RUBINA JABEEN (Principal, Nursing)
Data entry and Data analysis, drafting article.
Data acquisition, and analysis.
Coordination of collaborative efforts.

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