EFFECTIVENESS OF INTER COSTAL STRETCH TECHNIQUES AMONG COPD PATIENTS AT NIDCH

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled.

EFFECTIVENESS OF INTER COSTAL STRETCH TECHNIQUESAMONG COPD PATIENTS AT NIDCH

Submitted by **Nawrin Jahan**, for the partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT)

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DECLARATION

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study. I would be bound to take written consent from my supervisor.

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ABBREVIATIONS

BHPI	Bangladesh Health Professional Institute
BMRC	Bangladesh Medical and Research Council.
COPD	Chronic Obstructive Pulmonary Disease
HR	Heart Rate
IC	Inter Costal
IRB	Institutional Review Board
NIDCH	National Institute of Disease of the Chest & Hospital.
RR	Respiratory Rate
SPSS	Statistical package for Social Sciences
WHO	World Health Organization

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ABSTRACTS

***Purpose**:* COPD is a most common pulmonary disease in our country. But physical therapy is not common for the COPD patients. So the purpose of this study is evaluate the effectiveness of inter costal stretch technique as a physical therapy.

***Objective**:* Find out the effect of Inter costal stretch techniques among COPD patients at NIDCH.

***Methodology**:* It was quazi experimental study. Data was collected by questionnaire and confidentiality of information and voluntarily participation were ensured by the researcher. Data were numerically coded and captured in Microsoft Excel 10, using an SPSS 16.0 version program**.**

Result: In this study 10 patients were participated. After providing the inter costal stretch techniques I had found that reduce dyspnea by decreasing respiratory rate, decrease heart rate or improve cardiovascular status, improve pulmonary function by increasing inhale and exhale volume.

***Conclusion**:* There is a paucity of population-based data on COPD prevalence and its determinants in Bangladesh. COPD prevalence and socioeconomic and lifestyle determinants among > 40 years Bangladeshi adults. Worsening this symptom day after day. In this study found that inter costal stretch technique reduce its symptom.

Key words: Intercostals stretch techniques, Chronic Obstructive Pulmonary Disease.

CHAPTER: I INTRODUCTION

1.1 Background

Chronic obstructive pulmonary disease (COPD) is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible. The more familiar terms 'chronic bronchitis' and 'emphysema' are no longer used, but are now included within the COPD diagnosis. COPD is not simply a "smoker's cough" but an under-diagnosed, life-threatening lung disease founded by (WHO, 2015).

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable disease that makes it difficult to empty air out of the lungs. This difficulty in emptying air out of the lungs (airflow obstruction) can lead to shortness of breath or feeling tired because you are working harder to breathe. COPD is a term that is used to include chronic bronchitis, emphysema, or a combination of both conditions. It is not uncommon, however for a patient with COPD to also have some degree of asthma declared by (American thoracic society, 2011).

Chronic obstructive pulmonary disease (COPD) is a condition which is common treatable disorder and it is also progressive, partially its main character is reversible airflow limitation declared by (Barnes, 2002). COPD is also a gradual worsening disease of lung functions and health status of a person health founded by (Sharker, 2008).

Globally COPD is associated with considerable morbidity and mortality proportion, it is the fifth leading cause of death in the world, with its mortality rate is expected to increase more than 30% during the next 10 years declared by (WHO, 2010).

The goal of treatment for COPD is to control symptoms to a degree that allows people with the disease to breathe easier and live as normally and actively as possible for as long as possible. COPD patients most commonly and main features are exercise and activity intolerance Pulmonary; cardiovascular as well as skeletal muscles dysfunctions are the main underlying elements in limiting exercise capacity of COPD patients declared by (Mohamed & Mousa, 2012). Pulmonary functional abnormalities, COPD is also associated with significant effects outside the lungs, such as malnutrition, pulmonary

hypertension and peripheral muscle weakness, the so-called systemic effects of COPD founded by (Mahler, D.A et al., 2007). Mucous hyper secretion results in a chronic productive cough. This is characteristic of chronic bronchitis but not necessarily associated with airflow obstruction, and not all patients with COPD have symptomatic mucous hyper secretion. The hyper secretion is due to squamous metaplasia, increased numbers of goblet cells, and increased size of bronchial submucosal glands in response to chronic irritation by noxious particles and gases; ciliary dysfunction is due to squamous metaplasia of epithelial cells and results in an abnormal mucociliary escalator and difficulty in expectorating founded by (Burgel, 2009).

The main site of airflow obstruction occurs in the small conducting airways that are < 2 mm in diameter; this is because of inflammation and narrowing (airway remodeling) and inflammatory exudates in the small airways. Other factors contributing to airflow obstruction include loss of the lung elastic recoil (due to destruction of alveolar walls) and destruction of alveolar support; the airway obstruction progressively traps air during expiration, resulting in hyperinflation at rest and dynamic hyperinflation during exercise. Hyperinflation reduces the inspiratory capacity and therefore the functional residual capacity during exercise declared by (Macnee, 2006). These features result in breathlessness and limited exercise capacity typical of COPD. The airflow obstruction in COPD is best measured by spirometry and is a prerequisite for its diagnosis founded by (Macnee, 2006). These occur in advanced disease and are characterized by arterial hypoxemia with or without hypercapnia. An abnormal distribution of ventilation: perfusion ratios—due to the anatomical changes found in COPD—is the main mechanism for abnormal gas exchange. The extent of impairment of diffusing capacity for carbon monoxide per liter of alveolar volume correlates well with the severity of emphysema declared by (Macnee, 2006).

This develops late in COPD, at the time of severe gas exchange abnormalities; Contributing factors include pulmonary arterial constriction (as a result of hypoxia), endothelial dysfunction, remodeling of the pulmonary arteries (smooth muscle hypertrophy and hyperplasia), and destruction of the pulmonary capillary bed. Structural changes in the pulmonary arterioles result in persistent pulmonary hypertension and right

ventricular hypertrophy or enlargement and dysfunction (cor-pulmonale) founded by (Anderson, 2003). COPD patients aimed to relieve symptoms, prevent the progression of disease, prevent and treat secondary infections or complications, prevent and treat exacerbation, improve health status, reduce mortality, and increase quality of life. Non-pharmacological method consists of using breathing exercises, energy conservation, exercise, environmental adjustment, nutritional management, relaxation techniques, education and behavioral approaches declared by (Parveen, 2014). The causes of dyspnea in COPD patients included progressive airway obstruction, pulmonary hyperinflation, hypoxemia, hypercapnia, pulmonary hypertension, pulmonary embolism, respiratory infection, anxiety and depression, as well declared by (Jantarakupt & Porock, 2005).

We know that diaphragm is the main muscle for respiration; There are mainly two type of inter costals muscle and these are internal Inter costal muscles and external Inter costal muscles. These muscles are mainly working together when inspiration-expiration process occurs. This muscle of respiration may undergo atrophy in physical inactivity. This may affect chest wall mobility and Chest expansion and reduce lung compliance founded by **(**Kenneth Saladin, 2009).

Neuro physiological facilitation of respiration said that the proprioception and tactile stimuli that alter the depth and rate of breathing. Inter costal stretching is a technique which is effective PNF technique helps in improving breathing pattern and respiratory muscle activity declared by (Mohan et al., 2012).

The Inter costal stretch technique enhances the chest wall for elevation, increasing chest expansion and diaphragm excursion to improve intra-thoracic lung volume. Inter costal (IC) muscles are different and widely spread throughout the rib cage. These muscles are morphologically and functionally one kind of skeletal muscles and it helps in upward and outward movement of the ribs which results in increase in anterior-posterior diameter of the thoracic cavity declared by (De Troyer, 2005).

Various research studies demonstrated that IC stretching improved expired tidal volume decreased the level of dyspnea (increase respiratory rate) level and increased chest expansion clinically which results in better gaseous exchange in human subjects. IC

stretch is performed actively by thoracic mobility exercises. Passively IC stretch can be performed by thoracic rotation, mid sternum rotation, lateral thoracic stretching, through thoracic mobility exercises as well as through manual stretching of IC spaces discovered by (Leelarungrayub et al., 2009). The IC muscles are work for both in inspiration and forced expiration. Even though these muscles engage in respiration, their activities are less common during active contraction among normal healthy adults and respiratory suppressive patient declared by (Mohan et al., 2012).

In Bangladesh, COPD is a common clinical problem. It is difficult to manage dyspnea among these COPD patients because treatment facilities are not always available. There is only one tertiary level referral hospital for COPD patients. This hospital can serve for a limited number of patients among the increased prevalence of COPD, with health professional shortage, and inadequate supply of medicine declared by (Robinson et al., 2013).

Dyspnea management is important for the COPD patients to relieve their symptoms as it can prevent complication and slow the progression of the disease. Currently, no existing study examined physical therapy like inter costal stretch technique for management of COPD patients in Bangladesh. Although COPD cannot be cured, optimal management provides symptom control, slows progression of the disease, and may improve the quality of life founded by (Kaplan & Ries, 2005).

Chronic obstructive pulmonary disease (COPD) is characterized by poorly reversible airflow obstruction and its symptom produce due to abnormal inflammatory response in the lungs; the latter represents the innate and adaptive immune responses to long term exposure to noxious particles and gases, particularly cigarette smoke; all cigarette smokers have some inflammation in their lungs, but those who develop COPD have an enhanced or abnormal response to inhaling toxic agents; this amplified response may result in mucous hyper secretion (chronic bronchitis), tissue destruction (emphysema), and disruption of normal repair and defense mechanisms causing small airway inflammation and fibrosis (bronchiolitis) declared by (Macnee, 2006). These pathological changes result in increased resistance to airflow in the small conducting airways, increased compliance of the lungs, air trapping, and progressive airflow obstruction all

characteristic features of COPD. We have good understanding of the cellular and molecular mechanisms underlying the pathological changes found in COPD. The pathogenic mechanisms result in the pathological changes found in COPD; these in turn result in physiological abnormalities—mucous hyper secretion and ciliary dysfunction, airflow obstruction and hyperinflation, gas exchange abnormalities, pulmonary hypertension, and systemic effects declared by (Macnee., 2006).

Physical examination is not usually diagnostic of COPD but is an important part of patient care; diagnosing COPD in an early stage is relevant because early and appropriate management, especially smoking cessation interventions but also vaccination against influenza and medication, reduces the number and severity of exacerbations of COPD and improves quality of life of patients declared by (Broekhuizen et al.,2009).

Physical signs of airflow limitation and air trapping (barrel chest, loss of cardiac and liver dullness, prolonged expiration, reduced breath sounds) are not usually present until the disease is already at an advanced stage; physical examination may detect co-morbidities or other illnesses and detect the development of complications of COPD such as malnourishment and core pulmonale declared by (Kelly et al., 2007).

1.2 Justification of the study

The percentage of COPD is increasing day by day worldwide. In Bangladesh COPD is a most common pulmonary disease. So, various systems of medicine are trying their best to give maximum recovery within short time. Bangladesh is a developing country with massive population though there is very limited resources and opportunities to get proper medical care due to insufficient skilled professionals and expensive services. Who are not capable of taking treatment like operation, more medication they are poor. They have no much time to take a long procedure treatment as they are day labor. Inter costal stretch technique is more effective for COPD patients because it is stretching may have activated the stretch receptors in the chest wall. Inter costal stretch technique has been successfully used by respiratory physiotherapist in management of reducing breathlessness and improving pulmonary function in many developed and developing countries. But in our country few physiotherapist have known this technique. But for evidence based physiotherapy there is absolutely needed some guideline in which COPD patients will get proper treatment. It has been suggested that this technique can be used to treat diseases like chronic bronchitis, emphysema however there is a lack of evidence.

That does why researcher was choosing this topic to show the efficacy of inter costal stretch technique. In Bangladesh the field of research in physiotherapy this type research are limited, this is my wish to develop physiotherapy treatment for pulmonary conditions. So, evidence based physiotherapy intervention is the important to build up the liability to the patients also professionals. This topic is more interesting to researcher because of challenge. If the researcher can show that there is an efficacy of intercostals stretch technique as a new treatment may develop in Bangladesh and that may helpful for physiotherapy profession and the COPD patients. The results of this study may help to guide physiotherapist to give evidence based treatment in patient with COPD.

The study is designed to investigate the efficacy intercostals stretch techniques for the treatment of COPD patients and the study will help to other physiotherapist to know the actual effectiveness of this treatment approach.

1.3 Research question

Is intercostals stretch technique effective to improve pulmonary function for COPD patients?

1.4 Aim

The aim of the study was find out the effect of intercostal stretch technique along with conventional Physiotherapy for patients with COPD.

1.5 Study objectives

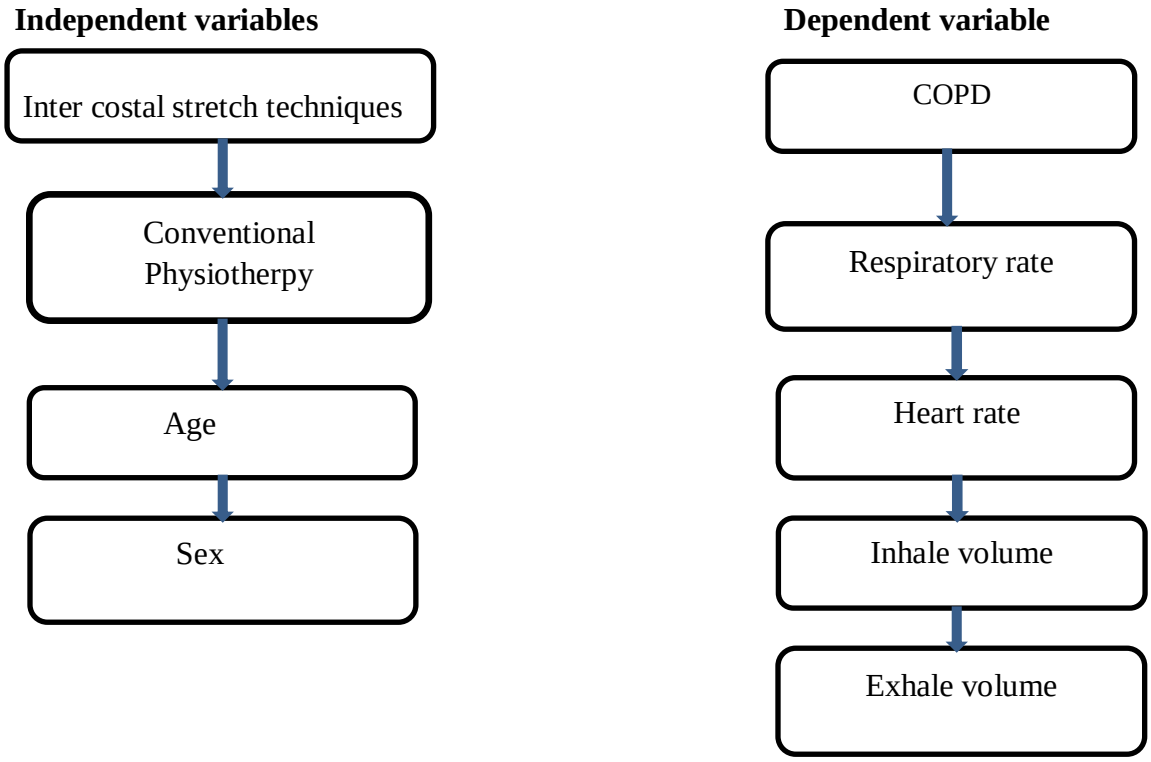
General objectives

To find out the effect of inter costals stretch technique along with conventional physiotherapy patient with COPD.

Specific objectives

- To assess the effectiveness of inter costal stretch technique on respiratory rate of the patients.
- To identify the effectiveness of inter costal stretch technique on heart rate for the patient.
- To evaluate the level of pulmonary functioning of the patients after applying inter costal stretch technique.
- To find out socio demographic factors for patient with COPD.

