

Evaluating the Add Effect of Hydrotherapy on Lower Limbs Varicose Veins Pain

Nesrine Ezzat Abdlkarim*, Rasha Aly Yakout*

*Lecturer of Medical Surgical Nursing Faculty of Nursing -Alexandria University,

*Assistant Prof. of Medical Surgical Nursing Faculty of Nursing -Alexandria University

Abstract: Varicose veins are one of the most significant venous disorders all over the world. It can be associated with heavy, aching, and restless legs, swelling and night cramps, and burning and tingling sensations. Thus, the present study was conducted to evaluate the add effect of hydrotherapy on varicose veins patient's pain. Quasi experimental research design was utilized. Forty adult patients were studied for 1 year from Abu-Qir Specialized Hospital, Gamal Abdel Nasser Hospital and the Main University Hospital using two tools. Results revealed that the most common complaints of studied patients were disfigurement, edema, and dilatation of the subcutaneous veins, discomfort easy leg fatigability, and pain. A significant decrease in disfigurement, subcutaneous vein dilatation, leg edema, and tenderness was observed after hydrotherapy sessions. In relation to standing, walking, and climbing stairs, rest, and lying positions more than one third of the patients in the study group had no pain. The add effect of hydrotherapy-in general- was effective, quick, and prolonged in the majority of the patients.

Keywords: Hydrotherapy, Varicose vein, and pain.

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I. Introduction

Varicose veins are one of the most popular venous diseases all over the world. Varicose veins or varicosities are superficial abnormally dilated and tortuous veins commonly in the lower limbs caused by incompetent venous valves.[1] Venous blood flow needs very little pressure to move and circulate. The venous return or flow depends on skeletal muscle contraction, respiratory movement, and venous constriction. During muscle contraction, as in muscular exercises, the blood is squeezed into the adjacent veins toward the heart. In respiratory movement during diaphragmatic contraction, i.e. inspiration, the intra-abdominal pressure exceeds the intra-thoracic pressure and the blood moves from the higher to the lower pressure to the heart. Venous valves also prevent the back flow of the blood to the opposite direction into the legs, and the sympathetic reflex causes contraction of the smooth muscles of the venous wall with the valves preventing the back flow of the blood.[2]

Such conditions that increase pressure on the leg veins such as overweight, lack of exercises, hormonal fluctuations during pregnancy and menopause, smoking; constipation or people who are prolong standing or sedentary position or repeated heavy lifting make veins of legs very weak and develop into varicose veins.

Conditions that increase pressure on the leg veins such as overweight, lack of exercises, hormonal fluctuations during pregnancy and menopause, smoking; constipation or people who are prolong standing or sedentary position or repeated heavy lifting make veins of legs very weak and develop into varicose veins.[3] The dilated veins hinder venous valves closure causing backward blood flow and increase the venous pressure causing varicose veins manifestations. It could be only darkened veins and/or disfigurement, easy leg fatigue, leg heaviness feeling, cramps and edema especially after prolonged standing, discomfort, and pain. These symptoms affect patient's life and work.[4]

In recent times, the concept of pain has evolved from one-dimensional to a multi-dimensional entity involving sensory, cognitive, motivational, and affective qualities. Pain is always subjective and every individual use this word through their previous experience related to the injury. It is an unpleasant emotional experience usually initiated by noxious stimulus and transmitted over a specialized neural network to the central nervous system where it is interpreted as such.[5, 6] On the other hand, discomfort is a concept found in the literature, usually related to pain. Some sources do not distinguish between pain and discomfort. Others refer to different sources of discomfort, thereby leading to a lack of conceptual clarity. Discomfort can be physical or psychological and is characterized by an unpleasant feeling resulting in a natural response of avoidance or reduction of the source of the discomfort. Pain is one of the causes for discomfort, but not every discomfort can be attributed to pain. It is identified by self-report or observation.[7]

Unlike previous guidance, the updated guideline focuses on alleviating symptoms and preventing the most severe consequences of venous disease, such as ulceration.[8] Varicose veins could be prevented, controlled and treated traditionally by elastic stockings, pharmacological treatment, and surgical intervention or alternatively by hydrotherapy and massage. Hydrotherapy is derived from the Greek word “Hydro” meaning water, and “therapia” meaning healing, it means water healing.[9] It is a local application of water using different temperature degrees. It depends on the effect of warm water in improving circulation by relaxation of muscles, venous dilatation and soothing the nerves which would relax and calm the whole body. Warmed water is repeatedly followed by cold water to decrease pain and inflammations, improve vasoconstriction and induce relaxation. It could be used alternatively in a bath or applications.[10] Hydrotherapy has been used as an adjunct to conventional systems for alleviating the symptoms or pain associated with different problems.[11]

Hydrotherapy, unlike conventional treatment, does not have side effects. However, the only caution is to avoid very hot water that could cause skin burn. [12] Moreover, several studies proved that, hydrotherapy is cost-effective as compared to other intervention.[13, 14]

All members of the healthcare team need a good understanding of the underlying causes of venous disease and its management, so they can give patients who have varicose veins up-to-date, accurate information; those involved in managing these patients need to be familiar with the updated guideline.[8] Nursing role in caring for patients with varicose veins is directed toward prevention, caring of varicose veins, prevention of its complications and help in following patients' prognosis. Varicose veins patients are taught and instructed about healthy behaviors as weight control, regular exercising, avoiding crossing legs. The nurse teaches and instructs them how to wear the prescribed elastic stockings and never to wear tight clothes.[15]

Research Question: Would hydrotherapy as an add be effective on decreasing varicose vein pain?

Aim: The study was conducted to evaluate the add effect of hydrotherapy on varicose veins pain

Research Hypothesis:

- Patients with varicose vein who enrolled in hydrotherapy sessions exhibit lower grade of pain than those who do not.

