



# KNOWLEDGE OF ICU-AW AMONG PHYSIOTHERAPIST

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Critically ill patients admitted to ICU are often restricted to bed rest and treatment is centered to restore acute organ functioning before attempts to conserve physical and mental functions (Koo K.Y. Karen, 2016).

Patients that require mechanical ventilation often develops acute neuromuscular weakness which in turn increases the frequency of readmission to ICU, decreases in long term physical activities and in general reduced quality of life. When patient is on bed rest it results inactivity and immobility which themselves have remarkable and detrimental physiological effects including bed sores, atelectasis and pneumonia (C Allen, 1999; CM Harper, 1988). Immobility causes a daily loss of muscle strength from 1.3% to 3%. In healthy individuals a complete bed rest for only one week can results into 10% reduction in strength of postural muscles. The effect of being immobile in even more intense in elderly patients and with long term illness like congestive heart failure and chronic obstructive pulmonary disease (Hodging E Katherine, 2009).

There are evidences that treating patients with critical illness might cause muscle and nerve damage resulting in neuromuscular dysfunction (Akinremi AA, 2019). Intensive care unit acquired weakness, can be defined as “clinically detected weakness in critically ill patients in whom there is no plausible etiology other than critical illness”, is the typical neuromuscular disability which affects the course of disease and prognosis of patients and has no definite cause (N. Latronico, 2011). ICU-AW can develop as early as on the second day of ICU admission or after few hours in mechanically ventilated patients. Patients with mechanical ventilation for more than 4-7 days have 33-82% chances to have ICU-AW (W.D. Schweickert, 2009; P.O. Rodriguez, 2012)

Intensive care unit acquired weakness (ICUAW) is seen in patients admitted to ICU for prolonged period of time and it can be classified into 3 types: Critical illness myopathy (CIM), Critical illness polyneuropathy (CIP), and Critical illness poly-neuromyopathy (RD Stevens, 2009; W Zink, 2009; J Kahn, 2006; CF Bolton, 2005). ICUAW is associated with prolonged bed rest in ICU, prolonged mechanically ventilated and prolonged hospital stay. Apart

from treating a critical illness of ICU patient there is another factor arises that affect post ICU function and quality of life (Garnacho-Montero J, 2001; de Jonghe B, 2004; Fink H, 2008).

These three conditions often co-occur, and the combination of CIP and CIM- designated as critical illness myopathy and neuropathy (CRIMYNE) or important multiple organ disease (CIPNM)- is an overlapping syndrome most popular (S. Piva, 2019).

Critical illness polyneuropathy is a sensory motor polyneuropathy (S. Piva, 2019). Compound muscle action potentials (CAMPs) and sensory nerve action potential (SNAPs) when investigated found to be decreased in amplitude with almost normal value of nerve conduction velocity. CIM is a primary acute myopathy with reduced muscle membrane excitability and loss of myosin filaments, fiber atrophy, and necrosis. There electrophysiological findings reveal reduced CAMP duration and near normal SNAP and on muscle stimulation it shows reduced muscle excitability. Muscle atrophy is the result of muscle discharge / inactivity that promotes muscle catabolism, resulting in loss of muscle cell size and reduced muscle cell strength. Mechanical mute- i.h. mechanical irritation in ICU patients who are on mechanical ventilation, are deeply sedated, are receiving neuromuscular blockers, or are receiving a combination of these, causes even more severe muscle wasting (S. Piva, 2019).

Recent studies shows that muscle atrophy and loss of muscle mass comes into existence shortly after critical illness (ZA. Puthuceary, 2013). Physiotherapists play an essential part in preventing and treating ICUAW. Some studies show beneficial role of early mobilization and inspiratory muscle training to improve weaning phase and make patients functionally independent at hospital discharge (C. Hodgson, 2015).

