Bull. Fac. Ph. Th. Cairo Univ., Vol. 20, Issue No. (1) Jan. 2015

Faculty Of physical Therapy
Cairo University

Cairo University

# Effect Of ResistiveTraining for Different Body Parts On Blood Pressure In postmeneposaulHypertensive Women

**Ryham Ezz El-din Mohamed[1],Samah M. Ismail[2]**

[1]ElMonira General Hospital, Ministry of health [2]Lecturer of physical therapy. Department for Cardiovascular/ Respiratory Disorder and Geriatrics, Faculty of Physical Therapy, Cairo University

## ABSTRACT

**Background:** The effects of resistance training on blood pressure in controlled older hypertensive women demonstrated that Resistive Training of different body muscles showed a significant reduction in mean systolic and diastolic blood pressure in hypertensive older women, controlled with anti-hypertensive medication**. Objectives:**to compare the changes of blood pressure as a result of resistive exercise training for different body muscles and determine the most effective muscle for exercising for hypertensive women. **Methods:** twenty subjects enrolled in the studywith age 50-60 **,**they were assigned into two groups, (GroupI)quadriceps group ten patients and ,(Group II) latissmus dorsi group ten patients enrolled in resistive training program of moderate work load (60 % of maximum voluntary contraction ( MVC) for 30 min . blood pressure were measured three times for each patient (before, one hour after exercise program each session and after completion training program) **Results:**resistive exercise for quadriceps and latissmus dorsi showed highly significant reduction in blood pressure but quadriceps showed more reduction compared to the latissmusdorsi muscle The quadriceps group showed mean reduction of 10.3 ± 0.7 and 7. ± 0.9 mmHg reduction in SBP and DBP and latissmusdorsi group a reduction of 5.2 ± 06 and 2.5 ± 0.5 mmHg in SBP and DBP respectively.**Conclusion:** The resistive exercises of different body muscles have a significant effect in reducing diastolic and systolic blood pressure. Lower limb exercises (quadriceps) are more effective in this action followed by upper trunk exercise(latissmus dorsi muscle).

***Key words***:*-Mild hypertension – postmeneposaul -Resistive exercise- large muscles-small muscles.*

## INTRODUCTION

Blood pressure is the pressure exerted by the blood against the walls of the blood vessels, especially the arteries. It varies with the strength of the heartbeat, the elasticity of the arterial walls, the volume and viscosity of the blood, and a person's (health, age, and physical condition .Etiology of hypertension is not yet fully elucidated; there is a growing body indicating it is multifactor. The influence of factors such as genetics, physical inactivity, overweight, excessive intake of sodium and alcohol and psycho social profile, in the genesis of high blood pressure (HBP) [1, 2].

Systemic hypertension (HBP) is currently the first modifiable risk factor causing morbidity and mortality of cardiovascular disease worldwide.[3]Menopause is defined by the ending of the reproductive phase of a woman's life. This is the time when the production of estrogen becomes irregular and begins to decrease. Menopause does not happen suddenly but rather occurs over time. Evidences have showed that the incidence of arterial hypertension is greater in postmenopausal women as compared to premenopausal. Physical inactivity has been implicated as a major contributor to weight gain and abdominal obesity in postmenopausal women and the incidence of cardiovascular disease increases dramatically after menopause [3, 4, 5].

A number of factors can contribute to this increase in incidence of arterial hypertension in postmenopausal women including estrogen deficiency, alterations in lipid profile, weight gain, and decreases in physical activity during the menopause.Factors contributing to hypertension in postmenopausal women: Genetic factors, environmental factors, and change in sex hormone levels have each been implicated in the development of hypertension [6, 7].

One mechanism by which BP may be increased in

aging postmenopausal women is activation of the renin-angiotensin system(RAS). Postmenopausal women exhibit increases in plasma renin activity, suggesting activation of the RAS. In addition, there may be a genetic component of the RAS that contributes to postmenopausal hypertension, as certain renin gene polymorphisms are associated with hypertension in women aged 40 to 70 years, but not in men [8].