II. Materials and Method

Material

Research design:

Quasi experimental research design was utilized to meet the aim of the present study.

Settings:

The present study was carried out at the outpatient clinics in vascular surgery unit and physical therapy and rehabilitation unit in Health Insurance Hospitals “Gamal Abdel Nasser and Abu Qir Specialized hospital”, in addition to Alexandria Main University Hospital.

Subjects:

The study subjects comprised of a convenience sample of 40 adult patients with the diagnosis of varicose veins, and were selected according to the following criteria: able to communicate, between 20 - 60 years old, they were on their routine prescribed stockings and/or taking hospital prescribed medications, no prominent -severely bulged varicosities- varicose veins and not complicated, stage I varicose veins and complaining from cosmetic problems, some aches, heaviness not relieved spontaneously or by leg elevation and with pain and/or discomfort that was felt after 30 minutes of sitting or standing, free from uncontrolled hypertension, severe arteriosclerosis, diabetes mellitus, pelvic inflammatory diseases and any other peripheral disorders as: deep vein thrombosis, localized open wound, local hematoma, malignancies, vaso-occlusive peripheral disorders or osteoarthritis.⁽¹⁰⁾

The study subjects were selected and assigned randomly into two equal groups; 20 patients in each group.

- Study group (I): Were enrolled to hydrotherapy sessions for 8 weeks plus the routine hospital prescribed elastic stocking
- Control group (II): Were follow only the routine hospital prescribed elastic stocking for 8 weeks.

Tools:

Two tools were developed by the researcher after review of the related literature[16, 17] and was used for data collection.

Tool 1: The Varicose Vein Assessment Sheet: It comprised of three parts.

Part I: Patient's Sociodemographic Characteristics: It comprised questions to collect the socio-demographic data of the patients regarding gender, age, type of activity (moderate or heavy), marital status, level of education, smoking history, family history of varicose vein, and body mass index.

Part II: History and Patient's clinical data: It consisted ; patient's past and present history of varicose veins, onset, past complaints (description and duration), previous received treatment, reason of seeking treatment, date of starting past treatment and type of past treatment, as well as current used treatment of varicose veins.

Part III: Lower limb physical examination included varicose lower limbs patients 'complaints, and sites of varicose veins, sensation to touch, color, temperature, as well as thigh and calf circumference. .

Tool II Pain visual analogue scale (PVAS)

This tool was adapted from [18] Breivik ,et al (2000). It aimed to assess and evaluate both legs for the presence, level and pain description during rest, sleep, after sitting 30 minutes, after standing 30 minutes, on walking and on climbing stairs. It included simple pain scale graded from zero to ten where "zero" =no pain, "1-3"= mild pain, "4-6"= moderate pain, "7-10" =severe pain. Using a ruler, the score is determined by measuring the distance (mm) on the 10- cm line between the "no pain" anchor and the patient's mark, providing a range of scores from 0–10.

Methods:

- A written approval to apply the study was obtained from the studied sitting directors Main University Hospital, Health insurance Hospitals and Clinics (Abu Qir and Gamal Abdel Nasser Hospitals), head of both vascular surgery department, physical medicine and rehabilitation unit .
- Tool **I** was developed by the researcher, tool **II** was adapted. All tools were submitted to five experts in the field of vascular surgery and physical medicine and rehabilitation for content validity and clarity and the necessary modifications were carried out accordingly.
- Written procedural protocol for hydrotherapy was developed by the researcher based on reviewing the related literature (Tool II).
- Patients' informed consents were obtained after full explanation of the purpose of the study and the procedure.
- A pilot study was conducted prior to the actual data collection phase on six patients to test the tools feasibility and applicability in Abu Qir Specialized Hospital in physical medicine and rehabilitation unit. Accordingly necessary modifications were done.
- Data collection started at the beginning of December 2018 and ended of March 2019.

Steps of the study:

The study was carried out through **four phases:**

I. Assessment Phase:

- On admission, an initial assessment was carried out, for each patient of the two groups, to obtain base line data using tool I.
- Time and place of implementation of treatment program were selected according to each setting policy. Organization of the working area with the staff was done.

II. Planning phase: All needed equipment were prepared before the treatment program (chair, two large bucket (one for warm water, the other for cold water), watch, towels, bath thermometer for measuring the water temperature).

III. Implementation of treatment program for the study group:

- A comfortable, private environment was chosen before the sessions.
- Ensure privacy, adequate light, and closed door and windows.
- Patients were asked for feeling of ; general discomfort, easy leg fatigability, general pain
- Patients were examined for; sites of varicose veins, color and veins sensation ,leg disfigurement , dilated veins, ankle edema,
- Leg temperature was examined by the dorsum of the researcher' hands, and circumferences were measured using metric centimeter in the mid-calf and mid-thigh.
- Patients were asked about presence of pain, severity and description during resting, sitting for 30 minutes, standing for 30 minutes, walking and climbing stairs.
- Check patient's leg cleanliness.
- Test water temperature. (Cold water (16-20 °C), and warm water (40- 46 °C).
- Firstly, immerse both patients' leg in the warm water (40- 46 °C) up to the knees for 3 minutes to promote vasodilation of the veins and relaxation of muscle and nerve.
- Then, remove both legs from warm water, and immersing them in the cold water (16-20 °C), up to the knees for 3 seconds to provide vasoconstriction of veins and contraction of the muscles and to decrease pain and discomfort.
- Dry the leg and examine both legs using tool I (part III) after hydrotherapy.
- The treatment program was carried out for 3 times / week for 8 weeks.
- Any missed session, for the study group, was replaced to complete the procedural protocol.

