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Role of physiotherapists in intensive care units of India: A multicenter survey

Jithendra A. Kumar, Arun G. Maiya*, Daphne Pereira*

Abstract

Purpose: The purpose of this study was to find what role physiotherapists play in the care of the critically ill in Indian Intensive Care Units (ICU). **Materials and Methods:** Study Design and Setting: Exploratory cross-sectional survey Questionnaires were sent to 260 ICUs in India. A stamped self-addressed envelope was enclosed with the questionnaire and a period of six weeks for completion were given in an attempt to ensure good response rates. If response was not obtained within six weeks, two subsequent reminders were sent to the hospitals with a further time gap of six weeks. **Results:** Eighty-nine completed questionnaires were received and analyzed, representing 35% of the questionnaires sent. The present study revealed that, 24% of ICUs had a resident physiotherapist available during the night and 79% of physiotherapists available on-call. In almost 90% of ICUs physiotherapists performed chest manipulations, mobilization, incentive spirometry and postural drainage. Correlation of physiotherapists' role between different states of India, were performed by Chi-square. Mann-Whitney U test was performed to compare, within each of the five states for two types of postings in relation to the years of experience in ICU. **Conclusion:** All physiotherapists in ICU are routinely involved in chest physiotherapy and mobilization

Key words: Chest physiotherapy, Indian intensive care unit, multicenter survey, physiotherapy

Introduction

"An intensive care unit (ICU) is a specially staffed and equipped hospital ward dedicated to the management of patients with life-threatening illnesses, injuries or complications" (Oh, 1998).^[1] Throughout the course of ICU development, the role and responsibility of the physiotherapist has been poorly defined. In an ICU consensus conference in 1983, authors clarified the roles of physicians and nurses but not physiotherapists. In regard to physiotherapists it was simply mentioned that they should be included in the ICU team and

should be involved in any continuous training programs. Consequently, there is little uniformity in physiotherapy training or duties, with considerable variation between and sometimes within countries.^[2] Although a wide variety of literature is available about the roles of nurses and physicians in the ICU, the role of physiotherapists has received comparatively little attention and remains largely undefined and variable across sites.^[3,4]

Physiotherapists in the ICU are part of a multi-disciplinary team involved in the treatment of critically ill patients. Physiotherapists liaise closely with medical, nursing and other allied health professionals regarding patient condition, progression and treatment plans.^[5]

In order to understand the role of physiotherapists, two things must be considered, namely the degree to

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which specialist physiotherapy services are available in the ICU and the specific tasks that are performed by physiotherapists in the ICU. Literature regarding the staffing levels and the availability of physiotherapists in the ICU is rare.

In a study of European ICUs, Norrenberg and Vincent^[6] found that one quarter of the ICUs did not have exclusive physiotherapists for ICUs and two thirds had no physiotherapist available after hours, suggesting that the inclusion of physiotherapy within the ICU multidisciplinary team may not be firmly established.

The precise role that physiotherapists play in the ICU varies considerably from one unit to the next, depending on factors such as the country in which the ICU is located, local tradition, staffing levels, training and expertise.^[7] The referral process is one example of this variation, in some ICU's, physiotherapists assess all patients, whereas in other ICU's patients are seen only after referral from medical staff.^[7] Despite the emphasis on multidisciplinary team, the lack of role definition has resulted in many specialist physiotherapy services being subsumed by other professional groups, mostly nursing staff. The lack of strong evidence base to support the role of physiotherapists in the ICU has undermined the importance of providing specialist physiotherapists.

In intensive care units, physiotherapists are involved in the prevention and treatment of pulmonary, circulatory, musculoskeletal system and integumentary complications, by regular chest physiotherapy, graded mobilization and proper positioning of patients. The role of physiotherapists as stated by Kathy Stiller,^[8] in the ICU are positioning, mobilization, manual hyperinflation, percussion, vibration, coughing, suctioning, various breathing exercises and limb exercises. Colin F. Mackenzie^[9] stated the role of physiotherapists in ICU as positioning, postural drainage, percussion, vibration, manual lung inflation, coughing, tracheal suctioning, breathing exercises, patient mobilization and application of aerosol, humidification, incentive spirometry, forced expiratory techniques, bronchodilators and mucolytic agents.

