

Correlation between Dyspnea-Related Kinesiophobia and Activity Limitation in Patients with Chronic Respiratory Diseases

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Abstract

Introduction: Dyspnea or shortness of breath is one of the cardinal features of chronic respiratory diseases (CRDs). It is a subjective symptom, frequently influenced by the state of mind of the patient. Kinesiophobia, excessive, irrational fear of physical movement due to dyspnea, often prevents patients from performing activities of daily living leading to physical deconditioning. The identification of relationship of dyspnea-related kinesiophobia and activity limitation can help guide patient management to improve quality of life, physical independence, and prevent physical deconditioning. **Patients and Methods:** The study was conducted using convenience sampling at a tertiary care hospital on 18–60-year-old patients with CRDs with dyspnea. Breathlessness Belief Questionnaire (BBQ) was used to evaluate dyspnea-related kinesiophobia. Activity limitation was assessed using Dyspnea Barthel Index (DBI). The scores of both scales were calculated, and the correlation between dyspnea related kinesiophobia and activity limitations was obtained using the Spearman's correlation. **Results:** Sixty subjects, 23 females and 37 males, were recruited. The mean (\pm standard deviation [SD]) age of the patients was 48.9 ± 12.5 years. Mean \pm SD scores of BBQ were 58.4 ± 4.5 . The mean score for DBI was 21.5 ± 2.12 , and the average duration of the disease was 2 ± 0.707 years. Spearman's rank correlation coefficient between BBQ and DBI obtained was $\rho = 0.712$ with a $P < 0.001$. **Conclusion:** There is a strong correlation between dyspnea-related kinesiophobia and activity limitation in patients with CRDs.

Keywords: Activity limitation, breathlessness, dyspnea, kinesiophobia

INTRODUCTION

Although breath is fundamental to life, lung health is less well recognized as a critical health factor than other indicators, such as weight and blood pressure.^[1] In 2017, 544.9 million people worldwide had a chronic respiratory disease (CRDs), representing an increase of 39.8% compared with 1990.^[2] CRDs prevalence showed wide variability with the highest prevalence among both males and females in high-income regions. Smoking was the leading risk factor for CRDs-related disability across all regions for men. Among women, household air pollution from solid fuels was the predominant risk factor for CRDs, while ambient particulate matter represented the leading risk factor in South-east Asia, East Asia, and in the Middle East.^[2]

Globally, CRDs, both communicable and noncommunicable, are among the leading causes of mortality, morbidity, economic and societal burden, and disability-adjusted life years.^[3]

Dyspnea is a cardinal feature of CRD.^[4] It is defined as “a subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity.”^[5] Dyspnea is an important predictor of quality of life, exercise tolerance, and mortality in various conditions.^[6] It also contributes to low adherence to exercise training programmes in sedentary adults and in patients with chronic obstructive pulmonary disease (COPD).^[7] The recent ATS statement (2012) has emphasized the multidimensional nature of dyspnoea in the

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sensory–perceptual (intensity and quality), affective distress, and impact domains.^[5] It is also mentioned that dyspnea is the most common cause of limitation of activity in patients with pulmonary diseases.^[8]

Kinesiophobia or “fear of movement” was originally defined as a state where an individual experiences excessive, irrational, and debilitating fear of physical movement and activity as a result of a feeling of susceptibility to painful injury or re-injury.^[9] The low physical activity level severely affects the emotional, social, behavioral, self-care, mobility, sleep, and rest functions of individuals with respiratory diseases.^[10] This further leads to physical deconditioning–reduction in aerobic capacity, lung function, peripheral muscle strength and muscle endurance. This muscle deconditioning, associated with reduced physical activity, contributes to further inactivity, and as a result, patients get trapped in a vicious cycle of declining physical activity levels and increasing symptoms with exercise.^[11] There is a need to establish to what extent dyspnea-related kinesiophobia is related to limitation in physical activity.

PATIENTS AND METHODS

The study was conducted using the convenience sampling at a tertiary care hospital. The study design was observational cross-sectional study. Patients aged between 18 and 60 years with CRDs having dyspnea were included in the study. Patients with cognitive disorders, neurological or musculoskeletal conditions causing activity limitation were excluded.

