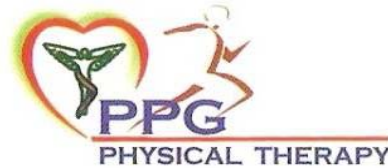




**EFFECTS OF HIGH INTENSITY AEROBICS IN WATER
VERSUS HIGH INTENSITY AEROBICS IN LAND ON
DYSPNOEA, QUALITY OF
LIFE IN MODERATE COPD**

**Dissertation submitted to
THE TAMIL NADU DR. M. G. R. MEDICAL UNIVERSITY,
Chennai-32
towards partial fulfillment of the requirements of
MASTER OF PHYSIOTHERAPY
Degree programme
Submitted by
Reg no: 27113224**



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The Dissertation entitled

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Dissertation submitted to

THE TAMILNADU DR. M. G. R. MEDICAL UNIVERSITY,

CHENNAI-32.

Dissertation evaluated on -----

Internal Examiner

External Examiner

CERTIFICATE I

This is to certify that the dissertation work entitled “**EFFECTS OF HIGH INTENSITY AEROBICS IN WATER VERSUS HIGH INTENSITY AEROBICS IN LAND ON DYSPNOEA, QUALITY OF LIFE IN MODERATE COPD**” was carried out by Reg. no. **27113224** P.P.G College of physiotherapy, Coimbatore-35, affiliated to The Tamilnadu Dr. M.G.R medical university, Chennai-32, under the guidance

Prof. C K MURALIDHRAN M P T (CARDIO) MIAP., ,

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CERTIFICATE II

This is to certify that the dissertation work entitled “**EFFECTS OF HIGH INTENSITY AEROBICS IN WATER VERSUS HIGH INTENSITY AEROBICS IN LAND ON DYSPNOEA, QUALITY OF LIFE IN MODERATE COPD**”

” was carried out by Reg. no. **27113224** P.P.G College of physiotherapy, Coimbatore-35, affiliated to The Tamilnadu Dr. M.G.R medical university, Chennai-32, under my guidance Prof. C K MURALIDHRAN M P T (CARDIO) MIAP.,

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I Praise and thank **GOD** for his gracious showers of blessings upon me that has shaped me.

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is the expected to be the third causes of death by 2020. Approximately 14 millions Indians are currently suffering from COPD. Chronic obstructive pulmonary disease (COPD) is a preventable and treatable disease characterized by airflow limitation that is not fully reversible.

The airflow limitation usually progressive and an inflammatory response of the lung to noxious particular (or) gases, primarily caused by cigarette smoking. Currently there are 94 millions smokers in India. Among them 10 lacks Indians die in a year due to smoking related disease.(**The Indian Chest Diseases & Allied Science 2001: 43:39 : 47**)

Patient with chronic obstructive pulmonary disease (COPD) often complex of disability breathlessness and reduced exercise capacity. Despite optimal medical treatment patient often experience a functional deficit associated with dyspnea and de conditioning as well as decreased endurance and health related quality of life. - **Kerin Wandell et. al., 2003**

Even though much research has been done on different training methods in land still there is a need for evaluating new training modality for this increasing group of patient. Previous exercise training evaluate only the benefits of endurance training, strength training individually on

land and water. Water exercise may be an attractive alternative as it combines elements of strength, endurance and mobility training as well as psychosocial and low-cost benefits of group training.

Therefore study is intended to compare the effects of high intensity exercise group training in water and high intensity exercise training group in land.

AIM OF THE STUDY

The aim of study to compare the effectiveness of high intensity aerobics in water versus endurance high intensity aerobics in land on dyspnoea, quality of life in moderate COPD.

OBJECTIVES OF THE STUDY

- To find out the effects at high intensity aerobic training in water in moderate COPD.
 - To find out the effects of high intensity endurance training land in moderate COPD.
 - To find out any significant difference between high intensity aerobic training in water and endurance high intensity training in land on moderate COPD.
-

HYPOTHESIS

NULL HYPOTHESIS

The null hypothesis states that there is no significant difference in high intensity aerobic training in water and endurance high intensity training in land on moderate COPD.

ALTERNATE HYPOTHESIS

The alternate hypothesis states that there was significant difference high intensity aerobic training in water and endurance high intensity training in land on moderate COPD.

REVIEW OF LITERATURE

Fernanda, et.al., (2006)

Conducted an experimental study to find out optimizing exercise performance in 24 COPD patients. A portable device was used to measure peak oxygen uptake (VO₂) between --- SWPP & SWT groups. The results of the study showed a statistically correlation coefficient between distance walked & peak VO₂ in the SWTP was 0.86 (P,0.2) better performance was achieved during the SETP (Peak VO₂ 3.300 ML/Ka/Nm P,0.1; distance walked, 32m, (P<001) than during the conventional SWT.

Susan et.al., (2008)

Conducted an experimental study to find out feasibility & acceptability of swimming pool-based exercise as pulmonary Rehabilitation for 101 COPD patients. Spirometer test , Dyspnoea score,Chronic respiratory questionnaire (QOL),and increased shuttle walk test were measured before and after the programme. The resut shoed a statistically, reduction in Dyspnoea score (difference 4.0; 95% 11-8.27 to -1:48) & improvement in walking distance difference 32 meters 95% (1-52.63 to 11.36).

PJ wijkstra. et.al., (1995)

Conducted an experimental study to find out the health related quality of life in 60 COPD patients. Comparisons between the long term effects of one month physiotherapy versus once week physiotherapy at the home after a comprehensive home rehabilitation programme on quality of life & exercise tolerance in COPD. The quality of life is measured by using (CRQ), FEV₁, (IVC) were studied. The result of study showed more significant improvement in long term training group compare to short term training group.

Regheieur Harpa Arnardohir et.al., (2006)

Conducted an experimental study to find out functional capacity, dyspnoea, mental health & health related quality of life in 60 COPD subjects. Interval (or) continuous land aerobics training, performed for 16 weeks, pre & Post intervention, all patient performed spirometry, ergometer, cycle test, cardiopulmonary test & a 12 min walk test, Dyspnoea was measured by the dyspnoea scale, chronic obstructive questionnaire. The result of study showed a statistically significant improvement in functional capacity, dyspnoea, mental health & HRGL in continuous training group in patient with moderate or severe COPD.

Sebastian Duverge et.al., (2009)

Conducted an experimental study to compare the maximum walking speed & peak shuttle walking test (ISWI), In 22 older populations. The VO2 peak, the maximum walking speed & the total distance walked measured during both tests were compared. The result of study reveal incremental shuttle walk test appears to be a better tools to asses the maximum aerobic functional capacity in older population.

Laviolette L. et.al., (2001)

Conducted an experimental study to compare the gender difference in exercise endurance operating lung volumes & symptoms limitations during exercise. Ninety-Nine women, 93 men with COPD matched for age & disease severity were evaluated The result of the study showed significant improvement in quality of life over 18 months, but it reveal there was no significant gender difference between male and female COPD patient.

Gi. Booman, et.al., (2006)

Conducted an experimental study to find out the water, interval effects of high intensity deep training with vest in elder women. They trained in deep water running / watering wearing a vest two times a week for 8 weeks. The aerobic capacity assessed by using maximal heart rate target heart rate. The result of the study show high intensity deep water

running with vest improves sub maximal work capacity. Maximal aerobic power and maximal ventilation.

Miyahara.N., et.al., (2000)

Conducted an experimental study to find out, dyspnea, fatigue and quality of life in 18 COPD patients. The physical exercise training regimen consist of respiratory muscle stretch technique and exercise training, 5 days per 23 week. Pulmonary function test, incremental ergometer exercise test, 6 min walk test and a quality of life cycle was assessment by the chronic respiratory questionnaire were administered before and after the programme. The result of the study showed a significant improvement in the quality of life, dyspnoea, fatigue and emotional scale.

Karin Wadell, et.al., (2003)

Conducted an experimental study to find out physical capacity and health related quality of life in 43 COPD patient. High intensity physical training were given in water or land for 12 weeks. Pre and post intervention, all patient performed incremental and endurance shuttle walking test, cycle ergometer tests and responded questionnaires about HRQL. The result of the study showed a significant improvement in exercise capacity in high intensity water exercise group. reached a critical inspection and to exercise termination.

Counil.F.P., et.al., (2003)

Conducted an experimental study to find out the effect of aerobic training in children with asthma. 16 subjects were taken with mild to moderate asthma that includes 6 weeks of aerobic walking training duration for 45 minutes, 3 sessions per week. Changes in 6 minute walking distance, maximum oxygen uptake (VO₂ Max), short term peak power (PP) and pulmonary function were assessed. The result shad shown a significant improvement in exercise tolerance and pulmonary function with aerobic training in children with asthma.

