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RESEARCH ARTICLE

APPLYING STRESS COPING TECHNIQUES ON UNCONTROLLED ESSENTIAL HYPERTENSIVE PATIENTS: A RANDOMIZED CLINICAL CONTROLLED TRIAL.

Amany Mohammed AbdAllah¹, Marwa Mostafa Ahmed², Mohammed Adel Soliman Foda³, Nagwa Eid Saad².

1. Department of Family Medicine, Zagazig University, Zagazig, Egypt.
2. Department of Family Medicine, Cairo University, Cairo, Egypt.
3. Department of Community Medicine and Public Health, Zagazig University, Cairo, Egypt.

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Key words:-

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Abstract

Background: Psychosocial, occupational and economic stress can contribute to development of hypertension and subsequent cardiovascular morbidity and mortality. Reduction of stress in addition to usual medical care can improve clinical outcome in essential hypertensive patients.

Objectives: To assess the effect of stress coping techniques training sessions for uncontrolled essential hypertensive patients on reducing their self-reported perceived stress.

Methodology: A single blinded randomized clinical controlled trial was conducted in Zagazig University internal medicine outpatient clinic on 112 uncontrolled non complicated apparently healthy essential hypertensive patients without comorbidities from 45 to 65 years old randomly allocated into two groups (intervention and control 1:1). Data for this study was collected by social, biological and PSS-10 questionnaires for both groups. The intervention group received health education and training on stress management technique monthly for nine months while patients within control group received classic consultation. The outcome of disease was assessed by measuring change in blood pressure control and perceived stress scores within the two groups.

Results: Essential hypertensive patients within both groups reported statistically non-significant high stress scores at the start of the study. By the end of the study, there was a statistically significant difference between both study groups regarding blood pressure control and perceived stress scores where patients within intervention group reported statistically significant improvement in both variables.

Conclusion: Addition of training on stress coping techniques to classic consultation visits is more beneficial in reducing perceived stress and improving blood pressure control of essential hypertensive patients.

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Corresponding Author:- Amany Mohammed AbdAllah.

Address:- Department of Family Medicine, Zagazig University, Zagazig, Egypt.

Introduction:

Stress has been defined as a process in which environmental demands exceed the adaptive capacity of an organism. This can result in psychological and biological changes that may place persons at risk of disease¹.

Large inconsistency does exist between exposure to stressors and expected outcomes. Stress hormones such as cortisol may help the individual cope with a stressful situation².

On the other hand, protracted triggering of such hormones seems to be injurious. Several behavioral and psychophysiological mechanisms can explain the association between psychosocial stress and hypertension. The former contributes to adverse health behaviors as physical sedentariness, poor diet and smoking, while the latter encompasses neuro-endocrine activation mediated by the hypothalamo-pituitary-adrenal (HPA) system³.

While, acute stressful events have no reliable association with hypertension, chronic stress, particularly the non-adaptive response to stress, have been conveyed as more likely the cause of unremitting elevation of blood pressure⁴.

Essential hypertension (EH) is a psychophysiological disorder and the main problem linked with it is its risk potential. In Egypt, approximately 33.3% women and around 25% of men aged 35-59 years old are hypertensive. More than half of women and more than 40% of men in the 55-59 age group are hypertensive⁵.

Attaining better blood pressure control through lifestyle modification with or without antihypertensive medications declines the overall and cardiovascular mortality rates of older adults by 20 and 33 %, respectively, and the incidences of stroke and coronary heart disease by 40 and 15 %, respectively⁶.

Treatment of hypertension fails when patient-related barriers towards treatment are not recognized. A better assessment and understanding of these barriers will allow optimal tailoring of interventions⁷.

Stress is linked to lesser medication adherence and so it can prejudice disease control and upturn jeopardy of progress of cardiovascular complications⁸.