Recent attempts have been made to make clear diagnostic criteria and rehabilitation program for ICU patients (RD. Stevens, 2009). It is important to timely analyze the condition and rehabilitation program to provide a better guideline for examination, evaluation, interventions and outcomes for patients with ICU-acquired weakness (C. Nordon, 2012).

**Objectives of the study:** To find out the knowledge of ICU-AW among physiotherapists.

**Need of the present study:** The prevalence of ICU-acquired weakness was underestimated by physiotherapists working in intensive care units, and feel ill-prepared to treat patients on mechanical ventilation. The need of this study to investigate the knowledge of physiotherapists as an initial step towards implementing strategies aimed at preventing ICU-AW. The study will help physiotherapist to recognize their duties and make them more aware towards their role in ICUs.

**Study design:** The intended research is a cross-sectional survey. The study is designed to investigate the knowledge of ICU-AW among physiotherapy professionals and students.

**Source of data:** Web-based open E-surveys distributed via email, What's App, and Instagram messengers are used to collect data from research subjects online.

**Method of data collection:** Data is collected through the online google form. Based on inclusion and exclusion criteria, a convenient random sampling approach is employed for the investigation.

**Inclusion criteria:**

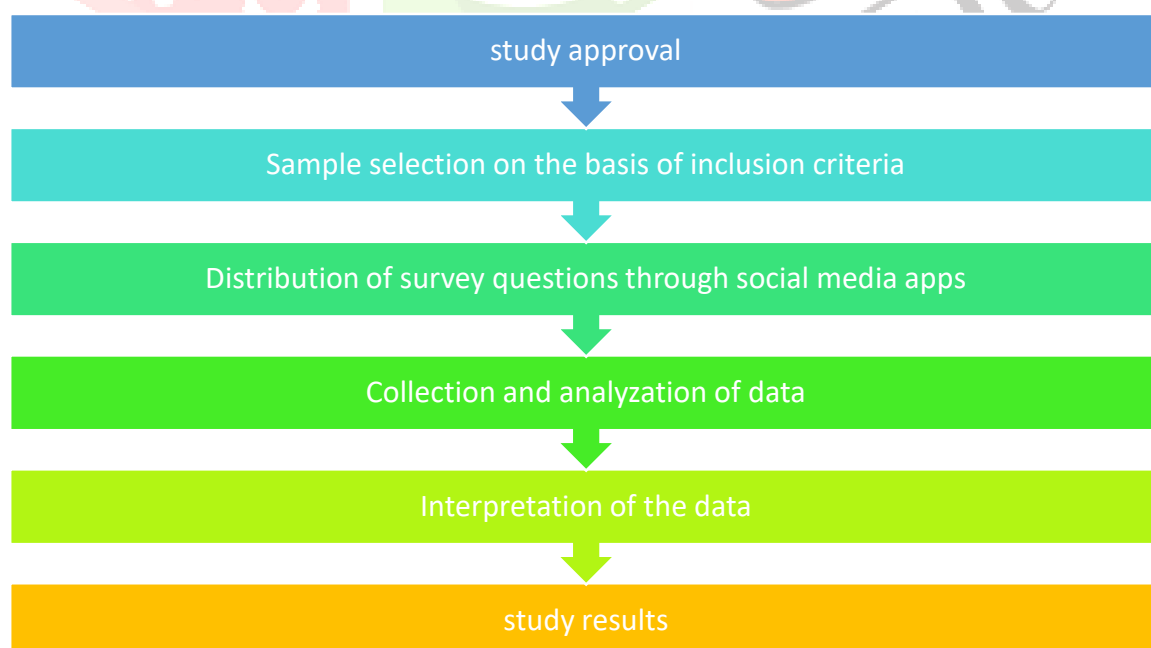
- BPT 3<sup>rd</sup> and final year students
- Physiotherapy Interns
- PhD students
- Physiotherapy professionals.

