Physiotherapy and Occupational Therapy Journal
Volume 2 Number 4, October - December 2009

Physiotherapy following cardiac surgery: A national survey

Narasimman Swaminathan*
Praveen JS & Reshma P**
Jayakrishnan***

ABSTRACT

Physiotherapy has been widely accepted as an integral part of post operative care following open heart surgeries. Preventing and correcting postoperative pulmonary complications are the main goals of postoperative physiotherapy. In the health care practice following a uniform protocol based on the available evidence is considered as one of the important tool in improving the quality of care. With this back ground this study was aimed to identify the variability in postoperative care at national level., **Methods:** The randomly identified centres which perform open heart surgeries were approached for this survey. The senior most therapists were interviewed through telephone by using a standardised questionnaire. The questionnaire consisted of various aspects of postoperative physiotherapy., **Results:** Out of 28 centres which were contacted, representatives of 25 centres participated in this interview. There was a marked difference in postoperative physiotherapy care among these centres. In all the centres Deep breathing was practised mandatorily but the recent techniques like Active Cycle of breathing techniques were underutilized. Phase II cardiac rehabilitation was followed only in two centres. This survey leads us to think of formulating a nationwide protocol for postoperative Physiotherapy.

Key words: Postoperative Pulmonary Complications, Physiotherapy, Open Heart Surgery.

INTRODUCTION

The disability caused due to cardio vascular disorders is increasing in India as also seen in many other parts of the world. More than 60,000 open heart surgeries are performed to reduce the morbidity and mortality, associated with cardiovascular disorders, throughout the country every year [1]. A high risk of pulmonary complications following major surgery is universally acknowledged, especially in the thoracic procedures. Postoperative pulmonary complications after cardiac surgeries are a major source of morbidity and mortality and increased length of hospital stay and resource utilization. The occurrence of post operative pulmonary complications following open heart surgeries may be of a multi factorial origin. The effect of general anaesthesia on the respiratory system, use of cardio pulmonary bypass and the presence of drains in addition to the post surgical pain lead to impaired pulmonary function [2, 3, 4]. Physiotherapy is recognised in the prevention and management of these postoperative pulmonary dysfunctions. Physiotherapists have, therefore, been accepted as important members of the cardio thoracic surgical team. Post operative physiotherapy – consisting of breathing exercises emphasizing inspiration, incentive spirometry, air way clearance techniques and early mobilization is administered with an aim to increase lung ventilation, prevention of chest infections and rehabilitation of the individual to the activities of daily living [5]. Though the scientific evidence regarding the efficacy of physiotherapy is limited, due to a dearth of good quality studies, it is practised in almost all the cardio thoracic surgery units worldwide. It has therefore, been suggested

Author's Affiliations: *Associate Professor & Head, Department of Physiotherapy, Father Muller Medical College, Mangalore, **Lecturer, Department of Physiotherapy, Father Muller Medical College, Mangalore, ***Chief Cardio Thoracic Surgeon, Father Muller Medical College Hospital, Mangalore.

Reprints Requests: Dr. Narasimman Swaminathan, Associate Professor, Dept.of Physiotherapy, Father Muller Medical College, Mangalore. E-mail: naraswamin2001@gmail.com.

(Received on 14.05.2010, accepted on 02.06.2010)

by experts that practicing a uniform protocol is needed to improve the quality of care.

Hence this study aimed to explore the various protocols used in different cardiothoracic units throughout the country, in order to find out the variability in postoperative physiotherapy care, which in turn determines effective patient recovery and health costs.

METHODOLOGY

An Interview method was used to survey the various cardiac surgery centres across the country. A detailed questionnaire was prepared related to postoperative physiotherapy care. A total of 44 centres spread across the nation were identified for the study, of which therapists from 28 centres were contacted and interviewed successfully through telephonic conversation. At the commencement of the interview, the purpose of the study was explained to the respondents, most of them being the in-charges of the physiotherapy services in their respective workplace. If the in-charges could not be contacted, the senior most therapists working in the Cardio Thoracic surgery unit was interviewed. After explaining the purpose of the study, the interview was conducted with the consent of the respondent. All the interviews were conducted by the same therapist to avoid any bias. Three of the respondents were not willing to participate in the survey due to their personal reasons.

All the answers were documented in the Proforma and clarifications were sought whereever necessary. The duration for each interview varied from 9 – 11 minutes. The total time taken for each of the interview was documented. In case a fixed protocol was being followed in the centre, a copy of the same has been requested.

DATA ANALYSIS

The data was analysed using the descriptive statistics and Chi square test, as appropriate.

RESULTS

The mean age of the respondents was 27years and 11 of them were having their post graduate degree in Cardio Pulmonary Physiotherapy. 52 % of the respondents were having only 1- 2 years of post qualification experience in the field of postoperative cardiac care, 24 % of therapists were having 3-4 years and while the remaining 24% had more than 5 years of experience. 40 % of the therapists were working in multi speciality hospitals, 40% in super speciality hospitals and only 20% of the respondents were from academic institutes. The number of cardiac surgeries performed in the hospitals ranged from 2 to 60 per week with a mean of 11.08 surgeries a week. The total number of physiotherapists working in the cardiac surgery unit varied from 1 to 12 with the mean of 3.36 therapists per unit. Of the 25 hospitals included in the study only 7 hospitals had 24 hour physiotherapy service. The preoperative admission in the hospitals ranged from 1 – 4 days. In 19 of these centres physiotherapists evaluated the patients preoperatively. 13 centres had a fixed hospital protocol for the management of the cardiac surgical patients.

