Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(4), 982-989 | ISSN:2251-6727

Knowledge of Intensive Care Unit Physiotherapy among Physiotherapists: A Cross-Sectional Study

Sangeerthana[a b 1], Aastha Neupane [c]

a Yenepoya Deemed to be University, Department of Physiotherapy, Bangalore

b Assistant professor, School of Allied Health Sciences, Presidency University, Bengaluru, Karnataka,India

c Aastha Neupane Assistant Professor, Yenepoya Deemed to be University, Department of Physiotherapy, Bangalore, Karnataka, India

Corresponding Author: Aastha Neupane, Assistant Professor, Yenepoya Deemed to be University, Department of Physiotherapy, Bangalore.

(Received: 27 September 2025 Revised: 05 October 2025 Accepted: 10 November 2025)

kEYWORDS

Knowledge assessment, critical care, practice, respiratory care, early mobilization, physiotherapy knowledge

ABSTRACT:

Background: Intensive care unit (ICU) physiotherapy plays important role in the recovery of critically ill patients by preventing pulmonary complications, improving oxygenation, and facilitating early mobilization. While ICU physiotherapy is a specialized area, there is limited evidence on level of knowledge among physiotherapist from other specialties.

Objective of The Study: To evaluate the knowledge of intensive care physiotherapy among physiotherapists.

Study Design: Cross- sectional study

Method: A cross-sectional study was conducted with the total of 283 physiotherapists working in public and private hospitals, rehabilitation centers, and clinics across Bangalore. Participants were selected using a convenience sampling method which included Physiotherapists aged above 25 years, with a completed undergraduate or postgraduate degree in physiotherapy. Those with cardiopulmonary specialization, working in ICUs and students were excluded. Data was collected using a self-administered questionnaire containing 18 multiple choice questions to assess the knowledge of ICU physiotherapy. The questionnaire was distributed after obtaining informed consent. Statistical analysis was performed using JAMOVI 2.6.26 software.

Result: Among 283 physiotherapists surveyed, (35.7%) participants had average knowledge, (27.9%) with good knowledge and, (21.2%) with below average knowledge. Only (1.8%) of physiotherapists had excellent knowledge, while (13.4%) had poor knowledge.

Conclusion: The study highlights that physiotherapists had average knowledge in ICU physiotherapy. This shows the clear need for specific training, practical experience, and improved education to help physiotherapists confidently and effectively care for ICU patients.

1. Introduction

An intensive care unit (ICU) is a special ward in hospital where the most seriously ill patients are treated.[1] These patients need specialized care and advanced equipment like monitors, ventilators, pacemakers, and defibrillators.[2] They often need support for vital functions such as breathing or the functioning of multiple organ systems, including the cardiovascular, respiratory, renal, metabolic or cerebral function.[2]

According to the World Health Organization (WHO) cardiovascular disease caused 17.9 million deaths in 2016, accounting for 31% of all global deaths which indicate that cardiovascular disease will continue to be the leading cause of death with an estimated 23 million deaths by 2030.[4] Physiotherapy is a healthcare profession that helps people to improve and maintain their movement and functional abilities throughout their life span. It consists of specialties such as cardiopulmonary, geriatrics, neurology, orthopedics, pediatrics, women's health and oncology.[5] Physiotherapists need to understand the cultural, psychological, and social factors that affect their patients to provide effective treatment.[6] They use various techniques including positioning, postural

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(4), 982-989 | ISSN:2251-6727

drainage therapy, chest wall manipulations, manual hyperinflation (MHI), early mobilization and therapeutic exercises to facilitate the early recovery of critically ill patients.[1]

The assessment of a patient's condition starts with a review of their medical history and physical examination which applies to all patients regardless of their age or conditions.[5]

The role of physiotherapy in ICU management has been widely recognized, especially in developed countries.[6] The primary goal of physiotherapeutic interventions in critical care units is to prevent pulmonary complications by clearing airway secretions, and enhancing gaseous exchange and lung volumes.[1] Apart from pulmonary complications such as muscular weakness and ICU induced delirium. They also help in preventing complication related to immobilization, aids in weaning process from ventilatory support and reduces the overall ICU stay. [3]