Pitta.F., et.al., (2004)

Conducted an experimental study to find out the effect of bicycle ergometer training on exercise capacity and lung function patients in mild to moderate COPD subjects. Total 20 COPD subject were selected and trained with bicycle ergometer with a heart rate close to 80% of maximum heart rate for duration of 30-45 minutes, 3 times / week. The result of the study showed a significant improvement in exercise capacity and lung function to mild to moderate COPD subjects.

MATERIALS AND METHDOLOGY

MATERIALS

- Endurance shuttle walk test
- Chronic respiratory questionnaire
- Borg scale

METHDOLOGY

STUDY DESIGN

Quasi experimental study

STUDY SETTING

STUDY SAMPLING

30 samples is selected by convenient sampling techniques, each group consist of 15 persons.

STUDY DURATION

6 months

INCLUSION CRITERIA

- **COPD** patient having spirometry evidence of severe airflow limitation FEV1 ranging 40-60%. Stable clinical and functional states.
- Age: 45-60 years.
- Sex: Male
- Patient physical therapy had to be limited dyspnoea.

EXCLUSION CRITERIA

- Dyspnoea at rest
- Cardiac disease
- Previous lung surgery
- Use of long term O₂ therapy.
- Drug and alcohol abuse
- CO₂ retention.

PARAMETER:

DYSPNOEA

Dyspnoea in daily activities is assessed using modified Borg Scale.

Rate of perceived exertion (Borg Scale)

0	- Nothing at all
0.5	- Very very weak
1	- Very weak
2	- Weak
3	- Moderate
4	- Some what strong
5	- Strong
6	-
7	- Very Strong
8	-
9	-
10	- Very very strong

QUALITY OF LIFE:

It is assessed by using the chronic respiratory disease Questionnaire Self Administered Standardized Format (CRQ-SAS).

PROCEDURE

- 30 patients with evidence of significant COPD is recruited for the study with consideration of inclusion and exclusion criteria. Each group consist of 15 members (2 groups)
 - A pre test is conducted for Group A, B on modified borg scale for dyspnoea and on endurance shuttle walk test.
-

- Group A is given high intensity aerobic training in water for 45 minutes the duration of 6 month.
- Group B is given high intensity aerobic training in land for 45 minutes the duration of 6 month.
- To compare the pre and post test mean value of Group A and B.

TECHNIQUE

The following techniques are used for training the High intensity Aerobic in water training Group A samples. After selection of 30 subjects with Significant COPD according to inclusion criteria, the subjects are made aware of the swimming aerobic .

High intensity Aerobic training in water A

Prior to treatment endurance capacity is measured with incremental shuttle walk test. Aerobics in water program was given (45 minute) until they become fatigue according to endurance capacity. In between they have given a period of rest if the feel fatigue (10 min). Again we ask them to walk. After the end of the total treatment duration we measure the incremental shuttle walk test.

Frequency – 3 times per week for 24 weeks

Time - 15 minutes

Type - Aerobic training in water

High intensity Aerobic training in land B

Prior to treatment endurance capacity is measured with incremental shuttle walk test. Aerobics in water program was given (45 minute) until they become fatigue according to endurance capacity. In between they have given a period of rest if the feel fatigue (10 min). Again we ask them to walk. After the end of the total treatment duration we measure the incremental shuttle walk test.

Frequency – 3 times per week for 24 weeks

Time - 15 minutes

Type - Aerobic training in land

STATISTICAL TOOLS

The statistical tools used in the study are Paired t- test and unpaired t –test.

PAIRED –T – TEST

The paired t- test was used to find out the statistical significance between pre and post- test values of dyspnoea, incremental shuttle walk test and quality of life before and after treatment for Group A and Group B.

Formula: Paired t- test:

$$S = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d} \sqrt{n}}{S}$$

d = Difference between the Pre Test Vs Post Test

\bar{d} = Mean difference

n = Total number of subjects

S = Standard deviation

UNPAIRED T- TEST

The unpaired t- test was used to compare the statistically significance difference of dyspnoea, incremental shuttle walk test and quality of life before and after treatment for Group A and Group B.

Formula: Unpaired t- test:

$$S = \sqrt{\frac{(n_1-1) S_1^2 + (n_2-1) S_2^2}{n_1 + n_2 - 2}}$$

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{S \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

n_1 = Total number of subject in Group - A

n_2 = Total number of subject in Group - B

x_1 = Difference between Pre test Vs Post test of Group - A

\bar{x}_1 = Mean difference between Pre test Vs Post test of Group - A

x_2 = Difference between Pre test Vs Post test of Group - B

\bar{x}_2 = Mean difference between Pre test Vs Post test of Group - B

S = Standard deviation

DATA PRESENTATION

TABLE-1

HIGH INTENSITY AEROBICS IN WATER GROUP A

<i>S. No</i>	<i>Perception of dyspnea</i>		<i>Incremental shuttle walk test</i>		<i>Quality of life</i>	
	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>
1.	5	2	270	310	3	5
2.	6	2	260	300	3	5
3.	6	0	280	320	3	6
4.	6	2	240	295	3	5
5.	6	1	275	310	3	5
6.	7	1	270	305	2	6
7.	6	2	280	320	4	6
8.	5	1	290	320	2	6
9.	6	2	280	315	3	6
10.	5	1	275	305	2	6
11.	7	2	265	300	3	6
12.	6	1	270	305	4	6
13.	5	1	290	325	2	6
14.	6	1	270	300	2	6
15.	5	1	280	310	2	6

TABLE-2**HIGH INTENSITY AEROBICS IN LAND GROUP
GROUP B**

<i>S.No</i>	<i>Perception of dyspnea</i>		<i>Incremental shuttle walk test</i>		<i>Quality of life</i>	
	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>	<i>Pre</i>	<i>Post</i>
1.	6	2	260	280	3	5
2.	5	2	265	275	2	4
3.	5	1	240	270	2	4
4	6	3	260	290	2	5
5	5	2	265	285	2	4
6	6	3	280	300	3	6
7	5	3	265	290	1	3
8	4	2	255	285	1	4
9	6	3	260	290	1	3
10	4	3	250	285	1	4
11	6	2	265	290	1	3
12	5	3	240	275	1	3
13	4	2	255	280	1	4
14	4	2	245	270	1	4
15	4	3	275	300	1	3

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of data collected from 30 COPD patients to compare the difference between High intensity Aerobic training in water and High intensity Aerobic training in land. Collected data are analyzed and tabulated in the following section.

TABLE-I

The comparative mean values, mean difference, standard deviation and paired t- values between Pre Vs Post test of Perception of dyspnoea High intensity Aerobic training in water Group A.

<i>S. No</i>	<i>Perception of Dyspnoea</i>	<i>Improvement</i>			<i>Paired t-value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Pre-test	5.80	4.47	0.83	20.8
2.	Post-test	1.33			

The paired t- value of 20.8 is greater than the tabulated t-value 2.14 showed is statistically significant difference at 0.05 level between Pre Vs Post test results. The Pre test mean was 5.80 Post test mean was 1.33 and mean difference is 4.47 which show reduction on perception of dyspnoea in response for High intensity Aerobic in water training Group A samples.

