Effect of Buerger's Exercise vs. Manual Lymphatic Drainage on Pain, Functional Capacity, Oedema and Quality of Life in Adults with Varicose Veins: A Pilot Study

[1]Aditi Samudre, [2]Dr. Ganesh.B.R
Post Graduate Student, Cardiovascular and Pulmonary Physiotherapy, Kle Institute of Physiotherapy, Nehru Nagar, Belgavi
ORCID ID- 0000-0002-9906-5538
Professor and Head of Cardiovascular and Pulmonary Department of Physiotherapy, Kle Institute of Physiotherapy, Nehru Nagar, Belgavi

10.5281/zenodo.15304162

Introduction: The Prevalence of varicose veins varies geographicallyit's reported that globally about 2%–73% of the population is affected. Varicose veins may become more severe over time and can lead to complications. It should be highlighted that functionality and quality of life are closely linked phenomena since individuals with Chronic venous insufficiency have lower Quality of life as their functional capacity and physical activity levels decline, affects the disease's prognosis and great impact on subjects quality of life, limiting daily activities, functional performance it can cause symptoms that result in complications which can have a negative influence on subjects quality of life. **Objective of the Study:** To evaluate the effects of Buerger's exercise versus Manual lymphatic drainage on Pain using visual analogue scale, Functional capacity using 6 min walk test, Oedema using pitting oedema grades, and Quality of life using chronic venous insufficiency quality of life questionnaire in subjects with varicose veins. **Methodology:** The Study Design was Experimental Study and the Study Type was Randomized clinical trial.The Duration ofData collection for 6 Months. The study was Non-Probabilitysampling design study and the Sampling Technique was Convenient this study included the Target population of Subjects 35-55 years of age diagnosed with Varicose veins. **Results:** Analysis of the data was done using Paired "t" for the pre to post-test comparison of visual analogue scale, six-minute walk test, and CIVIQ-20; irrespective of groups.There was a difference ($p < 0.05$) in visual analogue scale, six-minute walk test, and CIVIQ-20; from pre-test to post-test. **Conclusion:** This study concluded that there is effect of lymphatic drainage on symptoms in subjects with Varicose Veins than that of the burger's exercises.

Key Words: Buerger's Exercise, Manual Lymphatic Drainage, Varicose Veins, Visual Analogue Scale, Functional Capacity, Pitting Oedema Grades, Quality Of Life, Chronic Venous Insufficiency.

Introduction

Varicose veins often contain a one-way valve that closes when muscle contraction occurs, allowing blood to flow exclusively up the leg as in normal veins. In contrast, the valves in varicose. [1] Veins are not operating correctly. As a result, valves malfunction and blood might flow in four different ways. We refer to this blood flow backward as venous reflux. As a result, blood builds up in the legs, resulting in varicose veins. [2] Widening, tortuous superficial veins in the legs subcutaneous tissues are known as varicose veins, and they are frequently very noticeable. These often have a size more than 3 mm. They are typically found inside and are five times larger. [3] Women are more likely than men to have varicose veins. Patients who exhibit signs of noticeable dark blue blood vessels, particularly in the legs and feet, or who have a history of being in contact with risk factors. Assessment is necessary for diagnosis, and it is carried out via colour Doppler imaging and palpation. [2] Risk factors in varicose veins can be classified as hormonal, lifestyle, acquired, and inherited.[5]

Venous hypertension or thrombosis may be the cause of venous disease. Although there may be overlap with venous thrombosis because this can also result in venous hypertension, hypertension is the cause of what is known as chronic venous illness. Although pelvic venous diseases (PeVDs) and postthrombotic syndrome (PTS) are two underlying causes of chronic venous disease, the former is frequently the major cause. Furthermore, there are conditions like lipedema and lymphedema that are frequently misdiagnosed.[13]

The general population is afflicted with chronic venous disease (CVD), a disorder that significantly lowers quality of life. Some of the disease's symptoms are less distinct, but varicose veins and venous ulcers are typically the most noticeable indicators.

Pain is the symptom that drives CVD sufferers to seek medical attention the most often, among the other symptoms that include heaviness, edema, muscular cramps, and restless legs.

