

Effectiveness of lumbar stabilization exercises along with diaphragm training on pain & aerobic capacity in young adults with chronic non specific low back pain: A randomized clinical trial

by

DEEPTI MANJARI PATEL

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In Cardiopulmonary science

Under the guidance

Dr. Arpita Panda

Associate Professor



Abhinav Bindra Sports Medicine And Research Institute,

Pahal, Bhubaneswar, Odisha

2021-2023



DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled “Effectiveness of lumbar stabilization exercises along with diaphragm training on pain & aerobic capacity in young adults with chronic non specific low back pain: A randomized clinical trial” is a bonafide and genuine research work carried out by me under the guidance of Dr. Arpita Panda , Associate professor ,ABSMARI.

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Associate professor
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Date:

Signature of the candidate
Deepti Majari Patel

Place:

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Effectiveness of lumbar stabilization exercises along with diaphragm training on pain & aerobic capacity in young adults with chronic non specific low back pain: A randomized clinical trial

ABSTRACT

PURPOSE: This study conducted to see the effectiveness of lumbar stabilization exercise along with diaphragm breathing training on pain and aerobic capacity in subjects with nonspecific low back pain in a short term duration of 4 weeks.

METHOD: A total number of 30 subjects who met the inclusion criteria were selected and divided into two groups by randomized sampling technique .Group A performed Lumbar stabilization and walking exercise and group B performed lumbar stabilization, walking exercise with diaphragm breathing training. These intervention held for 4 weeks , 5 days per week , for 45 minutes . The assessment was taken at the baseline i.e. prior to intervention (Pre-test) and at the end of protocol i.e. post intervention by using recumbent cycle ergo meter and NRS scale .

RESULT: The study demonstrated that both the interventions has approximately equal effect on VO₂max and pain in young adults with chronic nonspecific low back pain .

CONCLUSION: The result of this study after pre a post test taken by NRS and VO₂max showed a significant improvement in their pain and aerobic capacity within the two groups . But there is no significant improvement between the two groups . The study concluded that both lumbar stabilization and walking exercise and lumbar stabilization and walking exercise along with diaphragm breathing training reduce pain and improve aerobic capacity in adults with low back pain .

KEYWORDS : Chronic non specific low back pain ,young adult , lumbar stabilization , diaphragm breathing training , Recumbent cycle , NRS ,

INTRODUCTION

Low back pain is one most common musculoskeletal disorder , with the prevalence rate of 80% . the pain that had persisted for 3 months or longer time period referred as chronic low back pain . The risk factors which lead to non specific low back pain among young adults ca be mechanical over burdening , incorrect posture , ergonomic characteristics of sitting chair and desk .Other risk factors can be sedentarism psychological intervention .According to Anggiat Panjaitan et al.(2018) , The prevalence among young adults is 74.6% .

Research has shown the core muscles in chronic lower back pain are(paraspinals , transverse abdominis , internal oblique , multifidus , diaphragm and pelvicfloor)week and get easily fatigue .

Paraspinal muscles: The paraspinal muscles run along with the sides of the spinal column responsible for maintaining upright posture supporting the spine , and assisting in bending , twisting , and extending movements .Dysfunction or tightness I these muscles can lead to muscle imbalance , spinal misalignment , and chronic muscle tension , contributing to low back pain

Traversus abdominis : It is a deep abdominal muscle that acts like corset , providing stability to lumbar spine . It helps control intra abdominal pressure and work with other core muscle to support the spine during movement . Weakness or poor activation of it ca lead to decreased spinal stability and increased stress on lower back , which can cause low back pain .

Internal oblique: These muscles play a role in trunk rotation and lateral flexion.

Dysfunction of this muscle can disrupt proper movement pattern and contribute to low back pain .

Diaphragm: It works synergistically with other deep trunk muscles to maintain proper intra-abdominal pressure and spinal alignment . Dysfunction or fatigue of the diaphragm contribute to low back pain .

Paraspinal muscles are again help to maintain upright posture , provide stability to spine . During aerobic activities they assist to support the torso and maintain an erect posture which is important for effective breathing . Transverse abdominis and internal oblique, contribute to overall core stability and the stable core helps to transfer force s between the upper and lower body during activities like running , cycling or swimming . This stability enables more efficient movement and energy transfer , allowing to maintain an effective aerobic pace .

Diaphragm is primarily a respiratory muscle . A strong diaphragm enhances lung's ability to take oxygen and expel carbon dioxide . , contributing better aerobic capacity .

As the core muscles as well as diaphragm muscles are related with low back pain and aerobic capacity , the lumbar stabilization exercise and diaphragmatic exercises can be considered to reduce the pain and improve aerobic capacity .

Lumbar stabilization exercise with walking and diaphragmatic breathing training have been proven to improve pain and muscle endurance in athletes . Since there is a lack of research focusing on improving aerobic capacity and pain in patient with low back pain who are non-athletes .

Need of the study

Lumbar stabilization exercise with walking and diaphragmatic breathing training have been proven to improve pain and muscle endurance in athletes . Since there is a lack of research focusing on improving aerobic capacity and pain in patient with low back pain who are non-athletes .

Also the studies showed the result for long term for long term intervention . there is a lack of research that focuses on term intervention .

Aim of the study

To see the effectiveness of lumbar stabilization exercise along with diaphragm breathing training on pain and aerobic capacity in subjects with nonspecific low back pain in a short term duration of 4 weeks .

Objective

To find out the effect of lumbar stabilization exercise along with diaphragmatic training on pain and aerobic capacity in subjects with non specific low back pain using NRS and recumbent cycle test .

Hypotheses

Null hypothesis

- There will be no significant effect of lumbar stabilization exercises on pain and aerobic capacity in young adults with low back pain in a short duration of intervention .
- There will be no significant effect of lumbar stabilization exercises along with diaphragm breathing training on pain and aerobic capacity in young adults with low back pain in a short duration of intervention .