IV. Evaluation phase:

- Every patient in the study and control group was re-evaluated patient's evaluated after each third session / week using tools II, and III for 8 weeks . Comparison between the findings of both groups was carried out using appropriate statistical analysis in order to determine the effect of hydrotherapy sessions on patient's pain intensity
- Evaluation of any unexpected reaction was done and recorded.

III. Results

Table (1): Shows frequency distribution of biosociodemographic data of the patients in the study and control groups: It can be noticed that, (50%, 45%) respectively of the patients were between the age group; (40, 50-60) years old in both groups. In relation to gender more than third of the patients were male in both groups. In relation to level of activity, moderate activity in the form of employer, employee merchant, security, supervisor, teacher, and housewife were observed by a large proportion 90% of the control group and more than three quarters 85% of study group. As regard marital status, a large proportion of patients in both groups were married (90%, 75%) respectively. Regarding level of education, about one third 35% of the study group patients had secondary level of education, while less than half 40% of them in the control group. In relation to smoking habit, about two thirds 65% of the patients in the study group and three quarters 75% of them were non-smoker in both groups. No positive family history of the disease was found between both groups. Regarding body mass index, high proportion (75%, and 85%) respectively of the patients in both groups were above average body mass index.

Table (2): Illustrates frequency distribution of initial patient's complaints and local leg examination of the patients in the study and control groups: Regarding the affected lower limb/s, both limbs were affected in both groups. In relation to patient's complaints, all the patients 100% in both groups had disfigurement. On the other-hand, 85% of patients in the study group had discomfort, ankle edema, pain and subcutaneous vein dilation. Regarding sites of varicose veins, the highest percent of patients in both groups (90 %,100%,95%) consecutively had varicose vein in the Tributaries, and capillaries. As for sensation of varicose veins to touch, more than half of the patients in both groups (30%,45%) respectively relation to both color and temperature of the lower limb. All patients in both groups had normal color and temperature of their lower limb.

Table (3): Denotes frequency distribution of initial pain assessment (presence and severity) in various positions in both study and control groups. The table revealed that the highest percent of patients in both groups (90%, 85%) respectively had no pain in resting and in lying flat position. In relation to standing, walking, and climbing stairs more than one third of the patients in the study group had no pain (45%, 35%) respectively.

Table (4): Shows initial pain description in various positions in both study and control groups. The results denotes that more than half of the patients in both groups had no pain in relation to rest and lying flat position (90%,65) respectively. In relation to sitting position, more than one third of the patients in both groups were complained of feeling of heaviness (35%, 45%) consecutively. (45%, 60%) respectively of the patients in both groups had no pain during standing position. Regarding walking, more than one third of the patients 40% in both groups had muscle cramp , and in relation to climbing stairs, more than one third of the patients 40% had muscle cramp in the study group, and 40% of them had no pain in the control group.

Table (5.a): Shows comparison between the study and control groups according to local leg examination along the eight weeks follow up evaluation periods. Regarding disfigurement, the patients in the study group showed a significant gradual decreased in disfigurement on the 2nd, 4th, 6th, and 8th as compared to control group. ($p= 0.002, < 0.000$) respectively. The table revealed a significant decrease in subcutaneous vein dilatation on the 4th, 6th weeks in the study group , $p = 0.011$. On the other hand, a significant decrease in subcutaneous vein dilatation was observed on the 6th and 8th weeks follow up periods in the control group, $P= 0.007$. In relation to leg edema, 20% of the patients in the study group had significant decreased in leg edema on the 2nd week, while on the 4th, 6th, and 8th the weeks (50%, 60%, and 75%) consecutively of them had significant decreased in leg edema, ($p= 0.0286, 0.013$) respectively as compared with the control group who showed a significant decrease on the 8th week $p = 0.002$. No significant improvement in thigh, and calf circumference was observed in both groups along the eight weeks follow up periods.

Table (5.b) cont.: Illustrates comparison between the study and control groups according to local leg examination along the eight weeks follow up evaluation periods. The results conveyed that no significant changes in relation to sites, color and temperature of varicose veins, and leg fatigability in both the study and control groups along the 8 weeks follow up periods. On the other hand, in relation to leg tenderness, The majority of the patients in the study group (80%, 85%) respectively had no leg tenderness, while (20%, 15%) of them consecutively showed decreased in leg tenderness on the 4th, and 6th weeks of follow up periods.

Table (6.a): Shows comparison between the study and control groups according to pain in different positions along the eight weeks follow up evaluation periods. The table revealed that gradual

decrease in pain intensity was observed in the patients in the study group regarding the sitting and standing positions along the follow up periods. The majority of patients (90%, 85%) respectively had no pain on the 8th week. Regarding the control group, a significant increase in the number of patients who had no pain in the sitting and standing positions on 6th, and 8th weeks was observed, $p=(0.003,0.012)$ respectively. In relation to walking and climbing stairs, the results denoted that gradual significant decrease in pain intensity in the patients in the study group after hydrotherapy sessions along the eight follow up periods was noted. The highest percent of patients in the study group had no pain on the 8th week (95 %, 100%) respectively in walking and climbing stairs as compared to patients in the control group, no significant decrease in pain intensity was observed.

Table (6.b): Conveys comparison between the study and control groups according to pain in different positions along the eight weeks follow up evaluation periods. Regarding the evaluation of pain intensity along the eight follow up periods, it can be noticed that a significant increase in the number of patients who had no pain in rest and lying flat positions after hydrotherapy sessions than those in the control group. p value = (0.000,0.003,0.017,0.011) respectively.

