JOURNAL OF CRITICAL REVIEWS

ISSN 2394-5125 Vol 08, Issue 01, 2021

EFFECT OF TENS ON ACUPOINTS FOR POSTMENOPAUSAL HYPERTENSION

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ABSTRACT:

This study was conducted to determine the effect of transcutaneous electrical acupoint stimulation (TEAS) on postmenopausal hypertension. It was conducted from 27 July 2020 to 29 October 2020. Forty postmenopausal women (with at least one year after last menstruation) suffering from high blood pressure (diagnosed by a gynecologist) participated in this study. The participants' ages and body mass index were 50-65 years, 24.2-34.5 kg/m² respectively. Their blood pressure ranged from 150/95 to 170/108 mmHg. Their selection was from Mansoura New General Hospital (Department of Obstetrics and Gynecology). They were allocated randomly into 2 equal number groups, 20 for each; the first group (Study group) received low-frequency TENS (4 Hz) on 3 acupoints (Pericardium-6, Spleen-6, and Liver-3) bilaterally at the same time for 40 minutes per session, once per day, 3 days per week for 5 weeks (total 15 sessions) in addition to the antihypertensive drug (Captopril-25 mg tablets twice daily), while the second group (Control group) received the same antihypertensive drug only (Captopril-25 mg tablets twice daily).

Hypertension was evaluated by a mercury sphygmomanometer and stethoscope pre and post-treatment of both groups. A statistically significant reduction in systolic and diastolic blood pressure in the study and control groups ($P < 0.001$) was observed in the findings of this study, but when compared between results of the two groups, we found that the study group (G1) displayed a statistically significant reduction in both systolic and diastolic BP than the control group (G2) ($P < 0.001$). Finally, based on the obtained results of this study, adding TEAS to the postmenopausal hypertension treatment produced a statistically significant improvement in blood pressure. So, applying transcutaneous electrical nerve stimulation on acupoints (TEAS) should be considered an adjunctive treatment method for postmenopausal hypertension.

KEYWORDS: Post-menopause, Hypertension, Systolic blood pressure, Diastolic blood pressure, and TEAS.

I. INTRODUCTION

Menopause is the final menstrual period that's an inevitable component of the overall aging process in women. It's diagnosed after consecutive 12 months of menstrual cessation **[1].** It's associated with a deficiency in ovarian follicles resulting in hormonal level alterations in women. The average age of menopause in the majority of women is at about 51 years **[2].** It represents the end of a woman's fertility that's related to estrogen deficiency and has a significant impact on women's health-related quality of life **[3].**

Menopause is distinguished by a series of changes including, though not limited to, irregular menstrual periods; genitourinary and sexual symptoms such as dysuria and lack of lubrication; disturbances of sleep; and depressed mood **[4].** Women are exposed to several chronic health conditions related to menopausal changes such as cardiovascular events, diabetes, high blood pressure, cancer, autoimmune disorders, psychiatric problems, as well as bone mass loss **[5].** These symptoms vary between women depending upon many conditions includes socio-cultural, environmental, and biological aspects **[6].**

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Hypertension is defined as blood pressure is more or equal to 140/90 mmHg. It can be classified into Grade I or mild hypertension in which the systolic blood pressure (SBP) ranges from 140 to 159 mmHg and the diastolic blood pressure (DBP) ranges from 90 to 99 mmHg, Grade II or moderate hypertension in which the SBP ranges from 160 to 170 mmHg and the DBP ranges from 100 to 109 mmHg, Grade III or severe hypertension in which the SBP is more or equal to 180 mmHg and the DBP is more or equal to 110 mmHg, and Isolated systolic hypertension in which the SBP is more or equal to 140 mmHg and the DBP is less than 90 mmHg **[7].**

Hypertension has two main types, regarding 95% of subjects with elevated blood pressure, their hypertension etiology is unknown — this is termed primary hypertension. If it is possible to identify the cause, this is termed secondary hypertension **[8].**

