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A STUDY TO COMPARE THE EFFECT OF PRONE VS SEMI-FOWLER'S POSITIONS ON PEAK EXPIRATORY FLOW RATE AND RESPIRATORY RATE AMONG POST COVID PATIENTS ADMITTED IN LHDM & DR PREM HOSPITAL, PANIPAT. HARYANA

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Abstract:

Background of the Study: COVID-19 has overwhelmed healthcare services in various nations. Prolonged hypoxemia is a common presentation in patients with severe COVID-19. Several hospitalised COVID-19 patients had ARDS, which requires invasive mechanical breathing and intensive care. Prone position enhances the ventilation/perfusion ratio and recruitment of the dorsal lung segments, resulting in the opening of collapsed dorsal alveoli with enhanced gas exchange and oxygenation. **Aim of the study:** To examine the effect of prone versus semi-fowler's positions on peak expiratory flow rate and respiratory rate among Post Covid patients treated in LHDM & Dr Prem Hospital, Panipat. Haryana. **Research Methodology:** This study used true quasi-experimental design. Group 1 was given prone position, while Group 2 was given semi-position. fowler's This study used non-probability purposive sampling. LHDM & Dr Prem Hospital, Panipat post-covid patients provided data. Group 1 received prone positioning, whereas Group 2 received semi-position. fowler's Before situating the individuals in both groups, the researcher examined peak expiratory flow rate and respiratory rate and gave them the prescribed position for 30 minutes. The subjects were asked to maintain the position for 12 hours per day as comfortable. Post-test assessment occurred seven days after positioning. Descriptive and inferential statistics analysed data. Results: Experimental group PEFR values were 525.27 + 38.868 post-test. Control group mean and standard deviation values were 498.87 + 82.582 at post-test. Their mean difference was 428.6 and their paired "t" test value was 26.4 for 58 degrees of freedom. This is substantial at 0.003. Hence, experimental and control group post-test PEFR levels differed. **Conclusion:** Post-covid patients' PEFR was higher in prone position than semi- fowler's. The researcher recommends prone and semi-for fowler's post-covid patients' respiratory characteristics.

Key Words: Prone, Semi-fowler, Post Covid, PEFR

Introduction:

Coronaviruses (CoVs), positive-sense single-stranded RNA viruses, infect humans and animals. HCoVs were first linked to acute upper respiratory infection (URI) in 1962. HCoVs have increasingly been linked to severe upper and lower respiratory tract infections in recent years (RTI). They are the leading cause of pneumonia in immunocompromised and elderly persons. Over the last two decades, two extremely dangerous human coronaviruses were identified, including coronaviruses linked with severe acute respiratory syndrome (SARS-CoV-2) and the Middle East respiratory sickness (MERS-CoV) which developed in different locations of the world. 2 The International Committee on Taxonomy of Viruses (ICTV) isolated and named severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) from Wuhan city, China, pneumonia patients on December 31, 2019. The WHO declared COVID-19 a "public-health emergency of worldwide significance" on March 11, 2020.

The SARS-CoV-2-caused COVID-19 pandemic of 2020 was the worst event of the century. This research has exploded. SARS-CoV-2 "long-haulers" have caused a second pandemic. 5 Million have been infected, and more will be. Thus, healthcare providers and researchers must identify, characterise, and understand COVID-19 consequences.

Although the literature on post-COVID symptoms is still in its early stages, "long-haulers" report a variety of symptoms affecting different systems: neurocognitive (brain fog, dizziness, loss of attention, confusion), autonomic (chest pain, tachycardia, palpitations), gastrointestinal (diarrhoea, abdominal pain, vomiting), respiratory (general fatigue, dyspnea, cough, throat pain), and musculoskeletal (myalgias, arthr (ageusia, anosmia, parosmia, skin rashes). Most post-COVID studies have found that 50–70% of hospitalised patients have numerous symptoms up to three months following release.

Viral pneumonia hospitalisations have skyrocketed due to the COVID-19 pandemic. Older men, black and Asian minority ethnicity, and comorbidities are particularly affected. COVID-19 increases hypercoagulability and venous thromboembolism. Most hospitalised patients with respiratory failure are treated on regular wards, but others need intensive care. Previous coronavirus outbreaks like SARS and MERS suggest that some individuals will develop long-term respiratory difficulties from COVID-19 pneumonia. Based on thoracic imaging abnormalities and clinical experience, interstitial lung disease and pulmonary vascular disease may be the most serious respiratory consequences.

