

Evaluation of Physiotherapy and Rehabilitation Practice and Associated Barriers in Reduction of Pulmonary Complications in Critical Care Units across North Karnataka: A Survey Study

Ganesh BR* and Samaradnyi Hichkad

Department of Cardiopulmonary Physiotherapy, KLE Institute of Physiotherapy, Belgaum, Karnataka, India

Abstract

Background: Physiotherapy in the Intensive care unit has shown beneficial effects to the patient, as it improves their quality of life, increases their bodily functions, improves their respiratory muscle strength and reduces hospital as well as ICU length of stay.

Aim: The aim of this study is to evaluate the characteristics of physiotherapist and their different ways of treatment approach in patient care admitted in intensive care unit.

Material and Method: In this study a survey questionnaire consisting of 32 items, were electronically sent to 70 participants via mail to different tertiary hospitals in Karnataka and the response were received in the same manner.

Conclusion: The most common interventions were positioning, active, passive, breathing exercises and percussion. Critical barriers toward physiotherapy are multifactorial and related to physiotherapists, patients, team, equipment, and legal procedures. This study concluded that a proper protocol for rehabilitation in the ICU is necessary to enhance the performance and the quality of life of patients in ICU.

Keywords: Physiotherapy • Intensive care unit • Rehabilitation

Introduction

Physiotherapy in the Intensive care unit is of great importance. It has shown beneficial effects to the patient in ICU, as it improves their quality of life, increase their bodily functions, improves respiratory muscle strength and reduces hospital and ICU length of stay [1]. The requisite of patient in the ICU range from observation of vital sign after surgery to the total support of physiological systems.

Physiotherapy in developed countries is a very important component of the multidisciplinary treatment of the patient in ICU. The role of physiotherapy in ICU and the rehabilitation methods used by the physiotherapist in ICU differs between unit which depends on various factors like country in which ICU is located, local tradition, levels of staffs and specialists [2].

Physiotherapist are the primary contact therapist that use a vast variety of techniques like respiratory, cardiovascular, neurological and musculoskeletal systems to create a systematic and individualized treatment plan [3]. However due to the loss of physical impairment for the patients in the ICU, it has become necessary to include exercise rehabilitation as a part of standard clinical practice [3]. When mobilizing a critically ill patients there are many complications that can arise which may not be limited to haemodynamic status, severe weakness, various catheters, artificial airways, basic life support monitors or ventilators and operational factors like different rehabilitation work practices [4]. Also due to use of sedative drugs to relax agitation or to decrease expenditure of energy, reduced level of alertness from medications, disturbance of sleep,

electrolyte imbalance are also some of the factors that limit mobilization in critically ill patients. Patients with less aerobic capacity respond to exertional stress with elevated heart rate and blood pressure responses or else they may not have enough physiologic reserve to meet the simplest task of sitting on the edge of the bed [5]. Early physiotherapy in ICU patients will help to prevent or avoid recurrence of physical impairments, by using early mobilization techniques patients in ICU recover much faster and are out of bed following cardiac surgery [6]. Early mobilization also aims at improving physical and mental functions of critically ill patients [7].

Treatment of pulmonary complications like retained pulmonary secretions, atelectasis is necessary to avoid reintubation and has become the main focus of physiotherapy for critically ill patients [8]. Thus physiotherapy in the respiratory management mainly aims to promote secretion clearance, improve oxygenation and prevent any respiratory complications in both intubated as well as spontaneously breathing patients [9]. The physical care in ICU focuses on interventions for respiratory conditions using techniques such as percussion, manual hyperinflation, vibration, suctioning, bed exercises etc. [8].

Along with these techniques, early mobilization for the patients in the ICU has great importance. Early mobilization along with upright body positioning after major surgery aids in increasing lung volumes and to prevent pulmonary complications. In spite of safety and consistency of early mobilization in ICU, most of the patients remain immobilized for a long duration. This can be mostly due to modifiable and non-modifiable barriers to ease mobilization as per literature. These barriers according to some literatures are classified into 4 categories 1) patient related barriers that includes patient symptoms and conditions (e.g. haemodynamic instability) 2) structural barriers, that include human and technical resources (e.g. staffing, equipment) 3) barriers that are related to ICU cultures (e.g. staff morals) 4) barriers related to process that includes the way services are delivered and clinician functioning. Thus barrier related to them are miscellaneous, with the most common barrier being patient related barrier. Therefore to understand such barriers and to find out the strategies to overcome them, will be helpful for any therapist who want to implement early mobility as a part of daily clinical practice [8-11].