1.6 Conceptual Framework



1.7 Operational definition

Inter costal stretch

Innermost inter costal muscle, the deep layers of the internal inter costal muscles which are separated from them by a neurovascular bundle. Procedure: This is provided by applying pressure to upper border of a rib in order to stretch the inter costal muscle in a downward direction (not inward). Application of stretch should be timed with exhalation.

COPD

Chronic obstructive pulmonary disease (COPD) is a type of obstructive lung diseases which characterized by long-term poor air flow or air flow limitation. The main symptoms include shortness of breath and cough with sputum production. COPD is a progressive disease meaning it typically worsens over time. COPD is a common preventable and treatable disease, characterized by persistent airflow limitation that is usually progressive and associated with enhanced chronic inflammatory responses in the airways and the lungs to noxious particles or gases. Exacerbations and co morbidities contribute to the overall severity in individual patients (GOLD, 2014).Chronic obstructive pulmonary disease (COPD) is defined independently of exacerbations, which are largely a feature of moderate-to-severe disease.

Effectiveness

The capability of producing desired results. When something is deemed effective, it Means it has an intended or expected outcome, or produces a deep, vivid impression.

Pulmonary Disease

Any abnormal condition of the respiratory system, characterized by cough, chest pain, dyspnea, hemoptysis, sputum production, stridor, or adventitious sounds.

Pulmonary Function

Pulmonary function tests are a broad range of tests that measure how well the lungs take in and exhale air and how efficiently they transfer oxygen into the blood.

CHAPTER: II LITERATURE REVIEW

Chronic Obstructive Pulmonary Disease (COPD) is an important public health problem and it is the major cause of chronic morbidity and mortality in the world declared by (GOLD., 2013). Approximately, 210 million people suffer from COPD and 3 million people die every year because of COPD, which will become the third leading cause of death in the world by 2030 declared by (WHO, 2008).

In Bangladesh, formal reports on the prevalence of disease are limited for assessing, one study conducted in Bangladesh reported the prevalence of COPD among patients attending at the outpatient department (OPD) was 0.7% and among the inpatient department (IPD) was about 5.9% said by (Ilias, et al., 2009). Factors associated with increase prevalence of COPD in Bangladesh may relate to smoking habit declared by (Alam, et al., 2013).

Occupational dust and chemicals, outdoor and indoor air pollution, and environmental change founded by (Ilias, et al., 2009). Many people suffer from the disease for years and die too early from its complications. It is the fourth leading cause of death in adults of United States and also projected to be the third by 2020 declared by (Gold,2008).

COPD is a preventable and treatable disease, however once developed this disease along with its co morbidities cannot be cured, though its progression and morbidity can be reduced which makes the pulmonary component of COPD is characterized by airflow limitation which is not fully reversible and usually progressive and chronic airflow limitation in COPD is caused by mixture introduction mortality throughout the world in where many people suffer from the disease for years and die too early from its complications and it is the fourth leading cause of death in adults of United States and also projected to be the third by 2020 (Gold,2008). (Buist et al., 2003) aimed to measure the prevalence of COPD and its risk factors and investigate variation across countries by age, sex, and smoking status. Participants from 12 sites (n=9425) completed post bronchodilator spirometry testing plus questionnaires about respiratory symptoms, health status, and exposure to COPD risk factors which helps to assurance the COPD prevalence

estimates based on the Global Initiative for Chronic Obstructive Lung Disease staging criteria were adjusted for the target population. Logistic regression was used to estimate adjusted odds ratios (ORs) for COPD associated with 10-year age increments and 10-pack-year (defined as the number of cigarettes smoked per day divided by 20 and multiplied by the number of years that the participant smoked) increments. Meta-analyses provided pooled estimates for these risk factors. The prevalence of stage II or higher COPD was 10·1% .Overall, 11·8% (7·9) for men, and 8·5% (5·8) for women. The ORs for 10year age increments were much the same across sites and for women and men declared by (Buist et al., 2007).

The overall pooled estimate was 1·9 per 10-year increment. Site-specific pack-year ORs varied significantly in women, but not in men; this worldwide study showed higher levels and more advanced staging of spirometrically confirmed COPD than had typically been reported. However, although age and smoking were strong contributors to COPD, they did not fully explain variations in disease prevalence other factors also seemed to be important. Although smoking cessation is becoming an increasingly urgent objective for an ageing worldwide population, a better understanding of other factors that contribute to COPD is crucial to assist local public-health officials in developing the best possible primary and secondary prevention policies for their regions said by (Buist et al., 2007). There is currently no consensus on the criteria for the diagnosis of chronic obstructive pulmonary disease. This study evaluated the impact of different definitions of airway obstruction on the estimated prevalence of obstruction in a population-based sample in needed references founded by (Celli et al., 2003).

On November 19th this year, World Chronic Obstructive Pulmonary Disease (COPD) Day 2003, people worldwide will be encouraged to review their not only health but also respiratory health status and consult a doctor in case of certain symptoms are exposed showed by (Schermer et al., 2003).

WHO- FCTC (2015) stated that other risk factors of this disease is including exposure to indoor and outdoor air pollution and occupational dusts and fumes. Some cases of COPD are due to try to cope up with long-term asthma. COPD is likely to increase in coming years due to higher smoking prevalence and aging populations in many countries such as

ours. Many cases of COPD are preventable by the avoidance or early cessation of smoking, who is smoked and who is secondarily smoked. Hence, it is important that countries adopt the WHO Framework Convention on Tobacco Control and implement the MPOWER package of measures so that non-smoking becomes the norm globally for reducing the change of chronic obstructive disease. COPD is not curable, but some treatments can relieve symptoms, improve quality of life and may reduce the risk of death. From 37472 publications a total of 123 studies depended on a spirometry result which is defined as the prevalence of retained for the review. From the Meta regression epidemiological model, we estimated about 227.3 million COPD cases in the year 1990 among people aged 30 years or more than it, corresponding to a global prevalence of 10.7% (95%) confidence interval (CI) 7.3%–14.0%) in this age difference group. The number of COPD cases is increased to 384 million in 2010, with a global prevalence the percentage of 11.7% (8.4%–15.0%). This number of increase of 68.9% was mainly driven by global demographic changes. (WHO., 2015) stated that, the highest prevalence was estimated in the Americas (13.3% in 1990 and 15.2% in 2010), and the lowest in South East Asia (7.9% in 1990 and 9.7% in 2010). The percentage is so much increased in COPD cases between 1990 to 2010 was the highest in the Eastern Mediterranean region (118.7%), followed by the African region (102.1%), while the European region recorded the lowest increase (22.5%). In 1990, we studied the estimated about 120.9 million COPD cases among urban dwellers (prevalence of 13.2%) and 106.3 million cases among rural dwellers (prevalence of 8.8%). In 2010, there were more than 230 million COPD cases among urban dwellers (prevalence of 13.6%) and 153.7 million among rural dwellers (prevalence of 9.7%). The overall prevalence in men aged 30 years or more was 14.3% (95% CI 13.3%–15.3%) compared to 7.6% (95% CI 7.0%–8.2%) in women founded by (Adeloye et al., 2015).

Epidemiologic studies examining the incidence of respiratory symptoms show that COPD is a major health problem in not only Europe but also the whole world. However, it is very hard to have an exact figure of COPD prevalence in the Europe due to the heterogeneity of studied populations (general, “targeted”, selected age groups). The heterogeneity means a term of methods that depends on (symptom-based, medical diagnosis & expert opinion, spirometry based). Underestimations of the disease

severity by the patients who report their smoking with a sense of guilt, anxiety and depression that alter the perception of the disease and quality of life with fewer adherences to treatment, more exacerbations, and more reaction time when the symptoms are being worsen. As a consequence, COPD is often under-diagnosed; not the false prevalence rates and the burden of disease may be much higher than the currently available data suggest showed by (Halbert et al., 2003) it should to understand not to realize. In 2005, about one in 20 deaths in the United States had COPD as the remarkable because Smoking is manning to be responsible for at least 75% of COPD deaths. Excess health-care expenditures are estimated is near about $6,000 annually for every COPD patient in the United States (Centers for Disease Control and Prevention founded by (Cdc,2008).

The COPD prevalence rates projected by the model reflect at high prevalence of the risk factors for the disease in not only Asia but also near about Asia. The combined prevalence of 6.3% for these countries is considerably higher than the overall rate of 3.8% as extrapolated from WHO data for only this region. These estimates highlight the need for further epidemiological studies to support appropriate allocation of resources for the evaluation, prevention and management of COPD. The total number of moderate to severe COPD cases in the 12 countries of this region, as projected by the model, is 56.6 million with an overall prevalence rate of 6.3%. The COPD prevalence rates for the individual countries range from 3.5% (Hong Kong and Singapore) to 6.7% (Vietnam) founded by (WHO, 2003). The survey showed that 76.1% of the respondents used the pulmonary function test as assessment which is higher when compared to the extent to which this test is employed in countries like Australia and New Zealand (42.8%). According to the World Health Organization (WHO) published, currently 210 million people have COPD and 3 million people died of COPD in 2005. The WHO assuming that COPD will become the fourth leading cause of death worldwide in 2030 researched by (COPD., 2007). The burden of COPD assessed by disability-adjusted life years (DALYs) ranks 10th worldwide founded by (WHO 2008).

Total deaths from COPD are projected to increase by more than 30% in the next 10 years unless urgent preventive measures are in place said by (COPD, 2007). Even with recent

treatment advances; COPD continues as a severely debilitating condition or disease that is usually undiagnosed until clinical symptoms become apparent. COPD is a leading cause of morbidity and mortality and results in an economic and social burden that is both substantial and increasing. COPD prevalence, morbidity, mortality vary across countries and across different groups within countries. It is the result of cumulative exposures over decades. Often the prevalence of COPD is directly is directly related to the prevalence of tobacco smoking. Although in many countries outdoor, occupational, indoor air pollution- the latter resulting from burning of wood and other biomass fuels are the major risk factors. A systematic review and Meta-analysis of 2 studies carried out in 28 countries between 1990 and 2004 which provide evidence that COPD is appreciably higher in smokers and ex-smokers than in non-smokers, in those over 40 years of age than those under 40 and in men than in women declared by (Gold, 2013).

The development of successful preventive strategies requires better elucidation of the untraditional risk factors for COPD besides smoking. In addition, it is likely that other risk factors biologically interact with cigarette smoking and potentiate the development of airflow obstruction. Consequently, there is an urgent need to evaluate the contribution of novel risk factors for COPD at the population level, both in our country and worldwide. Although COPD cannot be cured, the optimal management can provides for symptom control, slows progression of the disease, and may improve the quality of life showed by (Kaplan & Ries .,2005; Rodriguez-Roisin., 2005).

Breathing exercises are used to improve the efficiency of ventilation and gas exchange, increasing the excursion of the diaphragm and easing the mobilization of secretions founded by (Caroline et al., (2007). Breathing exercises like localized breathing exercises, diaphragmatic breathing exercises, lateral basal expansion, upper lateral expansion, and apical pectoral expansion exercises are important for treating thoracic surgery patients. These exercises help to counteract an abnormal breathing pattern in the postoperative period founded by (Shields, 2010).

In 2005, an estimated 22.2 million Americans had asthma: 6.5 million children and 15.7 million adults. The public health impact of asthma is significant and 2003, asthma accounted for 1.4 deaths/100,000 persons in the USA founded by (Ahmed, 2016).

According to the National Center for Health Statistics, in 2003, children between the ages of 5 and 17 years with a history of at least one asthma attack in the previous year accounted for 12.8 million missed school days, and adults with a history of at least one asthma attack in the previous year accounted for 10.1 million missed workdays. Gina estimates that the prevalence of asthma is 300 million persons worldwide. The World Health Organization estimates that 1% of the global disease burden, 15 million disability-adjusted life years, is attributable to asthma. Asthma accounts for 250,000 deaths annually worldwide declared by (Gina, 2015).

Mortality does not correlate with prevalence since countries such as Wales and New Zealand have the lowest asthma related mortality rate, despite a high prevalence of disease (Gina, 2015).

The epidemiology of asthma differs from that of COPD in that asthma usually presents early in childhood, and atrophy is much more prevalent in asthma than in COPD. Asthma is usually not progressive, although exacerbations can be intermittent and variable. Eosinophils and lymphocytes are the major inflammatory cells in asthma. With appropriate therapy, asthma is completely reversible in most patients declared by (Wise et al., 2007).

COPD is the fourth leading cause of death in the USA recommended by (Wise et al., 2007). In 2001, the World Health Organization reported that COPD was the fifth leading cause of 4 deaths in high-income countries and the sixth leading cause of death in low- and middle-income countries and COPD usually presents in middle age, is slowly progressive and is associated with history of cigarette smoking in 80-90% of patients declared by (Taussig et al., 2003).

Patients usually present with a chronic productive cough, and atrophy is not a frequent finding with these clinical symptoms are slowly progressive, and airflow limitation is only partially reversible after tobacco cessation and with bronchodilator use T

lymphocytes, with macrophages and neutrophils, are the predominant inflammatory cell types declared by (Rabe et al., 2005).

COPD is more likely to be reported as a contributory rather than underlying cause of death or morbidity, or may not be reported at all declared by (Holguin et al., 2001). In Asia Pacific countries where tobacco smoking and indoor air pollution are highly prevalent the rise of COPD incidence is particularly dramatic contributing to a significant disease burden data from a WHO World Bank study were used to extrapolate a COPD prevalence figure of 3.8% for the entire Asian population, but recent studies suggest that COPD is a more significant problem in the region than has been previously realized. Two major studies conducted in Japan said by (Takemura et al., 2005). More recently showed a COPD prevalence of 8.55% and 7.5% respectively (Kim et al., 2005).

Consistent with the findings of WHO Global Burden of Disease study said by (Whiteford,2013) both mortality and morbidity rates for COPD in the Asia-Pacific region were reported to be higher in men than in women and increased with increasing age. (NIH, 2004) said that COPD-related illness was higher in men, with rates of 32.6 to 334 per 10,000 people, compared with rates of 21.2 to 129 per 10,000 for women declared by (Whiteford., 2013).

Prevalence of COPD in >40 years population was 21.24%.The total number of COPD patients in Bangladesh is assumed to be 5947200. The overall prevalence of COPD in total population of Bangladesh is estimated to be 4.32%. The prevalence of COPD was found to be highest for rural population 23.15%, followed by urban 22.62% and was lowest for metropolitan population 17.77% of the patients were suffering from moderate-COPD, the prevalence of which in rural areas (48.55%) was higher than that of urban and metropolitan areas (44.30% and 42.53%). In general, males suffer more than females (62.83% vs. 37.17%) declared by (Biswas et al., 2016).

Day by day prevalence of Asthma and COPD is increasing in the whole world as well as in Bangladesh; the morbidity and mortality rate also has been increased. Asthma affects both children and adults. Using conservative definitions, it is estimated that as many as 300 million people of all ages and all ethnic backgrounds suffer from asthma. For the past

40 years, the prevalence of asthma has increased in all countries in parallel with that of allergy. It is estimated that asthma accounts for about 250 000 annual deaths worldwide. Chronic obstructive pulmonary disease (COPD) affects 210 million people. It was the fifth cause of death in 2002 and it is projected to be the fourth cause of mortality by 2030. Tobacco smoking is the major risk factor, but the use indoors of solid fuels for cooking and heating also presents major risks declared by (Mannino et al., 2007).

