Impact of Aerobic Exercise on Bleeding Factors, Physical Fitness and Quality of Life in Women with Von Willebrand Disease

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ABSTRACT

This study was conducted to determine the Impact of Aerobic Exercise on Bleeding factors, Physical Fitness and Quality of Life in Women with Von Willebrand Disease. Thirty adult (age ranged from 20-30years) females medically diagnosed as having type I von Willebrand disease, were referred from the out- patient clinic of gynecology department, Faculty of medicine, Cairo University. The patients were divided into two equal groups (A&B). Control Group (A): consisted of fifteen patients who received their medical treatment (Tranexamic acid – Cyklokapron 500 mg. oral dose twice daily) and continuing their orderly daily living activity and Study Group (B): consisted of fifteen patients who received an aerobic exercise program in the form of 45 minutes walking on treadmill, 3 times weekly, for 3 successive months (36 training sessions) in addition to continuing their medical treatment (Tranexamic acid – Cyklokapron 500 mg. oral dose twice daily) and continuing their orderly daily living activity. All participants in both groups (A&B) were evaluated through blood test (Ristocetin Cofactor Assay vWF:RCo), Congenital Rare Bleeding Disorder Questionnaire, PBAC Scheme, modified cardiopulmonary exercise test (Bruce Protocol) and SF-36v2 Questionnaire before and after the study duration. The results of this study showed a statistically significant increase ($P<0.05$) in vWF, physical fitness determined by VO_2max and V_E as well as quality of life. Results also reveal a significant decrease ($P<0.05$) in bleeding score and PBAC score after the end of three consecutive months of aerobic exercise program. So, it could be concluded that aerobic exercise is effective in decreasing menorrhagia and bleeding as well as increasing physical fitness and quality of life in women with Von Willebrand disease.

Key words: *Aerobic exercise – vWD- vWF- Menorrhagia - Physical fitness- Quality of life.*

INTRODUCTION

There are several types of bleeding disorders that affect women where von Willebrand disease (VWD) is considered the most common one. VWD is a hereditary bleeding disorder with, according to epidemiological studies, an estimated prevalence worldwide as high as 1 to 2% in the general population. In contrast, estimates based on referral for symptoms of bleeding suggest a prevalence of 30 to 100 cases per million, similar to that of hemophilia A[19].

VWD results from a quantitative/qualitative deficiency of von Willebrand factor (VWF), a large, multimeric plasma glycoprotein that is required for normal platelet adhesion (primary homeostasis), and as the carrier protein for factor VIII (secondary homeostasis)[11].

There are various forms of vWD. Type 1 is the most common and the mildest form of the disease. In Type 1, the level of von Willebrand factor in the blood is slightly reduced, while Type 3 patients have severe bleeding problems and have very low von Willebrand factor[12].

Common signs of bleeding disorder are: Epistaxis, Menorrhagia, Bleeding after dental extraction, Ecchymosis, Bleeding from minor cuts or abrasions, Gingival bleeding, Postoperative bleeding, Hemarthrosis, and Gastrointestinal bleeding[11]. Petechiae are more often associated with thrombocytopenia, especially after the use of aspirin or other nonsteroidal anti-inflammatory drugs[17].

Aside from the fact that women have similar symptoms to men with bleeding disorders, they can also experience added obstetric and gynecological complications. VWD and other bleeding disorders are particularly troublesome for reproductive-aged women. Excessive and prolonged menstrual

bleeding, also known as menorrhagia, can lead to serious complications if left untreated[19].

Menorrhagia has been classically defined as blood loss of ≥80 mL per month during cyclic menses. As menstrual blood volume is difficult to gauge, the term is commonly used to denote excessive volume and/or prolonged duration (>1 week) of menstrual bleeding[12].

Quality of Life (QoL) measures recently became an essential part of clinical trials being one of the most important patient-rated outcomes (PROs). PROs are derived from direct patient reports and they allow to evaluate the impact of a disease and its treatment on patients' well-being and functioning. PROs include health-related quality of life, patient preferences/utilities, treatment satisfaction and other PROs such as functional assessment[6].