Chart I: Mean values between pre and post treatment values of perception of dyspnoea in high intensity aerobic training in water Group A

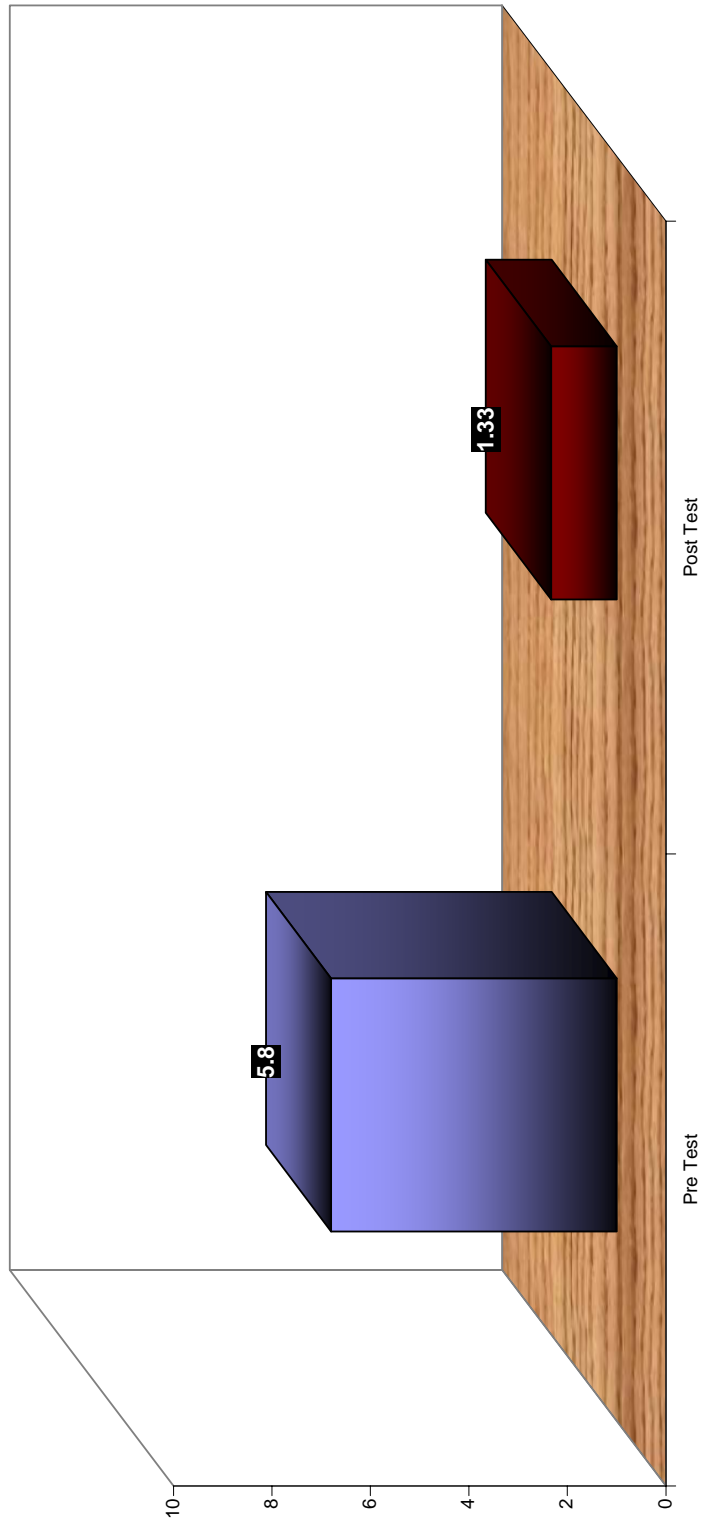


TABLE-II

The comparative mean values, mean difference, standard deviation and paired t- values between Pre Vs Post test of Perception of dyspnoea on High intensity Aerobic training in land Group B.

<i>S. No</i>	<i>Perception of Dysponea</i>	<i>Improvement</i>			<i>Paired t-value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Pre-test	5	2.6	0.98	10.27
2.	Post-test	2.4			

The paired t- value of 10.27 is greater than the tabulated t-value 2.14 showed a statistically significant difference at 0.05 level between Pre Vs Post test results. The Pre test mean is 5 Post test mean was 2.4 and mean difference is 2.6 which showed reduction on perception of dyspnoea in High intensity Aerobic training in water Group B samples.

Chart II: Mean values between pre and post treatment values of perception of dyspnoea in high intensity aerobic training in land Group B

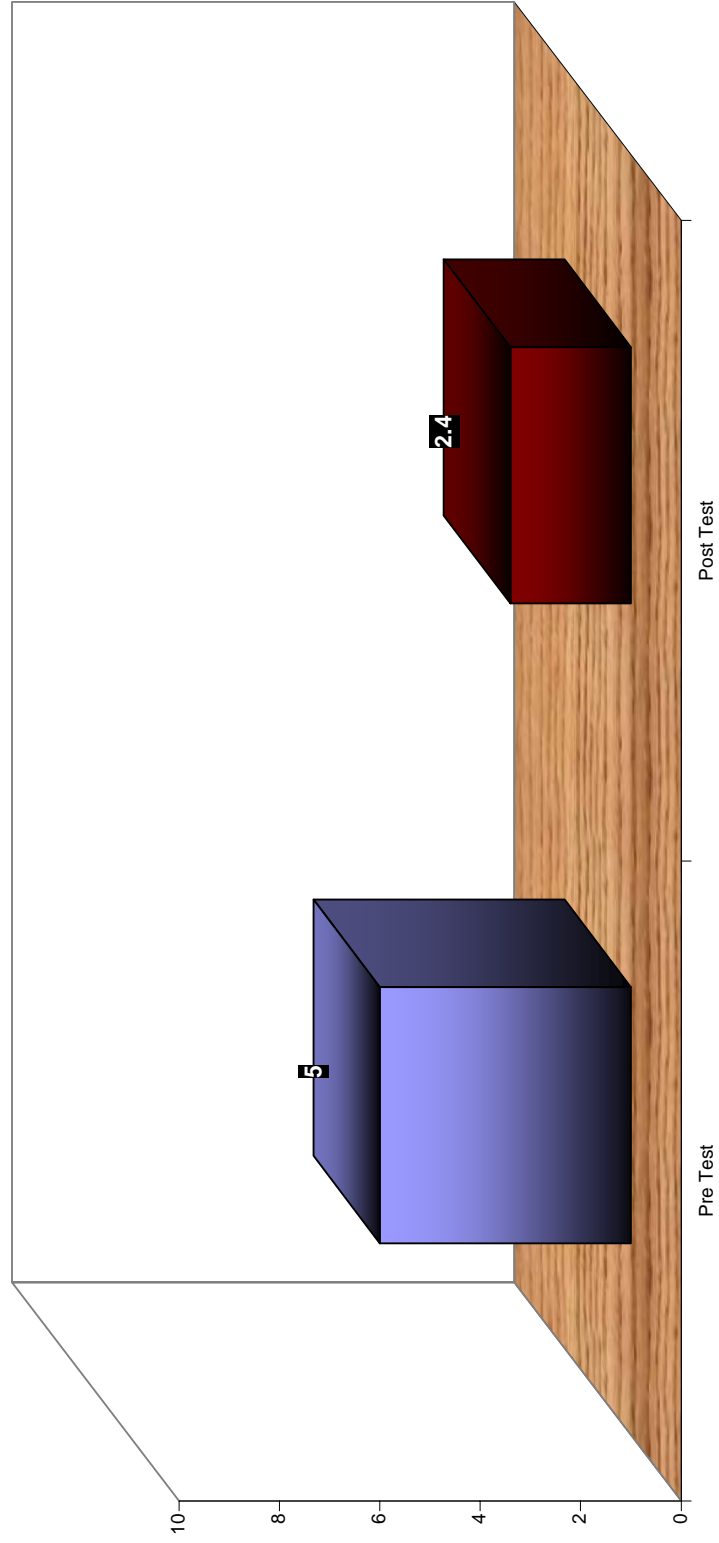


TABLE-III

The comparative mean values, mean difference, standard deviation and unpaired t- value between Group A and Group B on perception of Dyspnoea.

<i>S. No</i>	<i>Perception of Dyspnoea</i>	<i>Improvement</i>			<i>Unpaired t- value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Group A	4.5	1.90	0.905	5.8
2.	Group-B	2.6			

The unpaired t- value of 5.8 greater than the tabulated t- value of 2.05 showed a statically significant difference at 0.05 level between mean difference of Group-A and Group-B. the Pre Vs Post mean of Group-A is 4.5 the Pre Vs Post mean of Group –B is 2.6 an the mean difference of Group A Group B is 1.90, which showed greater reduction in perception of dyspnoea in High intensity Aerobic training in water Group A when compared to High intensity Aerobic training in land Group B.

Therefore the study is rejecting the null hypothesis and was accepting alternate hypothesis.