An individual's coping approach can influence how one cognitively evaluates a situation and finally derives stress from it, coping skills could show a critical role in cushioning the impact of life happenings on adherence conduct⁹.

To some extent, tight adherence to blood pressure medications increases psychosocial and financial stress which also plays a role in disease development so the addition of stress management training to management plan for hypertension appears to be beneficial to cut this vicious circle.

Effective non pharmacological management of hypertension should involve lifestyle modifications and teaching the patients the behavioral and cognitive techniques to control stress. A probable rationale for adding stress coping techniques to classic management plan is that patients showing stress symptoms may be more susceptible to the negative effects of their medications and thus may discontinue taking them which in turn makes them at risk for development of complications.

The aim of this study was to assess the effect of application of tailored health education and training on stress management techniques provided to essential hypertensive patients on their perceived stress and attaining blood pressure control versus traditional consultation.

Methods:-**Study Design and Place:-**

Single blinded randomized controlled clinical trial was carried out in Zagazig University Internal Medicine outpatient clinic.

Study Population:-

According to Confidence Interval 95%, power of the study 80%, ratio of intervention to control groups 1:1 and effect size 28%, the sample size was 112 randomly allocated as 1:1 so 56 were in intervention group and 56 in control group.

Inclusion Criteria:-

Non hospitalized apparently non complicated essential hypertensive patients (diagnosed at least one year ago) without any associated comorbidities ($\geq 140/90$) male and female patients from 45 to 65 years old.

Exclusion Criteria:-

Newly diagnosed patients.

Non cooperative.

Mentally disabled.

Tools for Data Collection:-**The Social Part Includes:-**

Personal data were collected and the updated scale by **El-Gilany et al.** was used to calculate the socioeconomic level. The Socioeconomic level is classified into very low, low, middle and high levels depending on the quartiles of the score calculated¹⁰.

The Biological Part:-

It included asking about special habits, history of other disease, family history of hypertension and past history of drug intake, diseases and surgery. Blood pressure was measured using mercurial sphygmomanometer. Resting pulse, weight and height were measured then BMI was calculated.

Perceived Stress Scale (PSS-10):-

Stress assessment by **perceived stress scale (PSS)** questionnaire which is the most widely used psychological instrument for measuring the perceived stress. The scale includes a number of direct queries about current levels of experienced stress designed for use in community sample¹¹.

The PSS consists of multiple choice questions. Items include choice on a 5-point agreement scale. The points corresponding to each level of the scale are marked with boldfaced brackets: [0], [1], [2], [3], or [4]. Items number 4, 5, 7, and 8 require reverse coding. Total scores range from 0 to 40 with higher scores indicating high perceived stress¹¹.

Scores ranging from 0-13 would be considered low stress, from 14-26 would be considered moderate stress and from 27-40 would be considered high perceived stress¹¹.

The Cronbach's alpha coefficients were 0.74 (Factor 1), 0.77 (Factor 2) and 0.80 for the Arabic version Perceived Stress Scale overall¹².

Intervention:-

Patients within intervention group underwent classic consultation session and nine monthly individualized education and training sessions about stress management techniques with each session taking about 60 minutes. Meanwhile, those within control group underwent only classic consultation visits monthly for 9 months. The participants' BPs were checked at the beginning and by the end of the study.

Classic consultation visits for both groups:-

Patients within both groups received monthly classic consultation visits for 9 months in the form of asking about any symptoms, medication adherence, general examination, blood pressure measurement focusing on importance of compliance to lifestyle intervention and antihypertensive medications.

Education and training on stress coping techniques:-

In the first session, all of the following items were delivered to the participants within intervention group

- What is stress, benefit and risk of stress and how to get utmost benefit from stress to improve performance, physical, mental and emotional signs and symptoms of stress, lifestyle intervention to reduce/prevent stress
- Training on stress coping techniques such as planning in advance, focusing on positive things, communicating stress through writing and emotions, talking stressful events over with someone trusted and engaging in any enjoyable, relaxing activity, such as cooking, deep breathing, a hot bath and stress reducing exercise, such as running, dancing, progressive muscular relaxation, visualization, or imagery alone or combined with other types of physical relaxation such as deep breathing.