Menstruation may be a source of inconvenience to women in general, but is significantly more so for women with excessive blood loss. Heavy and prolonged menstrual bleeding has a major influence on these women's lifestyle and employment. These women may have diminished quality of life relating to constant fatigue from iron deficiency anemia[6].

Plasma vWF levels are known to be affected by a number of determinants including age, stress and exercise. The vWF levels are known to increase with exercise and this increase has been shown to be modified by age and intensity of exercise[15].

Epinephrine and vasopressin trigger the activation of endothelial cells[13], which may result in the release of ultra-large vWF multimers (ULvWF), that in turn may induce platelet activation and thrombus formation under the condition of high shear stress[2].

Patients with vWD frequently experience bleeding episodes. So far it is unknown whether and how much bleeding severity influences Quality of Life (QoL). Quality of Life is a multidimensional construct of patient-perceived wellbeing and functioning in terms of physical, emotional, mental and social components. This study suggests that in patients with vWD, bleeding severity is an important determinant of quality of life[3].

SUBJECTS, MATERIAL AND METHODS

Subjects

This study was carried out on thirty adult (age ranged from 20-30years) females medically diagnosed as having type I von Willebrand disease, they were referred from the out-patient clinic of gynecology department, Faculty of medicine, Cairo University.

All patients were under primary replacement therapy and they were free from any evidence of internal organs bleeding, recent deep venous thrombosis, cardiac problems, clinical evidence of pulmonary disease, uncontrolled hypertension and liver disease or severe degrees (type 2 and 3) of vWD.

The patients were divided into two equal groups (A&B). Group (A): consisted of fifteen patients who received their medical treatment and continuing their orderly daily living activity. Group (B): consisted of fifteen patients who received an aerobic exercise program in the form of 45 minutes walking on treadmill, 3 times weekly, for 3 successive months in addition to continuing their medical treatment and orderly daily living activity. All participants in both groups (A&B) were assessed through blood test (Ristocetin Cofactor Assay vWF:RCo) to evaluate the quantity of vWF, Congenital Rare Bleeding Disorder Questionnaire, to evaluate the bleeding score, PBAC Scheme, to evaluate menorrhagia and modified cardiopulmonary exercise test (Bruce Protocol) to evaluate the cardiorespiratory capacity as well as SF-36v2 (Short Form) Questionnaire to measure the quality of life before and after the study duration.

Materials

A. Evaluating Instruments

1) ***Cardiopulmonary exercise stress test unite (Jaeger- Germany):*** it consists of the following parts:

a. Oxygen pro:

Cardiopulmonary exercise test unit with 12 channel ECG, gas analyzer to measure maximal O_2 uptake.

b. ZAN 100 flow handy:

A medical device is a PC-connected open spirometer system. The device's software was used to calculate the walking speed, oxygen consumption (VO2 1/min and VO_2 ml/kg), minute ventilation (VE 1/min).

c. Electronic treadmill:

Treadmill RAN 770 CE, which can act manually and/or computer controlled was used to work at two speeds 3.5 and 5 Km/h. The system consists of a facemask connected to mouthpiece for collecting expired air. Sensors for analyzing oxygen and carbon dioxide content of expired air, the mouthpiece was worn by each subject while walking on the treadmill during the two speeds. There is display connected to the treadmill to show the speed of walking, duration of the test and the distance walked by the subject.

2) Blood test (Ristocetin Cofactor Assay vWF:RCo):

Used to evaluate the quantity of vWF for all participants in both groups before and after the study duration.

3) Congénital Rare Bleeding Disorder Questionnaire:

It is a pencil and paper questionnaire used to assess the bleeding score for all participants in both groups before and after the study duration.

4) PBAC Scheme:

This used a simple scoring system, taking into account the number of sanitary items used and the degree of soiling.