Several cross sectional studies have been conducted over past 20-30 years that indicate prevalence of allergic respiratory diseases worldwide declared by (Anderson et al., 2007). In this study we will try to find out the prevalence of Asthma and COPD in a region for the better understanding of the present situation and to aware people about the diseases and to reduce mortality rate, to reduce severity and increase patient's compliance and to improve management of asthma and COPD. Asthma and COPD are common diseases of the airways which are mainly diagnosed and treated in general practice. Various studies have reported an increase in the morbidity of asthma and COPD declared by (Vestbo et al., 2007). Another has conducted a study on a sample of 2328 adults from the general population were screened for asthma and COPD. Those screened were then divided into five sub-groups (grades 1-5), according to severity of: (1) respiratory symptoms; and (2) loss in FEV1. The number of patients who were not known to the general practitioner prior to the screening as having asthma or COPD grades 1-5 was also assessed (Tirimanna et al., 2003).

In 1992, they studied a different sample of 1184 adults of the general population in the same area. They used the same criteria as in 1977 to analyze their results. The number of patients not known to the general practitioner prior to the screening was also studied. The result was overall prevalence (grades 1-5) of asthma and COPD has increased from +/- 19% in 1977 to +/- 31% in 1992 (range 21-42). The main reason for this is an increase in prevalence of very mild to moderate asthma and COPD (grades 1-3) from 17% in 1977 to 27% in 1992. The prevalence of severe cases (grades 4-5) increased from 2% in 1977 to 4% in 1992. In 1992, around 65% of the patients were not known to the general practitioner as having any grade of asthma or COPD. This was only slightly lower than the 72% in 1977. All patients with a severe disease (grade 5) were known to the general

practitioner. There is a real increase in the prevalence of asthma and COPD, caused predominantly by an increase in the number of mild cases declared by (Tirimanna et al., 2001). According to our study, more than 95% of physiotherapists employ breathing exercises postoperatively and this is more than the response rate reported by physiotherapists in Australia and New Zealand (90%) founded by (Reeve et al., 2007). Exercise and activity intolerance are the two main characteristic features or treatment of COPD patients. Pulmonary, cardiovascular as well as skeletal muscles dysfunctions are the main underlying elements in limiting or reducing exercise capacity of COPD patients. Pulmonary function test is used to determine the degree to which the preexisting obstructive and restrictive components of pulmonary function may compromise the ability to ventilate adequately and to maintain clear lungs after thoracic surgery. Pulmonary function abnormalities in thoracic region has including a decrease enforced expiratory volume, increased airway resistance, a decreased inspiratory capacity, and also a decrease in maximum voluntary ventilation (MVV) and also founded that neglect of skeletal muscle from a low level of physical activity is also a factor that may have detraining effect on muscle mass or muscle fiber. This will have an impact or effect on the oxidative capacity of the skeletal muscles and it will decrease or reduce the proportion of muscle fibers from type I to type II declared by (Gosker et al., 2000).

Hence, it can be hypothesized inter costal muscles which aids in the mechanical future or aspects of breathing may undergo atrophy when there is a poor physical activity. Therefore, this could have an impact on chest wall mobility to upward or downward and expansion in turn to ventilation on normal healthy body adults; various research studies or finds demonstrated that IC stretching improved expired tidal volume decreased the level of dysponea level and increased chest expansion clinically which results in better gaseous exchange in human subjects found by (Leelarungrayub et al., 2009).

IC stretch is performed actively by thoracic mobility exercises by the help of the therapists. Passively IC stretch can be performed by thoracic rotation, mid sternum rotation, lateral thoracic stretching, through thoracic mobility exercises as well as through manual stretching of IC spaces found by (Leelarungrayub et al., 2009). The external IC muscles which are helpful during inspiration period showed a higher discharge activity

during forcible inhalation for a individuals. Similarly, a stretch of 15 micrometers applied to IC spaces showed an increase or enhance in muscle activity and also said that the increase in muscle activity or such as muscle work of the IC muscles could lead to increase in lung volume, capacities and also in function. According to (Puckree et al.,2002). IC stretching is effective in improving or enhancing the breathing pattern and respiratory muscle activity among healthy conscious adults. However; none of the research studies examined the effect of IC stretching on dynamic pulmonary function parameters among healthy subjects who are normal and morphologically inter costal muscles displayed a variation in fiber size and atrophy among obstructive lung disease subjects. Puckree et al. (2002) studied with the effect of IC stretch on third and the eighth IC space in which they were proved there were a number of decreases in breathing frequency when a stretch performed on third and eighth IC spaces. This study did not have statistically significant values between the groups on respiratory rate although another. However, the rate of respiration lessened only in the experimental group not in control group, which showed here there were impacts on respiratory rate also when an IC stretch was performed; although there is a lack of evidence that supports the use or applies of this technique, the results showed or exposed improvements in dynamic ventilator parameters (FEV1%). A previous study reported or said that localized stretch in the third and eighth IC space showed a deeper breathing pattern, greater activities on para sternal ICs, electro myographic activities which resulted in an increase or enhance in tidal volume and a decrease in breathing frequency among healthy subjects found by (Puckree et al., 2002).

In addition, Threlkeld (2002) reported that applying manual techniques such as IC stretch may produce a suitable amount of plastic deformation of connective tissue to enhance mobility at joints that helps to move body parts easily. Therefore, the results of this study provide preliminary evidence whereby IC stretch was an effective treatment parameter which works shown in before study. Hence, future studies on a larger sample size may corroborate the findings in detail for better result. A possible limitation of our study was quantification of stretch pressure was not performed and it is uncertain that how far these stretch receptors stimulated to evoke response. The respiratory rate measurement which was used in our study did not provide or help a sensitive measure of change in the group

and therefore, future design of stretching protocol and its measured quantities in cardio respiratory physiotherapy may be considered or envisaged in order to promote ventilation declared by (Parveen et al., 2014).

CHAPTER: III METHODOLOGY

3.1 Study Design

This study was conducted using experimental study under a quantitative study design. Here this study included the single group under the pre-test and post-test design because here the one group of patient is tested under one condition, take the data before (pre-test score) and after (post-test score) giving 6 session physiotherapy treatment. Thus two scores were compared to see if there were any differences between them. Quasi experimental design differs from a true experimental design in that, although it contains an independent variable that was manipulated in order to look for an effect on a dependent variable, either control group or randomization was lacking. These designs were useful to researcher looking for validation of treatment method and techniques.

A pre-test (before intervention) and post-test (after intervention) were administered with each subject of the selected group to compare the respiratory rate, heart rate ,pulmonary function of the subject before and after the treatment.

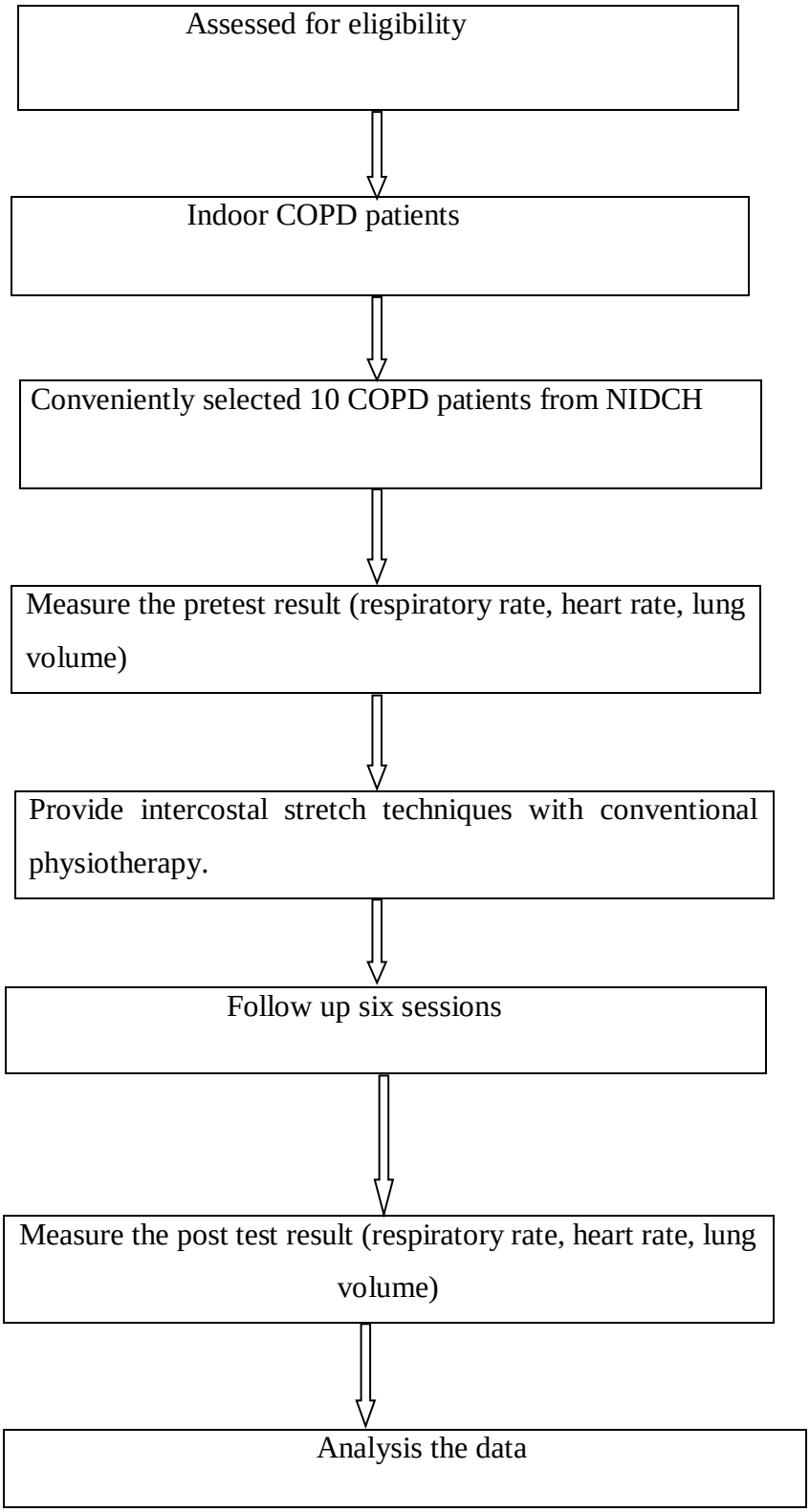
3.2 Study area

The researcher is a fourth year B.Sc. in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) and the research is a part of the course curriculum. Data were taking from those patients who were admitted in Bangladesh National Institute of Diseases of the Chest & Hospital (NIDCH) for the condition of COPD.

3.3 Study population

The populations were selected by me. The study populations were taken from National Institute of Disease of the Chest & Hospital (NIDCH) patients with COPD who attended for treatment.

3.4 Flow chart of phages of Pre-test & Post-test design



3.5 Sample size

The number of items to be selected from the population is the sample size. Sample a group of subjects were selected from population, who are used in a piece of research (Hicks, 1999).

10 participants (COPD patients) were selected for my dissertation.

3.6 Sampling procedure

Searching a appropriate number and kind of people who are a part of this study is called "Sampling" (Hicks 1999, p. 24).

A total ten sample with COPD patients were selected conveniently as sample group. The samples were regularly taking hospitals treatment. Establishes inclusion and exclusion criteria and selected those individuals who fit these factors and volunteer to participate in the study. The samples had been collected on the basis of some inclusion and exclusion criteria. I was provided treatment for 2 weeks totally. Three session per week. That's mean every selective patient was received three sessions on this dissertation. When qualified physiotherapist was give therapy firstly I was check that patient's respiratory rate, heart rate, inhale volume and exhale volume. After complete the session I was again check that patient's respiratory rate, heart rate, inhale volume and exhale volume.

3.7 Selection criteria

3.7.1 Inclusion criteria

- Medically diagnosed Chronic Obstructive Pulmonary Disease patient.
- Male and Female patient.
- Willing to participate.
- Admitted into National Institute Of Disease of the Chest & Hospital (NIDCH).

3.7.2 Exclusion criteria

- Any heart disease patient.
- Depressed patient.
- Any tumor
- Sternum fracture
- Intercostals muscle strain

3.8 Treatment protocol

Treatment option	Duration/Repetation
Diaphragmatic breathing	5 rep. per session
Pulse lip breathing	10 rep. per session
Incentive Spirometry	3 times per session
Thoracic expansion exercise	5 rep. per session
Intercostals stretch techniques	4 rep. per costal space per session

Table-1: Treatment Protocol

Procedure of Inter costal stretch techniques

Patients positioning were standardized to supine flat, limbs positioned in neutral. The position of the therapist is behind the patient. First palpate the supra sternal notch. Then goes downward about 5cm and palpate the angle of Louis. 2nd rib lies at the level of angle of Louis. From the angle of Louis trace the finger laterally. The Inter-costal stretch technique is applied over 2nd and 3rd rib bilaterally. The technique is given with the help of index finger. The direction of the pressure is downward towards the next rib. Technique is applied during expiration phase. Therapist was providing intercostals stretch technique in 2nd and 3rd intercostals space by four repetitions per set. Three set per session where therapist giving 1 minute rest between two set.

3.9 Data collection tools

The researcher organized the materials to successfully complete the interview session. The organized material was a written questionnaire, pen, paper, pencil, laptop, automatic blood pressure monitor, spirometry, stop watch were use as data collection tools in this study.

3.9.1 Questionnaire

The questionnaire was developed under the advice and permission of the supervisor following certain guidelines. There were two parts a socio-demographic and a medical

information part. Data was gathered through a pre test, intervention and post test and the data was collected by using a written questionnaire from which is formulated by the researcher.

3.9.2 Incentive Spirometer

Incentive Spirometer is a machine which is commonly used for test and assess how well your lungs work by measuring how much air you inhale, how much you exhale and how quickly you exhale. Spirometer was used to diagnose asthma, chronic obstructive pulmonary disease (COPD) and other conditions that affect breathing. In this study researcher used spirometer to measure lung volume, expiratory volume.

3.9.3 Digital blood pressure machine

In this study the researcher use digital blood pressure machine for measuring heart rate. This was a simple and accurate way of objective assessment of heart rate.

3.10 Data collection procedure

The study procedures were conducted through assessing the patient, initial recording, treatment and final recording. After screening the patient at ward, the patients were assessed by qualified physiotherapist. Six sessions of treatment was provide for every patient. 10 subjects were choosing for data collection according to the inclusion criteria. A qualified physiotherapist was providing inter costal stretch techniques along with conventional physiotherapy. Data was gathering through a pre-test, intervention and post-test and the data will collected by using a written questionnaire form which was formatted by the researcher. Pretest will performed before beginning the treatment and measure the respiratory rate, heart rate and pulmonary function. Post test result record after finishing the last session.

3.10.1 Data Analysis

In order to ensure that the research have some value, the meaning of collecting data has to be presented in ways that other research worker can understand. In other words the researcher has to make sense of the results. As the result of a quasi-experimental study I was analyzed my data by using of SPSS 20 software, Microsoft Office Excel and scientific calculator.

Probability & Pair t-test

No.	Variables	Observed "t" value	Observed "P" value	Significant/Not Significant
01	Respiratory rate	1.464	.004	Significant
02	Heart Rate	3.943	.000	Significant
03	Inhale volume	2.283	.001	Significant
04	Exhale volume	.688	.001	Significant

Interpretation of data

In this way respiratory rate (p=.004), heart rate (.000), inhale volume (p=.001) and the last one is exhale volume (p=.001) was significant. It indicates that intercostal stretch technique was effective for those variables this technique was significant.

3.10.2 Significant level

In order to find out the significance of the study, the researcher calculated the "p" value. The p values refer the probability of the results for experimental study. The word probability refers to the accuracy of the findings. A p value is called level of significance for an experiment and a p value of <0.05 was accepted as significant result for health service research. If the p value is equal or smaller than the significant level, the results are said to be significant.