- A handout about all previous items was delivered to each participant to act as a reminder and guidance to promote change.

In the next 8 visits, the patients asked to rate their own perceived stress and to do stress coping exercises explained before and re-explain if the patient misunderstand or forget.

Outcome measurement:

Change in Perceived Stress level for patients within both groups by filling in using PSS 10 questionnaire twice on at the start of the study and the other by the end of the study to check the effectiveness of our intervention.

Ethical Consideration:

Informed written consent was obtained from the two groups of patients after explaining the objectives of the work. Confidentiality was guaranteed on handling data base and questionnaires forms according to Helsinki declaration of biomedical ethics. Ethical approval was obtained from the Research Committee of Cairo and Zagazig University.

Data analysis:-

The data were coded, entered and analyzed by SPSS program version 16. Data were statistically described in terms of Mean, \pm Standard Deviation (\pm SD) or Frequencies (Number of cases) and percentages when appropriate. The difference in the mean was assessed using paired t test. For comparing categorical data, Chi square (X^2) test was performed. P value less than 0.05 was considered statistically significant while p value less than 0.01 was considered highly significant.

Results:-

As the result of good matching, there were statistically non-significant differences between the two studied groups regarding marital status, residency, patient education, patient occupation, social class and source of health care.

At the start of our study, both groups were uncontrolled hypertensive patients yet by the end of this study, the largest percentage of patients within intervention group reported statistically significant improvement in systolic and diastolic blood pressure control.

The largest percentage of patients within intervention group reported moderate stress score at the start of the study with statistically non-significant difference ($p>0.05$) (table 1) & (figure 1).

Patients from 45 to less than 55 years old, male gender, those within middle social class, those with lower education levels, clerks, professionals and habitants of urban slums were the most frequent groups reported moderate and high stress but with statistically non-significant differences ($p>0.05$).

By the end of this study, there was highly statistically significant improvement in perceived stress score within intervention group but there was non-significant change among control group ($p<0.01$) (table 1) & (figure 2).

Table 1:- Comparing Perceived Stress Scale scores in intervention group at the start and in the end of the study:

Perceived stress score	Intervention group		Control group		p
	N	%	n	%	
At the start of the study					
Low stress	0	0	3	5.36	0.194
Moderate stress	33	58.93	29	51.79	
High stress	23	41.07	24	42.85	
By the end of the study					
Low stress	41	73.21	22	39.29	<0.001**
Moderate stress	14	25	24	42.85	
High stress	1	1.79	10	17.86	

