Multi-DisciplinaryJournal
ISSN No- 2581-9879 (Online), 0076-2571 (Print)
www.mahratta.org,editor@mahratta.org

Effect of Manual Positioning As An Adjunct To Intercostal Drainage In Pleural Effusion

Authors - Dr. Monali M. Kashyap[1], Dr. NishaShinde[2],Dr. Manasi Tendulkar – Sukhatankar[3]

1. *Dr. MonaliMahendraKashyap,Assistant Professor,*
Tilak Maharashtra Vidyapeeth college of physiotherapy, Pune-37,
Email id- monali.kashyap@tmv.edu.in

2. *Dr.NishaShinde Professor,*
Tilak Maharashtra Vidyapeeth college of physiotherapy, Pune-37,
Email id- nisha.shinde@tmv.edu.in

3. *Dr. Manasi Tendulkar – SukhatankarAssistant professor,*
Tilak Maharashtra Vidyapeeth college of physiotherapy, Pune-37,
Email id- manasi.sukhatankar@tmv.edu.in

Abstract

Objectives- The purpose of this study was to check the effect of manual positioning in supine lying, prone lying, and semi fowler's (45^0)

Method: 30 subjects diagnosed with pleural effusion with ICD. Were included in this study. These subjects were allocated by convenient sampling method. RR, SpO_2, CC of all the three levels (axillary level, 2nd intercostal space, xiphistrenum level). Pre and post-treatment assessment was done and documented.

Result: Pre and post treatment protocol was analysed by using paired t test. Results in all 3 groups were analysed. But group C for RR (p=<0.0001), SpO_2 (p=0.0006), CC at all three levels (p=<0.0001) showed extremely significance than other 2 groups.

Conclusion: This study concludes that semi-fowlers position was more effective as compared to the two other positions.

Key words:chest circumference, inter costal drainage, pleural effusion.

Introduction

Pleural effusion is the accumulation of fluid in between the parietal and visceral pleura, called pleural cavity. It can occur by itself or can be the result of surrounding parenchymal disease like infection, malignancy or inflammatory conditions. Pleural effusion is one of the major causes of pulmonary mortality and morbidity.[1]

All healthy humans have a small amount of pleural fluid that lubricates the space and facilitates normal lung movements during respiration. This delicate balance of fluid is maintained by the oncotic and hydrostatic pressure and the lymphatic drainage; disturbances in any one of these systems can lead to a build-up of pleural fluid. Pleural fluid is classified as a transudate or exudate based on modified Light's criteria. Pleural fluid is considered an exudative effusion if at least one of the criteria are met[1]

Pleural effusion is the most common disease among all the pleural disease and affects 1.5 million patients per year in the United States. A wide variety of diseases can present with pleural effusions like diseases primarily involving the lung like pneumonia, asbestos exposure, primarily systemic diseases like lupus, rheumatoid arthritis, or maybe the pleural manifestation of diseases which primarily affect other organs like congestive heart failure, pancreatitis, or diseases local to the pleura like pleural infections and mesothelioma.[2]

In the normal healthy adult, the pleural cavity has minimal fluid which acts a lubricant for the two pleural surfaces. The amount of pleural fluid is around at 0.1 ml/kg to 0.3 ml/kg and is constantly exchanged. Pleural fluid originates from the vasculature of parietal pleura surfaces and is absorbed back by lymphatics in the dependent diaphragmatic and mediastinal surfaces of parietal pleura. Hydrostatic pressure from the systemic vessels that supply the parietal pleura is thought to drive the interstitial fluid into the pleural space and hence has a lower protein content than serum. Accumulation of excess fluid can occur if there is excessive production or decreased absorption or both overwhelming the normal homeostatic mechanism.[2] If pleural effusion is mainly due to Mechanisms that lead to pleural effusion mainly due to increased hydrostatic pressure are usually transudative, and leading to pleural effusion have altered the balance between hydrostatic and oncotic pressures (usually transudates), increased mesothelium and capillary permeability (usually exudates) or impaired lymphatic drainage.[5] A patient with pleural effusion can be asymptomatic or can present with exertional breathlessness depending on the impairment of thoracic excursion. Patient with active pleural inflammation called pleurisy complains of sharp, severe, localized crescendo/ decrescendo pain with breathing or a cough. When the effusion develops, pain can subside, falsely implying an improvement in condition. Constant pain is also a hallmark of malignant diseases like mesothelioma.

Depending on the cause of effusion, the patient can also complain of a cough, fever and systemic symptoms.[6]

The physical examination can be subtle. In large effusion, there will be the fullness of intercostal spaces, and dullness on percussion on that side. Auscultation reveals decreased breath sounds and decreased tactile and vocal fremitus. Egophony is most pronounced at the superior aspect of the effusion.[5]

Pleural rub, often mistaken for coarse crackles can be heard during active pleurisy without any effusion.[5]

Manual positioning is prescribed to optimize cardiopulmonary function and oxygen transport is different from routine body positioning. Positioning stimulate normal physiological effect of gravity and change on oxygen transport are priority that is being upright and moving. The distribution and ventilation in the lungs are primarily influenced by gravity and by manual positioning. Manipulating body positioning however alters both intraregional and interregional determinants ventilation perfusion and their matching.[4] Changing a patient's position may not seem a dramatic technique, but some action often prevents recourse to more time consuming. Positioning is an integral part of all respiratory care. Sometimes knowledge and technology can't save patients complications and the stay in hospital is prolong.so, something simple as giving the patient manual positioning like supine lying, prone lying, semi-fowler. Positioning generates significant alterations in arterial oxygenation in patients with unilateral lung diseases. Change in positioning and the consequent change of the gravity effect, among other factors, cause change in respiratory function at different intensities. Body position changes to aid in the prevention of skin breakdown, to enhance secretion clearance, and to improve ventilation perfusion. Proper positioning is also vital for providing comfort for patients who are bedridden or have decreased mobility related to a medical condition or treatment. Supine is the least helpful position for lung function. For ventilated patients the lateral position increases functional residual capacity and enhances gas exchange compared with supine. Patients who are confined to bed should spend a proportion of time on their prone lying well forwards so that their diaphragm is free from abdominal pressure.[9] Compared to supine this position not only increases lung volume, but also improves gas exchange and reduces the work of breathing. Airflow resistance is lower in prone lying compared to supine. Optimizing O2 transport is goal of positioning and mobilization. The purpose of this study is to throw light on the effects of various manual body positioning in patients with inter costal drainage in pleural effusion. It affects the pulmonary volumes of the lung manual positioning reduces the collapsing of lungs.[10] and improves the gas exchange.

Need For Study

- Many studies have been conducted related to intercostal drainage as an intervention in pleural effusion. There are no any studies been conducted on positioning as an intervention in pleural effusion.
- To see the effects of manual positioning in supine lying, prone lying, and semi-fowler's position. In patients with pleural effusion as an adjunct with inter costal drainage.
- To find out the effect of different manual positioning on early recovery of patient with inter costal drainage in pleural effusion.