Chart III: Mean difference between pre and post treatment values of perception of dyspnoea in high intensity aerobic training Group A & Group B

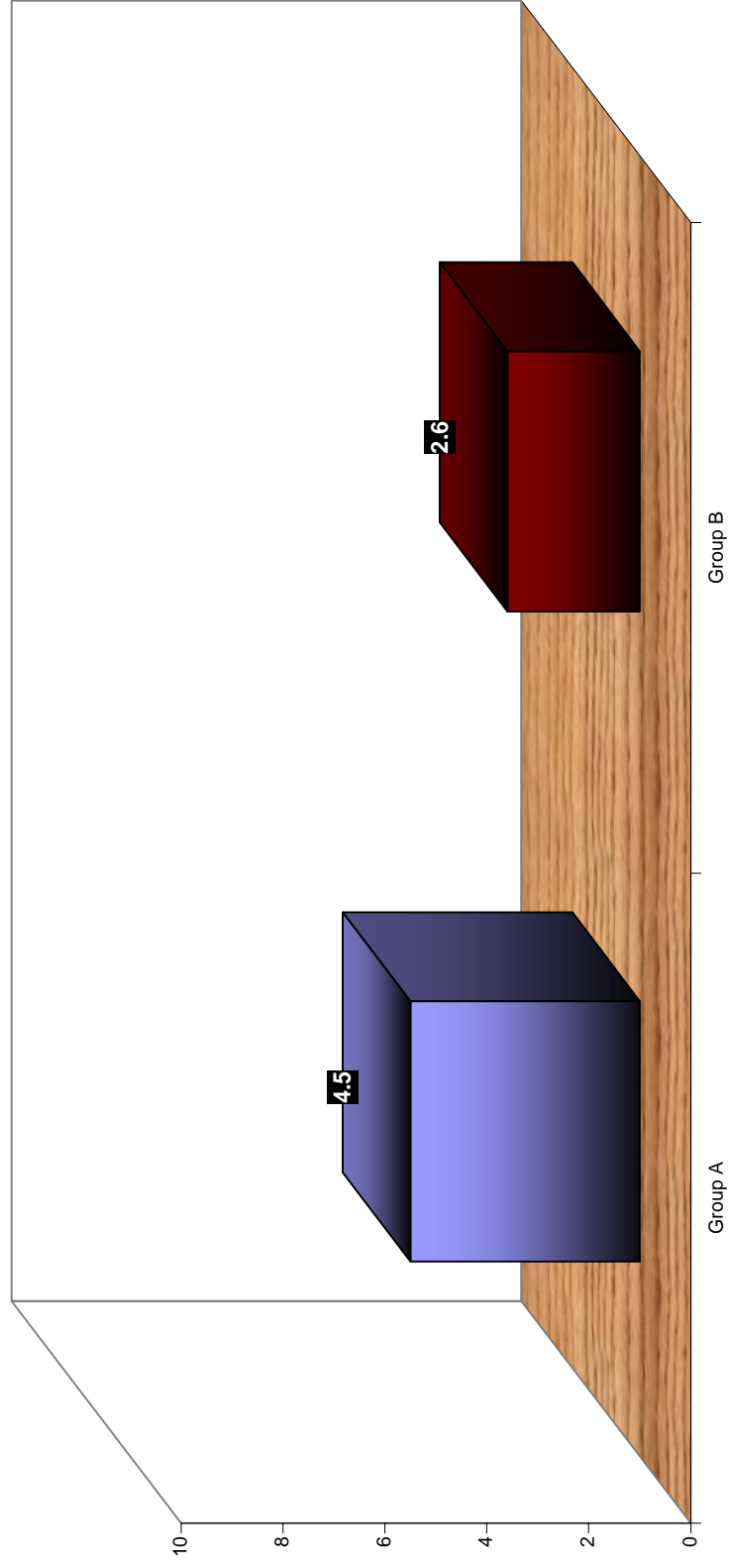


TABLE-IV

The comparative mean values, mean difference, standard deviation and paired t- values between Pre Vs Post test of incremental shuttle walk test in High intensity Aerobic training in water Group A .

<i>S. No</i>	<i>Incremental shuttle walk test.</i>	<i>Improvement</i>			<i>Paired t-value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Pre-test	273	31.3	6.3	22.29
2.	Post-test	304.3			

The paired t- value of 22.29 is greater than the tabulated t-value 2.14 showed a statistically significant difference at 0.05 level between Pre Vs Post test results. The Pre test mean was 273 Post test mean is 304.3 and mean difference is 31.3 which show reduction on incremental shuttle walk distance for High intensity Aerobic training in water Group A samples.

Chart IV: Mean values between pre and post treatment values of incremental shuttle walk test in high intensity aerobic training in water Group A

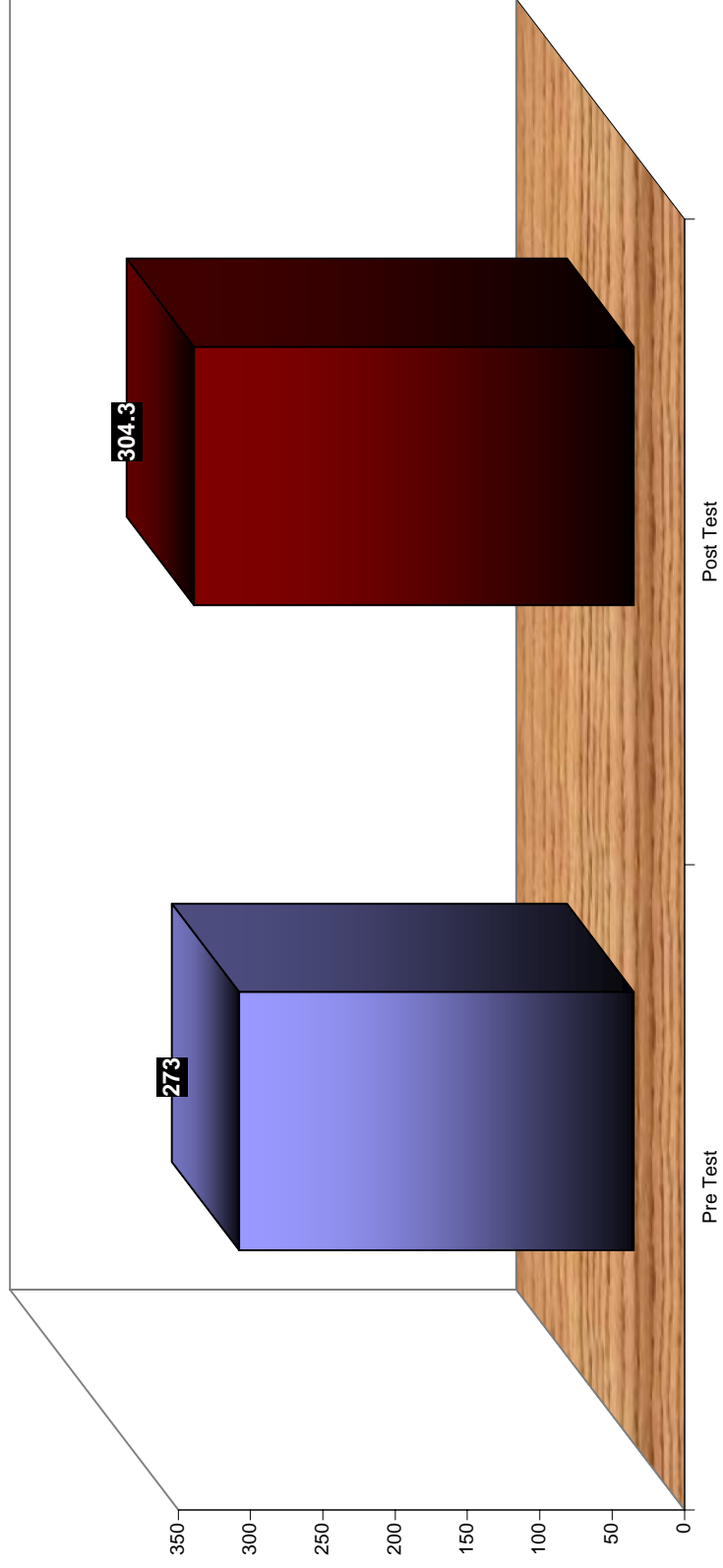


TABLE-V

The comparative mean values, mean difference, standard deviation and paired t- values between Pre Vs Post test of incremental shuttle walk test in High intensity Aerobic training in land Group B.

<i>S. No</i>	<i>Incremental shuttle walk test.</i>	<i>Improvement</i>			<i>Paired t-value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Pre-test	258.6	25.67	6.5	15.27
2.	Post-test	284.3			

The paired t- value of 15.27 is greater than the tabulated t-value 2.14 showed a statistically significant difference at 0.05 level between Pre Vs Post test results. The Pre test mean is 258.6 Post test mean is 284.3 and mean difference is 25.67 which show improvement on walking for High intensity Aerobic training in land Group B samples.

