A STUDY TO ASSESS THE EFFECTIVENESS OF BREATHING STRATEGIES ON RESPIRATORY PARAMETERS AMONG ICU PATIENTS IN SELECTED HOSPITAL

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Abstract
Breathing is the most vital functioning for maintenance of life. Respiratory function of the lung is critical and of immediate importance for the survival of organisms, and molecular oxygen is vital for energy that is essential for life. The physiological model of the lung consists of conducting airways to transport the gas in and out of the lungs and the alveolar membranes where gas exchange occurs by diffusion from the alveoli to capillaries within the lungs, oxygen diffuses freely through the cells that from the alveolar septa to the pulmonary capillaries for eventual distribution by the systemic blood. The main purpose of breathing strategies is to assist the patients in removal of secretions, correct abnormal breathing patterns and decreases the work of breathing, aid in bronchial hygiene – prevent accumulation of pulmonary secretions, mobilization of these secretions and improves cough mechanism.
Keyword: Respiratory Parameters, ICU Patients, Systemic Blood, Lungs, Pulmonary secretions

INTRODUCTION

Breathing is the most vital functioning for maintenance of life. Respiratory function of the lung is critical and of immediate importance for the survival of organisms, and molecular oxygen is vital for energy that is essential for life. The physiological model of the lung consists of conducting airways to transport the gas in and out of the lungs and the alveolar membranes where gas exchange occurs by diffusion from the alveoli to capillaries within the lungs, oxygen diffuses freely through the cells that from the alveolar septa to the pulmonary capillaries for eventual distribution by the systemic blood.

Breathing is a mechanism by which body rejuvenates, revives and restores its homeostasis and optimum functions. So, it is without a doubt, of paramount importance in health impaired patients.

Breathing exercises are only part of a treatment program designed to improve pulmonary status and improve a patient's overall endurance and function of lungs. Depending on patient's clinical program, breathing exercises are often combined with medicines, postural drainage and graded exercise program.

Breathing exercises and ventilatory training are the fundamental interventions for the prevention for acute and chronic pulmonary disease mainly for COPD (chronic bronchitis, emphysema and asthma).

The main purpose of breathing strategies is to assist the patients in removal of secretions, correct abnormal breathing patterns and decreases the work of breathing, aid in bronchial hygiene – prevent accumulation of pulmonary secretions, mobilization of these secretions and improves cough mechanism.

Problem Statement

"A study to assess the effect of Breathing Strategy on respiratory parameters among ICU patients in selected hospital."

Objectives

1. To assess and compare the respiratory parameters among ICU patients in control and experimental group before intervention.
2. To assess and compare the respiratory parameters among ICU patients in control and experimental group after intervention.
3. To assess the effect of Breathing Strategy on respiratory parameters among ICU patients in the experimental group.
4. To find out the association between respiratory parameters with selected demographic variables.

Assumptions

1. Breathing strategy may improve lung functioning among ICU patients.
2. Breathing strategy may maintain the respiratory parameters among ICU.
3. Breathing exercises affect the recovery of ICU patients.
4. Ventilation is an important parameter for reducing the ICU stay of patients

Hypotheses

H0 - There is no significant difference in respiratory parameters before and after intervention

H1 - There is significant difference in respiratory parameters before and after intervention.

H2 – There is no significant association between respiratory parameters with selected demographic variables.

REVIEW OF LITERATURE

Literature review is an evaluation report of information found in the literature related to selected area of study. The review describes summarizers, evaluate and clarify this literature. It

gives a theoretical base for the research and helps to determine the nature of research.[1]

1. A cross-sectional study was conducted in 2021 by Daniel, Roy Arokiam, Aggarwal, Praveen, Kalaivani, Mani Gupta, Sanjeev Kumar**.** The aim of the study was to rule out the prevalence rate of COPD in India. The method involves searching of previously related study from PUBMED, Embase, Cochrane Library, Google Scholar, and Scopus and included community-based cross-sectional studies reporting data on the prevalence of COPD among adults based on spirometry. A random-effects model was used to estimate the pooled prevalence of COPD. Eight identified studies were included which consist of 8569 participants, the result of the study stated that in eight studies the estimated prevalence was 7.4% (95% confidence interval: 5.0%–9.8%), I^2 (heterogeneity *statistic)* = 95.4% ($P < 0.001$). The prevalence was higher among males, in the urban area, and the northern region. The study concluded that necessary adequate training and resources should be provided to diagnose COPD early, and nation-wide survey should be conducted on regular interval. [2]

2. A study was performed to estimate the incidence of chronic respiratory diseases in rural area Nilamel health block in Kollam district, Kerala, southern India by Krishnaveni Viswanathan, P.S. Rakesh, ET ALL. It included sample size of 12,556 participants above 15 years of age. A questionnaire sheet including household information sheet and translated symptoms regarding respiratory diseases made on the basis of International Union against Tuberculosis and Lung Disease bronchial symptoms was provided to all the participants of the study, which was selected randomly from Nilamel health block. Result of the study revealed that the prevalence of the self-reported asthma was 2.82% (95% CI (confidence interval) 2.52–3.12) and that of chronic bronchitis was 6.19% (95% CI 5.76–6.62) while other CRDs which either did not fit to constitute 1.89%. Prevalence of asthma among males was 2.44% (95% CI 2.05–2.85) while that of females was 3.14% (95% CI 2.71–3.57). Chronic bronchitis prevalence was 6.73% and 5.67% among males and females respectively. Conclusion of the study stated that due to high prevalence rate of chronic respiratory disease and its involvement in morbidity and mortality rate, well defined plan is needed to tackle issues related to chronic respiratory diseases.[3]

