

Current Physical Therapy Practice in the Intensive Care Unit in Saudi Arabia: A Multiple Centre Cross-Sectional Survey

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Research article

Keywords: Facilitators and barriers, Intensive care unit, Physical therapy practice

Posted Date: November 22nd, 2019

DOI: <https://doi.org/10.21203/rs.2.17658/v1>

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Abstract

Background: Early mobilization of patients in the intensive care unit (ICU) is associated with positive health benefits. The available literature does not provide insights into the current status of physical therapy practice in the ICU in the Kingdom of Saudi Arabia (KSA). To determine the current standard of ICU physical therapy practice, attitude, and barriers, an online survey was administered to KSA physiotherapists (PTs) working in the hospitals.

Methods: A total of 124 PTs volunteered to participate, and the questionnaire consisted of closed-ended questions with regard to their experiences, qualifications, barriers, and most frequently encountered case scenarios in the ICU.

Results: The most commonly referred cases were traumatic paraplegia (n=111, 89%) and stroke (n=102, 82.3%) compared to congestive road traffic accidents (n=20, 16.1%) and pulmonary infections (n=7, 5.6%). The preferred treatment of choice among PTs was chest physiotherapy (n=102, 82.2%) and positioning (n=73, 58.8%), whereas functional electrical stimulation (n=12, 9.6%) was the least preferred choice of physical therapy, irrespective of the condition. The perceived barriers in ICU physical therapy management was low confidence in managing cases (n=89, 71.7%), followed by inadequate training (n=53, 42.7%), and the least mentioned barrier was a communication gap among the critical care team members (n=8, 6.4%).

Conclusion: PTs reported significant variation in the choice of treatment for different clinical case scenarios in the ICU. Several facilitators and barriers to physical therapy management should be taken into account to improve ICU recovery. Among the most important barriers are low confidence and inadequate training and strategies needed to overcome these barriers.

Introduction

Patients admitted to the intensive care unit (ICU) suffer from life-threatening illnesses, injuries, or complications, requiring dedicated multidisciplinary teamwork (1, 2). Physiotherapists (PTs) play an important role in promoting short-term functional independence (3, 4), reducing the length of hospital stay (5), improving the quality of life, and facilitating early weaning of the patient from a ventilator (6). The most common physical therapy (PT) treatment strategies in the ICU include bedside mobility exercises, ambulation, chest therapy, and ventilator weaning (7). Although physical therapy plays a crucial part in rehabilitation and critical care management, the roles and responsibilities of PTs are poorly defined, and there is no adequate consensus on the uniformity of the treatment protocols followed (8, 9).

The Kingdom of Saudi Arabia (KSA) launched physical therapy services with the Diploma in Physical Therapy program in the early 1980s. The KSA has witnessed a remarkable increase in the number of universities offering bachelor's, master's, and PhD programs in physical therapy (10). The National Commission for Academic Accreditation & Assessment monitors and conducts the accreditation of programs offered at colleges and universities in the KSA (11). Hospital sectors are divided into

government-regulated and privately regulated institutions. Government hospitals are categorized as primary, secondary, and tertiary hospitals. The primary hospital provides basic medical care, whereas the tertiary hospital is equipped with the latest sophisticated medical equipment. The number of qualified PTs working in hospitals and rehabilitation centers has grown considerably in the last few decades, reaching from 231 in 1994 to 2552 in 2018 as per data published in the World Confederation for Physical Therapists webpage, of whom only 17.1% (440) are members of the Saudi Physical Therapy Association (12). This increase in the number of PTs is partially attributed to the establishment of universities and colleges across the KSA.

Sufficient evidence-based practice guidelines with a specific scope of practice for PTs in the ICU are still lacking, and the precise role that PTs play in the ICU varies based on the type of unit, local customs, staffing levels, and expertise (13). There is a lack of scientific literature on the current standard of physical therapy practice in ICU settings and associated perceived barriers. Hence, the purpose of this study was to determine the current standard of physical therapy practice and barriers in the ICU settings of Saudi Arabia.

Methods

Study Design

The study started in August 2018 and ended in September 2019. We conducted the study through an online survey emailed to the PTs working in hospitals across the KSA. We obtained approval of the study design from the Institutional Review Board of Majmaah University and KSU. The questionnaire along with the consent form was sent to each PT directly or to the head of the departments for dissemination.