Alternate hypothesis

- There will be significant effect of lumbar stabilization exercises on pain and aerobic capacity in young adults with low back pain in a short duration of intervention .
- There will be significant effect of lumbar stabilization exercises along with diaphragm breathing training on pain and aerobic capacity in young adults with low back pain in a short duration of intervention .

Review of literature

- . Marugán-Rubio D, Chicharro JL, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Rodríguez-Sanz D, Vicente-Campos D, Molina-Hernández N, Calvo-Lobo C. Effectiveness of Ultrasonography Visual Biofeedback of the Diaphragm in Conjunction with Inspiratory Muscle Training on Muscle Thickness, Respiratory

Pressures, Pain, Disability, Quality of Life and Pulmonary Function in Athletes with Non-Specific Low Back Pain: A Randomized Clinical Trial. J Clin Med. 2022

- Beeckmans N, Vermeersch A, Lysens R, Van Wambeke P, Goossens N, Thys T, Brumagne S, Janssens L. The presence of respiratory disorders in individuals with low back pain: A systematic review. Man Ther. 2016 Dec

))aimed to determine the VO₂mx values using a direct method and provide normative data of VO₂max for healthy young adults in the age group of 18 to 25 years in both sexes As result the value obtained in this study for males are 45. 30 mL/ kg /min and female it was 35. 71mL /kg / min .The value of VO₂max in Indian population was lower than western population.

- Khadijeh otadi ,Nouredin N A, Shariar Sharify et al. (2021) (Effect of combining diaphragm training with electrical stimulation on pain , function , and balance in athletes with chronic low back pain :A randomized control trial) aimed to explore the effect of diaphragm training with electrical stimulation on pain , function , static stability , dynamic balance of athletes with non specific low back pain done an experiment where they divided the subjects in 2 groups . One group was provided both diaphragm training and TENS , another group was provided only TENS .The result concluded that the pain , function , static stabilities , dynamic balance are improved more in experimental group .
- Jee Hyun Suh , Hayoung Kim , Gwang Pyo Jung et al.(2019)(The effect of of lumbar stabilization and walking exercises on chronic low back pain :A randomized control trial)aimed to compare the efficacy between 2 exercises :The individualized lumbar stabilization and walking exercise ,They divided the subjects into 4 groups ,1st flexibility exercise , 2nd walking exercise ,3rd stabilization exercise , 4th stabilization with walking exercise The result of the

study concluded that Lumbar stabilization exercise and walking exercise can be recommended for the people with chronic low back pain as it relieve the pain and also improve muscle endurance .

- Ozgur Carioglu et al.(2018)aimed to analysis the visual analogue scale , the verbal rating scale and numerical rating scale to determine , were they compliance and usability different among scale , were any other superior than other(s) for clinical use ,?They re the clinical trials published before 2017 A literature search via electrical database was carried for the last 15 years on English language papers and concluded that all three scale are valid , reliable and appropriatr for use in clinical practice .
- H Goodwatte , A gendreau , E Fleming , K Friedric (2015)Validity of VO2max testing on a recumbent ergometer compaire to treadmill)aimed to determine the validity of new recumbent cycle ergo meter against treadmill to identify of using the new ergometer for the determination of VO2max The study concluded that the treadmill is more accurate than recumbent cycle ergo meter to determine VO2max .
- Ltte Janssens , Simon Brugmanea , Alison K McCnnell et al. (2013) greater fatigabilitybin individual with recurrent low back pain , aimed to determine whether the individuals with low back pain axhibit greater diaphragm fatigability compared to healthy control individuals with low back pain , concluded individuals with low back pain exhibit propensity for diaphragm fatigue , which was not observed in control individuals .
- Duque I ,Parra JH , Alain Duballet (2011)(Maximal aerobic power I patient with low back pain :A comparison study with healthy subject)aimed to compare maximal aerobic capacity of patient with chronic low back pain with healthy

asymptomatic controls matched for age concluded that maximal aerobic capacity is significantly lower in the chronic low back pain population .

- Antonio Ignacio , Sophie Heywood , aimed to compare a specific graded exercise test using deep water running test with cycle ergo meter test on land to develop an equation to estimate aerobic threshold for training in DWR in patient with chronic non specific low back pain concluded the positive correlation between maximal variables of deep water running and cycle ergo meter suggest the validity of deep water running protocol as a graded exercise test in chronic low back pain .High intensity DWR in this population can be carried out safely and effectively and should be investigated further related to the subgroups of chronic non specific low back pain patients ,with which the DWR test may be useful .

MATERIALS AND METHODOLOGY

MATERIALS

Recumbent cycle

Pulse oxy-meter

Sphygmomanometer

Paper

Pen

METHODOLOGY

STUDY DESIGN –Randomized Control Trial

STUDY POPULATION – Young adults with chronic mechanical low back pain

SAMPLE SIZE - 30

SAMPLING TECHNIQUE – Purposive sampling

STUDY SETTING – Utkal signature

SUDY DURATION – 6 months

INCLUSION CRITERIA

- Age – 18 to 25 years
- Both male and female
- Subject with chronic non specific low back pain >3 months
- Reduced aerobic capacity
- Willingness to participate

EXCLUSION CRITERIA

- Any musculoskeletal injuries (fracture , strains and sprains)within the last 1 year
- Any pathological low back pain
- Any neurological , cardio – respiratory systemic involvement
- Any recent surgeries (last 1 year)
- Acute trauma
- Pregnancy
- Taking physiotherapy treatment since 1 month
- Non athlete

OUTCOME MEASURE

RECUMBENT CYCLE

The recumbent bike test also known as recumbent ergo-meter test , is a cardiovascular fitness assessment performed using a recumbent stationary bike .This tes can be particularly useful for individuals who may have mobility or balance issues , as the recumbent bike provides a supportive and comfortable seated position . To perform a basic recumbent cycle adjust the bike seat and handle bar to feat the participant comfortably . The seat should be positioned so that the participant's legs can pedal fully and comfortably .The handle bars should also be adjusted for a comfortable reach . Before performing the test subject should warm up first for 5 to 10 minutes by gentle pealing at low resistance . Then the protocol for recumbent cycle test can be started at a initial load of 100 watts , increasing by 25 watts every 2 minutes . Continue the progressive increase in workload until the participant reaches a point of moderate and high exertion . Through out the test monitor the heart rate .Then the patient should cool down , by gradually decreasing the resistance and pace of pedaling . Record the duration of the test , the highest workload achieved ,heartrate data .