3. An observational study was conducted in 2018 by Bindu K. Vasu, Sunil Rajan, Arathy M. Raj, Jerry Paul, Lakshmi Kumar. The aim of the study was to compare the peri-operative factors which are helping to increase the prevalence of post- operative respiratory factors among patients who underwent head and neck surgeries as well as abdominal surgeries receiving post-operative ventilation. An observational study was designed; data was collected from the patients who fulfilled the inclusion criteria from August 2017 and March 2018. Correlation of post-operative pulmonary complications (PPCs) with duration of surgery, perioperative mechanical ventilation (PMV), and volume of crystalloids used in both the groups was analysed by multiple binary logistic regressions. The inhospital mortality and number of days of intensive care unit (ICU) and hospital stay were analysed with t-test. Sample size of 155 patients was studied in which 77 patients who underwent head-and-neck surgeries (Group 1) and 78 who underwent abdominal surgeries (Group 2). Both the groups had a comparable demographic profile. Group 2 patients had a higher incidence of PPCs. Duration of PMV but not of surgery influenced the occurrence of PPCs independently, showing 8.2% (1.2%–15.7%) increase in PPCs with every hour increase in PMV (odds ratio: 1.08 [95% confidence interval, 1.01–1.16] with P = 0.002). PPCs prolonged the ICU and hospital stays and mortality. The study concluded that duration of PMV (peri- operative mechanical ventilation) is an independent risk factor for the development of PPCs. Abdominal surgeries proved to be an independent risk factor for PPCs. Early identification and risk modifications are required to reduce PPCs in high-risk category of patients who receive general anaesthesia with prolonged mechanical ventilation.[4]

4. An experimental study was conducted in USA (2021) by Cook NE, Huebschmann NA, Iverson GL. The aim of the study was to examine the safety and tolerability of a virtual reality-based deep breathing exercise for children and adolescents who are slow to recover from concussion. The method of the study included Fifteen participants (ages 11 to 22; mean = 16.9 years) were recruited from a specialty concussion clinic within a tertiary care medical centre. Participants completed a 5-min paced deep breathing exercise administered via a virtual reality headset. The result of the study stated that nearly all participants (93.3%) reported the experience was either positive or extremely positive. No participants reported significant discomfort or discontinued the exercise. Three participants reported a mild increase in headache, dizziness, or nausea. Participants reported significant decreases in stress (r =.57), tension (r =.73), fatigue (r =.73), and confusion (r =.67), with large effect sizes, following the deep breathing exercise. The study concluded that a brief, virtual reality-based deep breathing exercise is worthy of additional study as a rehabilitation component for children and adolescents with prolonged concussion recoveries.[5]

5. A quasi experimental study was conducted in Brazil (2018) by Silva CMDSE, Gomes Neto M, Saquetto MB, Conceição CSD, Souza-Machado A. The objective of the study was to evaluate the effects of upper limb resistance exercise on the functional capacity, muscle function, and quality of life in patients with chronic obstructive pulmonary disease. The intervention of the study included Control group performed warm-up, aerobic exercise, inspiratory muscle training, and session stretching, followed by massage therapy. The treatment group performed warm-up, aerobic exercise, inspiratory muscle training, three sets of upper limb resistance exercise, and session stretching, followed by massage therapy. Total three sessions per week for eight weeks. The result of the study stated that 51 patients (25 in the control group and 26 in the treatment group); 41% of the subjects were men. Mean forced expiratory volume was 2.6 ± 0.6 L, and mean body mass index was 27.3 ± 7.0 kg/m2. The upper limb resistance exercise resulted in significantly greater benefit in terms of exercise capacity (88.5 ± 81.9 m, P = 0.043), inspiratory muscle strength (22.9 ± 24.2 cm H2O, P = 0.001), upper limb muscle strength (2.3 ± 3.1 kg, P = 0.027), and quality of life scores (-15.3 ± 10.9 points, P= 0.000). The study concluded that Upper limb resistance exercise improved the exercise capacity, respiratory muscle strength, and quality of life.[6]