There is no available information on the role of physiotherapists in ICUs in India. The purpose of this study was to find what role physiotherapists play in the care of the critically ill in Indian ICU.

Materials and Methods

Study design

Exploratory cross sectional survey.

Participants

Physiotherapists who are currently working in ICU with two years of working experience were requested to fill the questionnaire.

Procedure

The study was reviewed and approved by the institutional ethical committee, Manipal College of Allied Health Sciences (MCOAHS), Manipal Academy of Higher Education (MAHE). The lists of hospitals were obtained from Indian Association of Physiotherapists (IAP) and Medical Council of India (MCI) websites. A total of 500 hospitals were identified. In India, both modern medicine and traditional systems of medical practice are well established. In this study the traditional systems of medical practices like Unani, Ayurveda, homeopathy and dental colleges were excluded and a total of 260 hospitals from the above mentioned websites were included in the study.

Survey was done by the questionnaire and pilot study was conducted at Kasturba Medical College Hospital, Manipal and Kasturba Medical College Hospital, Mangalore. Physiotherapists involved in ICU were given the questionnaire, experts in the field of cardio-respiratory physiotherapy with 10 years of working experience were consulted for their comments on the questionnaire design, structure and content and a final questionnaire was prepared. The questionnaire covers details of the hospital (number of beds in hospital and ICU beds), therapist profile (qualification, experience) and role of physiotherapists (chest manipulation, positioning, mobilization, breathing exercise, postural drainage and advanced physiotherapeutic techniques) in ICU and several other questions were incorporated to elicit the information about physiotherapists awareness to ICU.

Questionnaires were posted to the Head of the department of physiotherapy of the hospitals selected. As per the inclusion criteria, physiotherapists who are currently working in ICU with two years of working experience, were requested to fill the questionnaire.

A covering letter was included explaining the purpose of

the questionnaire, identifying the researcher and assuring confidentiality.

A stamped self-addressed envelope was included with the questionnaire and a period of six weeks for completion was given in an attempt to ensure good response rates. If response was not obtained within the stipulated time period, two subsequent reminders were sent to the hospitals with a time gap of six weeks for the first reminder and four weeks for the second reminder. Non-respondents were excluded from the study after the second reminder.

Data analysis

Questionnaire contents were statistically analyzed by SPSS (V. 10) software. Data was summarized using percentages. Chi-square was performed for correlations of physiotherapists' role between states, Mann-Whitney U test was performed to compare years of experience of physiotherapists in ICU with their postings in ICU, Kruskal-Wallis test was performed to compare physiotherapists' years of experience in ICU within different states.

Results

A total of 89 completed questionnaires were received out of 260 (35% response rate) with the largest response from Karnataka, Maharashtra, Andhra Pradesh, Delhi and Tamil Nadu in descending order [Table 1]. Out of 89 questionnaires received, 23 (26%) were from hospitals with more than 500 to 1000 beds. Forty (45%) respondents were from hospitals with 10 to 20 beds in ICU. Majority of the respondents (59%) working in ICU were postgraduate qualified physiotherapists [Table 2].

Twenty four percent of ICUs had a resident physiotherapist available during the night and 79% of physiotherapists available on call. Many respondents, 78%, reported their posting to be on rotation basis rather than on permanent basis.

The role of physiotherapists in ICUs is presented in [Figure 1]. Ninety one percent respondents reported to be involved in chest manipulation, 100% in mobilization, 100% in breathing exercises, 94% incentive spirometry, 98% in postural drainage, 95% in assisted coughing and huffing.