Cardiopulmonary physiotherapy plays a crucial role in ICU rehabilitation by providing detailed, phase-wise interventions that are important for minimizing complications, improving functional outcomes, and enhancing the long-term recovery in critically ill patients across acute, subacute, and rehabilitation phases. ICU patients often present with wide range a challenging condition such as sepsis, multi-organ dysfunction syndrome (MODS), acute kidney injury requiring dialysis, toxicological emergencies like poisoning and snake envenomation, brain hemorrhage, and various neurological impairments, in addition to cardiopulmonary diseases.[15,16,17]

In the acute phase the main focus is to prevent secondary complications due to prolonged immobility and mechanical ventilation. Common complications include hospital-acquired pneumonia, ventilator-associated pneumonia (VAP), ICU-acquired weakness, and post-intensive care syndrome (PICS), which includes constant physical, cognitive, and psychological dysfunction following ICU discharge.[16,18] During this phase, physiotherapy interventions include respiratory care like secretion clearance, airway management, passive mobilization (PROM), active-assisted movements (AAROM), and positioning techniques.[16,19]

In the subacute phase, as the patient's condition stabilizes, physiotherapy goal is to shift the patient gradually by increasing activity tolerance, restoring functional independence, and weaning from mechanical ventilation. Early mobilization protocols, strengthening exercises, ventilatory support weaning, and neuromuscular re-education form essential components in this stage.[16,20,21] Physiotherapists also actively collaborate with the multidisciplinary team to improve respiratory muscle performance, reduce ventilator dependency, and promote early ambulation.[21] In the rehabilitation phase, physiotherapy continues to address residual impairments through comprehensive rehabilitation programs aimed at restoring physical function, improving cardiovascular endurance, and dealing with cognitive and psychological consequences of critical illness. Long-term physiotherapy interventions are essential for improving quality of life and facilitating community reintegration post- ICU discharge.[18]

Positioning is one of the most effective interventions used by physiotherapists, particularly in the intensive care unit (ICU) setting. The concept of positioning, primarily governed by the influence of gravity, is based on the principles of the West lung model. These principles of body positioning directly impact the optimization of respiratory mechanics, leading to enhanced gas exchange, improved oxygenation, and better ventilation-perfusion matching in mechanically ventilated ICU patients.[1]

Postural drainage therapy remains the gold standard for mobilizing secretions in critically ill patients.

This technique involves using gravity-assisted positions to help drain secretions from the peripheral areas of the lungs toward the central airways. To effectively target different lung segments, a total of 14 specific positions are employed.[1] Chest wall manipulations like percussion and vibration are usually carried out in gravity- assisted positions to aid secretion clearance. The mechanical energy produced by chest wall manipulations is transmitted to the airways and promotes the loosening and mobilization of secretions.[2] It is believed that these techniques combined with MHI and endotracheal suctioning enhance airway clearance. Chest wall squeezing during expiration enhances airway clearance during endotracheal suctioning.[7]

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(4), 982-989 | ISSN:2251-6727

During Manual Hyperinflation (MHI), the patient is temporarily taken off mechanical ventilation, and a high tidal volume is administered using a manual resuscitation bag. [8]The process involves a slow, deep breath in, followed by a brief pause, and then a quick release. The pause, or inspiratory hold, helps open up the alveoli through collateral ventilation, while the quick release of the bag boosts the expiratory flow.[8] Other airway clearance techniques, such as the Active Cycle of Breathing Technique (ACBT) and Positive Expiratory Pressure (PEP), have proven effective for clearing airways in extubated patients. ACBT involves cycles of breathing control, where the patient is guided to breathe at tidal volume, followed by thoracic expansion and a forced expiratory technique.[9] Positive Expiratory Pressure (PEP) is another airway clearance technique where the patient exhales against resistance. The positive pressure generated during exhalation helps keep the airways from collapsing and recruits collateral airways. This process helps in mobilizing secretions from the peripheral to the central airways.[9] Knowledge is broadly defined as the ability to acquire, retain and use information through experience and understanding to make informed decisions and take right action. In the ICU settings, having adequate knowledge allows physiotherapists to make to make timely, life supportive decisions for critically ill patients .[5,2] However, despite the importance of physiotherapy ICU settings there is limited information about how much physiotherapists from other specialties know about these specialized treatments. Thus, understanding their knowledge is essential to ensure complete patient care and full recovery in intensive care unit.[5,2]