6. An quasi experimental study was conducted in Portland to assess the effects of Diaphragmatic Breathing Patterns on Balance (2017) by Stephens RJ, Haas M, Moore WL 3rd, Emmil JR, Sipress JA,Williams A. The purpose of this study was to determine the feasibility of performing a larger study to determine if training in diaphragmatic breathing influences static and dynamic balance. Method of this study included a group of 13 healthy persons (8 men, 5 women), who were staff, faculty, or students at the University of Western States participated in an 8-week breathing and balance study using an uncontrolled clinical trial design. Participants were given a series of breathing exercises to perform weekly in the clinic and

at home. Balance and breathing were assessed at the weekly clinic sessions. Breathing was evaluated with Liebenson's breathing assessment, static balance with the Modified Balance Error Scoring System, and dynamic balance with OptoGait's March in Place protocol. The result of the study revealed that Improvement was noted in mean diaphragmatic breathing scores (1.3 to 2.6, P < .001), number of single- leg stance balance errors (7.1 to 3.8, P = .001), and tandem stance balance errors (3.2 to 0.9, P = .039). A decreasing error rate in single-leg stance was associated with improvement in breathing score within participants over the 8 weeks of the study (-1.4 errors/unit breathing score change, P < .001). Tandem stance performance did not reach statistical significance (-0.5 error/unit change, P = .118). Dynamic balance was insensitive to balance change, being error free for all participants throughout the study. The study concluded that promotion of a costal-diaphragmatic breathing pattern may be associated with improvement in balance and suggests that a study of this phenomenon using an experimental design is feasible.[7]

7. An observational study was conducted in Hyderabad (2003) by V V Shailaja, LA Pai, DR Mathur, V Lakshmi. This study was conducted to document the prevalence of HIV associated respiratory infections Such studies have not been worked out before in this region. The study included specimens from 130 patients with complaints suggestive of lower Respiratory tract infection. Among them 100 was HIV reactive and 30 were HIV nonreactive. Both the expectorated as well as induced sputum samples were collected and processed to examine for the bacterialand fungal pathogens including Pneumocystis carinii. The result of the study stated that Sputum samples from 63% of HIV reactive and 33.3% of HIV nonreactive patients were culture positive. In all, there were 70 pathogens isolated from the HIV reactive subjects, 44.3% were bacteria, 42.9% were Mycobacteria and 12.8 % were fungi. The study concluded Lower respiratory tract infection is a common problem among HIV reactive patients and majority are bacterial infections. Polymicrobial isolation was observed only among the HIV reactive patients.[8]

8. A quasi experimental study was conducted in Iran (2018) by Sakhaei S, Sadagheyani HE, Zinalpoor S, Markani AK, Motaarefi H. The aim of the study was to evaluate the effect of PLB (pursed lip breathing) on cardiac, pulmonary and oxygenation level in patients with Chronic Obstructive Pulmonary Disease (COPD). Total 60 subject sample size was included which was divided into 3 groups 20 control, 20 experimental suffering from COPD and 20 healthy individual. The demographic, anthropometric information form and checklist recording changes in levels of oxygenation, respiration, temperature, heart rate and blood pressure with cardiopulmonary follow up in three stages before, during and after PLB were used for data collection. Data were analysed using descriptive statistics, repeated measure test, ANOVA, and Chi-square. The result revealed on evaluation with the COPD patient of intervention group saturation of Peripheral Oxygen (SPO2) index with the mean difference of 2.05 percent, Respiratory Rate (RR)-0.65 minute and Pulse Rate (PR)-1.6 bpm was significant ($p \leq 0.05$), and systolic blood pressure index in healthy subjects was increased (3.35 mmHg). The study concluded that using effective PLB as an easy, inexpensive, non-invasive and non-pharmacological method is considered as an important factor in improving the status of oxygenation and physiological indicators in patients with COPD and should be considered as an important part of rehabilitation programs for these patients. [9]

9. An experimental study was conducted in Thailand (2019) by Ubolnuar N, Tantisuwat A, Thaveeratitham P, Lertmaharit S, Kruapanich C, Mathiyakom W. The aim of the study was to evaluate the effect of breathing Exercises in patients with COPD. Total sample size of 745 were included, the breathing exercises includes Pursed Lip breathing, Deep breathing, diaphragmatic breathing. The result of the study stated that the quality of evidence was low to moderate. When compared to the control groups, respiratory rate significantly ($p \leq 0.001$) improved in the pursed-lip breathing (PLB), ventilatory feedback (VF) plus exercise, diaphragmatic breathing exercise (DBE), and combined BEs. Additionally, PLB significantly improved tidal volume ($p<0.001$), inspiratory time ($p=0.007$), and total respiratory time ($p<0.001$). VF plus exercise significantly improved inspiratory capacity ($p<0.001$), and singing significantly improved the physical component of QoL, than did the control groups ($p<0.001$). All breathing exercises did not significantly improve dyspnea, compared to the controls ($p>0.05$). The study concluded that pursed lip breathing, deep breathing exercises and combined breathing exercises and singing improves ventilation and quality of life in COPD patients.[10]

10. A quasi experimental study was conducted in Netherland (2021) by Han JW, Kim YM, Kim K. This study aimed to investigate the effects of resistance exercises combined with breathing exercises on the respiratory-muscle strength of elderly women. The study included 26 elderly women, who were randomly divided into two sub-groups of 13 participants each. The experimental group performed breathing exercises and dynamic upper- and lower-extremity exercises, and the control group practiced only dynamic upper- and lower-extremity exercises. The maximum expiratory pressure (MEP) and maximum inspiratory pressure (MIP) were measured both before and at the end of the six-week study. The result of the study revealed in both groups showed that, both the post-test MIPs and MEPs were significantly higher than the pre-intervention ones ($p< 0.05$). For MIPs, the between-group difference was not statistically significant, either before the intervention or post-test ($p> 0.05$). For MEPs, the between-group difference was statistically significant at post-intervention points ($p< 0.05$). The study concluded that resistance exercises applying maximum expiration improved the respiratory-muscle strength of elderly women. These findings indicate that resistance exercises applying maximum expiration as described here in should be considered in patients who require breathing therapy, because the combination seems to significantly increase the strength of the respiratory muscles.[11]

RESEARCH METHODOLOGY

In this study the researcher intends to assess the effect of Breathing Strategy on respiratory parameters among ICU patients in selected hospital.