The respondents reported that (55%) of the referral

Table 1: State-wise response to the questionnaire

State	Number sent	Number received	Proportion of response (%)
Andhra Pradesh	42	14	15.73
Assam	3	0	0
Bihar	15	0	0
Chandigarh	2	0	0
Delhi	21	12	13.48
Goa	2	1	1.12
Himachal Pradesh	1	0	0
Jammu and Kashmir	4	1	1.12
Gujarat	12	3	3.37
Karnataka	54	24	26.96
Kerala	6	1	1.12
Maharashtra	31	15	16.85
Orissa	3	1	1.12
Pondicherry	2	1	1.12
Punjab	7	2	2.24
Rajasthan	3	1	1.12
Tamilnadu	37	10	11.23
Uttar Pradesh	8	1	1.12
West Bengal	2	1	1.12
Madhya Pradesh	5	1	1.12

Table 2: Hospital and patient demographic data

Hospital bed distribution	n (Number)	Percentage
<100 beds	8	8.9
100-200 beds	10	11.23
201-300 beds	10	11.23
301-400 beds	9	10.11
401-500 beds	12	13.48
>500-1000 beds	23	25.84
>1000 beds	17	19.1
ICU bed distribution		
<10 beds	24	26.96
10-20 beds	40	44.94
21-30 beds	16	17.97
31-40 beds	5	5.95
41-50 beds	1	1.12
>50-100 beds	3	3.37
Type of ICU		
Multidisciplinary	64	71.91
Neuro	34	38.2
Cardiac	42	47.19
Post-operative	40	44.94
Neonatal	32	35.95
Burns	18	20.22
Nephro	16	17.97
Qualification of the physiotherapists		
Diploma	1	1.12
Bachelors	35	39.32
Masters	52	58.42
Ph D	1	1.12
Teaching/non-Teaching		
Teaching	69	77.52
Non-teaching	20	22.47
Experience as physiotherapist		
1-5 years	47	52.8
6-10 years	22	24.71
>10-20 years	17	19.1
>20 years	3	3.37

system in the ICUs is by physician. Overall response rate of the physiotherapists being in setting ventilatory parameters was 10%, with respondents involved in weaning being 18%.

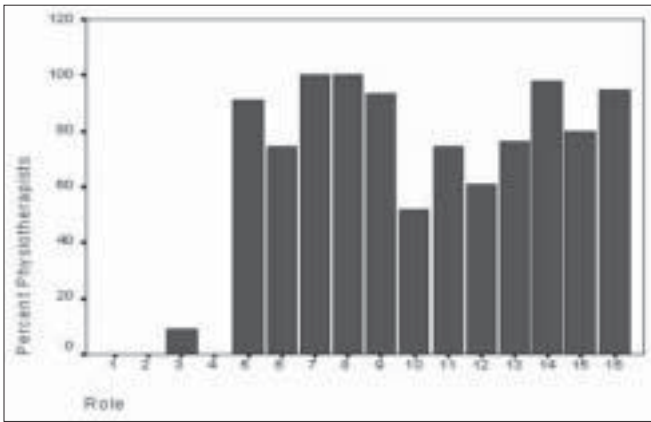


Figure 1: Different role of Physiotherapists in ICU's of India.

1- Percussion only, 2- Vibration only, 3-Percussion+Vibration, 4- Suctioning only, 5- Chest manipulation (Percussion + vibration + suctioning), 6- Positioning, 7- Mobilization, 8- Breathing exercises, 9- Incentive spirometry, 10-Ambulation of tracheostomy patients in ICU, 11-Ambulation of non-intubated patients in ICU, 12- Counseling, 13-Nebulization+ Humidification, 14- Postural drainage, 15- Forced expiratory technique, 16- Assisted coughing and huffing

Correlation of role of physiotherapists between different states of India [Table 3] has been performed by Chi-Square, except ambulation of non-intubated patients, all other parameters were found to be non significant.

Mann-Whitney U test was performed to compare, within each of the five states for two types of postings in relation to the years of experience in ICU [Table 4] and it was found to be insignificant. Kruskal-Wallis test was performed to compare between five states for two types of postings with relation to the years of experience [Table 5] and was found to be insignificant.

Discussion

Remarkably, a dearth of literature exists 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. Literature regarding the staffing levels and availability of physiotherapists in the ICU is rare.

