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A pre-experimental study to assess the effectiveness of deep breathing exercise on respiratory problems among post COVID patients attending OPD in selected hospitals of Pune City

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Abstract---Introduction: Coronavirus disease 2019 is caused by Novel Coronavirus, it is a Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2). There are several respiratory problems lasting for post covid period. Peoples are facing symptoms of respiratory illness in post covid period. Aim of the study: To assess the effectiveness of deep breathing exercise on respiratory problems among post covid patients. Material and method: The quantitative approach and pre-experimental pre-test post-test one group design was adopted for the study. 60 patient with post covid respiratory problems attending OPD were selected by purposive sampling technique. The group received intervention as diaphragmatic breathing exercise, and again respiratory problems were assessed. Result: According to the study majority 30% patients were complained of chest pain, majority 80% patients had cough and 28.3% patients had cold. The results of Wilcoxon sign test shows significantly decrease in the respiratory problems in post intervention group, the deep breathing exercise is effective on respiratory problems among post COVID patients Conclusion: The study concluded that the deep breathing exercise was effective in terms of reducing the respiratory problems and complications in post covid patients.

Keywords---COVID-19, post covid, respiratory problems, deep breathing exercise, patients attending OPD.

Introduction

Coronavirus disease 2019 is caused by Novel Coronavirus, it is a Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2). In Wuhan, China, December 2019 the global pandemic began and then it spread too worldwide. After outbreak of COVID19 and the patients suffered with this novel corona virus had symptoms of illness that long lasted after tested negative for disease. Coronavirus is currently heating the world; it is newly discovered disease from the SARS group of respiratory infection. It is an infection of respiratory system and results in severe form of respiratory illness. The common symptoms include fever, cough, body ache, sore throat etc. will be untreated result in pneumonia and respiratory failure and respiratory distress syndrome. The symptoms of the disease are varies according to the patients co-morbidities. WHO published a comprehensive package of guidance documents on 10th Jan, 2021 for countries, covering topics related to the management of an outbreak of a new disease: Infection prevention and control, Laboratory testing, National capacities review tool, Risk communication and community engagement, Travel advice, Clinical management and Surveillance case definitions. Now the WHO creating awareness about the rehabilitation of the post COVID respiratory problems. With the global pandemic vaccine safety concerns, governments are struggling to vaccinate peoples to approach herd immunity levels. Also creating awareness about use of mask and social distancing. The post COVID respiratory problems is a major health related issue faced by worldwide.¹ The worldwide pandemic was declared by the WHO, and it has affected the all countries. Now patients are suffering from the post COVID respiratory problems after getting rehabilitated and taking treatment for coronavirus. The severe form includes Lung fibrosis, Mucormycosis etc. The new strain of coronavirus is detected in worldwide with their specified symptoms and the severity. The currently diagnosed strains of coronavirus are alpha strain and delta virus etc.¹

Need for the study

The patient who are recovered after COVID19 are having respiratory problems like dyspnea, breathlessness, weakness and other associated secondary lung problems. As we battle with COVID19, the challenging is to manage the post COVID respiratory problems commonly found in the patients. The common problems include hypoxia, weakness. Cough, dyspnea and severe forms like lung fibrosis, Mucormycosis etc. that require oxygen administration and the emergency medical management. Various studies about COVID19 report 70 to 80% of cases with presenting persistent complaints of breathing difficulty after declared COVID19 negative.² According to the study conducted in Oman, covid pandemic has been associated with high short-term morbidity and mortality. Lungs are the main organs affected by SARS-CoV-2 infection. In the long-term, the pulmonary sequelae related to COVID-19 are expected to rise significantly leading to an extended impact on community health and health care facilities. A wide variety of long-term respiratory complications secondary to COVID-19 have been described ranging from persistent symptoms and radiologically observable changes to impaired respiratory physiology, vascular complications, and pulmonary fibrosis. Even after two-years, respiratory sequelae related to post-acute SARS-CoV-2 infection have not been fully explored and understood. The main treatment for

most COVID-19 respiratory complications is still symptomatic and supportive-care oriented⁴. As per the studies there is need to adopt the symptomatic modalities for the post covid respiratory problems which based on their symptoms and the severity without hospital admission. In this research study the one of intervention is selected to see the effectiveness on the post covid respiratory problems. Their is further symptomatic management needed for the long term acute problems which can be relieved by the interventions. Many studies are active in clinical trials to know about the post COVID lung fibrosis and respiratory distress syndrome and the further management with prevention and reduction in the morbidity and mortality rate.