Table I: Frequency distribution of biosociodemographic data of the patients in the study and control groups. n= (20)

Variables	Study group (n:20)		Control group (n:20)		Level of Significance
	No.	%	No.	%	
Age					0.125
• 20 years-	3	15	0	0	
• 30 years-	1	5	4	20	
• 40 years -	7	35	10	50	
• 50-60 years	9	45	6	30	
Gender					0.196
• Male	14	70	10	50	
• Female	6	30	10	50	
Type of activity					0.48
• Heavy	3	15	2	10	
• Moderate	17	85	18	90	
Marital status					0.21
• Single	2	10	5	25	
• Married	18	90	15	75	
Level of education:					0.108
• Illiterate	2	10	5	25	
• Read & write	5	25	0	0	
• Primary level	1	5	0	0	
• Secondary level	7	35	8	40	
• High education	5	25	7	35	
Smoking					0.33
• Smoker	7	35	5	25	
• Non-smoker	13	65	15	75	
Family history					0.109
• Yes	3	15	2	10	
• No	9	45	18	90	
• Do not know	8	40	0	0	
Body mass index					0.415
• Below average	1	5	0	0	
• Average	4	20	3	15	
• Above average	15	75	17	85	
Total	20	100	20	100	

X²: Chi square test

MCp: Monte Carlo test

*Statistically significant at $p \leq 0.05$

Table (2): Frequency distribution of initial patient's local leg examination in both study and control groups. n= (20)

Variables	Study group (n=20)		Control group (n=20)		Level of Significance
	No.	%	No.	%	
Affected lower limb(s):					-
• Right	0	0	0	0	
• Left	0	0	0	0	
• Both	20	100	20	100	

Patient's complaints					
• Disfigurement	20	100	20	100	-
• Sc. v.v. dilatation	15	75	20	100	0.098
• Edema (ankle)	14	85	7	35	0.0013*
• Discomfort	17	85	17	85	-
• Leg fatigability	3	15	3	15	-
• Pain	17	85	17	85	-
Varicose veins sites.					
• Great saphenous	3	15	2	10	0.59
• Short saphenous	11	55	10	50	0.68
• Tributaries	18	90	20	100	0.41
• Capillaries	18	90	19	95	0.55
Tenderness					
• Normal to touch	14	70	11	55	0.174
• Tender	6	30	9	45	
Color and temperature					
• Within normal	20	100	20	100	-
Total	20	100	20	100	

X²: Chi square test

MCp: Monte Carlo test

* Statistically significant at: p≤0.05

Table (3): Frequency distribution of initial pain severity assessment in various positions in both study and control groups. n= (20)

Positions	Pain severity	Study group (n=20)		Control group (n=20)		Level of Significance
		No.	%	No.	%	
Resting						
• No		18	90	18	90	0.99
• Mild		2	10	2	10	
• Moderate		0	0.0	0.0	0.0	
• severe		0	0.0	0.0	0.0	
Lying flat						
• No		17	85	17	85	0.99
• Mild		2	10	2	10	
• Moderate		1	5	1	5	
• severe		0	0.0	0.0	0.0	
Sitting						
• No		5	25	8	40	0.106
• Mild		6	30	0	0	
• Moderate		6	30	10	50	
• Severe		3	15	2	10	
During standing						
• No		9	45	6	30	0.362
• Mild		0	0	3	15	
• Moderate		6	30	8	40	
• Severe		5	25	3	15	
Walking						
• No		7	35	4	20	0.258
• Mild		5	25	3	15	
• Moderate		5	25	7	35	
• Severe		3	15	6	30	
Climbing stairs						
• No		7	35	3	15	0.538
• Mild		5	25	6	30	
• Moderate		3	15	4	20	
• Severe		5	25	7	35	
Total		20	100	20	100	

Table (4): Initial pain description in various positions in both study and control groups. n= (20)

Positions	Pain description	Study group (n=20)		Control group (n=20)		Level of Significance
		No.	%	No.	%	
Resting	No	18	90	18	90	-
	Heaviness	2	10	2	10	
	Muscle cramp	0	0	0	0	
	Both	0	0	0	0	
Lying flat	No	17	65	17	65	0.982
	Heaviness	2	10	3	15	
	Muscle cramp	1	5	0	0	
	Both	0	0	0	0	
Sitting	No	5	25	8	40	0.42
	Heaviness	7	35	9	45	
	Muscle cramp	4	20	4	20	
	Both	4	20	1	5	
During standing	No	9	45	6	60	0.411
	Heaviness	7	35	8	40	
	Muscle cramp	2	10	3	15	
	Both	2	10	3	15	
Walking	No	7	35	7	35	0.98
	Heaviness	4	20	3	15	
	Muscle cramp	8	40	8	40	
	Both	1	5	2	10	
Climbing stairs	No	7	35	8	40	0.726
	Heaviness	3	15	3	15	
	Muscle cramp	8	40	6	30	
	Both	2	10	3	15	
Total		20	100	20	100	

Table (5.a) : Comparison between the study and control groups according to local leg examination along the eight weeks follow up evaluation periods. (n=20).