3.11 Ethical consideration

The research proposal was submitted to Institute Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) for oral presentation and defense was done in front of the IRB. Then IRB was approved the proposal. A research proposal was submitted to the physiotherapy department of BHPI for approval and the proposal was approved by the faculty members. For data collection purposes, it was also taken permission from the director of National Institute of Disease of the Chest & Hospital (NIDCH).Data collection was started and completed within the allocate time frame. All information was kept in secure. World Health Organization (WHO) and Bangladesh Medical and Research Council (BMRC) rules were followed to conduct the study.

3.12 Informed Consider

Written consent (appendix) was given to all participants prior to completion of the questionnaire. The researcher explained to the participants about his or her role in this study. The researcher received a written consent form every participants including signature or finger trip (who were not able to give signature). So the participant assured that they could understand about the consent form and their participation were on voluntary basis. The researcher was obtained consent to participate from every subject. A signed informed consent form was received from each participant. The participants are informing that they have the right to meet with outdoor doctor if they think that the treatment is not enough to control the condition or if the condition become worsens. The participants are also inform that they are completely free to decline answering any question during the study and were free to withdraw their consent and terminate

participation at any time. Withdrawal of participation from the study would not affect their treatment in the hospital authorities and they would still get the same facilities.

3.13 Rigor

During the data collection and data analysis the author was always tried not to influence the process by his own perspectives, values and biases. No leading questions were asked and judgments were avoided. When conduct the study the researcher was taken help from the supervisor when needed. The other researchers could use the results in their related area.

CHAPTER: IV RESULTS

In this study 10 patients with COPD were taken as sample from National COPD who attended in National Institute of Disease of the Chest & Hospital (NIDCH) for the condition of COPD.

This study works to explore the effectiveness of Intercostal stretch techniques among COPD patients.

In this study the results which were found have been shown in different bar diagrams, pie charts and tables.

4.1 Socio demographic Information:

Table 2: Mean age of the participants

Subjects	Age (years)
p1	27
p2	70
p3	70
p4	50
p5	55
p6	56
p7	39
p8	62
P9	60
p10	35
Mean age	=52.4 years

From the above mentioned table, it is obvious that mean age of participant was 52.4 years**.**

4.1.2 Gender Distribution of the Participants

In this study 10 Patients with COPD are included as sample, among them 30% (n=3) are Female and 70% (n=7) were Male.

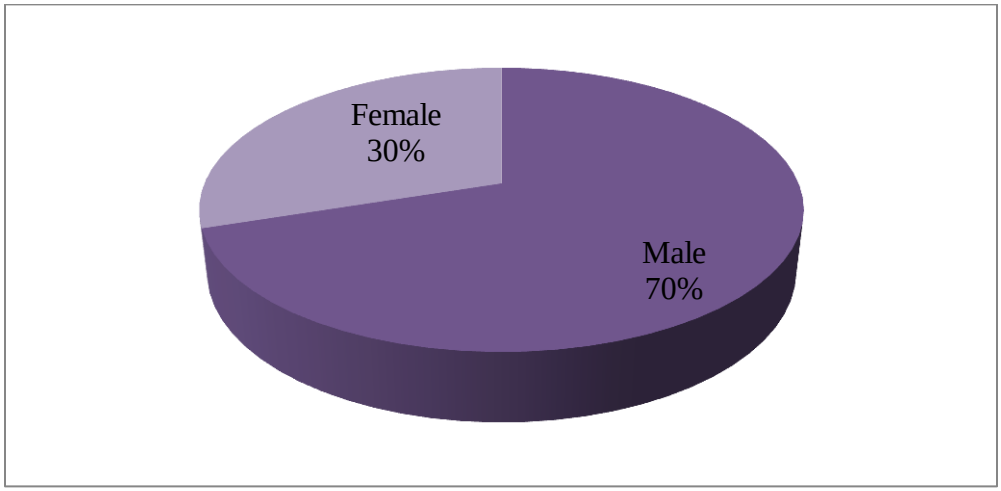


Figure – 1: Gender Distribution

4.1.2 Education Level of the participants

Among the 10 participants 30% (n=3) was Illiterate, 50% (n= 5) was Primary, 10% (n=1) was Secondary, 10% (n=1) was Higher secondary.

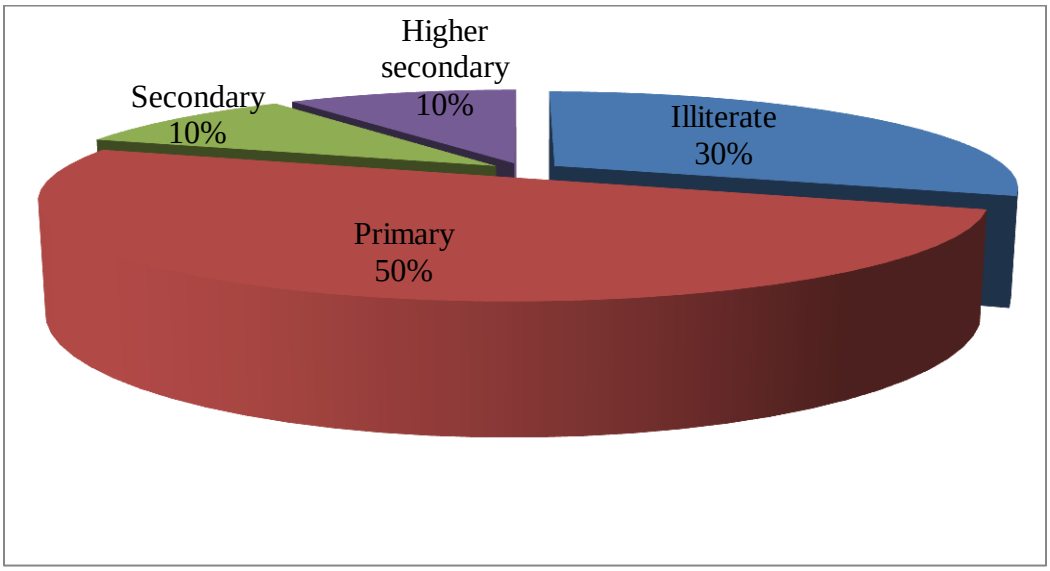


Figure – 2: Educational level of the participants.

4.1.3 Occupation of the Participants

Among the total 10 sample 30% (n=3) were housewife, 30% (n=6), 10% (n=2) were Farmer and 20% (n=4) were others.

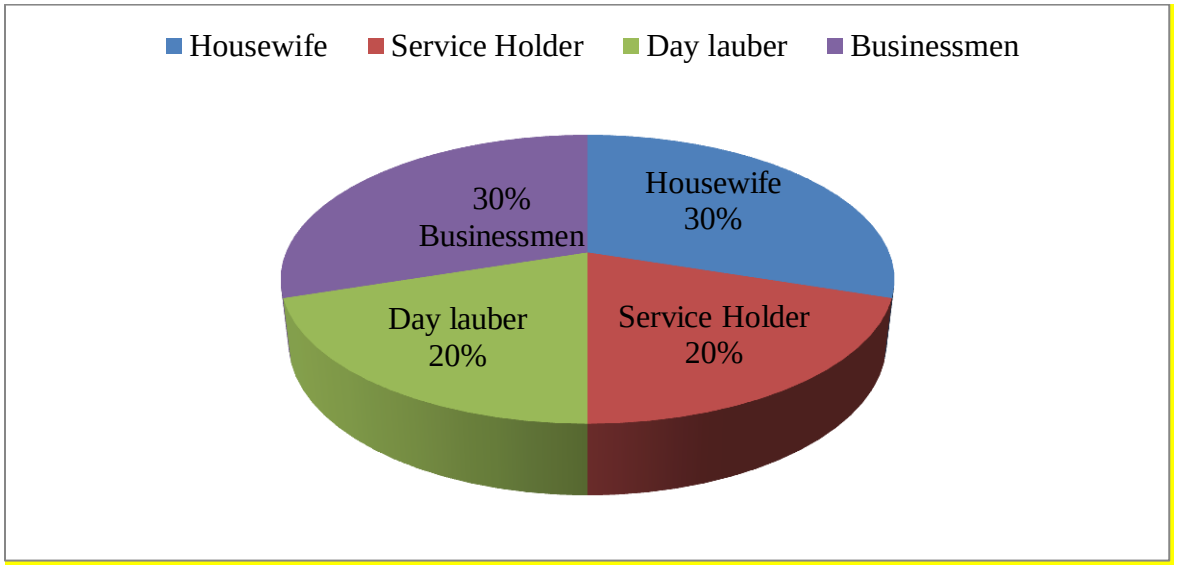


Fig-3: Occupation of the Participants

4.1.4 Living area of the participants

This study done with 10 patients among them 30% (n=3) came from urban living area 10% (n=1) came from semi urban area and 70% (n=7) came from rural living area.

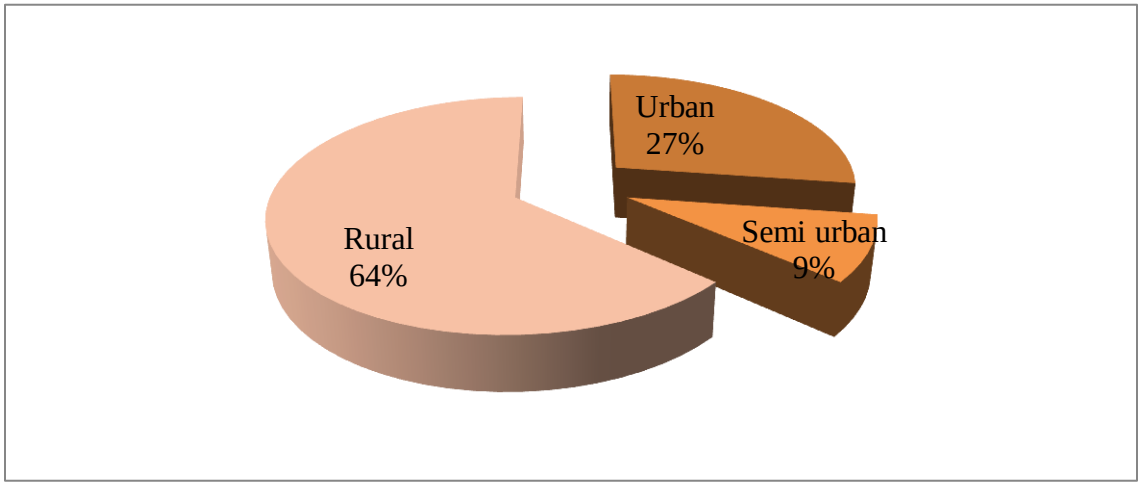


Fig -4: Living area of the participants

Individual Patient Status in Chart

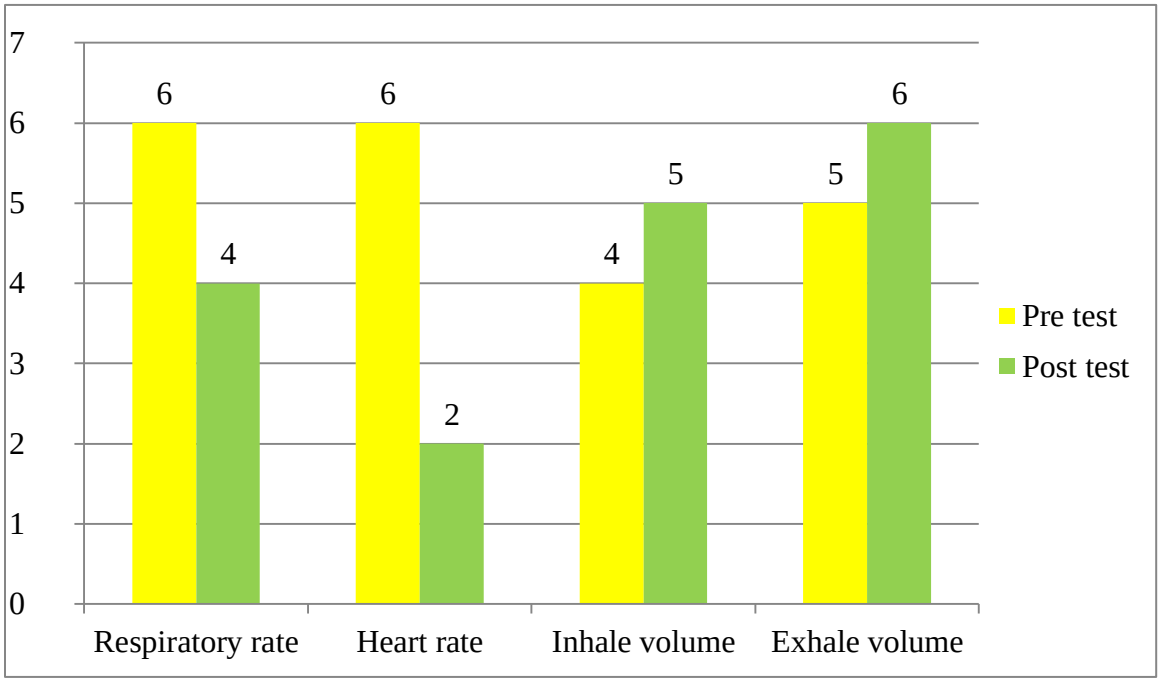


Fig-5: Compare pretest and post test score of 1st patient (according to questionnaire coding)

In this study 1st patient 27 years old male his pretest RR was 6 (41-45)/min after six session found that post test result was 4 (31-35)/min. that means his respiratory rate decrease or reduce dyspnea level. Then pretest HR was 6 (96-100)/min after six session measure post test score was 2 (76-80)/min. So his cardio vascular was improved. His inhale pretest volume was 6(1800cc) and posttest is same. His exhale pretest volume was 4(1200cc) and six sessions posttest value was 5 (1200-1800). So intercostals stretch technique has improved lung volume.

Individual Patient Status in Chart

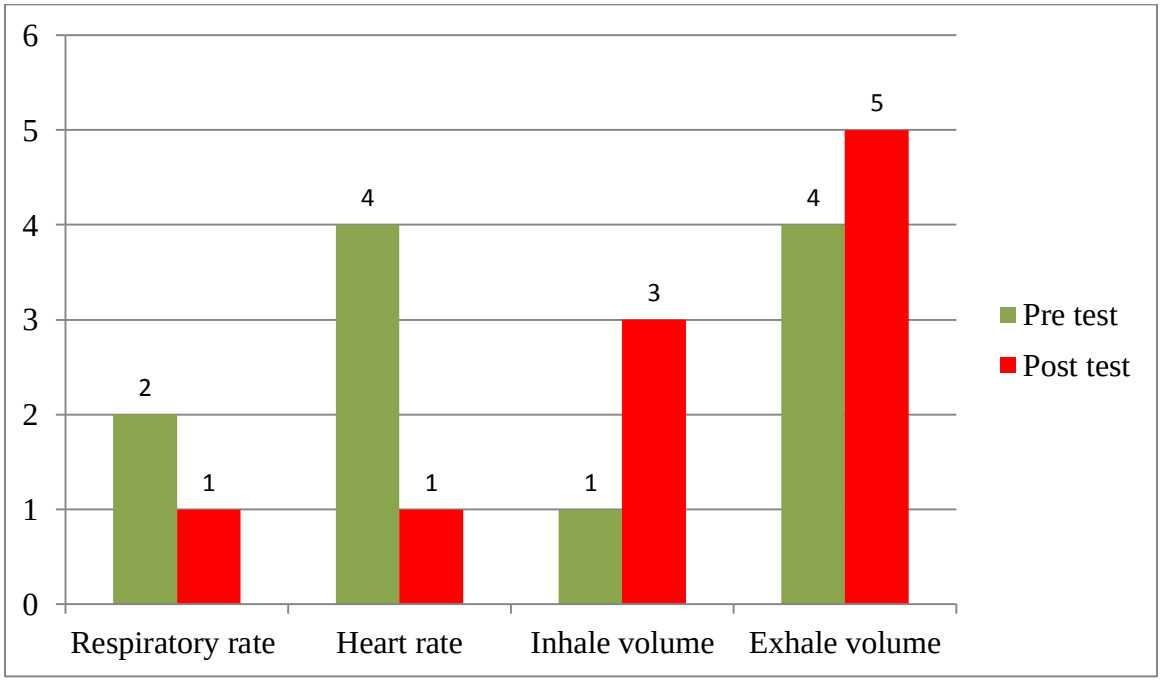


Fig-6: Compare pretest and post test score of 2nd patient (according to questionnaire coding)

In this study 2nd patient 70 years old female her pre-test RR was 2 (21-15)/min after six session found that post-test result was 1(15-20)/min. that means her respiratory rate decrease or reduce dyspnea level. Then pretest HR was 4 (86-90)/min after six session measure post test score was 1 (71-75)/min. So her cardio vascular function was improved. His inhale pretest volume was 1 (<600cc) and post-test 3 (600-1200cc). Her exhale pretest volume was 4 (1200cc) and six sessions post-test value was 5 (1200-1800cc). So intercostals stretch technique has improved lung volume.