Subjects with varicose veins in India, according to the population, which is growing daily, makes up between 15% and 20%.

The Prevalence of varicose veins varies geographically. Currently, it is reported that globally about 2%–73% of the population is affected by varicose veins.[4]

Hypothesis

- Null hypothesis: There will be no difference of Buerger's exercise and Manual lymphatic drainage on pain, functional capacity, oedema, and quality of life in subjects with varicose veins.
- Alternative hypothesis: There will be difference of Buerger's exercise and Manual lymphatic drainage on pain, functional capacity, oedema, and

quality of life in subjects with varicose veins.

Methodology

A random sample of 15 patients that visited KLE Hospital in interventional radiology department who were diagnosed with varicose veins these subjects were randomly categorized in each group. Both females and male participants of age group 35 to 55 years with varicose veins and pitting oedema ≥ 2 were enrolled for this study.

Exclusion criteria was subjects with deep vein thrombosis, undergone with recent surgical interventions in lower limb, recent lower limb fractures, and neuropathies or ulcers in lower limb these participants were excluded. The ethical clearance from the Institutional Ethical Committee was obtained and CTRI resisgtration was done( ). The written informed consent from the each participant was involved was taken. The baseline assessment was done on the 1st day of the treatment and post-intervention assessments was conducted after a month following the intervention which include the outcome measure of visual analogue scale, 6 min walk test, Pitting oedema grades, and chronic venous insufficiency quality of life questionnaire.heintervention was given for each Group for 6 days / week for a 4 weeks. Participants were told to continue and perform Buerger's exercises and Manual lymphatic drainage one time in a day as a home programme and tele- Rehab was conducted.The study design was experimental study and the study type was randomized clinical trial.the duration ofdata collection was for 3 months. the study was non-probabilitysampling design study and the sampling technique was convenientsampling.

Visual Analouge Scale

The visual analouge scale (VAS) is a validated, subjective measure for acute and chronic pain. Scores are recorded by making a handwritten mark on a 10-cm line that represents a continuum between "no pain" and "worst pain."

6 Min Walk Test

The American Thoracic Society describes the six-minute walk test as a measure of functional status or fitness. It is used as a simple measure of aerobic exercise capacity. The aim of this test is to walk as far as possible for 6 minutes. walking along this hallway between the markers, as many times as you can in 6 minutes. 6 minutes is a long time to walk, so you will be exerting yourself. You are permitted to slow down, to stop, and to rest as necessary, but resume walking as soon as you are able.

Pitting Oedema Scale

A grading system is often used to determine the severity of the oedema on a scale from +1 to +4. It is assessed by applying pressure on the affected area and then measuring the depth of the pit (depression) and how long it lasts (rebound time).

Chronic Venous Insufficiency Quality of Life Questionnaire (Civiq)-20

The 20-item questionnaire, which provides a global index and an outline of 4 quality-of-life dimensions—"pain" (4 items), "physical" (4 items), "psychological" (9 items), and "social" (3 items) Items on the CIVIQ-20 scale are scored from 1 to 5. A low score corresponded to greater patient comfort.

Statistical Analysis

The Independent sample "t" test was used to compare age, BMI, visual analogue scale, six-minute walk test, and CIVIQ-20; between Group - A: Manual lymphatic drainage and Group - B: Burgers exercise.The Paired "t" test was used to compare visual analogue scale, six-minute walk test, and CIVIQ-20; within the groups as well as irrespective of groups. The Likelihood ratio test was used to compare difference in proportions. Also, the Independent sample "t" test was used to compare age, BMI, visual analogue scale, six-minute walk test, and CIVIQ-20; according to Pitting oedema scale. To find the relation between visual analogue scale, six-minute walk test, CIVIQ-20, age, and BMI; the Pearson correlation coefficient: ("r") was used. The p value < 0.05 was considered as significant. Data were analyzed by using the SPSS software (SPSS Inc.; Chicago, IL) version 29.0.10.