Fig 1. Preoperative Physiotherapy Assessment:

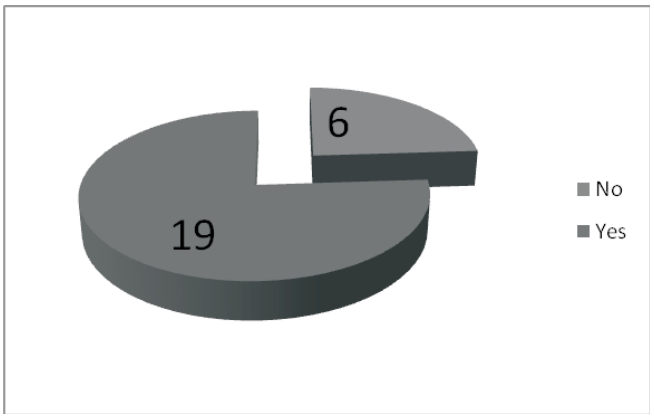


Fig.2 Components of Preoperative Physiotherapy Assessment

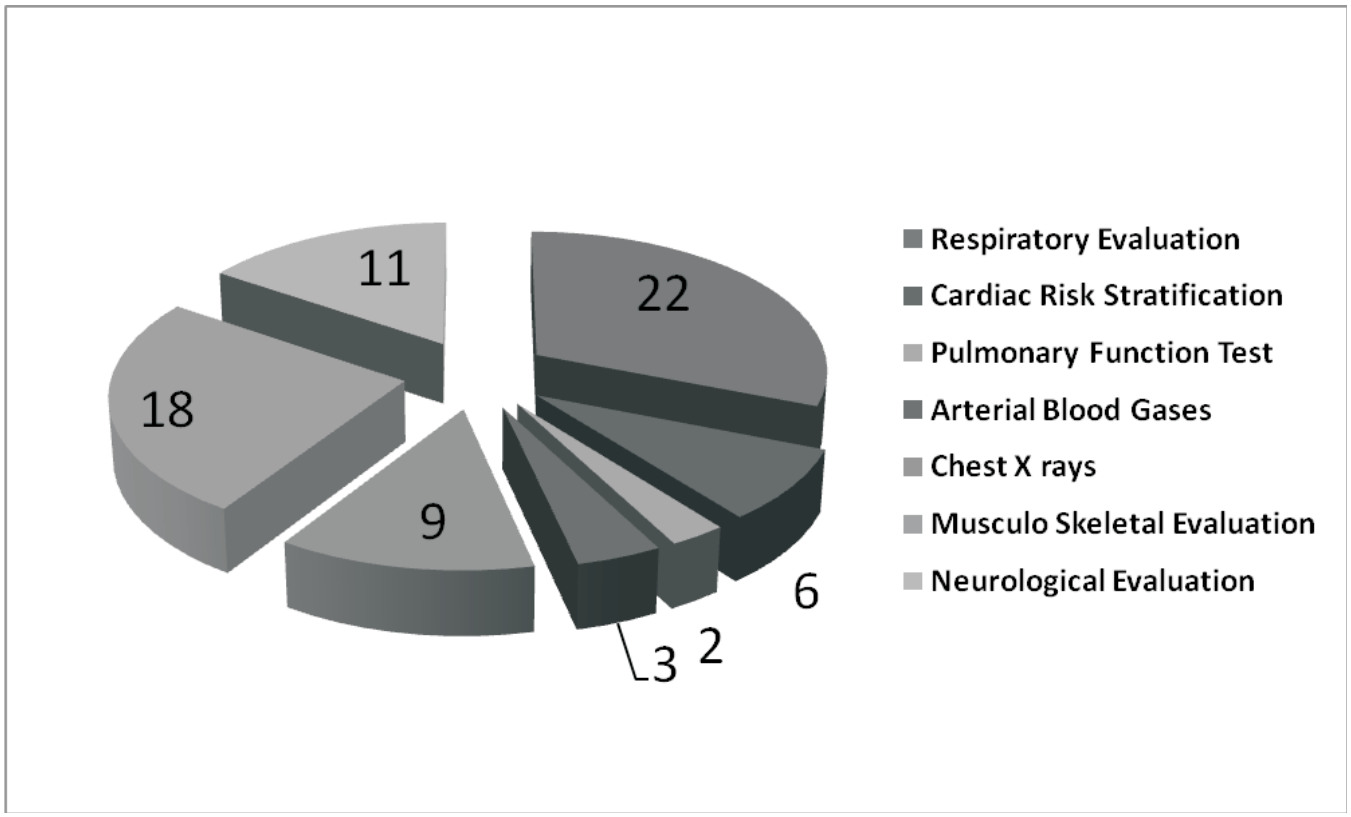