In view of the objectives of the present study a “Quantitative (Quasi-experimental) research approach” was considered to be most suitable for the study. Hence Quasi -experimental approach was considered to be most appropriate, since it involved an intervention which was implemented on the experimental group to assess the effectiveness.

In this study Pre-test post-test control group research design was selected in which 52 patients on the basis of inclusion criteria were divided into 2 groups; 26 patients in each group. In experimental group, respiratory assessment of patients was performed on day 1; planned intervention was performed twice a day from day 1 to day 5 with routine treatment, and re

assessment of respiratory status was done on day 5. In control group respiratory assessment was performed on the day 1 and day 5 along with routine treatment.

ETHICAL ASPECT

- Research synopsis was presented in front of ethical committee and proposal got approved.
- Permission for conducting the study was taken from Sushrut hospital, KJ Somaiya super-speciality and K.J Somaiya hospital and research center.
- Consent was taken from the patients in ICU before study
- The participants were allowed to deny for participating in the study.

Delimitation

The study is limited to ICU patients.

TOOL AND TECHNIQUES FOR DATA COLLECTION

Tools are the designed equipment, used by the researcher for the evaluating and testing the hypothesis. In this study the designed tool is divided into 5 sections.

Section A

It consists of demographic variables, which includes sample code, age, gender, diagnosis, past medical- surgical history, family history, any co-morbidities.

Section B

This section included respiratory assessment of rhythm, fremitus, breathing effort and lung sounds. A score of 1 was given for all normal findings and a zero score for all abnormal findings.

Section C

This section included assessment of physiological parameters like Blood pressure, pulse, respiratory rate and oxygen saturation. These parameters were checked twice, before implementing the strategies and after 5 days.

Section D

In this section, the tidal volume measurements were assessed by spirometer and recorded for 5 days for control and experimental group.

Section E

This section included questions to assess the opinion of the doctors and nurses regarding the intervention. The tool had 5 questions that were framed.

FINDINGS OF THE STUDY

Section A

This section deals with distribution of frequency and percentage according to demographic variable of ICU patients in control and experimental group

- In control group maximum samples were from age group of 60yrs and above that is 12(46.15%), followed by 08 (30.77%) were in age group of 41-60 years and 06 (23.08%) samples were in age group of 26-40 years.
- In experimental group majority samples were from age group of 41-60yrs that is 12 (46.16%), followed by 10 (38.46%) were in age group of 60 years above and only 4 (15.38%) samples were in age group of 26-40 years.
- In control group maximum 16 (61.54%) samples were male, followed by 10 (38.46%) were male.
- In experimental group maximum 15 (57.70%) samples were female, followed by 11 (42.30%) were female.
- In control group majority 14 (53.80%) samples got diagnosed with cardiac diseases, followed by 05 (19.20%) were diagnosed with GI diseases and 03 (11.50%) samples were diagnosed with renal diseases and 02 (7.70%) samples were diagnosed with Neuro diseases followed by 01 (3.8%) sample was diagnosed with respiratory diseases and only 01 (3.8%) sample diagnosed with Neuro diseases. Whereas in experimental group majority 11 (42.30%) samples diagnosed with cardiac diseases, followed by 4 (15.4%) samples got diagnosed with GI diseases.
- In control group majority 3 (11.54%) samples had history of TB, followed by 1 (3.85%) sample was having history of asthma and only 1(3.85%) sample had history of covid. Furthermore in experimental group majority 03 (11.54%) samples were having history of pneumonia, followed by 02 (7.70%) samples were having history of TB and 1 (3.85%) sample was having history of asthma and only 1(3.85%) ad history of covid.
- In control group, nobody had past surgical history. Whereas in experimental group only 1(3.84%) sample had history of surgery.
- In control group maximum 11(42.30%) samples had co-morbidities of cardiac diseases, followed by 11(42.30%) samples had mixed (cardiac & endocrine) diseases, followed by 3(11.50%) samples did not had any co-morbidities and only 1(3.80%) sample had comorbidity of endocrine disease.
- In control group maximum 21(80.77%) samples didn't underwent any in surgery, followed by 4(15.38%) samples undergone cardiovascular surgery, and only 1(3.85%) sample undergone Neuro surgery. Furthermore in experimental group majority 17(65.38%) sample did not undergone any surgery, followed by 5(19.23%) samples undergone GI surgery, followed by 3(11.54%) samples undergone cardiovascular surgery and only 1(3.85%) sample undergone Neuro surgery.

Section B

This section deals with distribution of frequency and percentage according to respiratory parameters among ICU patients in control and experimental group before and after intervention.