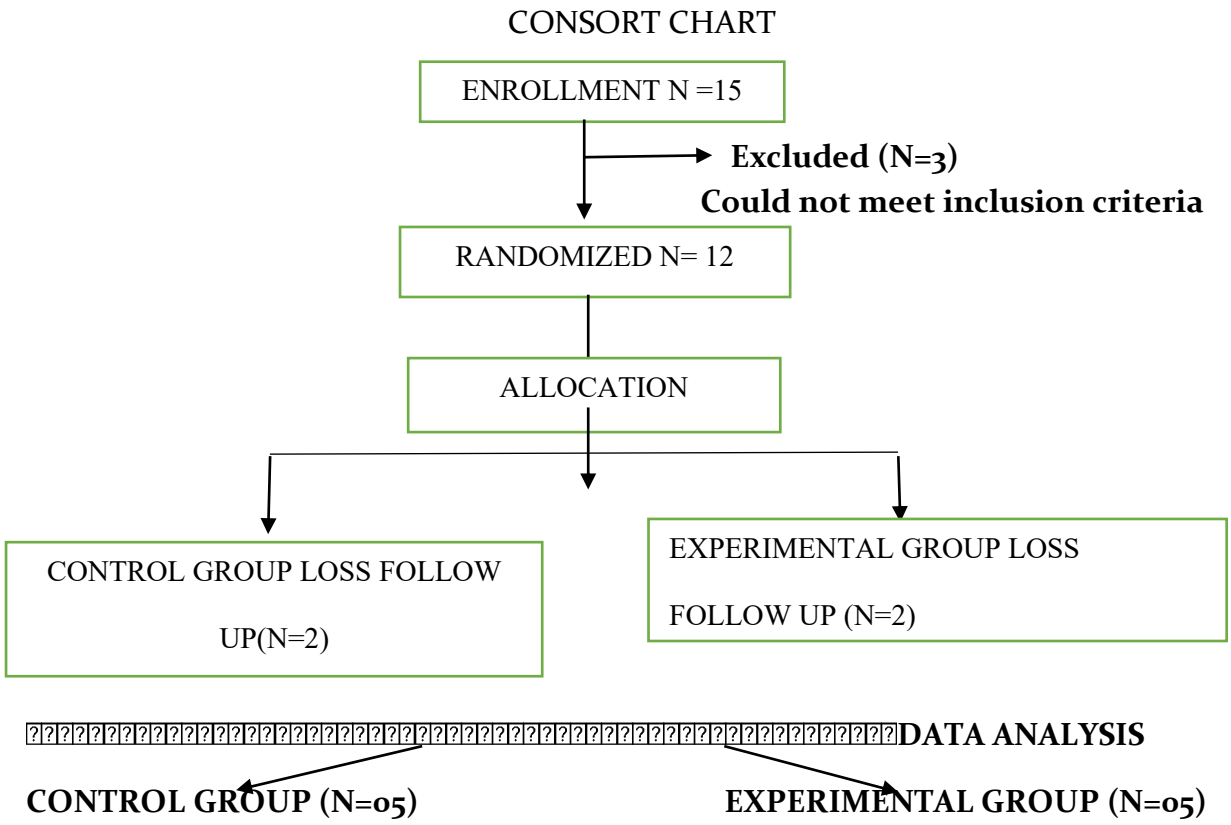

Figure 1: Consort flow diagram

Results:

Table 1: Descriptive Statistics for age, and BMI

(n = 10)	Range	Mean	S.D.
Age (Years)	35 to 55	45.40	7.58
BMI (Kg/M²)	15.1 to 27.1	23.62	3.39

Age of the participants ranged from35 to 55 years with mean:45.40±7.58 years; and the BMI ranged from15.1 to 27.1Kg/M² with mean:23.62±3.39 Kg/M². [Table – 1]

Table 2: Pre to post-test comparison of visual analogue scale, six-minute walk test, and CIVIQ-20; irrespective of groups

(Irrespective of groups)		Mean	S.D.	"t"	p value
Visual analogue scale	Pre	7.10	0.99	2.33	0.045*
	Post	6.40	1.58		
Six-minute walk test	Pre	36.06	5.07	-2.47	0.036*
	Post	39.00	5.50		
CIVIQ-20	Pre	15.10	1.45	-3.28	0.010*
	Post	16.50	1.96		

("t" = Paired "t" test; * Significant)