PEFR can be measured by anyone with a Mini-Wright peak flow metre. 22 The expiratory muscles are at a better length-tension relationship curve and can generate more intra-thoracic pressure when PEFR rises (Siva, 2015). The position with the highest PEFR maximises oxygen transfer and reduces WOB, dyspnea, and tiredness. Hence, more time can be spent in favourable positions with high PEFR values and less in detrimental positions with low values. Strong expiratory motions demand high respiratory flow. This position encourages coughing and other forced expiratory motions. This will help the elderly with everyday tasks and quality of life. Many young old elderly are mobile, self-sufficient, and have normal lung function. Body postures and PEFR in young old senior adults will be examined. Physiotherapists can counsel elderly patients on daily postural modifications to prevent issues by learning how PEFR is affected by body postures.

This study will be the first to examine how different body positions affect peak expiratory flow rate and respiratory rate in post-Covid patients. The researcher will lead such studies across India and the world. This study will help nurses and doctors understand how different positions affect peak expiratory and respiratory rate in post-Covid patients. The researcher chose this study as part of her Nurse Practitioner Course at Pandit B.D. Sharma University of Health Sciences. Rohtak.

Objectives:

1. To assess pre and post –test peak expiratory flow rate and respiratory rate among subjects in two groups.
2. To compare the effect of body positioning on peak expiratory flow rate and respiratory rate among subjects in two groups.
3. To determine association between peak expiratory flow rate with selected socio-demographic variables among subjects in two groups.
4. To determine association between respiratory rate with selected socio-demographic variables among subjects in two groups.

Conceptual framework: The conceptual frame work and the model for the present study was based on Wiedenbach's helping art of clinical nursing theory [1964]. It describes a desired situation and a way to attain it. It directs action towards the implicit goal. This theory had three factors central purpose, prescription, and realities. A nurse develops a prescription based on central purpose and implements it according to the realities of the situation.

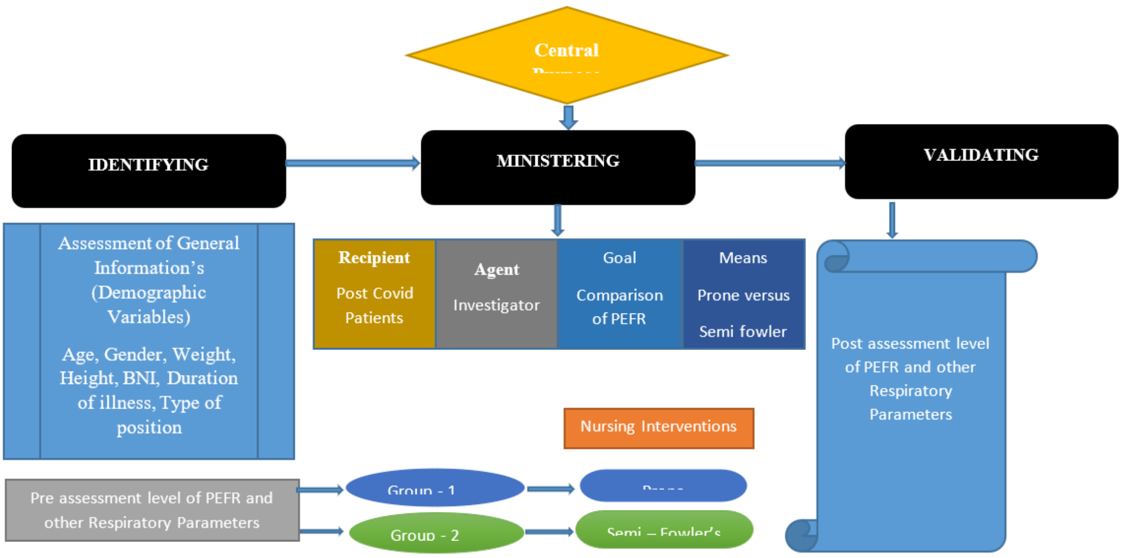

Figure – 1: Modified Wiedenbach's Helping Art of Clinical Nursing Theory

Materials and Methods:

Research design:

The research design adopted for this study was quasi - experimental design.