Ethical committee clearance was obtained before beginning work on the research project. Patients were recruited as per the inclusion and exclusion criteria, from the chest medicine ward and outpatient department of a tertiary care hospital. Informed consent was obtained. Patient’s demographic data, history of symptoms, and comorbidities (if any) were documented. Evaluation of the dyspnea-related kinesiophobia was done using the Breathlessness Belief Questionnaire (BBQ) which is a 17-item measure of dyspnea-related kinesiophobia, based on the Tampa scale (TSK). Patients indicated to which extent they agree with the items on a 5-point scale from “strongly disagree” (scored 1) to “strongly agree” (scored 5).^[12] Activity limitation was assessed by Dyspnoea Barthel Index (DBI). This Barthel Index based on dyspnea perception is reliable, sensitive, and adequate as a tool for measuring the level of dyspnea perceived in performing basic daily living activities.^[13]

Both BBQ and DBI were translated in local language and validated posttranslation. The outcome measures were given in the language which the patient best understood. The scores of both the scales were calculated.

Spearman’s rank correlation test was performed. SPSS software (version 26) for data analysis (IBM Corp. Released 2019. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY, USA: IBM Corp) was used to determine

correlation between dyspnea-related kinesiophobia and activity limitation.

RESULTS

The study was performed on 60 participants, of which 23 were female and 37 were male. The mean age of the patients was 48.9 years (standard deviation [SD] = 12.5), mean scores of BBQ was 58.4 (SD = 4.5) [Table 1]. The mean score for DBI was 21.5 (SD = 2.12), and the average duration of the disease was 2 years (SD = 0.707) [Table 1].

Out of the total participants, 20 patients had restrictive type of CRDs (pneumonia ($n = 9$), posttuberculosis ($n = 7$), interstitial disease ($n = 4$) and 40 had obstructive CRDs (COPD [$n = 20$], and bronchial asthma [$n = 12$]) [Figure 1].

The mean score of BBQ for males was 58.27 (SD = 4.90) and 58.60 (SD = 4.12) for females, mean score of DBI was 26.45 (SD = 4.25) for males and 27.30 (SD = 3.85) for females [Table 2]. Spearman’s rank correlation coefficient for correlation between BBQ and DBI obtained was $\rho = 0.712$ with a $P < 0.001$ [Figure 2].

DISCUSSION

Kinesiophobia is defined as fear of movement and activity resulting from a feeling of vulnerability to increase in symptoms or injury. Although there are studies concerning kinesiophobia and its relationship with clinical variables in various chronic diseases, there are limited studies about kinesiophobia in CRD patients. The aim of this study was to evaluate dyspnoea related kinesiophobia in CRD patients and find its correlation with limitation in activities. In the present study, it was observed that dyspnoea related kinesiophobia had a strong correlation $\rho = 0.712$ ($P < 0.001$) with limitation in activities in patients with CRDs i.e.,

Table 1: Age, duration of disease and scores of Breathlessness Belief Questionnaire and dyspnoea barthel index (mean±standard deviation)

Variable	Mean±SD
Age (years)	48.9±12.5
Score BBQ	58.4±4.5
Score DBI	21.5±2.12
Duration of disease (years)	2±0.707

BBQ: Breathlessness Belief Questionnaire, DBI: Dyspnoea barthel index, SD: Standard deviation

Table 2: Breathlessness Belief Questionnaire and dyspnoea barthel index scores in men and women (mean±standard deviation)

Variables	Men	Women
BBQ score	58.27±4.9	58.6±4.12
DBI score	26.45±4.25	27.30±3.85

BBQ: Breathlessness Belief Questionnaire, DBI: Dyspnoea barthel index

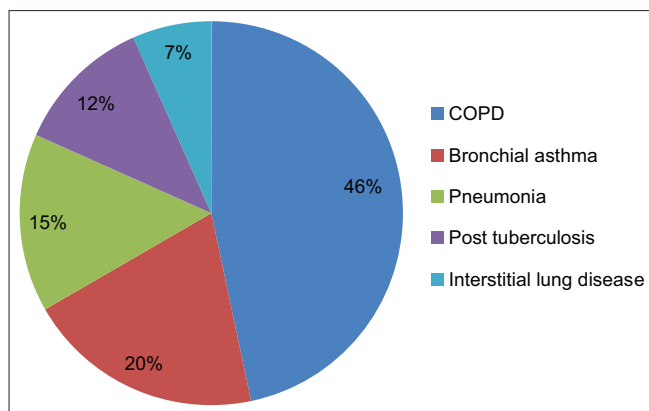


Figure 1: Distribution of type of chronic respiratory diseases

higher scores of the BBQ had corresponding higher scores of DBI.