The Paired "t" test was used for the pre to post-test comparison of visual analogue scale, six-minute walk test, and CIVIQ-20; irrespective of groups. There was a difference ($p < 0.05$) in visual analogue scale, six-minute walk test, and the CIVIQ-20; from pre-test to post-test irrespective of groups. [Table – 2]

Table 3: Comparison of visual analogue scale, six-minute walk test, and CIVIQ-20 within the groups

		Group A: Manual lymphatic drainage				Group B: Burgers exercise			
		Mean	S.D.	"t"	p value	Mean	S.D.	"t"	p value
Visual analogue scale	Pre	6.60	1.14	3.21	0.033*	7.60	0.55	0.54	0.621
	Post	5.40	1.52			7.40	0.89		
Six-minute walk test	Pre	36.52	7.28	-2.63	0.058	35.60	2.07	-0.99	0.380
	Post	40.60	5.64			37.40	5.46		
CIVIQ-20	Pre	15.40	1.95	-6.00	0.004*	14.80	0.84	-1.00	0.374
	Post	17.80	1.79			15.20	1.10		

("t" = Paired "t" test; * Significant)

The Paired "t" test was used for the pre to post-test comparison of visual analogue

scale, six-minute walk test, and CIVIQ-20; within the groups. There was a difference ($p < 0.05$) in visual analogue scale as well as CIVIQ-20; from pre-test to post-test amongGroup A: Manual lymphatic drainage. [Table – 3]

Table 4: Comparison of visual analogue scale, six-minute walk test, and CIVIQ-20 between groups

		Pre				Post			
		Mean	S.D.	"t"	p value	Mean	S.D.	"t"	p value
Visual analogue scale	Group A: Manual lymphatic drainage	6.60	1.14	-1.77	0.115	5.40	1.52	-2.54	0.035*
	Group B: Burgers exercise	7.60	0.55			7.40	0.89		
Six-minute walk test	Group A: Manual lymphatic drainage	36.52	7.28	0.27	0.793	40.60	5.64	0.91	0.389
	Group B: Burgers exercise	35.60	2.07			37.40	5.46		
CIVIQ-20	Group A: Manual lymphatic drainage	15.40	1.95	0.63	0.545	17.80	1.79	2.77	0.024*
	Group B: Burgers exercise	14.80	0.84			15.20	1.10		

("t" = Independent sample "t" test; * Significant)

The Independent sample "t" test was used to compare visual analogue scale, six-minute walk test, and CIVIQ-20 between the groups. During pre-test, there was no difference ($p > 0.05$) in visual analogue scale, six-minute walk test as well as CIVIQ-20 between Group - A: Manual lymphatic drainage and Group - B: Burgers exercise. A difference ($p < 0.05$) in visual analogue scale as well as CIVIQ-20were found between manual lymphatic drainagegroup and burgers exercise group; during post-test. [Table – 4]

Table 5: Comparison of effectiveness (Pre-Post) in visual analogue scale, six-minute walk test, and CIVIQ-20 between the groups

Effectiveness (Pre-Post)		Mean	S.D.	"t"	p value
Visual analogue scale	Group A: Manual lymphatic drainage	1.20	0.84	1.89	0.095
	Group B: Burgers exercise	0.20	0.84		
Six-minute walk test	Group A: Manual lymphatic drainage	-4.08	3.47	-0.95	0.369
	Group B: Burgers exercise	-1.80	4.09		
CIVIQ-20	Group A: Manual lymphatic drainage	-2.40	0.89	-3.54	0.008*
	Group B: Burgers exercise	-0.40	0.89		

("t" = Independent sample "t" test; * Significant)

The Independent sample "t" test was used to compare effectiveness (Pre-Post) in visual analogue scale, six-minute walk test, and CIVIQ-20between groups. There was a difference ($p < 0.05$) in the effectiveness in CIVIQ-20 between manual lymphatic drainage group and burgers exercise group. [Table – 5]

Discussion

The study focuses on comparing Buerger's exercise and Manual Lymphatic Drainage (MLD) in improving pain, functional capacity, edema, and quality of life in patients with varicose veins.

Varicose veins affect a significant portion of the population, leading to chronic venous insufficiency and reduced quality of life.