5) ***SF-36v2 Questionnaire to measure QoL:***

SF-36 is a multi-purpose, short-form health survey with only 36 questions. It yields an 8-scale profile of functional health and well-being scores as well as psychometrically-based physical and mental health.

B. Treatment Instrument

Electronic treadmill apparatus*:*

- The treadmill supplied by the following specifications: operating panel, programmable operating unit, emergency stop via emergency button, hip belt with safety switch (for automatic stop if the patient cannot maintain the running speed of the belt).
- Technical specifications: Supply voltage: 230 V ± 10%, 50/60 Hz, Driving force: Frequency-controlled rotary-field electromotor, Motor capacity: 1500 W, Max power consumption: 10 A, Min./max. speed: 0.5-18 km/h, Belt area: 50x150 cm, Max permissible patient weight: 135 kg, Inclination: 0-25%, Weight: 145 kg.

Procedures

A. Evaluative procedure (for both groups A&B)

1. Blood test (Ristocetin Cofactor Assay vWF:RCo):

Before starting the study, blood samples were collected from the antecubital vein (at rest). To separate the plasma, mix 1 part sodium citrate solution 0.11 mol/L with 9 parts venous blood. Centrifuge immediately at no less than 1.500 × g for at least 10 min, then the supernatant plasma removed and stored deep-frozen at -20 °C. Agglutination method: dilute the plasma specimen with isotonic saline, the reference interval: 70-150% of the norm. The same procedure was repeated after the treatment duration (3months) for all patients in both groups (A&B).

2. Cardiopulmonary exercise test (Bruce Protocol):

The exercise tolerance test was done for all patients in both groups before and after the treatment duration (3months) on treadmill of the cardiopulmonary exercise test unit. The patient was adjusted on the treadmill, separate both lower limbs to increase the base of support and decrease the falling possibilities. After one minute of zero inclination, this inclination increased every minute until volitional exhaustion is reached.

Protocols: Protocols for clinical exercise testing include: an initial warm-up (low load), progressive uninterrupted exercise with increasing loads and an adequate time interval in each level, and recovery period.

During the maximal exercise test, subjects breathed through a facemask connected to a calibrated expired gas analysis system. Expired gas was passed through a flow meter, an oxygen analyzer and a carbon dioxide analyzer. The flow meter and gas analyzers were connected to a computer, which calculated breath-by-breath minute ventilation. Absolute peak oxygen uptake (VO2peak) was taken as the average value over the last 30 seconds during the maximal exercise test. The patients were asked to report

3 days after the test procedures whether or not they had un-experienced adverse effects[18].

3. PBAC scheme:

All patients were asked to score on the Pictorial Blood loss Assessment Chart (PBAC) (fig. 1) taking into account the number of sanitary towels used at each day during menstruation and the degree of soiling of each one.

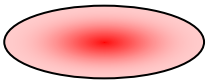
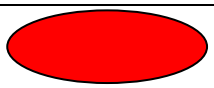
score	soiling	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day	8th day
1									
5									
20									

Fig. (1): Pictorial Blood loss Assessment Chart (PBAC).

4. Congénital Rare Bleeding Discorder Questionnaire:

All subjects in both groups were asked to answer the questionnaire before starting and after finishing the study (after three months).

5. SF-36v2 (Short Form) Questionnaire to measure QoL:

36 questions under 8-scale profile were answered by each participants in both groups (A&B) before and after the treatment duration to determine physical and psychological quality of life.

B. Treatment Procedure

i. For group (A):

All patients of group (A) were asked to continue their orderly daily living activity in addition to their medical treatment (Tranexamic acid – Cyklokapron 500 mg. oral dose twice daily). This medication is used short-term in people with bleeding disorder to prevent and reduce bleeding. It is also used in people with high-risk bleeding conditions to control bleeding at such times as after surgery or an injury or during heavy menstrual bleeding. Tranexamic acid works by helping the blood clot normally to prevent and stop prolonged bleeding. It belongs to a class of drugs known as anti-fibrinolytics.

ii. For group (B):

Before starting the walking exercise program, reminding the patient to wear loose-fitting comfortable clothes and suitable shoes for exercise. Each subject in this group was instructed to stop eating for 3 hours before the exercise session. Water could be taken as needed at any time. Unusual physical efforts should be prevented for at least 12 hours before testing.

