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Awareness about indication of breathing exercises among physiotherapists in india- A multicenter survey

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Abstract

Background: Importance of Breathing exercises while giving chest physiotherapy and lack of extent of use of these exercises in clinical practice was often lacking. Objective of the study was to find out awareness about the indication of breathing exercises amongst physiotherapists in India and the association of the level of experience, level of education with the total value in the questionnaire.

Method: A self designed questionnaire was send via email to 250 selected hospitals in India. A period of six weeks for completion was 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: Of the 116 physiotherapist responses all were administering breathing exercises as a part of their protocol in management of cardio respiratory disorders. The mean score of 116 physiotherapists was 14.40(total score was 24).116 questionnaires were received; representing response rate of 46%. There was association between duration of experience as a physiotherapist and duration of experience in cardio respiratory department with the awareness of breathing exercises and it was statistically significant with p values (<0.001) and (<0.001) respectively.

Conclusion: The knowledge among the physiotherapist about the awareness of using breathing exercises is only 60%. These results underline the necessity of an educational programme regarding breathing exercises among physiotherapists.

Keywords: Breathing exercise, Lung Expansion, Bronchial hygiene, Work of Breathing, Physiotherapy

1. Introduction

Breathing exercise is defined as the therapeutic intervention by which purposefully alteration of a given breathing pattern is done [1]. Studies have shown that deep breathing increases lung volume, increases ventilation and decrease airways resistance, increases surfactant secretion, thereby improving lung compliance, increases V_A/Q matching, decreases dead space ratio, increases diffusion, increases oxygen saturation, improves basal ventilation as a result of reduced airway turbulence and preferential distribution of air to dependent regions [2].

Breathing exercises are fundamental interventions for prevention and comprehensive - management of acute or chronic pulmonary disorders (such as COPD), for patients with surgical procedures (such as thoracic and abdominal surgery), for patients with central nervous system deficit (such as high spinal cord lesion), for psychological conditions (such as nervousness, apprehension) or for patients who are bedridden for extended period of time [3,4].

Breathing exercises to improve lung expansion should be performed in cycles of no more than three or four breaths. The breathing exercises to improve lung expansion are deep breathing exercises, end inspiratory hold, diaphragmatic breathing, sniff, rib springing: Deep breathing exercises (DBEx) is used to increase alveolar volume and the end inspiratory hold technique is believed to hold the alveoli inflated and redistribution of inspired gas to the alveoli with different time constants. Thus the treatment with breathing exercises restores FVC by improving collateral ventilation [2, 5]. The studies has been shown that DBEx and incentive spirometry are similar in their prevention of clinical pulmonary complications, respiratory failure and lack of side effects in the average patient undergoing abdominal surgery [6].

Breathing exercises for bronchial hygiene therapy is useful during the episodes in which there is an acute secretion clearance problem, for example: cystic fibrosis, bronchiectasis, COPD. Bronchial hygiene therapy includes: Active cycle of breathing (ACB) – it consists of repeated cycles of breathing control, thoracic expansion and the Force expiratory technique (FET) and

Autogenic drainage – it consists of peripheral loosening of mucus (unsticky phase), collection of mucus in larger airways (collecting phase), and the transport of mucus from larger airways to mouth (evacuating phase) [7] ACBT is used by most physiotherapists for clearance of excessive secretions. However the author believe that the thoracic expansion exercise component of this cycle also increases lung volume by promoting collateral ventilation [5]. Autogenic drainage is as effective as ACBT in clearing secretions and improving lung function. These techniques can be used in stable COPD patients according to the patients' and the physiotherapists' preferences [8] The studies has been shown that Positive Expiratory Pressure technique using flutter device eliminates mucus from the bronchial airway and thus improves bronchial hygiene in moderate chronic bronchitis patients [9].

Increased work of breathing (WOB) in spontaneously breathing patients decreases ventilatory capacity and increases ventilatory requirements which are seen in the patients with COPD, asthma, interstitial lung disease, pneumonia, pulmonary oedema, hyperventilation etc. The types of breathing exercises which helps to reduce work of breathing (WOB) are breathing control, Innocenti breathing technique, Pursed lip breathing, Rapid shallow breathing for restrictive lung disease and Slow, deep breathing for moderate obstructive lung disease [2].

