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Effectiveness of video assisted teaching program of pranayama on selected physiological parameters among patients with COPD

Harshika Tembhurne, Dipali Dumbre

Abstract:

BACKGROUND: According to research on the global burden of illness, chronic obstructive pulmonary disease (COPD) is expected to rank third globally in terms of cause of mortality in the first 20 years of the 20th century and fifth in terms of major cause of impairment. A thorough yoga program can enhance general well-being and respiratory function, which will improve a person's capacity to complete daily chores.

MATERIALS AND METHODS: One group pretest and posttest design in a quasi-experimental study was applied. Collected 50 samples by using non-probability sampling method to collect data with the help of tool prepared by researcher. The present study was conducted from April 2022 to June 2023. Analyzed by using Statistical Package for the Social Sciences (SPSS) software.

RESULTS: The comparison of pretest and posttest physiological parameters of COPD patients. At the 5% significant level, The Student's paired "t" test is employed, and the mean, standard deviation, and mean difference values are compared. For $n = 50 - 1$, or 4 degrees of freedom, the value was 2.00. At the 5% level of significance — a statistically acceptable level of significance — the computed oxygen saturation "t" value, or 29.69, the heart rate (7.16), respiratory rate (16.50), diastolic blood pressure (3.77), and walking distance (15.23), are all significantly greater than the value for general physiological parameters. Thus, the H_1 is accepted for oxygen saturation, respiratory rate, and distance in walking.

CONCLUSION: Moreover, the study findings highlight the need for ongoing education and outreach efforts to continue improving the health status of COPD patients. This paragraph say that the pranayama is effective in patient with COPD as it help in managing the illness and also to improve the lifestyle and also help to improve the health status of the patient having any other illnesses. In addition, the Compassion of Pranayama and Yoga Pranayama shown effectiveness in daily lifestyle.

Keywords:

COPD, old age home, patient, video

Symbiosis College of Nursing, Symbiosis International (Deemed University), Pune, Maharashtra, India

Address for correspondence:

Dr. Dipali Dumbre,
Symbiosis College of Nursing, Symbiosis International (Deemed University),
Pune - 412 115,
Maharashtra, India.
E-mail: dipalidumbre@scon.edu.in

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Introduction

Based on studies on the worldwide burden of illness, chronic obstructive pulmonary disease (COPD) is expected to be the third most common cause of death and the fifth most prevalent cause of disability worldwide in the first half of the 21st century.

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It is anticipated that in developing nations, COPD will rank third for women and fourth for men in terms of disability in 2020.^[1,2] As per the Global Initiative for Obstructive Lung Disease (GOLD), airflow limitation is a clinical condition of COPD that is not entirely reversible. Dyspnea is the most common reason people seek medical attention for COPD, and it also plays a

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major role in the disease's anxiety and disability. Often, a chronic cough is the initial indication of COPD. COPD is a complex disorder that has an impact on a person's quality of life via pulmonary and systemic causes^[3-5] It moves forward and can't be stopped. In the absence of major side effects or a deterioration of the disease, long-term regular medical therapy must continue at the same level. The disease's progression can be slowed down with the use of preventive measures, the most significant of which is quitting smoking; nevertheless, extra intervention through rehabilitation is indicated. Pranayama is practically cost-free because it is simple to comprehend and practice, requiring little effort. Its routine maintenance only takes about 15 to 20 minutes. Pranayama, a powerful breathing technique, has been widely applied to COPD patients in India. There were 11 randomized controlled trials that comprised 586 individuals in all. With regard to the COPD assessment test (CAT) (mean difference [MD] =3.81; 95% confidence interval [CI] =0.97 to 6.65; $P = 0.009$, $I^2 = 70\%$), the 6-minute walk test (MD = 25.53; 95% CI = 12.16 to 38.90; $P = 0.001$, $I^2 = 0\%$), and the predicted forced expiratory volume in 1 second (FEV1) measure of pulmonary function (MD = 3.95%; 95% CI = 2.74 to 5.17%; $P < 0.001$, $I^2 = 0\%$), the meta-analysis's findings indicated that yoga improved quality of life in comparison to no treatment^[6-8] The effects on lung function and exercise capacity were the only ones that held up well against methodological bias. Only breathing-focused yoga therapies showed effects; yoga posture-focused interventions did not. Rarely were adverse events reported. This meta-analysis found that yoga significantly improved lung function and exercise capacity in people with COPD. Yoga, and particularly the breathing techniques used in yoga, may be beneficial for patients with COPD. Future studies ought to examine the safety of yoga in greater detail.^[9-12]