The prevalence of hypertension in premenopausal women is much lower than in age-matched men, but it increases abruptly after menopause **[9].** Hypertension is the leading serious public health problem related to morbidity and mortality in women after menopause. Different factors that trigger a predisposition to hypertension during the postmenopausal period are including estrogen deficiency, renin-angiotensin system activation, sympathetic nerve activity, endothelial cell dysfunction, inflammatory causes, elevated vasoconstrictor elements, and psychiatric disorders such as anxiety and depression **[10].**

Effective control of hypertension is recommended to decrease the incidence of heart attack and stroke. Long-term use of antihypertensive drugs may result in side effects and lowering the QOL **[11].** Combining non-pharmacological treatment with antihypertensive drugs can control BP in patients with hypertension **[12]**. Lifestyle modification, such as regular physical activity, is one of several treatments for alleviating blood pressure and enhancing the overall risk of developing cardiovascular diseases. Combined aerobic with resistance exercises can decrease both arterial stiffness and BP in postmenopausal women **[13].** Isometric handgrip exercise and acupressure are effective non-pharmacological methods in reducing blood pressure in post-menopausal women **[14, 15].**

Acupuncture (AP), an approach of ancient Traditional Chinese Medicine (TCM), is considered one of the non-pharmacological interventions and is being implemented by the World Health Organization as an adjunctive method for the management of chronic non-communicable diseases (CNCD) **[16].** In Chinese medicine theory, acupuncture meridians are recognized to be channels for the flow of vital energy called qi, regulating blood flow, and connecting internal body organs with acupoints. These meridians and points of acupuncture are a fundamental element in the control of diseases **[17].**

Acupuncture, a non-pharmaceutical treatment, is broadly applied for the treatment of hypertensive individuals and having potential related effectiveness **[18, 19].** The place of application of the acupuncture technique on the skin surface of the body is called acupoints or acupuncture points **[20].**

Transcutaneous electrical acupoint stimulation (TEAS) is a non-invasiveness alternative therapy to electro-acupuncture and manual acupuncture **[21].** It is used to induce the acupoints by using transcutaneous electrical nerve stimulation (TENS) instead of needles, given it an advantage of a very simple method to be learned without any adverse effects associated with traditional acupuncture such as infections or punctures of the internal organs **[22].**

TEAS has been widely used in the treatment of type 2 diabetes mellitus **[23],** recovery of gastrointestinal function after cesarean section **[24],** various psychiatric disorders including postoperative anxiety and depression **[25, 26],** and postoperative nausea and vomiting after abdominal hysterectomy **[27].**

TEAS is possibly affecting the blood pressure by protecting the myocardial tissues and influencing the nervous system through regulating the autonomic nervous system function and reduction in sympathetic activity **[28]**.

II. SUBJECTS, MATERIALS, AND METHODS

This study was designed to investigate the effect of transcutaneous electrical acupoint stimulation (TEAS) on postmenopausal hypertension.

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1. SUBJECTS:

This study was conducted on forty postmenopausal women (with at least one year after last menstruation) suffering from high blood pressure diagnosed by a gynecologist. The participants' ages and body mass index were 50-65 years, 24.2-34.5 kg/m² respectively. Their blood pressure ranged from 150/95 to 170/108 mmHg. Their selection was from Mansoura New General Hospital (Department of Obstetrics and Gynecology). This study was performed after gathering the ethical approval from the ethical committee number P.T.REC/012/002828, Faculty of Physical Therapy, Cairo University. Then, the study was conducted from 27 July 2020 to 29 October 2020.

1.1. Group design of patients:

Patients were assigned randomly into two equal number groups:

1.1.1. Study group (G1): It included 20 postmenopausal women with high blood pressure. They received TEAS (40 minutes per session, 3 days per week for 5 weeks) in addition to the antihypertensive drug (Captopril-25 mg tablets twice daily).

1.1.2. Control group (G2): It included 20 postmenopausal women with high blood pressure. They received the antihypertensive drug only (Captopril-25 mg tablets twice daily).

2. MATERIALS (EQUIPMENT):

The equipment of this study was divided into two different categories; measurement equipment and treatment equipment:

2.1. Measurement equipment:

The following measurement instruments were used in this study:

2.1.1. Informed consent form.

It's a freely and voluntarily written consent signed by each patient before participating in the research study.