Regular physical activity is the first treatment recommended to lower BP and improve cardiovascular health, both in the general population and in those people with hypertension. Importantly, exercise is usually safe and beneficial whether or not BP-lowering (antihypertensive) medication is used.It was found recommended that individuals with hypertension engage in 30 min of continuous or accumulated physical activity on most, if not all days of the week, primarily of the endurance type. Additionally resistance training or muscular strengthening activities indicated a marked decrease in blood pressure [9].

The aim of this study was to evaluate the effect of resistance exercise for latissmus dorsi versus quadriceps muscle on blood pressure levels in postmeneposaulhypertensivewomen.

## METHODS

Twenty sedentary postmenopausal hypertensive female was selected for this study ,with 4-5 years at least of menopause, Their ages ranged 50-60 years ,with mild hypertension from 139/89 to 159/99mmHg, their body mass index ranged from 25 to 29.9 (kg/ m2) none of them receiving hormonal therapy replacement. Subjects were under medical control they received antihypertensive drugs in form of angiotensin Inhibitor (ACE). subjects are all house wife's, they are right handed. subject were selected with muscle power ranged from grade 4 to grade 5.subjects were divided into two group latissmusdorscigroup (ten patients) and quadriceps group(ten patients ) performed exercise on specific muscle for eight weeks, All patients underwent a physical examination and a review of their medical histories and all participants were given a written informed consent for all procedures.

### *A) Evaluation Instruments*

(1) Standard calibrated scales and standiometers (seca-755, West Germany),(2) Electronic digital sphygmomanometer.

### *B) Therapeutic Instruments*

Weights in form of sand bags ranged from half to two kilos (1/ 2, 1 ,1 1/ 2, 2 kilos)

### *A) Evaluation procedures*

The weight and height of each patient was measured using weight and height scale and then BMI for each patient was calculated using the following formula:

**BMI= weight (kg) / [height (m)]$^2$ (WHO, 2004)**

Muscle power test were done before the program to the study group which is divided into three groups equal in number each group exercising a specific muscle (quadriceps, andlatissmusdorsi) to determine the power of the muscle (which grade) to be sure that the subjects are able to do the exercise against gravity with moderate resistance, subject included in these study their muscle power ranged from grade 4 to grade 5.

Blood pressure were measure three time, one time before the exercise program the second time one hour after each session the third time after finishing the exercising program( after eight weeks).blood pressure were measured from supine position for all subject.

One examination session were done to the study group which is divided into two groups equal in number each group exercising a specific muscle (quadriceps,latissmusdorsi) to determine the greatest amount of tension the muscle can generate and hold then take 60 % of MVC maximum voluntary contraction

Right body muscles are exercised(latissmusdorsi and quadriceps)

### *B) Treatment procedures*

Twenty which is divided into two groups equal in number participated in a supervised resistive exercises program each group exercised for specific part, group (A) for quadriceps muscles, group (B) for latissmus dorsi. Used moderate work load method (60 % of MVC maximum voluntary contraction).

The exercise program performed 3 times per week for 8 weeks. Patient exercised in the morning between 9 to 12 AM to avoid any interfere between the effect of medication and the effect of exercises. Medication were takenat night hours

The program consists of 4 sets each set consist of 60 repetitions. Duration: of the program about 30 min (five min warm up, and five min cooling down in form of light aerobic exercise), Intensity: moderate intensity (60%MVC), Frequency: 3days / wks.for 8 wks.and Mode: resistive exercise in form of weight training exercise.

*Group (A) quadriceps exercise(knee extension)*

1. Patient in sitting position knee flexed,weight are positioned above the ankle from anterior part , fixation is done above the knee to avoid hip raising from the plinth After warming up patient start first set, patients are asked to extend the knee to the end it takes about 1 second of contraction then asked to relax and rest for two seconds patient asked to do 15 repetition and rest for two minute then do another15 repetition. each set consist of 30 repetition
2. Then patient is asked to rest and relax for two minutes before starting the second set.
3. The second, third and fourth set is the same as first set. Each set takes about three and half minutes.
4. After finishing the four sets patient asked to do cooling down in form of light aerobic exercise
5. Blood pressure were measured after one hour from the session, from supine position