**Exclusion criteria:** other healthcare professionals.

**Sample size:** Out of 300 google forms sent 150 responses came.

**Tools of data collection:** A self-administered structured questionnaire that includes questions on knowledge, attitudes about therapy delivery in ICUs, and perceived constraints to providing physiotherapy care there. The questionnaire was adapted from *Koo K.Y. K et al., (2016)*, *Akinremi AA et al (2019)*, *Akhtar M P. et al., (2021)*, *Zhang H et al., (2021)* and *Wu Y et al., (2021)*.

Flow Chart of the study



**Procedure for data collection:**

Online survey is used for the investigation. A networked survey gateway called Google Forms was used to construct the survey. Links were shared through social networking platforms including WhatsApp, Facebook and Instagram. The online survey was chosen because it is convenient, less demanding, economical, ecologically friendly, and time-consuming. The survey questionnaire consists of 24 questions and it will take up to 6 to 8 minutes.

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Since providing care for the critically ill involves specialized staffing and training, this study evaluated how well physiotherapists knew about the ICU-AW (L Ebirim, 2012). Participants in this study are 3<sup>rd</sup> year bachelor's student (6.7%), 4<sup>th</sup> year bachelors' student (8.7%), interns (8%), post-graduation student (36.7%) and physiotherapy professionals (40%).

**Awareness of ICU-AW and knowledge on classification of ICU-AW**

Most(64.4%) of the participants claimed to be familiar with ICU-AW. Most of the responders incorrectly believed ICU-AW to be both a musculoskeletal and neuromuscular condition.

**Knowledge on diagnostic tools and assessment for ICU-AW**

Knowledge on the diagnosis of this acquired weakness was average, with most of the participants being aware of the use of Medical Research Council Scoring Scale— an inexpensive tool—for ICU-AW diagnosis. This data suggests that most critical care centers in low resource settings do not frequently perform functional evaluation on critically sick patients. This may be due to the misconception that ICU-AW is not a significant issue in this setting, where there are more emergent acute problems and a dearth of personnel and resources to handle them. In our regression study, uncertainties were not related to experience level, practice area, or practice discipline.

The recognition of ICU acquired weakness has grown as a result of reported gains in outcome measures and cost savings in prospective trials of early mobility for critically ill patients. We saw a lot of support for early mobilization, especially among physiotherapists and in areas with mobility champions. Safety issues, lags in identifying potential patients, a lack of priority given to this part of treatment, and inadequate multidisciplinary communication and coordination can all impede mobility. Like earlier researchers, we discovered that significant obstacles to early mobility were severe sedation (RTD Appleton, 2011; P. Nydahl, 2014)), medical instability(J. King, 1998), a lack of physician instructions(J. King, 1998; KE. Hodgin, 2009), inadequate personnel, and inadequate equipment. Experts believe that the MRC scale is a relatively authoritative scale for diagnosis of ICU-AW because it has good reliability and validity along with the MMT scale and other physical function scales. ICU-AW should be evaluated every day, according to the majority of responders (YC Wu, 2018; Piva S, 2019).

According to a study by *Dong et al.* in China, 43% of ICU nurses were judged to have accurate understanding of ICU-AW (D. Dong, 2016). *Feng et al.* found that 22% of ICU nurses in China had strong understanding of ICU-

AW evaluation and diagnosis, compared to 58% who had poor knowledge and 21% who had none at all (J. Feng, 2015). Similarly, the present study showed only 54.7% physiotherapist thought that their ICU-AW related knowledge met clinical needs, 16.7% thought it did not meet clinical needs, and 28.7% were unsure. The majority of respondents thought that the evaluation of ICU-AW should be given equal weight to the evaluation of other problems (pressure ulcers, infections, etc.) and that ICU-AW assessments had to be carried out as a regular component of ICU treatment and care procedures.