2.1.2. Recording datasheet:

It contains data and information about name, age, address, weight, height, blood pressure, and family history of hypertension.

2.1.3. Height and Weight scale:

A Health Scale (Model No. TCS-200-LP, Made in China) was used to determine the height, weight, and body mass index of all participants before the beginning of the study for both groups. It has the following features:

- Liquid-crystal display (LCD) with blue backlight.
- Unit: kg/lb & capacity: 200 kg/grade: 100 g.
- Height Range: 60-210 cm/grade: 0.5 cm.
- BMI Function.

2.1.4. Mercury sphygmomanometer:

The YAMASU Model 600 mercurial sphygmomanometer (Made in Japan) was used for blood pressure monitor for both groups. It has the following features:

- It is a compact and portable desktop unit containing a die-casting aluminum housing provided with a push-button lock, a cotton cuff of grey color, latex bladder, and valve latex bulb. Its range is 0-300mmhg.
- When the device is not in usage, the reservoir lock secures mercury.

2.1.5. Stethoscope:

CK-S601P Spirit Deluxe Stethoscope is a high-quality dual head stethoscope. It is used for listening to the sound that the blood makes as it flows through the brachial artery found in the

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upper arm. It was used with a mercury sphygmomanometer to determine both SBP and DBP for both groups. It has the following features:

- It is made with stainless steel "Super flex" binaural tubing set.
- It has a plastic coordinated in color.

2.2. Treatment equipment:

The treatment was achieved by the following equipment:

2.2.1. Transcutaneous Electrical Nerve Stimulation (TENS):

The EV-906 Digital TENS (Made in Taiwan) is a battery-operated pulse generator. The device contains controllable output channels (8 pads). It's a fully digital device with microprocessor circuitry and control. It was used for providing low-frequency TENS on acupoints for the study group (G1). It has the following parameters:

- Five TENS Modes: B (Burst), N (Normal), M (Modulation), SD1 (Strength Duration), and SD2.
- Pulse Rate: Adjustable, from 2-150 Hz, 1 Hz/step.
- Pulse Width: Adjustable, from 50 to 300 μs, 10 μs/step.
- Intensity: There are 100 steps of intensity level controlled by press buttons from 1 to 100 mA.
- Two separate treatment timers for treating two areas simultaneously: 1-60 minutes or continuous operation.
- Wave Form: Asymmetrical Bi-Phasic Square Pulse.

3. METHODS (PROCEDURES):

All patients were given a full explanation of the study protocol and signed on an approved written consent before participating in this study.

3.1. Evaluative Procedures:

Measurement and assessment were performed before the beginning of treatment and after completing five weeks of both groups' treatment.

3.1.1. History Taking:

All data of each patient were recorded in a recording datasheet including name, age, weight, height…….etc.

3.1.2. Weight and height measurement:

Weight, height, and BMI were measured by the TCS-200-LP digital body scale. The patients wore a thin layer of clothes during the measurement.

3.1.3. Mercury sphygmomanometer and Stethoscope:

It was used for measuring BP before starting the treatment and after completion of the treatment for both groups as the following **[29, 30]:**

- Patients were asked to refrain from caffeine and exercise before each visit. They should be rested and seated in a chair with back support for 5 minutes before BP measurement. The BP was ideally taken in the sitting position of the patients with their back supported. The patients' arm should be supported, slightly flexed, and at the heart level. A proper sized blood pressure cuff, with a bladder width of approximately 40% of the patients' upper arm circumference and a bladder length covered 80%-100% of the upper arm circumference, was used.

- The patients' right upper arm was wrapped with the cuff' of the BP device above the antecubital fossa by nearly one inch. The stethoscope's bell was placed over the brachial artery just below the edge of the cuff. The cuff was rapidly inflated to 180 mmHg and the air was released from the cuff at a moderate rate (3mm/sec).

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- The stethoscope was used to listen to the first knocking sound (Korotkoff) that was the patients' SBP. When the knocking sound disappeared, it was the patients' DBP. The sphygmomanometer was also observed simultaneously during listening by the stethoscope. Two measurements were taken five minutes apart and were reported as the mean of two readings that didn´t differ by more than 5 mmHg.