Objective

1. To assess the effectiveness of video assisted teaching program of Pranayama on COPD.
2. To find the effectiveness of video assisted teaching program of Pranayama on COPD with selected demographic variables.

Materials and Methods

Study Design and Setting

One group pre/posttest design in a quasi-experimental study was used. The present study was conducted from April 2022 to June 2023. The study include video assisted teaching of pranayama in which Suryabhedana, Nadishuddhi, Bhramari, and Kapalbhathi Pranayama were included in the video. The study has analyzed all COPD parameters according to CAT score of daily living style of COPD patients. In this study, Roy Adaptation

Model was used as a conceptual framework. The Roy Adaptation Model sees the person as a biopsychological being in continuous interaction with the changing environment. The environment includes focal contextual and residual stimuli.

Suryabhedana: The practitioner inhales slowly and deeply through the right nostril while closing the left nostril with the ring and little fingers of the right hand. The practitioner then uses their right thumb to shut their right nostril before taking a slow, deep breath out of their left nostril. It is ideal to exhale more slowly than to inhale. The cycle is repeated by the practitioner.^[13]

The nadishuddhi technique involves the practitioner closing their right nostril with their thumb, fully exhaling through their left nostril, and then taking a deep breath through the same nostril. The practitioner then uses the ring and little fingers of his or her right hand to shut the left nostril before gently and fully exhaling via the right nostril. By switching between nostrils, the practitioner does the rounds again.^[14,15]

Bhramari: The practitioner feels the vibrations throughout their entire head, taking a deep breath and then exhaling to create a low-pitched sound that sounds like a bee humming. The method is repeated by the practitioner.^[15]

In Kapalbhathi, the practitioner inhales and exhales quickly through their noses, using a powerful and aggressive exhale and a passive inhale.^[15]

Study Participants and Sampling

The sample consisted of 50 participants selected through a non-probability sampling method to collect data with the help of tool prepared by the researcher among the patients' elderly people residing in old age homes of Pune city with COPD. Sampling was performed based on World Health Organization (WHO) guidelines, in which the participants stayed at old age homes. Participants had no previous relationship or familiarity with the interviewer, and confidentiality was emphasized in interviews. Informed consent from received from each participant. Table 1 shows the demographic characteristics of the participants. Inclusion criteria included having COPD.

Data Collection Tool and Technique

The tool had two sections: Section A was a questionnaire about demographics and Section B was a checklist to assess the physiological parameters including pulse rate, respiration rate, saturation, blood pressure, and walk-in distance. The individual physiological parameters are measured by the researcher before and after the intervention. Own demonstrated video is prepared by the researcher.

Data Analysis

Statistical Package for the Social Sciences (SPSS) version 24 were used for the data analysis for the present study in which Chi-squared test, Student unpaired *t*-test, and Pearson coefficient correlation test were used.