NRS SCALE

The numeric rating scale (NRS) is a widely used tool for assessing pain intensity .It involves asking an individual to rate their pain on scale from 0 -10 , 0 being o pain , 10 being the worst pain imaginable .

PROCEDURE

The present study was reviewed by the institutional Ethical Committee . A total of 30 samples were selected by using purposive sampling based on inclusion criteria and exclusion criteria . The demographic and clinical variables were collected from the patients .The study protocol was explained to all the participants , and there informed consent form was obtained . Group allocation was done using simple randomization .

15 subjects were placed in group A .

15 subjects were placed in group B .

Pretest of pain and aerobic capacity was assessed through NRS scale and Recumbent cycle ergo-meter .

INTERVENTION

The group A participants were instructed to perform lumbar stabilization exercise. The exercise consisted of 2 parts; the stretching exercise and stabilization exercise. After the stretching exercise of 5 minutes participants were instructed to complete the stabilization exercise for 25 minutes. Each level has 7 basic positions, that are, supine, dead bug, side lying prone, bird dog, bridge and plank position. At the beginning participants were placed into an exercise level with moderate difficulty, with gradual increase in difficulty with increased participant's capacity. Total duration of the intervention was 4 weeks, 5 days per week. Participant was instructed to walk fast on flat ground for 10 minutes.

Stretching					
REW Core Stabilization	Level 1	Level 2	Level 3	Level 4	Level 5
Supine					
Dead bug					
Side lying					
Prone					
Bird dog					
Bridge					
Plank					

B

Participants of group B were instructed to perform lumbar stabilization exercise. The exercise consisted 2 parts; the stretching exercise and stabilization exercise. After the stretching exercise of 5 minutes participants were instructed to complete the stabilization exercise for 20 minutes. Each level has 7 basic position, that are, supine, dead bug, side lying prone, bird dog, bridge and, plank position. At the beginning participants were placed into an exercise level with moderate difficulty, with gradual increase in difficulty with increased participant's capacity. Total duration of the intervention was 4 weeks, 5 days per week. Participant was instructed to walk fast on flat ground for 5 minutes. Additionally they were instructed to perform diaphragm breathing training. 1st 2 weeks they were instructed to perform supine breathing and crocodile breathing, and for last 2 weeks seated breathing and 90/90/90 breathing. Each exercise were performed for 5 minutes.



Fig 1. prone core stabilization



Fig 2. Bird Dog



Fig 3. Dead bug



Fig 4. Supine core stabilization



Fig 5. Side plank



Fig 6. Plank

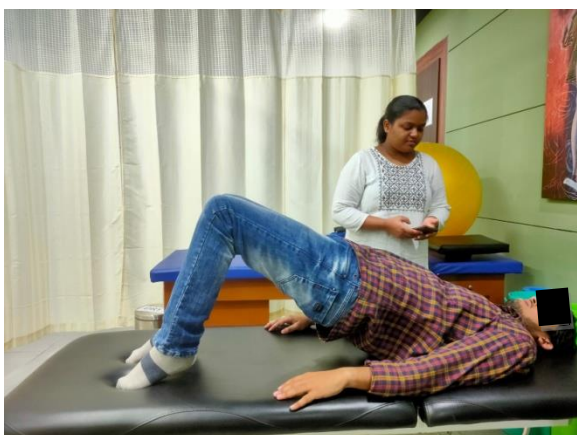


Fig .7 Bridge



Fig 8. Seated breathing



Fig. 9. Crocodile breathing



Fig 10. 90/90/90 breathing

STATISTICAL ANALYSIS

The statistical analysis was done using Statistical Package for the Social Sciences (SPSS for Windows, Version 19.0). Descriptive statistics were calculated for all the variables as mean and standard deviation. The comparison of pain score and VO2 Max before and after the intervention in the study groups was done using paired t-test. Comparison of change in pain score and VO2 Max between the two groups was done using independent t-test. The level of significance for the present study was fixed at a p-value of less than 0.05.