3.2. Treatment Procedures:

3.2.1. Transcutaneous Electrical Acupoint Stimulation (TEAS):

This procedure was applied to the study group (G1) only. Before starting the first treatment session, each patient was instructed briefly about the nature of the treatment to gain the patient's confidence and cooperation. It was performed by using the TENS device on acupoints (TEAS) as the following:

- The patients were placed in a relaxed comfortable sitting position with their back well supported. They were breathing deeply during the session and wore loose clothes.

- The TENS parameters were adjusted as the following **[31]:**

- **Mode:** Burst.
- **Frequency:** 4 Hz.
- **Pulse Width:** 200 μs.
- **Intensity:** The stimulation intensity was adjusted to the maximum tolerable intensity that didn´t cause discomfort or pain.
- **Duration:** 40 minutes.

- The following acupoints were selected for TEAS application bilaterally: Nei-Guan (PC6), Taichong (LR3), and Sanyinjiao (SP6) **[32].**

- The skin surface of the selected acupoints was cleaned with an alcohol wipe.

- The locations of the selected acupoints were determined by Cun that is a traditional Chinese unit of length. Cun measurement is determined by using the width of a person's thumb across the interphalangeal joint that denotes 1 cun, but the width of the middle 3 fingers denotes 2 cun, and the width of 4 fingers (except the thumb) side-by-side denotes 3 cun **[33].**

- The adhesive electrodes of the TENS device were placed on the selected acupoints bilaterally after determining their locations:

1. Nei-Guan (P6 or PC6): It is located 2 cun (width of the middle 3 fingers – index, middle, and ring fingers) above the mid wrist creases between the tendons of flexor carpi radialis and palmaris longus muscles **[21].**

2. Taichong (LR3): It is located 2 cun (width of the middle 3 fingers – index, middle, and ring fingers) above the distance between the 1st and 2nd metatarsal bones on the dorsum of the foot **[34].**

3. Sanyinjiao (SP6): It is located 3 cun (width of 4 fingers except the thumb – index, middle, ring, and little fingers) directly above the tip of the medial malleolus on the posterior border of the tibia **[35].**

- The TENS device was applied to the selected acupoints bilaterally at the same time for 40 minutes and automatically turned off after the selected time was completed. Then, the adhesive electrodes were withdrawn from the patients' skin surface.

- This program was done for 5 weeks, 3 days/week, 40 minutes duration for each session.

III. STATISTICAL ANALYSIS

The statistical package for social studies, version 25 for windows (IBM SPSS, Chicago, IL, USA), was used for conducting all data analysis. To compare the characteristics of subjects between the study and control groups, descriptive statistics and unpaired t-test were performed. The Shapiro-Wilk test was used to assess the normal distribution of data. To confirm heterogeneity between groups, Levene's test

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for homogeneity of variances was performed. Comparison between the two groups' mean values of systolic and diastolic blood pressure was checked by using the unpaired t-test. The paired t-test was performed to compare the pre and post-treatment mean values of systolic and diastolic blood pressure within groups. For all statistical tests, the significance at the alpha level was set at $p < 0.05$.

IV. RESULTS

1. Subjects' basic characteristics:

There was no significant difference between groups' basic characteristics of age, weight, height, and BMI ($p > 0.47$) as shown in table (1).

Table (1): Basic characteristics of participants:

	Study group	Control group	MD	t- value	p-value
	$\overline{X}$ ± SD	$\overline{X}$ ± SD			
Age (years)	57.8 ± 4.9	58.8 ± 4.55	-1	-0.66	0.5
Weight (kg)	79.5 ± 8.78	80.05 ± 10.5	-0.55	-0.18	0.85
Height (cm)	163.7 ± 4.37	162.1 ± 5.2	1.6	1.05	0.29
BMI (kg/m²)	29.62 ± 2.57	30.4 ± 3.05	-0.78	-0.86	0.39

x̄: **Mean, SD: Standard deviation, MD: Mean difference, p-value: Probability value.**

2. Effect of treatment on systolic and diastolic blood pressure:

2.1. Within groups comparison:

Post-treatment systolic and diastolic blood pressure decreased significantly in the study and control groups relative to pre-treatment ($p < 0.001$). The study group showed a lowering in both systolic and diastolic blood pressure with a percent change of 16.68 and 14.73% respectively; and that in the control group was 13.74 and 10.97 % respectively (Table 2, Figure 1).