Statement of the problem

A pre-experimental study to assess the effectiveness of Deep breathing exercise on Respiratory problems among post COVID patients attending OPD in selected hospitals of Pune city.

Materials and Methods

The research approach was quantitative research approach. In the present study the researcher has adopted Nola Blenders Health Promotional model. A pre-experimental pre-test post-test one group design was chosen for the study. The sample size which was selected for the study was 60 post covid patients with respiratory problems. Non probability purposive sampling technique was used in study and sample were selected as per the given criteria. Self-instructed tool used to collect the data from the sample which includes Section I) Demographic variables It consists of Age, Gender, Educational status, Occupation, Habits, History of other respiratory problems, Date of COVID diagnosis, History of Hospitalization and History of COVID19 vaccination of the patient. Section II-A) Assessment of respiratory parameters It consists of the oxygen saturation, respiratory rate and the breathing pattern section II-B) Assessment of respiratory problems in post COVID period. It consists of the respiratory problems Hypoxia, Cold, Cough, Chest pain, Cyanosis, and Dyspnoea. The tool was validated by experts and reliability of the tool was established by using the inter-rater observation method and it was measured by 'Cohen's Kappa. The collected data was analysed by using both descriptive & inferential statistics. Paired t-test, Chi-square test and Wilcoxon sign rank test was used to find association between demographic variables & effectiveness of deep breathing exercise on respiratory problems among post COVID patients.

Results

The results was divided into three sections. The first part includes demographic data of the participants. Second part includes assessment of respiratory parameters and effectiveness of deep breathing exercise on respiratory problems.

Section 1- Description of the data according to their demographic characteristics.

Description of the data according demographic characteristics majority 43.3% patient from age group of 36-50 years, 30% patient from age group off 18 to 35 years and 26.7% patient were participated from age group of 51-65 years. According to gender majority 58.3% of the patients was male and 41.7% patient was female. The Data presented in table 1.3 provides description of the patient education. According to the age majority 81.7% patient are higher educated, 18.3% patient are secondary educated. There was no patients with no formal education and primary education. As per the occupational status of the group majority 35% patients are self-employed and 31.7% patients are employed in private and government sector. 30% of the patients are doing their business and 3.4 % patients working as a HR and Manager. According to the data majority 80% patient have history of hospitalization and 20% patients are not having history of hospitalization.

Section II: frequency and percentage distribution of data according to respiratory problems

Table1: Frequency and percentage distribution of respiratory problems in the interventional group

RESPIRATORY PROBLEMS		Frequency	Percentage (%)
Cold	No	43	71.7
	Yes	17	28.3
Cough	No	12	20.0
	Yes	48	80.0
Chest Pain	No	42	70.0
	Yes	18	30.0

Table 1: Which shows that in the majority 71.7% patient does not complaints of cold and 28.3% patient had cold, 80% of patient is having cough and 20% patient does not having cough problem. Majority 70% patient were reported chest pain and 30% of patient had not chest pain problem.

Table 1.1: frequency distribution of dyspnoea in pre-intervention category

Pre-Intervention		Frequency	Percentage
Dyspnoea Category	No Dyspnoea	18	30.0
	Mild	41	68.3
	Moderate	1	1.7