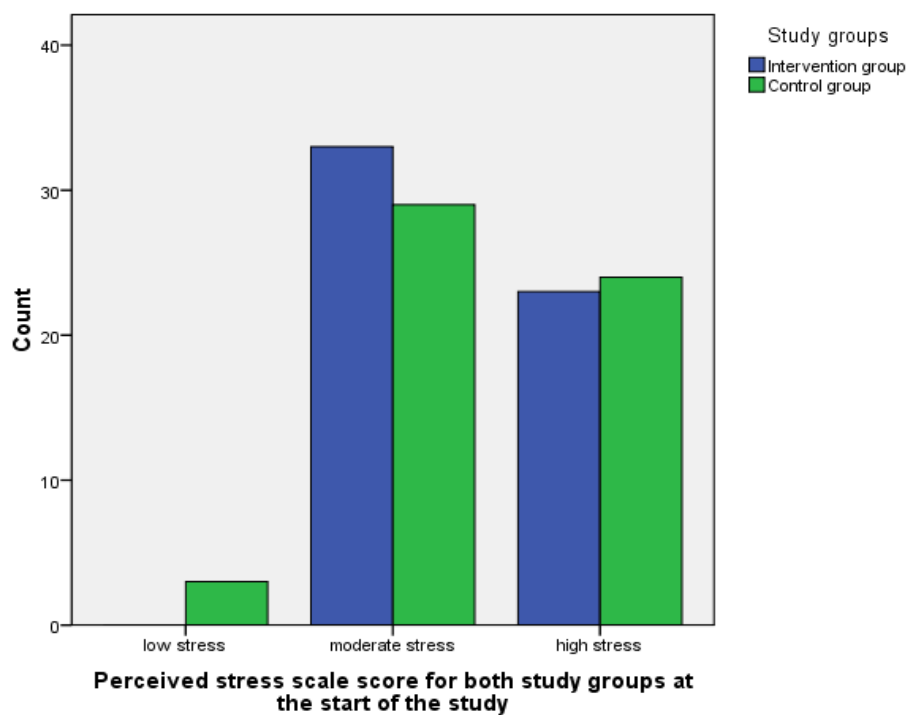


Figure 1:- distribution of patients within both study groups regarding perceived stress scores at the start of the study.

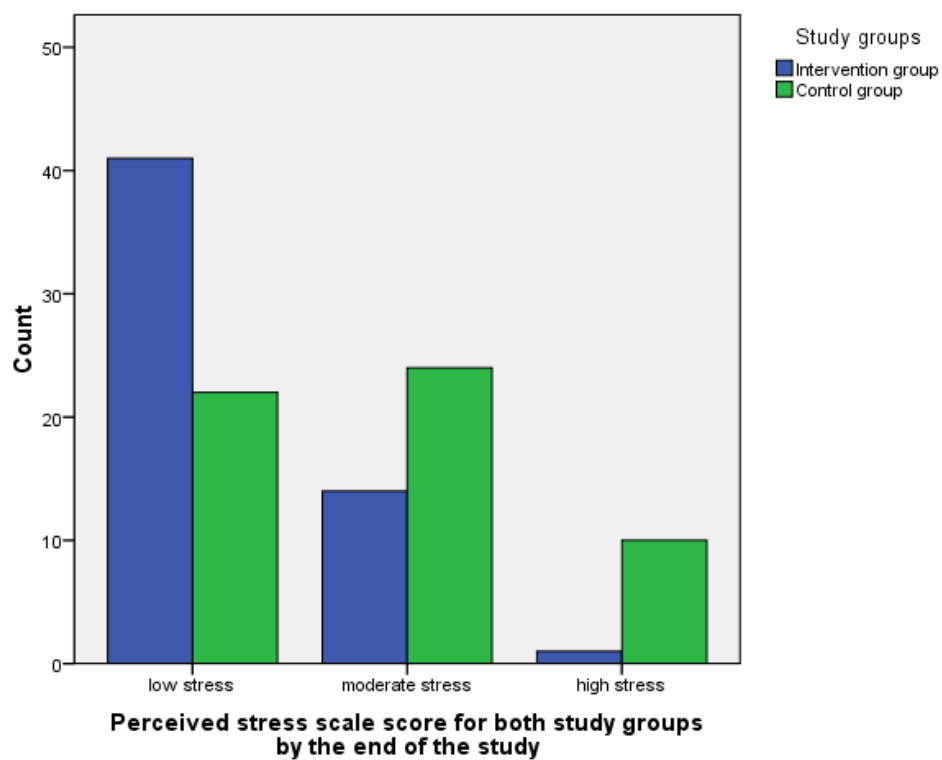


Figure 2:- distribution of patients within both study groups regarding perceived stress scores at the start of the study.

The largest percentage of patients within intervention group whose blood pressure was controlled reported non-significant reduction of perceived stress score (fig 3&4). Most of patients within intervention group reported low stress score yet blood pressure control was almost equal on both sides (controlled and uncontrolled) regardless low stress score, but all those who reported high stress score within both groups were uncontrolled.