Subjects

PTs working in the KSA were eligible to participate in the survey. Participation in this survey was voluntary and the participants did not receive any incentives for participation. Informed consent form was sent to the participants via an email providing all the information related to the survey and the contact details of the corresponding author. Nonresponsive PTs were sent a reminder every 2 weeks for 2 months. In the case wherein the PT did not respond after 4 consecutive reminders, further communication was discontinued.

Survey Development

Our study adopted a questionnaire developed by Hodgkin et al. Cronbach's alpha for the reliability of the questionnaire was about 0.843 (14). Prior permission to use the questionnaire was obtained from the authors of the questionnaire. The survey questions were incorporated into the Google survey in their original form (English language) (Appendix 1).

The survey comprises 3 sections: the first section contains 7 general items related to demographic data and the description of physical therapy practice in the ICU. The second section included 6 scenario-based

questions, and the third section consists of open-ended questions related to barriers to current practice, training, and evidence-based practice. The survey consists of a Likert scale ranging from 1 to 10 (where 1 was “very unlikely” and 10 was “very likely”). The most common physical therapy performed included cardiopulmonary physical therapy (including postural drainage, chest mobilization and manipulation, ventilator weaning), passive range of motion exercises (passive joint mobilization and ankle-toe movements to prevent deep vein thrombosis), positioning (such as position changes to improve pulmonary capacity and to prevent pressure sores), exercises (including aerobic or resisted exercises performed by the patient with the help of the therapist), functional activities (such as bed mobility, balance training, transfer training, and ambulation), and functional electrical stimulation (including placing electrodes on a particular area with the intention of assisting paralyzed muscles in completing a functional task). The final question after every case scenario involved selecting the most effective method among the available physical therapy modalities.

Survey Analysis

The data obtained from the Google online survey were saved on a Microsoft Excel™ 2018 spreadsheet. The data were analyzed using SPSS software version 19.0 (IBM Corp., New York, USA). Demographic data were analyzed using descriptive statistics as mean and standard deviation or percentages. Open-ended answers were sorted out into five common categories, and the remaining questions were analyzed using SPSS software version 20. Fisher exact and Kruskal-Wallis (one-way analysis of variance (ANOVA)) tests were used to analyze the data. The level of significance was set at 0.05 with a 95% confidence interval.

Results

General Demographic

A total of 442 PTs were contacted through email. The authority concerned in the hospital provided the number of PTs working in the department and their contact details. In total, 124 PTs completed the questionnaire with an overall response rate of 28.1%. Out of 124 PTs, 83 (66.9%) were working in tertiary hospitals, 15 (12.1%) in secondary hospitals, 14 (11.2%) in private hospitals, and 12 (9.6%) in primary hospitals. Forty-eight (38.7%) PTs in tertiary hospitals had over 10 years of physical therapy experience in comparison to PTs working in primary and secondary government-regulated hospitals. Thirty-nine (31.5%) PTs working in tertiary hospitals had 10 years of ICU experience in comparison to those working in primary (n=18, 14.5%) and secondary (n=32, 25.8%) hospitals. The mean average working hours for all the health sectors were 8 hours/day, ranging from 8.7 hours/day in private hospitals to 6.8 hours/day in secondary hospitals (Table 1).

Referral and Preferred Physical Therapy Approach in the ICU

The probability of patients being referred to PTs varied with the clinical case (highest at 89.5% for traumatic paraplegia, followed by 82.3% for stroke, and lowest at 5.6% for pulmonary infections; $P < 0.001$;

Table 2).

Chest physiotherapy was preferred in all the clinical cases with the highest mean value of 9.79 ± 0.19 , followed by 8.71 ± 1.66 in respiratory failure and patient intubated with pulmonary infections, and least preferred in road traffic accidents (2.04 ± 1.57). Functional electrical stimulation was least preferred with the highest mean value ranging from 3.06 ± 1.66 for stroke to 1.44 ± 0.87 for road traffic accidents (Table 3).

One-way ANOVA was used to compare the means of clinical case scenarios for each physical therapy strategy. The statistical test results showed that there was a significant difference in the preference of the treatment choice such as cardiopulmonary physical therapy, range of motion exercises, positioning, and functional activities among the different clinical scenarios. Conversely, exercises ($P = 0.35$) and functional electrical stimulation ($P = 0.111$) were administered to all patients irrespective of clinical scenarios (Table 4).