Fig 3. Protocol Followed

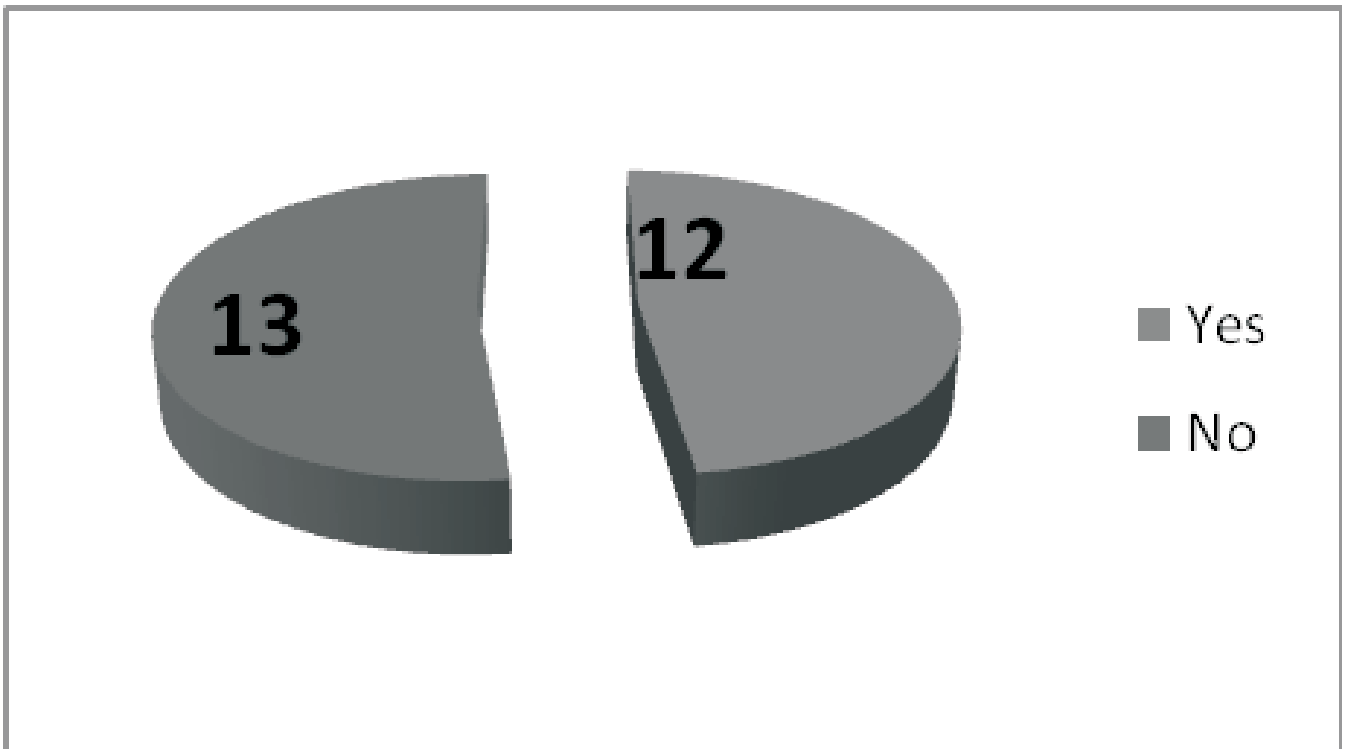


Fig. 4: Commencement of Physiotherapy

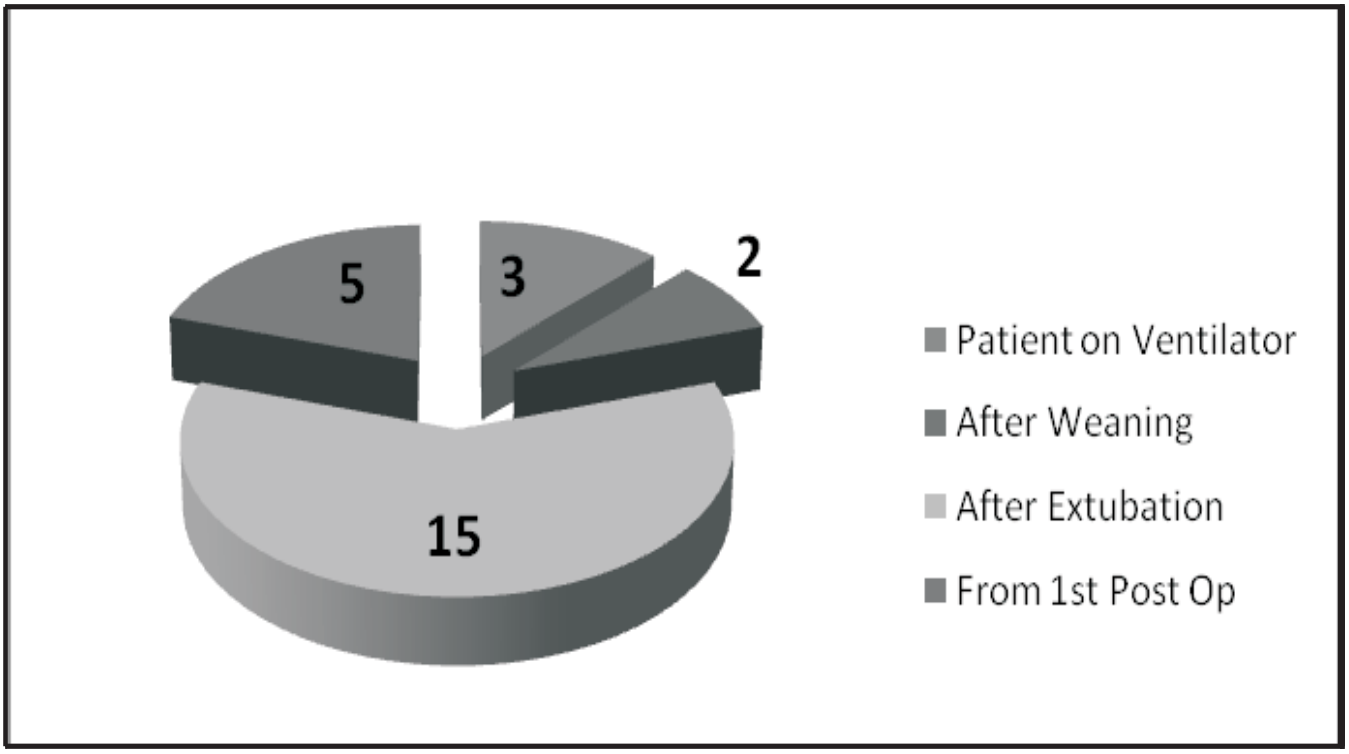


Fig. 5: Physiotherapy Techniques Used

