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Lifestyle Modification and Its Effect on The Control of Hypertension

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ABSTRACT

Background: An estimated 1.13 billion people worldwide (26%) have hypertension, most of them live in low-and middle-income countries. Hypertension has been considered as a major risk factor of cardiovascular diseases. **Objective:** Promoting health of hypertensive patients through improving their lifestyle. **Patients and methods:** An interventional study conducted on 300 grade I hypertensive patients who were recruited from outpatient clinics of two hospitals in Alexandria and Kafr El-Shiekh Governorates. All hospitals of each governorates(Alexandria or kafr elshiekh) were listed in tables. One hospital was chosen randomly from each governorate using random numder tables. Patients were investigated to measure the effect of lifestyle modification on control of their hypertension. Health education was prepared and blood pressure was measured before health education and followed after modifying their life style. Systemic sampling technique was used to identify subjects. