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Effect of Walking Intervention Program on Varicose Veins among Pregnant Women

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Abstract: The main purpose of this study was to examine the effects of walking on the strength of legs muscles and velocity of blood flaw in legs veins and their diameters to prevent varicose veins in pregnant women. The research sample was divided into two groups, an experimental group consisting of 8 pregnant women and control group consisting of 7 pregnant women using the pre-and post tests. Homogeneity and equality were considered for both groups in age, tallness, weight, muscular strength, diameters of legs veins velocity of blood flow in legs veins. The program has been applied to the experimental group for 3 months with the rate of 3 training units weekly with a total of 36 training units. The researcher used the echo -Doppler Instrument to examine blood vessels and the Dynamometer instrument to measure muscular strength. Results showed improvement in both of legs muscular strength and velocity of blood flow in legs veins and did not show an enlargement in the diameters of legs veins and the protection of them in the experimental group comparing with the control group. The researcher recommends following systematic sport activity to activate blood circulation, such as walking to prevent vulnerability of pregnant women to varicose veins risk.

Key words: Walking program · Primary varicose · Pregnant women

INTRODUCTION

The body's veins are responsible for ensuring blood flows back to the heart. To assist this process veins are designed with a series of valves, which close between heartbeats to prevent the blood flowing backwards [1]. When you stand up, gravity pulls blood down to your feet. Support hose squeeze the legs and help to prevent blood from pooling in veins and distending them [2].

Varicose veins are among the most common chronic conditions seen by physicians today. A varicose vein, sometimes called varicosity, occur when a valve weakens, putting more pressure on other valves and causing blood to stagnate [3].

Women in general are more susceptible to vein problems than men are, but a pregnant woman's risk is increased dramatically. This risk can be attributed to several theories regarding the appearance of varicose veins in pregnant women.

Firstly, many hormonal changes occur in the bodies that have a profound effect on the veins. Increases in progesterone production during pregnancy cause the vein walls to dilate and become less elastic. Moreover, Blood volume increases between 40 to 50% [4, 5]. This increase can cause nasal and sinus stuffiness, nosebleeds, voice changes and/or a sensation of fullness in the ears. You may also notice swelling of veins in rectum (hemorrhoids), in legs (varicose veins) or vulva (vulvar varicosities). In addition, a pressure of the fetal head in the pelvis can compress iliac veins and obstruct venous outflow from the legs.

As the baby grows, the uterus enlarges and applies pressure on important veins that return blood to the heart. This pressure can cause a slowing of the blood flow and valve damage, resulting in swelling, leg discomfort and even varicose veins. So, Pregnancy plays a role in the development of varicose veins. Reports have estimated that up to 73% of females have varicose veins. In addition, 30% of women pregnant for the first time and 55% of women who have had two or more full term pregnancies develop varicose veins.

In 70% to 80% of women who develop problems with varicose veins during pregnancy, the symptoms appear during the first trimester (first three months of pregnancy), often within two to three weeks of a woman becoming pregnant.

Varicose veins are preventable. Maintaining healthy body weight and doing exercises help lessen their emergence - appropriate exercises can be the best preventative and defensive strategy against varicose veins [3].

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The most important part of non-medical treatment for varicose veins is exercise. In fact, it is a vital part of maintaining a healthy and balanced body. Any program of regular exercise stimulates circulation, improves muscle tone and helps prevent varicosities. However, high-impact aerobics, jogging, strenuous cycling, or any intense activity may increase blood pressure in the legs and accentuate varicose veins. Walking is great exercise for the lower leg area - either out in the open or on a treadmill especially with the incline level rose. Simple interventions like leg elevation, water immersion and exercise should be studied. Further studies should ensure adequate sample size and follow up to ensure reasonable conclusions are drawn to guide practice [6, 7].

The purpose of this study was to examine the effect of walking as a prevention program on the strength of legs muscles and velocity of blood flaw in legs veins and their diameters in pregnant women.