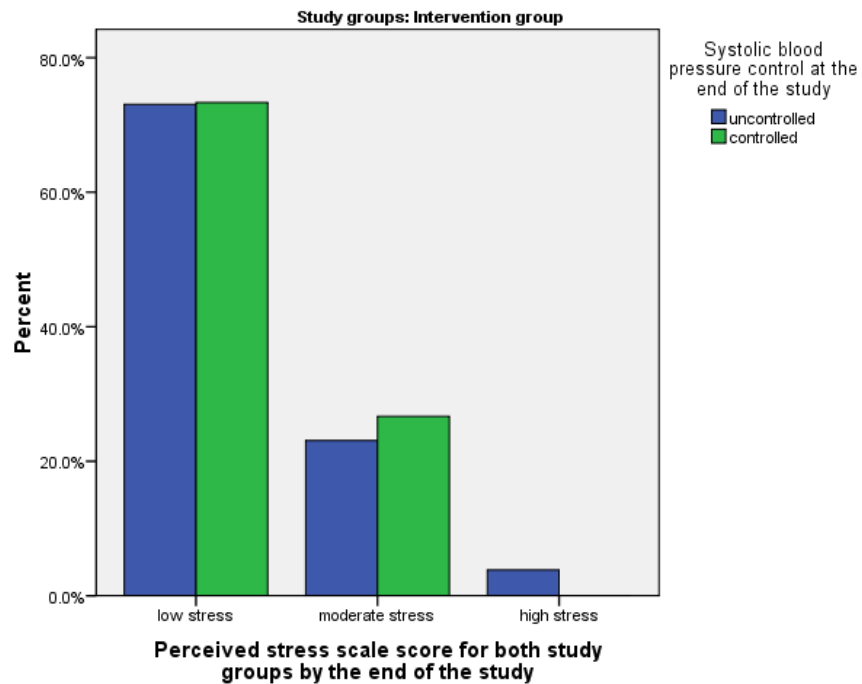


Figure 3:- Distribution of systolic blood pressure control of intervention group patients regarding perceived stress score.

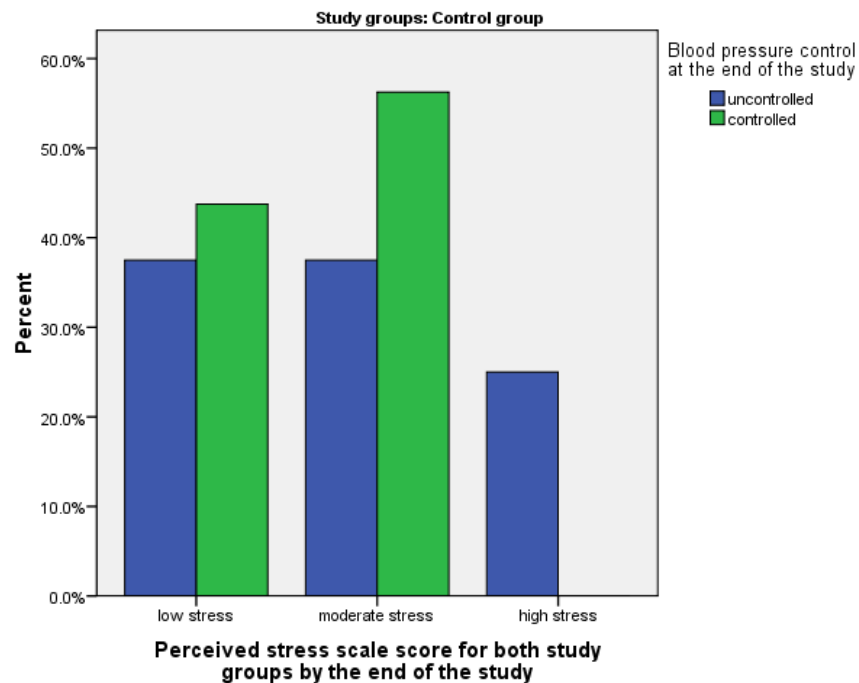


Figure 4:- Distribution of diastolic blood pressure control of intervention group patients regarding perceived stress score.