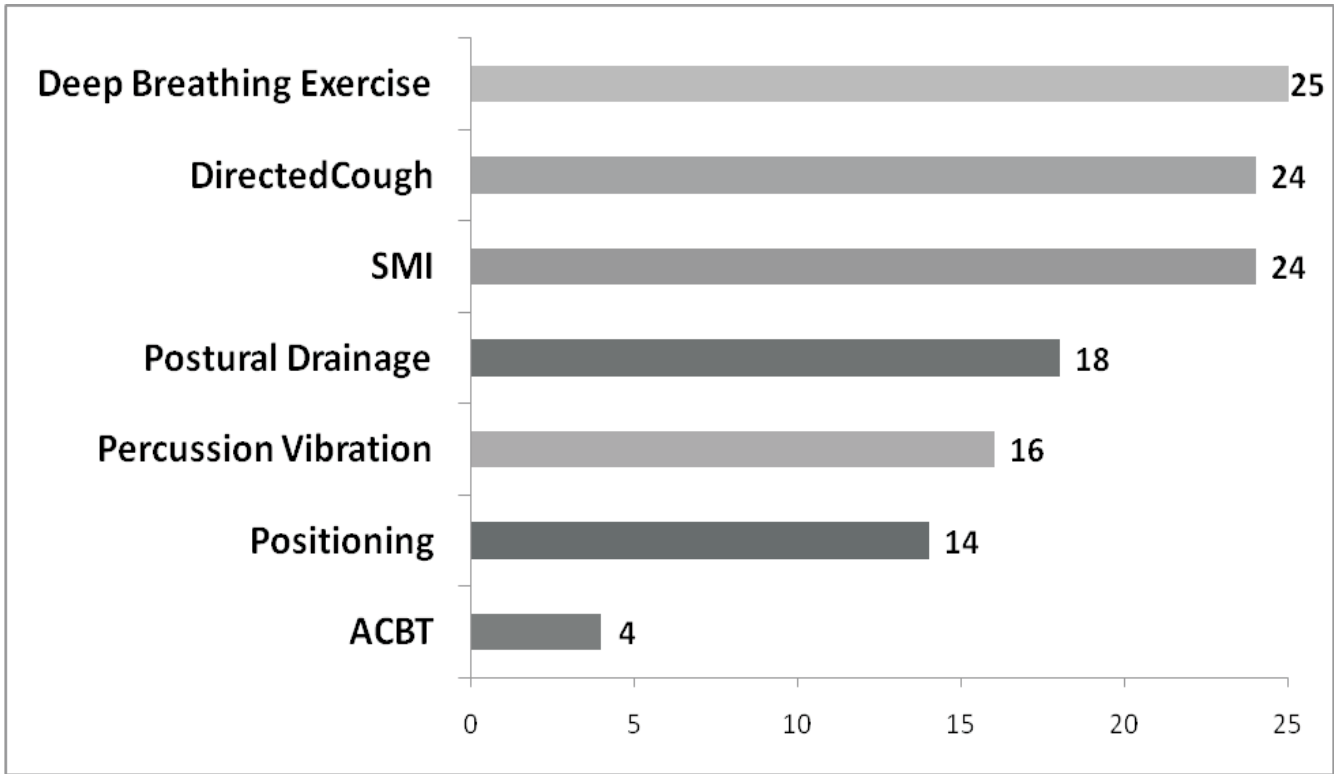


Fig. 6: Supervision of SMI

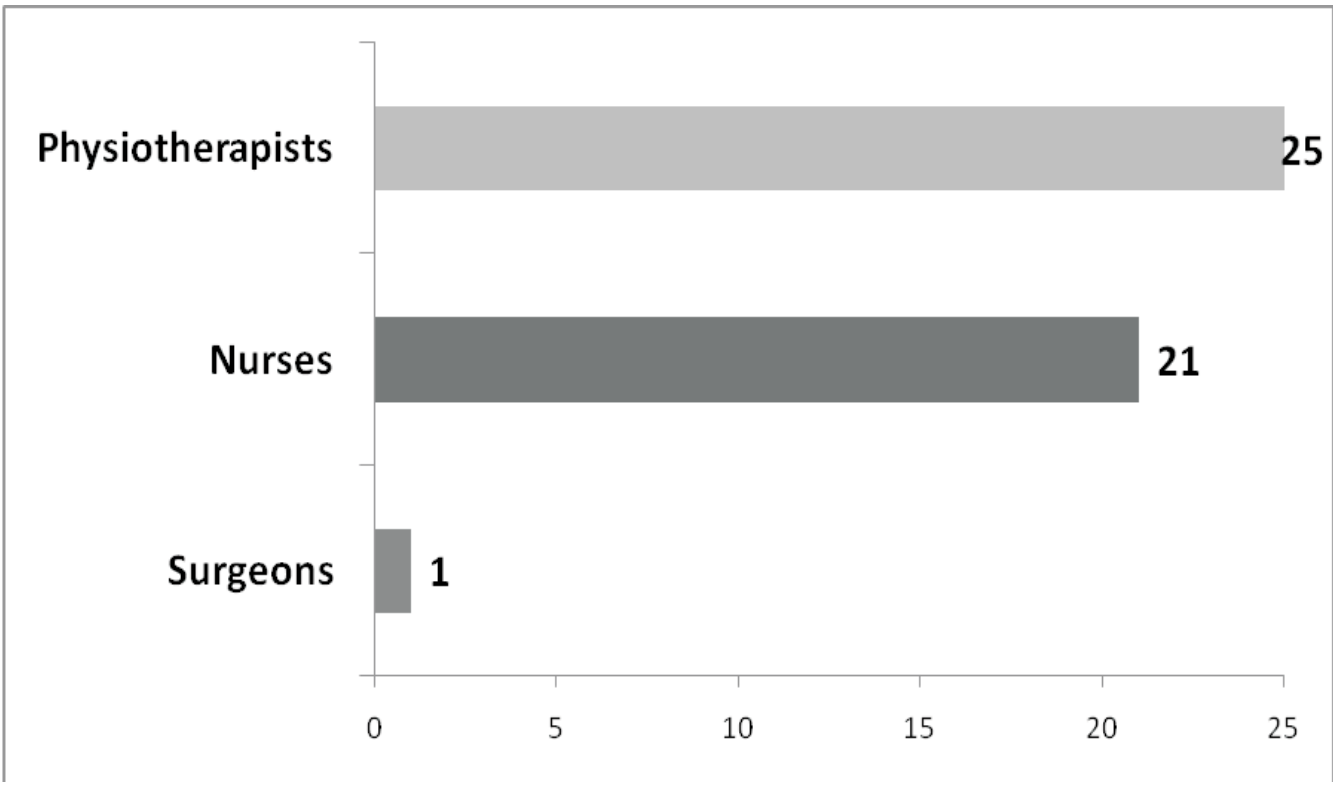


Fig. 7: Mobilisation

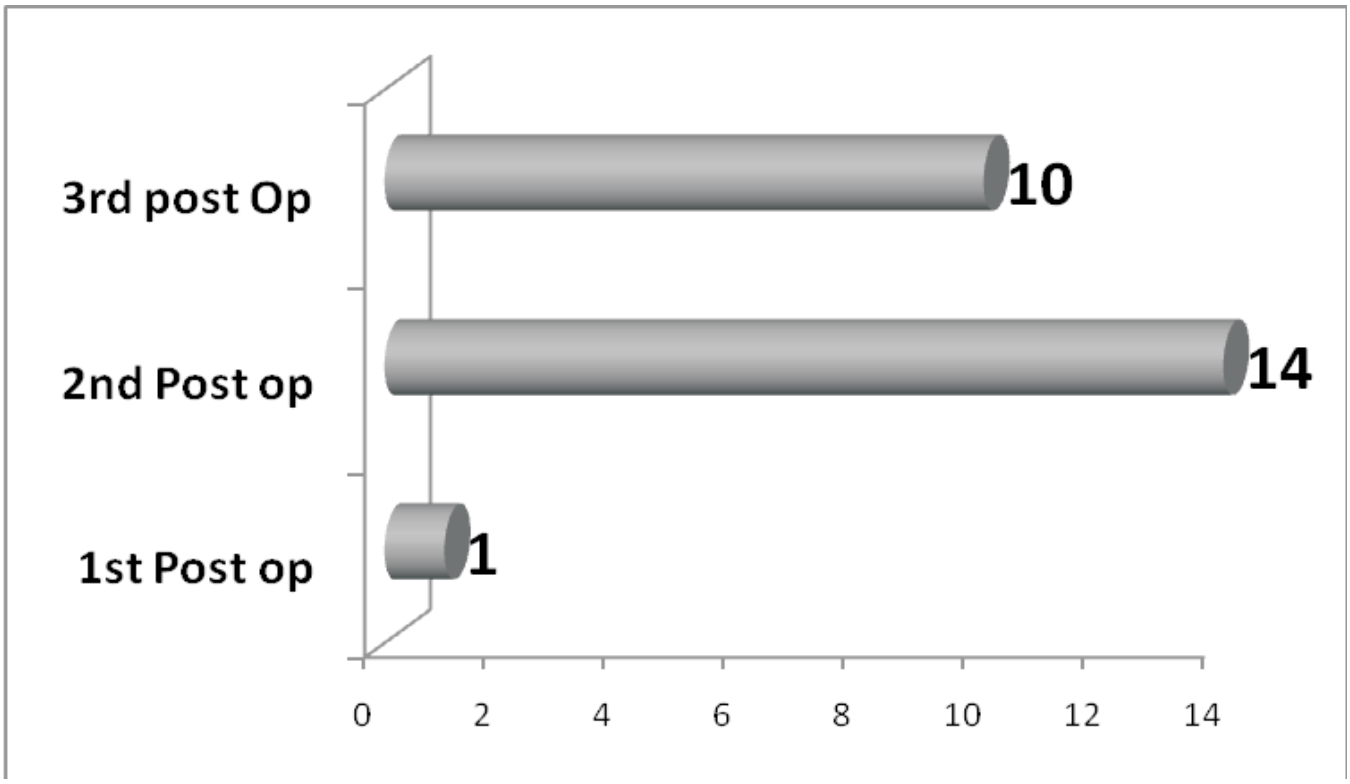


Fig. 8: Who decides about Mobilisation?