*Group (B) Latissimus dorsi(shoulder extension)*

1. Patient in prone position arm outside plinth,weight are positioned above the elbow from posterior part, fixation is done above the upper back to avoid back raising from the plinth. After warming up patient start first set, patients are asked to extend theshoulder to the end it takes about 1 second of contraction then asked to relax and rest for two seconds patient asked to do 15 repetitionsand rest for two minutes then do another 15 repetition. Each set consist of 30 repetitions.
2. Then patient is asked to rest and relax for two minutes before starting the second set.
3. The second, third and fourth set is the same as first set. Each set takes about three and half minute.
4. After finishing the four sets patient asked to do cooling down in form of light aerobic exercise
5. Blood pressure were measured after one hour from the session, from supine position

## Results

Twenty cases were included in the study distributed amongtwo groups of 10 cases each. These were the Quadriceps group and the LatissmusDorsi groups. Table (1) and (2) show the mean and Standard error of some baseline measurements.

The total period of training program was eight weeks, three session /per week. All medical investigation was performed before training program body mass index was calculated height weight,systolic diastolic blood pressure for the two groups.

Paired T-test was used to test the null hypothesis that there are no differences in the means of the age, BMI, and blood pressure between the two groups to reject the null hypothesis as evidenced by the high p values displayed in (Table 3). That is, the means of these variables across the two groups were not significantly different prior to exercising.

**Table 1:Pre-exercise means of baseline measurements between the two groups (age, and BMI)**

| | Age (years) Mean±SD | BMI Mean±SD |
|---|---|---|
| **Quadriceps training group** | 54.5 ± 3.4 | 28.2 ± 1.4 |
| **Latissmus Dorsi training group** | 53.3 ± 3.0 | 28.0 ± 1.6 |

**Table 2: Pre-exercise baseline measurements between the two groups (Baseline Systolic blood pressure, Baseline Diastolic blood pressure, and Baseline muscle strength)**

| Group | Baseline Systolic blood pressure (mmHg) Mean±SD | Baseline Diastolic blood pressure (mmHg) Mean±SD | Baseline muscle strength (grade) Median |
|---|---|---|---|
| **Quadriceps** | 150 ± 6.7 | 94 ± 3.8 | 4 |
| **Latissmus Dorsi** | 147 ± 6.7 | 91 ± 2.0 | 4 |

Kruskal–Wallis test used to test the null hypothesis that there are no differences in the medians of the muscle strength between the two groups. Indeed, results confirmed that there was not enough evidence to reject the null hypothesis as evidenced by the high p values displayed in (Table 4). That is, the medians of these variables across the four groups were not significantly differentprior to exercising.

Training Program results following exercise, new measurements were taken including the systolic blood pressure. Comparison between the latissmus dorsi and quadriceps group exercise measurements are displayed in (table 5) below together with results of the paired t test of significance for comparing the results in each group.

From the table above, we can see that the reduction in systolic blood pressure is highly significant in the two groups of exercising. But the quadriceps showed more

significant reduction than latissmusdorsi group.

Diastolic blood pressure measurement was taken. Comparison between the latissmusdorsi and quadriceps group measurement are displayed in (table 6) below together with results of the paired t test of significance for comparing the in each group.

**Table 3:Paired T-test was used to test the null hypothesis between-groups baseline measurements**

| Variable | T -value | P - value |
|---|---|---|
| Age | 0.4 | 0.77 |
| BMI | 0.6 | 0.60 |
| Baseline Systolic blood pressure | 0.7 | 0.53 |
| Baseline Diastolic blood pressure | 2.0 | 0.13 |

**Table 4: Kruskal–Wallis results for comparison of baseline measurements of muscle strength between groups.**

| Variable | $\chi 2$ statistic | p-value |
|---|---|---|
| Baseline muscle strength | 0.42 | 0.93 |

**Table 5: Comparison of baseline and post-exercise SBP in each group.**

| Group | Baseline Systolic blood pressure (mmHg) Mean ± SD | Post-exercise Systolic blood pressure (mmHg) Mean ± SD | T - value | P –value |
|---|---|---|---|---|
| Quadriceps | 150.4 ± 6.7 | 140.1 ± 6.7 | 48.3 | <0.001 |
| Latissmus Dorsi | 147.2 ±6.9 | 142 ±6.9 | 26 | <0.001 |