A wide range of techniques are available to provide lung expansion and clearance of pulmonary secretions. Some interventions can be performed with just the physiotherapist's manual abilities and/or the patient's voluntary effort such as deep breathing exercises, manual pulmonary clearance techniques and forced expiratory techniques [10].

Physiotherapists play a part of multidisciplinary team involved in the treatment of critically ill patients. They lie closely with medical, nursing and allied health professionals regarding patient's condition, progression and plans. Traditionally physiotherapists administer generalized treatment for all cardio respiratory conditions. So a lot of confusion prevails on the administration of specific breathing exercises. Despite the lack of evidence of benefits still breathing exercises are commonly used in clinical practice [9].

The objective of study was to find out awareness about the indication of breathing exercises amongst physiotherapists in India, to find out the association of the level of total experience with the total value in the questionnaire, to find out the association of the level of education in regard to BPT, MPT and PhD physiotherapists, to find out the association of the level of experience in cardio respiratory department with the total value in the questionnaire, to orientate the researcher regarding literature on the topic, in order to highlight important aspects and assists the researcher in development of questionnaire.

2. Methodology

Study design was exploratory cross sectional survey. The study population was Physiotherapists working in hospital set up for more than 2 years of working experience. They were Included if they are graduates, postgraduates or doctorates in physiotherapy and should be employed in hospitals for more than 2 years of experience. Undergraduate Students and trainees who are working in hospitals were excluded from the study. The study was reviewed and approved by the institutional ethical committee, Padmashree institute of physiotherapy.

Hospitals with well equipped cardio respiratory physiotherapy departments were selected for the study. The lists of hospitals were obtained from the internet and a total of 500 hospitals were identified. Hospitals in which anaesthetist, respiratory therapists and nurses are employed to deal with breathing exercises were excluded from the study. Also the hospitals in which physiotherapists are restricted to deal with outpatient were also excluded. Finally a total of 250 hospitals were short listed.

A self designed questionnaire was used for the study. Survey questionnaire was prepared, expert in the field of cardio-respiratory physiotherapy with 5 years of working experience were consulted for their comments on the questionnaire design, structure and content and a final questionnaire was prepared and it was validated. The questionnaire was divided into two parts- preliminary part & main part. Details of the questionnaire is included in the annexure.

Questionnaire was emailed to the head of the department of physiotherapy of the hospitals selected. As per the inclusion criteria, physiotherapists who are currently working in cardio respiratory department 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 ensuring the confidentiality. 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 second reminder.

Data analysis was performed by Statistical software namely SPSS 15, and R environment version 2.11.1. Descriptive statistical analysis has been carried out in present study. Data was summarized using number and percentage. Significance is 95% confidence interval has been computed to find out significant features. Confidence interval with lower limit more than 50% is associated with statistical significance. Fisher's exact test has been used to find the significance of association of level of awareness between MPT and BPT. Microsoft word and excel have been used to generate graphs and tables

3. Results

Out of the 250 physiotherapists surveyed, only 116 were responded (response rate 46.4%). The largest response rate obtained from Karnataka, Maharashtra, West Bengal, Tamilnadu and Andhra Pradesh (table 1). A large percentage of response was obtained from nonteaching hospitals (51%). Most of the respondents were BPT (59%) while only (41%) were found to be MPT. Majority of physiotherapists (77%) were found to have less than five years of experience. Only a small variation of 2% was among male and female distribution of physiotherapists.

Table 2 summarizes detailed wise answer of 116 respondents. The 18th Question was the most correct answer for these respondents (107 therapists answered correctly). The 16th question was the least answered question (21 out of 116). The number of statements in the questionnaire was 24, so the maximum score can be obtained was 24. In the study mean score obtained was 14.40 with a standard deviation of 4.80. The percentage of mean score to the total score was 60%. The median score was 15.