Ethical Consideration

Institutional Research Committee clearance was

Table 1: Distributions of COPD patients according to the demographic characteristics. n=50

Demographic Variables	Video Assisted Teaching Program
Age (yrs)	
65–69 yrs	15 (30%)
70–74 yrs	16 (32%)
75–79 yrs	9 (18%)
≥ 80 yrs	10 (20%)
Gender	
Male	32 (64%)
Female	18 (36%)
Transgender	0 (0%)
Source of information regarding Pranayama	
Internet	12 (24%)
Newspaper	16 (32%)
Magazine	13 (26%)
Others	9 (18%)
Education	
Primary	15 (30%)
Secondary Schooling	15 (30%)
Higher Secondary Schooling	15 (30%)
Graduate and PG	5 (10%)
Marital Status	
Married	49 (98%)
Unmarried	0 (0%)
Divorced	1 (2%)
Widowed	0 (0%)
Previous Occupation	
Industrial Worker	14 (28%)
Self Employed	10 (20%)
Civil Servant	17 (34%)
Others	9 (18%)
Bad Habits	
Cigarette Smoke	16 (32%)
Pipe Cigar Smoke	8 (16%)
Tobacco Smoke	13 (26%)
None of the above	13 (26%)
Number of hospitalizations in last 12 months	
0	14 (28%)
1	14 (28%)
2	14 (28%)
>2	8 (16%)
Comorbidity	
Hypertension	23 (46%)
Diabetes Mellitus	27 (54%)
Anaemia	0 (0%)
Thyroid	0 (0%)

PG=Post Graduate, yrs=years

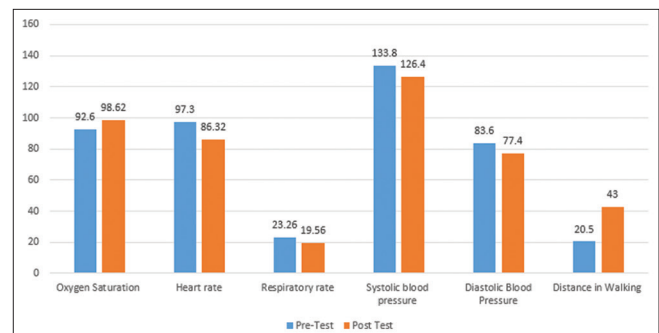
obtained. The Old Age Homes’ involved authorities granted permission for the research to be conducted, which is how the samples were collected. The participants were given adequate explanations about the goal and methodology of the study before they signed a written consent form. Maintaining sample confidentiality. Approved by the intuitional research committee. Ethical Code- IRC – SCON/IRC/445.

Results

Table 2. shows that the mean oxygen saturation level among COPD patients at the pretest was 92.60 ± 0.98 and at the posttest it was 98.62 ± 0.98 . The mean heart rate at pretreatment was 97.30 ± 7.38 and at posttreatment it was 86.32 ± 8.05 . The mean respiratory rate at pretreatment was 23.26 ± 1.46 and at posttreatment it was 19.56 ± 1.64 . Mean systolic blood pressure at pretreatment was 133.80 ± 11.40 and at posttreatment it was 126.40 ± 10.64 . Mean diastolic blood pressure at pretreatment was 83.60 ± 7.76 and at posttreatment it was 77.40 ± 6.64 and the mean distance in walking at pretreatment was 20.50 ± 8.52 and at posttreatment it was 43 ± 9.89 .

Table 3 shows that the mean oxygen saturation level among COPD patients at the pretest was 92.60 ± 0.98 and at the posttest it was 98.62 ± 0.98 . The mean heart rate at pre-treatment was 97.30 ± 7.38 and at posttreatment it was 86.32 ± 8.05 . The mean respiratory rate at pretreatment was 23.26 ± 1.46 and at posttreatment it was 19.56 ± 1.64 . Mean systolic blood pressure at pretreatment was 133.80 ± 11.40 and at posttreatment it was 126.40 ± 10.64 . Mean diastolic blood pressure at pretreatment was 83.60 ± 7.76 and at posttreatment it was 77.40 ± 6.64 and the mean distance in walking at pretreatment was 20.50 ± 8.52 and at posttreatment it was 43 ± 9.89 .