RESULTS

Group A

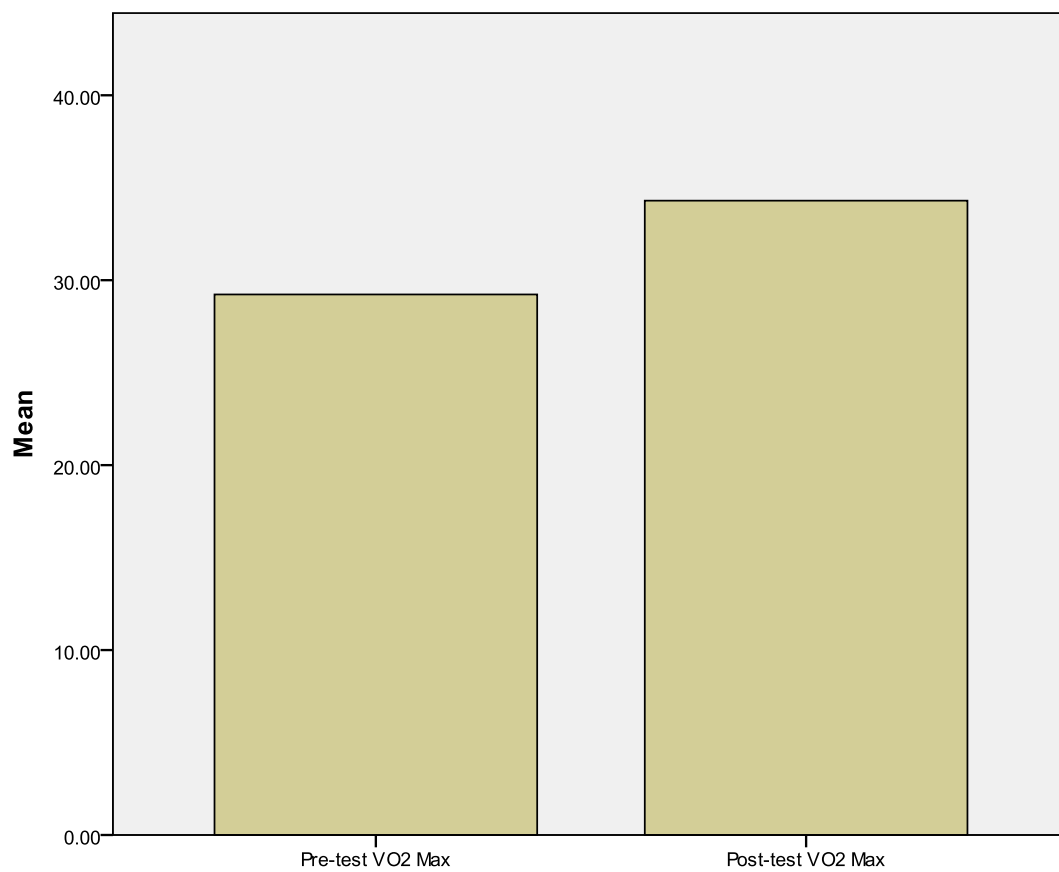
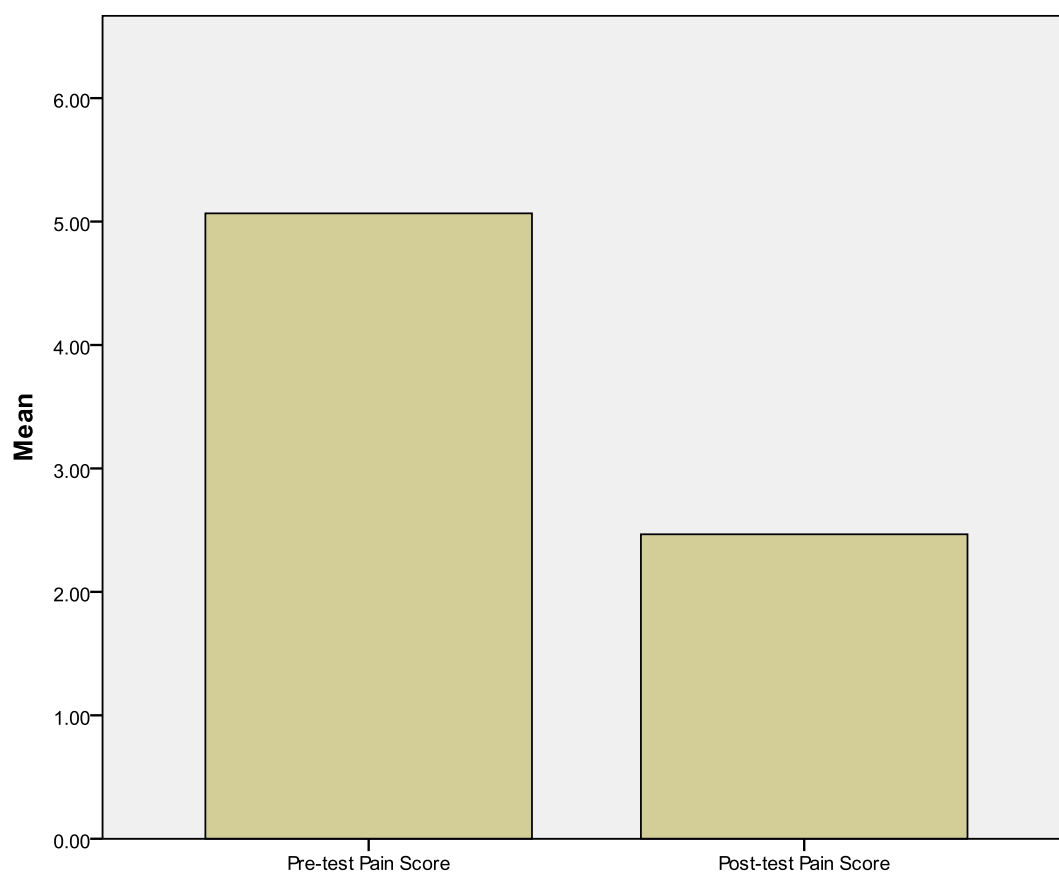
Table 1 shows the change in pain score and VO2 Max in Group A. Statistical analysis using paired t-test showed that there was a statistically significant change in pain score in Group A after the intervention ($P < 0.001$). The post-test pain score (2.46 ± 1.06) was significantly lower than pre-test pain score (5.06 ± 0.79).

There was also a statistically significant change in VO2 Max in Group A after the intervention ($P < 0.001$). The post-test VO2 Max (34.30 ± 6.43) was significantly higher than pre-test VO2 Max (29.22 ± 6.76).