Items	Study Group (N= 20)										Control Group (N=20)									
	Week 1		Week 2		Week 4		Week 6		Week 8		Week 1		Week 2		Week 4		Week 6		Week 8	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Disfigurement																				
- No	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
- Same	20	100	12	60.0	0	0.0	0	0.0	0	0.0	20	100	20	100	20	100	20	100	20	100
- Decreased	0	0.0	8	40.0	20	100	20	100	20	100	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Test of significance	X ² =----- P=-----				X ² = 10.01 P= 0.002*				X ² =40.01 P=0.000*				X ² = 40.01 P=0.000*				X ² = 40.01 P=0.000*			
Sc. Veins Dilatation																				
- No	5	25.0	5	25.0	7	35.0	9	45.0	18	90.0	13	65.0	13	65.0	13	65.0	13	65.0	13	65.0
- Same	15	75.0	10	50.0	7	35.0	5	25.0	2	10.0	7	35.0	7	35.0	5	25.0	5	25.0	0	.0
- Decreased	0	0.0	5	25.0	6	30.0	6	30.0	0	0.0	0	0.0	0	0.0	2	10.0	2	10.0	7	35.0
Test of significance	X ² = 0.476 P=0.490				X ² = 9.085 P=0.011*				X ² = 4.133 P=0.127				X ² = 2.727 P=0.255				X ² = 9.807 P=0.007*			
Leg edema																				
- No	6	30.0	6	30.0	10	50.0	12	60.0	15	75.0	13	65.0	13	65.0	13	65.0	13	65.0	13	65.0
- Same	14	70.0	10	50.0	10	50.0	8	40.0	5	25.0	7	35.0	7	35.0	5	25.0	5	25.0	0	.0
- Decreased	0	0.0	4	20.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	10.0	2	10.0	7	35.0
Test of significance	X ² =4.912 P=0.027*				X ² = 7.108 P=0.0286*				X ² = 4.058 P=0.013*				X ² =2.732 P=0.255				X ² =12.143 P=0.002*			
Thigh circumference																				
- Same	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100
- Decreased	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Test of significance	X ² =----- P=-----				X ² =----- P=-----				X ² =----- P=-----				X ² =----- P=-----				X ² =----- P=-----			
Calf circumference																				
- Same	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100
- Decreased	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Test of Significance	x ² a=----- P=-----				x ² b=----- P=-----				x ² c=----- P=-----				x ² d=----- P=-----				X ² =----- P=-----			

X2 ; Chi square test

X2b chi square test at week 2, chi square test at week 4, X2d chi square test at week 6

X2e chi square test at week 8

* statistically significant at $p \leq 0.05$

Table (5.b) : Cont. Comparison between the study and control groups according to local leg examination along the eight weeks follow up evaluation periods. (n=20)

Items	Study Group N= 20										Control Group N=20									
	Week 1		Week 2		Week 4		Week 6		Week 8		Week 1		Week 2		Week 4		Week 6		Week 8	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sites of varicose veins																				
- Same	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100
- Decreased	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Test of significance	$X^2a=$ ----- P=-----				$X^2b=$ ----- P=-----				$X^2c=$ ----- P=-----				$X^2d=$ ----- P=-----				$X^2e=$ ----- P=-----			
Tenderness																				
- No	14	70.0	14	70.0	16	80.0	17	85.0	20	100	11	55.0	11	55.0	11	55.0	12	60.0	13	65.0
- Same	6	40.0	1	5.0	0	0.0	0	0.0	0	0.0	9	45.0	9	45.0	4	20.0	4	20.0	4	20.0
- Decreased	0	0.0	5	25.0	4	20.0	3	15.0	0	0.0	0	0.0	0	0.0	5	25.0	4	20.0	3	15.0
Test of significance	$X^2a=0.96$ P=0.327				$X^2b=11.76$ P=0.003*				$X^2c=5.037$ P=0.081				$X^2d=5.005$ P=0.082				$X^2e=8.485$ P=0.0144*			
Leg fatigability																				
- No	17	85.0	17	85.0	18	90.0	19	95.0	20	100	17	85.0	17	85.0	17	85.0	17	85.0	18	90.0
- Same	3	15.0	2	10.0	2	10.0	1	5.0	0	0.0	3	15.0	3	15.0	2	10.0	2	10.0	1	5.0
- Decreased	0	0.0	1	5.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	5.0	1	5.0	1	5.0
Test of significance	$X^2a=$ ----- P=-----				$X^2b=1.22$ P=0.529				$X^2c=1.029$ P=0.598				$X^2d=1.444$ P=0.486				$X^2e=2.105$ P=0.349			
Color																				
- Average	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100
- Changed	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Test of significance	$X^2a=$ ----- P=-----				$X^2b=$ ----- P=-----				$X^2c=$ ----- P=-----				$X^2d=$ ----- P=-----				$X^2e=$ ----- P=-----			
Temperature																				
- Average	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100	20	100
- Changed	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Test of significance	$X^2a=$ ----- P=-----				$X^2b=$ ----- P=-----				$X^2c=$ ----- P=-----				$X^2d=$ ----- P=-----				$X^2e=$ ----- P=-----			

X^2 chi square test between control and study group ,
 X^{2a} chi square test at week 1, X^{2b} chi square test at week 2, X^{2c}
 chi square test at week 4, X^{2d} chi square test at week 6
 X^{2e} chi square test at week 8, * statistically significant at $p \leq 0.05$

Table (6.a) cont.: Comparison between the study and control groups according to pain in different positions along the eight weeks follow up evaluation periods. (n=20)