Limited studies exist comparing Buerger's exercise and MLD directly, highlighting the study's novelty.

Fan Lin et al conducted a study which aimed to review the current management modalities for varicose veins. There are a variety of management modalities for varicose veins. The outcomes of the treatment of varicose veins are different. The papers on the management of varicose veins were reviewed and the postoperative complications and efficacy were compared. Which concluded that Patients undergoing endovenous laser ablation and radiofrequency ablation are most likely to have a faster recovery time and earlier return to work in comparison with those undergoing conventional high ligation and stripping.[1]

In this study MLD showed significant improvements in pain (measured by Visual Analogue Scale) and quality of life (using CIVIQ-20), outperforming Buerger's exercises.
There was other study by Jennifer A Heller et al conducted a study to find various problems related to varicose veins which concluded Varicose veins are dilated veins that may cause pain, swelling, itching, and skin changes. They are diagnosed on physical examination, followed by a vascular ultrasound test if a procedure is planned. Medical treatment consists of elastic compression stockings, which may relieve symptoms but do not make varicose veins go away. In patients who continue to have symptoms, minimally invasive treatment options include endovenous laser ablation, ambulatory phlebectomy, and sclerotherapy. The type of treatment depends on the size and shape of your veins. Treatment complications are uncommon.[3]

The author Josicléia Leôncio da Silva et al conducted a study which aims to mitigate these losses and involves a wide range of interventions, one of which is therapeutic exercise. This article presents the existing evidence on the effectiveness of therapeutic exercises for quality of life, pain, and functionality in chronic venous insufficiency it concluded Only one of these studies showed benefits of exercise for improving quality of life and reducing pain. The others had low methodological quality.[6]

MLD showed significant improvements in reducing pain (measured by Visual Analogue Scale) and enhancing quality of life (measured using CIVIQ-20) compared to Buerger's exercise.

Both interventions are non-invasive and low-risk, making them valuable in the conservative management of chronic venous insufficiency.

MLD also helps address lymphatic dysfunction, which often coexists with venous disorders.

Functional capacity (6-Minute Walk Test) and edema (Pitting Edema Scale) improved slightly with both methods, but MLD demonstrated superior overall effectiveness.

The study underscores the strong link between symptom management and improved quality of life for patients with varicose veins.

Pain relief and enhanced mobility contribute significantly to physical and mental well-being.

Both interventions marginally improved functional capacity (6-minute walk test) and edema (pitting edema scale), though MLD was more effective.
The pre- and post-intervention differences in pain and quality of life for MLD were statistically significant ($p < 0.05$).

Buerger's exercise did not show significant results in many outcome measures, suggesting limited effectiveness.

MLD appears to be a more effective intervention for managing symptoms of varicose veins, particularly pain and quality of life, which are critical for patient well-being.

These findings support integrating MLD into physiotherapy practices for varicose vein management.

MLD likely aids lymphatic drainage and venous return, reducing edema and pain more effectively.

Buerger's exercise, while promoting circulation, may not address lymphatic issues as directly as MLD.

Emphasizing MLD in varicose vein treatment may enhance therapeutic outcomes.

Training healthcare professionals in MLD techniques might improve accessibility for patients.

Limitations

Small sample size (n = 10) limits generalizability.

Short intervention period (4 weeks) may not capture long-term effects.

Non-probability sampling and a single center study reduce external validity.

Acknowledgement

I would like to express my sincere gratitude to everyone who supported and guided me throughout the completion of this study.I am deeply thankful to Dr. Ganesh B.R, Professor and Head of the Cardiovascular and Pulmonary Department of Physiotherapy at KLE Institute of Physiotherapy, for his invaluable mentorship, encouragement, and expertise, which played a crucial role in shaping this work.I extend my heartfelt thanks to the KLE Hospital and interventional radiology department KLE Institute of Physiotherapy for their cooperation and assistance during the data collection and analysis phase. I am also grateful to the participants who volunteered to be part of this study and contributed to its successful execution.Special thanks to my family and friends for their constant encouragement and unwavering support during the course of this research.Lastly, I acknowledge the *Institutional Ethical Committee* for granting the necessary ethical clearance and guidance in adhering to research protocols.This research would not have been possible without the collective contributions of all these individuals and organizations.

