Journal of Health and Rehabilitation Research 2791-156X JHRR

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Original Article

Practices of Physical Therapist Regarding Chest Physiotherapy for Patients Undergoing Open Heart Surgery in Karachi

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Conflict of Interest: None.

*Siddiqui HAF., et al. (2023). 3(2): **DOI**: https://doi.org/10.61919/jhrr.v3i2.329*

ABSTRACT

Background: Despite the critical role of chest physiotherapy in the recovery process post open-heart surgery, there is a paucity of data on the practices of physical therapists in Karachi. With the high incidence of cardiovascular surgeries and the significant burden of postoperative complications, understanding current physiotherapy practices is essential for improving patient outcomes.

Objective: The objective of this study was to evaluate the current practices of physical therapists regarding chest physiotherapy for patients undergoing open-heart surgery in Karachi and to identify potential areas for standardization and improvement.

Methods: A cross-sectional study was conducted using a questionnaire survey among 40 physiotherapists working in cardiothoracic units across six major hospitals in Karachi. Participants were selected through non-probability convenient sampling, and data on preoperative and postoperative physiotherapy practices were collected. The survey included both open-ended and close-ended questions, with an emphasis on the types of treatments administered during the first five postoperative days. Statistical analysis was performed using SPSS version 25.

Results: The mean age of the physiotherapists was 31.20 (SD = 6.8) years with an average working experience of 7.592 (SD = 6.7) years. On the day of surgery, physiotherapy was provided routinely by 7.5%, as needed by 62.5%, and was never provided by 30% of the respondents. From the first to the fifth postoperative day, routine physiotherapy was administered by an increasing majority, peaking at 100% on the second day. Written guidelines for the management of extubated and intubated patients were accessible to 35% and 10% of participants, respectively.

Conclusion: There is a substantial engagement in chest physiotherapy post open-heart surgery among physiotherapists in Karachi. However, the variability in practice and the lack of standardized guidelines point towards a need for the development and implementation of standardized protocols to ensure consistent and evidence-based care.

Keywords: Chest Physiotherapy, Open-Heart Surgery, Physical Therapy Practices, Postoperative Care, Karachi, Standardization, Cardiovascular Surgery.

INTRODUCTION

Despite significant advancements in cardiovascular therapy, which now offer a range of pharmacological and minimally invasive options, open heart surgery remains a critical intervention for millions of patients globally. The number of these surgeries has stabilized in western countries over the past decade, yet they continue to be associated with an elevated risk of cardiovascular morbidity, pulmonary complications, and prolonged hospital stays, including extensive periods in intensive care units (ICU). This scenario contributes significantly to the rising costs of medical care. An integral aspect of post-operative care is the inclusion of early physical activity and physiotherapy, which have been identified as vital components in improving post-procedural functional capacity, reducing muscle weakness, and mitigating post-operative complications following heart surgery. These measures ultimately enhance the quality of life for patients (1, 2).

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Coronary artery disease (CAD), characterized by an imbalance between myocardial tissue blood supply and metabolic demand/cardiac workload, is commonly treated with coronary artery bypass grafting (CABG). Post-CABG, strenuous activities, particularly involving the upper limbs, are typically avoided to prevent strain on the sternum. Prompt recovery is anticipated, and mobility within the first 48 hours of cardiac rehabilitation is crucial for monitoring the patient's capacity, recovery rate, and overall postoperative progress. Such early mobilization facilitates a quicker return to full functionality (3, 4).

Chest physiotherapy has emerged as a fundamental technique in aiding the recovery of patients undergoing open-heart surgery. Employed by physical therapists, this approach encompasses a range of methods aimed at clearing the airways and enhancing lung function post-surgery. The significance of chest physiotherapy in reducing postoperative complications such as atelectasis, pneumonia, and respiratory distress is well-recognized. However, the specific practices and methodologies employed by physical therapists in Karachi in administering chest physiotherapy for open-heart surgery patients have not been thoroughly documented (5, 6).