Discussion:-

By the end of our study, patients within intervention group reported statistically significant improvement in perceived stress scores and blood pressure control compared to patients within control group. This can be attributed to application of our intervention that also increases number of patients whom blood pressure became controlled

Different studies agreed with our finding as they found that the relaxation response may contribute to a reduction in anxiety and other negative, psychological reactions attributable to stress¹³⁻¹⁴.

Various studies reported that deep diaphragm breathing and muscular relaxation, applied in combination and together with other resources, have been shown to be useful strategies for controlling excessive stress¹⁵⁻¹⁶.

In spite of systolic and diastolic blood pressure reduction reported in our study, yet we found that stress management taken alone cannot significantly increase blood pressure control. Blood pressure control should include a multidisciplinary approach as it is a multifactorial disorder.

This finding agreed with study by **Chicayban and Malagris**, as they found that stress management training for hypertensive patients has been identified as a beneficial strategy in controlling stress mainly and it may be helpful as a non-pharmacological strategy in the treatment of hypertension, however, it was not regarded as capable of significantly reducing SBP levels¹⁴.

Fauvel et al.¹⁷ in their study to test the effect of job stress and stress BP reactivity, found that an increase in progression of BP reactivity to hypertension was not associated with neither job strain nor stress in agreement with our study where there was statistically non-significant difference between patient occupation and perceived stress.

On the other hand, other studies¹⁸⁻²⁰ identified a statistically significant association between job stress and hypertension in disharmony with our finding.

Kretchy and colleagues reported that 20% of their hypertensive patients exhibited moderate to severe high scores of stress symptoms which was by far less than percentages reported in our study²¹.

Our study showed that perceived stress scores were statistically non-significant higher in urban slums in agreement with several studies²²⁻²⁵ suggesting increasing trends in the prevalence of hypertension in urban subjects over the last four decades compared to the people in rural areas.

Another study reported that stress and lack of formal exercise were prevalent among hypertensive patients, present in 44.1% and 36.1%, of patients, respectively which remained also less than percentages reported in this study²⁶.

High stress levels in our patients at the start of the study can be explained by that prevalence of hypertension is higher among those who had stress and by that there is significant association between hypertension and stress.²⁷ Hence this emphasizes the importance of stress management programs that will aid in control of blood pressure. However, the National CSI study did not show any clear impact of stress or personality type on blood pressure²⁸.

In agreement with our results, a study done by **Zadeh and Nejad**²⁹ to investigate role of stress reduction on measurement of blood pressure, results showed significant decrease in blood pressure of experimental groups who underwent either psychotherapy, relaxation training program or both compared to the control group.

In consistency with our study, **García-Vera et al.**³⁰ conveyed that after application of stress management training for essential hypertension, mean reductions of clinic BP were significantly higher in control group and percentages of subjects who in addition achieved a normotensive level were significantly higher in the treated group than in the control group

A stress management program has a beneficial effect in the prevention and control of high BP and may contribute to decreased mortality from cardiovascular diseases in older hypertension population³¹.

Jacobs et al³² reviewed 75 controlled clinical trials of relaxation therapies for hypertension and noted that treatments starting with high initial BP also produced greater reductions.

Conclusion:-

Educating essential hypertensive patients and training them on how to cope with stressor leads to decreasing self-reported perceived stress and hence, improving blood pressure control.

Study limitation:-

Generalization of the results of this study is difficult because it was done in one center only and the sample size was relatively small and the subjective way of data collection and of delivery of the Biopsychosocial model. Also, the PSS-10 questionnaire records only perceived stress in the last four weeks

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