I. Comparison of frequency and percentage of rhythm Pre-Test

- In control group 13(50%) samples had regular rhythm in pre-test, followed by 13(50%) samples had irregular rhythm. Whereas in experimental group majority 18(69.23%) samples had regular rhythm and 8(30.77%) samples had irregular rhythm.

II. Comparison of frequency and percentage of rhythm (Post-Test)

- In control group maximum 19(73.08%) samples had irregular rhythm in post-test, followed by 07(26.52%) samples had regular rhythm. Moreover in experimental group maximum 25(96.15%) samples had regular rhythm, followed by 1(3.85%) sample had irregular rhythm.

III. Comparison of frequency and percentage of fremitus Right Lung (Pre-Test)

- In control group maximum 19(73.08%) samples fremitus was absent in pre-test of right lung, followed by 07(26.93%) samples fremitus was present. Whereas in experimental group 13(50%) samples fremitus was absent, followed by 13(50%) fremitus was present.

IV. Comparison of frequency and percentage of fremitus Right Lung (Post-Test)

- In control group 23(88.46%) samples fremitus was absent in post-test assessment of right lung, followed by 3(11.54%) samples fremitus was present. Whereas in experimental group 24(92.31%) samples fremitus was absent, followed by 02(7.69%) samples fremitus was present.

V. Comparison of frequency and percentage of fremitus in Left Lung (Pre-Test)

- In control group 21(80.77%) samples fremitus was absent in pre-test assessment of left lung, followed by 5(19.23%) samples fremitus was present. Whereas in experimental group 15(57.69%) samples fremitus was absent, followed by 11(42.31%) samples fremitus was present.

VI. Comparison of frequency and percentage of fremitus of Left Lung (Post-Test)

- In control group 25(96.15%) samples fremitus was absent in post-test assessment of left lung, followed by 1(3.85%) samples fremitus was present. Whereas in experimental group 25(96.15%) samples fremitus was absent, 01(3.85%) followed by samples fremitus was present.

VII. Comparison of frequency and percentage of efforts (Pre-Test)

- In control group maximum 22(84.62%) samples were with without efforts in pre-test, followed by 4(15.38%) were with efforts. Whereas in experimental group 24(92.31%) were without efforts, followed by 02(7.69%) were with efforts.

VIII. Comparison of frequency and percentage of efforts (Post-Test)

- In control group maximum 17(65.38%) samples were with without efforts in post – test, followed by 9(34.62%) were with efforts. Whereas in experimental group 26(100%) were without efforts.

IX. Comparison of frequency and percentage of Right Lung according to Respiratory Auscultation- Anterior (Pre-Test):

- In control group majority 17 (65.38%) samples were having bilateral equal air entry followed by 06 (23.07%) samples had wheeze and 02 (7.70%) samples with rales and only 01 (3.85%) samples had crackles during respiration.
- Where as in experimental group maximum 11 (42.30%) samples were having bilateral equal air entry followed by 11 (42.30%) samples had wheeze and 03 (11.53%) samples found with rales andonly 01 (3.85%) samples had ronchi during respiration.
- Whereas while auscultating right middle lobe in control group, majority 15 (57.69%) samples had bilateral equal air entry followed by 05 (19.23%) samples with wheeze and 05 (19.23%) samples had rales and only 01 (3.85%) sample was having crackles during respiration.
- More over in experimental group, majority 12 (46.15%) samples had bilateral equal air entry followed by 10 (38.46%) samples assessed with wheeze and 03 (11.53%) samples had rales and only 01 (3.85%) sample had Ronchi during respiration.
- Furthermore right lower lobe in control group, majority 24 (92.30%) samples was assessed with bilateral equal air entry and only 02 (7.70%) samples had wheeze during respiration. And in experimental group, maximum 20 (76.92%) samples were having bilateral equal air entry followed by 05 (19.23%) samples with wheeze and only 01 (3.85%) sample had rales during respiration.

X. Comparison of frequency and percentage of Left Lung according to Respiratory Auscultation- Anterior (Pre-Test)

- In upper lobe of control group patients, majority 12 (46.14%) samples was having wheeze followed by 10 (38.46%) samples were with bilateral equal air entry and 02 (7.70%) samples had rales and 01 (3.85%) sample was assessed with crackles and also 01 (3.85%) sample washaving friction rub during respiration.
- Furthermore in experimental group, maximum 18 (69.24%) samples were having bilateral equal air entry followed by 05 (19.23%) samples were with wheeze and 02 (7.70%) sampleshad rales and only 01 (3.85%) sample had Ronchi during respiration.
- More over in left lower lobe of control group patients, majority 24 (92.30%) samples were having bilateral equal air entry followed by 01 (3.85%) sample had wheeze and 01 (3.85%) sample was with rales during respiration.
- Whereas in experimental group, majority 25 (96.15%) samples were having bilateral equal air entry followed by 01 (3.85%) sample were having crackles during respiration.