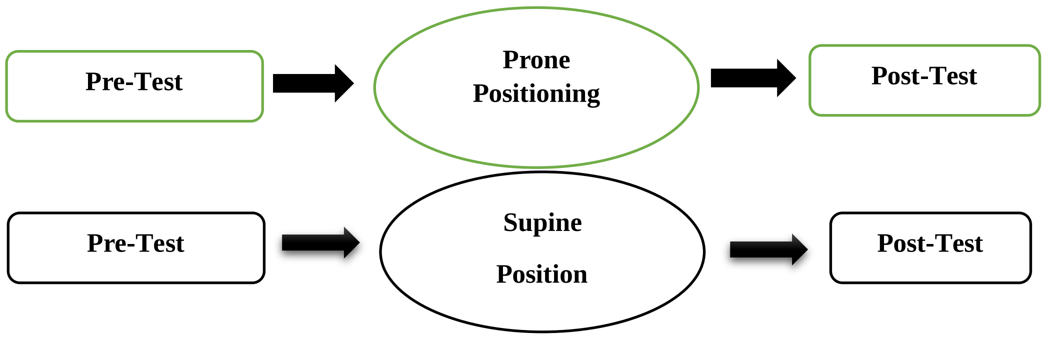

Figure – 2: Diagrammatic Presentation of Research Design

Setting of the study: Research setting is the physical, social, or experimental context within which research is conducted. This study was conducted in, LHDM & Dr Prem Hospital. Panipat. It is a multi-speciality hospital with NABH accreditation, consisting of 210 beds with modern facilities and excellence in health care delivery system. In this hospital comprehensive quality health care were given to the covid patients.

Sample size:
Sample were divided equally in two groups. i.e., group – 1 and group -2 (30 samples in each group) group – 1 subjects were given prone position by the investigator, group – 2 subjects were given semi-fowler's position by the investigator.

Sampling technique:
The technique adopted for this study was Non probability purposive sampling.

Criteria for sample selection:

Inclusion Criteria:

- Patients who had recovered from fever within 3 days and maintain saturation above 95 % for the next four days without oxygen support.
- Both male and female post covid patients.
- Patients who were willing to participate in this study
- Patients who were diagnosed negative for covid – 19 for two consecutive times through PCR test.

Exclusion Criteria

- Covid – 19. Positive patients.
- Patients who had saturation level of oxygen below 95 %.
- Critically ill patients who were admitted in Covid ICU.

Development and description of the tool:
The investigator prepared the tool after going through the related literature and guidance of experts in the field of Nursing and Medicine
The tool for data collection were consisted of three sections namely,

Section A: Demographic data
It will include sample number, age, sex, weight, height, duration of illness, type of position given.

Section B: Peak Flow Meter and Disposable Mouth piece.
It is a calibrated instrument used to measure lung capacity in monitoring breathing disorders

Section C: Respiration Parameters

Peak Expiratory Flow Rate

Respiratory Rate

Procedure for data collection: Data collection required hospital permission. The primary study will begin when Ved Nursing College - Panipat's ethical committee approves. LHDM & Dr Prem Hospital, Panipat post-covid patients would provide data. Group 1 received prone positioning, whereas Group 2 received semi-position. fowler's Before situating the individuals in both groups, the researcher examined peak expiratory flow rate and respiratory rate and gave them the prescribed position for 30 minutes. The subjects were asked to maintain the position for 12 hours per day as comfortable. Post-test assessment occurred three days after positioning.

Data analysis: Descriptive and inferential statistics analysed the data. This study described mean, standard deviation, and percentage. Inferential statistics uses a one-sample paired "t" test to determine the relationship between demographic variables and evoked problems.