**Table 6: A Comparison of baseline andpost-exercise DBP in each group**

| Group | Baseline Diastolic blood pressure (mmHg) Mean ± SD | Post-exercise Diastolic blood pressure (mmHg) Mean ± SD | T statistics | P – value |
|---|---|---|---|---|
| Quadriceps | 94.2±3.8 | 86.9±3.8 | 24.3 | <0.001 |
| Latissmus Dorsi | 91.5 ±2.0 | 89 ±2.1 | 15 | <0.001 |

From the table above, we can see that the reduction in diastolic blood pressure is highly significant in the two groups of exercising patients.But the quadriceps is showed more significant reduction than latissmusdorsi group.

## DISCUSSION

Hypertension is a major risk factor for stroke, myocardial infarction (heart attacks), heart failure, aneurysms of the arteries (e.g. aortic aneurysm), peripheral arterial disease and is a cause of chronic kidney disease. Even moderate elevation of arterial blood pressure is associated with a shortened life expectancy.

**Table (7) shows the mean difference and percent of change in blood pressure.**

| Group | Reduction in SBP (mmHg) Mean difference | % of reduc-tion | Reduction in DBP (mmHg) Mean difference | % of reduc-tion |
|---|---|---|---|---|
| Quadriceps | 10.3 | 6.84 | 7.3 | 7.74 |
| Latissmus Dorsi | 5.2 | 3.53 | 2.5 | 2.73 |