Table 1. Comparison of pre-test and post-test data in Group A

	Mean	N	Std. Deviation	P value
Pre-test Pain Score	5.0667	15	.79881	<0.001*
Post-test Pain Score	2.4667	15	1.06010	
Pre-test VO2 Max	29.2287	15	6.76289	<0.001*
Post-test VO2 Max	34.3013	15	6.43045	

*Statistically significant ($P < 0.05$, Paired t-test)



Group B

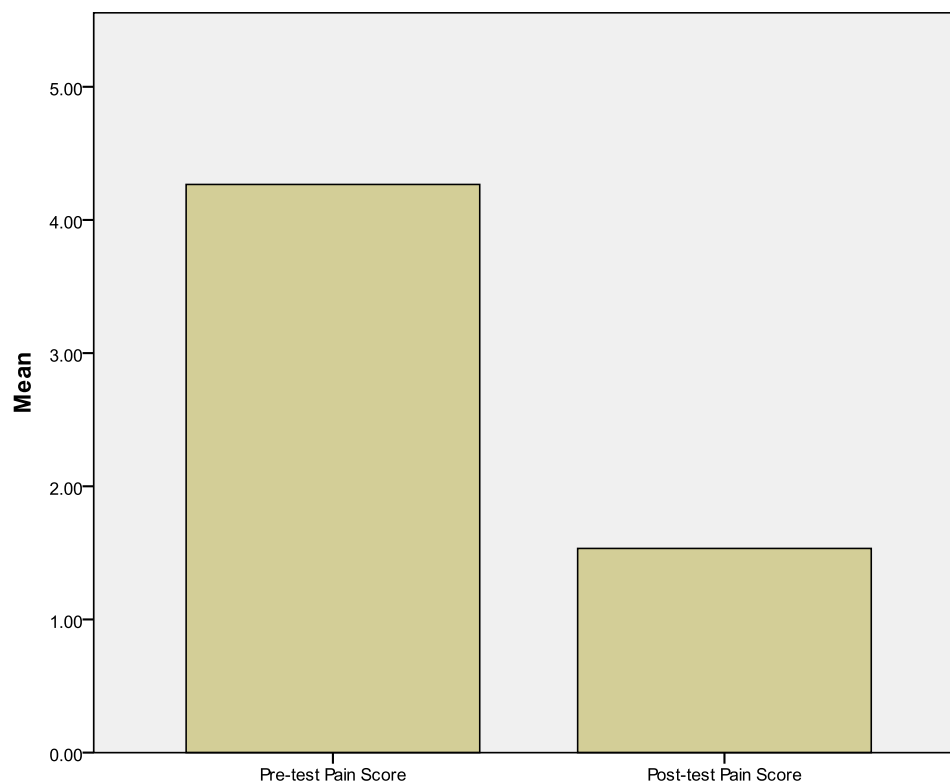
Table 2 shows the change in pain score and VO2 Max in Group B. Statistical analysis using paired t-test showed that there was a statistically significant change in pain score in Group B after the intervention ($P < 0.001$). The post-test pain score (1.53 ± 0.83) was significantly lower than pre-test pain score (4.26 ± 0.88).

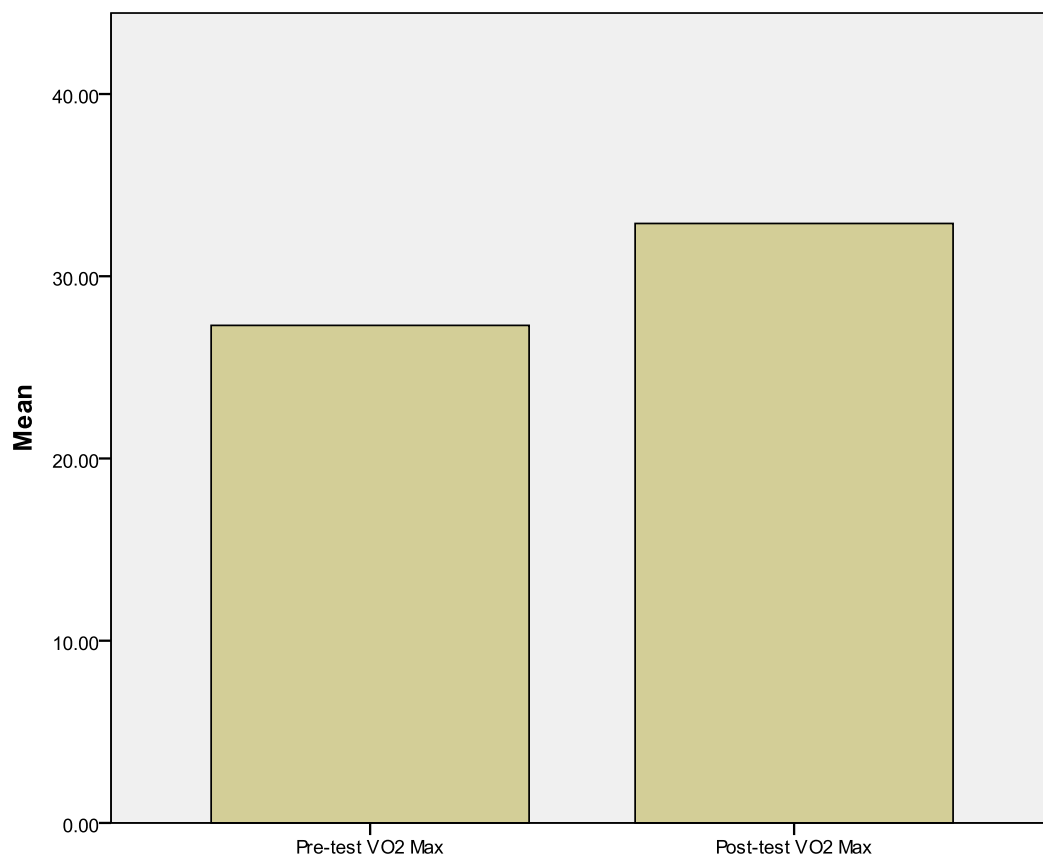
There was also a statistically significant change in VO2 Max in Group B after the intervention ($P < 0.001$). The post-test VO2 Max (32.89 ± 5.85) was significantly higher than pre-test VO2 Max (27.30 ± 6.32).