The physiological parameters of COPD patients’ pretest and posttest comparisons are displayed in Table 3. At the 5% significant level, the mean, standard deviation, and mean difference values are compared, and the Student’s paired “*t*” test is used. For $n = 50-1$, or 49 degrees of freedom, the tabulated result was 2.00. The



Graph 1: Significance of difference between physiological parameters among COPD patients in video assisted teaching programme

computed oxygen saturation ($t = 31.34$), ($t = 7.46$) heart rate, ($t = 12.06$) respiratory rate, ($t = 3.03$) systolic blood pressure, ($t = 4.10$) diastolic blood pressure, and ($t = 13.34$) distance in walking are much more than the tabulated value at 5% level of significances for overall physiological parameters which is a statistically acceptable level of significances. Thus, the H_1 is accepted for oxygen saturation and respiratory rate [Graph 1].

Discussion

In this study, the researcher aims to assess the effectiveness of video assisted teaching program of pranayama and demonstrations of traditional Pranayama on selected physiological parameters among patients with COPD in selected old age homes in Pune City. To achieve the desired goal the researcher constructed a tool that consisted of nine demographic variables, five physiological parameters, and a modified CAT score test. By using the parallel-form method of reliability, it is found to be 0.949, and hence tool is reliable and valid. 15 professionals further validated this tool in the field of clinical research and educational research for validity. Further, the researcher conducted a pilot study from October 17, 2022, to October 27, 2022, for a period of 10 days on 10 selected subjects. Subjects were selected based on the sampling criteria to determine whether the investigation was feasible. Hence, the pilot study proved that the study was feasible and could be carried out on a large scale. The final study was conducted on 100 samples. The researcher applied Pearson’s correlation coefficient to assess the correlation between video assisted teaching. Similar kinds of findings are in the study conducted and the present study defines

the effectiveness of pranayama on COPD patients. And in the discussion, the researcher has discussed the David A. Kaminsky (*et al.*) research in which they explained about the exercise tolerance of COPD patients. The researcher gets the idea about the COPD patients are able to do the Pranayama exercise or not. Exercise tolerance in those with chronic obstructive lung disease is increased by pulmonary rehabilitation. (COPD).

The goal of pulmonary rehabilitation is to increase the ability of individuals with COPD to tolerate exercise. Nonetheless, many patients lack access to programs for pulmonary rehabilitation. We postulated that pranayama, or yoga breathing, may be practiced independently at home as an alternative to pulmonary rehabilitation to enhance exercise tolerance. In addition, we wanted to know if patients could be taught pranayama by non-yoga practitioners.

Design: Randomized, double-blind, controlled pilot trial for proof of concept.

Location/Settings: Two pulmonary academic practices.

Subjects: 43 individuals with moderate-to-severe COPD who are symptomatic.

Interventions: Compared to schooling alone, pranayama plus instruction for twelve weeks. The research coordinators were educated by two yoga experts to teach pranayama and to oversee the quality of pranayama instruction and participant pranayama practice.

Results metrics: The primary outcome was the 6-min walk distance (6MWD). The secondary outcomes included ratings of dyspnea and quality of life, changes in lung function, and markers of oxidative stress and systemic inflammation.

Results: The 6MWD increased in the pranayama group (least square mean [95% CI] = 28 m [-5 to 61]) and decreased in the control group (-15 m [-47 to 16]), indicating a practically significant treatment effect ($P = 0.06$) in favor of pranayama. Pranayama also brought about a small improvement in inspiratory capacity

Table 2: Pretest/posttest physiological parameters among COPD patients in video assisted teaching program

Parameters	Pretest	Posttest
Oxygen Saturation	92.60±0.98	98.62±0.98
Heart rate	97.30±7.38	86.32±8.05
Respiratory rate	23.26±1.46	19.56±1.64
Systolic blood pressure	133.80±11.40	126.40±10.64
Diastolic Blood Pressure	83.60±7.76	77.40±6.64
Distance in Walking	20.50±8.52	43±9.89

Table 3: Significance of difference between physiological parameters among COPD patients in video assisted teaching program