XI. Comparison of frequency and percentage of Right Lung according to Respiratory Auscultation- Posterior (Pre-Test)

- In right upper lobe of control group majority 22 (84.62%) samples were having bilateral equal air entry followed by 02 (7.69%) samples had wheeze and 02 (7.69%) samples was with rales during respiration.
- Whereas in experimental group, it is found that maximum 16 (61.54%) samples were having bilateral equal air entry followed by 06 (23.07%) samples was with wheeze plus 03 (11.54%) samples had rales and only 01 (3.85%) sample was assessed with ronchi during respiration.
- Furthermore in right middle lobe of control group samples, it is found that majority 22 (84.62%) samples were having bilateral equal air entry followed by 02 (7.69%) samples had wheeze additionally 02 (7.69%) samples were having rales during respiration.
- In experimental group, it is found that majority 18 (69.23%) samples was having bilateral equal air entry followed by 05 (19.23%) samples with wheeze and 02 (07.69%) samples with rales and only 01 (3.85%) sample had ronchi during respiration.
- More over in right lower lobe of control group, majority 23 (88.46%) samples were having bilateral equal air

entry and only 03 (11.54%) samples were having wheeze during respiration.

- In experimental group, it is found that majority 19 (73.07%) samples were having bilateral equal air entry followed by 04 (30.78%) samples were having wheeze and 01 (3.85%) sample had ronchi and 01 (3.85%) sample was with crackles and 01 (3.85%) sample had rales during respiration.

XII. Comparison of frequency and percentage of Left Lung according to Respiratory Auscultation- Posterior (Pre-Test)

- In control group majority 24 (92.30%) samples were having bilateral equal air entry followed by 01 (3.85%) sample was with wheeze and only 01 (3.85%) sample had rales during respiration.
- Where as in experimental group, it is found that majority 21 (80.77%) samples were having bilateral equal air entry followed by 03 (11.53%) samples were having wheeze and 01 (3.85%) sample had rales and another 01 (3.85%) sample had crackles during respiration.
- Furthermore in left lower lobe in control group, it is found that majority 26 (100%) samples were having bilateral equal air entry during respiration. And in experimental group, majority 24 (92.30%) samples were having bilateral equal air entry followed by 01 (3.85%) sample with crackles and another 01 (3.85%) sample had wheeze during respiration.

XIII. Comparison of frequency and percentage of Right Lung according to Respiratory Auscultation- Anterior (Post-Test)

- In control group majority 17 (65.38%) samples were having bilateral equal air entry followed by 06 (23.07%) samples were having wheeze and 02 (7.70%) samples was with rales and only 01 (3.85%) sample had crackles during respiration.
- In experimental group, majority 21 (80.76%) samples were having bilateral equal air entry followed by 03 (11.54%) samples were having wheeze and 01 (3.85%) sample was with ronchiand another 01 (3.85%) sample had rales during respiration.
- For right middle lobe, in control group majority of samples 15 (57.69%) having bilateral equal air entry followed by 05 (19.23%) samples having wheeze and 05 (19.23%) samples having rales and only 01 (3.85%) sample had crackles on auscultation. And for experimental group majority of samples 25 (96.15%) were having bilateral equal air entry and only 01 (3.85%) sample had ronchi on auscultation.
- More over in right lower lobe, for control group majority of samples 24 (92.30%) were having bilateral air equal entry followed by 02 (7.70%) samples were having wheeze. And for experimental group, 26 (100%) samples were having bilateral equal air entry.

XIV. Comparison of frequency and percentage of Left Lung according to Respiratory Auscultation- Anterior (Post-Test)

- In control group, majority 12 (46.15%) samples were having wheeze followed by 10 (38.47%) samples were having bilateral equal air entry and 02 (3.85%) samples were having rales and 01 (3.85%) sample was with crackles and another 01 (3.85%) sample had friction rub during respiration. And in experimental group, it is found that majority 25 (96.15%) samples were having bilateral equal air entry followed by 01 (03.85%) sample had crackles during respiration.
- Furthermore left lower lobe in control group, it is found that majority 24 (92.30%) samples were having bilateral equal air entry and only 01 (3.85%) sample was with wheeze during respiration.
- Whereas in experimental group, it is found that majority 26 (100%) samples were having bilateral equal air entry during respiration.

XV. Comparison of frequency and percentage of Right Lung according to Respiratory Auscultation- Posterior (Post-Test)

- In control group majority 22 (84.62%) samples were having bilateral equal air entry followed by 02 (7.69%) samples were with wheeze and 02 (7.69%) samples had rales during respiration. And in experimental group, it is found that majority 24 (92.30%) samples were having bilateral equal air entry followed by and 01 (3.85%) sample had ronchi and another 01 (3.85%) sample was with wheeze during respiration.
- Furthermore in right middle lobe in posterior side, for control group majority of samples 22 (84.62%) was having bilateral equal air entry followed by 04 (15.38%) samples had wheeze on auscultation. And for experimental group majority of samples 26 (100%) were having bilateral equal air entry on auscultation.
- Whereas in right lower lobe in posterior side, for control group majority of samples 23 (88.46%) were having bilateral air equal entry followed by 03 (11.54%) samples were having wheeze. And for experimental group, in right lower lobe, 26 (100%) samples were having bilateral equal air entry.