This study seeks to explore the practices and challenges encountered by physical therapists in Karachi in providing chest physiotherapy to patients undergoing open-heart surgery. Existing literature, including the work of Adele Cook et al. (2022), demonstrates the potential benefits of preoperative threshold inspiratory muscle training in reducing postoperative complications and the duration of hospital stays (3). However, these findings also highlight the need for further research due to the presence of conflicting evidence and biases. Dr. Jigar Mehta et al. (2021) observed minor variations in physiotherapy practices, including incentive spirometry, deep breathing exercises, and early ambulation (7). Georgios Afxonidis et al. (2021) emphasized the positive impact of early respiratory physiotherapy and mobilization on reducing ICU and hospital stays (1), while Hadel Shahood et al. (2021) demonstrated the effectiveness of preoperative chest physiotherapy in improving respiratory function (5). Additionally, Muhammad Khan et al. (2021) underscored the importance of staying abreast of advancements in physiotherapy practices (6). The contributions of Abdul Razzaque et al. (2019) focused on the utilization of breathing exercises, and Nardi et al. (2019) highlighted the advantages of preoperative respiratory physiotherapy and motor exercises (8). Mohammad Zolfaghari et al. (2017) pointed out the potential role of chest physiotherapy in managing postoperative pain (9), and Riaz Fatima et al. (2017) called for the establishment of evidence-based guidelines in physiotherapy. Lastly, Muhammad Iqbal Tariq et al. (2017) emphasized the positive outcomes of early physical activity post-cardiac surgery (8, 10).

By synthesizing insights from these studies and conducting primary research, this research aims to present a comprehensive understanding of the current practices and challenges faced by physical therapists in Karachi (7, 11). This endeavor will contribute to the development of evidence-based guidelines, enhance patient outcomes, and potentially address any existing gaps or challenges in current practices. The goal of this study is to improve the standardization and optimization of the recovery process for patients undergoing open-heart surgery in this specific demographic (12, 13).

MATERIAL AND METHODS

This study employed a cross-sectional design, utilizing a questionnaire survey to collect data. The research was conducted across several prominent hospitals in Karachi, including the National Institute of Cardiovascular Diseases Karachi (NICVD), Ziauddin Medical University Hospital Karachi (ZMUH), National Medical Center (NMC), Health Care Hospital, Liaquat National Hospital (LNH), and Karachi Institute of Heart Diseases. A non-probability convenient sampling approach was adopted, and the study involved 40 physiotherapists working in cardiothoracic units within these institutions. Prior to data collection, necessary permissions were obtained from the respective institutes.

The physiotherapists who participated in the study were informed about the nature and purpose of the survey. Written informed consent was obtained from each respondent, ensuring their understanding and voluntary participation. To maintain confidentiality, participants were assured that the information they provided would remain confidential. Furthermore, the respondents had the liberty to choose their participation level and were free to decline to answer any question that they were not comfortable with.

The inclusion criteria for the physiotherapists were having a minimum of one year of experience in a cardiothoracic unit. The study focused on physical therapy treatments administered to adult patients who had undergone uncomplicated open-heart surgery. This included procedures such as coronary artery bypass graft surgery (CABG), mitral, aortic, or tricuspid valve surgery, or a combination of CABG and valve surgery, including off-pump surgeries. Excluded from the study were physiotherapists with less than one year of experience in a cardiothoracic unit, as well as physical therapy treatments for patients who developed neurological symptoms,

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circulatory instability, extended intubation, or other conditions requiring individualized programs. Additionally, physical therapy treatments for children and patients who underwent complicated open heart surgeries were not considered in this study.

The survey instrument used in this study was the questionnaire developed by Westerdahl E et al. (2011), originally designed for a survey conducted in Sweden concerning chest physical therapy and breathing exercises for patients undergoing cardiac surgical procedures (13). This questionnaire comprised 27 questions, encompassing both open-ended and close-ended formats, and focused on preoperative and postoperative chest physiotherapy treatments for patients undergoing uncomplicated open-heart surgery (13).

Face-to-face interviews were conducted with the respondents, during which the questionnaire was explained and completed. The study emphasized the voluntary nature of participation, with respondents having the option to withdraw or omit responses to any questions they preferred not to answer (9).

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 25. This involved appropriate statistical techniques to analyse the collected data, ensuring a comprehensive understanding of the practices and challenges faced by physiotherapists in the provision of chest physiotherapy for patients undergoing uncomplicated open-heart surgery in Karachi.

RESULTS

The horizontal bar graph illustrates the percentage of physiotherapists engaging in various management practices for intubated patients. It shows that 35% of therapists adhere to written guidelines or protocols for managing intubated patients and 35% participate in actively weaning patients off respirators. A significant majority, 92.5%, perform suction of the airway through the nose, mouth, and tracheostomy. Lastly, 37.5% of therapists perform manual hyperinflation or bagging as part of their practice. The graph provides a clear visualization of the distribution of these practices among the surveyed physiotherapists.