The subject was asked to stand upright on the treadmill, then begin the treatment session as following:

- Duration: each exercise session lasts 45 min, and included three phases (an initial warm-up [low load], progressive uninterrupted exercise with increasing loads and an adequate time interval in each level, and recovery-cooling down- period).
- Warm up phase: an initial 10 minutes in the form of slow walking on treadmill.
- Aerobic phase: this phase started in short bouts about 10 minutes and gradually prolonged up to reach 30 minutes at the end of the 3rd week and then continued till the end of the 3rd month.
- Cool down phase: for 5 minutes with velocity decreased gradually to reach the resting base line.

All patients of group (B) were also asked to continue their orderly daily living activity in addition to their medical treatment as those of group (A).

Statistical Analysis

- The collected data of this study was tabulated ,computerized for analysis to obtain Arithmetic mean, Standard deviation (SD) as a measure of dispersion of results around mean and Percentage.

- Student t-test for comparison of means between the results before and after treatment duration in both groups (A&B).

RESULTS

The results of this study were represented as follows:

A) Blood test (Ristocetin Cofactor Assay vWF:RCo) of vWF level:

Group (A): The mean value of vWF level of patients in group (A) was (41.47±21.25), and after three months the mean value was (40.20±20.87), which revealed a statistically significant decrease.

Group (B): The mean value of vWF level of patients in group (B) was (37.73±21.64), and after three months the mean value was (78.27±16.10), which revealed a statistically highly significant increase.

Comparison between both groups (A) and (B), revealed a statistically non significant difference (P>0.05) in vWF level before the treatment and a statistically high significant difference (P<0.001) after the treatment favoring group (B) as shown in table (1).

Table (1): Shows the mean values of vWF before treatment versus after treatment in both groups (A & B).

		Mean	SD	df	t-value	P-value	S
Group (A)	Before	41.47	±21.25	1.26	4.01	0.002	S
	After	40.20	±20.87				
Group (B)	Before	37-73	±21.64	-40.53	-12.36	0.001	H.S
	After	78.26	±16.10				
Before treatment	Group (A)	41.47	±21.25	3.73	0.65	0.52	N.S
	Group (B)	37-73	±21.64				
After treatment	Group (A)	40.20	±20.87	-38.06	-7.32	0.001	H.S
	Group (B)	78.26	±16.10				

B) Congenital Rare Bleeding Disorder Questionnaire (bleeding score):

Group (A): The mean value of bleeding scores before the study was (6.47±3.41), after 3 months the mean value was (7.07±3.39), which revealed a statistically highly significant increase (P<0.001).

Group (B): The mean value of bleeding scores before the study was (8.47±2.41), after 3 months the mean value was (3.33±2.96), which revealed a statistically highly significant decrease (P<0.001).

Comparison between both groups (A) and (B), revealed a statistically non significant difference (P>0.05) in bleeding scores before the treatment and a statistically high significant difference (P<0.001) after the treatment favoring group (B) as shown in table (2).

Table (2): Shows the mean values of bleeding scores before treatment versus after treatment in both groups (group A&B).

		Mean	SD	df	t-value	P-value	S
Group (A)	Before	6.47	±3.41	-0.60	-5.58	0.001	H.S
	After	7.07	±3.39				
Group (B)	Before	8.47	±2.41	5.14	11.52	0.001	H.S
	After	3.33	±2.96				
Before treatment	Group (A)	6.47	±3.41	-2.00	-2.03	0.62	N.S
	Group (B)	8.47	±2.41				
After treatment	Group (A)	7.07	±3.39	3.73	5.04	0.001	H.S
	Group (B)	3.33	±2.96				

C) Modified cardiopulmonary exercise test (Bruce Protocol):

i. VO_2max

Group (A): The mean value of VO2max before the study was (58.33±9.08), , after 3 months the mean value was (59.40±8.94), which revealed a statistically significant decrease.