Results:

Table – I: Frequency and Percentage Distribution of Subjects at Socio – Demographic Variables in an Experimental Group - I

(n = 30)

S. No	Demographic Variables	Options	Experimental Group - 1		Experimental Group - II	
			(f)	(%)	(f)	(%)
1	Age (Years)	21 - 31	2	6.7	7	23.3
		32 - 41	6	20.0	12	40.0
		42 - 51	11	36.7	2	6.7
		52 - 61	7	23.3	9	30.0
		62 - 71	4	13.3	13	43.3
2	Gender	Male	15	50.0	17	56.7
		Female	15	50.0	3	10.0
3	Body Mass Index	Normal	3	10.0	4	13.3
		Over Weight	5	16.7	1	3.3
		Obese Class - I	1	3.3	8	26.7
		Obese Class - II	12	40.0	14	46.7
		Obese Class - III	9	30.0	5	16.7
4	Duration of Illness	1 - 5 days	4	13.3	19	63.3
		6 - 10 days	23	76.7	6	20.0
		11 - 14 days	3	10.0	30	100.0
5	Type of Position Given	Prone	30	100.0	0	0.0
		Semi-Fowler's	0	0.0	30	100.0

Table II shows how often and how many people in Experimental Group I and Experimental Group II have certain socio-demographic characteristics.

The following table shows how the subjects' ages were spread out in the Experimental Group I. Most of the 11 subjects (36.7%) were between the ages of 42 and 51. There were 6 (20%) people who were between 32 and 41 years old. The following table shows how the subjects' ages were spread out in the Experimental Group II. Most of the 12 people who took part (60%) were between the ages of 32 and 41. Nine (30%) of the subjects were between the ages of 52 and 61.

Concerning the gender of the people in Experimental Group I, 15 (50%) of the people in that group were both men and women. In the test group (II), Concerning the gender of the people in Experimental Group II, most of them were women (56.7%), and the rest were men. 13 (43.3 %)

The subjects' body mass index (BMI) was split up like this: most (12, or 40%) were in Obese Class II. There were 9 (30%) people in this group who were in the obese class III. In experimental group II, the subjects' body mass index (BMI) was split up like this: 14 (46.7%) were in the Obese Class III. Eight (26.7%) of the people in this group were in the obese Class II.

In terms of how long they were sick, most of the people in the Experimental Group I-23 (76.7% of them) were sick for 6–10 days, while 13.3% of them were sick for 1–5 days. In Experimental Group II, 19 (63.3%) of the subjects were sick for 6–10 days, while 6 (20%) were sick for 11–14 days.

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Table – II: Mean, Mean Percentage, Standard Deviation and Variance of the Physiological Parameters of the Subjects in Experimental Group -I

(n = 30)

S. No	Physiological Variables	Mean	Standard Deviation	Variance	Standard Error
1	Height (cm)	147.73	9.822	96.478	1.793
2	Weight (kg)	77.37	12.609	158.999	2.302
3	Body Mass Index	35.89	7.293	53.185	1.331

The above table shows the Mean, Mean Percentage, Standard Deviation and Variance of the Physiological Parameters of the Subjects in Experimental Group - I

The mean and standard deviation values for height was 147.73 $\pm$ 9.822. the variance level was 96.478 and the standard error 1.793.

The mean and standard deviation values for weight was 77.37 $\pm$ 12.609 the variance level was 158.999 and the standard error 2.302.

The mean and standard deviation values for body mass index was 35.89 $\pm$ 7.293 the variance level was 53.185 and the standard error 1.331.

Table – III: Mean, Mean Percentage, Standard Deviation and Variance of the Physiological Parameters of the Subjects in Experimental Group - II

(n = 30)

S. No	Physiological Variables	Mean	Standard Deviation	Variance	Standard Error
1	Height (cm)	148.13	11.346	128.740	2.072
2	Weight (kg)	81.47	10.631	113.016	1.941
3	Body Mass Index	37.83	8.141	66.278	1.486

The above table shows the Mean, Mean Percentage, Standard Deviation and Variance of the Physiological Parameters of the Subjects in Experimental Group - II

The mean and standard deviation values for height was 148.13 $\pm$ 11.346. the variance level was 128.740 and the standard error 2.072.

The mean and standard deviation values for weight was 81.47 $\pm$ 10.631 the variance level was 113.016 and the standard error 1.941.

The mean and standard deviation values for body mass index was 37.83 $\pm$ 8.141 the variance level was 66.278 and the standard error 1.486.