Barriers of Practice

Based on the response from the participants, barriers to physical therapy practice are categorized into four types:

1. Staffing: 66.1% (N=82) of the participants responded that the number of staff required is not sufficient.
2. Training: 57.2% (N=71) of the participants felt that additional training in ICU management would improve their quality of care.
3. Physical therapy practice outcome in the ICU: The patient outcome after the physical therapy session is one of the biggest motivating factors among PTs working in the ICU. Approximately 41.9% (N=52) of PTs reported that appreciation and encouragement by the associated critical care team is an essential motivating factor among PTs.
4. PTs' work as a team: 20.1% (N=25) of participants felt that there is a communication gap between the team members. A regular case discussion among various health professionals involved in the ICU management of the patient is essential to improve the quality of patient care.

Discussion

The aim of this study was to report the current status of physical therapy practice in the ICU. Our study is able to put forward the current scenario of practice in the ICU in terms of the use of physical therapy modalities/therapeutics for a specific case, demographic data, education, and barriers to practice.

A recent review on the common treatment strategies used by therapists in the hospital reported that positioning, manual hyperinflation, mobilization, percussions and vibrations, suctioning, exercises, and continuous rotational therapy helped address, prevent, and reduce potential pulmonary complications (2, 15–17). The frequency of the use of these treatment strategies depended on the clinical case scenario

(18). In our study, the most preferred treatment among PTs was chest physiotherapy (54%) irrespective of the clinical case scenario. The results of our study are in accord with similar practices observed in the USA (19), Europe (20), Australia (21, 22), the UK, Hong Kong (23), and Asia (8, 24, 25). Based on the previous literature, the findings suggest a moderate to strong evidence of the use of chest physical therapy in maintaining bronchial hygiene (26, 27).

Positioning was the second most common treatment preferred by PTs in the ICU to treat 78% of cases. A recent study reported that a high percentage of therapists agree that positioning is helpful in preventing bedsores and improving patient comfort (28). A cross-sectional study among nurses and physicians reported that positioning is an important intervention to reduce the likelihood of bedsores among patients admitted in the ICU (29). A study by Norrenberg and Vincent (2000) had reported a similar variation in physical therapy practice across European countries (20).

Functional activities (including bed mobility, gait training) and therapeutic exercises were moderately preferred by 46% and 39% of PTs, respectively. Because of the strong efficacy of these physical therapy techniques, they were proven to be highly preferred therapies in the USA (30) and many European countries (31).

Functional electrical stimulation was least preferred (13%) by PTs in the ICU. Research studies have also reported that there is an increase in muscle strength with FES treatment in critically ill patients (32). The possible reason for the least use of FES was the lack of strong scientific evidence about its efficacy and practice guidelines (33).

The barriers found in our survey were classified into four categories. Our participants reported that inadequate staffing (66%) and training (57%) and the lack of understanding about the role of PTs in the ICU were the main barriers. A similar study conducted in the USA reported that the prioritization of policies, small number of qualified staff, inadequate training, and inadequate consultation are the main barriers to practice (34). Another study reported that comatose patients with mechanical ventilation and the instability of vital signs were the main barriers for PTs (35). Knowledge, training, confidence, and practice barriers had to be identified in order to amend changes to improve the quality of care in the ICU. Most of the participants did not receive specialized training in ICU management. Almost 57% of PTs reported lack of training in ICU physical therapy management during their education. This reflected the lack of confidence and interest in providing quality care for patients in the ICU. Most of the PTs responded to have learned ICU physical therapy management from their seniors and coworkers. Among all the common practices in the ICU, weaning of the patient from the ventilator was the most challenging practice. Although the participants reported that the number of staff in the ICU is sufficient, there is a lack of formal training in ICU physical therapy management, which is a critical factor in determining the quality of patient care as reported in many other studies.

Most participants showed a neutral response towards the prioritization of service, PT consultation, and the importance of physical therapy sessions in the ICU as perceived by other team members, despite of

strong evidence that physical therapy sessions in the ICU help improve the quality of life, shorten ICU stay, and reduce financial costs.

The study was conducted to validate the knowledge, behavior, and skill of the PTs working in the ICU to be used in designing the residency and fellowship program. In order to overcome the barriers and improve the quality of care in the ICU physical therapy practice, we recommend that the academic program must include course learning outcomes related to knowledge and psychomotor skills involved in ICU physical therapy management. Our study, however, was limited in exploring certain characteristics of the ICU but nonetheless useful for better designing the bachelor's and master's curriculum to address the current requirements.