Table 1: State wise response

State	No. Sent	No. Received	Proportion Of Response %
Andhra Pradesh	25	11	4.4
Assam	6	3	1.2
Bihar	4	2	0.8
Chhattisgarh	4	1	0.4
Delhi	10	6	0.4
Himachal Pradesh	4	2	0.8
Jammu And Kashmir	9	4	1.6
Gujrat	18	9	3.6
Karnataka	45	22	8.8
Kerala	10	5	2
Maharashtra	30	15	6
Meghalaya	12	4	1.6
Orissa	6	3	1.2
Rajasthan	6	2	0.8
Tamil Nadu	24	11	4.4
Tripura	8	2	0.8
Uttar Pradesh	5	1	0.4
West Bengal	24	13	5.2
Total	250	116	46.4

Table 2: Awareness of use of breathing exercises

Statements	Number of physiotherapist said correct answer out of 116 respondents	%	95%CI
Q1	87	75.0	66.40-81.9
Q2	92	79.3	71.1-85.7
Q3	92	79.3	71.1-85.7
Q4	75	64.7	55.6-72.76
Q5	94	81.0	72.95-87.13
Q6	103	88.8	81.77-93.33
Q7	65	56.0	46.95-64.73
Q8	69	59.5	50.38-67.97
Q9	61	52.6	43.56-61.44
Q10	77	66.4	57.38-74.33
Q11	31	26.7	19.51-35.43
Q12	82	70.7	61.85-78.20
Q13	83	71.6	62.75-78.97
Q14	66	56.9	47.81-65.54
Q15	36	31.0	23.34-39.96
Q16	21	18.1	12.16-26.10
Q17	43	37.1	28.83-46.14
Q18	107	92.2	85.91-95.86
Q19	71	61.2	52.12-69.58
Q20	61	52.6	43.58-61.44
Q21	67	57.8	48.66-66.36
Q22	91	78.4	70.12-84.96
Q23	66	56.9	47.81-65.54
Q24	44	37.9	29.62-47.01

4. Discussion

This multicenter survey identified the awareness about indication of breathing exercises among physiotherapists in India. Out of 250 questionnaires sent, only 116 responded. Burns and Groove (2001-430) regarded response rate of 50% as satisfactory [13] and in our study response rate was only 46% which is considered as low. Reason for such a low response rate is hypothesised as distribution of sample population which can be contacted only through email and phone but no personal meetings or face to face interaction was made. As questionnaire was quite time consuming, this could have reduced its response rate.

According to the results of this survey out of 116 respondents the majority of respondents were BPT. In most of the clinical set up hospitals of India, graduates are employed in comparison to postgraduates. In the study it is seen that physiotherapists who are in between 3 to 5 years experience

are aware compared to 1 to 2 year experience. So there was association of level of experience with the awareness among them which was statistically significant. There was no association between level of education (BPT and MPT) with the awareness. The experienced physiotherapists may be not updated with evidence based practice.

The very first question of the questionnaire got the score of 75% which states that only 87 physiotherapists are aware that breathing exercises can be used for all the conditions i.e., to improve lung expansion, to improve bronchial hygiene and as well as to reduce work of breathing. Julio F Fiore Junior *et al.* in 2010 conducted a study on utilization of positive pressure devices for breathing exercises in the hospital setting, a regional survey in Sao Paulo, Brazil and concluded that despite the lack of evidence of benefits still breathing exercises are commonly used in clinical practice [10]

With an equal response of 79.3% each from physiotherapists was obtained on questions regarding efficacy of breathing exercises and mechanical aids for increasing lung expansion and bronchial hygiene. Skaria Simbi *et al.* in 2008 conducted a study on the effect of positive expiratory pressure technique over forced expiratory technique on bronchial hygiene in patients with moderate chronic bronchitis. The author concluded that Positive expiratory pressure technique using flutter device eliminates mucus from the bronchial airway and thus improves bronchial hygiene in moderate chronic bronchitis patients [9] in the study 64.7% were using both breathing exercises and mechanical aids to reduce work of breathing.

Breathing exercises can be used in the management of both obstructive and restrictive disorders, 81% of respondents agree with this. Savci S *et al.* [8] in 2000 conducted a study on autogenic drainage and the active cycle of breathing techniques in patients with chronic obstructive pulmonary diseases and concluded that Autogenic drainage is as effective as the ACBT in cleaning secretions and improving lung functions. These techniques can be used in stable COPD patients according to the patients' and the physiotherapists' preferences [8]. Breathing exercises cannot be administered for patients with fractured ribs, this was correctly identified by 88.8% respondents. This question got the second highest score among all the 116 respondents.