Individual Patient Status in Chart

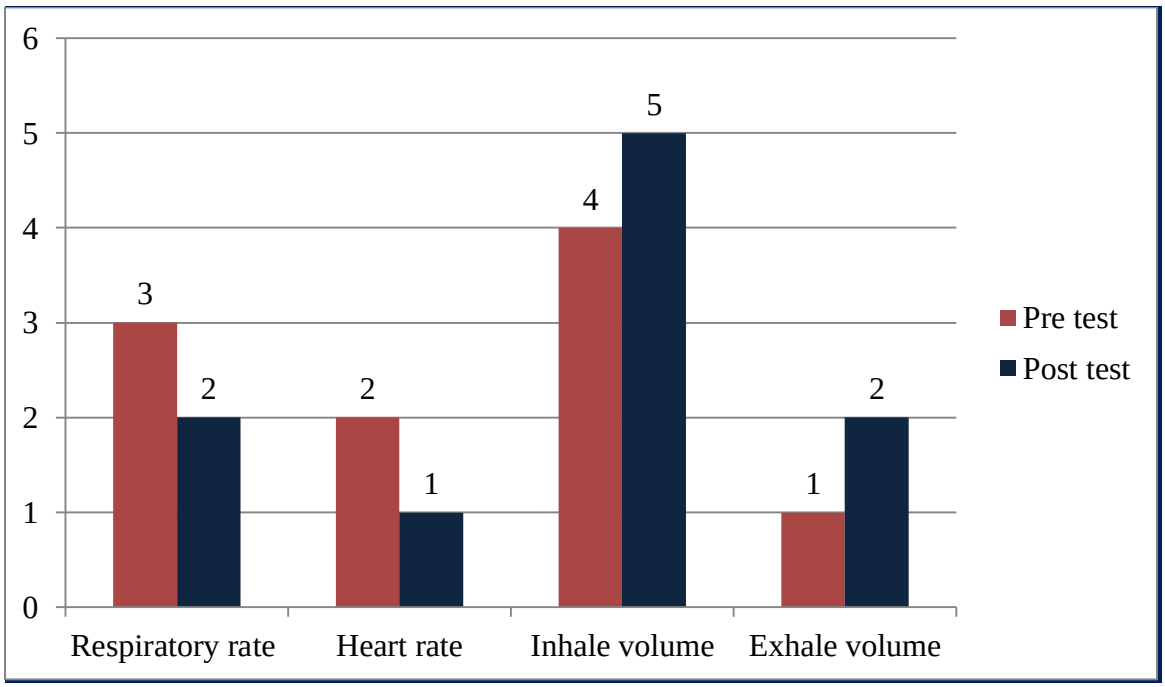


Fig-7: Compare pretest and post test score of 3rd patient (according to questionnaire coding)

In this study 3rd patient 70 years old male his pre test RR was 3 (26-30)/min after six session found that post test result was 2 (21-25)/min. that means his respiratory rate decrease or reduce dyspnea level. Then pre test HR was 2 (76-80)/min after six session measure post test score was 1 (71-75)/min. So his cardio vascular was improved. His inhale pretest volume was 4 (1200cc) and post test was (1200-1800cc). His exhale pretest volume was 1(<600cc) and six sessions post test value was 2 (600cc). So intercostals stretch technique was improving lung volume.

Individual Patient Status in Chart

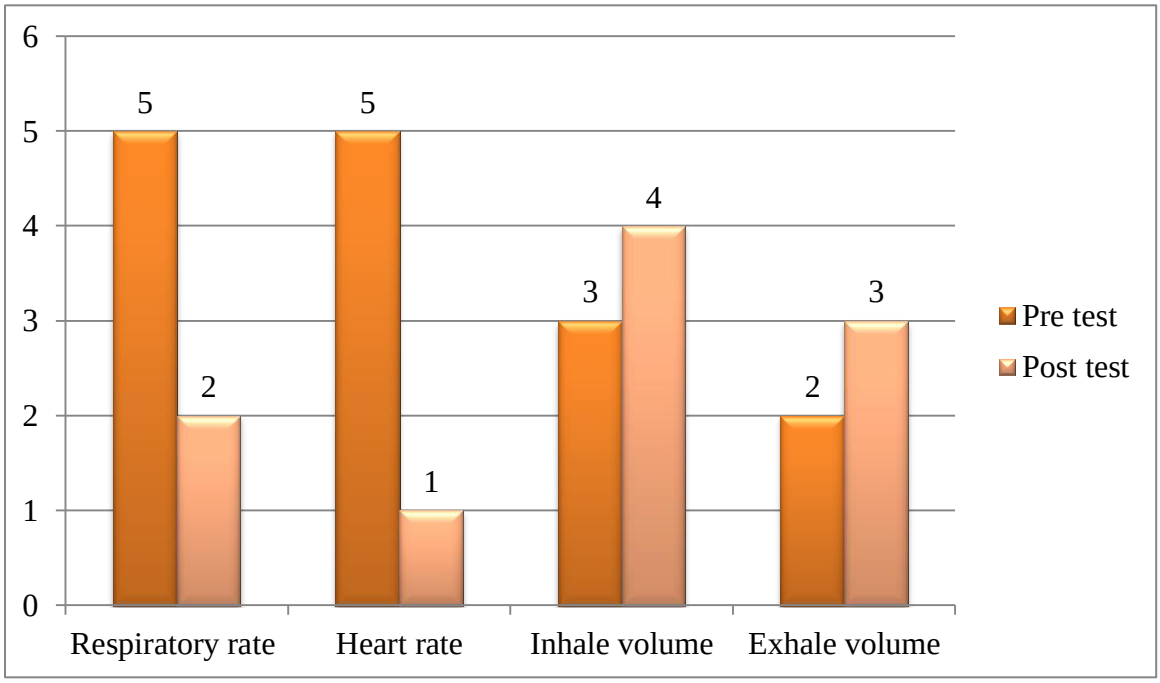


Fig-8: Compare pre-test and post-test score of 4th patient (according to questionnaire coding)

In this study 4th patient 50 years old female her pre-test RR was 5 (36-40)/min after six session found that post test result was 2 (21-25)/min. that means her respiratory rate decrease or reduce dyspnea level. Then pre-test HR was 5 (91-95)/min after six session measure post test score was 1 (71-75)/min. So her cardio vascular is improved. Now his inhale pretest volume was 3 (600-1200cc) and post-test 4 (1200cc). Her exhale pretest volume was 2 (600cc) and six sessions post-test value was 3 (600-1200). So intercostals stretch technique has improved lung volume.

Individual Patient Status in Chart

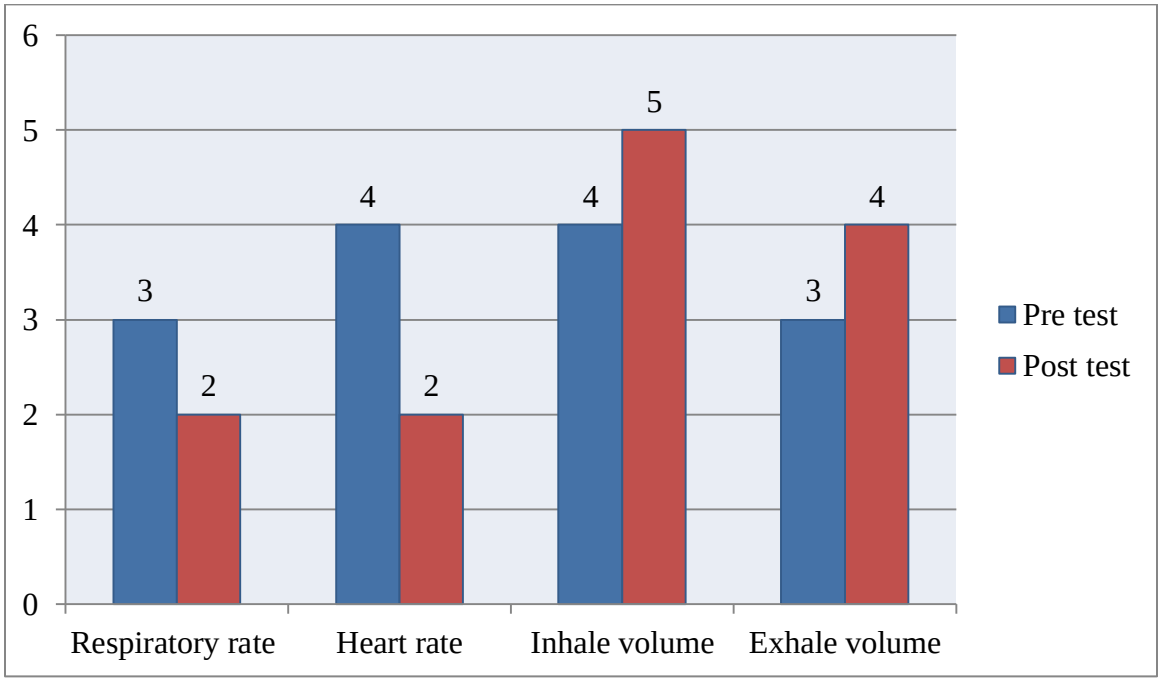


Fig-9: Compare pretest and post test score of 5th patient (according to questionnaire coding)

In this study 5th patient 55 years old male his pre-test RR was 3 (26-30)/min after six session found that post test result was 2 (21-25)/min. that means his respiratory rate decrease or reduce dyspnea level. Then pre-test HR was 4 (86-90)/min after six session measure post test score was 2 (76-80)/min. So his cardio vascular is improved. His inhale pretest volume was 4 (1200cc) and post test was 5 (1200-1800cc). His exhale pretest volume was 3 (600-1200cc) and six sessions post test value was 4 (1200cc). So intercostals stretch technique was improving lung volume.

Individual Patient Status in Chart

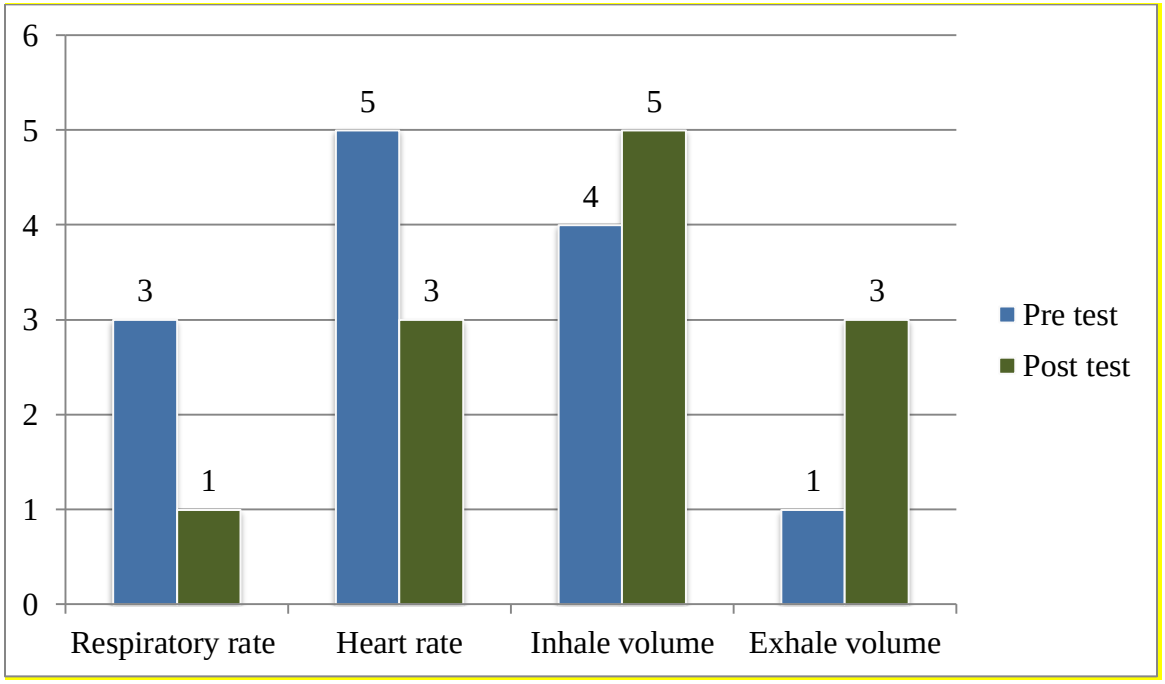


Fig-10: Compare pre-test and post-test score of 6th patient (according to questionnaire coding)

In this study 6th patient 56 years old male his pre-test RR was 3 (26-30)/min after six session found that post test result was 1 (15-20)/min. that means his respiratory rate decrease or reduce dyspnea level. Then pre-test HR was 5 (91-95)/min after six session measure post test score was 3 (81-85)/min. So his cardio vascular is improved. Now his inhale pretest volume was 4 (1200cc) and post-test was 5 (1200-1800cc). His exhale pretest volume was 1 (<600) and six sessions post test value was 3 (600-1200cc). So intercostals stretch technique has improved lung volume.