Method and Methodology

Method –

- Sample size: 30
- Sampling method: convenient sampling.(chit method)
- Place of study: hospitals in and around Pune,
- Type of study: Experimental Study.
- Study duration: 6 months

MATERIALS USED

- Data collection sheet.
- Patient consent form.
- Measuring tape,
- Pulse oximeter,
- Watch

INCLUSION CRITERIA:-

- Participants diagnosed with pleural effusion
- Age 30-60 years.
- Both male and female gender

EXCLUSION CRITERIA:-

- Unstable head or neck injury
- Recent spinal injury
- Rib fracture
- Uncontrolled hypertension

OUTCOME MEASURES

1. **RESPIRATORY RATE**

It is act of breathing, the normal respiratory is 16-20 breath per min. When patient was given manual positioned in supine lying, prone lying, semi-fowler in intensive care unit. After and prior to positioning the patient RR was noted down pre and post treatment according to the pulse oximetry and was checked by the therapist.[10]

2. **PERIPHERAL OXYGEN SATURATION**

It is an estimate of the amount of oxygen in the blood. More specifically it is the percentage of oxygenated haemoglobin (haemoglobin containing oxygen) compared to the amount of haemoglobin in the blood (oxygenated and non-oxygenated hemoglobin). When patient was positioning supine lying, prone lying, and semi-fowler in intensive care unit the SpO2 was noted down pre and post treatment by pulse oximetry.[3]

3. **Chest circumference**

Circumference of chest at the fullest part of the breast region. When patient was given manual positioned in supine lying, prone lying, semi-fowler in intensive care unit.[9] After and prior to positioning the patientchest measurement was taken sitting position. Pre and post measurement was noted down. Chest circumference taken at 3 levels i.e. Axillary level, 2nd intercostal space, xiphisternum level.

PROCEDURE

30 Participant those who are diagnosed with pleural effusion with ICD were taken into study. Each of the patient was screened as per the inclusion and exclusion criteria. After briefing of the study and screening informed consent was taken. 30 participants were divided into 3 groups by chit method. The treatment protocol were for 2 weeks.

GROUP A- Patients being treated with supine lying position

GROUP B- Patients being treated with prone lying position.

GROUP C- Patients being treated with semi fowler's (45^0) position.

In group A,In group B,In group C- The treatment was given for 2 hours for continuously for 2 weeks. 2 session per day was given as participant had to maintained position for 2 hours in the morning and 2 hours in afternoon. Pre and post assessment of RR, SpO2, CC (at axillary level, 2^{nd} inter costal space, and xiphisternum level) were taken.

After the data collection done. Data was recorded in excel sheet. And data analysis was done using paired and unpaired-t test and repetitive measures ANAVOA test.

Result

Table no 1: GENDER DISTRIBUTION

	GROUP A	GROUP B	GROUP C
MALES	8	8	6
FEMALES	2	2	4
TOTAL	10	10	10

Graph no 1: GENDER DISTRIBUTION

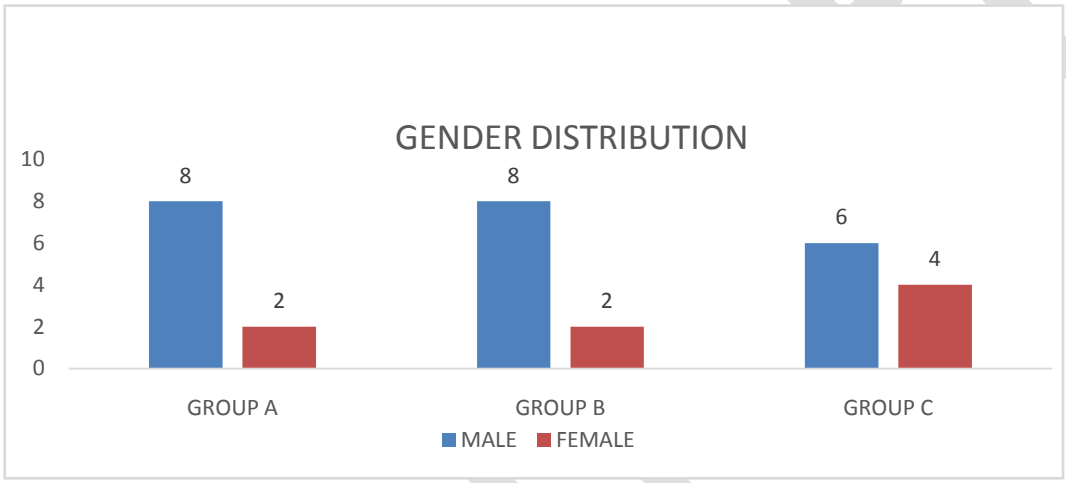


Table no -2 AGE DISTRIBUTION

	Group A	Group B	Group C
MeanAge	42.2	51.7	44.5
S. D	11.153	7.349	12.457

Graph no -2 AGE DISTRIBUTION

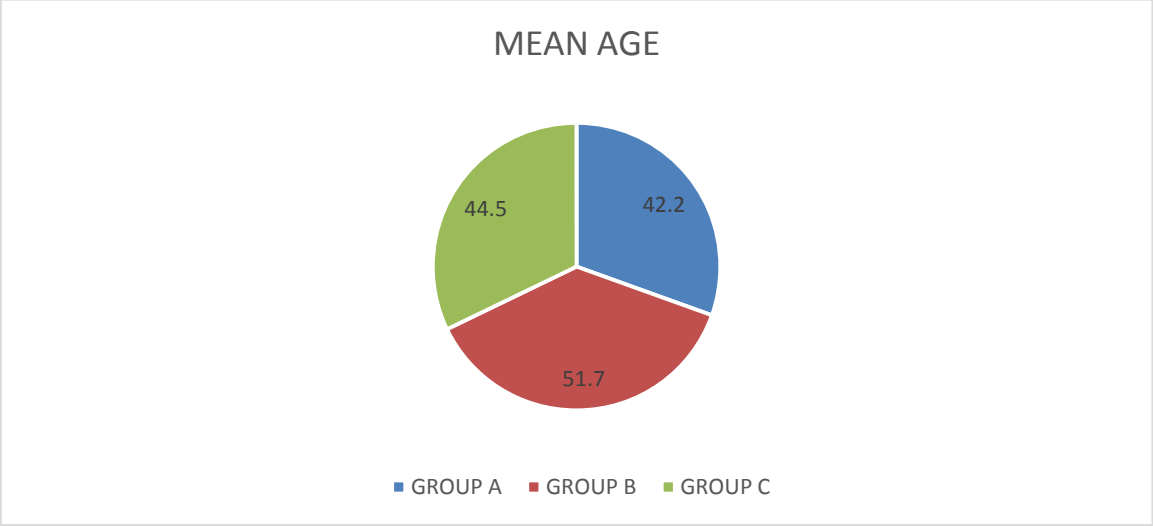
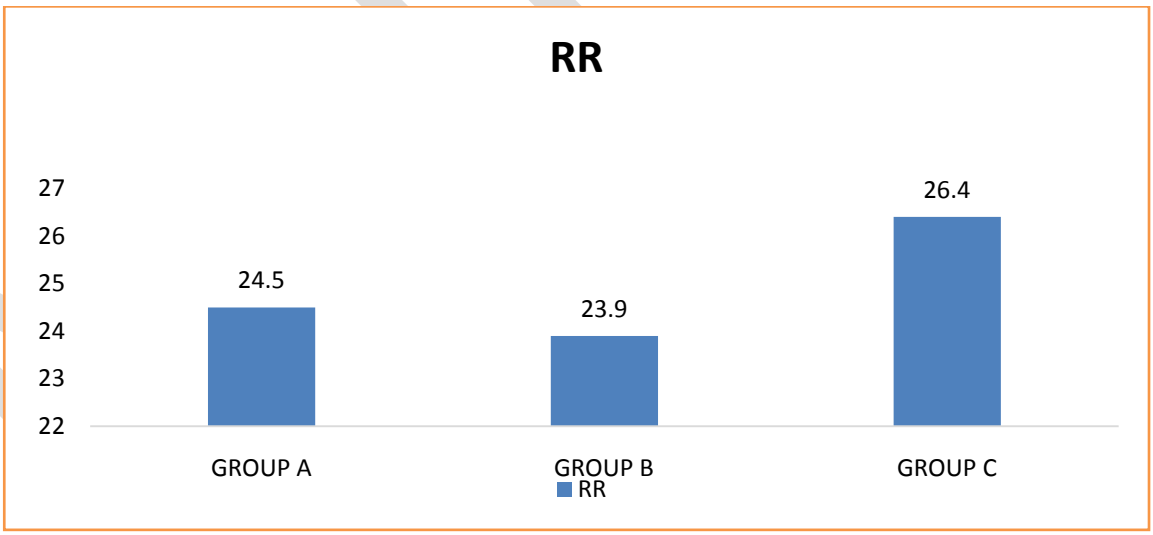