Future Scope

-Conducting large-scale, multi-center trials to validate these findings.

- Exploring combined interventions (MLD with Buerger's exercise) to assess synergistic effects.

- Including diverse patient populations with varying severities of varicose veins to ensure broader applicability.

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Figures

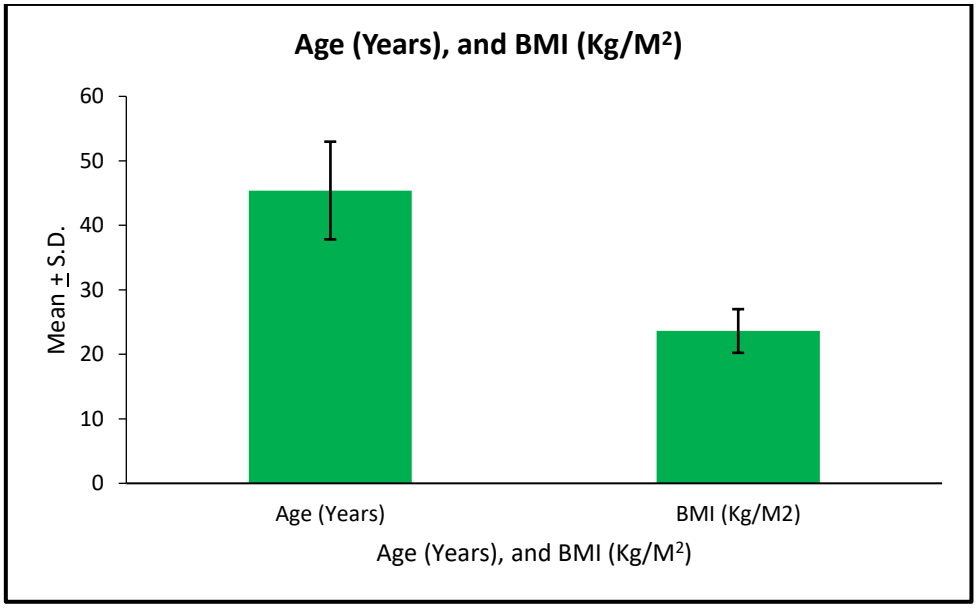
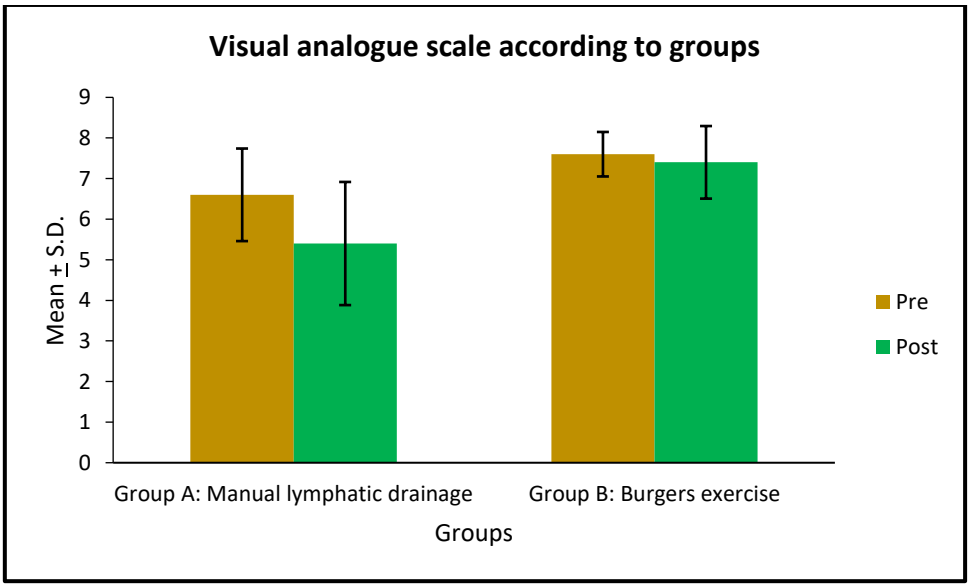