Table 2. Comparison of pre-test and post-test data in Group B

	Mean	N	Std. Deviation	P value
Pre-test Pain Score	4.2667	15	.88372	<0.001*
Post-test Pain Score	1.5333	15	.83381	
Pre-test VO2 Max	27.3033	15	6.32925	<0.001*
Post-test VO2 Max	32.8953	15	5.85022	

*Statistically significant ($P < 0.05$, Paired t-test)



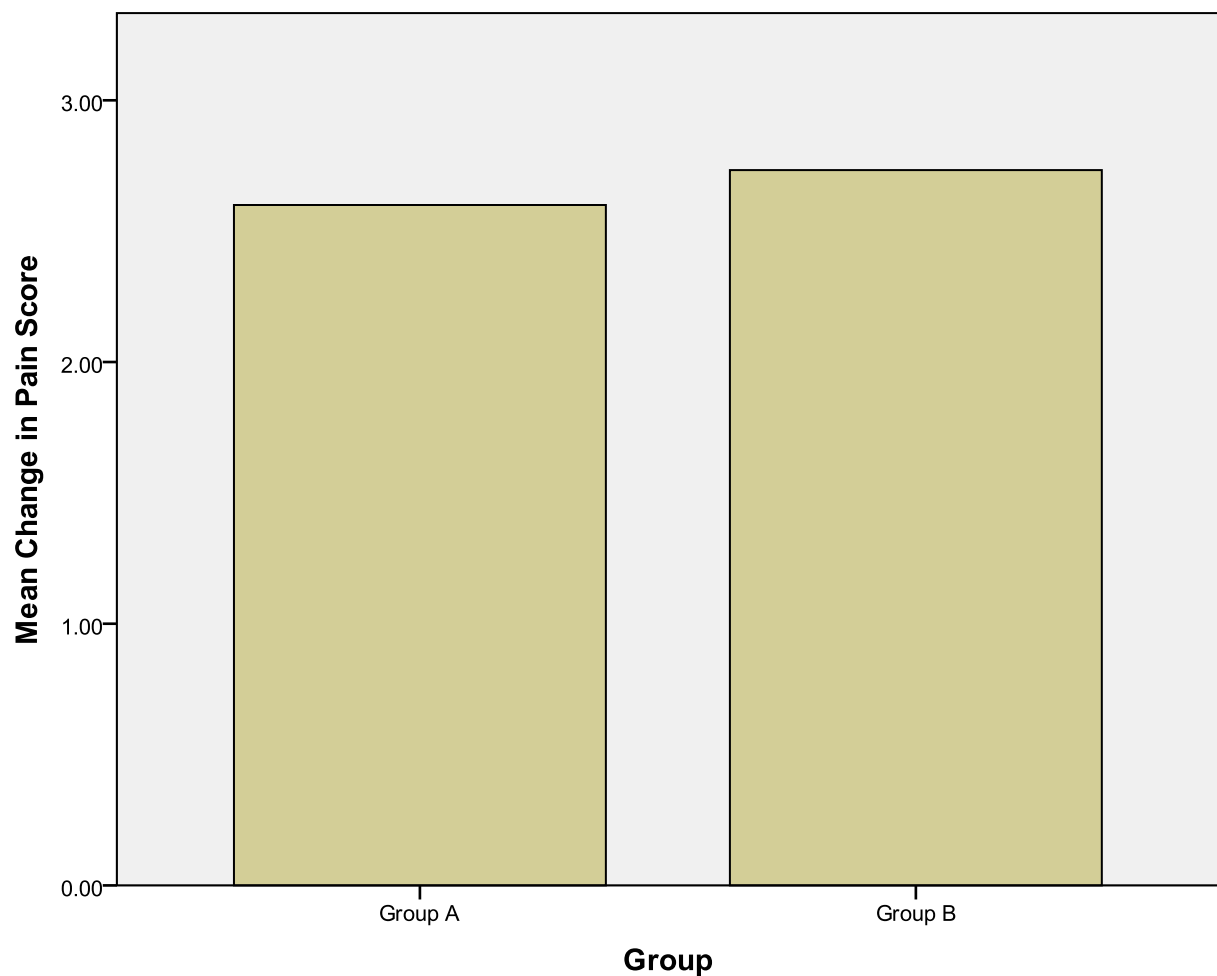


Comparison of Change in Pain Score

Table 3 shows the comparison of change in pain scores (difference in pre-test and post-test pain scores) between group A and group B. Statistical analysis using independent t-test showed that there was no statistically significant difference in the change in pain scores between the two groups (P=0.673).

Table 3. Comparison of change in pain scores in the study groups

	Group	N	Mean	Std. Deviation	P value
Change in Pain Score	Group A	15	2.6000	.82808	0.673
	Group B	15	2.7333	.88372	