Table no 3: ANOVA ANALYSIS OF PRE-INTERVENTION RR

RR	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	24.5+3.171	1.429	0.4895	NOT SIGNIFICANT
GROUP B	23.9+2.961			
GROUP C	26.4+2.547			

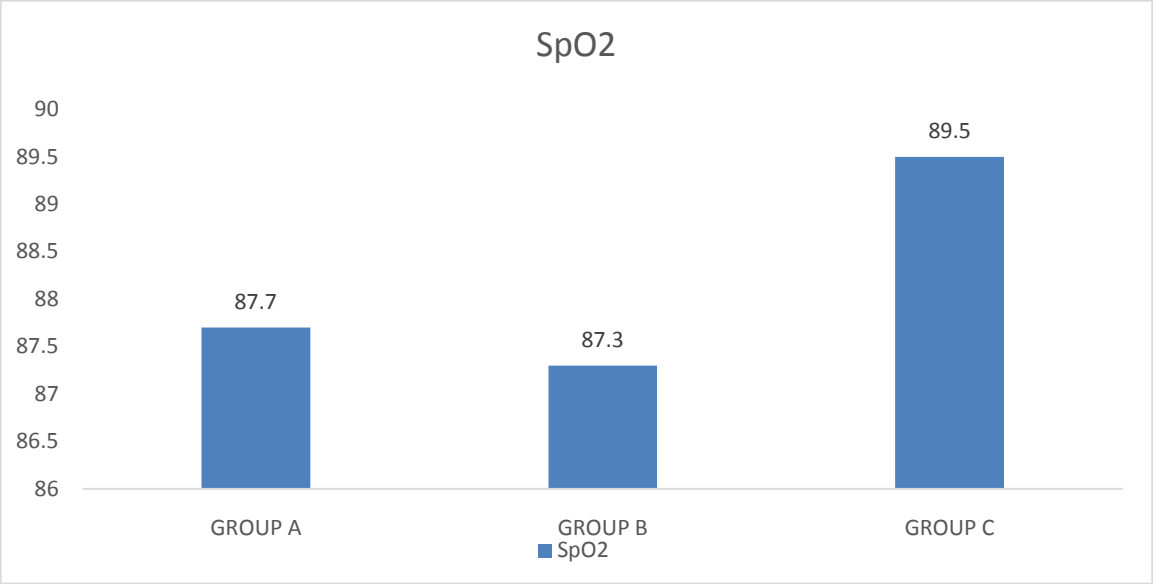


Graph No.3.The Graph Shows Pre-Intervention Of RR

ANOVA of pre-intervention of respiratory rate. Mean and standard deviation of group A is 24.5+3.171 group B is 23.9+2.961 group c is 26.4+2.547 and the F 1.429 value of all the group is 1.429 and P value is 0.4895 respectively. Which means there was no statistical difference among this groups.

Table no 4: ANOVA ANALYSIS OF PRE-INTERVENTION SPO2

SPO2	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	87.7+3.831	1.590	0.4516	NOT SIGNIFICANT
GROUP B	87.3+3.713			
GROUP C	89.5+3.440			



Graph No.4.The Graph Shows Pre-Intervention Of SpO2

ANOVA analysis of pre-intervention of oxygen saturation. Mean and standard deviation of group A is 87.7+3.831group B is 87.3+3.713group c is 89.5+3.440 the F value of all the group is 1.590 and P value is 0.4516 respectively. Which is not significant.

Table no 5: ANOVA ANALYSIS OF PRE-INTERVENTION CHEST-CIRCUMFERENCE

AXILLARY LEVEL	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	34.15+2.925	2.239	0.1260	NOT SIGNIFICANT
GROUP B	36.35+2.348			
GROUP C	34.16+2.348			

ANOVA analysis of pre-intervention of chest circumference. Axillary level Mean and standard deviation of group A is 34.15+2.925 group B is 36.35+2.348 group c is 34.16+2.348 the F value of all the group is 2.239 and P value is 0.1260 respectively. Which is not significant

Table no 6:

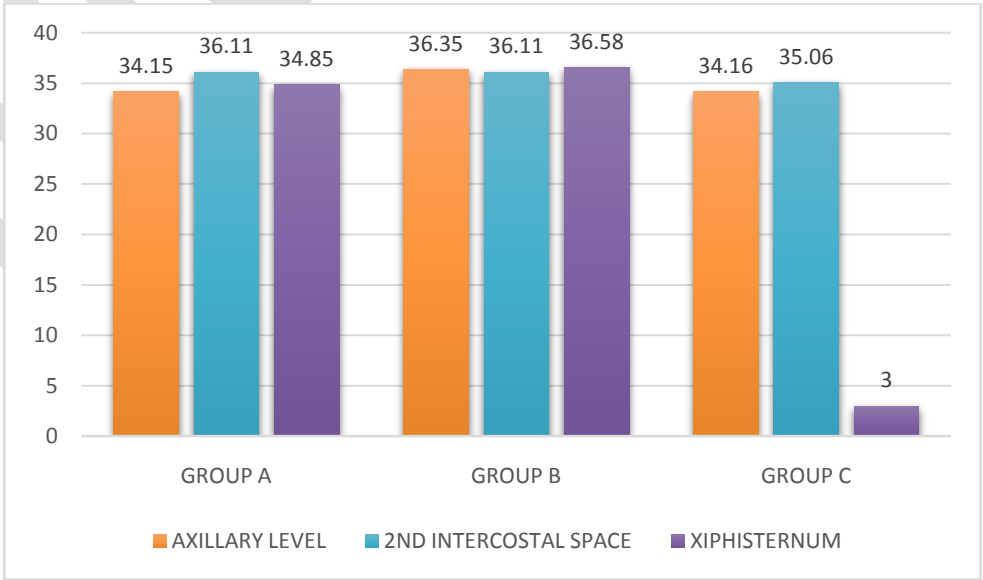
2ND INTERCOSTAL SPACE	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	36.11+2.786	0.4634	0.6340	NOT SIGNIFICANT
GROUP B	36.11+2.786			
GROUP C	35.06+2.875			

ANOVA analysis of pre-intervention of chest circumference. 2nd intercostal space Mean and standard deviation of group A is 36.11+2.786 group B is 36.11+2.786 group c is 35.06+2.875 the F value of all the group is 0.4634 and P value is 0.6340. Respectively.Which is not significant.

Table no 7:

XIPHISTERNUM LEVEL	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	34.85+3.408	0.8248	0.4490	NOT SIGNIFICANT
GROUP B	36.58+3.365			
GROUP C	34.86+3.625			

ANOVA analysis of pre-intervention of chest-Circumference.Xiphisternum level Mean and standard deviation of group A is 34.85+3.408 group B is 36.58+3.365 group c is 34.86+3.625 the F value of all the group is 0.8248 and P value is 0.4490. respectively. Which is not significant.