Chart V: Mean values between pre and post treatment values of incremental shuttle walk test in high intensity aerobic training in land Group B

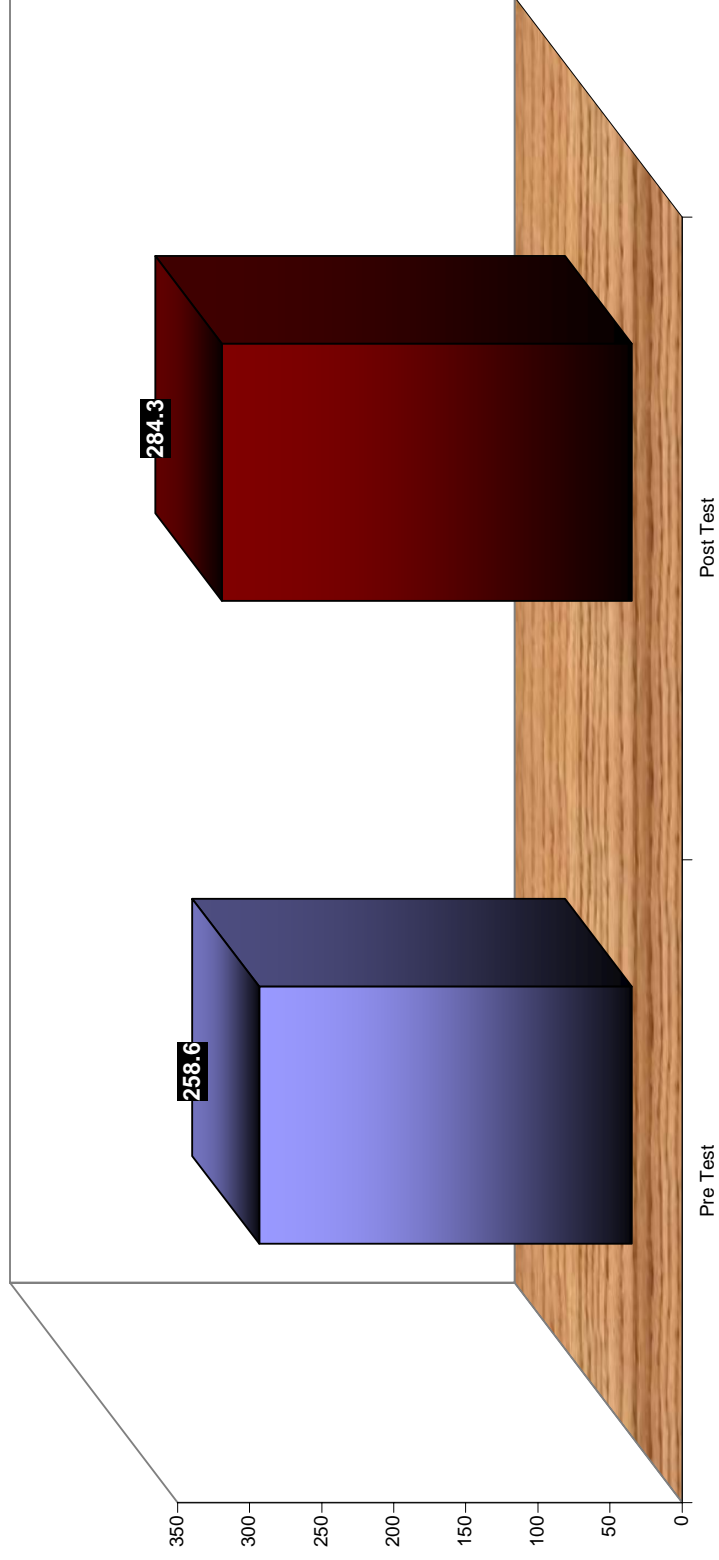


TABLE-VI

The comparative mean values, mean difference, standard deviation and unpaired t- value between Group A and Group B on Incremental shuttle walk test.

<i>S. No</i>	<i>Incremental shuttle walk test.</i>	<i>Improvement</i>			<i>Unpaired t- value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Group A	36.3	10.6	6.4	4.6
2.	Group-B	25.7			

The unpaired t- value of 4.6 greater than the tabulated t- value of 2.05 showed a statically significant difference at 0.05 level between mean difference of Group-A and Group-B. the Pre Vs Post mean of Group-A is 36.3 the Pre Vs Post mean of Group –B is 25.7 an the mean difference of Group A Group B is 10.6 Which show greater improvement in High intensity Aerobic training in water Group A when compared to High intensity Aerobic training in water Group B.

Therefore the study is rejecting the null hypothesis and was accepting alternate hypothesis.

Chart VI: Mean Difference between pre and post treatment values of incremental shuttle walk test in high intensity aerobic training Group A & Group B

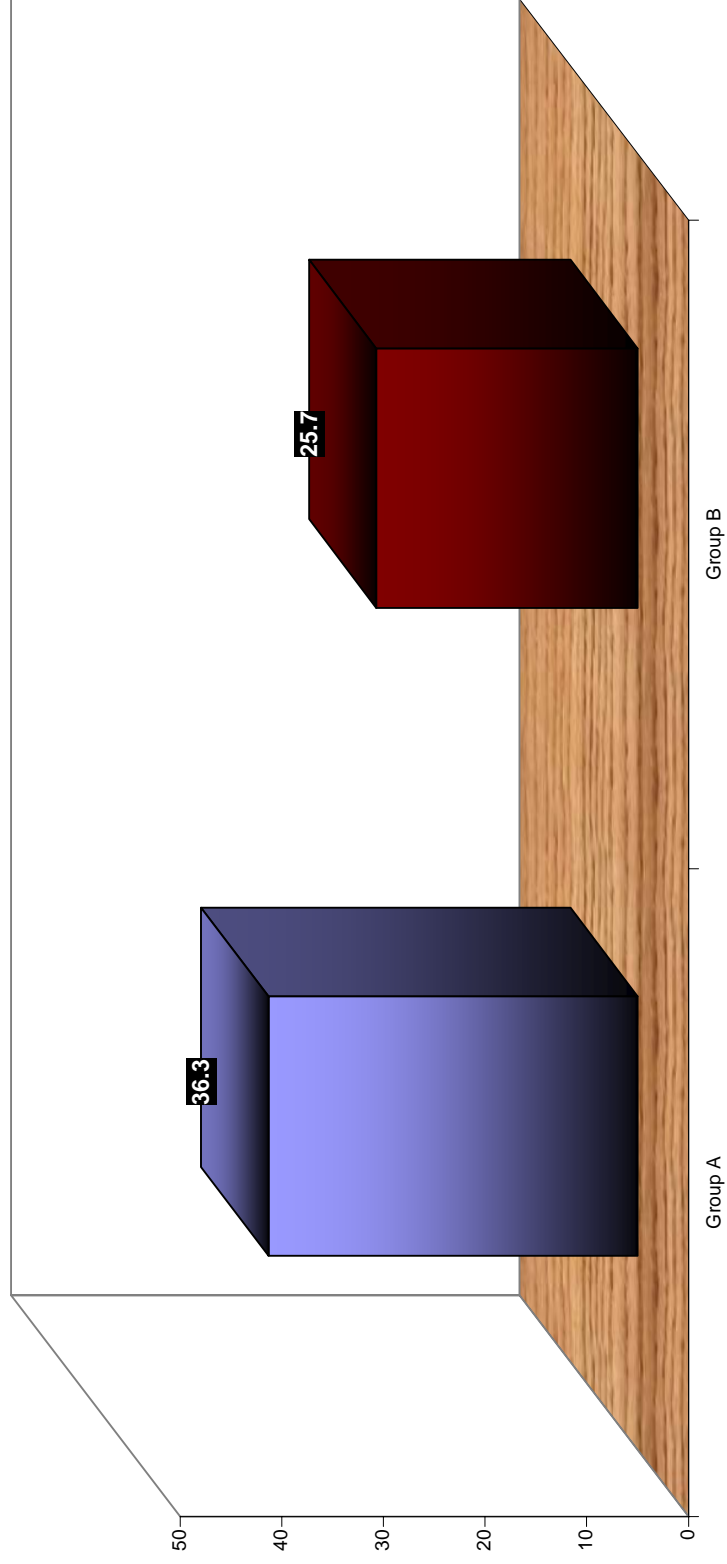


TABLE-VII

The comparative mean values, mean difference, standard deviation and paired t- values between Pre Vs Post test of quality of life (QOL) in High intensity Aerobic training in water Group A.

<i>S. No</i>	<i>Quality of Life (QOL)</i>	<i>Improvement</i>			<i>Paired t-value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Pre-test	2.6	3.13	0.83	14.59
2.	Post-test	5.73			

The paired t- value of 14.59 is greater than the tabulated t-value 2.14 showed a statistically significant difference at 0.05 level between Pre Vs Post test results. The Pre test mean is 2.6 Post test mean is 5.73 and mean difference is 3.13. This showed improvement on Quality of Life (QOL) in High intensity Aerobic training in water Group A samples.