2. Objectives

To evaluate the knowledge of ICU physiotherapy among physiotherapists using a structured questionnaire

3. Methods

After obtaining SRB approval and Ethical clearance from the Yenepoya (Deemed to be university) Ethical Committee, participants who fulfil the eligibility criteria were included in the study, the study was conducted among physiotherapists across a range of healthcare facilities, including public and private hospitals, rehabilitation centers, and physiotherapy clinics in and around Bangalore. The target population consisted of registered physiotherapists who were currently practicing in these healthcare settings, including those specializing in areas other than cardiopulmonary physiotherapy. The participant is selected by convenience sampling method. 283 participants who met the inclusion criteria were selected by convenience sampling method.

Inclusion Criteria:

Practicing physiotherapist.

Completed bachelor of physiotherapy or master of physiotherapy in any specialization.

Both gender groups male and female. Age group >25 years and above.

Exclusion Criteria:

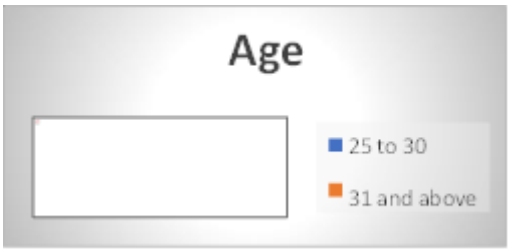
Cardiopulmonary physiotherapist. Physiotherapist working in ICU Physiotherapy students.

Other health care professionals. Unwilling to participate.

4. Statistical Analysis:

Data collected through the questionnaire were analyzed using **jamovi version 2.6.26**. Descriptive statistics were computed to summarize participants demographic characteristics, as well as their levels of knowledge.

Frequencies and percentages were reported for categorical variables in this study.



5. Results

A total of 283 physiotherapists participated in the study, with the majority of participants were female (67.5%). Most of the respondents (83.3%) were between 25 and 30 years of age contributing to (29.3%) of the total participants.

In the primary area of clinical focus most participants mainly worked in musculoskeletal (orthopedic) with (21.2%) practicing in orthopedic clinics and (12.4%) in neuro rehabilitation center. More than half of the participants (51.5%) were under 3 years of experience

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(4), 982-989 | ISSN:2251-6727

and (3.6%) participants were with more than 10 years of experience.

Regarding ICU-related training, (55.5%) had received formal education during their undergraduate program, while (25.4%) were exposed to ICU physiotherapy during their postgraduate programs, and (8.1%) had undergone additional courses or workshops but, (11%) reported no formal training. The demographic characteristics are shown in Table. 1