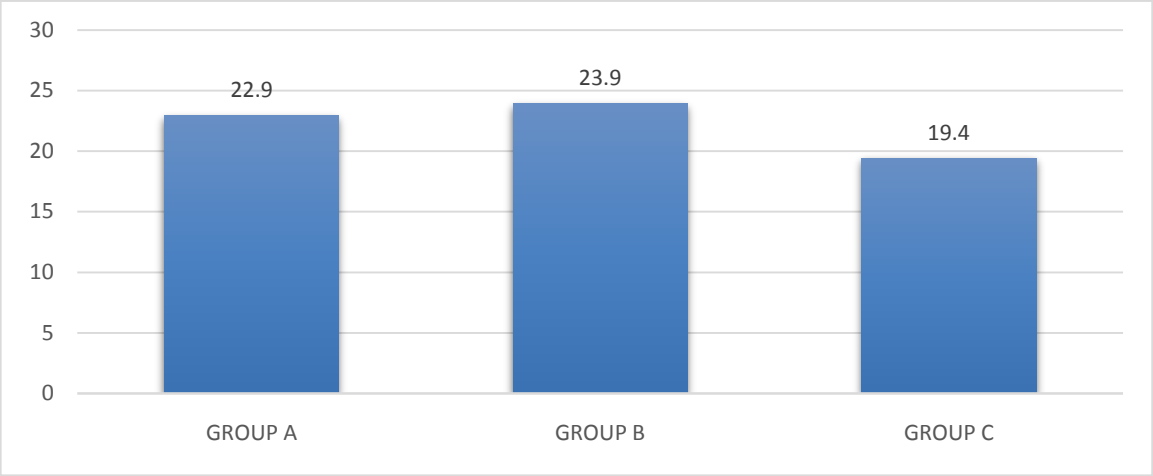


Graph No.5.The Graph Shows Pre-Intervention Of Chest-Circumference That Is Axillary Level,2nd Intercostal Space, Xiphisternum Level.

Table no 8: ANOVA ANALYSIS OF POST INTERVENTION RR

RR	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	22.9+1.912	8.85	0.0011	SIGNIFICANT
GROUP B	23,9+3.107			
GROUP C	19,4+2.366			

ANOVA analysis of post intervention of respiratory rate. Mean and standard deviation of group A is 22.9+1.912 group B is 23.9+3.107 group c is 19.4+2.366 the F8.85 value of all the group is and P value is 0.0011. Respectively.Which is significant.

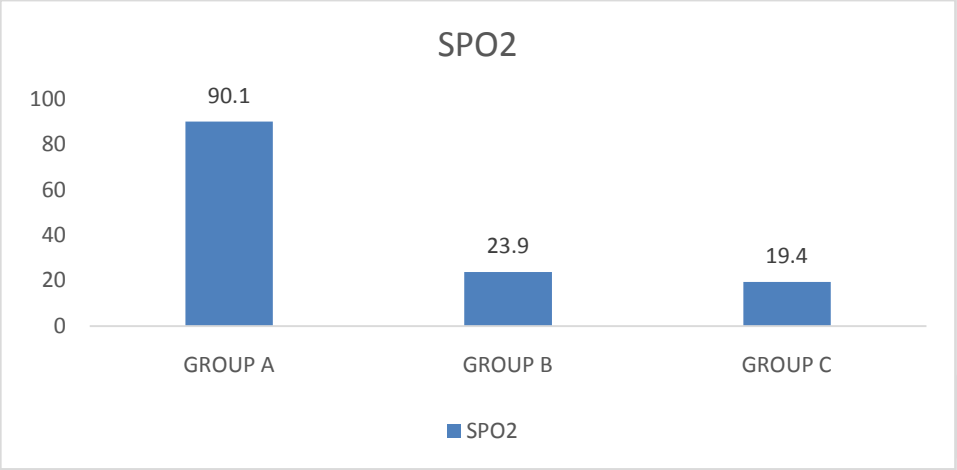


Graph No.6.The Graph Shows Post-Intervention Of RR

SPO2	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	90.1+2.685	12.951	0.0001	SIGNIFICANT
GROUP B	92.1+2.079			
GROUP C	95.7+2.669			

Table no 9:ANOVA ANALYSIS OF POST INTERVENTION SPO2

ANOVA analysis of pre-intervention of spo2 Mean and standard deviation of group A is 90.1+2.685 group B is 92.1+2.079 group c is 95.7+2.669 the F 12.951 value of all the group is and P value is 0.0001. respectively. Which is significant.

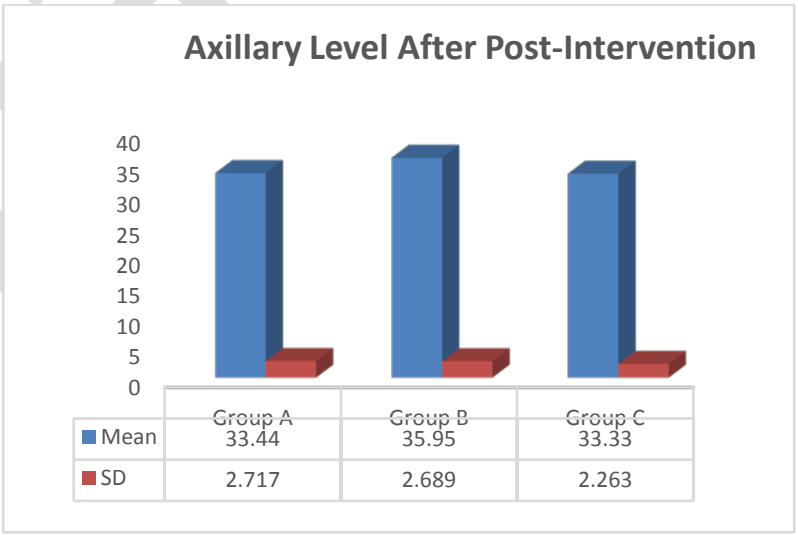


Graph No.7.The Graph Shows Post-Intervention Of Spo2

Table no 10: ANOVA ANALYSIS OF POST INTERVENTION CHEST-CIRCUMFERENC

AXILLARY LEVEL	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	33.44+2.717	3.380	0.0490	SIGNIFICANT
GROUP B	35.95+2.689			
GROUP C	33.33+2.263			

ANOVA analysis of post intervention of chest circumference. Axillary level Mean and standard deviation of group A is 33.44+2.717 group B is 35.95+2.689 group c is 34.42+2.333 the F value of all the group is 2.394 and P value is 0.1104 respectively. Which is not significant**.**

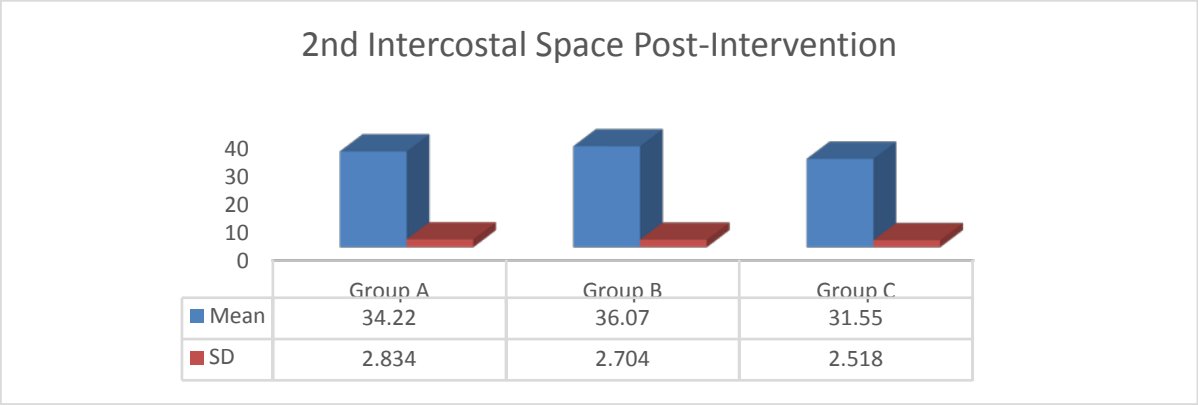


Graph No.8. Post Intervention Of Chest-Circumference Of Group A, B, C, Axillary Level