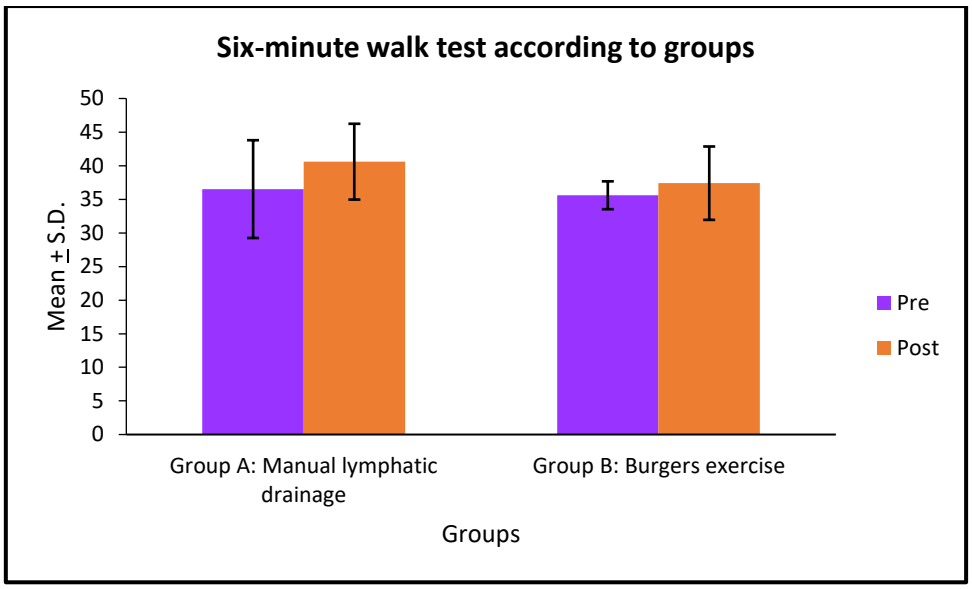
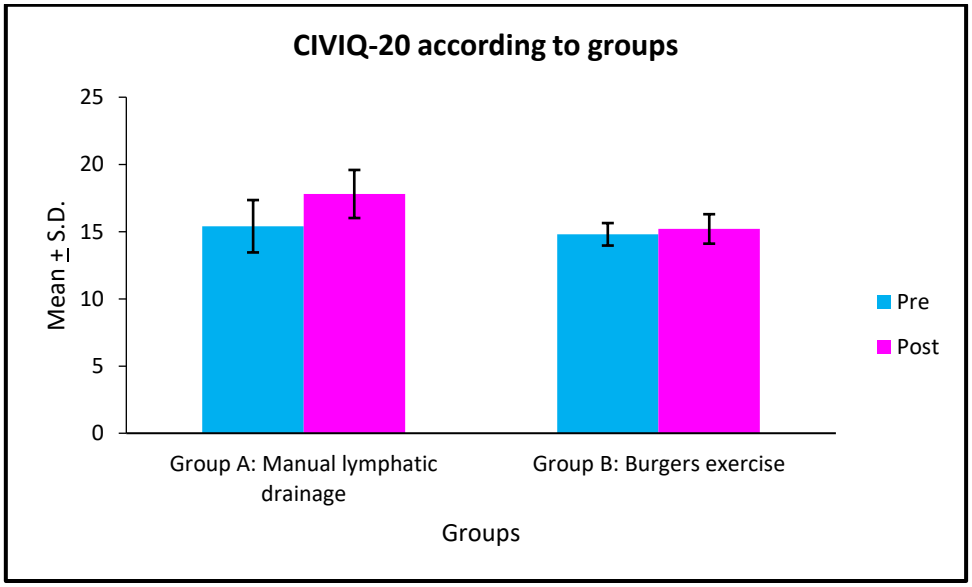


Figure 2: Graphical Statistics for age, and BMI




Six-minute walk test according to groups
Mean ± S.D.
50
45
40
35
30
25
20
15
10
5
0
Pre
Post
Group A: Manual lymphatic drainage
Group B: Burgers exercise
Groups


CIVIQ-20 according to groups
Mean ± S.D.
25
20
15
10
5
0
Pre
Post
Group A: Manual lymphatic drainage
Group B: Burgers exercise
Groups