Individual Patient Status in Chart

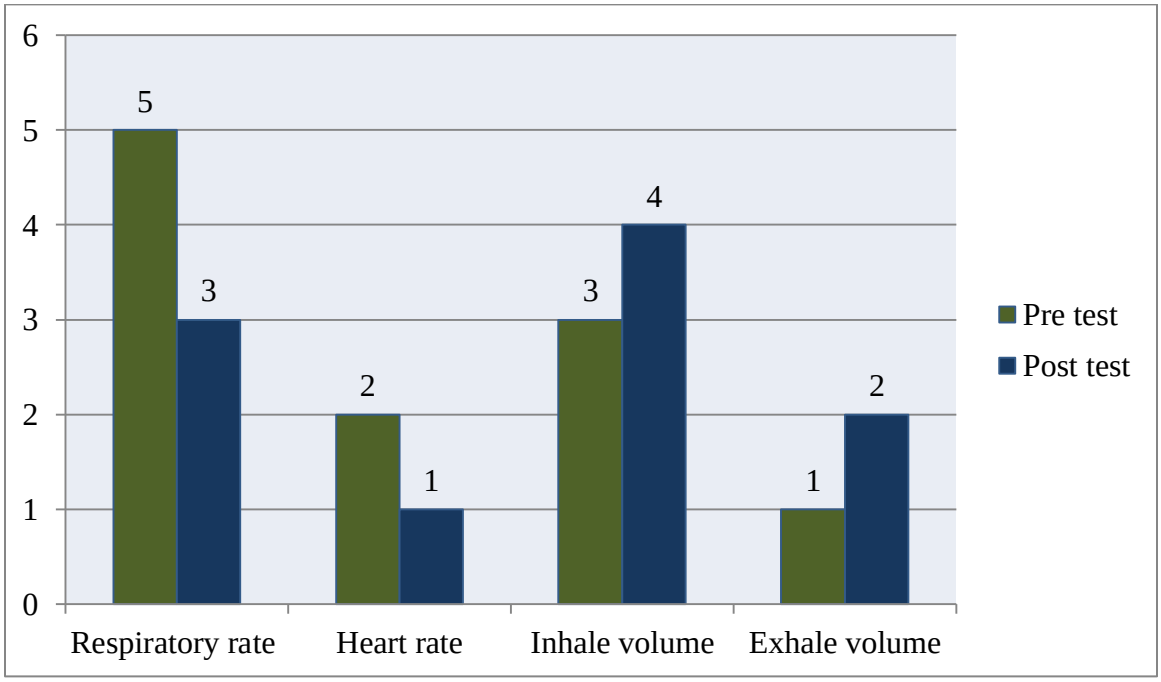


Fig-11: Compare pre-test and post-test score of 7th patient (according to questionnaire coding)

In this study 7th patient 39 years old male his pre test RR was 5 (36-40)/min after six session found that post test result was 3 (26-30)/min. that means his respiratory rate decrease or reduce dyspnea level. Then pre test HR was 2 (76-80)/min after six session measure post test score was 1 (71-75)/min. So his cardio vascular was improved. His inhale pretest volume was 3 (600-1200cc) and post test is 4 (1200cc). His exhale pretest volume was 1 (<600cc) and six sessions post test value was 2 (600cc). So intercostals stretch technique has improved lung volume.

Individual Patient Status in Chart

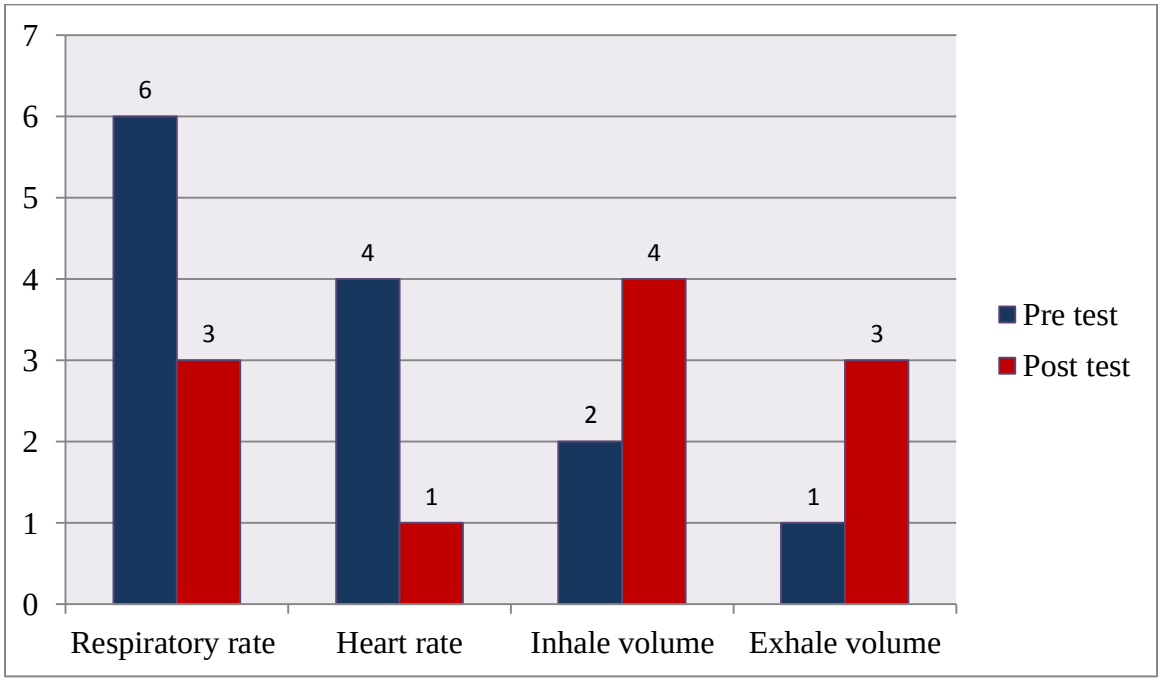


Fig-12: Compare pre-test and post-test score of 8th patient (according to questionnaire coding)

In this study 8th patient 62 years old male his pre-test RR was 6 (41-46)/min after six session found that post test result was 3 (26-30)/min. that means his respiratory rate decrease or reduce dyspnea level. Then pre test HR was 4 (86-90)/min after six session measure post test score was 1 (71-75)/min. So his cardio vascular was improved. His inhale pretest volume was 2 (600cc) and post test is 4 (1200cc). His exhale pretest volume was 1 (<600cc) and six sessions post test value was 3 (600-1200cc). So intercostals stretch technique has improved lung volume.

Individual Patient Status in Chart

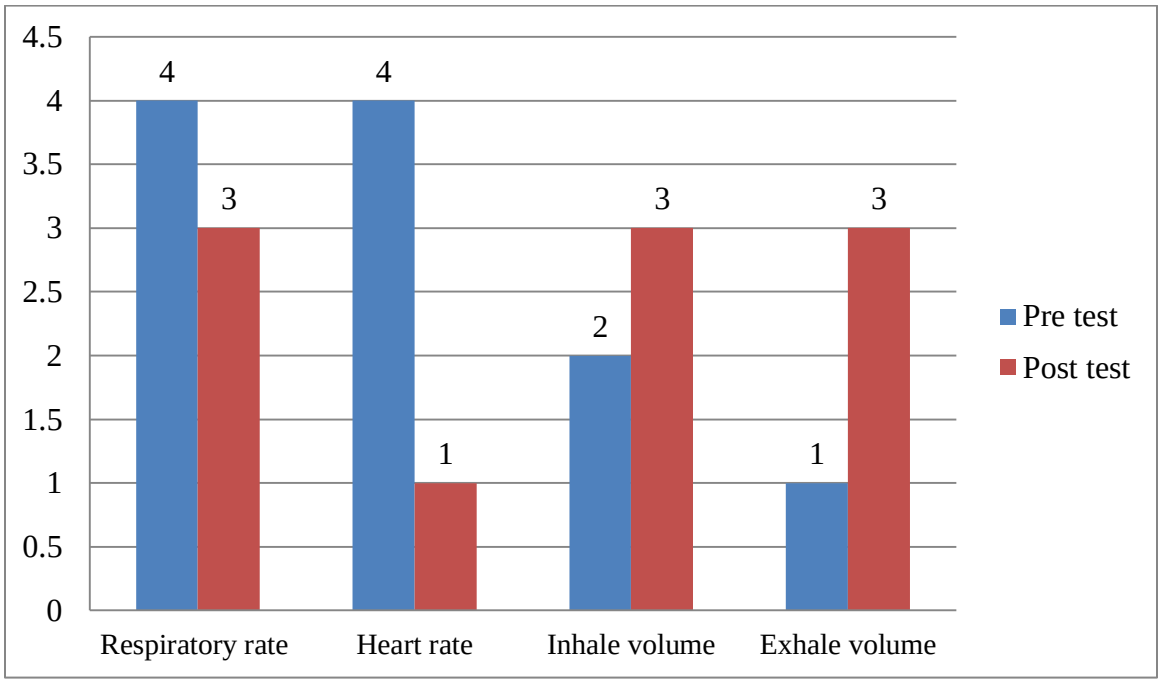


Fig-13: Compare pre-test and post-test score of 9th patient (according to questionnaire coding)

In this study 9th patient 60 years old male his pre test RR was 4 (31-35)/min after six session found that post test result was 3 (26-30)/min. that means his respiratory rate decrease or reduce dyspnea level. Then pre test HR was 4 (86-90)/min after six session measure post test score was 1 (71-75)/min. So his cardio vascular was improved. Hisinhale pretest volume was 2 (600cc) and post test is 3 (600-1200cc). His exhale pretest volume was 1 (<600cc) and six sessions post test value was 3 (600-1200). So intercostals stretch technique has improved lung volume.

Individual Patient Status in Chart

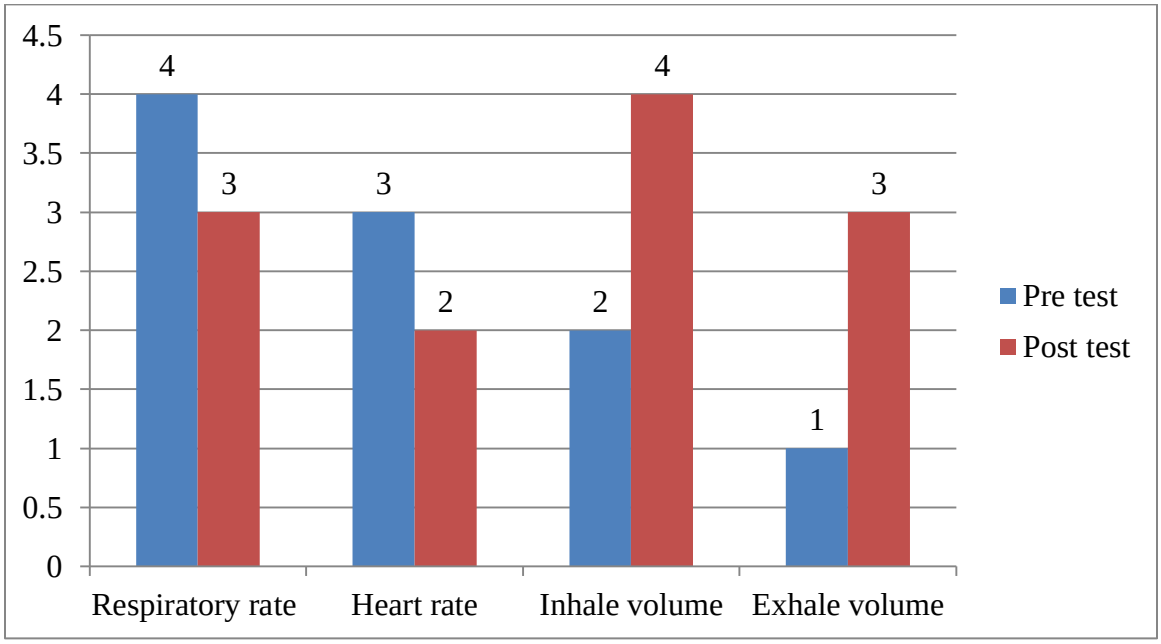


Fig-14: Compare pre-test and post-test score of 10th patient (according to questionnaire coding)

In this study 10th patient 35 years old male his pre test RR was 4 (31-35)/min after six session found that post test result was 3 (26-30)/min. that means his respiratory rate decrease or reduce dyspnea level. Then pretest HR was 3 (81-85)/min after six session measure post test score was 2 (76-80)/min. So his cardio vascular was improved. His inhale pretest volume was 2 (600cc) and post test was 4 (1200cc). His exhale pretest volume was 1 (<600cc) and six sessions post test value was 3 (600-1200cc). So intercostals stretch technique has improved lung volume.

4.2 Respiratory Rate measurement:

Respiratory rate reduction of COPD patients

Reduction of Respiratory rate is shown in the table.

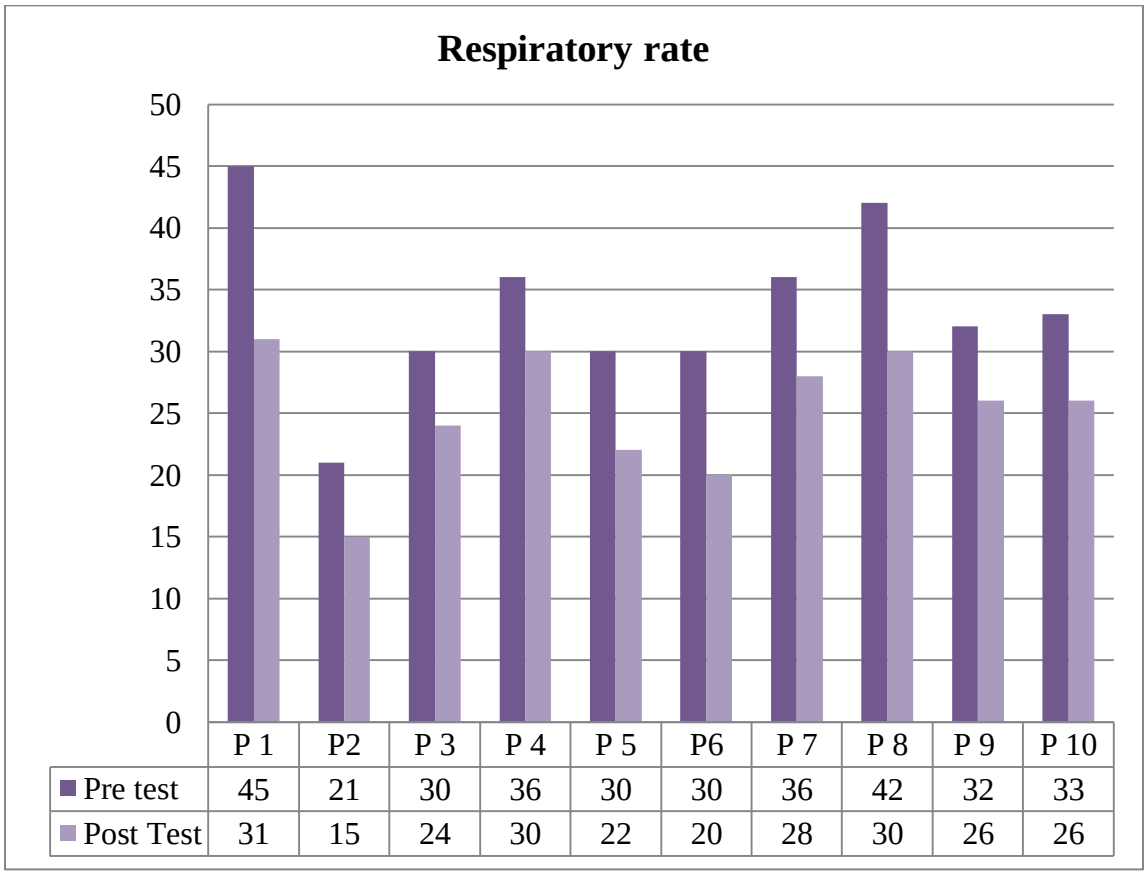
Table –3 Comparisons of changes of Respiratory rate

Subjects	Pre-test	Post-test	Subject defferance
P1	6	4	2
P2	2	1	1
P3	3	2	1
P4	5	3	2
P5	3	2	1
P6	3	1	2
P7	5	3	2
P8	6	3	3
P9	4	3	1
P10	4	3	1

Table-4: Mean difference of Respiratory rate

	Pre test	Post test
Mean	4.10	2.40
Mean difference	1.70	

Statistical difference of respiratory rate



	P 1	P2	P 3	P 4	P 5	P6	P 7	P 8	P 9	P 10
Pre test	45	21	30	36	30	30	36	42	32	33
Post Test	31	15	24	30	22	20	28	30	26	26

Figure – 15: Respiratory rate of COPD patients

Result of respiratory rate for ten patients pre-test and post-test scores were shown at figure-15. It indicates that there have differences between pre-test and post-test scores. Pre-test scores were higher than post-test score. So Intercostals stretch techniques have great role on respiratory rate.