XVI. Comparison of frequency and percentage of Left Lung according to Respiratory Auscultation- Posterior (Post-Test)

- In control group majority 24 (92.30%) samples were having bilateral equal air entry followed by 01 (3.85%) samples were having wheeze and only 01 (3.85%) sample was having rales during respiration and in experimental group, it is found that majority 25 (96.15%) samples were having bilateral equal air entry followed by 01 (03.85%) sample had crackles during respiration.
- Furthermore left lower lobe in control group, it is found that majority 26 (100%) samples were having bilateral equal air entry during respiration and in experimental group, during auscultation on anterior side it is found that majority 26 (100%) samples were having bilateral equal air entry during respiration.

Section C

This section deals with effect of Breathing Strategy on respiratory parameters among ICU patients in the both groups.

I. Physiological response to breathing strategy (Systolic BP)

- In pre-test systolic Blood Pressure mean was (121) with standard deviation (SD) 13.54, and in post- test group systolic BP mean was (115) with standard deviation (SD) 11.39. When these values were analyzed using paired t test, calculated t value was 1.96 which is less than table t value 2.06. Therefore, null hypothesis is accepted. In experimental group when systolic BP assessed, it is found

that in pre-test systolic Blood Pressure mean was (131) with standard deviation (SD) 20.53, and in post- test group systolic BP mean was (124) with standard deviation (SD) 10.26. Calculated t value was 2.20, more than table t value 2.06. Therefore, null hypothesis is rejected and alternative hypothesis is accepted.

II. Physiological response to breathing strategy (Diastolic BP)

- In pre-test Diastolic Blood Pressure mean was (73) with standard deviation (SD) 12.50, and in post- test group Diastolic BP mean was (68) with standard deviation (SD) 11.20. When these values were analyzed using paired t test, calculated t value was 1.36 which is less than table t value 2.06. Therefore, null hypothesis is accepted. In experimental group when Diastolic BP assessed, it is found that in pre-test Diastolic Blood Pressure mean was (79) with standard deviation (SD) 13.54, and in post- test group Diastolic BP mean was (71) with standard deviation (SD) 9.67. Calculated t value 2.56, more than table t value 2.06. Therefore, null hypothesis **is** rejected and alternative hypothesis is accepted.

III. Physiological response to breathing strategy (Pulse)

In pre-test Pulse mean was (84) with standard deviation (SD) 6.22, and in post- test group Pulse mean was (82) with standard deviation (SD) 4.65. When these values were analysed using paired t test, calculated t value was 1.86 which is less than table t value 2.06. Therefore, null hypothesis is accepted. In experimental group , it is found that in pre-test Pulse mean was (86) with standard deviation (SD) 7.87, and in post- test group Pulse mean was (80) with standard deviation (SD) 11.86. When these values were analyzed with paired t test, calculated t value 2.86 which is more than table t value 2.06. Therefore, null hypothesis is rejected and alternative hypothesis is accepted.

IV. Physiological response to breathing strategy (Respiration)

In pre-test respiration mean was (23.85) with standard deviation (SD) 8.35, and in post- test group respiration mean was (22.62) with standard deviation (SD) 3.95. When these values were analysed using paired t test, calculated t value was 0.912 which is less than table t value 2.06. Therefore, null hypothesis is accepted. In experimental group it is found that in pre-test respiration mean was (27.69) with standard deviation (SD) 5.05, and in post- test group respiration mean was (21.08) with standard deviation (SD) 5.05. When these values were analyzed with paired t test, calculated t value 8.20 which is more than table t value 2.06. Therefore, null hypothesis is rejected and alternative hypothesis is accepted.

V. Physiological response to breathing strategy in control group (oxygen saturation)

- In pre-test oxygen saturation mean on Day 1 was (93%) with standard deviation (SD) 1.42, Day 2 was (94%) with standard deviation (SD) 1.56, Day 3 was (94%) with standard deviation (SD) 1.20, Day 4 was (95%) with standard deviation (SD) 1.23 and Day 5 was (95%) with standard deviation (SD) 1.05.
- To assess significance for repeated measure one-way ANNOVA was used and calculated p value was 0.151 which is more than 0.05, shows that there is no significant association between oxygen saturation and breathing strategies.

VI. Physiological response to breathing strategy in experimental group (oxygen saturation)

- In pre-test oxygen saturation mean on Day 1 was (93%) with standard deviation (SD) 2.42, Day 2 was (95%) with standard deviation (SD) 1.37, Day 3 was (96%) with standard deviation (SD) 1.63, Day 4 was (98%) with standard deviation (SD) 1.42 and Day 5 was (99%) with standard deviation (SD) 0.99.
- To assess significance for repeated measure one-way ANNOVA was used and calculated p value was 0.000 which is less than 0.05, shows that there is significant association between oxygen saturation and breathing strategies.

VII. Physiological response to breathing strategy in control group (spirometry)

- In pre-test spirometry mean was (205) with standard deviation (SD) 192.13, and in post- test group spirometry mean was (240) with standard deviation (SD) 213.10.
- When these values were analyzed using paired t test, calculated t value was which is less than table t value 2.78. Therefore, null hypothesis is accepted.

VIII. Physiological response to breathing strategy experimental group (Spirometry)

- In pre-test spirometry mean was (722) with standard deviation (SD) 182.28, and in post- test group spirometry mean was (886) with standard deviation (SD) 153.02.
- When these values were analyzed using paired t test, calculated t value was 14.479 which is more than table t value 2.06. Therefore, null hypothesis is rejected and alternative hypothesis is accepted.