Also there are very few studies that have established the extent to which physiotherapy and rehabilitation should be administered in ICU, in India, as well as

*Address for Correspondence: Ganesh BR, Department of Cardiopulmonary Physiotherapy, KLE Institute of Physiotherapy, Belgaum, Karnataka, India, Tel: 0831 247 3906; E-mail: drganeshnssofficer@gmail.com

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its effect and the obstacles that can occur while practicing physiotherapy in ICUs. Hence the present trial aims to find out the efficacy of physiotherapy practice and to find out barriers of applying physiotherapy in ICU within North Karnataka.

Materials and Methods

Patient selection

Physiotherapist working in ICU in tertiary care hospital in north Karnataka since ≥ 2 yrs, of gender, any age and those who voluntarily wanted to participate were included in this study. The physiotherapists who were not willing to participate were excluded. Ethical clearance was obtained from the Institutional Ethical Committee and participants were recruited as per the inclusion criteria.

Method

A survey questionnaire consisting of 32 item, including both open and close ended questions were used.

The survey questionnaire addressed the following : demographics of the hospital or ICU and physical therapist (9 items) , staffing patterns (2 items) , training methods for working in the ICU (2 items) , self-confidence working in the ICU (5 items) , presence of specific consultation and treatment guidelines (2 items) and perceived barriers to providing rehabilitation services in the ICU (6 items). The adequacy of training and barrier identification were assessed with a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Likelihood of the physical therapist, consultation, frequency of care prescribed by the physical therapist , therapist's confidence in/ and perception of the benefit of performing various interventions , identification of the single most beneficial intervention category and physical therapist confidence in mobilizing patients out of bed as a part of a physical therapy intervention session. Confidence in mobilization was assessed with a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

This survey questionnaire was electronically sent to the participants via mail (using google forms) to different tertiary care hospitals within North Karnataka and the responses were received in the same manner.

Statistical analysis

Statistical analysis was performed using Statistical Package for the Social Sciences for Mac version 20.0, where $p < 0.05$ was considered to be significant.

Results

A total of 70 surveys were mailed, and 62 were obtained. Of the 70 respondents, 8 did not complete the survey because they did not currently practice in acute care or ICU setting, or the survey was not deliverable because of an inaccurate address. Therefore, 62 surveys were included in the final analysis.

Completed surveys represented various physiotherapists working in tertiary care hospital within north Karnataka.

In the present study, the participants were mainly female accounting for 59.7% and male accounting for 40.3 (Figure 1). Figure 2 illustrates that there 33.9% were BPT by qualification and 66% were MPT. About 67.7% were non-teaching staff. Most of the ICU was multi centred type of ICU. 48.4% of the physiotherapist performs head down postural drainage for ventilated patient. 41.9% of the physiotherapist understood mechanical ventilation and 67.4% of the therapist understood how to work with physiologic monitoring in ICU and patient support equipment found in ICU. 48.4% of the physiotherapist was involved in setting ventilator parameters and 53.2% were involved in weaning mechanical ventilators. 56.5% of the physiotherapist was confident in decision making to determine which patient should or should not receive physiotherapy. 72.6% were confident in discussing appropriateness of physiotherapy rehabilitation and mobility with nurses and physicians. 63.9% of therapist has a specific guideline of protocol to determine patient's eligibility for physiotherapy in ICU and 64.5% have a specific guideline to terminate a physiotherapy session in ICU. 79% of physiotherapist participated in interdisciplinary rounds on the floor or wards and 74% participated in interdisciplinary rounds in the ICU. 43.5% of physiotherapist decides at the bedside if the patient is ready to start with physiotherapy rehabilitation program. 42.2% of physiotherapist stated that there is a lack of adequate physiotherapy resources while 51.6% stated that there is lack of proper physiotherapy training to provide physical therapy in ICU. 38.7% physiotherapist stated that there is a lack of specific consult criteria to facilitate early physical therapy for patients in the ICU. In this study most of the barriers were due to lack of resources and equipment followed by lack of staff for rehabilitation in ICU (Tables 1-3).

The SD is less than 1, it indicates that there is consistency in the respondent's opinion towards the factors influencing physiotherapy and Rehabilitation practices in reducing pulmonary complications as the aggregate mean value is more than 3 which falls on the positive side of the scale and also falls within the upper and lower confidence intervals as observed from the descriptive statistics (Table 2).

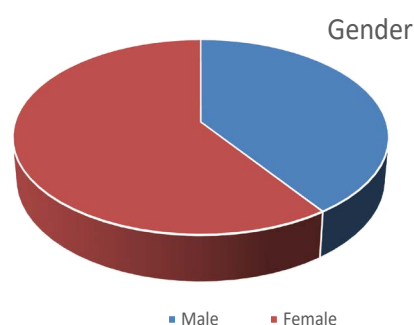


Figure 1. The participants were mainly female accounting for 59.7% and male accounting for 40.3.