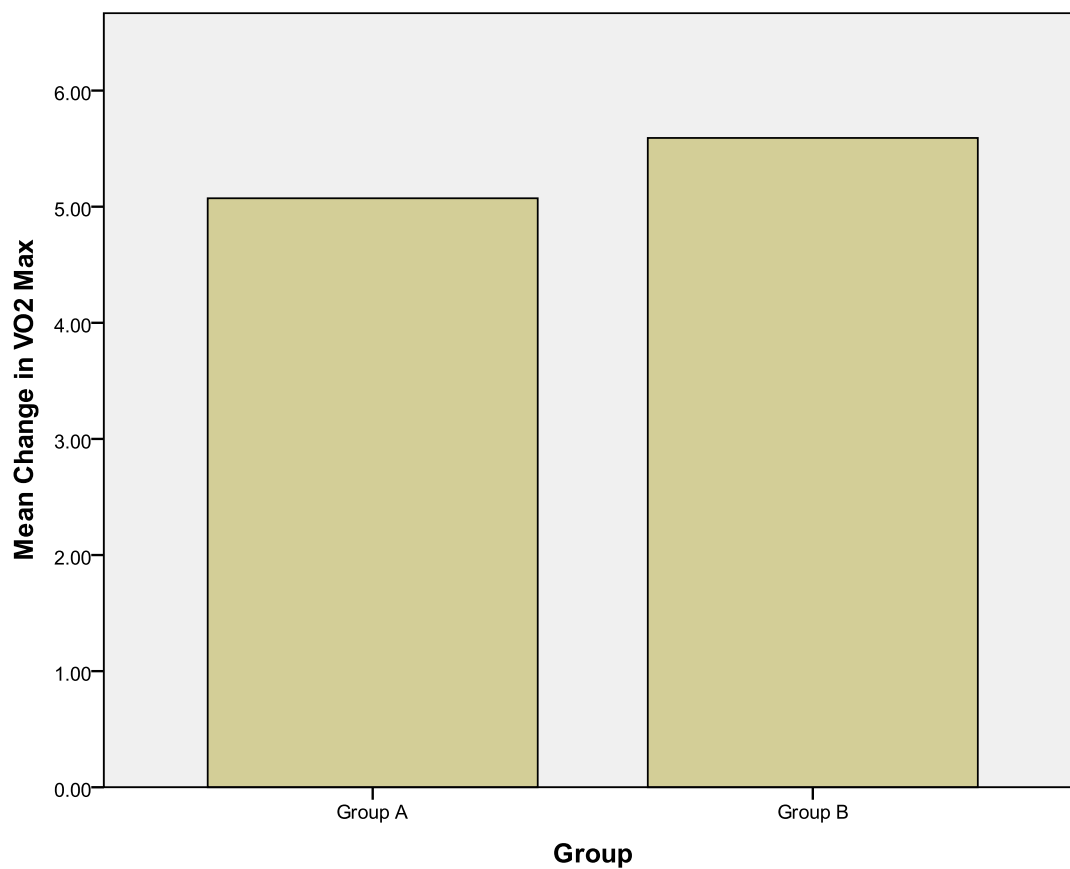


Comparison of Change in VO2 Max

Table 4 shows the comparison of change in VO2 Max (difference in pre-test and post-test VO2 Max) between group A and group B. Statistical analysis using independent t-test showed that there was no statistically significant difference in the change in VO2 Max between the two groups (P=0.374).

Table 4. Comparison of change in VO2 Max in the study groups

Group		N	Mean	Std. Deviation	P value
Change in VO2 Max	Group A	15	5.0727	1.66812	0.374
	Group B	15	5.5920	1.47182	



DISCUSSION

The study conducted on group A , where the intervention was applied , and measurements were taken before and after . The study focused on changes in pain score and VO₂max . The statistical analysis used was the paired t-test to determine the changes .The observed changes are statistically significant where pain score of pre test was 5.06+_0.79 and the post test is 2.46+_1.06 . Paired t-test showed significant change in painscore($P < 0.001$) . This indicates , that the pain score in group A significantly decreased after the interventio .VO₂max for pre test was 29.22+_6.76 and post test is 34.30+_6.43. Paired t –testshowed a statistically significant change in VO₂ max ($P > 0.001$) . This idicates the cardio vascular fitness (VO₂max) of group A significat ly increased after the intervention . The post test VO₂max is significantly higher than pre test VO₂ max . Over all the study's result suggests that the intervention has a positive impat on both pain scores and aerobic capacity .

The study conducted on group B , where the intervention was applied , and measurements were taken before and after . The study focused on changes in pain score and VO₂max , with statistical analysi conducted by pair t-test to asses the significance of the observed changes . The observed changes are statistically significant where pain score of pre test was 4.26+_0.88 and the post test is1.53+_0.83. Paired t-test showed significant change in painscore($P < 0.001$) . This indicates , that the pain score in group B significantly decreased after the intervention .VO₂max for pre test was 27.30+_6.32and post test is32.89+_5.85 . Paired t –test showed a statistically significant change in VO₂ max ($P > 0.001$) . This idicates the cardio vascular fitness (VO₂max) of group B significat ly increased after the intervention . The post test

VO₂max is significantly higher than pre test VO₂ max . Over all the study's result suggests that the intervention has a positive impact on both pain scores and aerobic capacity .

Overall the study's result for group B is parallel those of group A , indicating that the intervention had a positive effects on pain scores and aerobic capacity in both the groups . The paired t-test results in both cases suggest that the intervention led significant improvement in both outcomes .

A comparison was made between the change in pain score for group A and B . To determine whether there was a statistically significant difference in the pain score between two groups . The statistical analysis used for this comparison was independent t-test . The independent t-test showed that there was no significant difference in the change in pain scores between the two groups ($P = 0.673$) .

Comparison of change in VO₂max (the difference between pre test and post test) between group A and group B was made to determine whether there is a statistically significant difference in the change in VO₂max between the two groups . The statistical analysis used for this comparison is an independent t- test . The independent t test showed that there was no statistically significant difference in the change in VO₂max between the two groups ($P=0.374$) . Khadijeh otadi ,Nouredin N A, Shariar Sharify et al. (2021) concluded that the pain , function , static stabilities , dynamic balance are improved .Whether diaphragm is primarily an inspiratory muscle secondarily it serves as a core muscle whose work is to stabilize the back which prevent low back pain . So the diaphragm training helps to reduce pain in low back pain patient . Sonali Soumyashree, Jaskirat Kaur () concluded that inspiratory muscle

training is effective in improving aerobic capacity, respiratory muscle strength and rate of perceived exertion than deep breathing exercises in these patients .