Table no 11:

2ND INTERCOSTAL SPACE	MEAN±SD	F- VALUE	P-VALUE	INTERPRETATION
GROUP A	34.22+2.834	7.145	0.0032	SIGNIFICANT
GROUP B	36.07+2.704			
GROUP C	31.55+2.518			

ANOVA analysis of post intervention of chest circumference. 2nd intercostal space Mean and standard deviation of group A is 34.22+2.834 group B is 36.07+2.704 group c is 31.55+2.518the F value of all the group is 1.118and P value is 0.0032 respectively. Which is significant.

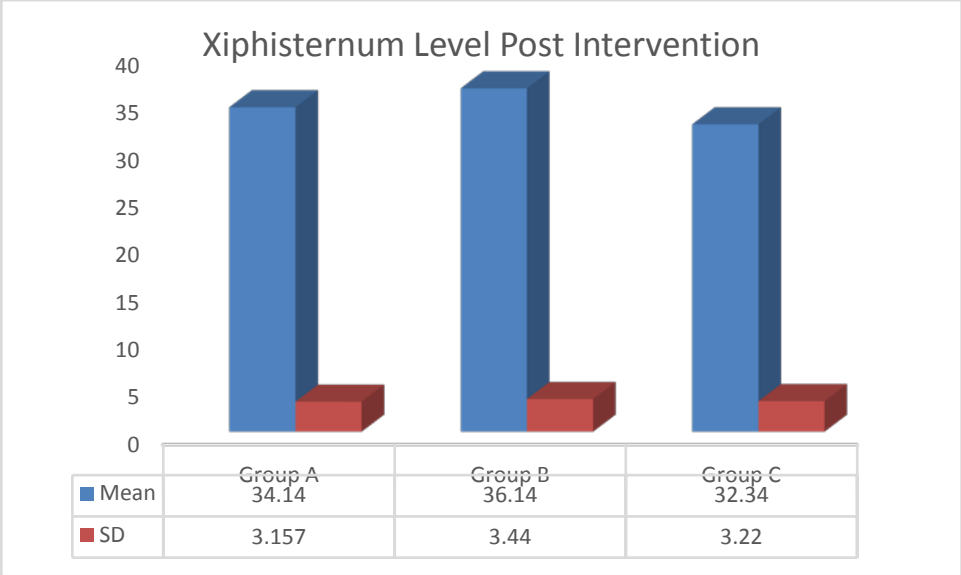


Graph No.9post Intervention Of Chest-Circumference Of Group A, B, C, 2nd Intercostal Space.

Table no 12:

XIPHISTERNUM LEVEL	MEAN±SD	F VALUE	P VALUE	INTERPRETATION
GROUP A	34.14+3.157	3.370	0.0494	SIGNIFICANT
GROUP B	36.14+3.440			
GROUP C	32.34+3.220			

ANOVA analysis of post intervention of chest Circumference.Xiphisternum level Mean and standard deviation of group A is 34.14+3.157 group B is 36.14+3.440 group c is 32.34+3.220the F value of all the group is 3.370 and P value is 0.0494 respectively. Which is significant

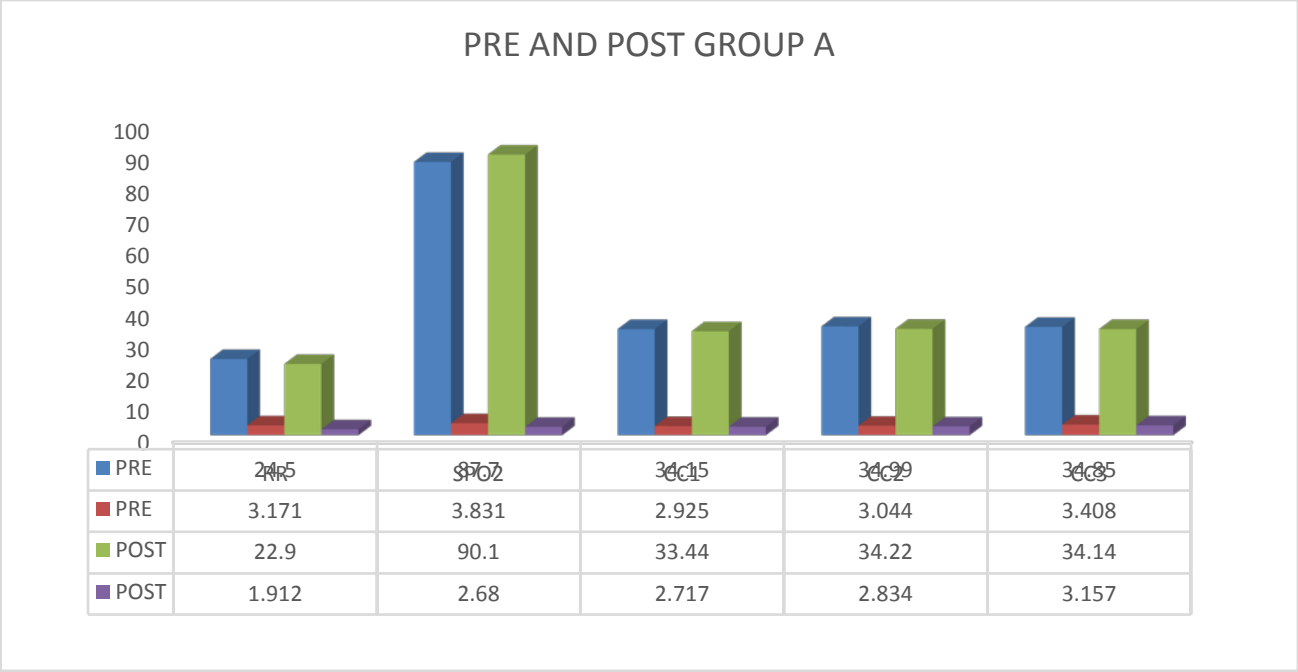


Graph No.10 Post Intervention Of Chest-Circumference Of Group A, B, C, Xiphisternum Level.

Table no 13: **PRE AND POST INTERPRETATION OF GROUP A**

GROUP A	PRE TREATMENT	POST TREATMENT			INTERPRETATION
	Mean±SD	Mean±SD	't' value	'p' value	
RR	24.5±3.171	22.9±1.912	1.199	0.2613	Not significant
SPO2	87.7±3.831	90.1±2.685	1.869	0.0944	Not significant
CC(AXILLAY LEVEL)	34.15±2.925	33.44±2.717	3.339	0.0087	Very significant
CC(2ND INTERCOSTAL SPACE)	34.99±3.044	34.22±2.834	2.377	0.0414	Significant
CC (XIPPISTERNAL LEVEL)	34.85+3.408	34.14±3.157	3.215	0.0106	Significant

We studied five parameters among that axillary level P value was 0.0087 and 2nd intercostal space P value was 0.0414. xiphisternum. P value was 0.0106. shows statistically significant except all other variables had no statistical significance.