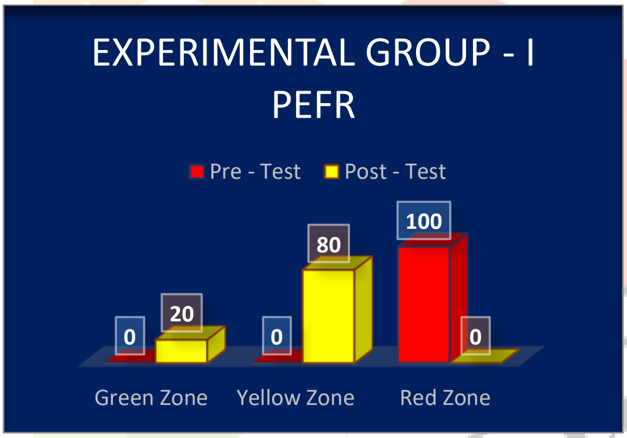

Figure – 3: Bar diagram Representing the Percentage Distribution of PEFR Values of the Subjects in Experimental Group – 1

Figure – 3: shows the percentage Distribution of Subjects According to PEFR Level in Experimental During Pre and Post – Test

In experimental group with regard to the level of PEFR at the time of pre – test on day – 1 all the subjects who had participated in the study 30 (100 %) were under red zone. None of the subjects in the study were under green zone and yellow zone.

During post – test day - 7, majority of the subjects 24 (80%) were under yellow zone. Subjects who were under green zone 6 (20 %)

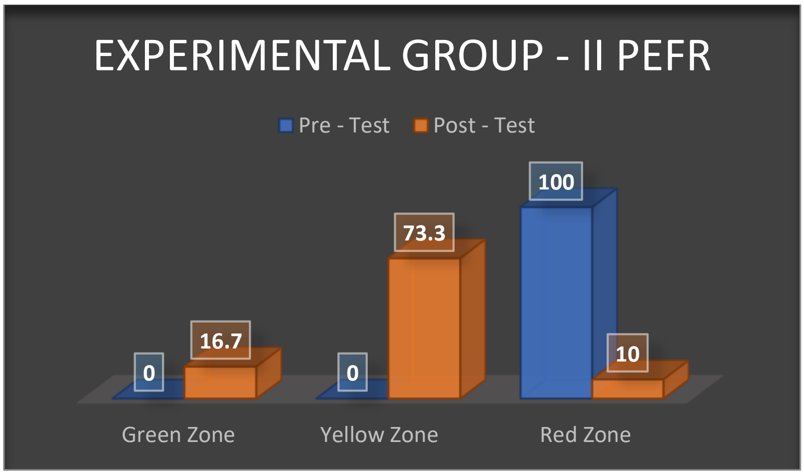

Figure – 4: Representing the Percentage Distribution of PEFR Values of the Subjects in Experimental Group - II

The above Bar diagram depicts the Frequency and Percentage Distribution of Subjects According to PEFR Level in Experimental Group - II During Pre and Post – Test.

In control group with regard to the level of PEFR at the time of pre – test on day – 1 all the subjects who had participated in the study 30 (100 %) were under red zone. None of the subjects in the study were under green zone and yellow zone.

During post – test day - 7, majority of the subjects 22 (73.3 %) were under yellow zone. Subjects who were under green zone 5 (16.7 %)

Table – IV: Mean, Standard Deviation and Variance of the Subjects Physiological Variables in Experimental Group - I

(n = 30)

S. No	Parameters	Mean		Standard Deviation		Variance	
		Pre – Test	**Post - Test**	**Pre – Test**	**Post - Test**	**Pre – Test**	**Post - Test**
1	**Respiratory Rate**	35.60	21.93	6.290	4.118	39.559	16.961
2	**SP02**	51.97	90.03	8.185	4.597	66.999	21.137
3	**HC03-**	47.50	29.87	9.073	2.636	82.328	6.947
4	**PaCo2**	69.73	38.63	6.762	3.358	45.720	11.275

Table – IV depicts the Mean, Standard Deviation and Variance of the Subjects Physiological Variables in Experimental Group - I

During pre – test assessment the mean and standard deviation of the respiratory rate was 35.6 $\pm$ 8.290. the variance level was 39.559. similarly, during post – test assessment on day – 7 the mean and standard deviation values were 21.93 $\pm$ 4.118. the variance level was 16.961.