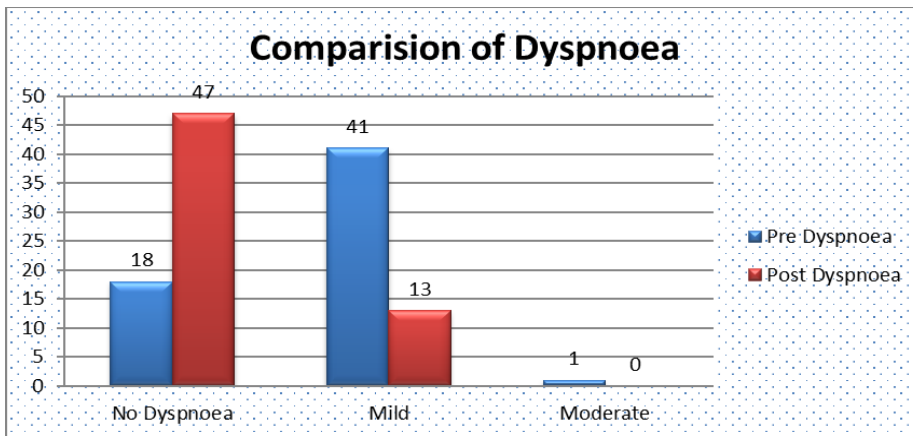
Table 1.1: Represents the pre-interventional dyspnoea in the patients categorized mild, moderate and severe. The 68.3% patient had mild dyspnoea, 1.7% had moderate dyspnoea and 30% patient had no dyspnoea.

Table 1.2: frequency distribution of dyspnoea in pre-intervention category

Post intervention		Frequency	Percentage
Dyspnoea Category	No Dyspnoea	47	78.3
	Mild	13	21.7

Table 1.2: Represents the post-interventional dyspnoea in the patients categorized mild, moderate and severe. The 78.3% patient had no dyspnoea, 21.7% had mild dyspnoea.

Graph 1: Frequency distribution of dyspnoea



The graph 1 shows the comparison between dyspnoea in the pre intervention and post intervention category.

Section III- Association between the respiratory problems and demographic variables

Table 2: Association between Dyspnoea Category and demographic characteristics

ASSOCIATION BETWEEN DEMOGRAPHIC CHARACTERISTICS AND DYSPNOEA CATEGORY							
		Dyspnoea Category			Total	Chi-Square Value	p-value
		No Dyspnoea	Mild	Moderate			
AGE	18 TO 35	4	14	0	18	2.32	0.67
	36 TO 50	8	17	1	26		
	51 TO 65	6	10	0	16		
GENDER	F	8	17	0	25	0.77	0.68
	M	10	24	1	35		
EDUCATIONAL STATUS	HIGHER	15	34	0	49	4.53	0.104
	SECONDORY	3	7	1	11		
OCCUPATION	BUSINESS	5	13	0	18	3.29	0.91
	EMPLOYEE	6	12	1	19		
	HR	0	1	0	1		

	MANAGER	0	1	0	1		
	SELF EMPLOYEE	7	14	0	21		
HABBIT	DRINKING	8	11	1	20	4.96	0.29
	NO	5	21	0	26		
	SMOKING	5	9	0	14		
ADMISSION HISTORY	NO	2	10	0	12	1.63	0.44
	YES	16	31	1	48		

Table2: There was no statistically significant association was observed between the demographic characters and dyspnoea.

Table2.1: association between respiratory problems and dyspnoea category.

Table 2.1 The Chi square and p value shows the association between the respiratory problems and dyspnoea category

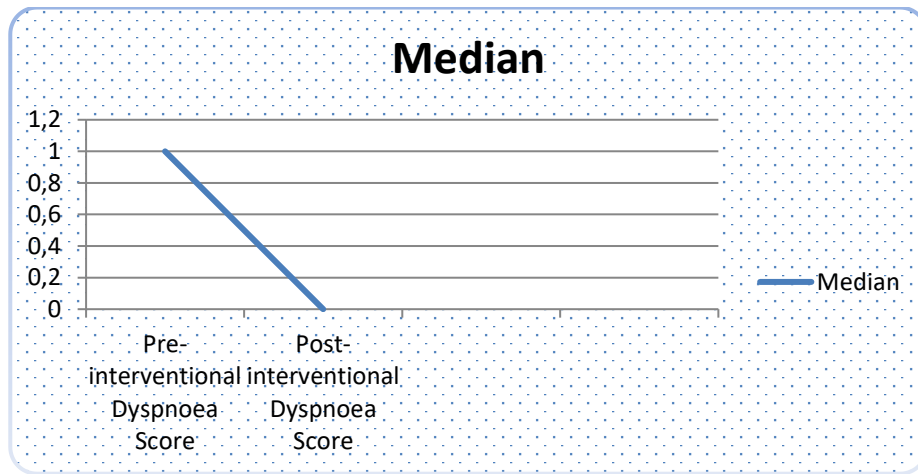
ASSOCIATION BETWEEN SYMPTOMS AND DYSPNOEA CATEGORY							
		DYSPNOEA CATEGORY			TOTAL	CHI-SQUARE VALUE	P-VALUE
		NO DYSPNOEA	MILD	MODERATE			
COLD	NO	14	28	1	43	0.95	0.62
	YES	4	13	0	17		
COUGH	NO	3	9	0	12	0.47	0.79
	YES	15	32	1	48		
CHEST PAIN	NO	10	31	1	42	2.83	0.24
	Yes	8	10	0	18		