Jee Hyun Suh , Hayoung Kim , Gwang Pyo Jung et al.(2019) concluded that the lumbar stabilization exercise along with walking exercise relive pain and improve muscle endurance . Rustem Mustafaoglu et al concluded that core stabilization exercise can improve pulmonary function, respiratory muscle strength, and functional capacity in adolescents . The lumbar stabilization exercise strengthen and stabilize the muscles which enhance spinal stability , reduce pain , improve overall activity .Lumbar stabilization exercises help to improve posture by strengthening core muscles ,which can lead to better alignment of spine and ribcage .When posture is improved , lungs has more space to expand , which improve aerobic capacity .

This study was conducted with less sample size . Future study should conduct with larger sample size . This study is conducted on only one age group .The study can be conducted on other age group population and can compare the effect on different age groups .The further studies can take other outcomes like performance , quality of life in different age groups .

CONCLUSION

The result of this study after pre a post test taken by NRS and VO2max showed a significant improvement in their pain and aerobic capacity within the two groups . But there is no significant improvement between the two groups . The study concluded that both lumbar stabilization and walking exercise and lumbar stabilization and walking exercise along with diaphragm breathing training reduce pain and improve aerobic capacity in adults with low back pain .

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CONSENT FORM

Title of the study - Effectiveness of lumbar stabilization exercises along with diaphragm training on pain and aerobic capacity in young adults with chronic lower back pain: A Randomized Clinical Trial

I have been confirmed by Deepti Patel ; that pursuing MPT (cardio) and conducting the above mentioned study under the guidance of Dr Arpita Panda ,Associate Professor ,and co-guide Dr Aparna Pattnaik , Assistant Professor , department of physiotherapy , ABHINAV BINDRA SPORTS MEDICINE AND RESEARCH INSTITUTE , BHUBANESWAR . I have also been told that the study will be improving my overall performance. I have no objection and will be a part of that group. I also understand that the study does not have any negative implications on my health. I understand that the information produced by the study will become a part of the institute's record and will be utilized, as per the confidentiality regulations of the institute. I am also aware that the data might be used for medical literature and teaching purposes, but all my personal details will be kept confidential.

I am well informed to ask as many questions as I can to Deepti Patel either during the study or later. I wish to discuss my participation and concerns regarding these studies with a person not directly involved.

I understand that my assent is voluntary and I reserve the right to withdraw or discontinue participation from the study at any point of time during the study.

I have explained to MR/MISS/MRS the purpose of the research, and the procedure required in the language he/she could understand to the best of my ability.

(Investigator)

(Date)

I confirm that Miss Deepti Patel (investigator) has explained to me in a language I can understand, the purpose of the study and the procedure. Therefore, I agree to give my assent for the participation as a subject in this study and I will be accountable for the decisions.

(Signature)

(Date)



ABHINAV BINDRA

Sports Medicine & Research Institute

A Unit of the Abhinav Bindra Foundation Trust

Recognised by DMET, Health & FW Dept., Govt. of Odisha, Affiliated to Utkal University
Recognised by Odisha State Council for Occupational Therapy and Physiotherapy

Head Office:

Plot No.-107, Sector-82
JLPL Industrial Area,
Sahibzada Ajit Singh
Nagar, Punjab - 140306
+91 99156 31755
principal@absmari.com

LETTER NO- ABSMARI/ADMIN/2023/896

DATE-13.03.2023

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Ms. Deepti Manjari Patel is a bonafide student of MPT (2021-22: AB) batch of ABSMARI bearing Roll No-ABS-MPT-2021-15. With reference to her requisition this institute has no objection in allowing her to carry out her research work as per the following details under the guidance of Dr. Arpita Panda.

Title – "Effectiveness of Lumbar Stabilization Exercise Along With Diaphragm training on Pain and Aerobic Capacity in Young Adult with Chronic Low Back Pain."

Population from- Adult Individuals

study settings –Utkal Signature

Duration.– 4 Weeks From – 13.03.2023

To – 10.04.2023

under the following conditions subject to thorough permission from their end -

1. She has to produce her official engagement plan.
2. She has to submit her certificate of attendance at last
3. She is liable to respond to the institute when required
4. She must attend all examinations scheduled by the institution or university during this period
5. Daily report to Research- Guide and Course-Coordinator is highly required

This NOC is effective from 13.03.2023 to 10.04.2023.


Principal, ABSMARI
PRINCIPAL, ABSMARI

CC –The Dean, ABSMARI, The Course -Coordinator, The Research Guide, Admin office



Utkal Signature, Plot No 273, NH-5, Pahal, Bhubaneswar, 752101

Phone: 6370703650, 6370703651



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Head Office:
Plot No.-107, Sector-82
JLPL Industrial Area,
Sahibzada Ajit Singh
Nagar, Punjab - 140306
+91 99156 31755
principal@absmari.com

Reference No. – ABSMARI/IRB/16/2023
Date: 22nd June 2023

INSTITUTIONAL REVIEW BOARD

To
Ms Deepti Manjari Patel,
Post Graduate student, Department of Physiotherapy,
Abhinav Bindra Sports Medicine and Research Institute (ABSMARI).

This is to certify that your proposal for the study titled **“Effectiveness of Lumbar Stabilization Exercise Along with Diaphragm Training on Pain and Aerobic Capacity in Young Adults with Chronic Lower Back Pain: A Randomized Clinical Trial.”** has been taken for discussion in the meeting held on 20th May 2023. Following the meeting, the committee approves the proposal and it has no objection on the study being carried out.

You are advised to familiarize yourself with the ICMR guidelines on biomedical research in human subjects and also adhere to the principles of Good Clinical Practice. You are hereby directed to submit the final report to the committee, on completion of the study. Any case of adverse reactions should be informed to this ethics committee and action will be taken thereafter.

Any such adverse reactions during the course of the study are the sole responsibility of the Principal Investigator and there is no onus on the Ethical Committee members resulting thereof.

We wish you all the best for your study.


Member Secretary




Chair Person

Utkal Signature, Plot No 273, NH-5, Pahal, Bhubaneswar, 752101
Phone: 6370703650, 6370703651