MATERIALS AND METHODS

Experimental Approach to the Problem: Two groups (experimental and control), performed a pre and post training designed intervention in which: strength of leg muscles (SL) by dynamometer, quickness of veins blood flow in great saphenous vein of left leg (OVBFG-L),quickness of veins blood flow in great saphenous vein of right leg (QVBFG-R), quickness of veins blood flow small saphenous vein of left leg (QVBFS-L), quickness of veins blood flow small saphenous vein of right leg (QVBFS-R), vein diameters in great saphenous vein of left leg (VDGS-L), vein diameters in great saphenous vein of right leg (VDGS-R), vein diameters in small saphenous vein of left leg (VDSS-L) and vein diameters in small saphenous vein of right leg (VDSS-R) by Echo-Doppler were recorded. The experimental group (EG) (8 pregnant) trained (18 - 50) per day 3 times a week on walking training for (12) weeks. One subject didn't complete the walking program; the control group (7 pregnant) continued their normal life style without practicing any form of exercises, while the experimental group completed a walking training program to see whether this type of training modality would have a positive or negative or no effect on (SL) (QVBFG-L) (QVBFG-R) (QVBFS-L) (QVBFS-R) (VDGS-L) (VDGS-R) (VDSS-L) and (VDSS-R).

Research Sample: The sample consisted of 15 pregnant women age ranged between 27-30 years old, volunteered in this study. They were sedentary, not practiced any sports or exercises before and have had two or more full term pregnancies and suffered from primary varicose veins, Subjects were required to read and complete a health questionnaire and informed consent document; there was no history of coronary heart disease, diabetes, high pressure, blood diseases or recent surgery.

Training Protocol: A 12-week in-season training program, load intensity ranged from (50 to 75 %) from the maximum rate of pulse with the gradual increase in intensity in pregnancy from a month to another and in a continuous regular rhythm and with increasing length of walking weekly with a rate of 200m and an increase of 2 minutes weekly. During the first month, easy light and comfortable walking pattern was used with short breaks during walks and keeping systematic breathing and the exertion of a light effort and starting using the walking sport and training the body organs on walking in a systematic rate. During the second month of pregnancy, walking pattern was to keep the exerted effort light with full feeling of comfort during practicing the training unit. During the third month, walking pattern in a systematic rate was used with keeping the systematic rate of walking with trying not to take breaks with feeling of relaxation, organizing the breath during walking in rhythm and comfortable way to taking breath (inhalation process) every two steps during the first month. In addition, rate of three steps during the second month. Moreover, four steps during the third month. With continuous following up the permitted pulse rate Stop walking immediately and call healthcare provider if subject have any of the following symptoms: vaginal bleeding, difficulty breathing, dizziness, exercise, chest pain, muscle weakness, calf pain or swelling, preterm labor, decreased fetal movement, or contractions. The walking training program is described in Table 1.

Testing Procedures: Subjects were assessed before and after 12-week training program Tests followed a general light warm-up.

Statistical Analysis: All statistical analyses were calculated by the SPSS statistical package. The results were report as means and standard deviations (SD). Wilcoxon signed-rank test (non-parametric statistical hypothesis test) was used to determine the differences. p<0.05 was considered as statistically significant.

RESULTS AND DISCUSSION

The main findings from this study were the significant improvement in muscular strength and velocity of veins blood, which proved the walking training efficacy. There are a number of potential explanations for these findings.

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Table 1: Walking training program										
Month	Aims	Time	Units	Walking distance	Load intensity	Performance type Aerobics				
First	Light walking	18-30	12	400-1000	50-60%					
Second	Walking with regular speed	26-38	12	1200-1800	60-70%	Aerobics				
Third	Walking with regular speed	35-50	12	2000-2600	65-75%	Aerobics				

Table 2: Mean, sum of rank and Z score in ((SL) (QVBFG-L) (QVBFG-R) (QVBFS-L) (QVBFS-R) (VDGS-L) (VDGS-R) (VDSS-L) and (VDSS-R) between post tests for the Experimental and control groups