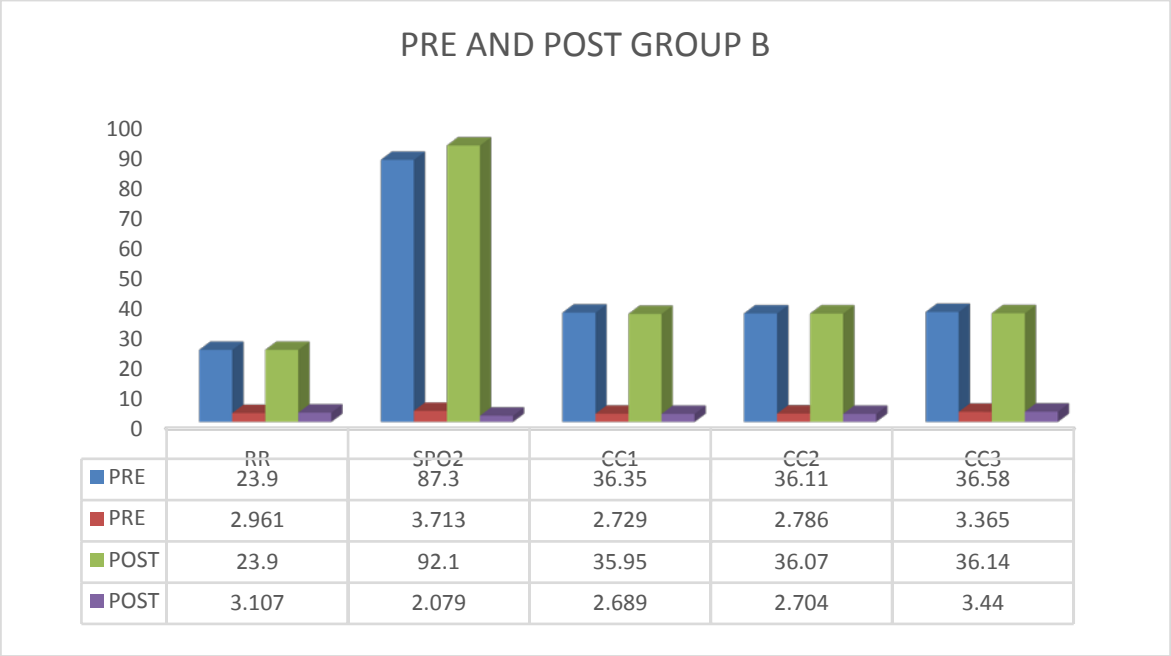
	RR	SPO2	CC1	CC2	CC3
PRE	24.5	87.7	34.15	34.99	34.85
PRE	3.171	3.831	2.925	3.044	3.408
POST	22.9	90.1	33.44	34.22	34.14
POST	1.912	2.68	2.717	2.834	3.157

Graph No.11 Pre-Post Interpretation Of Group A RR,Spo2 AndChest-Circumference.

Table no 14: **PRE AND POST INTERPRETATION OF GROUP B**

GROUPB	PRE TREATMENT	POST TREATMENT			INTERPRETATION
	Mean±SD	Mean±SD	't' value	'p' value	
RR	23.9±2.961	23.9+3.107	0.000	>0.9999	NOT SIGNIFICANT
SPO2	87.3+3.713	92.1+2.079	4.431	0.0016	VERY SIGNIFICANT
CC (AXILLARY LEVEL)	36.35+2.729	35.95+2.689	1.517	0.1637	NOT SIGNIFICANT
CC(2ND INTERCOSTAL SPACE)	36.11+2.786	36.07+2.704	0.2750	0.7895	NOT SIGNIFICANT
CC(XIPPISTERNAL LEVEL)	36.58+3.365	36.14+3.440	2.787	0.0212	SIGNIFICANT

We studied five parameters among that xiphisternum P value was 0. 0212.shows statistically significant except all other variables had no statistical significance shown in graph

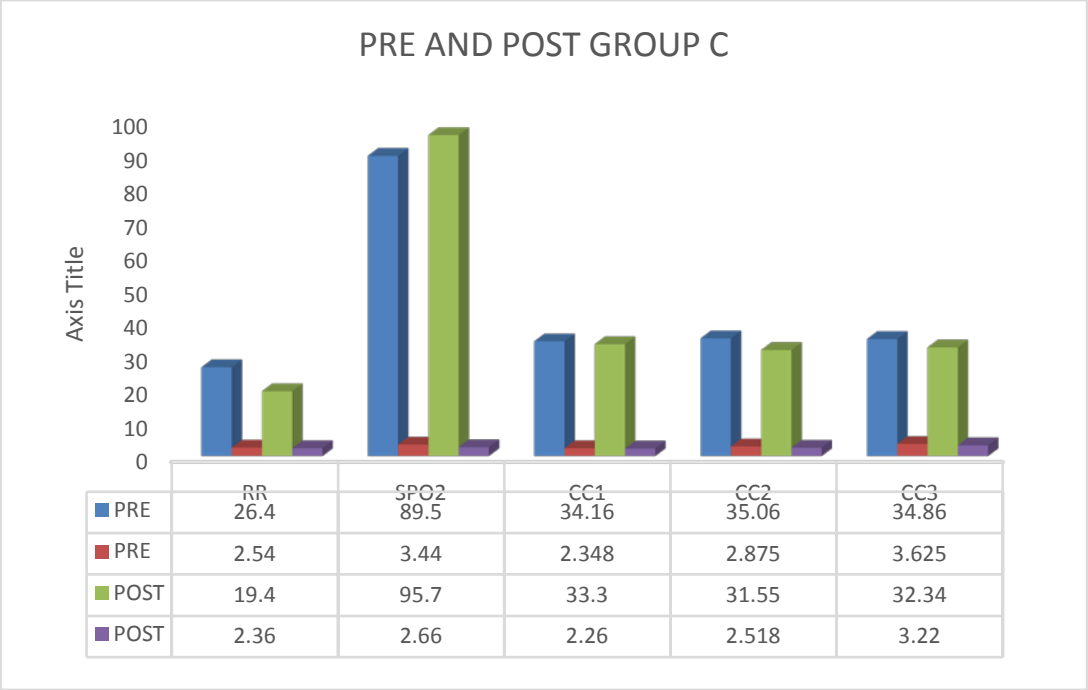


Graph No.12 Pre-Post Interpretation Of Group B RR,SpO_2 AndChest-Circumference.

Table no 15: **PRE AND POST INTERPRETATION OF GROUP C**

GROUPS C	PRE TREATMENT	POST TREATMENT			INTERPRETATION
	Mean±SD	Mean±SD	't' value	'p'value	
RR	26.4+2.547	19.4+2.366	7.000	<0.0001	EXTREMLY SIGNIFICANT
SPO2	89.5+3.440	95.7+2.669	5.207	0.OOO6	EXTREMLY SIGNIFICANT
CC (AXILLARY LEVEL)	34.16+2.348	33.3+2.263	8.777	<0.0001	EXTREMLY SIGNIFICANT
CC(2^{ND} INTERCOSTAL SPACE)	35.06+2.875	31.55+2.518	11.296	<0.0001	EXTREMLY SIGNIFICANT
CC(XIPHISTERNAL LEVEL)	34.86+3.625	32.34+3.220	6.978	<0.0001	EXTREMELY SIGNIFICANT

We studied five parameters among that respiratory P value was <0.0001. SPO2 P value was 0.0006 and.axillary level P value was <0.0001. 2^{nd} intercostal space P value was <0.0001 andxiphisternum p value was <0.0001 which shows statistically significant. as seen in graph.