Parameters	Pretest	Posttest	Mean Difference	t	n=50 P
Oxygen Saturation	92.60±0.98	98.62±0.98	6.02±1.36	31.24	0.0001, S
Heart Rate	97.30±7.38	86.32±8.05	10.98±10.40	7.46	0.0001, S
Respiratory Rate	23.26±1.46	19.56±1.64	3.70±2.16	12.06	0.0001, S
Systolic Blood Pressure	133.80±11.40	126.40±10.64	7.40±17.23	3.03	0.004, S
Diastolic Blood Pressure	83.60±7.76	77.40±6.64	6.20±10.40	4.10	0.0001, S
Distance in Walking	20.50±8.52	43±9.89	22.50±11.92	13.34	0.0001, S

and air trapping. Both groups showed considerable improvements in several symptom ratings, but there were no overall changes in markers of oxidative stress, systemic inflammation, or respiratory system impedance.

In conclusion, this pilot study effectively showed that pranayama was linked to better exercise tolerance in COPD patients. Patients could be sufficiently taught to practice pranayama by lay personnel. Further, larger-scale clinical trials are necessary to substantiate the hypothesis that pranayama can provide considerable clinical advantages for symptomatic COPD patients, as shown by our data. Even so, a large number of patients are unable to take part in pulmonary rehabilitation regimens. In place of pulmonary rehabilitation, we suggested pranayama, or yoga of breathing, may be practiced alone at home to improve exercise tolerance.

Implications

The study results are relevant to nursing practice, nursing education, nursing research, and geriatric nursing care, among other fields. From the current study, some conclusions about the geriatric age group may be reached. Nursing staff members can run educational programs in local old age homes that aim to raise the general public awareness of Pranayama. In illness prevention and health promotion, nurses have a crucial role to play. People are motivated to pursue healthy practices in daily life, requiring changes in lifestyle, via educational programs with effective video assisted teaching programs.

Nursing interventions such as regular exercise and physical therapy can help with chronic illnesses. COPD affects the daily lifestyle of people and leads to various additional illnesses. To overcome it, performing daily activities such as exercise, Pranayama's etc. Nursing intervention can include physical therapy, respiratory therapy, occupational therapy, and assistive devices to help improve mobility. Nurses can monitor the nutritional status of older adults and provide dietary counseling to help prevent malnutrition.

Limitations and Recommendation

- The study did not have randomization and control group.
- Regardless of underlying comorbidity, a similar study can be carried out among the general population.
- Various settings can be used for a comparable study.
- A sizable sample can be used to duplicate a study of this nature.
- Two populations, those with underlying comorbidities and those without any underlying comorbidities, can be compared.
- People of different ages can also be studied in a similar way.

Conclusion

The findings indicate that the physiological parameters were an efficacious strategy in assessing the effectiveness of video assisted teaching program of Pranayama on selected physiological parameters among patients with COPD. The tool was an acceptable and appropriate method for the assessment of COPD. The important interest of the present study was to find the effectiveness of video assisted teaching programs of pranayama on selected physiological parameters among patients with COPD in selected elderly homes in Pune city. To improve the health status of old age people with COPD, Pranayama education is important. It is an effective complementary therapy to improve health status. This suggests that the education of pranayama among old age home people is having a positive impact and helping to raise awareness of this important health concern.

Moreover, the study findings highlight the need for ongoing education and outreach efforts to continue improving the health status of COPD patients. By targeting older adults and their caregivers with targeted video assisted teaching programs aiming to improve their health status and enable them to live ordinary lives despite chronic illness. In addition, the Pranayama's effectiveness is shown in the daily lifestyle of old age people also, and managing the related health issues.

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Ethical considerations

Institutional Research Committee clearance was obtained. The Old Age Homes' involved authorities granted permission for the research to be conducted, which is how the samples were collected. The participants were given adequate explanations about the goal and methodology of the study before they signed a written consent form. Maintaining sample confidentiality. Approved by the institutional research committee. Ethical Code- IRC – SIU/IEC/445.

Declaration of patient consent

All consent was taken from the participants and confidentiality was maintained.

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No funds were received or used for this study.

Conflicts of interest

There are no conflicts of interest.

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