According to the results of our survey, Indian ICU physiotherapists perform both the roles of chest physiotherapy and mobilization. Apart from the roles mentioned in the questionnaire, therapists are also involved in application of non-invasive ventilation, proprioceptive neuromuscular facilitation in respiration, bed sore management, active cycle of breathing techniques and autogenic drainage.

In our study 91% of the respondents reported to perform chest manipulation (percussion, vibration, suctioning), on comparison with other countries Australian physiotherapists (79%),^[10] European (98%)^[6] counterparts.

Therapists in ICU are not only involved in chest physiotherapy techniques, but also reported to have a very active role in mobilization and positioning. Mobilization from our study was found to be 100%, which is on par with Australia (100%)^[10] and Europe (100%).^[6] The above data reveals that therapists from different parts of the country are involved in patient mobilization inside the ICU which focuses on representing early rehabilitation. In, therapeutic positioning was found to be 75%, while it was higher in Australia (100%)^[10] and Europe (90%).^[6]

We found on-call physiotherapists available in Indian ICUs were 79% as compared to elsewhere, Europe (83%),^[6] Australia (66%)^[10] and South Africa (96%).^[11]

Even though recognition of the need for physiotherapists in ICU is growing world wide, the kind of referral system being practiced in Indian ICUs is physician-based (55%) rather than being standard treatment. Physiotherapists

Table 3: Correlation of role of physiotherapists between different states of India

	Andhra Pradesh n = 14	Maharashtra n = 15	New Delhi n = 12	Tamilnadu n = 10	Karnataka n = 24	Significance P value
Chest manipulation	14 (100.0)	15 (100.0)	12 (100.0)	10 (100.0)	24 (100.0)	1
Positioning	13 (92.9)	14 (93.3)	12 (100.0)	10 (100.0)	23 (95.8)	0.817
Limb physiotherapy	13 (92.9)	15 (100.0)	12 (100.0)	10 (100.0)	24 (100.0)	0.353
Breathing exercise	13 (92.9)	15 (100.0)	12 (100.0)	10 (100.0)	24 (100.0)	0.353
Incentive spirometry	13 (92.9)	15 (100.0)	12 (100.0)	9 (90.0)	23 (95.8)	0.658
Ambulation of tracheostomy patient	7 (50.0)	8 (53.3)	6 (50.0)	7 (70.0)	10 (41.7)	0.677
Ambulation of non intubated patient	6 (42.9)	13 (86.7)	8 (66.7)	10 (100.0)	19 (79.2)	0.013
Postural drainage	13 (92.9)	14 (93.3)	12 (100.0)	10 (100.0)	24 (100.0)	0.514
Forced expiratory technique	11 (78.6)	11 (73.3)	7 (58.3)	10 (100.0)	20 (83.3)	0.182

Figures in parentheses indicate percentage

Table 4: Comparison within each of the five states for two types of postings in relation to the years of experience

State	Type of postings in ICU	Number of subjects N	Number of years of experience (Mean ±Sd)	Z
Andhra Pradesh	Rotation	12	6.15 ± 4.47	1.84800 P=.065
	Permanent	2	2.00 ±.00	NS
Maharashtra	Rotation	11	4.79± 5.43	1.20400 P=.229
	Permanent	4	7.75 ± 6.13	NS
New Delhi	Rotation	11	4.50 ± 2.97	
	Permanent	1	12.00	
Tamilnadu	Rotation	8	5.50 ± 4.20	0.26600 P=.790
	Permanent	2	3.50 ±.70	NS
Karnataka	Rotation	17	3.42 ± 2.27	0.74900
	Permanent	7	4.14 ± 2.34	P=.454 NS

Table 5: Comparison between five states for two types of postings with relation to the years of experience

Type of postings in ICU	Place	Number of subjects in each state N	Number of years of experience (Mean ± SD)	H (Kruskal-wallis test)	P
Rotation	Andhra Pradesh	12	6.15 ± 4.47	5.57	0.234
	Maharashtra	11	4.79 ± 5.43		
	New Delhi	11	4.50 ± 2.97		
	Tamilnadu	8	5.50 ± 4.20		
	Karnataka	17	3.42 ± 2.27		
Permanent	Andhra Pradesh	2	2.00 ± 0.00	4.79	0.313
	Maharashtra	4	7.75 ± 6.13		
	New Delhi	1	12.00		
	Tamilnadu	2	3.50 ±.70		
	Karnataka	7	4.14 ± 2.34		

were not found to be involved in setting setting or adjusting ventilatory parameters and weaning, but majority of them were involved in suctioning during extubation and some reported to be a part of the weaning team.