Group (B): The mean value of VO2max before the study was (56.53±6.59), after 3 months the mean value was (70.80±6.60), which revealed a statistically highly significant increase.

Comparison between both groups (A) and (B), revealed a statistically non significant difference (P>0.05) in VO2max before the treatment and a statistically high significant

difference (P<0.001) after the treatment favoring group (B) as shown in table (3).

Table (3): Shows the mean values of VO2max before treatment versus after treatment in both groups (group A & B).

		Mean	SD	df	t-value	P-value	S
Group (A)	Before	58.33	±9.08	-1.07	3.76	0.002	S
	After	59.40	±8.94				
Group (B)	Before	56.53	±6-59	-14.27	-16.29	0.001	H.S
	After	70.80	±6.60				
Before treatment	Group (A)	58.33	±9.08	1.80	1.21	0.25	N.S
	Group (B)	56.53	±6.59				
After treatment	Group (A)	59.40	±8.94	-11.40	-6.07	0.001	H.S
	Group (B)	70.80	±6.60				

ii. VE of both groups A&B.

Group (A): The mean value of VE before the study was (22.73±5.84), after 3 months the mean value was (23.47±5.57), which revealed a statistically significant decrease.

Group (B): The mean value of VE before the study was (23.66±4.85), after 3 months the mean value was (30.53±4.66), which revealed a statistically highly significant increase.

Comparison between both groups (A) and (B), revealed a statistically non significant difference (P>0.05) in VE before the treatment and a statistically significant difference (P<0.05) after the treatment favoring group (B) as shown in table (4).

Table (4): Shows the mean values of VE before treatment versus after treatment in both groups (A & B).

		Mean	SD	df	t-value	P-value	S
Group (A)	Before	22.73	±5.84	-0.73	-2.44	0.028	S
	After	23.47	±5.57				
Group (B)	Before	23.66	±4.85	-6.86	-10.62	0.001	H.S
	After	30.53	±4.66				
Before treatment	Group (A)	22.73	±5.84	-.93	-0.46	0.65	N.S
	Group (B)	23.66	±4.85				
After treatment	Group (A)	23.47	±5.57	-7.07	-3.60	0.003	S
	Group (B)	30.53	±4.66				

D) PBAC Scheme: assessment of menorrhagia before and after treatment for both groups A&B:

Group (A): The mean value of PBAC before the study was (141.73±18.67), after 3 months the mean value was (115.73±11.58), which revealed a statistically highly significant decrease.

Group (B): The mean value of PBAC before the study was (139.27±15.44), after 3 months the mean value was (93.13±14.48), which revealed a statistically highly significant decrease.

Comparison between both groups (A) and (B), revealed a statistically non significant difference (P>0.05) in PBAC before the treatment and a statistically high significant difference (P<0.001) after the treatment favoring group (B) as shown in table (5).

Table (5): Shows the mean values of PBAC before treatment versus after treatment in both groups (A & B).

		Mean	SD	df	t-value	P-value	S
Group (A)	Before	141.73	±18.67	26.00	9.23	0.001	H.S
	After	115.73	±11.58				
Group (B)	Before	139.27	±15.44	46.13	13.43	0.001	H.S
	After	93.13	±14.48				
Before treatment	Group (A)	141.73	±18.67	2.47	1.36	0.156	N.S
	Group (B)	139.27	±15.44				
After treatment	Group (A)	115.73	±11.58	22.60	8.73	0.001	H.S
	Group (B)	93.13	±14.48				

E) SF- 36v2 Questionnaire which measure quality of life:

Group (A): The mean value of SF- 36 before the study was (76.93±12.57), after 3 months the mean value was (77.80±12.49), which revealed a statistically highly significant decrease.