A study by Kahraman *et al.* in 2020 on 73 patients with COPD showed similar results. This study found the relationship between kinesiophobia, dyspnoea level, functional exercise capacity and quality of life in patients with CRDs. The study concluded that dyspnea level, functional capacity and quality of life subdomains are all positively associated with higher degree of kinesiophobia in patients with COPD.^[14]

The activity limitation in this study was assessed using DBI which is a reliable, sensitive, and adequate as a tool for measuring the level of dyspnea perceived in performing basic daily living activities.^[13] In the present study it was found that in DBI the most affected components in patients with CRD were going up or down a flight of stairs (Question-5), walking for more than 50 m at your pace (Question-9a), and using the toilet (Question-4). This may be due to the demand of peripheral muscles due to energy expenditure, reduced aerobic capacity and physical deconditioning causing early fatigue of the muscles and limiting the patient from performing these activities.^[15] Activity limitations observed in the present study are those involving predominantly lower extremities.

44 (73.33%) of patients had a chronic duration of respiratory disease of more than 1 year. Long standing breathlessness and associated avoidance of physical activity can contribute to deconditioning. A study done by Barreiro and Gea on respiratory and limb muscle dysfunction in COPD stated that impaired muscle function and muscle mass are the common systemic manifestations in COPD patients which negatively influence the survival. Respiratory and limb muscles are usually affected in these patients, thus contributing to poor exercise tolerance and reduced quality of life. Muscles from the lower limb, mainly the quadriceps are more severely affected than those of the upper limb and the respiratory muscles.^[16] This can be a contributing factor in limitation of activities which majorly require lower limb muscles and therefore explain the findings of this study.

A study by Rovner *et al.* on chronic musculoskeletal pain and gender differences observed that women have significantly

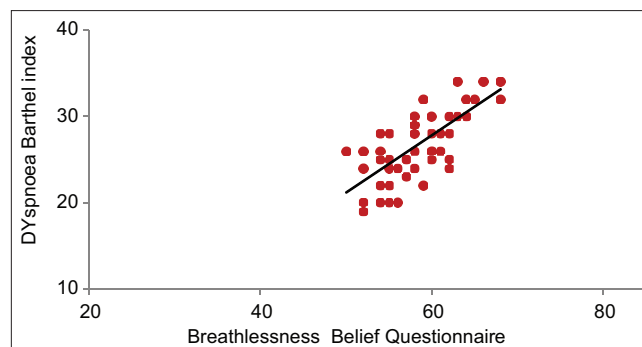


Figure 2: Graph showing correlation between scores of Breathlessness Belief Questionnaire and Dyspnoea Barthel Index BBQ: Breathlessness Belief Questionnaire, DBI: Dyspnoea Barthel Index

higher pain acceptance, activity levels and hence lower kinesiophobia while males report higher kinesiophobia, lower pain acceptance, and activity levels.^[17] The study by Rovner however was on chronic pain related kinesiophobia. The present study compared the average scores of BBQ and DBI of males and females, as shown in Table 2. This suggests that there is no significant difference between the dyspnea-related kinesiophobia levels and limitation in activities in males and females having CRDs. The mechanisms responsible for dyspnea-related kinesiophobia and how they are different from those of chronic pain-associated kinesiophobia may explain these findings and need to be studied in detail in future.

The results obtained in the present study highlight the need to manage kinesiophobia in patients with CRD having long-standing dyspnea. Usual strategies target clinical symptoms and functional impairments responsible for activity limitation. Management of kinesiophobia early in disease course may help prevent long-term consequences. This will further help to manage the adverse effects of reduced mobility and avoidance in activities such as reduced aerobic capacity, reduced functional independence, and physical deconditioning. Assessing kinesiophobia on a routine basis in all patients with CRDs is indicated. Treating this factor associated with activity limitations may help to improve the compliance of the patients and guide physiotherapists to make the process of pulmonary rehabilitation efficient and faster.

There are various pharmaceutical and nonpharmaceutical strategies to manage kinesiophobia in patients with CRD to improve their quality of life. The main nonpharmaceutical psychological intervention is cognitive behavioral therapy (CBT).^[18] Some of the CBT based strategies which a physiotherapist can use in the course of pulmonary rehabilitation include virtual walking using virtual reality,^[19] graded activity based on operant conditioning which aim to reinforce exercise behavior and active coping strategies.^[20] Furthermore, relaxation therapy and counselling can help manage kinesiophobia in patients with CRDs and hence improve physical independence, reduced deconditioning, and improve quality of life in patients with CRDs.^[18]

CONCLUSION

There is a strong correlation between dyspnea-related kinesiophobia and activity limitation in patients with CRDs. Various strategies can be adopted to manage kinesiophobia in patients with CRDs.

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Conflicts of interest

There are no conflicts of interest.

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