No conclusion could be made between duration of experience of physiotherapists in ICU with postings in ICU and duration of experience with different states.

Future studies should be aimed at identifying probable factors influencing the role of physiotherapists in ICU-like hospital administration policies, inter-professional needs and type of specialized care required.

More number of ICUs should be included in the future studies.

Conclusions

1. Our study showed that not all patients in Indian ICUs get routine chest physiotherapy as part of their ICU care unless referred by an ICU physician, so physiotherapy should be standard routine management of such patients.

2. All physiotherapists in the ICU are routinely involved in both chest physiotherapy and mobilization.

Acknowledgements

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- Do you have night duties - Y/N
- Do you have rotational postings on holidays - Y/N

Patients seen by you are

- On physician referral
- On routine assessment

Role of physiotherapist in ICU (State your role in ICU)

- Percussion only
- Vibration only
- Percussion and vibration (chest manipulation)
- Suctioning
- Chest manipulation and suctioning
- Positioning (Supine, side-lying, prone)
- Limb physiotherapy
- Breathing exercises
- Incentive spirometry
- Counseling
- Ambulating tracheostomy patients with AMBU in ICU
- Ambulating non intubated patients in ICU
- Aerosol therapy
- Nebulisation
- Oxygen therapy
- Postural drainage
- Forced expiratory technique
- Assisted coughing and huffing
- Others (please specify) _____

Questionnaire

(Please ✓ where ever appropriate)

Hospital

1. Name of the state where hospital is located
2. City
3. Number of beds in the hospital
4. Number of beds in largest ICU
5. Hospital - Teaching / Non-teaching

Equipments used regularly in ICU (in working condition)

Ventilator	Y / N	Number	
ECG monitors	Y / N	Number	_____
Pulse oxymetry	Y / N	Number	_____
Oxygen lines	Y / N		
Central suction lines	Y / N		
Mobile suction units	Y / N	Number	_____
AMBU	Y / N	Number	_____
Type of AMBU			
HUDSON MAPLESON C			
Nebuliser	Y / N	Number	_____
Number of beds	Tilttable	Fixed	_____

Physiotherapist profile

- Qualification: Diploma (3 yrs) / BPT / MPT/ PhD (Masters and PhD pl. specify the area of specialty)
- Gender: M/F
- Duration of experience as physiotherapist: month/year
- Duration of experience in ICU: month/year

State the area of ICU where you work

Multi disciplinary ICU	Neuro ICU
Cardiac ICU	Postoperative ICU
Neonatal ICU	Burns ICU
Nephrology ICU	Others: _____

Your posting schedule in ICU

- On rotation from general wards
- Permanent in ICU

- Approximate overall treatment duration spent for one patient
- Number of physiotherapists working together _____ if no Physiotherapists whose assistance you take _____ (please specify)
- Do you perform head down postural drainage in ventilated patients Y / N
- Decision making in choosing treatment techniques.
 - Decided personally
 - Decided by discussing with doctors
 - Decided by discussing with nurses
 - Decided by discussing with others (please specify) _____
- Number of sessions per day
 - Once a day
 - Twice a day
 - More than twice please specify the exact number _____
 - Decided according to patients needs
- What pre and post parameters assessed or checked (Please specify)
- Are you involved in setting initial ventilator parameters Regularly / Often / Occasionally / Never
- Are you involved in weaning from mechanical ventilator Regularly / Often / Occasionally / Never
- Do you perform any of the following role in extubation
 - Suction during extubation
 - Decision making in extubation
 - Others (please specify) _____.

Source of Support: The Indian Association of Physiotherapists (IAP),
Conflict of Interest: None declared.