Due to a low response rate, the sample size was small and we unable to present the current practices across KSA. A self-reported questionnaire is always associated with the risk of response bias, and the study findings may be easily influenced by the circumstances of the participants. Future studies must evaluate the correlation between the years of ICU experience and quality of care and further explore the adherence to clinical guidelines in the ICU.

Conclusion

With respect to ICU physical therapy management, the study revealed that the PTs had low confidence in weaning the patients from a ventilator because of inadequate training. Lack of academic training, low confidence, and difficulty in interpreting values on the ICU monitor are the main barriers to ICU physical therapy management. Evidence-based practice guidelines with a specific scope of practice for PTs in the ICU are recommended. Also strategies to overcome barriers like low confidence, and inadequate training are needed and the effectiveness of such programs may be evaluated in further studies.

Declarations

Ethics approval and consent to participate

Ethical approval in accordance with the Declaration of Helsinki was obtained from the Institutional Review Board of Majmaah University before data collection. All participants were informed about the purpose and nature of this study, and completion of the electronic survey was considered to be consent for participation in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests

Funding

There is no funding available for this study

Authors' contributions

The research idea and design were proposed by FZK, MA, MsA, and FA. Review of literature was done by MehA, AAA, GRM, SB. Data collection and analysis were executed by MehA, AAA, GRM, and SB. Manuscript preparation and submission was done by AAA, GRM, and SB. All authors have read and approved the manuscript.

Acknowledgments

We are grateful to all the participants who took the time to complete this survey despite their busy schedule. The authors wish to thank the Prince Naif Bin Abdulaziz Health Research Center (PNHRC) and Investigator Support Unit (ISU) at King Saud University for their technical supporting in English editing performed by professional editors at Editage, a division of Cactus Communications. The authors extend their appreciation to the Deanship of scientific research, Majmaah University, Saudi Arabia

Availability of data and materials

All related data has been presented within the manuscript.

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Tables

Table 1: Demographic data of the participants

	All	Government-regulated			Privately regulated
	N=124	Primary hospitals	Secondary hospitals	Tertiary hospitals	Private hospitals
Age, years (SD)	28.5 (6.9)	34.4 (3.7)	29.4 (5.3)	32.7 (6.1)	25.9 (6.9)
Experience as PT N (%)					
1 to 3	19 (15.3%)	4 (3.2%)	0	13 (10.5%)	2 (1.6%)
4 to 6	13 (10.4%)	1 (0.8%)	3 (2.4%)	4 (3.2%)	5 (4.0%)
7 to 8	19 (15.3%)	4(3.2%)	2 (1.6%)	12 (9.7%)	1 (0.8%)
9 to 10	16 (12.9%)	2 (1.6%)	5 (4%)	6 (4.8%)	3 (2.4%)
≥10	57 (45.9%)	1 (0.8%)	5 (4%)	48 (38.7%)	3 (2.4%)
Total	124 (100%)	12 (9.6%)	15 (12.1%)	83 (66.9%)	14 (11.2%)
ICU experience as PT N (%)					
No experience	11 (8.8%)	1 (0.8%)	6 (4.8%)	1 (0.8%)	3 (2.4%)
1 to 3	12 (9.6%)	2 (1.6%)	7 (5.6%)	2 (1.6%)	1 (0.8%)
4 to 6	4 (3.2%)	0	1 (0.8%)	2 (1.6%)	1 (0.8%)
7 to 8	19 (15.3%)	3 (2.4%)	3 (2.4%)	11 (8.9%)	2 (1.6%)
9 to 10	11 (8.8%)	1 (0.8%)	2 (1.6%)	5 (4%)	3 (2.4%)
≥10	67 (54%)	11 (8.9%)	13 (10.5%)	39 (31.5%)	4 (3.2%)
Total	124 (100%)	18 (14.5%)	32 (25.8%)	60 (48.3%)	14 (11.2%)
Working hours (Mean)	8	8.4	6.8	8.1	8.7

Note: PT: Physiotherapist; N: number; SD: Standard deviation; %: Percentage; ICU: Intensive care unit