Chart VII: Mean values between pre and post treatment values of quality of life (CRQ Scale) in high intensity aerobic training in water Group A

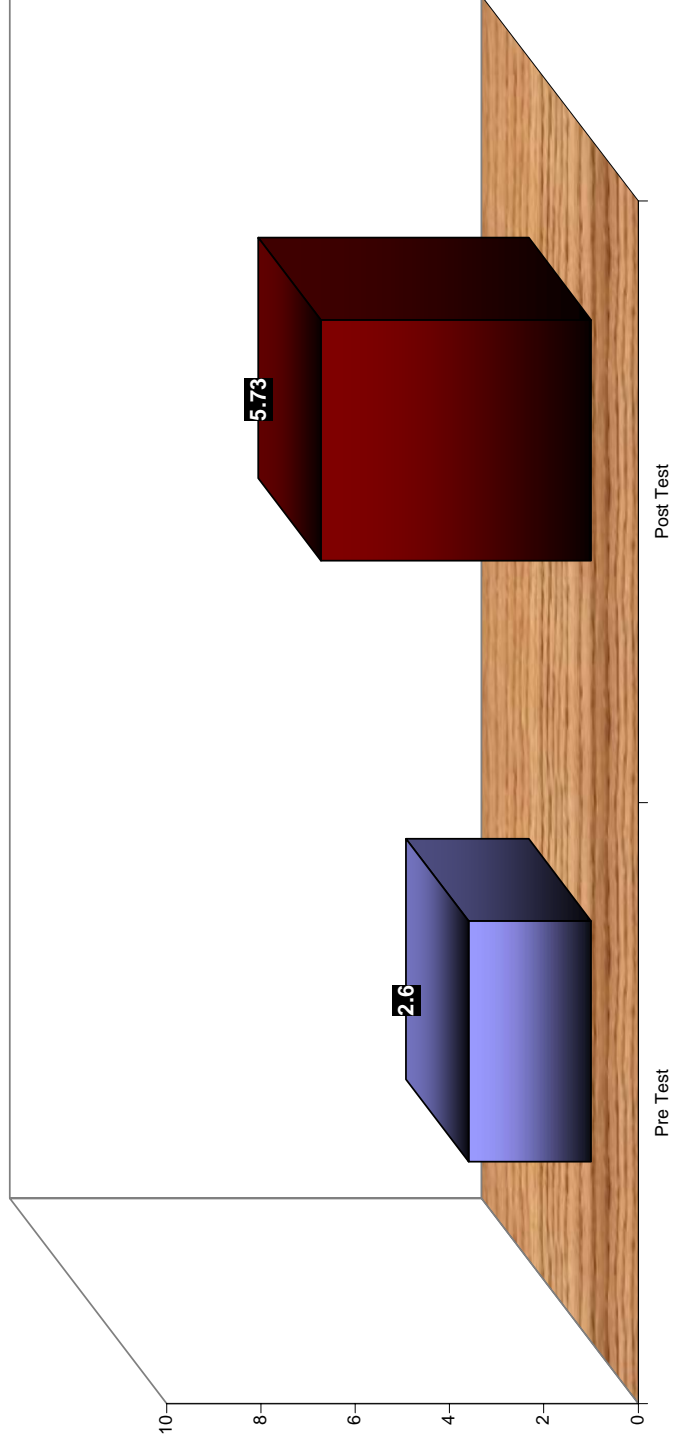


TABLE-VIII

The comparative mean values, mean difference, standard deviation and paired t- values between Pre Vs Post test of quality of life (QOL) in High intensity Aerobic training in land Group B.

<i>S. No</i>	<i>Quality of Life (QOL)</i>	<i>Improvement</i>			<i>Paired t-value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Pre-test	1.53	2.4	0.50	18.5
2.	Post-test	3.39			

The paired t- value of 18.5 is greater than the tabulated t-value 2.14 showed a statistically significant difference at 0.05 level between Pre Vs Post test results. The Pre test mean is 1.53 Post test mean is 3.93 and mean difference was 0.50. This showed improvement on Quality of Life (QOL) in High intensity Aerobic training in land Group B samples.

Chart VIII: Mean values between pre and post treatment values of quality of life (CRQ Scale) in high intensity aerobic training in land Group B