Group (B): The mean value of SF- 36 before the study was (71.60±12.64), after 3 months the mean value was (86.73±16.34), which revealed a statistically highly significant increase SF- 36 in quality of life.

Comparison between both groups (A) and (B), revealed a statistically non significant difference (P>0.05) in SF- 36 before the treatment and a statistically significant difference (P<0.05) after the treatment favoring group (B) as shown in table (6).

Table (6): Shows the mean values of QoL before treatment versus after treatment in both groups (A&B).

		Mean	SD	df	t-value	P-value	S
Group (A)	Before	76.93	±12.57	-0.87	-3.16	0.007	S
	After	77.80	±12.49				
Group (B)	Before	71.60	±12.64	-15.13	-7.42	0.001	H.S
	After	86.73	±16.34				
Before treatment	Group (A)	76.93	±12.57	5.33	1.46	0.166	N.S
	Group (B)	71.60	±12.64				
After treatment	Group (A)	77.80	±12.49	-8.93	-2.57	0.022	S
	Group (B)	86.73	±16.34				

DISCUSSION

Congenital bleeding disorders are usually diagnosed during childhood and present to the pediatrician as a bleeding symptom or a known family history. While von Willebrand disease (vWD), a hemorrhagic disorder mimicking a defect in platelet function, is the most commonly inherited coagulopathy, resulting in a deficiency that may prolong bleeding time and increase risk for major bleeding complications during childbearing period[17].

During normal cyclic menstruation, estrogen and progesterone from the ovary induce the production of prostaglandins, cytokines, and matrix metalloproteinase's (MMPs). These are directly responsible for the cyclic regeneration of the functional layer of the endometrium. Abnormal uterine bleeding represents a disruption in this orderly progression[16].

Von Willebrand factor (vWF), the largest human plasma protein, present in platelets, endothelial cells, and the sub-endothelium. It mediates the initiation and progression of thrombus formation at sites of vascular injury by means of specific interactions with extracellular matrix components and platelet receptors[5].

Bleeding disorders account for approximately 20% of both adolescent and adult women presenting for menorrhagia. Of these, von Willebrand's disease (vWD) is the most common[7].

This study was carried out on thirty adult females medically diagnosed as having type I von Willebrand disease. The results of this study showed a statistically highly significant increase (P<0.001) in vWF, physical fitness determined by VO_2max and V_E as well as quality of life. Results also revealed a highly significant decrease (P<0.001) in bleeding score and PBAC score after the end of three successive months of aerobic exercise program.

These results come in consistent with Boos and his colleagues[1] who performed a treadmill exercise stress test, using a full Bruce exercise protocol and reported a significant increase in endothelial markers, circulating endothelial cells (CECs) and von Willebrand Factor (vWF) compared with base-line levels. The rise in CECs correlated with the increases in other endothelial markers, but was not related to the exercise work-load capacity).

This may be explained by the Sabelis et al.,[14] who suggest that physical training led to normalization of the stimulated plasma vWF release, and by the results of Lekakis et al.,[9] who concluded that the acute-submaximal exercise increase coagulation, increase fibrinolysis, increase platelet activation (increase in platelet count), and increase endothelial function (increase in von Willebrand factor).

Physical stress, such as that induced by exercise, is held responsible for activation of platelets and formation of platelet–leukocyte conjugates. It has previously been shown that intense exercise increases the plasma level of von Willebrand factor (vWF)[4], platelet aggregation associated with an enhanced expression of adhesion molecules on platelets which also increased after the exercise[8]. However, the underlying mechanisms of exercise-induced changes on platelet aggregability remain unclear.

Also, it is well documented that exhaustive exercise leads to activation of several _stress hormones. Epinephrine and vasopressin are key regulators of the stress response via activation of adrenergic and V1 receptors, respectively. The magnitudes of the responses are modulated by both the relative intensity and the duration of exercise; in general, the higher the intensity and the duration of exercise, the more intensive the hormonal release[2]. The mechanism responsible for the post exercise vWF increment involves adrenergic receptor activation and release of stored vWF from the endothelial cell[15].