Table 2: Frequency of clinical cases referred for physical therapy

Clinical cases	Referred to PT, n (%)			
	<25%	25-50%	51-75%	75-90%
Major stroke	0	10 (8.1%)	12 (9.7%)	102 (82.3)
RF	8 (6.4%)	30 (24%)	41 (32.8%)	45 (36%)
Traumatic paraplegia	3 (2.4%)	1 (0.8%)	9 (7.3%)	111 (89.5%)
CHF	4 (3.2%)	13 (10.4%)	68 (54.8%)	39 (31.4%)
PI	26 (61.3)	76 (61.3)	15 (12.1)	7 (5.6%)
RTA	6 (4.8%)	67 (54.1%)	31 (25%)	20 (16.1%)
Total	47 (6.3%)	197 (26.4%)	176 (23.6%)	324 (43.5%)

*Chi-square test; $P < 0.001$. RF: Respiratory failure, CHF: Congestive heart failure; COPD: Chronic obstructive pulmonary disease; PI: Pulmonary infection; RTA: Road traffic accident

Table 3: Preferred physical therapy approach in the ICU

Common clinical cases in the ICU	Cardiopulmonary physical therapy	Passive range of motion exercises	Positioning	Exercises	Functional activities	Functional electrical stimulation
Major stroke	6.00±1.10	9.31±1.69	7.60±1.39	9.58±1.67	5.96±1.86	3.06±1.65
Respiratory failure	9.79±0.19	6.15±1.14	6.35±0.95	3.46±1.84	3.81±2.03	2.33±1.26
Vertebral fracture	5.41±1.91	3.73±1.90	4.60±1.81	3.35±1.75	3.17±1.92	1.50±0.96
Congestive heart failure	6.02±1.43	3.38±1.76	4.52±1.74	3.87±1.72	3.73±1.86	1.50±0.87
Intubated with pulmonary infection	8.71±1.66	2.98±1.81	4.40±1.79	4.02±1.84	2.90±1.49	1.46±0.90
Road traffic accident	2.04±1.57	3.10±1.74	3.69±2.09	3.67±1.77	3.65±1.79	1.44±0.87`

The values are expressed as mean ± SD of a Likert score (from 1 (very unlikely) to 10 (very likely)).

Table 4: Effect of clinical case scenarios on the preferred mode of physical therapy

	n	Mean ±SD	P value
Cardiopulmonary physical therapy			
Major stroke	161	6.00±1.10	0.002
Respiratory failure	173	9.79±0.19	
Vertebral fracture	123	5.41±1.91	
Congestive heart failure	79	6.02±1.43	
Intubated with pulmonary infection	98	8.71±1.66	
Road traffic accident	56	2.04±1.57	
Range of motion exercises			
Major stroke	161	9.31±1.69	0.001
Respiratory failure	173	6.15±1.14	
Vertebral fracture	123	3.73±1.90	
Congestive heart failure	79	3.38±1.76	
Intubated with pulmonary infection	98	2.98±1.81	
Road traffic accident	56	3.10±1.74	
Positioning			
Major stroke	161	7.60±1.39	0.04
Respiratory failure	173	6.35±0.95	
Vertebral fracture	123	7.60±1.81	
Congestive heart failure	79	4.52±1.74	
Intubated with pulmonary infection	98	7.40±1.79	
Road traffic accident	56	8.69±2.09	
Exercises			
Major stroke	161	5.58±1.67	0.35
Respiratory failure	173	3.46±1.84	
Vertebral fracture	123	3.35±1.75	
Congestive heart failure	79	3.87±1.72	
Intubated with pulmonary infection	98	4.02±1.84	
Road traffic accident	56	3.67±1.77	
Functional activities			
Major stroke	161	5.96±1.86	0.02
Respiratory failure	173	3.81±2.03	
Vertebral fracture	123	3.17±1.92	
Congestive heart failure	79	3.73±1.86	
Intubated with pulmonary infection	98	2.90±1.49	
Road traffic accident	56	3.65±1.79	
Functional electrical stimulation			
Major stroke	161	3.06±1.65	0.111
Respiratory failure	173	2.33±1.26	
Vertebral fracture	123	1.50±0.96	
Congestive heart failure	79	1.50±0.87	
Intubated with pulmonary infection	98	1.46±0.90	
Road traffic accident	56	1.44±0.87`	

ANOVA test ($P < 0.05$) was used to analyze the difference in the choice of treatment for different clinical cases. SD: Standard deviation; n=Number of responses