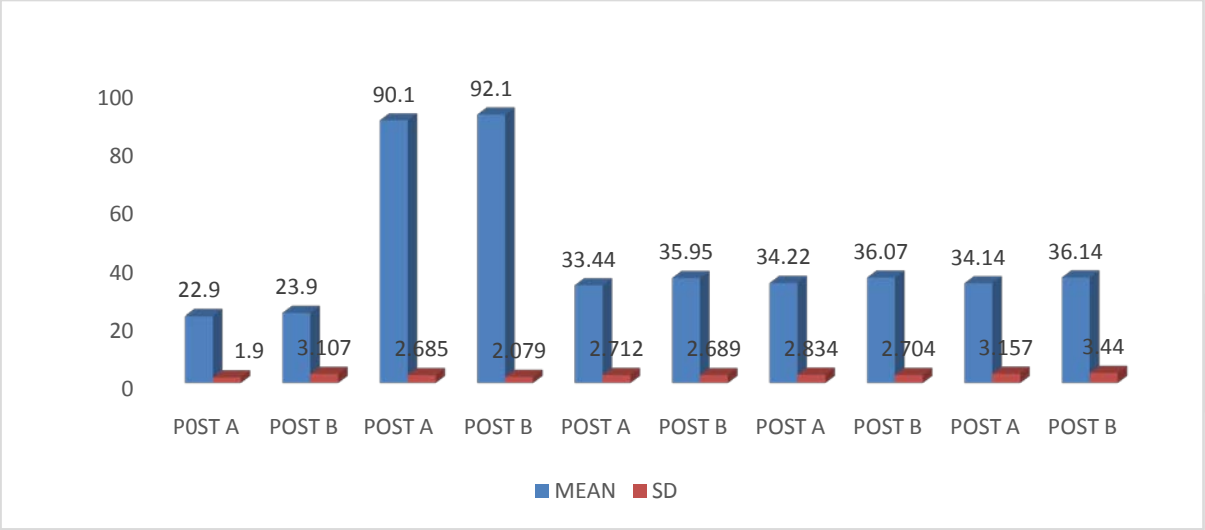


Graph No:13Pre-Post Interpretation Of Group CRr,Spo2 And Chest-Circumference.

Table no 16: COMPARISION OF GROUP A AND GROUP B

	RR		SpO2		CC at AXILLARY LEVEL		CC at 2ND		CC atXiphisternum Level	
	P0ST A	POST B	POS T A	POST B	POST A	POST B	POST A	POST B	POST A	POST B
MEAN	22.9	23.9	90.1	92.1	33.44	35.95	34.22	36.07	4.14	36.14
SD	1.912	3.107	2.685	2.079	2.717	2.689	2.834	2.704	3.157	3.440
T	0.8667		1.862		2.076		1.494		1.355	
P	00.8667		0.0790		0.0525		0.1526		0.1923	

After doing the comparing of post treatment group A and group B. statistically there is no significant of post treatment group A and group B.

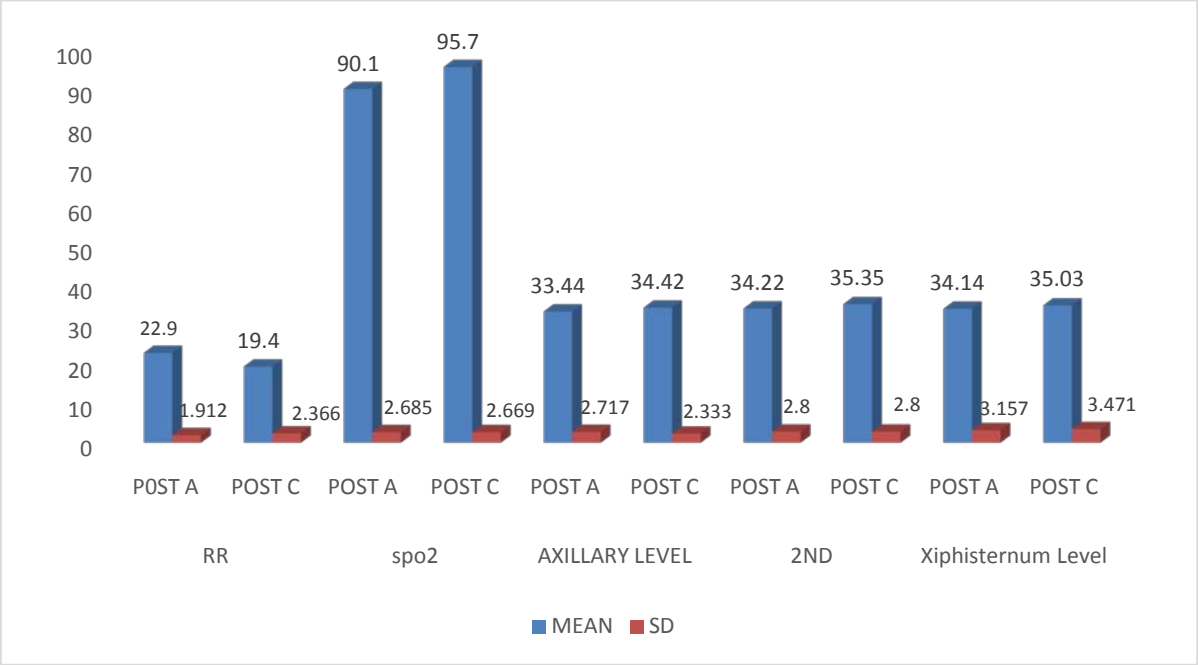


Graph No:14 Comparing Group A Post Treatment And Group B Post Treatment Which Is Not Significant As Shown In Graph.

.Table no 17: COMPARISION OF GROUP A AND GROUP C

	RR		SpO2		AXILLARY LEVEL		2ND		Xiphisternum Level	
	POST A	POST C	POST A	POST C	POST A	POST C	POST A	POST C	POST A	POST C
MEAN	22.9	19.4	90.1	95.7	33.44	34.42	34.22	35.35	34.14	35.03
SD	1.912	2.366	2.685	2.669	2.717	2.333	2.834	2.828	3.157	3.471
T	3.638		4.678		0.1252		2.227		1.262	
P	0.0019		0.0002		0.9017		0.0389		0.2229	

After comparing the post treatment group A and group C its said that respiratory rate P value was 0.00019 SPO2 P value was 0.0002 and 2nd intercostal space p value is 2.227, which is statistical significant. Except all other variables have no statistical significance. That is the axillary level and xiphisternum level.