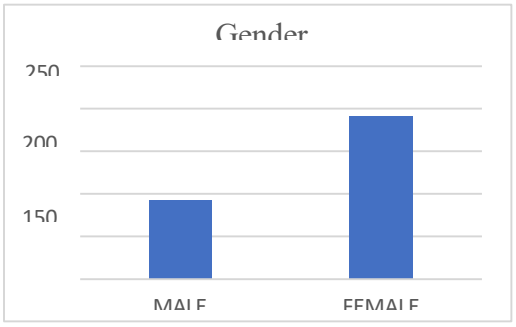


Figure 1: Frequency of Gender and Age

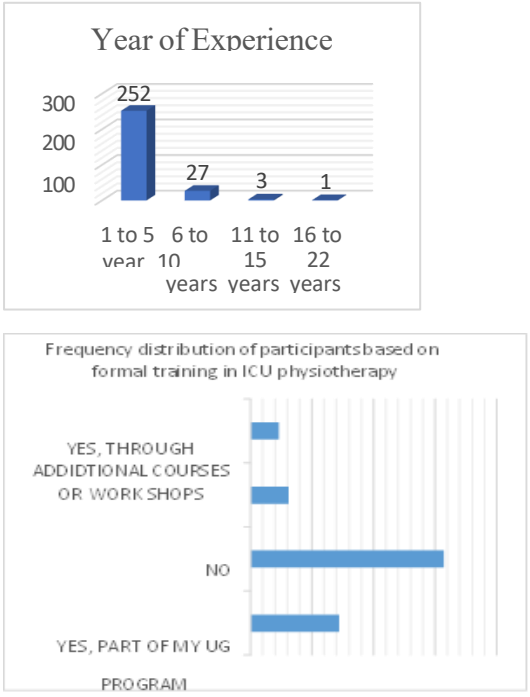


Figure 2: A) Frequency of year of experience, B) Frequency of participants based on Formal training in ICU Physiotherapy

Table 1. Demographic characteristics and percentages of total

GENDER	COUNTS	% OF TOTAL	CUMULATIVE %
Male	92	32.50%	32.50%
Female	191	67.50%	100.00%
AGE			
43	1	0.40%	0.40%
39	1	0.40%	0.70%
38	3	1.10%	1.80%
36	3	1.10%	2.80%
35	2	0.70%	3.50%
34	8	2.80%	6.40%
33	5	1.80%	8.10%
32	6	2.10%	10.20%
31	7	2.50%	12.70%
30	16	5.70%	18.40%
29	25	8.80%	27.20%
28	28	9.90%	37.10%
27	41	14.50%	51.60%
26	54	19.10%	70.70%
25	83	29.30%	100.00%
YEAR OF EXPERIENCE			
1	74	26.10%	26.10%
1.5	1	0.40%	26.50%
1.6	1	0.40%	26.90%
1.7	1	0.40%	27.20%
2	72	25.40%	52.70%
2.5	5	1.80%	54.40%
2.6	1	0.40%	54.80%
3	50	17.70%	72.40%
3.5	1	0.40%	72.80%
3.7	1	0.40%	73.10%
4	28	9.90%	83.00%
5	17	6.00%	89.00%
6	9	3.20%	92.20%
7	5	1.80%	94.00%
8	5	1.80%	95.80%
10	8	2.80%	98.60%
12	1	0.40%	98.90%
13	2	0.70%	99.60%
22	1	0.40%	100.00%

The knowledge of ICU physiotherapy among physiotherapists was assessed through 18 multiple-choice questions that addressed important areas such as vital sign monitoring, respiratory distress signs, ECG interpretation, ABG analysis, secretion clearance techniques, and evidence-based rehabilitation practices as shown in Table 2. Participants showed good understanding in some areas like red flags for respiratory distress (76.3%) and ECG interpretation (67.5%) were well-answered. However, knowledge was lacking in other important areas, such as sputum analysis in COPD (22.3%) and secretion clearance techniques (28.6%). Table 2 summarizes the frequency and percentage of correct and incorrect responses for each question.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(4), 982-989 | ISSN:2251-6727