Section D

This section deals with association between respiratory parameters with selected demographic variables using Chi-square test.

- The association between age and respiratory assessment is non-significant, whereas between age and respiratory parameters is not significant with any variable.
- The association between gender and respiratory assessment is non-significant, whereas association between gender and respiratory parameters only diastolic BP is significant with gender and remaining variables is not significant.
- The association between diagnosis and respiratory assessment is significant with bilateral equal air entry, and in association between respiratory parameter and diagnosis is significant with systolic blood pressure, diastolic blood pressure and pulse whereas it is not significant with respiratory rate and saturation.
- The association between surgery and respiratory assessment is bilateral equal entry, ronchi and wheeze, where as its not significant with wheeze. In association between surgery and respiratory parameters it is not significant with any variable.
- The association between past medical history and respiratory assessment is non-significant with bilateral equal air entry and wheeze, whereas significant with ronchi and crackles. And in association between respiratory parameter and surgery is significant with systolic blood pressure, diastolic blood pressure and

pulse, non-significant with respiratory rate and saturation.

- In the association between co-morbidities with respiratory assessment, is non-significant with bilateral equal air entry and wheeze, whereas it's significant with ronchi and crackles. And in association between co-morbidities and respiratory parameters is non-significant.

Section E

This section deals with frequency and percentage distribution of Opinionnaire about Breathing Strategy.

- 100% participants felt that breathing strategy was effective to improve the respiratory status of the patients. All the participants were satisfied with the steps of the breathing strategy used for patients, liked the way of breathing strategy performed, and 100% participants were agreed to recommend the breathing strategy for future use.

CONCLUSION

In this study, patients had decrease in difficulty while breathing, they lungs functioning was improved. The efforts while breathing was also decreased. The on duty nurses and doctors also liked the way of implementation of breathing strategy on patients and also improvement in the patient.

References

1. *Shebeer .P. Basheer, S. yaseen Khan,textbook of advanced nursing practice, 2nd edition, published by emmess, page number – 376,377*
2. *Daniel, Roy Arokiam[1]; Aggarwal, Praveen[2]; Kalaivani, Mani[3]; Gupta, Sanjeev Kumar[1,]. Prevalence of chronic obstructive pulmonary disease in India: A systematic review and meta-analysis. Lung India 38(6): p 506-513, Nov–Dec 2021*
3. *Krishnaveni Viswanathan, P.S. Rakesh, Shibu Balakrishnan, A. Shanavas, Varun Dharman, Prevalence of chronic respiratory diseases from a rural area in Kerala, southern India. Indian Journal of Tuberculosis. Volume 65, 2018, Pages 48-51*
4. *Vasu BK, Rajan S, Raj AM, Paul J, Kumar L. Perioperative factors influencing the incidence of postoperative pulmonary complications in patients undergoing head-and-neck versus abdominal surgeries and their outcome. Indian Journal of Respiratory Care| Volume. 2019 Jul; 8(2):97.*
5. *Cook NE, Huebschmann NA, Iverson GL. Safety and Tolerability of an Innovative Virtual Reality- Based Deep Breathing Exercise in Concussion Rehabilitation: A Pilot Study. Dev Neurorehabil. 2021 May; 24(4):222-229.*
6. *Silva CMDSE, Gomes Neto M, Saquetto MB, Conceição CSD, Souza-Machado A. Effects of upper limb resistance exercise on aerobic capacity, muscle strength, and quality of life in COPD patients: a randomized controlled trial. Clin Rehabil. 2018 Dec; 32(12):1636-1644.*
7. *Stephens RJ, Haas M, Moore WL 3rd, Emmil JR, Sipress JA, Williams A. Effects of Diaphragmatic Breathing Patterns on Balance: A Preliminary Clinical Trial. J Manipulative Physiol Ther. 2017 Mar- Apr; 40(3):169-175.*
8. *V V Shailaja, LA Pai, DR Mathur, V Lakshmi, Prevalence of bacterial and fungal agents causing lower respiratory tract infections in patients with human immunodeficiency virus infection, Indian Journal of Medical Microbiology, Volume 22, 2004,Pages 28-33.*
9. *Sakhaei S, Sadagheyani HE, Zinalpoor S, Markani AK, Motaarefi H. The Impact of Pursed-lips Breathing Maneuver on Cardiac, Respiratory, and Oxygenation Parameters in COPD Patients. Open Access Maced J Med Sci. 2018 Oct 20; 6(10):1851-1856.*
10. *Ubolnuar N, Tantisuwat A, Thaveeratitham P, Lertmaharit S, Kruapanich C, Mathiyakom W. Effects of Breathing Exercises in Patients With Chronic Obstructive Pulmonary Disease: Systematic Review and Meta-Analysis. Ann Rehabil Med. 2019 Aug;43(4):509-523.*
11. *Sakhaei S, Sadagheyani HE, Zinalpoor S, Markani AK, Motaarefi H. The Impact of Pursed-lips Breathing Maneuver on Cardiac, Respiratory, and Oxygenation Parameters in COPD Patients. Open Access Maced J Med Sci. 2018 Oct 20; 6(10):1851-1856.*