4.4 Heart Rate measurement

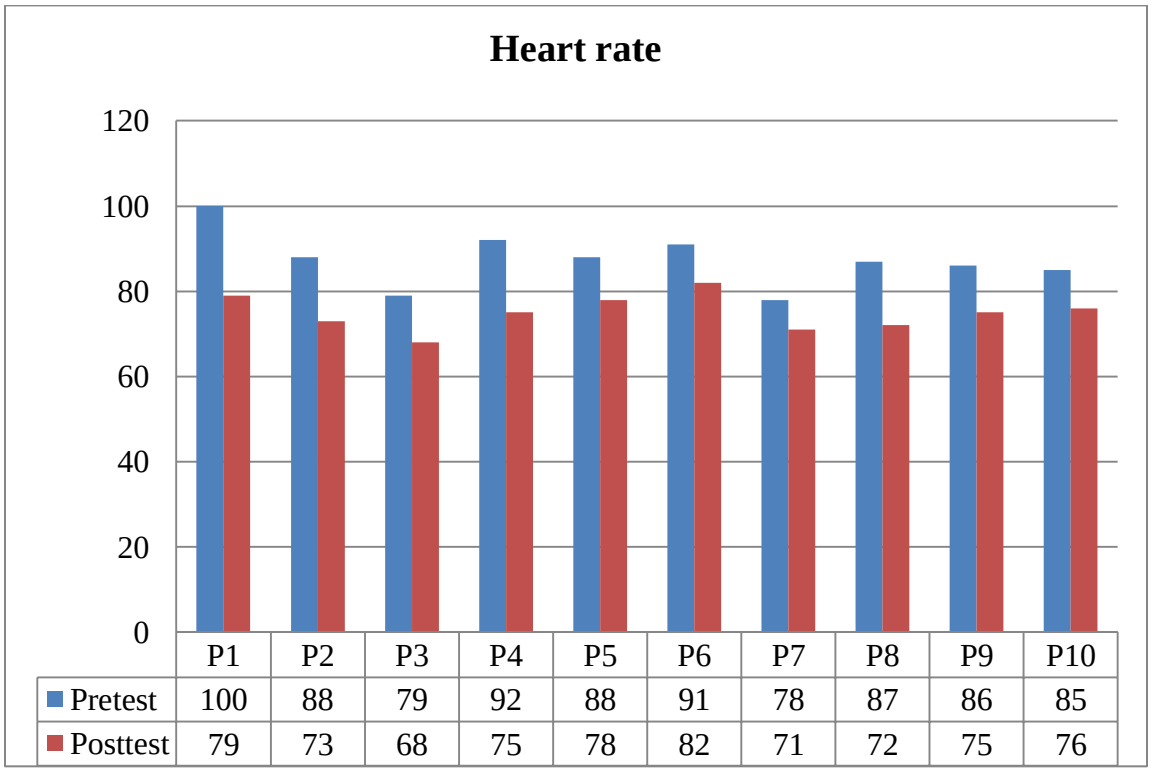
Table-5: Heart rate of COPD patients

Subjects	Pre-test	Post-test	Subject defferance
P1	6	2	4
P2	4	1	3
P3	2	1	1
P4	5	2	3
P5	4	2	2
P6	5	3	2
P7	2	1	1
P8	4	1	3
P9	4	1	2
P10	3	2	3

Table-6: Mean difference of Heart rate

	Pre test	Post test
Mean	3.9	1.5
Mean difference	2.4	

Statistical difference of Heart rate



	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Pretest	100	88	79	92	88	91	78	87	86	85
Posttest	79	73	68	75	78	82	71	72	75	76

Figure16- Heart rate of COPD patients

Result of Heart rate for ten patients pre-test and post-test scores were shown at figure-16. It indicates that there have differences between pre-test and post-test scores. Pre-test scores were higher than post-test score. So Intercostals stretch techniques have great role on Heart rate.

4.5 Inhale volume measurement:

Table-7: Comparisons of changes of Inhale volume

Subjects	Pre test	Post test	Subject difference
P1	5	6	1
P2	4	5	1
P3	4	5	1
P4	3	4	1
P5	4	5	1
P6	4	5	1
P7	3	4	1
P8	2	4	2
P9	2	3	1
P10	2	4	2

Table 8: Mean Difference Inhale volume increase

Table of mean difference:

	Pre test	Post test
Mean	1.6	3.00
Mean difference	1.4	

Statistical difference of Inhale volume

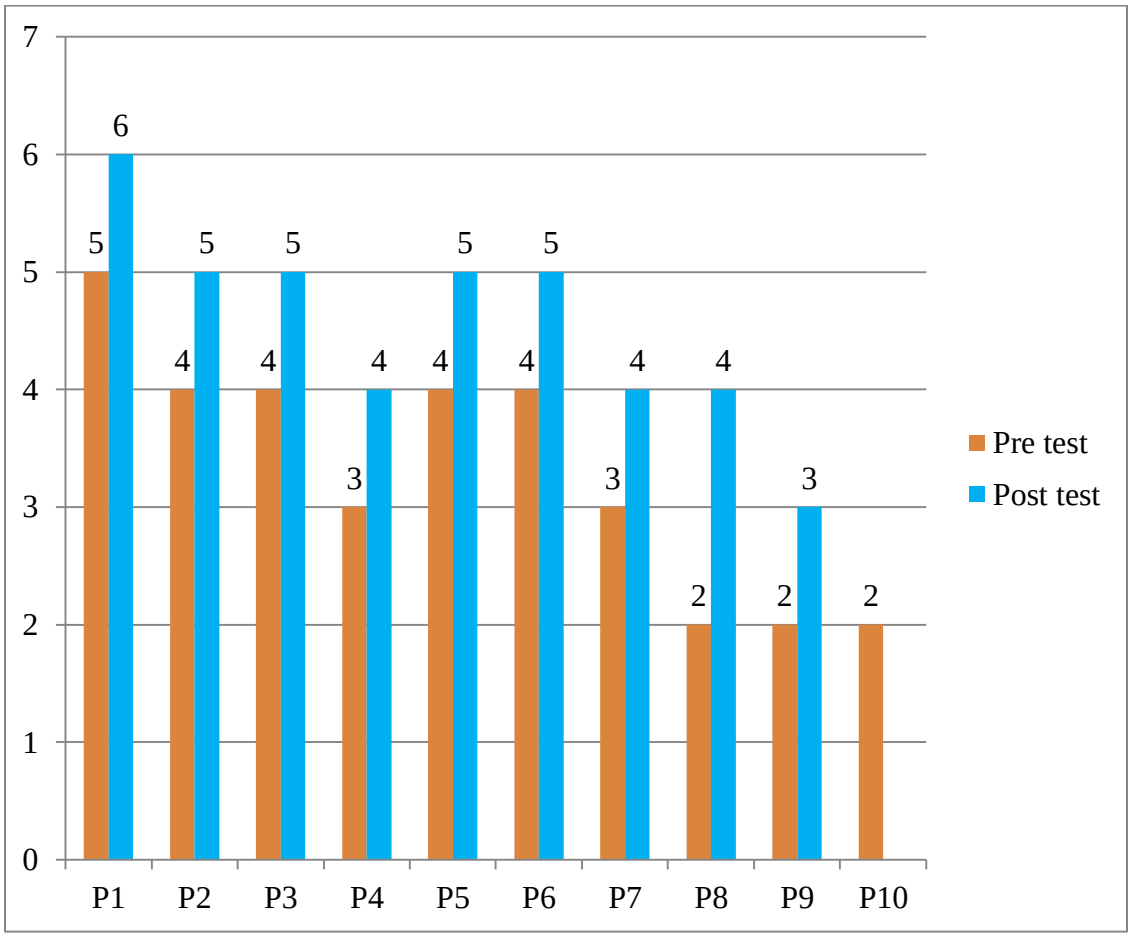


Figure – 17: Inhale volume of COPD patients

Result of Inhale volume for ten patients pre-test and post-test scores were shown at figure-17. It indicates that there have differences between pre-test and post-test scores. Post-test scores were higher than pre-test score. So Intercostals stretch techniques have improve pulmonary function for COPD patients.

4.6 Exhale volume measurement:

Table- 9: **Comparisons of changes of respiratory rate:**

Subjects	Pre test	Post test	Subject difference
P1	4	5	1
P2	1	3	2
P3	1	2	1
P4	2	3	1
P5	3	4	1
P6	1	3	2
P7	1	2	1
P8	1	3	2
P9	1	2	1
P10	1	3	2

Table 10: Mean Difference Exhale volume

	Pre test	Post test
Mean	3.3	4.5
Mean difference	1.2	

Statistical difference of Exhale volume

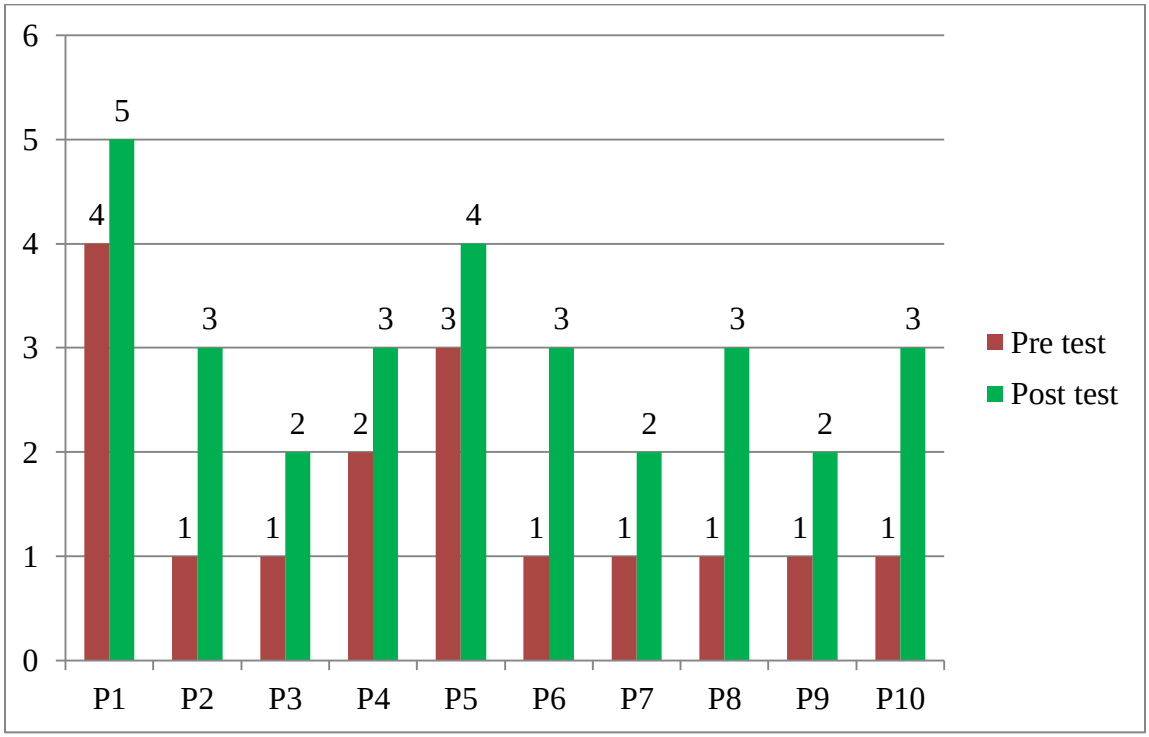


Figure – 18: Exhale volume of COPD patients

Result of Inhale volume for ten patients pre-test and post-test scores were shown at figure-18. It indicates that there have differences between pre-test and post-test scores. Post-test scores were higher than pre-test score. So Intercostals stretch techniques have improve pulmonary function for COPD patients**.**

Table 11: Within Participant age and Post-test comparison through paired t test for variables of RR, HR, Inhale volume and Exhale volume in statistically significance at the following level of significance

No.	Variables	Observed "t" value	Observed "P" value	Significant/Not Significant
01	Respiratory rate	1.464	.004	Significant
02	Heart Rate	3.943	.000	Significant
03	Inhale volume	2.283	.001	Significant
04	Exhale volume	.688	.001	Significant

In this way respiratory rate (p=.004), heart rate (.000), inhale volume (p=.001) and the last one is exhale volume (p=.001) was significant. It indicates that intercostal stretch technique was effective for those variables this technique was significant.

Interpretation of results:

Respiratory rate:

10 patients are receiving Inter costal stretch techniques in 6 sessions. Mean difference of respiratory rate between pre-test and post-test 1.7

Following application of treatment the study found that the intercostals stretch techniques showed a significant improvement ($p<.004$) in case of COPD patients.

Heart rate:

Mean difference of heart rate between pre-test and post-test 2.4

Following application of treatment the study found that the intercostals stretch techniques showed a significant improvement ($p<.005$) in case of COPD patients.

After completing 6 sessions of treatment named Inter costal stretch techniques. It could indicate that this techniques improve the cardiac function.

Inhale volume:

Mean difference of inhale volume between pre-test & post test 1.4.

Following application of treatment the study found that the intercostals stretch techniques showed a significant improvement ($p<.001$) in case of COPD patients.

Here 10 patients are received the intercostals stretch techniques by researcher.

Exhale volume:

Mean difference of inhale volume between pre-test & post-test 1.2.

Following application of treatment the study found that the intercostals stretch techniques showed a significant improvement ($p<.001$) in case of COPD patients.

In this study found that Inter costal stretch techniques reduce dyspnea, decrease heart rate or improve cardiovascular function, improve lung volume.

CHAPTER – V DISCUSSION

The study was indicated a process that could be continuing to establish the result. Here the aim of this study could be achieved if the researcher could show effective support. The purpose of this study was to evaluate the effectiveness of intercostals stretch techniques among COPD patients.

The situation of COPD is severe in Bangladesh among the aged people. The majorities of the patients were adult male, diagnosed with COPD within 5 years, and had history of smoking. It is possible that smoking habit increase among male in Bangladesh (WHO, 2009).

This finding indicated that people with older age and smoking were likely to be diagnosed with COPD more than younger people. Similar to another study which reported smokers were at two or three times higher risk of developing dyspnea in their life time compared to non-smokers. It is possible that smoking can damage sensory nerve and increase the risk of dyspnea said by (Rosi & Scano, 2004).

The prevalence of COPD was 13.5% by Gold criteria. The purpose of this study was to evaluate the effectiveness of the Inter costal stretch techniques among COPD patients at NIDCH**.** In this quazi experimental study 10 patients were received Inter costal stretch techniques Each patient attended for 6 sessions in every alternative day before giving treatment record pre test result and after giving 6 session record the post test result in order to demonstrate the improvement.

From this study it is obvious that mean age of participant was 52.4 years.

In this study 10 Patients with COPD are included as sample, among them 30% (n=3) are Female and 70% (n=7) were Male. In general, males suffer more than females (62.83% vs. 37.17%) said by (Biswas, et al., 2016).

The mean of respiratory rate reducing in COPD patients between pre-test and post-test are 4.1 and 2.4. Mean difference of respiratory rate is 1.7 and the intercostals stretch techniques showed a significant improvement ($p<.004$) in case of COPD patients. The results of the present study is similar to a previous study which reported that pulmonary

condition physical therapy along with medication acting a good result in the management of dyspnea (Parveen, 2014).

The mean of Heart rate reducing in COPD patients between pre-test and post-test are 3.9 and 1.5. And mean difference of heart rate is 2.4 and showed a significant improvement ($p<.005$). The mean of inhale volume increasing in COPD patients between pre-test and post-test are 1.6 and 3. Mean difference of inhale volume is 1.4 and found a significant improvement ($p<.001$) in case of COPD patients. The mean of exhale volume increasing in COPD patients between pre-test and post-test are 3.3 and 4.5. Mean difference of exhale volume is 1.2 i also found significant improvement ($p<.001$).

In this study showed that Inter costal stretch techniques reduce respiratory rate that's means reduce dyspnea and heart rate that reduce COPD symptom.