Question	Count	% of total	cumulati
1. Which of the following vital signs is most critical to monitor for early of sepsis in ICU patient			
Correct answer	107	37.80%	10
wrong answer	176	62.20%	62
2. Which of the following is a red flag indicating potential respiratory c an ICU patient			
Correct answer	216	76.30%	76
wrong answer	67	23.70%	10
3. What is the recommended position to facilitate an effective cougl patients			
Correct answer	189	66.80%	66
wrong answer	94	33.20%	10
4. What does rust-coloured sputum typically suggest in an ICU patient			
Correct answer	154	54.40%	10
wrong answer	129	45.60%	45
5. Which of the following scales is most commonly used to asses dyspnoe in patients with chronic obstructive pulmonary disease (COPD)			
Correct answer	185	65.40%	65
wrong answer	98	34.60%	10
6. Which clinical sign is a red flag indicating a possible pulmonary embo ICU patient			
Correct answer	158	55.80%	10
wrong answer	125	44.20%	44
7. What does a prolonged QT interval on an ECG suggest in an ICU pat			
Correct answer	191	67.50%	10
wrong answer	92	32.50%	32
8. In the context of ICU physiotherapy, why is continuous cardiac m important for patients with cardiovascular conditions			
Correct answer	180	63.60%	63
wrong answer	103	36.40%	10
9. What does an elevated level of B-type Natriuretic Peptide (BNP) indi ICU patient			
Correct answer	171	60.40%	10
wrong answer	112	39.60%	39
wrong answer	199	70.30%	70.30%
14. Which of the following techniques in ICU patients is a contraindication for using chest PNF			
Correct answer	181	64.00%	64.00%
wrong answer	102	36.00%	100.00%
15. Which of the following is an indication for early mobilization in ICU patient			
Correct answer	86	30.40%	30.40%
wrong answer	197	69.60%	100.00%
16. When performing chest physiotherapy on an ICU patient, what is the most effective technique for secretion clearance			
Correct answer	81	28.60%	28.60%
wrong answer	202	71.40%	100.00%
17. What is the primary purpose of using incentive spirometry in ICU patients			
Correct answer	158	55.80%	100.00%
wrong answer	125	44.20%	44.20%
18. According to the American Association of Respiratory Care (AARC) guidelines what is the minimum frequency for turning and repositioning an ICU patient to prevent pressure ulcers and improve lung function			
Correct answer	167	59.00%	100.00%
wrong answer	116	41.00%	41.00%

The Overall knowledge was classified into five categories: Excellent, Good, Average, below average, Poor knowledge as shown in Table 3, (35.7%) participants had average knowledge, (27.9%) with good knowledge and, (21.2%) with below average knowledge. Only 1.8% of physiotherapists had excellent knowledge, while 13.4% had poor knowledge.

10. Which finding in a sputum sample is most indicative of a chronic infla condition such as COPD			
Correct answer	63	22.30%	22
wrong answer	220	77.70%	10
11. A patient's ABG shows the following results: pH 7.30, PaCO2 5 HCO3- 24 Meq/L. What is the most likely interpretation of these values			
Correct answer	167	59.00%	59
wrong answer	116	41.00%	10
12. Which chest radiograph finding is a red flag for tension pneumotho			
Correct answer	168	59.40%	59
wrong answer	115	40.60%	10
13. According to the American Heart Association (AHA) guidelines, w recommended timing for initiating cardiac rehabilitation after a m infraction (MI)			
Correct answer	84	29.70%	10

Knowledge	Counts	% of Total	Cumulative %
AVERAGE KNOWLEDGE	101	35.70%	35.70%
GOOD KNOWLEDGE	79	27.90%	63.60%
BELOW AVERAGE KNOWLEDGE	60	21.20%	84.80%
EXCELLENT KNOWLEDGE	5	1.80%	86.60%
POOR KNOWLEDGE	38	13.40%	100.00%

Table 3: Frequency and percentage of knowledge

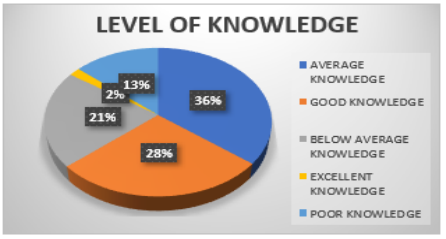


Figure 3: Percentage of level of knowledge

6. Discussion

The present study identified that the significant portion of physiotherapists possessed average knowledge related to ICU physiotherapy with only small proportion demonstrating excellent knowledge. The results found that majority of respondents were female (67.5%). Most of the participants (83.3%) were between 25 and 30 years of age, showing that they are early to their career as physiotherapists. A key finding was that more than half of the participants (51.5%) had less than 3years of experience and only a small number (3.6%) had over ten years of experience. This age distribution shows similar to what is seen in other countries where many physiotherapists working in ICU is still new to clinical practice.[20]

The present study found that most of the participants were mainly working in musculoskeletal or orthopedic areas (21.2%), followed by neurorehabilitation (12.4%). This may contribute to limited knowledge in ICU physiotherapy, as

experience with ICU patients and procedures.