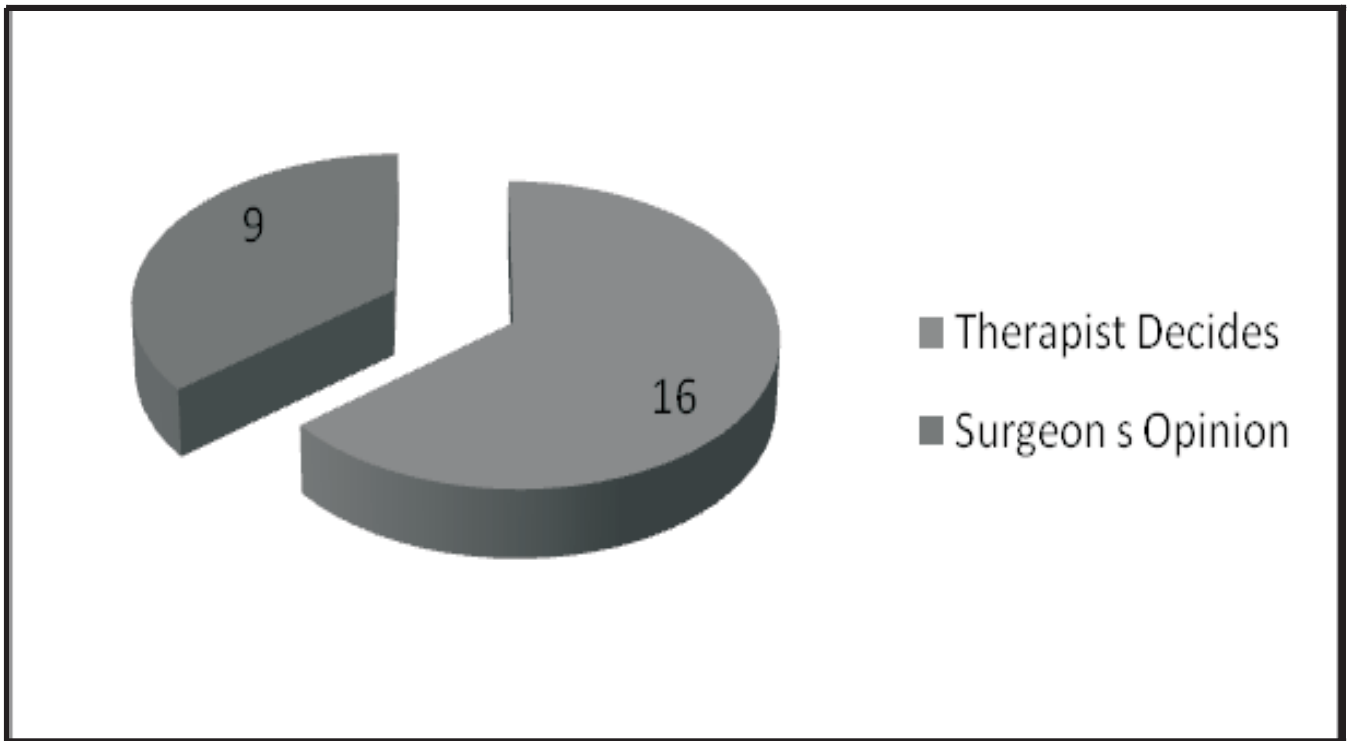


Fig 9: Frequency of Therapists' Visit

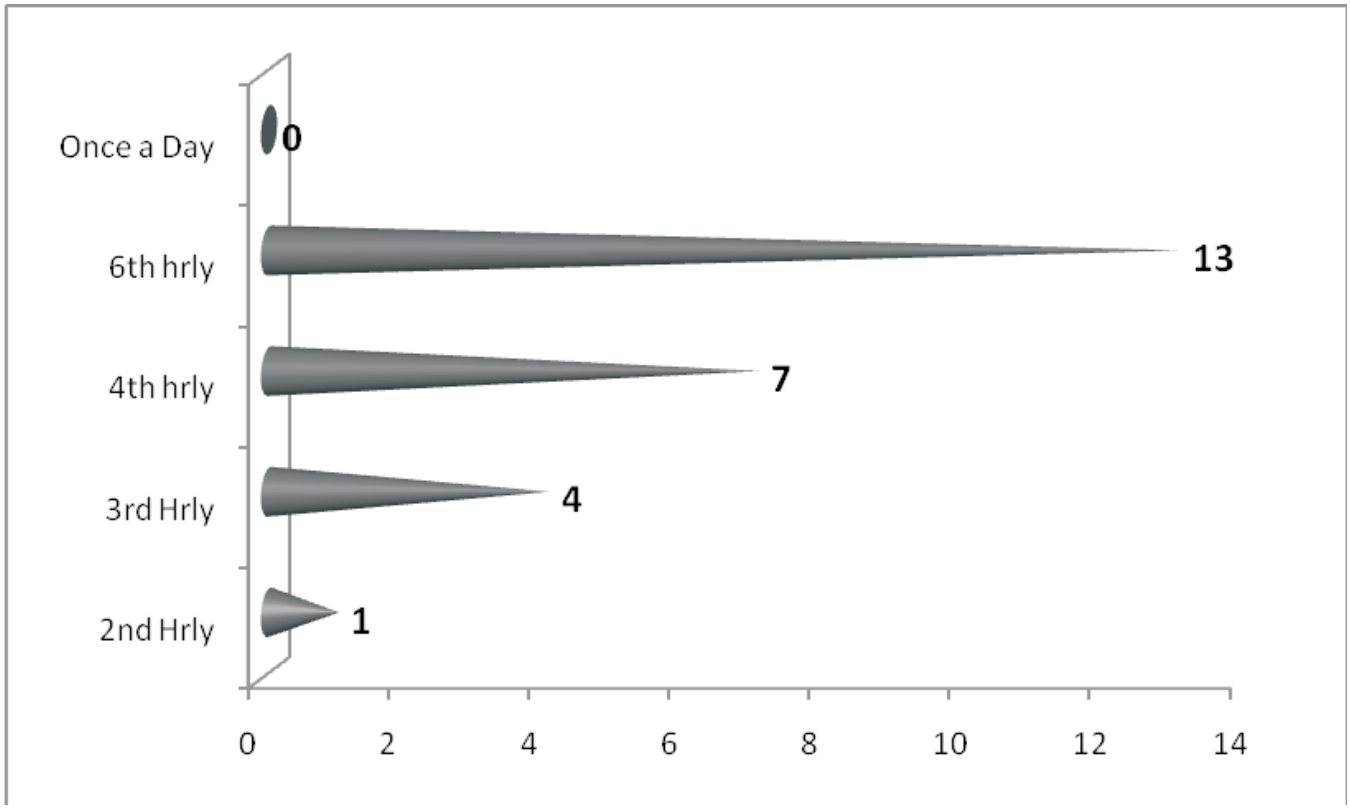


Fig 10: Advice on Discharge

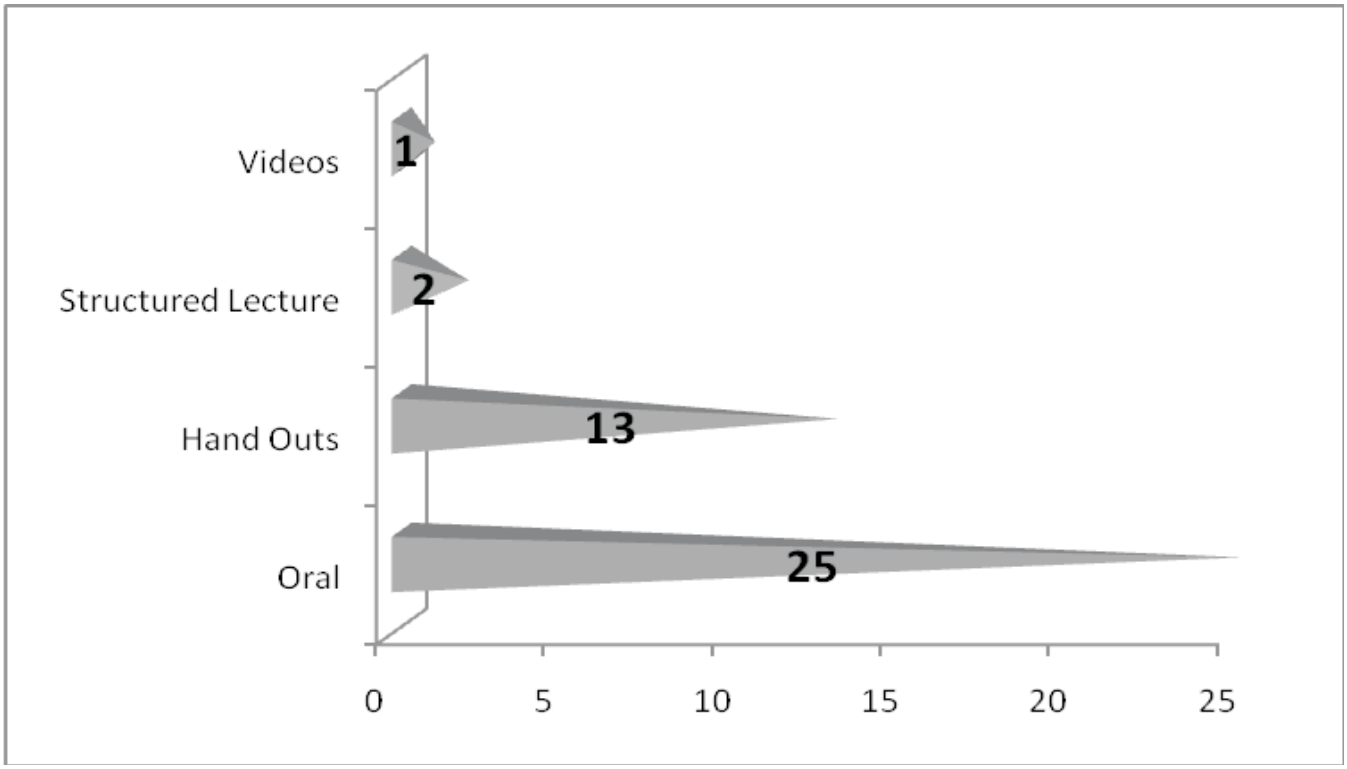
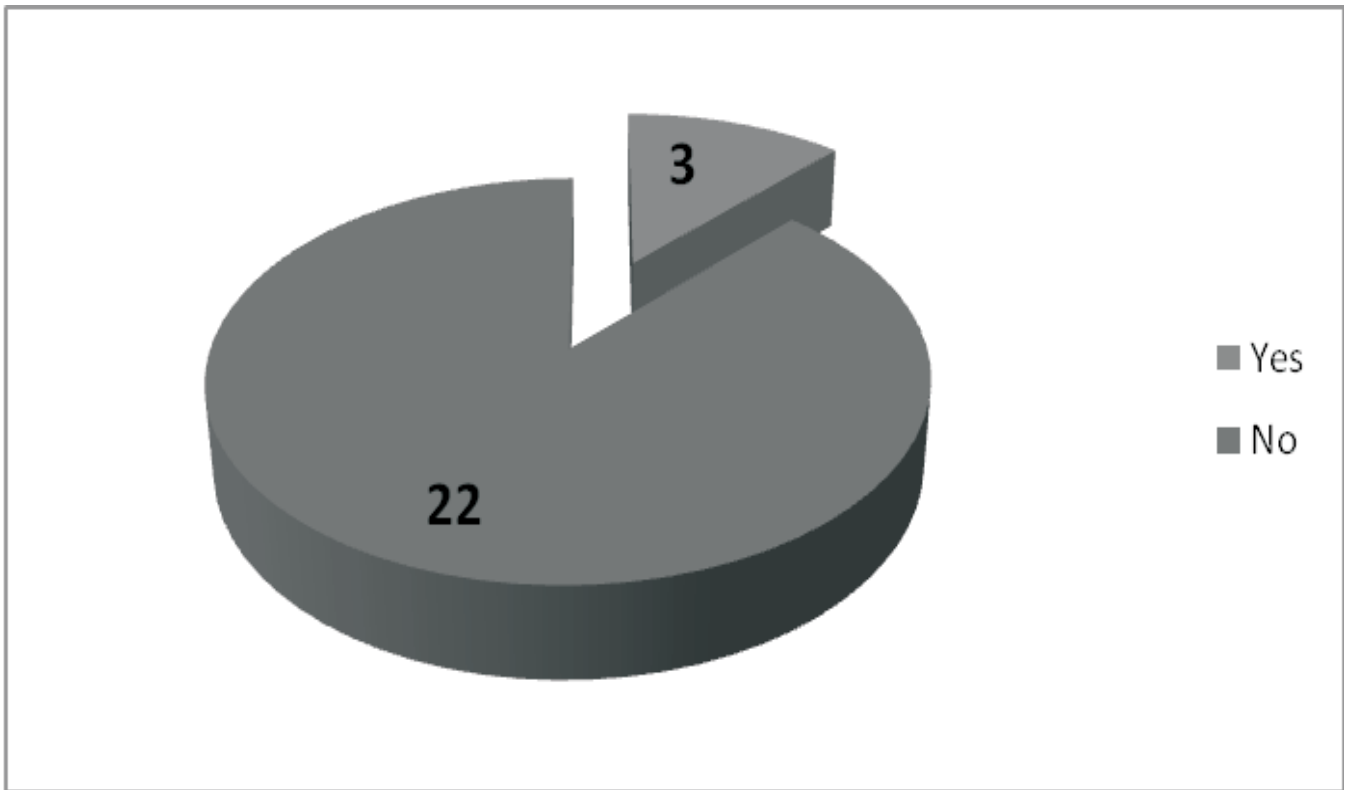


Fig. 11: Phase II Cardiac Rehabilitation



DISCUSSION

44 centres were identified for the study of which 25 centres were included. The included centres represented almost all the states of India.

In 76% of the centres, among the respondents, pre-operative physiotherapeutic assessment is carried out by the therapist. The remaining are not involved in pre-operative assessment probably due to lack of awareness which can be attributed to the therapists' qualification and hospital protocol. A similar study conducted in Australia in 1996 found that 94% of the respondents were involved in preoperative assessment [6]. Hence, the point to be focused is that in spite of the difference in the time period between the two studies and even though this study is conducted years later India still has a scope for improvement. This study could therefore be considered as a first step towards the same.