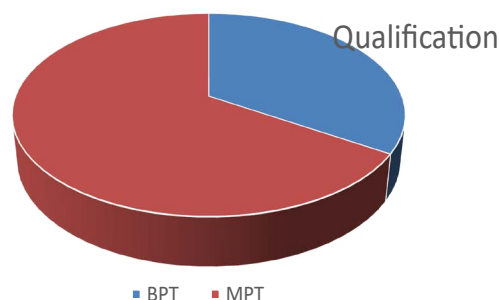


Figure 2. Figure illustrates that there 33.9% were BPT by qualification and 66% were MPT.

Table 1. Physiotherapist was involved in setting ventilator parameters.

Particular	Mean	SD	Lower	Upper	Percent
11. Do you perform head down postural drainage for ventilated patients?	3.39	1.16	3.09	3.68	48.4
13. Do you as a physiotherapist are involved in setting ventilator parameters	3.23	1.26	2.91	3.55	48.4
14. Do you as a physiotherapist are involved in weaning from mechanical ventilators?	3.50	1.11	3.22	3.78	53.2
15. Are you adequately trained to provide rehabilitation in the ICU	4.29	0.49	4.17	4.42	67.7
16. Do you understand mechanical ventilation	4.42	0.50	4.29	4.55	58.1
17. Do you understand how to work with the physiologic monitoring and patient support equipment found in the ICU	4.24	0.50	4.11	4.37	69.4
18. Are you confident in your decision making when determining which patients should/should not receive physical therapy?	4.56	0.50	4.44	4.69	56.5
19. Are you confident in discussing the appropriateness of physical therapy treatment and mobility with nurses and physicians	4.24	0.47	4.12	4.36	72.6
20. Do you have any specific guidelines/protocols to determine patient eligibility for physical therapy in the ICU?	3.60	1.02	3.34	3.85	63.9
21. Do you have specific guidelines/protocols to terminate a physical therapy session in the ICU?	3.71	1.00	3.46	3.96	64.5
22. In your facility, do physical therapists participate in interdisciplinary rounds on the floor/ward?	3.82	0.76	3.63	4.02	79.0
23. In your facility, do physical therapists participate in interdisciplinary rounds in the ICU?	3.92	0.77	3.72	4.12	74.2
24. A patient has been referred to physical therapy in the ICU. Does physical therapist decides at the bedside if the patient is ready to start a physical therapy rehabilitation program?	3.13	1.03	2.87	3.39	43.5
25. During a bedside physical therapy treatment in the ICU, a patient with a tracheostomy is unable to cough and has retained secretions. Do you perform suctioning in such condition?	3.69	1.05	3.43	3.96	61.3
26. Is There is a lack of adequate physical therapy resources(eg, not enough physical therapy staff members to provide physical therapy in the ICU)	3.27	0.89	3.05	3.50	45.2
27. Is there a lack of adequate physical therapy training to provide physical therapy in the ICU?	3.32	1.04	3.06	3.59	51.6
28. Are the Patients in the ICU considered lower a priority and physical therapy is allocated to other areas/service lines within the hospital?	2.79	1.19	2.49	3.09	24.2
29. Is There a lack of specific consult criteria to facilitate early physical therapy for patients in the ICU?	3.08	0.96	2.84	3.33	38.7
30. Are most patients too sedated to participate in physical therapy in the ICU?	3.58	1.02	3.32	3.84	38.7
31. Does the other team members (eg. physicians, nurses, respiratory therapists) undervalue the importance of early physical therapy in ICU?	2.98	1.05	2.72	3.25	30.6

Table 2. The upper and lower confidence intervals as observed from the descriptive statistics.

One-Sample Test						
	Test Value = 3					
	T	Df	p-value	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Q11	2.618	61	.011	0.39	0.09	0.68
Q13	1.411	61	.163	0.23	-0.09	0.55
Q14	3.539	61	.001*	0.50	0.22	0.78
Q15	20.645	61	.001*	1.29	1.17	1.42
Q16	22.465	61	.001*	1.42	1.29	1.55
Q17	19.481	61	.001*	1.24	1.11	1.37
Q18	24.645	61	.001*	1.56	1.44	1.69
Q19	20.887	61	.001*	1.24	1.12	1.36
Q20	4.627	61	.001*	0.60	0.34	0.85
Q21	5.598	61	.001*	0.71	0.46	0.96
Q22	8.545	61	.001*	0.82	0.63	1.02
Q23	9.346	61	.001*	0.92	0.72	1.12
Q24	.984	61	.329	0.13	-0.13	0.39
Q25	5.204	61	.001*	0.69	0.43	0.96
Q26	2.425	61	.018*	0.27	0.05	0.50
Q27	2.450	61	.017*	0.32	0.06	0.59
Q28	-1.388	61	.170	-0.21	-0.51	0.09
Q29	.659	61	.512	0.08	-0.16	0.33
Q30	4.495	61	.001*	.58065	.3224	.8389
Q31	-.121	61	.904	-.01613	-.2822	.2500

*Significant at 5% level

The test has revealed a significant statistical value with p-value is less than the 5% significance level (i.e. 0.001 < 0.05) in our study and therefore it justifies the

acceptance of alternate hypothesis based on the one sample t test procedure (Table 4).