Also, this study evaluated how much ICU related training the physiotherapists had received. Over half (55.5%) had learned about ICU physiotherapy during their undergraduate program, while (25.4%) had undergone during their postgraduate courses. Another (8.1%) gained knowledge through special workshops or courses. However, (11%) said they had no formal training in ICU physiotherapy.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(4), 982-989 | ISSN:2251-6727

To check ICU knowledge, participants answered 18 multiple choice questions on important topics like reading ECG, understanding ABG results, checking vital signs, and clearing lung secretions Most of them answered well in some areas like, (76.3%) correctly identified signs of breathing trouble, and (67.5%) answered the ECG questions right. This shows that many physiotherapists can recognize serious ICU problems. But scores were less in areas like secretion clearance, (28.6%) answered correctly and sputum analysis in COPD (22.3%) answered right. This is a concern because clearing lung secretions is very important to prevent problems like pneumonia and infections from ventilators. If these techniques are not well understood this can slow down recover and increase the patients ICU stay longer. Similarly,

Akmal et,al (2023), in his study found that many physiotherapists face difficulty in choosing the right techniques for patient's conditions in cardiopulmonary rehabilitation (CPR).

This study findings also align with evidence from various global contexts that have reported moderate knowledge levels among physiotherapists in ICU. For example, Kabbadj et al. (2024) found that (72.4%) of Moroccan physiotherapists had medium knowledge of cardiac rehabilitation, while in India Babu et.al (2024) highlighted that less than half of Indian physiotherapists correctly answered knowledge-based questions related to COVID 19 ICU care. Similarly, Okonkwo et al. (2023) noted that only about two-thirds of healthcare professionals in Nigerian ICUs had an acceptable understanding of physiotherapy's role in intensive care. These studies show that lack of knowledge about ICU physiotherapy is a common issue in many countries and healthcare systems.

Findings from this investigation suggests that majority of physiotherapists had average knowledge of ICU physiotherapy, with (35.7%) showing average knowledge, and (27.9%) with good knowledge. Only (1.8%) had excellent knowledge levels.

One of the important reasons for average level of knowledge found in this study could be that many of the physiotherapist mainly worked in musculoskeletal settings and also more than half of the participants had less than three years of experience., which likely limited their understanding with ICU-related physiotherapy practices. This supports the findings of Yeole et al. (2015), who reported that a majority of physiotherapists working in Maharashtra ICUs had limited ICU experience and formal training, resulting in variability in practice and knowledge.

Geographical diversity also plays an important role in the variability of knowledge and practice of ICU physiotherapy. Viloria et al. (2023) found that the use of physiotherapy techniques in ICUs varied widely across Asian countries, mainly due to differences in healthcare systems, training availability, and cultural contexts. This shows the need for educational programs that are adapted to fit the specific requirements and available resources for each region, rather than relying on one general approach overall.

Also, interdisciplinary teamwork is very important for effective ICU rehabilitation. Akmal et.al (2023), study pointed out that one major problem is that doctors often don't refer patients to physiotherapy, even when cardiopulmonary rehabilitation could help. In our study although many physiotherapists (55.5%) had undergone training in ICU care, there were still lack of knowledge. This might be due to not getting enough referrals or poor communication between physiotherapists and ICU team.