2.2. Between groups comparison:

There was no significant difference in systolic and diastolic blood pressure between both groups pre-treatment ($p > 0.05$), but post-treatment systolic and diastolic blood pressure of the study group decreased significantly in comparison to that of the control group ($p < 0.001$) (Table 2, Figure 1).

Table (2): Mean systolic and diastolic blood pressure pre and post-treatment of the study and control groups:

	Study group	Control group	MD	t- value	p-value
	$\overline{X}$ ± SD	$\overline{X}$ ± SD			
Systolic BP (mmHg)					
Pre-treatment	158.2 ± 6.85	159.3 ± 6.43	-1.1	-0.52	0.6
Post-treatment	131.8 ± 4.65	137.4 ± 5.61	-5.6	-3.43	0.001
MD	26.4	21.9			
Percentage of Change	16.68	13.74			
t- value	37.25	25.25			

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	p = 0.001	***p = 0.001***			
Diastolic BP (mmHg)					
Pre-treatment	99.45 ± 4.05	99.35 ± 3.78	0.1	0.08	0.93
Post-treatment	84.8 ± 2.68	88.45 ± 3.28	-3.65	-3.84	0.001
MD	14.65	10.9			
Percentage of Change	14.73	10.97			
t- value	28.76	19.25			
	p = 0.001	***p = 0.001***			

x̄: **Mean, SD: Standard deviation, P-value: Probability value.**

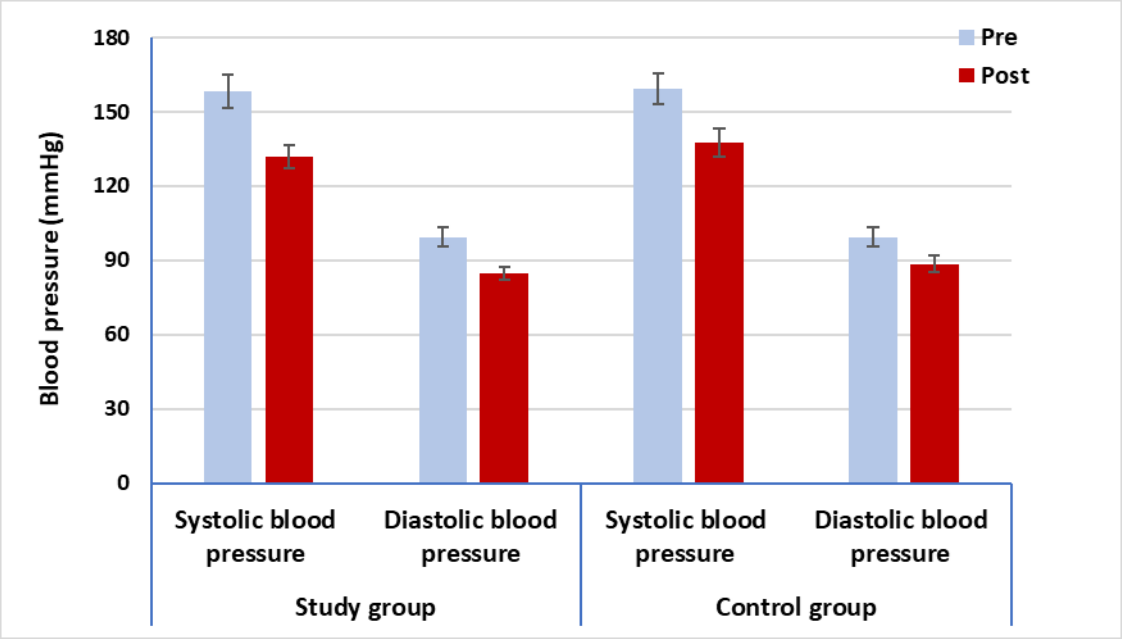

Fig. (1): Mean systolic and diastolic blood pressure pre and post-treatment of the study and control groups.