This shows result is significant at $p < 0.05$ level. So, the deep breathing exercise is effective on respiratory problems among post COVID patients. Chi square showed that there is no association between demographic variables and respiratory problems.

Table no 2.2: Wilcoxon sign rank test

Wilcoxon Sign Rank Test				
		N	Median	p-value
Pair	Pre-interventional Dyspnoea Score	60	1.00	<0.001
	Post-interventional Dyspnoea Score	60	0.00	

Graph 2: Comparison between dyspnoea score



The statistically significant median dyspnoea score was decrease in dyspnoea post interventional score as compare to the median dyspnoea score in pre intervention score.

Discussion

Description of demographic characteristics are as followed- As per the age group majority 43.3% patient from age group of 35-60 years. Majority 58.3% of the patients are male as per the gender of the patients. According to the educational background and occupational status majority 81.7% patient are higher educated and majority of 35% patients were self-employed. History of hospitalization shows, majority 80% of patients were hospitalized for the treatment. Description of the respiratory problems, according to the study majority 30% patients were complained of chest pain, majority 80% patients had cough and 28.3% patients had cold. The symptoms varied according to the patients co-morbidities. This shows result is significant at $p < 0.05$ level. So, the deep breathing exercise are effective on respiratory problems among post COVID patients. Chi square showed that there is no association between demographic variables and respiratory problems. The results of Wilcoxon sign test shows pre interventional median 1 which significantly decreases in post interventional which is 0. Respiratory rehabilitation in elderly patients with COVID-19: A randomized controlled study was conducted by the Liu et.al (2020). The title of study was Identifying the effectiveness of breathing exercises during rehabilitation for 6 weeks by monitoring respiratory function, quality of life, mobility and psychological function in elderly Covid-19 patients. 72 patients with Covid-19 were divided into 2 groups, namely 36 control groups and 36 intervention groups. He found that there was a significant difference, namely an increase in lung capacity and quality of life of patients seen in the intervention group through measurement of lung capacity and quality of life after the intervention for 6 weeks.¹⁷ In this above study the researcher had monitored the patient for the effectiveness of breathing exercises in the covid rehabilitation and the findings showed that it is effective in the pulmonary rehabilitation in covid patients.¹⁷

Conclusion

In this study the respiratory problems were compared with the pre intervention and post intervention group. By using the chi square and p value the demographic data and respiratory problems were tabulated. Wilcoxon sign rank test was used to check the effectiveness of deep breathing exercise which found that the median score has decreased in post-intervention group. Respiratory problems are very common in the patients with post Covid status. This constitutes a considerable problem for many covid patients affecting the quality of life. This study concludes that the practice of deep breathing exercise is an effective method to improve the respiratory status of patients suffering from breathing difficulty and the problems associated the respiratory system. These exercises which is easy to practice and reduces complications. As per the study the intervention of deep breathing exercise is a effective method which is easy to adopt and less costly. The patients can follow this technique to get relief from the post covid respiratory problems. For future study, the recommendations based on this study includes it can be replicated on larger samples, can be conducted in quasi experimental group design and to check the effectiveness of spirometry on respiratory problems among post covid patient.

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