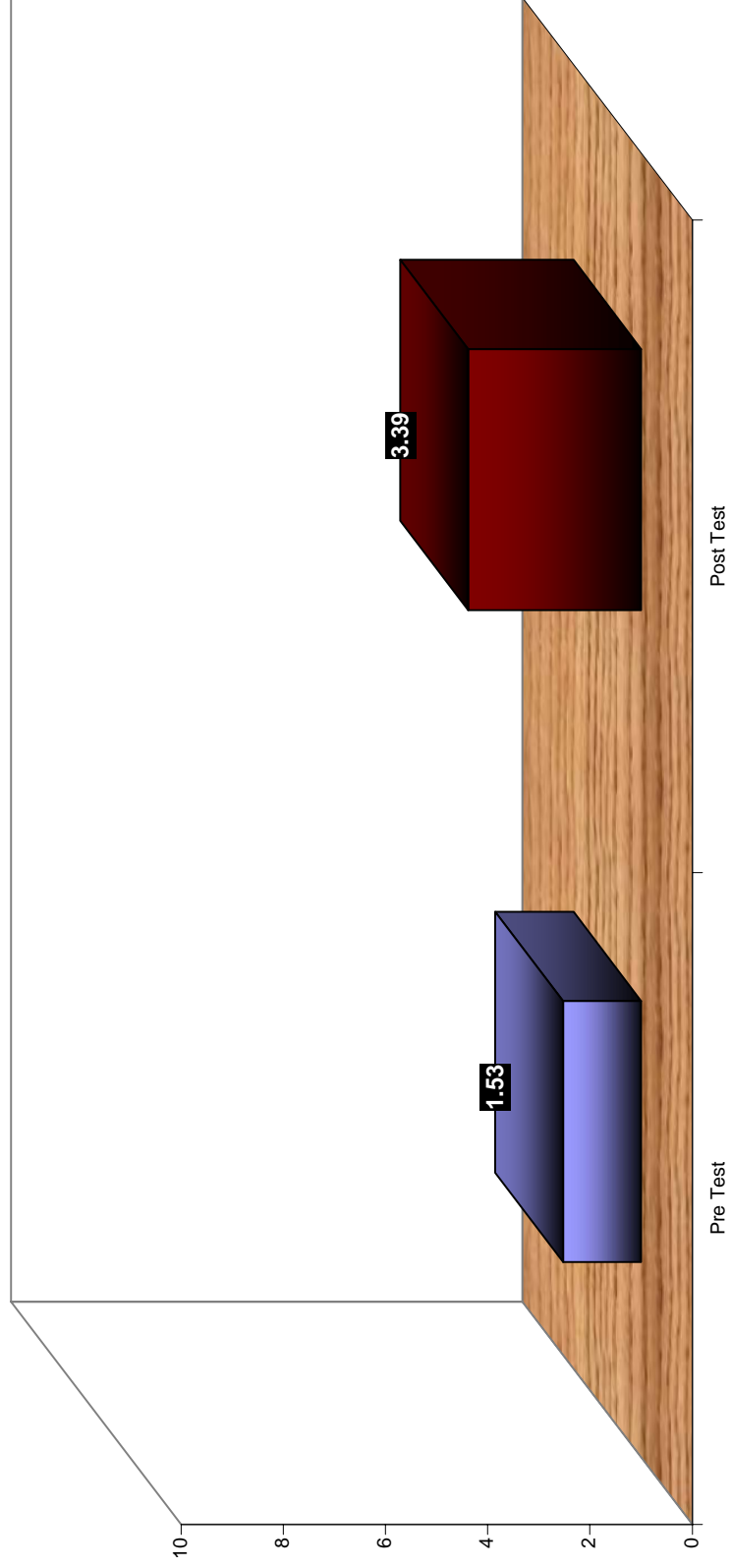


TABLE-IX

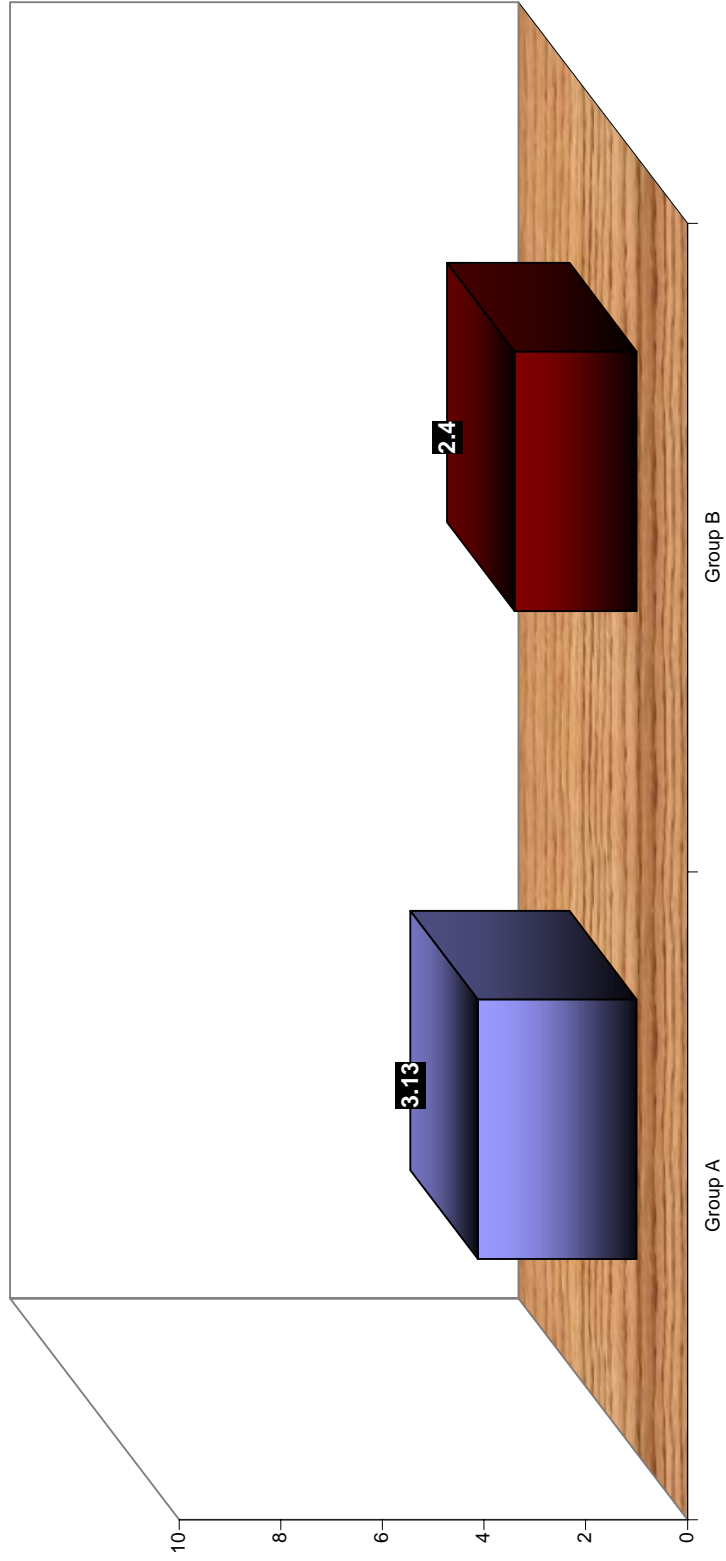
The comparative mean values, mean difference, standard deviation and unpaired t- value between Group A and Group B on Quality of Life (QOL).

<i>S. No</i>	<i>Quality of Life</i>	<i>Improvement</i>			<i>Unpaired t- value</i>
		<i>Mean</i>	<i>Mean difference</i>	<i>S.D</i>	
1.	Group A	3.13	1.9	0.73	7.40
2.	Group-B	2.4			

The unpaired t- value of 7.40 greater than the tabulated t- value of 2.05 showed a statically significant difference at 0.05 level between mean difference of Group-A and Group-B. the Pre Vs Post mean of Group-A is 3.13; the Pre Vs Post mean of Group –B is 2.4 an the mean difference of Group A Group B is 1.9, which showed greater improvement in High intensity Aerobic training in water Group A when compared to High intensity Aerobic training in water Group B.

Therefore the study is rejecting the null hypothesis and is accepting alternate hypothesis.

Chart IX: Mean difference between pre and post treatment values of quality of life (CRQ Scale) in high intensity aerobic training Group A & Group B



DISCUSSION

Aim of the study was to evaluate the Effects of high intensity aerobics in water versus endurance high intensity aerobics in land on dyspnoea, quality of life in moderate COPD .

DISCUSSION ON PARAMETER:

Based on the study of **Ragbheieur harpa.**, the present study had taken modified Borg scale as one of the parameter to assess the dyspnoea.

Based on the study results of **Laviolette.**, the present study had taken 6 min walk distance as one of the parameter to assess the exercise capacity.

Based on the study results of **Takashi Hajiro.**, present study had taken CRQ as a scale as a parameter to measure quality of life (QOL).

Discussion on Aerobic training in Group A

Based on the study of **Susan et al .**,the present study had given High intensity aerobics training in water Group A.

Based on the study of **Pj.Wijkstra et al.**, the present study had given High intensity aerobics in land group B.

IN THE ANALYSIS AND INTERPRETATION OF DYSPONEA IN GROUP A

The paired t-value of 20.8 greater than the tabulated t value 2.14 which showed a statistically significant difference at 0.05 Level between pre vs. post test results. The pretest mean was 5.80 . Post test mean was 1.33 and mean difference was 4.47 which showed reduction on perception of dyspnea in response to aerobic training for group A samples.

IN THE ANALYSIS AND INTERPRETATION OF INCREMENTAL SHUTTLE WALK TEST IN GROUP A.

The paired t value of 22.29 was greater than the tabulated t value 2.14 which showed a statistically significant difference at 0.05 Level between pre vs. post test results. The pre test mean was 273 post test mean was 304.3 and mean difference was 10.4 Which showed improvement in exercise capacity in group A samples.

IN THE ANALYSIS AND INTERPRETATION OF QUALITY OF LIFE IN GROUP A

The period t value of 14.59 was greater than the tabulated t value 2.14 which showed a statistically significant difference at 0.05 level between pre vs. post test results. The pre test mean was 2.6 pre test mean was 5.73 and mean difference was 3.13 which showed improvement in quality of life (QOL) in response to aerobic training for group A samples.

The study results of **Karin wadell, and Henriksson-Larsen** were similar to the present study results in which high intensity aerobics in water improves exercise capacity and quality of life and reduced perception of dyspnea.

DISCUSSION ON COMBINED PHYSICAL TRAINING IN GROUP B.

In the analysis and interpretation of perception of Dyspnoea in Group B.

The paired t value of 10.27 was greater than the tabulated t value 2.14 which showed a statistically significant difference at 0.05 level between pre vs. post test results. The pre test mean was 5 post test mean was 2.4 and mean difference was 2.6 which showed reduction on perception of dyspnoea to combined physically training for group B samples.

In the analysis and interpretation of improving Incremental Shuttle Walk test Group B

The paired t value of 15.27 was greater than the tabulated t value 2.14 which showed a statistically significant difference at 0.05 level between pre vs. post test results. The pre mean was 258.6 post test mean was 284.6 and mean difference was 25.67 which showed improvement in exercise capacity response to combined physical training for group b samples.

In the analysis and interpretation of quality of life in Group B

The paired t value of 18.5 was greater than the tabulated t value 2.14 which showed statistically significant difference at 0.05 level between pre vs. post test results. The pre test mean was 1.53 post test mean 3.93 and mean difference was 2.4 which showed improvement in quality of life in response to combined physical training for group B samples.

The study results of Pj wijkstra. et.al., support the present study in which high intensity aerobics in land improves the exercise capacity, quality of life and reduce the perception of dyspnoea.

DISCUSSION ON AEROBIC TRAINING AND COMBINED PHYSICAL TRAINING BETWEEN GROUP A AND GROUP B

In the analysis and interpretation of perception of Dyspnoea in Group A and B.

The unpaired t value of 5.8 Greater than the tabulated t value of 2.05 which showed a statistically significant difference at 0.05 Level between mean difference of group A and group B. The pre vs. post mean of group A was 4.5 is the pre vs. post mean of group B was 2.6 And the mean difference of group A and Group B was 1.90 Which showed greater reduction in perception of dyspnoea in combined to Group A.

In the analysis and interpretation of Incremental Shuttle Walk test Group A and B.

The unpaired t value of 4.6 greater than the tabulated t value of 2.14 which showed statistically significant difference 0.05 level between mean difference of group A and Group B. The pre vs. post mean difference of group A was 36.3; the pre vs. post mean of Group B was 25.7 and the mean difference of group A and Group B was 10.6 this showed significant improvement in six minute walk test in Group B when compared to Group A.