V. DISCUSSION

Menopause is the actual permanent cessation of the menstrual period with at least a year passed after last menstruation resulting from ovarian follicular inactivity **[36].** In most women, their menopausal average age occurs at 51 years. With increased longevity, women spend about one-third of their life in the postmenopausal period **[37].** It's characterized by a variety of symptoms including genitourinary and sexual symptoms such as dyspareunia, vaginal dryness, functional deficiency, urgency, dysuria, and frequent infections of the urinary tract **[38].**

Hypertension is a leading cause of cardiovascular morbidity and mortality worldwide **[39].** Blood pressure increases with aging and the prevalence of hypertension is higher among the elderly **[40].** Rates of hypertension rise in postmenopausal women in response to estrogen levels deficiency. So estrogen hormone is suggested to be a cardio-protective hormone **[41, 42]** and has a role in endothelial homeostasis by acting on vascular, cardiomyocyte, and brain receptors **[43, 44].**

This study was conducted to investigate the effect of transcutaneous electrical acupoint stimulation (TEAS) on postmenopausal hypertension. Forty postmenopausal women (with at least one year after last menstruation) participated in this study. They complained of high blood pressure (diagnosed by a gynecologist). The participants' ages and body mass index were 50-65 years, 24.2-34.5 kg/m²

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respectively. Their blood pressure ranged from 150/95 to 170/108 mmHg. Their selection was from Mansoura New General Hospital (Department of Obstetrics and Gynecology). The study was conducted from 27 July 2020 to 29 October 2020.

Patients were allocated randomly into two equal number groups; 20 for each. The study group (G1), with a mean ± SD age of 57.8 ± 4.9 years, received low-frequency TENS of 4 Hz on 3 acupoints (PC6, SP6, and LR3) bilaterally at the same time for 40 minutes per session, 3 days per week for 5 weeks in addition to their antihypertensive drug (Captopril-25 mg tablets twice daily). The control group (G2), with a mean ± SD age of 58.8 ± 4.55 years, received the antihypertensive drug only (Captopril-25 mg tablets twice daily).

The results of this study demonstrated a statistically significant reduction in both groups' systolic and diastolic blood pressure ($P < 0.001$), but when compared between the results of the two groups, we found that the study group (G1) which treated with a low-frequency TEAS in addition to the antihypertensive drug showed a statistically significant reduction in systolic and diastolic BP than the control group (G2) which treated by antihypertensive drug only ($P < 0.001$).

The observed improvement in high blood pressure in this study is supported by **Silverdal et al. [45]** who found a blood pressure reduction by acupuncture and low-frequency TENS. **Silverdal et al. [45] and Silva et al. [46]** stated that transcutaneous electrical nerve stimulation is an effective simple intervention for lowering BP in hypertensive and non-hypertensive individuals.

The results of this study came in line with those of **Liu et al. [47]** who showed that combining acupuncture with captopril tablets is superior to captopril tablets alone.

The results of this study also came in line with those of **Hisamitsu and Ishikawa [48]** who found that an effective method to improve circulation is the use of acupoints due to the ability of acupuncture to regulate several biological functions and affect the level of blood cells and hormones, provided that alterations in blood content affect the fluidity of blood.

The results of this study agreed with those of **Jacobsson et al. [49]** who stated that transcutaneous electrical acupoint stimulation may have an antihypertensive effect on 24-h ambulatory BP in hypertensive subjects who didn't respond to pharmacological therapy.

Li et al. [50] found that acupuncture as an adjunctive therapy has been demonstrated to be an effective non-pharmacological therapy for hypertension. Additionally, the antihypertensive effect of electro-acupuncture persists for at least a month after the end of EA treatment.

Sunay et al. [51] stated that acupuncture was effective in reducing menopausal complaints through occurring changes in levels of reproductive hormones, so it can be considered as adjunctive therapy for symptoms related to menopause.