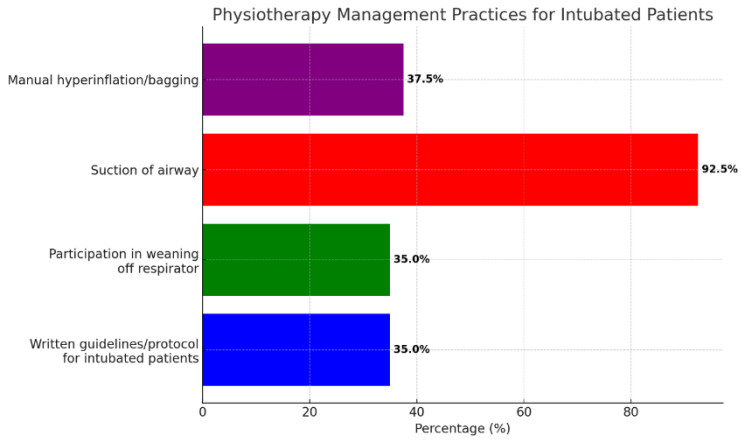

Figure 1 Physiotherapy management practices for incubated patients

In this study, the descriptive statistics of the participants' characteristics revealed a mean age of 31.20 years (SD = 6.8), indicating a relatively young cohort of physiotherapists. The participants possessed an average of 7.592 years (SD = 6.7) of overall working experience. Specifically, their experience working as physical therapists in a department of thoracic surgery averaged 4.51 years (SD = 5.21) (Table 1).

Regarding the physiotherapists' preoperative information delivery (Table 2), the majority provided oral information about the general surgical procedure (38 out of 40), sternotomy (39 out of 40), and postoperative pulmonary function/complications (38 out of 40). Notably, a significant number of physiotherapists used practical review methods to explain breathing exercises (26 out of 40) and the coughing/huffing technique (12 out of 40). Furthermore, a combination of oral and practical review was employed by some therapists for breathing exercises (11 out of 40) and the coughing/huffing technique (26 out of 40), indicating a preference for more interactive teaching methods for these specific areas.

The average number of physiotherapy treatment sessions provided to cardiac surgery patients during the first five postoperative days varied (Table 3). On the day of surgery, only a small percentage of therapists (7.5%) routinely provided treatment, while the majority (62.5%) provided treatment as needed, and 30% did not provide treatment at all. A significant increase in routine treatment was observed from postoperative day (POD) 1, with 77.5% of therapists providing routine treatment and this pattern continued, with 100% on POD 2, 97.5% on POD 3, and 90% on both POD 4 and POD 5, indicating a more consistent and active involvement in patient care as the postoperative period progressed.

Table 1: Descriptive Statistics of Participants' Characteristics

Variable	Mean ± SD
Age (Years)	31.20 ± 6.8
Working Experience (Years)	7.592 ± 6.7
Work as Physical Therapist in a Department of Thoracic Surgery (Years)	4.51 ± 5.21

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Table 2: Physiotherapists' Preoperative Information (N=40)

Information Type	Oral Information	Practical Review	Oral and Practical Review
Surgical Procedure in General	38	0	0
Sternotomy	39	0	0
Respiratory Treatment/Extubation	35	3	0
Postoperative Pulmonary Function/Complications	38	0	0
Breathing Exercise	2	26	11
Coughing/Huffing Technique	1	12	26

Table 3: Average Physiotherapy Treatment Sessions for Cardiac Surgery Patients During First Five Postoperative Days

Treatment Day	Routinely	If Needed	Never
Day of Surgery	2 (7.5%)	25 (62.5%)	12 (30%)
POD 1	31 (77.5%)	9 (22.5%)	0 (0%)
POD 2	40 (100%)	0 (0%)	0 (0%)
POD 3	39 (97.5%)	1 (2.5%)	0 (0%)
POD 4	36 (90%)	4 (10%)	0 (0%)
POD 5	36 (90%)	4 (10%)	0 (0%)

In terms of the specific types of chest physiotherapy treatment provided during the initial four postoperative days (Table 4), breathing exercises were the most administered treatment, with the highest percentage (92.5%) on POD 1, gradually decreasing to 55% by POD 4. The use of coughing/huffing techniques also varied, peaking at 77.5% on POD 2 and then decreasing to 30% by POD 4. Chest wall vibration and percussions were less commonly used, with a maximum of 35% on POD 3. The positioning and side-lying techniques were used by 40-70% of therapists across the four days. Postural drainage and relaxation techniques were less frequently employed, with the latter being more consistent across the days, ranging from 50% to 75%.