In the analysis and interpretation of quality of life in Group A and Group B

The unpaired t value of 7.40 Greater than the tabulated t value of 2.05 Which showed statistically significant difference 0.05 at level between mean difference of group A and group B. The pre vs. post mean of group A was 3.13, the pre vs. post mean of Group B was 2.4 and the mean difference of group A and group B is 0.73 this showed significant improvement in quality of life in group B when compared to aerobic training in group B.

The study result of Karin wadell, and Henriksson-Larsen. supported the present study result in which high intensity aerobics in water in group A showed more significant reduction in perception of Dyspnoea than Aerobic training in Group B.

The study result of Laviolette L. et al., the present study result in which high intensity aerobics in water in Group A showed more significant improvement in exercise capacity than aerobic training in Group A.

The study result of Susan et al., supported the present study result in which high intensity aerobics in water Group A, this showed more significant improvement in quality of life than Group B. Therefore the present study was accepting the alternate hypothesis and was rejecting the null hypothesis.

REASONS FOR MORE IMPROVEMENT IN WATER EXERCISE

Exercise in water has also been shown to reduce the resting heart rate, increase VO₂ max, maximum heart rate and exercise capacity than in land.

Exercise in water also resulted in an increase in the ratio of forced expired volume in one second to forced vital capacity (FEV₁, FVC) and decreased in PaCO₂ than in land.

Exercise in water has been shown to induce a lower heart rate compared to same exercise intensity on land. (Kurabayashi et. al.).

Walking in water elicits higher muscle activity, higher cardio respiratory response, increased perceived exertion level, Respiratory muscle strength and decreased dyspnoea in COPD than in land.

- Kebhu Masumotoan et. al.,

Water exercise induced hydrostatic pressure, reduces the functional residual capacity (FRC) and residual volume (RV) in COPD subjects, which decrease the some of dyspnoea and improve the exercise performance.

Therefore the water exercise increased exercise capacity and decreased dyspnoea. Leads to improvement in quality of life than land

SUMMARY AND CONCLUSION

SUMMARY:

The purpose of this study is to compare, the effects of high intensity aerobics in water versus High Intensity aerobics in land Training in moderate COPD.

A total number of 30 subjects of age group between 40-60 years diagnosed as COPD are randomly selected for the study. They are divided in two group ; High Intensity aerobics in water training (Group A) and High Intensity aerobics in land training (Group B).

After randomizing Group A subjects are given High Intensity aerobics in water training for a period of 6 months. Group B subjects were given High Intensity aerobics in land training for a period of 6 months. The pre & post test values of perception of Dyspnoea, Exercise capacity & quality of life are measured.

The paired t-test is to compare the pre test Vs Post test Values perception of Dyspnoea, exercise capacity & quality of life.

Based on the statistical analysis the result of this study show a significant improvement in both groups following High intensity aerobics in water training and high intensity aerobics in land training programme.

Based on the analysis and interpretation of perceptions of Dyspnoea the unpaired t value 5.8 was greater than the tabulated T-value

at 2.05 level which should a statistically significant difference between Pre Vs Post test results of group A & B. the mean value of Group A was -4.5 B was 2.6 and the mean difference was 1.09 , which should a significant reduction in perception of dyspnoea in High Intensity aerobics in water training Group A compared High Intensity aerobics land training Group B.

BASED ON THIS ANALYSIS & INTERPRETATION OF QUALITY OF LIFE (QOL)

Based on the analysis and interpretation of quality of life (QOL) the unpaired t-value 7.40 was greater than the tabulated t-values at 2.05 level which showed a statistically difference between Pre Vs Post result of group A & B. the mean value of Group A was 3.13 ; Group B was 2.4 and the mean difference was 1.9, which should a significant improvement in quality of life (QOL) in high intensity aerobics in water trained Group B compared to high Intensity aerobics in land trained Group B.

BASED ON THIS ANALYSIS & INTERPRETATION OF EXERCISE CAPACITY (EC)

Based on the analysis and interpretation of exercise capacity (EC) the unpaired t-value 4.6 was greater that the tabulated t-value at 2.05 level which showed a statistically significant difference between Pre Vs Post test result of group A and B. The mean value of Group A was 36.3 ; Group B was 25.7and the mean difference was 10.6, which showed a significant improvement in exercise capacity (EC) in high intensity aerobic in water trained Group A compared to High Intensity aerobic in land trained Group B.

CONCLUSION

The study showed a significant reduction in and perception of Dyspnoea increase in quality of life (QOL) and exercise capacity in COPD patients after the High Intensity aerobics in water training and High Intensity aerobics in land training.

The study showed that the High Intensity aerobics in water training was most effective than high intensity aerobics in land training on perception of Dyspnoea quality of life and exercise capacity.

RECOMMENDATION

- A similar study can be conducted with high, intensity aerobics in water to improve exercise performance in health subjects.
 - A similar study can be conducted with high, intensity aerobics in water to improve exercise perform in asthmatic patients.
 - A similar study can be conducted with high, intensity aerobics in water to improve exercise perform in asthmatic patients.
 - A similar study can be conducted with high, intensity aerobics in water to improve exercise perform in fibromyalgia patients.
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INFORMED CONSENT FORM

**Department of Physical Therapy
JKK Munirajah Medical Research Foundation,
Komarapalayam-638183, Tamilnadu.**

Title of the study:

**“EFFECTS OF HIGH INTENSITY AEROBICS IN WATER
VERSUS HIGH INTENSITY AEROBICS IN LAND ON
DYSPNOEA, QUALITY OF LIFE IN MODERATE COPD”**

I have been informed by Mr.S.VENKATA SUBRAMANIAM., a post graduate student in physiotherapy; this is an randomized study and this will help in decision making on the effect of high and low intensity Inspiratory Muscle Training. I understand that medical information produced by this study will be subject to the confidentiality and privacy regulations of the J.K.K.M College of Physiotherapy.

I have explained to ----- the purpose of the research, the procedures required and the possible risks and benefits to the best of my ability, in the language to the best of his/her understanding. ----- Investigator

Date _____

I confirm that Mr. S.venkata subramaniam has explained to me in the language I can understand about the purpose of the study, and the procedures that may ----- will participate, and the possible risks and discomforts as well as benefits that he/ she may experience. I have read and I understand this consent form, therefore I agree to my consent to participate as a subject in this research in this research project.

Patient proxy

Date

Witness

Date

CRQ- SAS
SUMMARY RESPONSE SHEET

PATIENTS NAME: _____

PATIENTS ID NUMBER: _____

Question Number	Visit Date (ddmmyy)	Visit Date (ddmmyy)	Visit Date (ddmmyy)	Visit Date (ddmmyy)	Visit Date (ddmmyy)	Visit Date (ddmmyy)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						

Domain scores:

The scores for each question of each dimension are added together AND DIVIDED BY THE NUMBER OF completed QUESTIONS IN EACH DOMAIN.

Review of the completed questionnaire should occur to ensure that questions are not missed during the completion of the questionnaire.

Dyspnoea: The mean of questions 1,2,3,4,5 (question 1 + question 2+ question 3+ question 4+ question 5) divided by the number of questions answered excluding those not done (typically 5, but sometimes respondents do not respond to all questions)

Fatigue: The mean of questions 8,11,15,17 calculated as the score (question 8+ question 11+ question 15+ question 17) divided by 4, which is the number of questions answered (questions not answered or missed should be excluded).

Emotional function: The mean of questions 6,9,12,14,16,18,20 calculated as the score (question 6+ question 9+ question 12+ question 14+ question 16+ question 18+ question 20) divided by 7, which is the number of questions answered (questions not answered or missed should be excluded).

Mastery: The mean of questions 7, 10, 13, 19 calculated as the score (question 7 + question 10+ question 13+ question 19) divided by 4, which is the number of questions answered (questions not answered or missed should be excluded).

Example: Calculating the score for the dyspnoea domain when a question has been missed or not done.

Question 1 is blank

Question 2 is 2

Question 3 is 3

Question 4 is 2

Question 5 is 3

Score is $= (3+3+2+3)/4 = 2.75$

- calculating the score for the above example at the follow up visit:

Question 1 is 4

Question 2 is 1

Question 3 is 2

Question 4 is 2

Question 5 is 8 = not done

Score is $= (4+1+2+2)/4 = 2.25$



FIG. 1: INCREMENTAL SHUTTLE WALK TEST



FIG. 2: HIGH INTENSITY AEROBIC EXERCISE IN WATER