During pre – test assessment the mean and standard deviation of the SP02 was 51.97 $\pm$ 8.185. the variance level was 66.999. similarly, during post – test assessment on day – 7 the mean and standard deviation values were 90.03 $\pm$ 4.597. the variance level was 21.137.

During pre – test assessment the mean and standard deviation of the HCO3- was 47.50 $\pm$ 9.073. the variance level was 82.328. similarly, during post – test assessment on day – 7 the mean and standard deviation values were 29.87 $\pm$ 2.636. the variance level was 6.947.

During pre – test assessment the mean and standard deviation of the PACO2 was 69.73 $\pm$ 6.762. the variance level was 45.720. similarly, during post – test assessment on day – 7 the mean and standard deviation values were 38.63 $\pm$ 3.358. the variance level was 11.275.

Table – V: Mean, Standard Deviation and Variance of the Subjects Physiological Variables in Experimental Group - II

(n = 30)

S. No	Parameters	Mean		Standard Deviation		Variance	
		Pre – Test	Post - Test	Pre – Test	Post - Test	Pre – Test	Post - Test
1	**Respiratory Rate**	34.47	38	5.746	5.582	33.016	31.154
2	**SP02**	51.47	94	7.912	4.636	62.602	21.490
3	**HC03-**	49.97	35	5.910	3.016	34.930	9.099
4	**PaCo2**	62.43	49	8.080	4.411	65.289	19.459

Table – V: depicts the Mean, Standard Deviation and Variance of the Subjects Physiological Variables in Experimental Group – II.

During pre – test assessment the mean and standard deviation of the respiratory rate was 34.47 ± 5.746. the variance level was 33.016. similarly, during post – test assessment on day – 7 the mean and standard deviation values were 38 ± 5.582 the variance level was 31.154.

During pre – test assessment the mean and standard deviation of the SP02 was 51.47 ± 7.912. the variance level was 62.602. similarly, during post – test assessment on day – 7 the mean and standard deviation values were 94 ± 4.636. the variance level was 21.490.

During pre – test assessment the mean and standard deviation of the HCO3- was 49.97 ± 5.910. the variance level was 34.930. similarly, during post – test assessment on day – 7 the mean and standard deviation values were 35 ± 3.016. the variance level was 9.099.

During pre – test assessment the mean and standard deviation of the PaCo2 was 62.43 ± 8.080. the variance level was 65.289. similarly, during post – test assessment on day – 7 the mean and standard deviation values were 49 ± 4.411. the variance level was 19.459.

Table – VI: Mean, Mean Difference, Standard Deviation and Paired 't' test Value of Subjects PEFR Values in Experimental Group - i

(n = 30)

S. No	Experimental Group (PEFR)	Mean	Mean Difference	Standard Deviation	Paired 't' test Value	Level of Significance
			Experimental Group - I (PEFR)			
1	**Pre – Test**	69.07	**456.2**	9.962	**70.325 (df = 29)**	**0.001 Significant**
2	**Post - Test**	525.27		38.868		
			Experimental Group - II (PEFR)			
1	**Pre – Test**	70.27	**428.6**	10.989	**27.917 (df = 29)**	**0.001* Significant**
2	**Post - Test**	498.87		82.562		

During pre – test the mean and standard deviation PEFR values was 69.07 + 9.962. at the time of the post – test the mean and standard deviation values were 525.27 + 38.868. their mean difference was 456.2. the paired 't' test value was 70.325 for the degree of freedom 29. Which shows the significant at the 'P' value ≤ than 0.001.

Hence, we shall conclude that, there was a difference between the pre-test PEFR value and post – test PEFR value of the subjects in experimental group - I.

During pre – test the mean and standard deviation PEFR values was 70.27 ± 10.989. at the time of the post – test the mean and standard deviation values were 498.87 ± 82.582. their mean difference was 428.6. the paired 't' test value was 27.917 for the degree of freedom 29. Which shows the significant at the 'P' value < than 0.001.

Hence we shall conclude that, there was a difference between the pre-test PEFR value and post – test PEFR value of the subjects in Experimental Group - II.