It was also found that only 56% uses the correct technique to improve lung expansion, 59.5% to improve bronchial hygiene, 52.6% to reduce work of breathing and 66.4% to improve cystic fibrosis patients. A. Hristara *et al.* in 2007 conducted a study in comparing the results of the appliance of two methods of respiratory physiotherapy; the active cycle of breathing techniques in drainage positions and the conventional physiotherapy, regarding their effects on mucociliary clearance in patients with cystic fibrosis and concluded that the active cycle of breathing techniques contributes effectively in the sputum expectoration from the peripheral broncho pulmonary segments and enhances the mucociliary clearance in children with cystic fibrosis [11].

Both deep breathing exercises and incentive spirometry are given in the management of clinical pulmonary complications and respiratory failure, only 26.7% agrees with that. Alice Jones *et al.* in 1997 conducted a study on restoration of lung volume using the flutter VRP1 or breathing exercises and found that Deep breathing exercises (DBEx) is used to increase alveolar volume and the end inspiratory hold technique is believed to hold the alveoli inflated and redistribution of inspired gas to the alveoli with different time constants. Thus the treatment with breathing exercises restores FVC by improving collateral ventilation. [5] Again, Bartolome R.

Celli *et al.* in 1984 conducted a study on a controlled trial of Intermittent positive pressure breathing, Incentive spirometry and deep breathing exercises in preventing pulmonary complications after abdominal surgery and concluded that Incentive Spirometry and deep breathing exercises were similar in their prevention of clinical pulmonary complications, respiratory failure and lack of side effects in the average patient undergoing abdominal surgery^[12].

In this study 70.7% respondents are aware about the components of ACBT and 92.2% about the components of Autogenic drainage, which scored the highest among the other questions in the questionnaire. Both ACBT and Autogenic drainage both can be used in clearing secretions and improving lung function. In our study 71.6% agrees with this. In this study it is seen that only 37.1% respondents are aware about performing breathing exercises in 6-7 breaths to improve lung expansion.

61.2% physiotherapists were found to be aware about incorporating the PNF techniques, if the patient is unconscious and similarly 52.6% were aware about the use of IPPB therapy if the patient is not alert. PEP therapy will be used if the patient is having problem with excess secretions, 57.8% respondents agrees with this. Elkins MR *et al.* in 2006 did a study on Positive expiratory pressure physiotherapy for airway clearance in people with cystic fibrosis and concluded that There was no clear evidence that PEP was a more or less effective intervention overall than other forms of physiotherapy in clearing secretions^[14].

The study also revealed that 78.4% respondents were found to be incorporating the use of incentive spirometer if the patient is conscious and co-operative, whereas 56.9% respondents were found to be used intermittent CPAP if the patient problems are not resolved after treatment. It is also found in our study that only 37.9% respondents incorporates both positioning and breathing exercises as the common management in pleural effusion. No conclusion can be made between numbers of beds in hospital, number of beds in cardio respiratory department, teaching Vs non teaching hospitals with awareness. According to descriptive score of the study, it is concluded that overall competence for use of awareness is 60%.

Limitations of the study was such that response rate was poor, No of questionnaires send to different states were not homogenous and Questionnaire was send through email not through direct contact. The further studies can be done to compare knowledge and competence levels of physiotherapists employed in private and academic hospitals with more response rate. The secondary study could be conducted in order to determine knowledge of physiotherapy staff that had received training following development of educational program. This study could be replicated in order determine skills in practice regarding breathing exercise.

5. Conclusion

The objective of the study was to find out awareness about the indication of breathing exercises amongst physiotherapists in India, to find out the association of the level of total experience with the total value in the questionnaire, to orientate the researcher regarding literature on the topic, in order to highlight important aspects and assists the researcher in development of questionnaire. Of the 116 physiotherapist responses (response rate 46.6%) all were administering breathing exercises as a part of their protocol in management of cardio respiratory disorders. The mean score was 14.40 out of 24. The knowledge among the physiotherapist about the awareness of using breathing exercises is only 60%. These

results underline the necessity of an educational programme regarding breathing exercises among physiotherapists. This customised self designed questionnaire can be used as an assessment tool in objective examination of the patient.

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