Cevik and Işeri [52] found a significant reduction in blood pressure from applying acupuncture on LR3 (Taichong), SP9 (Yinlingquan), LI4 (Hegu), HT7 (Shenmen), ST36 (Zusanli), and SP6 (Sanyinjiao) acupuncture points.

Jung et al. [53] found that acupuncture on LI11, SP4, PC6, ST36, and LR3 might lower blood pressure in prehypertension and stage I hypertension.

Zhang et al. [54] found that electrical stimulation of acupuncture points reduced SBP in persons with normal and high BP for 5 weeks. So, the results of our study came in agreement with those of Zhang et al. by using 5 weeks of treatment.

Longhurst and Tjen-A-Looi [55] stated that choosing an appropriate duration and frequency for acupuncture treatment is an issue.

Kamali et al. [31] applied TENS with a low-frequency of 4 Hz, a pulse width of 200 μs, and 21 minutes duration per session through surface electrodes for lowering blood pressure. So, our study finding of blood pressure reduction agreed with that of Kamali et al. by using the same frequency and pulse width, but for 40 minutes duration per session.

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Jones et al. [56] reported that the selected duration of acupoint transcutaneous electrical nerve stimulation (Acu-TENS) was 40 minutes because the 40 minutes of stimulation was essential to induce the optimal influence.

In contrast to the present study, **Silverdal et al. [45]** found that felodipine medication occurred a significant systolic lowering of 3 mmHg but no significant changes were showed after TENS application.

The results of this study came in disagreement with those of **Silverdal et al. [45]** who used TENS on acupuncture points LI4 and LI10, with 2-Hz for 4 weeks and concluded that the study doesn´t present any solid evidence of BP reduction of TENS, but in our study, we used the PC6, LR3, and SP6 acupoints with a TENS frequency of 4-Hz for 5 weeks, and the results revealed a significant decrease in both systolic and diastolic BP between the study and control groups. They also disagreed with those of **Kim et al. [57]** who showed no significant effect of acupuncture on lowering blood pressure.

The significant reduction in both SBP and DBP in the current study may be related to many possible mechanisms that have been studied.

Vilela-Martin et al. [58] found that electrical stimulation has been shown to enhance a local vasodilator effect, which may contribute to blood pressure lowering.

Jiandani and Sant [59] stated that the TENS BP lowering action mechanism occurs by stimulating an opioid-serotonergic mechanism or vasoactive intestinal polypeptides as possible induced-vasodilator neurotransmitters. Low-frequency TENS increases peripheral microcirculation by sympathetic activity inhibition**.**

Sherry et al. [60] stated that the vasodilator effect of TENS is more likely to occur with burst-mode than with constant-frequency as arterial smooth muscle is highly responsive to irregular, low-frequency stimulation bursts. They also stated that the possible mechanisms for TENS induced vasodilatation are the muscle pump, accumulation of local metabolic vasodilators, and flow-induced vasodilatation triggered by the local release of endothelial reflexing substances.

Li et al. [61] stated that the action mechanisms of electro-acupuncture on blood pressure include declines in plasma renin, aldosterone, and angiotensin II activity in patients with essential hypertension.

Leung et al. [62] found that acupuncture-reduced blood pressure may be due to the inhibition of nitric oxide (NO), enhancing antioxidant capacity, and reducing the level of reactive oxygen species (ROS).

The previous studies showed that the application of TENS on acupoints affects both the physiological and automatic functions of patients with hypertension. So, we can consider the use of TENS on acupoints (PC6, LR3, SP6) in the present study as one of the methods that treat hypertension in addition to the medical treatment aiming to decrease the complications of hypertension.

VI. CONCLUSION

Based on the obtained results of this study, the most notable conclusion is:

The results of this study supported that adding transcutaneous electrical acupoint stimulation (TEAS) to the postmenopausal hypertension treatment produced a statistically significant improvement in blood pressure. So, applying transcutaneous electrical nerve stimulation on acupoints (TEAS) should be considered an adjunctive treatment method for postmenopausal hypertension.

VII. ACKNOWLEDGMENT: Our sincere thanks to all the study participants who have provided us their valuable time and willingness to participate in the study.

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