Table – VII: Mean, Mean Difference, Standard Deviation and Independent 't' test Value of Subjects PEFR Values

(n = 30)

S. No	Post - Test (PEFR)	Mean	Mean Difference	Standard Deviation	Paired 't' test Value	Level of Significance
1	**Experimental Group -I**	525.27	**26.4**	38.868	**1.585 (df = 58)**	**0.003* Significant**
2	**Experimental Group - II**	498.87		82.562		

During post – test assessment among the subjects in experimental group - I the mean and standard deviation PEFR values was 525.27 ± 38.868. at the time of the post – test the mean and standard deviation values of the subjects in control group were 498.87 ± 82.582. their mean difference was 428.6. the paired 't' test value was 26.4 for the degree of freedom 58. Which shows the significant at the 'P' value $\leq$ than 0.003.

Hence, we shall conclude that, there was a difference between the post-test PEFR values among the subjects in experimental and in Experimental Group – II.

From the above analysis, we could find the mean value in experimental group – I was higher than the mean value of subjects in experimental group – II. So, we could conclude that prone position was more effective as compared to semi – fowler's position.

Discussion:

Below are supporting studies.

Rashmi A. Sheelvant and Dr. Varsha A. Kulkarni (2021) examined the effects of deep breathing exercises on Peak Expiratory Flow Rate in adult, non-smoking cigarette retailers using a Peak Flow metre. Intervention Group A (n=25) and Control Group B (n=25). PEFR was measured pre- and post-intervention in Group A. Results: 67% (n=24) of 36 subjects had lower Peak Flow Rates than predicted. 33% (12) had normal PEFR. 83% of 36 subjects were in the Green Zone (n=30), 17% in the Yellow Zone (n=6), and none in the Red Zone. Peak Flow improved in Group A (p<0.01).

Badr C, Elkins R.M, and Ellis R.E (2002) examined how body position affects MEP and PEFR. MEP and PEFR were measured in seven random positions (standing, chair sitting, sitting in bed with backrest vertical, sitting in bed with backrest 45 degrees, supine, side lying, and side lying with head down tilt 20 degrees) on 25 adults with normal respiratory function (NRF) and 11 adults with chronic airflow limitation (CAL). For the NRF group, MEP in standing (143+/-10cmH2O, mean+/-SEM) was significantly higher than in chair sitting (133+/-10cmH2O) and the remaining positions. Head-down tilt had the lowest MEP (108+/-9cmH2O). Standing (571+/-24L/min) and head down tilt (486+/-23L/min) had significantly higher and lower PEFRs than all other positions, respectively. The CAL group had higher MEP in standing (134+/-18cmH2O) and lower MEP in head down tilt (96+/-15cmH2O) than in most other positions. The CAL group had higher PEFR in standing (284+/-40ml/sec) and lower PEFR in head down tilt (219+/-38ml/sec) than in most other positions. MEP and PEFR are lowest in NRF and CAL subjects when they are head-down. Thus, patients should be encouraged to cough or huff upright to maximise expiratory manoeuvres during head-down treatments.

Weiner P et al. examined how incentive spirometry and inspiratory muscle training affected pulmonary function after lung resection (1997) Thirty-two patients with chronic obstructive pulmonary disease who were candidates for lung resection were randomised into two groups: 17 patients received specific inspiratory muscle training and incentive spirometry for 1 hour per day, six days a week, for 2 weeks before and 3 months after lung resection (group A), while 15 patients were in the control group and received no training (group B). Results: The training group had greater inspiratory muscle strength before and 3 months after surgery. In group B's lobectomy and pneumonectomy subgroups, the predicted postoperative FEV1 value consistently underestimated the actual value by 70 and 110 ml, respectively. In group A, the actual postoperative FEV1 was 570 ml higher than predicted in the lobectomy subgroup and 680 ml in the pneumonectomy subgroup. Conclusions: Lung resection patients' predicted postoperative FEV1 is slightly lower than their actual FEV1. Incentives spirometry and inspiratory muscle training before and after surgery improve lung function.

Conclusion:

By comparing the prone position to the semi-posture fowler's among post-coital patients, it was determined that the prone position was much more successful at increasing PEFR. The researcher suggests that the semi-position fowler's and the prone position should both be examined for enhancing the respiratory parameters of post-coital patients. The prone position should be considered initially.

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