	Experimental group			Control group				Experimental group		Control group					
		Mean	Sum		Mean	Sum				Mean	Sum		Mean	Sum	
Variables	Mean	rank	of ranks	Mean	rank	of ranks	Ζ	Variables	Mean	ranks	of ranks	Mean	ranks	of ranks	Ζ
SL	34.29	0	0	29.10	4.00	28.00	2.39*	VDGS-L	6.5	4.00	28.00	7.31	0	0	2.37*
QVBFG-L	4.24	0	0	2.76	4.00	28.00	2.38*	VDGS-R	6.34	4.00	28.00	7.47	0	0	2.37^{*}
QVBFG-R	4.29	0	0	2.77	4.00	28.00	2.37^{*}	VDSS-L	2.31	4.00	28.00	3.14	0		2.41*
QVBFS-L	4.75	0	0	3.40	4.00	28.00	2.37^{*}	VDSS-R	2.30	4.00	28.00	4.00	0	0	2.37^{*}
QVBFS-R	4.84	0	0	3.11	4.00	28.00	2.39^{*}								



Fig. 1: Significance clear positive differences in muscular strength and velocity of veins blood. In addition, no significant difference in veins diameters for the post tests in the experimental group



Fig. 2: No significant positive differences in muscular strength and velocity of veins blood but there was a negative significance difference in veins diameters in the control group.



Fig. 3: Superiority of the experimental group to the control group in all variables

Firstly, natural of walking program which adequate for pregnant women, this doesn't mean that you have to spend hours sweating away at the gym however or even that you need to purchase any type of expensive home exercise equipment. Instead, the no-frills exercise of walking can provide you with the necessary extra mobility [8]. The Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) recommend that more intense physical activity performed in 20- to 60-min sessions on 3-5 days per week will result in higher levels of physical fitness [9]. The American College of Obstetrics and Gynecology (ACOG) has presented additional recommendations that pregnant women should exercise with similar safeguards as non pregnant women provided that there are no medical or obstetric complications during the pregnancy. And the pumping action of leg muscles during walking exerts such a strong force to empty of veins. And activation of the two typical strong pumps identified in the vein block in foot metatarsus and the muscle pump in leg block. Consequently, walking is the best means to strengthen legs, blood circulation [10, 11].

According to Women's Health, a website of the U.S. Office on Women's Health, explains that low-impact exercise, such as walking, promotes better circulation in your legs and helps you build muscle strength, which can contribute to better vein health [12]. Exercise gets the blood flowing normally that helps greatly with blood circulation. Besides aerobic exercise, walking has also been noted as another important aspect of exercise that can be used to treat varicose veins.

During walking, legs muscles performance occurs in the tone and strength that helps controlling primary veins varicose symptoms through the mechanical movement of walking. Without the occurrence of contractions, there is no use of the existing valves in veins. During muscular contraction, muscles size increases, presses the deep veins, squeezes them and causes valves to meet [13, 14]. Any exercise that involves both legs is good to prevent varicose veins, the best and most effective is to train the muscles of the lower calf. Walking is more effective for calf muscle strength.

According to Jacobs *et al.* [15], leg volume was calculated from a formula using four circumference measurements prior to treatment (time 1). Measurements were then taken again immediately after 30 minutes of treatment (time 2) and again after 10 minutes of walking (time 3). Data from time 3 measurements, that is, after walking, are provided in this review. The study neither concern with what women felt about the treatment nor whether they felt any benefit from the reduction in leg volume.

Another explanation is from a hormonal view, considering walking an excellent therapy. Because it help restore the hormones balance, especially estrogen hormone. Previous studies demonstrated that and founded correlated between walking and estrogen hormone [16].

When walking, the leg muscles contract, squeezing the veins, thus help to force the blood to move forward on its way back to the heart. And excrete the female hormone (estrogen and progesterone) which reduced the pressure on leg veins Moreover, decreased the volume of blood, follow that increased of blood speed and maintained the veins diameter [11].

CONCLUSION

Walking exercises are an essential prevention should be practice for pregnant women.

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