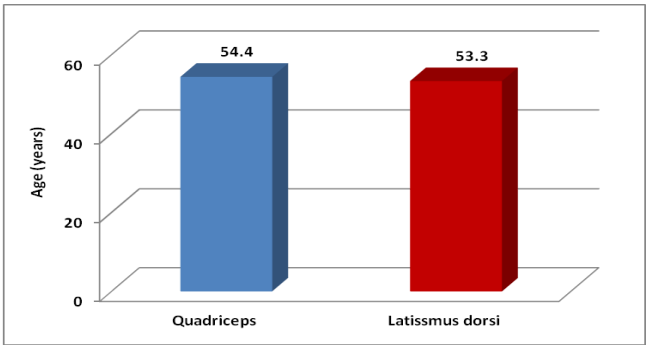



**Fig 1:age distribution within the two groups.**

**Fig 2: BMI distribution within the two groups**

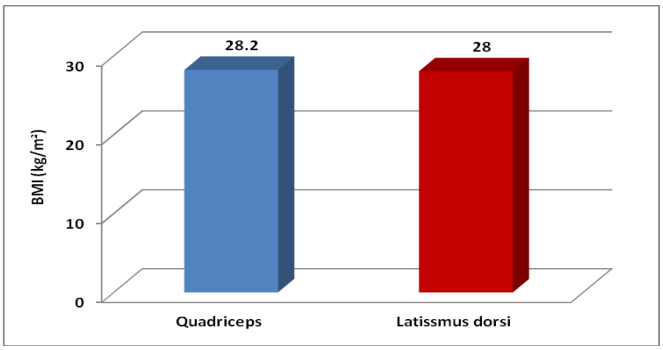


**Fig 3:Median values of muscle strength within the two groups**

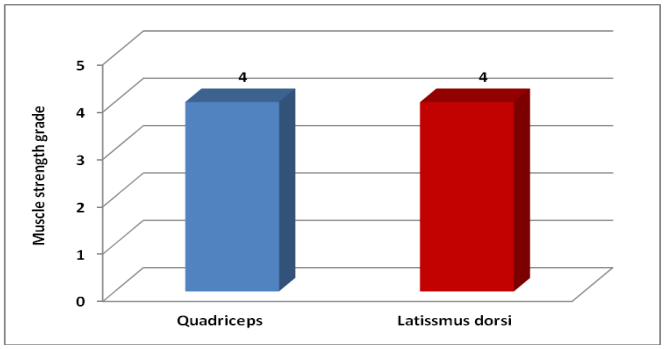
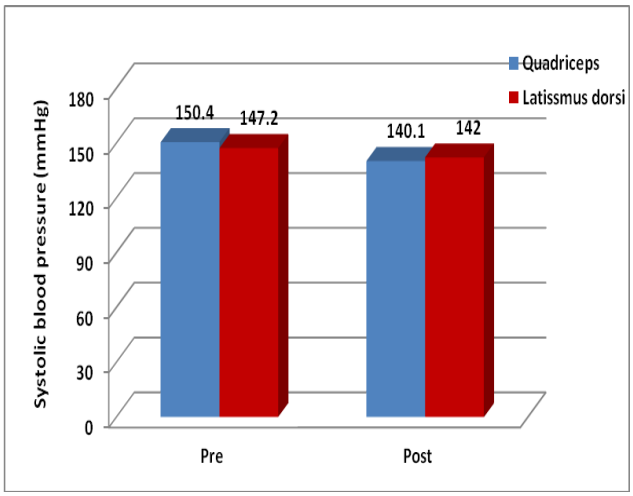



**Fig 4: A Comparison of baseline and post-exercise SBP in each group**




Dietary and lifestyle changes can improve blood pressure control and decrease the risk of associated health complications, although drug treatment is often necessary in people for whom lifestyle changes are not enough or not effective [10,11].

**Fig 5: A Comparison of baseline and post-exercise DBP in each group**

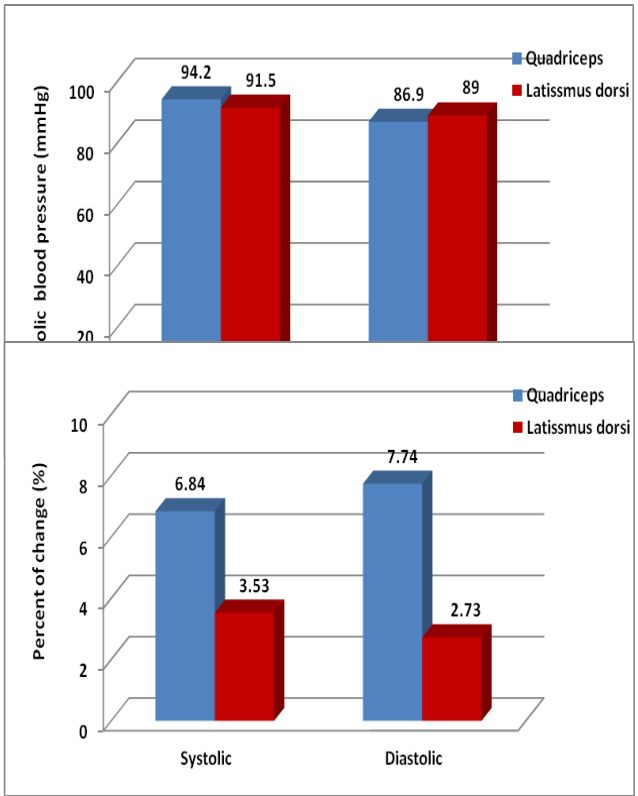



**Fig 6: Percent of change in blood pressure across the two groups.**

Looking at the above data for the exercising muscles, the quadriceps group showed the biggest reduction effects with means of 10.3 (6.84%) and 7.3 (7.74%) mmHg reduction in SBP and DBP and latissmusdorsi group a reduction of 5.2 (3.53%) and 2.5 (2.73%) mmHg respectively.

This study examined the effects of resistance exercise protocol for quadriceps muscle and latissmusdorsi muscle on blood pressure in hypertensive women. The primary findings of this investigation Results showed that both groups showed a reduction in systolic and diastolic blood pressure, but in quadriceps group there were highly significant when compared to the latissmus dorsi group which showed low significant reduction.