It is also noted that 52% of the physiotherapists are following a fixed protocol in managing the post operative patients while no two protocols are the same. This shows the need for a national wide standard protocol as mentioned by Prof B. Airan [1].

60% of the respondents reported that the commencement of physiotherapy is only after extubation. But we are not aware of the duration of mechanical ventilation in these centers. The previous survey conducted among the cardiothoracic units in Australian and Newzeland found that the average duration of mechanical ventilation following surgery was between 4-8 hours [6]. In the above survey 63% of the respondents used a specific respiratory management protocol even for the intubated patients, while according to our survey physiotherapy is being practiced in only 3 centres when the patient is on ventilatory support. 20% of the therapists started the management only from the first post-operative day.

There is a wide range of techniques incorporated in the physiotherapy protocols practiced by the respondents. Deep breathing exercises are a mandatory part of the postoperative cardiac physiotherapy in all the centres even though the evidence for deep breathing exercises is not well established. A study done by Brasher AP [7] found that the removal of deep breathing exercises from routine physiotherapy management does not produce any significant change in the incidence of pulmonary complications. Inspite of the controversy regarding the effect of deep breathing exercises in preventing the respiratory complications following cardiac surgery this technique is still widely practiced and accepted by the Physiotherapists all around the world [7, 8, 9]. The wide usage of deep breathing exercises may be attributed to the simplicity of the technique, traditional background and cost effectiveness [10].