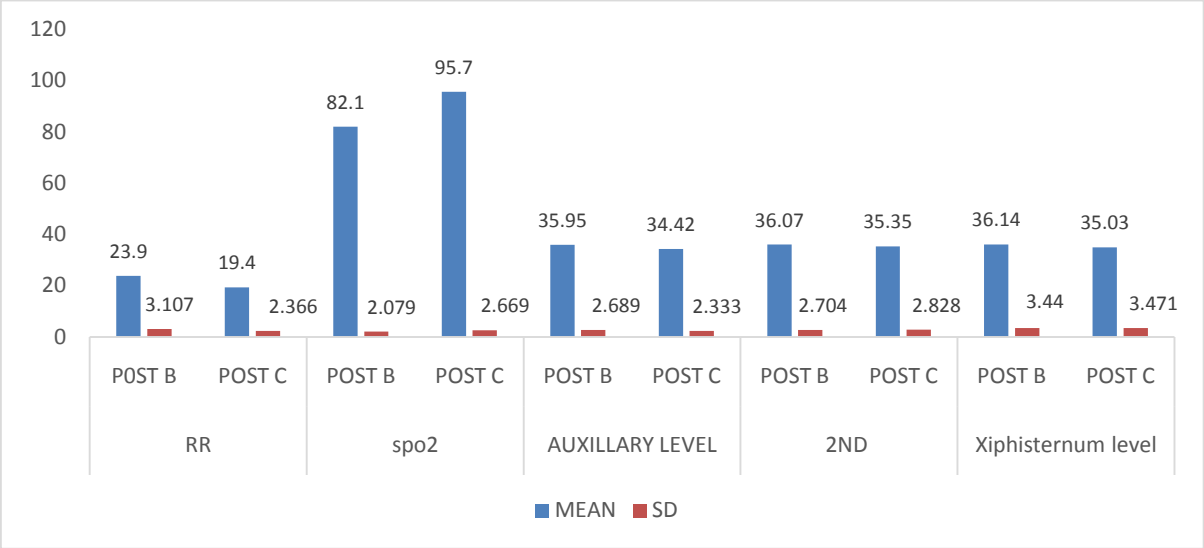


Graph No:15 Comparing Group A Post Tretment And Group C Post Treatment Which Is Not Significant As Shown In Graph.

Table no 18: COMPARISION OF GROUP B AND GROUP C

	RR		SpO2		AUXILLARY LEVEL		2ND		Xiphisternum level	
	P0ST B	POST C	POST B	POST C	POST B	POST C	POST B	POST C	POST B	POST C
MEAN	23.9	19.4	82.1	95.7	35.95	34.42	36.07	35.35	36.14	35.03
SD	3.107	2.366	2.079	2.669	2.689	2.333	2.704	2.828	3.440	3.471
T	3.643		3.365		1.359		3.869		2.550	
P	0.0019*		0.0034		0.1909		0.0011		0.0201	

After comparing the group B and C its said that the respiratory rate P value was 0.0019, SPO2 P value was 0.0034. which is statistical significant. 2nd intercostal space p value 0.0011, xiphisternum p value 0.0201.Except axillary variables are not statistical significant.



Graph No: 16 Comparing Group B Post Treatment And Group C Post Treatment Which Is Not Significant As Shown In Graph.

- According to study mean value of age for group A was 42.2 for group B was 51.7 for groupC was44.5 which is considered not significant**.**
- In the study post, interventional value for RR was 22.9 for group A 23.9 for group B and 19.4 for group C.
- p value 0.001 considered as significant.
- In the study post, interventional value for spo2 was 90.1 for group A 92.1 for group B and 95.7 for group C.
- p value 0.0001 considered as significant.
- In the study post, interventional value for chest circumference was 33.44 for group A 35.95 for group B and 33.33 for group C.
- p value 0.0490 considered as significant.

Discussion

In each group there were 10 participants involved. In Group A, B and C out of 10 participant 8 were male and 2 females were present.

Pleural effusion has been common entity in this country. However, only isolated case reports have been documented on pleural effusion and there has been a death of large cases.ICD was inserted in all the patients and drainage was required. This is usually the case seen in practice where the tube remains for longer time draining some amount of fluid due to underlying TB and most of these patients had Broncho pleural fistula by prolonged air leak in ICD. But there are not such cases documented on effects of manual position in patients with pleural effusion with ICD.the principal goal of positioning is to optimize proper oxygen transport, to maintain RR, and CC.[9]

In one of the study showed that examination the effect of positioning on oxygenation in patients with unilateral pleural effusions. In this study patients are given positioning with ICD.

Ventilation and perfusion matching and gas exchange can be theoretically augmented in the supine position by an increase in cardiac output.TheSpO2 remains stable even if the patient is in supine position and is supported by various studies. In all the three-position comparing the lung function in the semi-fowlers, prone and supine positions. The study suggests that the semi-fowlers position could be a therapeutic adjunct forimproving gas exchange.[4]

When three positions Compared with the conventional supine positioning.Prone lying positioning is frequently instituted for both medical and surgical patients.Inpatientsafter surgery arterial oxygen tensions were greater in the lateral position.in this position RR and SpO2is not significant the axillary level and 2nd intercostal space is not significant, xiphisternum is significant and comparing prone lying position the distribution of the blood flow and ventilation is similar to that of semi-fowlers position.[10]

Thereis two important concepts in semi fowler's situation. Because the perfusion is gravity dependent the vertical hydrostatic gradient is smaller in the lateral that in semi-fowlers position.in regard to ventilation the dependent diaphragm is pushed higher into chest by abdominal contents compared with the nondependent lung diaphragm thus prone lying can be used to enhance the efficiency of gas exchange and thereby to minimize or avoid the use of supplemental oxygen, in semi-fowlers position the FRC and tidal volume increase due to lowering of diaphragm and alveolar expansion due to lungs own weight. The semi-fowlers position maximizes lung volumes and capacities the FRC in prone lying falls between that is supine position. Semi-fowlers position is found to be better in improving TV and oxygenation in this the RR, SpO2 and CC are significant and that's why semi fowler's positionis proved to be more effective.[10]

Conclusion

Thus, the above study it concludes that semi-fowlers position was more improved as compared to the two positions that is prone lying, and supine lying position.in semi- fowlers position the Functional residual capacity and tidal volume is increased and oxygen transport is better seen.so semi-fowlers position is significantly improved clinically and statistically in patients with pleural effusion as an adjunct with intercostal drainage.

References

1. 1.Broaddus VC, Light RW. Pleural effusion. In: Broaddus VC, Mason RJ, Ernst JD, et al, eds. *Murray and Nadel's Textbook of Respiratory Medicine.* 6th ed. Philadelphia, PA: Elsevier Saunders; 2016:chap 79
2. Karki A, Riley L, Mehta HJ, Ataya A. Abdominal etiologies of pleural effusion. Dis Mon. 2019 Apr;65(4):95-103. [PubMed]
3. Hess D, Agarwal NN, Myers CL: Positioning, lung function, and kinetic bed therapy. Respir Care 1992, 37:181–197.
4. Donna Flowmeter D, Dean E. Principles and practices of cardiopulmonary physical therapy; 738-741
5. Bedawi EO, Hassan M, Rahman NM. Recent developments in the management of pleural infection: A comprehensive review. ClinRespir J. 2018 Aug;12(8):2309-2320. [PubMed]
6. McCool FD. Diseases of the diaphragm, chest wall, pleura and mediastinum. In: Goldman L, Schafer AI, eds. *Goldman-Cecil Medicine.* 26th ed. Philadelphia, PA: Elsevier; 2020:chap 92.
7. Guinde J, Georges S, Bourinet V, Laroumagne S, Dutau H, Astoul P. Recent developments in pleurodesis for malignant pleural disease. ClinRespir J. 2018 Oct;12(10):2463-2468. [PubMed]
8. 8.Arnold DT, De Fonseka D, Perry S, Morley A, Harvey JE, Medford A, Brett M, Maskell NA. Investigating unilateral pleural effusions: the role of cytology. EurRespir J. 2018 Nov;52(5) [PubMed]
9. Elizabeth Dean. Effect of Body Position on Pulmonary Function**.** 1985;65(5).
10. ImlePC, klemic N 1989 changes with immobility and methods of mobilization In:Mackenzie CF(ed) chest physiotherapy in the intensive care unit.2nd edn.williams and wilkins,Baltimore,PP188-214