51.7% physiotherapist feels barriers in implementing physiotherapy treatment in ICU. The main three components of barriers were lack of decision-making authority (65.8%), dependence on physician's order to initiate early mobilization (55.7%) and lack of written guidelines and protocols (76.7%). These findings imply that further education is required to advance technical knowledge and enable early mobility in the ICU. According to the knowledge-attitude-practice model (AT. Craig,2018), ICU-AW evaluation and prevention can only be effectively practiced after one has a thorough understanding of the condition and its negative consequences as well as the foundational evidence supporting early detection and prevention. In terms of patient-related obstacles, cognitive impairment or the inability to comprehend, a patient's unwillingness to comply with the assessment, a patient's unconsciousness, and excessive sedation or analgesia were the primary obstacles impacting ICU-AW evaluation. The kind of ICU-AW evaluation instrument utilized may be related to this. Many respondents believed that the best instruments for ICU-AW evaluation may be assessment scales (MRC scale, 59.5%; NCV, 53.7%; and EMG, 63.5%). In order to quantify muscular strength, mobility, or activity, these scales need active patient engagement. The patient must demonstrate awareness, active collaboration, and sensitive reactions, in particular, for the MRC scale. High sensitivity and specificity can be achieved using electrophysiological examination, musculoskeletal ultrasonography, electromyography, and muscle biopsy, but these procedures are costly and need for a qualified technician.

A greater understanding of the perspective, knowledge, and attitude of physiotherapists was made possible by this study. This study's results indicated that physiotherapists may not be well-informed. It could be necessary for the participants to get educational interventions such ongoing professional training in ICU-AW. This study's results indicated that physiotherapists may not be well-informed. It could be necessary for the participants to get educational interventions such ongoing professional training in ICU-AW. The majority of responders agreed that early mobilization of critically sick patients is crucial, but they highlighted various obstacles to implementation at the hospital and patient levels. To lessen the impact of ICU-AW on patients, early detection and intervention of the condition should be prioritized. As a crucial next step, future studies should focus on lowering modifiable barriers.

## REFERENCES

- Koo, K. K., Choong, K., Cook, D. J., Herridge, M., Newman, A., Lo, V., Guyatt, G., Priestap, F., Campbell, E., Burns, K. E., Lamontagne, F., Meade, M. O., & Canadian Critical Care Trials Group (2016). Early mobilization of critically ill adults: a survey of knowledge, perceptions and practices of Canadian physicians and physiotherapists. *CMAJ open*, 4(3), E448–E454.
- Allen C, Glasziou P, Del MC. Bed rest: a potentially harmful treatment needing more careful evaluation. *Lancet* 1999;354(9186):1229–1233. [PubMed: 10520630].
- Harper CM, Lyles YM. Physiology and complications of bed rest. *J Am Geriatr Soc* 1988;36(11): 1047–1054. [PubMed: 3049751].
- Hodgkin KE, Nordon-Craft A, McFann KK, Mealer ML, Moss M. Physical therapy utilization in intensive care units: results from a national survey. *Critical Care Medicine*. 2009 Feb;37(2):561-6; quiz 566-8. DOI: 10.1097/ccm.0b013e3181957449. PMID: 19114903; PMCID: PMC2908523.
- Akinremi AA, Erinle OA, Hamzat TK. ICU-acquired weakness: A multicentre survey of knowledge among ICU clinicians in South-Western Nigeria. *Niger J Clin Pract*. 2019 Sep;22(9):1229-1235. doi: 10.4103/njcp.njcp\_338\_18. PMID: 31489859.
- Latronico N, Bolton CF. Critical illness polyneuropathy and myopathy: a major cause of muscle weakness and paralysis. *Lancet Neurol*. 2011 Oct;10(10):931-41. doi: 10.1016/S1474-4422(11)70178-8. PMID: 21939902.
- Schweickert WD, Pohlman MC, Pohlman AS, Nigos C, Pawlik AJ, Esbrook CL, Spears L, Miller M, Franczyk M, Deprizio D, Schmidt GA, Bowman A, Barr R, McCallister KE, Hall JB, Kress JP. Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial. *Lancet*. 2009 May 30;373(9678):1874-82. doi: 10.1016/S0140-6736(09)60658-9. Epub 2009 May 14. PMID: 19446324.
- Rodriguez PO, Setten M, Maskin LP, Bonelli I, Vidomlansky SR, Attie S, Frosiani SL, Kozima S, Valentini R. Muscle weakness in septic patients requiring mechanical ventilation: protective effect of transcutaneous neuromuscular electrical stimulation. *J Crit Care*. 2012 Jun;27(3):319.e1-8. doi: 10.1016/j.jcrc.2011.04.010. Epub 2011 Jun 28. PMID: 21715139.
- Stevens RD, Marshall SA, Cornblath DR, Hoke A, Needham DM, de Jonghe B, Ali NA, Sharshar T. A framework for diagnosing and classifying intensive care unit-acquired weakness. *Crit Care Med*. 2009 Oct;37(10 Suppl):S299-308. doi: 10.1097/CCM.0b013e3181b6ef67. PMID: 20046114.
- Zink W, Kollmar R, Schwab S. Critical illness polyneuropathy and myopathy in the intensive care unit. *Nat Rev Neurol*. 2009 Jul;5(7):372-9. doi: 10.1038/nrneurol.2009.75. PMID: 19578344.
- Khan J, Harrison TB, Rich MM, Moss M. Early development of critical illness myopathy and neuropathy in patients with severe sepsis. *Neurology*. 2006 Oct 24;67(8):1421-5. doi: 10.1212/01.wnl.0000239826.63523.8e. PMID: 17060568.