The presence of surgical pain and drains may affect the sigh mechanism which in turn may produce postoperative pulmonary atelectasis. This is considered to be the physiological rationale behind deep breathing exercises and SMI. A narrative review with four RCTs and a systematic review, explored the evidence regarding the benefits of SMI is limited. But the physiological rationale behind this technique is widely accepted [11].

In 96% of the hospitals SMI and directed coughing is incorporated in their post operative treatment protocol. In most of the cases SMI was done by the patients under the supervision of the therapist while in 84% of the centers, nurses are also involved in supervising Incentive spirometry. As per the international standards SMI should be performed 5-10 times every awake hour to prevent pulmonary atelectasis. Hence, involving the critical care nurses in supervising Incentive spirometry could be beneficial.

Splinted coughing has been recommended as a gold standard technique to remove pulmonary secretions after abdominal or thoracic surgery. This has been endorsed by a study conducted by Fiore FJ et al [12]. Directed cough significantly increases the cough peak expiratory flow and cough expiratory volume. The method of holding the sternal incision firmly with the patient's palm during cough was not able to reduce the pain as

documented in the above study. In most of the centres the same method is still being used.

In only 56% of the centres positioning is being considered even though it has been well established that frequent change in the position is mandatory to prevent pulmonary complications. The limited practise of positioning could be accredited to the presence of various lines and drains connected to the patient. But it is suggested that positioning can still be considered with at most care.

ACBT is incorporated in the physiotherapy protocol only in 4 of the centers which is minimal as compared to the Australian and New Zealand survey. This may be attributed to the lack of familiarity of the technique among the therapists and its less popular use in the past, though the physiological rationale stands strong.

In 40 % of the centers mobilization is deferred to in the 3rd postoperative day, though early mobilization is considered to be the gold standard technique in preventing pulmonary complications. Early mobilisation is universally accepted to be practiced from the first postoperative day in cardiac surgery unit, hence a need for practice of the same should be emphasised. In majority of the centers the early mobilization is based on the therapists' assessment.

In all the centers advice on discharge is given orally. Only in 52 % of the centers handouts were provided in the local language. This component has not been analyzed in the previous surveys. Handouts may be more feasible in training the patients for a home based protocol and the same to be followed by them without supervision.

Unfortunately it has been found that only three centres do undertake a phase II cardiac rehabilitation. The knowledge that Phase II cardiac rehabilitation plays an important role in improving the quality of life of the patients who have undergone cardiac surgeries has been well established decades before. Therefore the key point here is that Cardio Thoracic surgical units in India need to initiate cardiac rehabilitation programmes for the complete rehabilitation of the patients.

CONCLUSION

The results of this survey strongly stress the need for a nationwide uniform physiotherapeutic protocol in the management of the post- surgical cardiac population the components of which should be designed based on the recent research evidence.

ACKNOWLEDGEMENTS

The authors want to thank all the participants of this survey and the management of Father Muller Medical College for their support. We would like to express our sincere gratitude to our Bio-Statistician Mrs. Suchitra Suresh for her help in preparing the Questionnaire and statistical Analysis.

REFERENCE

1. Balram Airan . Cardiothoracic & Vascular surgery in India- Achievements & future goals. Presidential Address IJTCVS 2005; 21: 133–137
2. Taggart DP, El-Fiky M, Carter R, Bowman A and Wheatley DJ (1993): Respiratory dysfunction after uncomplicated cardiopulmonary bypass. Annals of Thoracic Surgery 56: 1123-1128.
3. Van Belle AF, Wesseling GJ, Penn OCKM and Wouters EFM (1992): Postoperative pulmonary function abnormalities after coronary artery bypass surgery. Respiratory Medicine 86: 195-198.
4. Matthay MA and Wiener-Kronish JP (1989): Respiratory management after cardiac surgery. Chest 95: 424-434.
5. Renault JA, Costa - Val R, Rossetti MB. Respiratory Physiotherapy in Pulmonary Dysfunction after Cardiac surgery. Rev Bras Cir Cardiovasc 2008;23(4): 562- 69
6. Tucker B, Jenkins S, Davies K, McGann R, Waddell J, King R, Kirby V and Lloyd C (1996): The physiotherapy management of patients undergoing coronary artery surgery: A questionnaire survey. Australian Journal of Physiotherapy 42: 129-137.

7. Brasher PA, McClelland HK, Denehy L, Story I. Does Removal of deep breathing exercises from a physiotherapy program including pre-operative education and early mobilisation after cardiac surgery alter patient outcomes? 2003; 49: 165 – 73

8. Stiller K, Montarello J, Wallace M, Daff M, Grant R, Jenkins S, Hall B, and Yates H. Efficacy of breathing and coughing exercises in the prevention of pulmonary complications after coronary artery surgery. Chest 1994;105:741-747

9. Westerdahl E, Lindmark B, Almgren SO, Tenling A. Chest physiotherapy after coronary artery bypass graft surgery: a comparison of three different deep breathing techniques. J Rehabil Med. 2001; 33(2):79-84.

10. Westerdahl E, Lindmark B, Eriksson T, Friberg O, Hedenstierna G, Tenling A. Deep-breathing exercises reduce atelectasis and improve pulmonary function after coronary artery bypass surgery. Chest. 2005;128(5):3482-8.

11. Agostini P, Singh S. Incentive spirometry following thoracic surgery: what should we be doing? Physiotherapy 2009; 95: 76 -82

12. Fiore FJ, Chiavegato DL, Denehy L, Paisani MD, Faresin MS. Do Directed Cough Manoeuvres Improve Cough Effectiveness in the Early Period After Open Heart Surgery? Effect of Thoracic Support and Maximal Inspiration on Cough Peak Expiratory Flow, Cough Expiratory Volume, and Thoracic Pain. Respiratory Care 2008: 53 (8) 1027 - 34