Table 4: Responses Regarding Chest Physiotherapy Treatment Provided on the Initial Four Postoperative Days

Treatment	POD 1	POD 2	POD 3	POD 4
Breathing Exercise	37 (92.5%)	30 (75%)	23 (57.5%)	22 (55%)
Coughing/Huffing Techniques	18 (45%)	31 (77.5%)	19 (47.5%)	12 (30%)
Chest Wall Vibration, Percussions	2 (5%)	10 (25%)	14 (35%)	3 (7.5%)
Positioning, Side Lying	16 (40%)	28 (70%)	22 (55%)	17 (42.5%)
Postural Drainage	2 (5%)	4 (10%)	2 (5%)	0 (0%)
Relaxation Techniques	30 (75%)	28 (70%)	25 (62.5%)	20 (50%)

Overall, these results demonstrate a diverse range of practices among physiotherapists in the postoperative management of cardiac surgery patients, with a notable emphasis on interactive and practical methods for teaching breathing and coughing/huffing techniques. The varying frequency and types of treatments provided across the postoperative days reflect the dynamic nature of patient care in this context.

DISCUSSION

The study meticulously investigated the practices of physical therapists concerning chest physiotherapy for patients undergoing open-heart surgery in Karachi. It was found that during the first five postoperative days, physiotherapy was provided with varying frequency. On the day of surgery, a small fraction of therapists (7.5%) administered routine physiotherapy, while a majority (62.5%) provided it as needed, and a notable portion (30%) did not offer any physiotherapy. The propensity to provide routine physiotherapy increased substantially from the first postoperative day, with 77.5% of therapists doing so and continued at a high rate until the fifth postoperative day, with 90% of therapists providing routine sessions. This pattern underscores the emphasis on improving pulmonary function and managing postoperative complications to promote physical activity (9).

The accessibility of written guidelines for the physical therapy management of extubated patients in the ICU was reported by 35% of the participants, revealing a gap in standardized care protocols compared to previous studies where 21 out of 29 respondents

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had such guidelines available (12). The experience of therapists working in the Department of Thoracic Surgery averaged 4.5 years in the current study, contrasting with previous research showing a mean experience of 6 years among physiotherapists in the same specialty (12, 13).

The study's methodological strengths include the high response rate and the representative sample, which suggest that the findings may accurately reflect the current practices in Karachi. However, the weekends revealed a less intensive treatment regimen, a finding that aligns with the variable care observed in Sweden based on the day of the week of surgery (12). Interestingly, the use of breathing exercises involving positive pressure devices was less common in Karachi, diverging from other studies, such as that by Westerdahl et al. (13), which showed improved pulmonary function with such devices.

Despite these insights, the study faced limitations due to its small sample size, representing six cardiac surgical divisions or units in Karachi. The utilization of various methods, including face-to-face interviews, to achieve a high response rate, and the fact that responses were received from all targeted hospitals, lend credence to the generalizability of the findings across the city's cardiothoracic units.

The study revealed that a high percentage of physiotherapists (82.5%) advised patients to continue breathing exercises at home post-discharge, favouring deep breathing exercises, while spirometry was the most recommended device for home use (55.4%). Nonetheless, there was a notable variation in the duration for which patients were instructed to continue these exercises post-discharge, ranging from one to thirteen weeks. The provision of preoperative information was found to be a common practice among physical therapists, yet the identification of patients at high risk for postoperative pulmonary complications was reported to be low, and the availability of printed guidelines for physical therapy management was not widespread (7, 11).

In light of these findings, it is recommended that future observational studies should delineate current clinical practice in more detail (14, 15). Additionally, there is a need for the development and dissemination of standardized guidelines and protocols to ensure consistent physiotherapy care across institutions (16, 17). Furthermore, increasing the awareness of the importance of identifying high-risk patients and the potential benefits of positive pressure breathing devices could enhance postoperative outcomes (18, 19). The study contributes valuable insights into the practice of chest physiotherapy in Karachi, yet it also underscores the need for continued research and standardization in the field to improve patient care (20, 21).

CONCLUSION

The investigation concluded that physiotherapists in Karachi are committed to providing postoperative chest physiotherapy to patients following open-heart surgery, with a high frequency of routine treatments from the first postoperative day onwards. However, the study highlighted the need for standardized care protocols, as evidenced by the limited use of written guidelines for patient management. The results imply a potential disparity in care quality, underscoring the necessity for institutional protocols to ensure uniformity in treatment approaches. There's also an implication for improved patient education regarding the continuation of breathing exercises post-discharge, which varied widely in duration among the surveyed therapists. To optimize postoperative recovery, the study suggests that future research should focus on establishing comprehensive, evidence-based practice guidelines and increasing awareness among physiotherapists about the latest techniques and devices, such as positive pressure breathing aids, which have been shown to enhance pulmonary function. These steps could significantly contribute to the enhancement of patient outcomes in the field of cardiothoracic surgery physiotherapy.

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