Apossible explanation could be related toPEH depending on endothelial vasodilatoragents that would be released at higherlevels after effort, involving larger musclegroups, such as those of the lower limbs. There are two hypotheses to explain our results. First, the ischemia caused by the mechanical load in the larger arteries during lower limb exercises did not occur during upper and trunk exercises, limiting the stimulus for the release of vasodilator substances. Second, post-resistance exercise hypotension after a session including lower body exercises has been attributed to a decrease in cardiac output, probably mediated by a reduction in the venous return [12].

In fact, after lower body exercises, vasodilation of the leg muscles might contribute for the decrease in the venous return due to the difficulty of the blood to flow against gravity. On the other hand, when upper body exercises are performed, venous return might not decrease much since vasodilator territory is lower and not very influenced by gravity [12].

Post-resistance exercise hypotension has been observed in normotensive and hypertensive subjects after a resistance exercise session including upper and lower body exercises. Moreover, when only lower body exercise is employed, post-resistance exercise hypotension has been also documented [20].

A study conducted observed reductions inthe SBP and/or DBP using resistive exercises for thewhole body (generally, one exercise for each muscle group), the study observed Post exercise hypotension up to 60 minutes,using only one resistive exercise (leg-press)performed for 15 minutes uninterruptedlyand with limb alternation [13].

A study conducted reported significant post-exercise reduction in SBP after two resistive exercise sessions with different intensities in normotensive young individuals.One of the possible explanations for SBP's higher sensitivity to post exercise hypotension would be the posture subjects adopt after the exercise. Although all mentioned studies have chosen the seated position to assess arterial pressure, it was observed that the post-exercise SBP declines more deeply in the seated position rather in the supine position due to decrease in venous return and cardiac output [14].

In this study observed PEH of SBP after circuit model for resistance exercise composed by 13 resistance exercises performed with 20 repetitions at 40% 1RM and 30 seconds rest interval between exercises [15].

Systolic pressure was shown to decrease after a 19-week resistance training program consisting of leg presses and knee extensions. Exercises were performed at loads that lead to a failure to lift the weight by the third set of 6-12 repetitions. Baseline systolic blood pressure decreased significantly (6 mm Hg) due to the training [16].

One of the physiological mechanisms that could explain the influence of muscle mass on blood pressure after resistance exercise is the reduction in vascular resistance, caused by the liberation of vasodilating endothelial substances (e.g. nitric oxide and prostaglandins) [12].

In a study The effects of intense dynamic resistance training on resting blood pressure were examinedUntrained men aged 40-55 underwent a 16 week program which required them to perform 14 different dynamic resistance exercises on machines between 3 to 4 times per week. Subjects performed between 8-12 repetitions maximum (RM) for upper body exercises and 15-20 RM for lower body exercises. Supine resting diastolic pressure was significantly lowered (84 ± 7 before training vs. 79 ± 6 mm Hg after training, $P<0.05$) as a result of the training, whereas standing diastolic pressure was not [17].

In a studyof 17 older subjects of both sexes who performed resistance training with intensity of 8RM during 20 weeks, it verified decrease of 6mmHg for SBP and 3mmHg for DBP [18].

Another study observed no significant variance in the SBP after both traditional multiple set and tri-set methods where six upper limb exercises were used for two distinct muscular groups (chest and back) [19].

Study failed to induce a hypotensive response in SBP following three series of 12 maximal repetitions of knee extension unilaterally and bilaterally [20].

The practical application of this study was that the prescription of resistance training session with exclusively upper trunk exercises is not significantly high compared to the lower limb exercisefor promoting post-exercise hypotension. However, it is important to consider that a resistance exercise protocol including only trunk and upper body exercises might be useful to improve muscle skeletal function, which should be considered depending on the aims of the training.

## CONCLUSION

Results that both groups showed a reduction in systolic and diastolic blood pressure, but in quadriceps groupwere highly significant compared to the latissmus dorsi group which showed low significant reduction. The quadriceps group showed the biggest effects with mean reduction of 10.3 ± 0.7 and 7. ± 0.9 mmHg in SBP and DBP respectively,andlatissmusdorsi group a reduction of 5.2 ± 06 and 2.5 ± 0.5mmHg.