Positions	Study Group N= 20										Control Group N=20									
	Week 1		Week 2		Week 4		Week 6		Week 8		Week 1		Week 2		Week 4		Week 6		Week 8	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sitting																				
- No	11	55.0	11	55.0	13	65.0	8	40.0	18	90.0	7	35.0	7	35.0	7	35.0	15	75.0	18	90.0
- Same	9	45.0	4	20.0	3	15.0	6	30.0	0	0.0	13	65.0	6	30.0	6	30.0	3	15.0	0	0.0
- Decreased	0	0.0	5	25.0	4	20.0	6	30.0	2	10.0	0	0.0	7	35.0	7	35.0	2	10.0	2	10.0
Test of significance	$X^2a=1.616$ P=0.203				$X^2b=1.622$ P=0.444				$X^2c=3.618$ P=0.164				$X^2d=5.130$ P=0.076				$X^2e=11.846$ P=0.003*			
Standing																				
- No	12	60.0	12	60.0	14	70.0	15	75.0	17	85.0	9	45.0	9	45.0	11	55.0	11	55.0	12	60.0
- Same	8	40.0	6	30.0	6	30.0	3	15.0	0	0.0	11	55.0	11	55.0	9	45.0	8	40.0	7	35.0
- Decreased	0	0.0	2	10.0	0	0.0	2	10.0	3	15.0	0	0.0	0	0.0	0	0.0	1	5.0	1	5.0
Test of significance	$X^2a=0.902$ P=0.342				$X^2b=3.899$ P=0.142				$X^2c=0.960$ P=0.327				$X^2d=3.221$ P=0.199				$X^2e=8.862$ P=0.012*			
Walking																				
- No	14	70.0	14	70.0	16	80.0	17	85.0	19	95.0	7	35.0	7	35.0	7	35.0	8	40.0	9	45.0
- Same	6	30.0	2	10.0	2	10.0	1	5.0	1	5.0	13	65.0	6	30.0	6	30.0	7	35.0	6	30.0
- Decreased	0	0.0	4	20.0	2	10.0	2	10.0	0	0.0	0	0.0	7	30.0	4	20.0	5	25.0	5	25.0
Test of significance	$X^2a=4.912$ P=0.027*				$X^2b=5.511$ P=0.004*				$X^2c=8.299$ P=0.016*				$X^2d=9.026$ P=0.011*				$X^2e=12.238$ P=0.002*			
Climbing stairs																				
- No	11	55.0	14	70.0	15	75.0	16	80.0	20	100.0	7	35.0	7	35.0	7	35.0	6	30.0	6	30.0
- Same	0	0.0	2	10.0	2	10.0	2	10.0	0	0.0	13	65.0	6	30.0	6	30.0	6	30.0	6	30.0
- Decreased	9	45.0	4	20.0	3	15.0	2	10.0	0	0.0	0	0.0	7	35.0	7	35.0	8	40.0	8	40.0
Test of significance	$X^2a=22.89$ P=0.000*				$X^2b=7.809$ P=0.020*				$X^2c=7.506$ P=0.023*				$X^2d=5.130$ P=0.076				$X^2e=13.333$ P=0.083			

X^2 chi square test between control and study group ,
 X^{2a} chi square test at week 1, X^{2b} chi square test at week 2, X^{2c}
 chi square test at week 4, X^{2d} chi square test at week 6
 X^{2e} chi square test at week 8, * statistically significant at $p \leq 0.05$

Table (6.b) cont.: Comparison between the study and control groups according to pain in different positions along the eight weeks follow up evaluation periods. (n=20)

Items	Study Group N= 20										Control Group N=20									
	Week 1		Week 2		Week 4		Week 6		Week 8		Week 1		Week 2		Week 4		Week 6		Week 8	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Rest																				
-No	13	65.0	13	65.0	15	75.0	16	80.0	18	90.0	9	45.0	9	45.0	11	55.0	11	55.0	12	60.0
-Same	0	0.0	2	10.0	2	10.0	1	5.0	2	10.0	11	55.0	11	55.0	9	45.0	8	40.0	7	35.0
-Decreased	7	35.0	5	25.0	3	15.0	3	15.0	0	0.0	0	0.0	0	0.0	0	0.0	1	5.0	1	5.0
Test of significance	$X^{2a}= 18.727$ P=0.000*				$X^{2b}=11.958$ P=0.003*				$X^{2c}=8.069$ P=0.017*				$X^{2d}=7.370$ P=0.065				$X^{2e}= 4.978$ P=0.083			
Lying flat																				
-No	9	45.0	10	50.0	12	60.0	15	75.0	17	70.0	9	45.0	10	50.0	10	50.0	11	55.0	12	60.0
-Same	0	0.0	2	10.0	3	15.0	3	15.0	3	15.0	11	55.0	10	50.0	10	50.0	8	40.0	7	35.0
-Decreased	11	55.0	8	40.0	5	25.0	2	10.0	0	0.0	0	0.0	0	0.0	0	0.0	1	5.0	1	5.0
Test of significance	$X^{2a}= 22.00$ P=0.000*				$X^{2b}= 22.633$ P=0.000*				$X^{2c}= 8.951$ P=0.011*				$X^{2d}= 3.221$ P=0.199				$X^{2e}=3.462$ P=0.0177			

X^2 chi square test between control and study group ,
 X^{2a} chi square test at week 1, X^{2b} chi square test at week 2, X^{2c}
 chi square test at week 4, X^{2d} chi square test at week 6
 X^{2e} chi square test at week 8, * statistically significant at $p \leq 0.05$

IV. Discussion

Varicose veins are one of the most common venous diseases all over the world. Varicose veins or varicosities are superficial abnormally dilated and tortuous veins common in the lower limbs caused by incompetent venous valves. The dilated veins hinder venous valves closure causing backward blood flow and increase the venous pressure causing varicose veins manifestations. It could be only darkened veins and/or disfigurement, easy leg fatigue, leg heaviness feeling, cramps and edema especially after prolonged standing, discomfort, and pain. These symptoms affect patient life and work. Varicose veins could be prevented, controlled and treated traditionally by elastic stocking, pharmacological treatment, and surgical intervention or alternatively by hydrotherapy. Hydrotherapy is local application of water using different temperature degrees. Thus, the study was conducted to assess the effect of hydrotherapy on varicose veins patient’s discomfort. [19, 20]

Concerning bio-socio-demographic data, the present study illustrated that the majority of patient's age ranged from (40-60) years old. It significantly clear that advanced age results in loss of veins elasticity which lead to abnormal back flow of the blood, and ultimately to varicose veins. Moreover, in this age the activity and work become less, with increase in the sitting periods, which decreases venous return. Kapısız, et al (2014) [21] explained that age is one of the risk factor of varicose veins development. Male was the higher percentage in the study more than female. This result was congruent with the results of Evans, et al (1999) [22] who argued that the prevalence of varicose veins and chronic venous insufficiency (C.V.I.) in the general population through cross sectional survey in the city of Edinburgh found that male were more than female. Nevertheless, varicose veins in females are attributed to hormonal changes. Pregnancy could also be implicated by the pressure against the gravity.