There are many research said that IC stretching improved many pulmonary diseases condition like decreased the level of dysphonic level and increased chest expansion clinically which results in better gaseous exchange in human subjects founded by (Leelarungrayub , 2009).

Finding of the study supported by it has been found that IC stretch is more effective in reduction of respiratory rate and heart rate .The present study is in accordance with an earlier study in which IC stretch was given as one of the sets of unsupported arm exercises (Mohan et al., 2010).

The results of the present study is similar to a previous study which reported intercostals stretch techniques could lead to increase in lung volume, capacities and also in function (Puckree et al., 2002).

In this study intercostals stretch techniques was reduce respiratory and heart rate in similarly found by (Gupta et al., 2014) advantage of application of IC stretch technique is it helps in lowering the raised RR and HR.

Limitation of the study:

The study was conducted with 10 patients with COPD, which was a very small number of samples was not sufficient enough for the study to generalize the wider population of this condition.

There was no available research done in this area in Bangladesh. So, relevant information about COPD with specific intervention for Bangladesh was very limited in this study.

It is limited by the fact daily activities of the subject were not monitored which could have influenced like they all are taking drugs. Researcher only explored the effect of inter costal stretch techniques after 6 sessions of treatments, so the long term effect of inter costal stretch techniques was not explored in this study.

As the study was quasi-experimental and one group data is used so there is no comparison group and so there is no comparison. This research project was a part of 4th year physiotherapy course and this type of work is first at this level, so there may have some problems in techniques and short out in term of practical aspect.

CHAPTER- VI CONCLUSION AND RECOMMENDATION

6.1 Conclusion

COPD is the most common pulmonary disease in Bangladesh and major cause of disability and morbidity. The environment condition is poor here which aggravates the diseases more rapidly. COPD control is the most important factor, in the current situation these diseases can be reduced by giving proper guidelines, physical exercise and monitoring the conditions of these patients especially in remote areas by forming multi-disciplinary team which should be initiated by the government. There is need to identify the effective physiotherapy interventions that will reducing and relieving symptom of patients Bangladeshi people are not fully concerned about basic health care. Health services in government and non-government sector are not sufficient. Physiotherapy is considered as an important treatment process in the develop countries. So this physiotherapy technique is improving the condition. The result of the study had identified that the effectiveness of inter costal stretch techniques was better inter costal stretch technique for COPD patients which was a Quantitative experimental study. The result of the current study indicates that inter costal stretch techniques is an effective therapeutic approach for patient with COPD. It may be helpful for patient with COPD to increase return to normal daily activities, worsening symptom, work and to measure longer term effects for determining cost effectiveness of inter costal stretch techniques for COPD patients. By conducting the study the researcher found effectiveness of the Inter costal stretch techniques among COPD patients at NIDCH. But it is not always possible to gain complete achievement from every work. Same things happened in the study, what the researcher wanted to gain from the study not achieved fully. So, some further steps that might be taken for better accomplishment for further research. A much large subject should be chosen randomly because it will be more significant. In the study participant were taken only from indoor patient of NIDCH but the participant also can be taken from the outdoor patient. A further study could be done with longer duration of time and with good combination of the assessment and treatment. Sample should collect from different hospital, clinic, institute and organization in different area of Bangladesh to generate the result.

6.2 Recommendation

As a consequence of this researcher it is recommended to do further study include combined intercostals stretch techniques along with conventional physiotherapy.

As a consequence of this researcher it is recommended that further research on large group of population and different hospital and different area.

I got a limited time that's why i couldn't fulfill the all requirement what i had needed. So i want to recommend the next research on start early so that they can fulfill the all requirement as they can provide more session for more effectiveness result.

And also increase the treatment session more than 6 session and time increase the significance of results.

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সম্মতিপত্র (বাংলা)

(অংশগ্রহনকারীকে পড়ে শোনাতে হবে)

আসালামু আলাইকুম / নমস্কার, আমার নাম নওরিন জাহান , আমি এই গবেষণাটি বাংলাদেশ হেল্‌থ প্রফেশনাল ইন্সিটিউটে (বি এইচ পি আই), ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধীনে করছি যা আমার ফিজিওথেরাপী স্নাতক কোর্সের আংশিক অধিভূক্ত যার শিরোনাম হল **"শ্বাসতন্ত্রে বাধাগ্রস্ত দীর্ঘস্থায়ী রুগীদের পাঁজরের মধ্যবর্তী স্থানের প্রসারিত করার পদ্ধতির কার্যকারিতা"।**

ফরমে উল্লেখিত কিছু প্রশ্নের উত্তর দেয়ার জন্য আন্তরিকভাবে অনুরোধ জানাচ্ছি যা আনুমানিক ২০ – ৩০ মিনিট সময় নিবে ।

আমি আপনাকে অবগত করছি যে, এটা কেবলমাত্র আমার অধ্যয়নের সাথে সম্পর্কযুক্ত এবং অন্য কোন উদ্দেশ্যে ব্যবহার হবে না । আমি আপনাকে আরো নিশ্চয়তা প্রদান করছি যে সকল তথ্য প্রদান করবেন তার গোপনীয়তা বজায় থাকবে এবং এই তথ্যের উৎস অপ্রকাশিত থাকবে । এমনকি গবেষণাটির শেষে এই সকল তথ্য নষ্ট করে ফেলা হবে ।এই অধ্যয়নে আপনার অংশগ্রহন স্বেচ্ছাপ্রণোদীত এবং আপনি যে কোন সময় এই অধ্যয়ন থেকে কোন নেতিবাচক এবং ফলাফল কোন বিব্রতবোধ ছাড়াই নিজেকে প্রত্যাহার করতে পারবেন । এছাড়াও কোন নিদিষ্ট প্রশ্ন অপছন্দ হলে উত্তর না দেয়ার এবং সাক্ষাৎকারের সময় কোন উত্তর না দিতে চাওয়ার অধিকার আপনার আছে ।

যদি আপনার এই গবেষণা সম্পর্কে কিছু প্রশ্ন করার থাকে অথবা একজন অংশগ্রহনকারী হিসেবে এটা আপনার অধিকার , তাহলে আপনি গবেষক নওরিন জাহান , সাথে যোগাযোগ করতে পারেন । ফিজিওথেরাপী বিভাগ , বি এইচ পি আই , সাভার , ঢাকা – ১৩৪৩ এই ঠিকানায় ।

এই সাক্ষাৎকার শুরু করার আগে আপনার কি কোন প্রশ্ন আছে ?

আমি আপনার অনুমতি নিয়ে এই সাক্ষাৎকার শুরু করতে যাচ্ছি ?

হ্যা ☐ না ☐

সাক্ষাৎকার প্রদানকারীর স্বাক্ষর..... তারিখ .....

সাক্ষাৎকার গ্রহনকারীর স্বাক্ষর..... তারিখ .....

সাক্ষীর স্বাক্ষর. .....তারিখ .....

APPENDIX-II: INFORMED CONSENT (English)

Title: Effectiveness of Intercostal stretch techniques among COPD patients at NIDCH

Thanks in advance for being a part of my study. My name is Nawrin jahan. I am a student of Bangladesh Health Professions Institute (BHPI), CRP. As a part of my academic course requirement I need to conduct a research work. The aim of my research topic is to find out the effectiveness of intercostals stretch techniques for COPD patients at NIDCH. This will be a experimental type of study. I assure you that all data will be kept confidential. In report information will be presented in the form of group. No name will be mentioned. For your information Bangladesh Health Professions Institute (BHPI), CRP has permitted me to do the research.

Your co-operation in answering a few questions will be highly appreciated. If you kindly permitted then only shall I start.

So, may I have your consent to proceed with the interview?

Yes ☐ No ☐

Signature of the Participant and date _____

Signature of the Interviewer and date _____

Witness signature and date _____

Date of interview:

Address of participant:

পর্ব-ক (আর্থসামাজিক সম্পর্কিত প্রশ্ন)

ক্রমিক নং	প্রশ্ন	কোড
১	আপনার বয়স কত বছর হিসেবে?	২১-৩০ বছর=১ ৩১-৪০ বছর =২ ৪১-৫০ বছর=৩ ৫১-৬০বছর=৪ ৬১-৭০ বছর=৫
২	লিঙ্গ	মহিলা =১ পুরুস=২
৩	আপনার বৈবাহিক অবস্থা ?	বিবাহিত=১ অবিবাহিত=২
৪	আপনার শিক্ষাগত যোগ্যতা?	প্রাইমারী থেকে কম =১ প্রাইমারী =২ এস এস সি সম্পুরন=৩ এইস এস সি সম্পুরন=৪ স্নাতক=৫
৫	আপানার পেশা কি?	গৃহিণী=১ চাকুরিজিবি=২ দিন মজুর=৩ অন্যান্য=৪
৬	আপনার পরিবারের মাসিক আয় কত?	১০০০০>=১ ১০০০০-২০০০০=২ ২০০০০>=৩
৭	জীবনের বেশিরভাগ সময় আপনি কথায় বাস করেছেন?	শহর অঞ্চল=১ গ্রাম্য শহর=২ গ্রাম অঞ্চল=৩

পর্ব খ- চিকিৎসা সক্রান্ত তথ্যাবলি

ক্রমিক	প্রশ্নাবলি	কোডিং ক্যাটাগোরি চিকিৎসার পূর্বে	কোডিং ক্যাটাগোরি চিকিৎসার পরে
১.	আপনি এক মিনিটে কতবার শ্বাস গ্রহন করেন?	১=১৫-২০/মিন ২=২১-২৫/মিন ৩=২৬-৩০/মিন ৪=৩১-৩৫/মিন ৫=৩৫-৪০/মিন ৬=৪১-৪৫/মিন	১=১৫-২০/মিন ২=২১-২৫/মিন ৩=২৬-৩০/মিন ৪=৩১-৩৫/মিন ৫=৩৫-৪০/মিন ৬=৪১-৪৫/মিন
২.	আপনার হৃদস্পন্দন প্রতি মিনিটে কত?	১=৭১-৭৫/মিন ২=৭৬-৮০/মিন ৩=৮১-৮৫/মিন ৪=৮৬-৯০/মিন ৫=৯১-৯৫/মিন ৬=৯৬-১০০/মিন	১=৭১-৭৫/মিন ২=৭৬-৮০/মিন ৩=৮১-৮৫/মিন ৪=৮৬-৯০/মিন ৫=৯১-৯৫/মিন ৬=৯৬-১০০/মিন
৩.	ফুসফুসের আয়তর কত?	১=<৬০০ ২=৬০০ ৩=>৬০০-১২০০ ৪=১২০০-১৮০০ ৫=>১২০০-১৮০০ ৬=১৮০০	১=<৬০০ ২=৬০০ ৩=>৬০০-১২০০ ৪=১২০০-১৮০০ ৫=>১২০০-১৮০০ ৬=১৮০০
৪.	প্রতি বার আপনি কত টুকু শ্বাস বের করেন?	১=<৬০০ ২=৬০০ ৩=>৬০০-১২০০ ৪=১২০০-১৮০০ ৫=>১২০০-১৮০০ ৬=১৮০০	১=<৬০০ ২=৬০০ ৩=>৬০০-১২০০ ৪=১২০০-১৮০০ ৫=>১২০০-১৮০০ ৬=১৮০০

ENGLISH QUESTIONAIRRE

Title: Effectiveness of Intercostal stretch techniques among COPD patients at NIDCH

Data collection instrument: Questionnaire

A: Socio-demographical Questions

Serial	Questions	Coding category
1	What is your current age?(Years)	1=20-30 2=31-40 3=41-50 4=51-60 5=61-70
2	Sex	1 = Male 2 = Female
3	What is your marital status?	1 = Married 2 = Unmarried
4	What is your educational qualification?	1 = Illiterate 2=Primary 3=Secondary 4=Higher secondary 5=Graduation
5	What is your occupation?	1 = Housewife 2 = Service holder 3 = Day laborer 4 = Business
6	What is your total family income per month?(Taka)	1=<10000 2=10000-20000 3=>20000
7	Where you spent most of the time in your life?	1=urban area 2=Semi urban area 3=Rural area.

Part B Medical information:

Serial	Questions	Coding category Pretest	Coding category Post test
1	How many breath do you take per minute?(Respiratory rate)	1=15-20/min 2=21-25/min 3=26-30/min 4=31-35/min 5=36-40/min 6=41-45/min	1=15-20/min 2=21-25/min 3=26-30/min 4=31-35/min 5=36-40/min 6=41-45/min
2	What is your heart beat per minute?(Heart rate)	1=71-75/min 2=76-80/min 3=81-85/min 4=86-90/min 5=91-95/min 6=96-100/min	1=71-75/min 2=76-80/min 3=81-85/min 4=86-90/min 5=91-95/min 6=96-100/min
3	What is the volume of lung?(CC)	1=<600 2=600 3=>600-1200 4=1200 5=>1200-1800 6=1800	1=<600 2=600 3=>600-1200 4=1200 5=>1200-1800 6=1800
4	How much air exhale in once a time?(CC)	1=<600 2=600 3=600-1200 4=1200 5=1200-1800 6=1800	1=<600 2=600 3=600-1200 4=1200 5=1200-1800 6=1800

বাংলাদেশ হেল্‌থ প্রফেশন্স ইনষ্টিটিউট (বিএইচপিআই)
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)
(The Academic Institute of CRP)

Ref: CRP-BHPI/IRB/04/17/118 *Date*15/04/2017

To
Nawrin Jahan
B.Sc in Physiotherapy
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Effectiveness of intercostal stretch technique among the patients with COPD at NIDCH.

Dear Nawrin Jahan,

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on 14/08/2016 to conduct the above mentioned thesis, with yourself, as the Principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Thesis Proposal
2	Questionnaire (English and Bengali version)
3	Information sheet & consent form.

A self-administered questionnaire will be used that takes 20 to 30 minutes and have no likelihood of any harm to the participant. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09:00 AM on August 17, 2016 at BHPI.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

Millat Hossain

Muhammad Millat Hossain
Assistant Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

CRP-Chapain, Savar, Dhaka-1343. Tel: 02-7745464-5, 7741404 , Fax: 02-7745069,
Email: contact@crp-bangladesh.org, www.crp-bangladesh.org

Permission letter

March 25, 2017

Head of the Physiotherapy Department,

Bangladesh Health Professions institute (BHPI)

Chapain , Savar, Dhaka-1343.

Subject: Seeking permission of data collection to conduct my research project.

Dear Sir,

With due respect and humble submission to state that I am Nawrin Jahan student of 4th Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The ethical committee has approved my research project entitled on "**EFFECTIVENESS OF INTERCOSTAL STRECH TECHNIQUE AMONG THE PATIENTS WITH COPD AT NIDCH** " under the supervision of Ehsanur Rahman , Assistant Professor, Department of Physiotherapy, BHPI; CRP. Conducting this research project is partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. I want to collect data for my research project from the patients of NIDCH. So, I need permission for data collection from the National Institute of Disease of the Chest & Hospital (NIDCH) mohakhali, Dhaka.I would like to assure that anything of my study will not be harmful for the participants.

In these circumstances I pray & hope that you would be kind enough to grant me and also my application & give me the permission for data collection and oblige thereby.

Sincerely,

Nawrin Jahan

Nawrin Jahan

4th Professional B.Sc. in Physiotherapy

Roll-39, Session: 2012-2013

Bangladesh Health Professions Institute (BHPI), (An academic Institute of CRP)

CRP, Chapain, Savar, Dhaka-1343.

Fonwarded to
Head of Dept, PT
E. Rahman
25/03/17

Allowed
25/03/17
Md. Obaidul Haque
Associate Professor & Head of the Department
Department of Physiotherapy
Bangladesh Health Professions Institute (BHPI)
CRP, Chapain, Savar, Dhaka-1343