Furthermore, the lack of specialized training programs in ICU physiotherapy reduces the growth of knowledge in this field. Previous studies (Farah et al., 2022; AIKetbi et al., 2021) have shown that physiotherapists with higher qualification tend to have better knowledge. These results highlight the need for thorough knowledge training in ICU care physiotherapy to help the physiotherapists with the necessary skills and evidence-based knowledge. Without such training especially physiotherapists from other specialties may lack confidence and ability to manage ICU patients effectively. Incorporating hospital-based workshops, Increasing ICU exposures during physiotherapy education training or ICU specific based internships could prepare physiotherapists real life ICU responsibilities.

These problems are not just academic they affect real patient care. ICU patients are at high risk for complications such as ICU acquired weakness, delirium, and prolonged mechanical ventilation. Early physiotherapy can help to prevent these problems.

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(4), 982-989 | ISSN:2251-6727

According to Schweickert et.al (2009) shown that early mobilization and targeted respiratory exercises shorten hospital stays, improve survival rates and reduce long term disability. However, if physiotherapists don't have enough training or experience, they may not feel confident to begin or manage these treatments.

It's also important to consider that many participants in the present study were young and had limited work experience, which suggests that they are recent graduates who are still shifting from classroom learning to practical application. Hence providing mentorship and supervised ICU training could help support these early career physiotherapists.

This study gives a clear picture of what physiotherapists currently know about ICU care. With a large number of participants from different backgrounds and a detailed questionnaire, the study highlights both strengths and area that need improvement. It showed that many physiotherapists struggle with important topics clearing secretions and understanding sputum in COPD patients. These can reduce the quality of care in ICU if not improved. There is a strong need to improve physiotherapy education by updating the curriculum, offering more ICU focused clinical training and providing regular learning opportunities. Ultimately educating physiotherapists with better ICU knowledge and hands on training will not only improve their clinics confidence but also lead to better outcomes for patients in critical care settings.

7. CONCLUSION

This study reveals that while the majority of physiotherapists possess an average level of knowledge related to ICU physiotherapy. Only a small percentage showed good or excellent understanding, whereas many physiotherapists having below average and poor knowledge, clearly shows the need for targeted education and hands-on clinical training to improve their skills and confidence in working in ICU settings. Improving knowledge and practical skills in ICU physiotherapy is important to ensure safe, effective, and evidence-based patient care. Organized learning programs and continuous professional training can help to overcome lack of knowledge and help to provide high-quality rehabilitation for critically ill patients. Furthermore, if physiotherapists are adequately trained in ICU care, they can help as extra skilled staff during health emergencies like COVID 19 pandemic.

Limitations:

This study showed few limitations that should be accepted. Firstly, the data was collected using a self-reported questionnaire, which may have led to response bias, as some participants might have guessed the answers or thought they knew more or less than they actually knew. Secondly, most of the participants were early-career physiotherapists with less than three years of experience. Therefore, the results may not represent the knowledge of experienced physiotherapists. Thirdly, since this was a cross-sectional study, it only looked at participants knowledge at one point in time. This means it could not show how their knowledge might improve with experience or progress with more training. Additionally, the study was done within a limited geographical region, so the results might not represent the knowledge of physiotherapists working in other parts of the country or in different healthcare settings. Moreover, convenience sampling method was applied which may have limited how well the sample represents the whole group, since participants were chosen based on who was available instead of selecting randomly. Finally, the study focused on objective knowledge assessment and did not assess how well they actually use this knowledge when working with patients in real ICU settings.

References

1. Swaminathan N, Praveen R, Surendran P. The role of physiotherapy in intensive care units: a critical review. *Physiother Q*. 2019;27(4):1-5.
2. Javed HM, Ahmad H. Knowledge, attitude, and practices of cardiopulmonary rehabilitation among physiotherapists in Lahore: cardiopulmonary rehabilitation among physiotherapists. *Era Physiother Rehabil J*. 2022;2(1):1-4.
3. Farah R, Groot W, Pavlova M. Knowledge, attitudes, and practices of cardiopulmonary rehabilitation among physiotherapists in Lebanon. *Bull Fac Phys Ther*. 2022;27:1-8.
4. Elyamani R, Soulaymani A, Hami H. Epidemiology of cardiovascular diseases in

Journal of Chemical Health Risks
www.jchr.org
JCHR (2025) 15(4), 982-989 | ISSN:2251-6727

Morocco: a systematic review. *Rev Diabet Stud*. 2021;17(2):57-67.