Prolonged standing, obesity, smoking, sedentary lifestyle, are all considered risk factors for chronic venous insufficiency [23] The present results showed that the majority of patients in both groups were practice moderate activity. This result was contradicted to the results of Joyner, & Casey (2015) [24] who illustrated that heavy work these associated with action and movement might stimulate circulation and, then promote venous return. Smoking whether active or negative smoking, has also been implicated in varicose veins. Manerikar et al (2017) [25] explained that smoking could block arteries and reduce blood flow. This could explain why smokers always seem to feel the cold, especially in the feet where the blood flow to the extremities is decreased and vasoconstriction occurs. Obesity was a significant finding in all the studied patients in the two groups. This result was in agreement with the conclusion of Lee et al (2003) [26] who emphasized that obesity considered as a factor of varicose veins development. They stated that obesity as well as pregnancy was risk factors for varicose veins. These findings might be related to the fact that, in obesity an increase in the intra-abdominal pressure occurs, which might increase the external pressure on the legs, and place strain on the vessel causing varicose veins and gradual increase pressure all over the body. It could also be due to the low level of activity of the obese patients and the pressure along the legs and thighs due to accumulation of adipose tissue associated with obesity.

The majority of two studied groups had bilateral varicose veins. This could be explained by the fact that the risk factors that affected one leg mostly would affect the other leg by the same degree at the same time

unless other factors occasionally interfered as unilateral injury or the patient was depending on one leg only in activity as in case of weak muscle of only one leg. As for the sites of varicose veins, saphenous vein tributaries followed by capillaries, then the short saphenous vein were the most common sites. The most superficial veins are affected prior to deeper ones. When the involvement reaches the valves, it attacks the distal tributaries and capillaries due to gravity effect. It could be also due to decreased amount of strong and supported structure around these vessels. Campbell B. (2006)[27] found that the varicose veins most commonly appear on the backs of the calves or on the inside of the leg where, the short saphenous veins, its tributaries and capillaries are located. However, they could be formed anywhere on the legs, from groin to ankle.

Patients' complaints and varicose veins manifestations in the form of disfigurement, ankle edema, easy leg fatigability and tenderness, together with discomfort and pain and increased with time. It could also due to the number of predisposing factors, duration of exposure to them, and patients' age. Nayak, et al (2015) [28] stated that discomfort and pain from varicose veins varies dramatically among people. Pain due to varicose veins may occur in the form of leg cramps, nocturnal muscle cramps, feeling of heaviness edema in the legs especially after prolonged standing, ropelike bluish veins.

It is worth to say that the significant was the same in the two groups with the difference in onset, frequency and duration of improvement. After application of hydrotherapy, a remarkable improvement in disfigurement was noticed as well as in ankle edema, while in the control group, less improvement occurred. This was supported by the study of Ernst, et al (1992)[29]; hydrotherapy for varicose pain : A randomized control trial concluded that a more pronounced improvement in all study patients as compared to control group. This could be explained here that hydrotherapy had the greater effect on varicose veins where it affects the whole veins along the lower limbs. Hydrotherapy and elastic stocking on the limb may be beneficial to patients in relation to appearance and pain.

In relation to tenderness, hydrotherapy decreased it more significantly than elastic stocking alone. Congruently with Okada, et al (2005)[30] who illustrated that using alternating hot and cold water, stimulate blood circulation, enhance venous return and relieve congestion which decrease tenderness or pain to touch. Whereas elastic stocking alone was supportive therapy that prevents further dilatation. These results were also supported by Baker (2011)[31] who mentioned that many patients found hydrotherapy very effective for alleviating their symptoms although they may be inconvenient particularly in warm weather. The same results regarding easy leg fatigability, the improvement in the hydrotherapy treated group occurred faster than in the control group. Moreover, he emphasized that hydrotherapy, and compression stocking had a helpful effect on treating varicose veins manifestations and they stated that alternating hot and cold baths help in improving the circulation. Hydrotherapy as a modality is more beneficial. These variations might be due to the faster effect of hydrotherapy, it affects venous return to all the leg veins and muscle so disfigurement, edema, dilatation, tenderness and easy leg fatigability of the veins are improved quicker. Meanwhile it is worth noting that these two groups were using elastic stocking to their patients. Whereas the elastic stocking was used alone in the control group and it was considered a supportive therapy.

As regard sites, color and temperature of varicose veins- which were normal in the initial assessment- and the mid-thigh and mid-calf circumferences remained the same after application of hydrotherapy, and elastic stocking. In the contrary Ernst, et al (1991) [29], they found that hydrotherapy could play an important role in the treatment of primary varicose veins. Furthermore some subjective symptoms were found to be improved as the leg volume changed. The same sequence was found for ankle and calf circumferences, which were reduced significantly only in patients treated with hydrotherapy. On the other hand, the elastic stocking is a supportive measure that gives the thigh and the calf muscles enough support to avoid further dilatation of the veins to avoid complications.