## REFERENCES

[1] Elliot T. and Victoria S."Blood pressure readings often unreliable. American Medical Association2007; 2: 6-11

[2] Dickson M. and Sigmund C.: Genetic basis of hypertension: revisiting angiotensinogen. Hypertension. 2006; 1: 14-20.

[3] Ostchega Y.; Dillon C.; Hughes J.; Carroll M.; et al. (2007):Trends in hypertension prevalence, awareness, treatment, and control in older U.S. adults: data from the National Health and Nutrition Examination Survey. J Am GeriatrSoc.2007 ; 7: 1056-65

[4] Carr M. : The emergence of the metabolic syndrome with menopause. J ClinEndocrinol Mata, 2003; 88: 2404-2411

[5] Pedro R Zaros.; Carla EM Romero Pires.; Mauricio Bacci Jr.; Camila Moraes. and Angelina Zanesco: Effect of 6-months of physical exercise on the nitrate/nitrite levelsin hypertensive postmenopausal women. Department of PhysicalEducation, Institute of Biosciences, University of Sao Paulo State 2009; 9:17-20.

[6] Anderson WF, Chatterjee N, Ershler WB, Brawley OW: Estrogen receptor breast cancer phenotypes in the Surveillance, Epidemiology and End Results database. Breast Cancer Res Treat ,2002; 01:27-36.

[7] Vishal R. Tandon, Annil Mahajan, and Anil Sharma.Prevalence of cardiovascular risk factors in postmenopausal women. Journal of Mid-Life Health.2010; 1:26-29.

[8] Rossi R, Nuzzo A, Origliani G, Modena MG. Prognostic role of flow-mediated dilation and cardiac risk factors in post-menopausal women. J Am Coll Card .2008; 51: 997–1002.
[9] Sharman JE. andStowasser M. (2009): Australian association for exercise and sports science position statement on exercise and hypertension. J Sci Med Sport 12 :252–257.
[10] Eline Silva da CunhaI; PatríciaAngélica de MirandaI; Silva NogueiraI; Eduardo Caldas CostaII; Eliane Pereira da SilvaIII; Gardênia Maria HolandaFerreiraI. Resistance training intensities and blood pressure of hypertensive older women - a pilot study . Exercise and sport medicine clinic .2012; 6 :373-376.
[11] Grossman E. and MesserliF : Drug-induced Hypertension an Unappreciated Cause of Secondary Hypertension. Am. J. Med; 2012; 1: 14–22.
[12] AnneliseLinsMenêses I; CláudiaLúcia de MoraesForjaz II; GleysonQueiroz de Moraes Silva I; Aluisio Henrique Rodrigues de Andrade Lima I; BrenoQuintella Farah I; Ozéas de Lima LinsFilho I; Gustavo Henrique Correia de Lima I; Raphael Mendes Ritti-DiasI. Post exercise cardiovascular effects of different resistance exercise protocols for trunk and upper limbs. Motriz: 2011: 4 :667-674
[13] Harman J, Walker ER, Charbonneau V, Akylbekova EL, Nelson C, Wyatt SB. Treatment of hypertension among African Americans: the JacksonHeart Study. J ClinHypertens (Greenwich).2013; 15:367–374.
[14] Mohebbi H, Rahmaninia F, VataniDSh, FarajiH(2010). Post-exercise responses in blood pressure, heart rate and rate pressure product in endurance and resistance exercise. Med Sport .2010; 63:209-19.
[15] Mota MR, Pardono E, Lima LCJ, Arsa G, Bottaro M, Campbell CSG, et al. Effects of treadmill running and resistance exercises on lowering blood pressure during the daily work of hypertensive subjects. J Strength Cond Res.2009; 23:2331-8.
[16] Tatro, D.L., Dudly, G.A., Convertino, V.A. Carotid-caridacbaroreflex response and LBNP tolerance following resistance training. Medicine and Science in Sports and Exercise.2010; 24:789-796..
[17] WILLIAMS III, JACK PLUMMER, M.S.The Effects of Isometric and Dynamic Resistance Exercise on Post-Exercise Blood Pressure. 2006;87
[18] Adriana Marques Battagin, Simone Dal Corso, Carmen LúciaRondonSoares, Silvia .Response after Resistance Exercise for Different Body Segments in Hypertensive.2010; 3:405-41.
[19] Rodriguez D, Polito MD Ferreira, Agnes Letícia, Cintia de Souza, Carla Malaguti (2010).Pressure
[20] Polito MD, FarinattiPTV.The effects of muscle mass and number of sets during resistance exercise on postexercise hypotension. J Strength Cond Res. 2009;23:2351–7.