5. Kabbadj K, El Haddaoui S, Taiek N, El Hangouche AJ. Knowledge, attitudes, and practices of cardiac rehabilitation among physiotherapists in Morocco. *Glob Cardiol Sci Pract*. 2024;2024(3).
6. Okonkwo AC, Ogbonna C, Umunnah JO, Chukwuemeka U. Knowledge and attitude on the role of physiotherapy in the intensive care unit among other health care professionals in South East, Nigeria. *J Biomed Invest*. 2023;11(2):23-37.
7. Akmal S, Murtaza F. Knowledge, attitudes and practices of cardiopulmonary rehabilitation among physiotherapists in ICU. *Pak J Phys Ther*. 2023;3(2).
8. Conceição TM, Gonzáles AI, Figueiredo FC, Vieira DS, Bündchen DC. Safety criteria for initiating early mobilization in intensive care units: a systematic review. *Rev Bras Ter Intensiva*. 2017;29(4):509-519.
9. sBurtin C, Clerckx B, Robbeets C, et al. Early exercise in critically ill patients enhances short-term functional recovery. *Crit Care Med*. 2009;37(9):2499-2505.
10. Suresh Babu N, Pratap Singh V, Shyam Krishnan K, Prabhu D. Knowledge, attitude, and practice of physiotherapists in COVID-19 ICUs: a national survey. *Sci World J*. 2024;2024:9918558.
11. Viloria MA, Lee SD, Takahashi T, Cheng YJ. Physical therapy in the intensive care unit: a cross-sectional study of three Asian countries. *PLoS One*. 2023;18(11):e0289876.
12. AlKetbi H, Hegazy F, Alnaqbi A, Shousha T. Evidence- based practice by physiotherapists in UAE: investigating behavior, attitudes, awareness, knowledge and barriers. *PLoS One*. 2021;16(6):e0253215.
13. Hasani F, MacDermid JC, Tang A, et al. Knowledge, attitude and implementation of evidence-based practice among physiotherapists working in the Kingdom of Saudi Arabia: a cross-sectional survey. *Healthcare (Basel)*. 2020;8(3):354.
14. Yeole UL, Chand AR, Nandi BB, et al. Physiotherapy practices in intensive care units across Maharashtra. *Indian J Crit Care Med*. 2015;19(11):669-673.
15. Schweickert WD, Pohlman MC, Pohlman AS, et al. Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial. *Lancet*.
16. Hodgson CL, Stiller K, Needham DM, et al. Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults. *Crit Care*. 2014;18:658.
17. Gosselink R, Bott J, Johnson M, et al. Physiotherapy for adult patients with critical illness: recommendations of the European Respiratory Society and European Society of Intensive Care Medicine task force. *Intensive Care Med*. 2008;34:1188-1199.
18. Needham DM, Davidson J, Cohen H, et al. Improving long-term outcomes after discharge from intensive care unit: report from a stakeholders' conference. *Crit Care Med*. 2012;40(2):502-509.
19. Stiller K. Physiotherapy in intensive care: towards an evidence-based practice. *Chest*. 2000;118(6):1801- 1813.
20. Dafoe S, Chapman MJ, Edwards S, Stiller K. Overcoming barriers to the mobilisation of patients in an intensive care unit. *Anaesth Intensive Care*. 2015;43(6):719-727.
21. Haines KJ, Skinner EH, Berney S, Austin Health POST Study Investigators. Association of postoperative pulmonary complications with delayed mobilisation following major abdominal surgery: an observational cohort study. *Physiotherapy*. 2013;99(2):119-125.