Any person feeling discomfort assumes different position to relieve that complaint. From this aspect, the present study revealed that when resting or lying flat, the initial assessment for pain was relieved in all studied groups of patients. This could be because resting promoted venous return that decrease venous pressure which cause discomfort and pain in the adjacent proximal part of the veins as well as lying flat. Luckman (1997) [32] pointed that these positions usually allow the maximum level of the muscle contraction, respiration and pumping action of the heart controlling venous return, decreasing backwards flow of the blood into the veins and consequently the level of discomfort and pain. These results were supported by Nettina (2001)[33], who found that varicose veins could be asymptomatic except for the appearance of darkness on the veins on patients' leg, whereas in other people, they would be uncomfortable, or having painful sensation. Only a minority of them had pain in their initial assessment i.e. prior to application of hydrotherapy, when assuming these positions. After application of hydrotherapy improvement started and the condition was improving after until it vanished in the 8th week. Sangita & Koddy (2014)[3] suggested that water treatments and wraps might detoxify the blood, stimulate blood circulation, enhance the immune system and improve digestion. Some theories are based on the observation that applying warmth to the skin causes vasodilatation (expansion of blood vessels), which brings blood to the body's surface. Warmth can also cause muscle relaxation. Cold temperatures have the opposite effect. Stocking wearers only had not improved during lying flat. All the patients were instructed to put stocking on after elevating their legs for 10 minutes to empty the varicose veins Rohan, et al

(2013)[34] illustrated that the basic lines of treating of varicose veins were elastic stocking; enough rest periods and leg elevation might control mild symptoms of varicose veins. Compression therapy in the form of elastic stocking or compression bandages is usually used to give an external support to the varicose veins to control it. This therapy might help varicose patient by preventing reflux in the superficial venous system that will decrease swelling during sitting or standing usually leads to decrease the associated leg pain, fatigue and discomfort some way. It was noted that higher percentage of the patients in the two groups complained of pain more than discomfort in various positions because it was their most concern.

Mirji, et al (2011)[4] found that the severity and number of symptoms were correlated with the size or extent of visible varices or with the volume of reflux. They added that such manifestations were associated with burning, swelling, throbbing, cramping, leg fatigue, as well as discomfort and pain. Pain associated with larger varicose veins is usually a dull ache that was worse after prolonged sitting or standing. Glass (2017)[35] pointed that pain was increased after sitting and standing for 30 minutes. It might be related to increase the effect of gravity increased by body weight on lower limbs veins, which hinder venous return causing increase venous pressure. This gravity applies on the standing or sitting while dangling legs continuously for 30 minutes or more. stated that easy leg fatigue, leg cramps, feeling of heaviness, nocturnal muscle cramps, legs edema were common especially after prolonged standing or sitting. This discomfort as well as pain followed the same sequences in improvement after the treatment.

There were discomfort and pain during walking or climbing stairs, which were described as heaviness and/or muscle cramp. Both walking and climbing stairs is considered simple exercise that usually improves circulation which promotes venous return thus, decreases discomfort and pain. This could be due to that the patients tended to stop or do only few exercises and when feeling tired, they stop without trying gradually increasing or to modify it according their tolerance. In other words, they prefer to rest than to exercise to avoid the initial discomfort and pain with exercise. Any activity that may add strain to the circulatory system or constrict the flow of blood (i.e. the beginning of walking and climbing stairs) might be a contributing factor of increase pain in varicose veins. This activity could cause stretching in the leg muscles and veins, which could lead to discomfort and pain in the affected legs. This activity cause stretching in the leg muscles and veins which causes discomfort and pain in the affected legs. Campbell B (2006)[27] explained that varicose veins in the first stage were characterized by moderate discomfort with local or general dilation of the subcutaneous veins.

The improvement of discomfort and pain during walking and climbing stairs in the hydrotherapy group took place early. In the control group the improvement started later on. Craven and Hirnle (2003)[36] supported this improvement in the level of discomfort and pain. They found that walking as well as with climbing stairs had improved circulation, and helped in prevention and treatment of varicose veins in their studied patients. Bull 2008 advised patients with varicose veins to walk, cycle and to climb stairs to keep the calf muscle in motion to promote venous return to help in reducing varicose veins. Ernst (1991)[29], Park, et al (2015)[37] agreed that hydrotherapy had faster effect on reducing muscle strain during walking and climbing stairs where, it affect the leg as a whole and relax the tense muscles.

Finally, the obtained results have put in evidence that hydrotherapy is effective in treating primary varicose veins. It can be considered as an adjunct measure to compression therapy and other conservative treatments. [29] Based on the research question would hydrotherapy as an add be effective on decreasing varicose vein” pain? The obtained results indicated that the add effect of hydrotherapy in general was effective, quick, and prolonged in the majority of the patients.

V. Conclusion And Recommendations

From the findings of the present study, it can be concluded that:

- Varicose vein is more frequent over the age of 40 years, in occupations that required prolonged sitting or standing.
- The incidence of varicose veins increases by age was more common in male, in occupations that required prolonged sitting or standing.
- No relation was found between smoking and family history and occurrence of varicose veins in the two groups. As for body mass index, there was a relation of increase in the occurrence of varicose veins in patients with above average body mass index.
- The statistical analysis showed significant difference with incidence of disfigurement, ankle edema, discomfort and pain and as well as of leg fatigability in the two groups.
- Regarding discomfort and pain there was significant statistical analysis correlation of pain during sitting, standing, walking and climbing stairs in the form of heaviness and leg cramp.
- The most common complaints were disfigurement, edema, and muscle cramp, dilatation of the subcutaneous veins, discomfort and pain. These complaints increase during sitting, standing, walking and climbing stairs in the form of heaviness, muscle cramp or both.
-

The main recommendations are:

- Write a hand out to be given to patients for directions of implementation of hydrotherapy.
- Researches are recommended on treating patients with second degree varicose veins using hydrotherapy.
- Researches are recommended on treating patients with discomfort and pain in the lower limbs not related to varicose veins using hydrotherapy.

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