- L Ebirim, S Ojum. Outcome Of Trauma Admissions In An Intensive Care Unit In The Niger Delta Region Of Nigeria. *The Internet Journal of Emergency and Intensive Care Medicine*. 2012 Volume 12 Number 2.
- Wu Y, Ding N, Jiang B, Zhang Z, Zhang C, Li B. [Diagnostic tools of intensive care unit acquired weakness: a systematic review]. *Zhonghua Wei Zhong Bing Ji Jiu Yi Xue*. 2018 Dec;30(12):1154-1160. Chinese. doi: 10.3760/cma.j.issn.2095-4352.2018.012.011. PMID: 30592950.
- Piva S, Fagoni N, Latronico N. Intensive care unit-acquired weakness: unanswered questions and targets for future research. *F1000Res*. 2019 Apr 17;8:F1000 Faculty Rev-508. doi: 10.12688/f1000research.17376.1. PMID: 31069055; PMCID: PMC6480958.
- Dong D, Feng B, Duan Y, Huang H, Zhou J, Chu S. Knowledge about ICU-acquired weakness among ICU nurses in four third level hospitals in Nanjing. *J Nurs Admin* 2016;16:723–5.
- Feng J, Tian Y, Nie M, Li K. Cognition on ICU-acquired weakness of ICU nurses. *J Nurs (China)* 2015;22:43–7.
- Craig AT, Joshua CA, Sio AR, et al. Towards effective outbreak detection: a qualitative study to identify factors affecting nurses' early warning surveillance practice in Solomon Islands. *BMC Health Serv Res* 2018;18:702.
- Appleton RTD, MacKinnon M, Booth MG, et al. Rehabilitation within Scottish intensive care units: a national survey. *J Intensive Care Soc* 2011;12:22
- Nydahl P, Ruhl AP, Bartoszek G, et al. Early mobilization of mechanically ventilated patients: a 1-day point prevalence study in Germany. *Crit Care Med* 2014;42:1178-86.
- King J, Crowe J. Mobilization practices in Canadian critical care units. *Physiother Can* 1998;50:20.
- Nordon-Craft, A., Moss, M., Quan, D., & Schenkman, M. (2012). Intensive care unit-acquired weakness: implications for physical therapist management. *Physical therapy*, 92(12), 1494–1506.