For rehabilitation training it is recommended that the intensity of exercise should be clearly below the individual anaerobic threshold. Long-duration exercise between 60 and 120 min controlled by individual anaerobic threshold (90%) on a treadmill ergometer only implicates a small increase in thrombin generation. Endurance exercise with an intensity below individual anaerobic threshold (90%) and a duration generates a more favorable condition for fibrinolysis than for blood coagulation in healthy young subjects[8].

VWF levels are known to increase with exercise and this increase has been shown to be modified by age and the intensity of exercise[15]. On studying the effect of physical activities on menorrhagia , recent surveys show that women who exercise regularly report having shorter periods and less bleeding during[10].

The results of the current study are also supports by that of Gillison et al.,[6] who stated that a meaningful improvement in quality of life can be brought about by exercise interventions in well populations, and in patients exercising from 3-6 months as part of their rehabilitation program.

In summary, this study concludes and adds an evidence that aerobic exercise is effective in decrease menorrhagia and bleeding as well a increasing physical fitness and quality of life in women with Von Willebrand disease.

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الملخص العربى

تأثير التمرينات على معاملات النزف وكذلك اللياقة وجودة الحياة لدى السيدات المصابات باضطرابات تجلط الدم الوراثية

أجريت هذه الدراسة لدراسة تأثير التمرينات العلاجية على معاملات النزف واللياقة البدنية وكذلك جودة الحياه لدى السيدات المصابات بمرض ڤون ويل براند (إضطرابات تجلط الدم الوراثية) . وقد شاركت فى هذه الدراسة ثلاثين سيدة تتراوح اعمارهن بين 20 و30 عاما. وتعانين من أعراض النزيف وغزارة لطمث نتيجة مرض ڤون ويل براند وقد تم تقسيمهن إلى مجموعتين المجموعة الضابطة (أ) تتكون من 15 سيدة تتناول كل منهن العلاج الدوائى التحفظى و مجموعة الدراسة (ب).تتكون من 15 سيدة تتناول كل منهن العلاج الدوائى التحفظى بالاضافة الى ممارسة تمرينات المشى على السير الكهربى لمدة 45 دقيقة ثلاث مرات اسبوعيا لمدة ثلاثة اشهر . وقد تم تقييم جميع المرضى فى المجموعتين قبل وبعد اجراء الدراسة باستخدام إختبار الدم لتحديد نسبة معامل ڤون ويل براند وكذلك باستخدام إستبيان إضطرابات النزيف النادره وقياس معدل النزف وإختبار التمرينات القلبية الرئوية المعدل لقياس أقصى معدل استهلاك للأكسجين ومعدل التنفس في الدقيق وكذلك اختبار غزارة النزف اثناء الدورة الشهرية. وقد أوضحت النتائج أن هناك إرتفاع ذو دلائل إحصائية عالية في نسبة معامل ڤون ويل براند ، أقصى معدل تنفس للأكسجين ومعدل التنفس في الدقيقة وكذلك فى جودة الحياة ، كما ان هناك إنخفاض ذو دلائل إحصائية عالية في معدل النزيف وغزارة النزف اثناء الدورة الشهرية وذلك فى مجموعة الدراسة (ب) . وهكذا يمكن أن نستخلص أنه يمكن ممارسة رياضة المشي وإعتبارها نمط حياة وعلاج تحفظي ممتاز يساعد على تقليل النزف وتحسين جودة الحياة لدى السيدات اللاتي تعانين من مرض ڤون ويل براند .

الكلمات الداله : مرض ڤون ويل براند ، معامل ڤون ويل براند ، أقصى معدل تنفس للأكسجين، معدل التنفس في الدقيقة ، معدل النزيف وإختبار التمرينات القلبية الرئوية .