Table 3. Followed by lack of staff for rehabilitation in ICU.

Barriers to Rehabilitation in the ICU	n	%	p-value
Treatment approach is quite vague	3	5%	0.014*
Clearance from physicians	1	2%	
Treatment Difficulties	3	5%	
Lack of awareness and skill in terms of all the possible rehabilitation techniques and protocols	2	3%	
Less staff	8	13%	
Less no of ICU beds in the hospital	3	5%	
Cardiologist do not refer on time	1	2%	
Discharging the patient without having complete physiotherapy rehabilitation program	2	3%	
Lack Hygiene Practice	1	2%	
Lack Support from staff	2	3%	
Communication with the interdisciplinary team	2	3%	
Lack of resources & equipment's	6	10%	
Lack of patient participation	5	8%	
Other health issues	5	8%	
Lack of physical exercise	2	3%	
Feeding time	4	6%	
Physiological instability	2	3%	
Sedation	3	5%	
Fatigue	2	3%	
None	5	8%	

Table 4. Hypothesis based on the one sample t test procedure.

Particular	Mean	SD	t-value	p-value
F1	3.30	0.93	2.58	0.012*
15. Are you adequately trained to provide rehabilitation in the ICU	4.29	0.49	20.64	0.001*
F2	4.40	0.40	27.40	0.001*
20. Do you have any specific guidelines/protocols to determine patient eligibility for physical therapy in the ICU?	3.60	1.02	4.62	0.001*
22. In your facility, do physical therapists participate in interdisciplinary rounds on the floor/ward?	3.82	0.76	8.54	0.001*
F3	3.36	0.57	5.03	0.001*
28. Are the Patients in the ICU considered lower a priority and physical therapy is allocated to other areas/service lines within the hospital?	2.79	1.19	-1.38	0.170
F4	3.28	0.82	2.68	0.009*

Discussion

Remarkably, there are very few literatures regarding the role of physiotherapists in intensive care units. In order to understand the role of physiotherapists, two things must be considered, namely the degree to which specialist physiotherapy services are available in the ICU, and the specific tasks that are performed by physiotherapists in the ICU.

Also, there was paucity in the Literature regarding staffing levels and availability of physiotherapists and their role in the rehabilitation in ICU's across north Karnataka. In our study we found that most of them performed head down postural drainage for rehabilitation for ventilated patients along with other techniques like percussion, vibration and mobilisation. The number of physiotherapists working in the ICU was 8.68 ± 13.94 , while the daily time spent in the ICU was 5.13 ± 1.337 h, and the number of beds in ICU was 56.55 ± 53.18 . According to the core standards for ICUs, physiotherapy should be available 24 h a day, if required, depending on the patient's need, and the suggested staffing levels are one physiotherapist to four beds in order to provide both the respiratory management and rehabilitation components of care. Anne Lediteschke et al conducted a study that aimed to determine the frequency of early mobilization in intensive care unit in order to identify barriers to easy mobilization. This study concluded that ICU patients can be safely mobilized for as much as their ICU stay. Interventions that may allow more patients to mobilize may include changing the site of vascular catheters, careful scheduling of procedures, and improved sedation management. A study was conducted by Ann Parker et al found a similar result as in our study which concluded that early rehabilitation implementation in intensive care unit decreases the physical and mental health complications that most of the times

occurs in the critically ill patients which are also safe and feasible if conducted through multidisciplinary approach. In our study the outcome measure was a questionnaire which was send to different physiotherapist working in ICU in various tertiary hospitals all over north Karnataka through which we found that the barriers associated with rehabilitation are lacking of staff, resources, equipment, patient's participation in rehabilitation due to their health issues etc. and also a proper training physiotherapist and a protocol for rehabilitation is mandatory in ICU for enhancing the performance and quality of life of the patients.

Conclusion

This study concluded that a proper protocol for rehabilitation in the ICU is necessary to enhance the performance and the quality of life of patients in ICU. Also, a proper trained physiotherapist is necessary for the purpose of rehabilitation of patient.

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