## الملخص العربي

# استجابة ضغط الدم لتمرينات المقاومة لدى السيدات ذات الضغط المرتفع ما بعد انقطاع الطمث

**هدف البحث:** -تقييم تأثير تمارين المقاومة لعضلات الجسم المختلفة على مستويات ضغط الدم للسيدات في مرحلة ما بعد انقطاع الطمث. **تصميم البحث: -**برنامج علاجى باستخدام تمارين المقاومة المتوسطة للسيدات ذات الضغط المرتفع ما بعد انقطاع الطمث.**مقاييس النتائج الرئيسية: -**قياس ضغط الدم والوزن والطول قبل البرنامج العلاجوبعده.. **طريقة البحث: -**في الدراسة 20 سيدة في مرحلة ما بعد انقطاع الطمث ب 3-5 سنوات على الأقل تراوحت أعمارهن بين 50- 60سنة و كان المتوسط الحسابي ± الانحراف المعياري( 54.4 ±2.9) جميعهن يعانون من ارتفاع ضغط الدم المتوسط ويعالجون بالأدوية ولا يوجد بينهم سيدات يتلقين العلاج الهرموني. أجريت لكل السيدات المشاركة قبل بدء البرنامج قياسات تشمل قياس ضغط الدم الوزن والطول. قسمت السيدات المشاركة عشوائياً إلى مجموعتين كل مجموعة 10 سيدات. تقوم كل مجموعة من مجموعات الدراسة الثلاث بعمل برنامج تدريبي يشمل تمارين المقاومة متوسطة الشدة باستخدام رفع أوزان تمثل 60% من الوزن الأقصى لكل عضلة لمدة شهرين بواقع 3 جلسات أسبوعياً كل جلسة 30 دقيقة وتشمل مجموعات الدراسة 2 عضلات تم عمل تمرينات المقاومة متوسطة الشدة لعضلة واحدة في كل مجموعة وهذه العضلات هي عضلة الفخذ رباعية الرؤوس والظهر الخلفية.. **النتائج: -** وبعد انتهاء البرنامج أعيدت القياسات السابقة لكل السيدات والتي وكان معدل التغير في ضغط الدم الانقباضي في مجموعات الدراسة كالأتي : المتوسط الحسابي ± الانحراف المعياري للانخفاض في ضغط الدم الانقباضي في مجموعة عضلة الفخذ 10.3± 0.7 مليميتر و كان المتوسط الحسابي± الانحراف المعياري للانخفاض في ضغط الدم الانقباضي في مجموعة عضلة الظهر الخلفية 5.2± 0.6 مليميتر وكان معدل التغير في ضغط الدم الانبساطي في مجموعة الدراسة كالأتي : المتوسط الحسابي± الانحراف المعياري للانخفاض في ضغط الدم الانبساطي في مجموعة عضلة الفخذ 7.3± 0.9مليميتر و كان المتوسط الحسابي± الانحراف المعياري للانخفاض في ضغط الدم الانبساطي في مجموعة عضلة الظهر الخلفية 2.5± 0.5 مليميتر زئبقي ومن هنا تبين إن العضلتين قاما بخفض ضغط الدم ولكن عضلة الفخذ كان لها تأثير اكبر مقارنة بعضلة الظهر. **الخلاصة:-** تمثل تمارين المتوسطة الشدة لعضلات الجسم المختلفة وبخاصة عضلة الفخذ رباعية الرؤوس بحسب هذة الدراسة ذات أهمية للسيدات ذات الضغط المرتفع بعد انقطاع الطمث حيث تساعد فى تخفض ضغط الدم المرتفع.

**مفتاح كلمات البحث:-** تمرينات المقاومة - ارتفاع ضغط الدم.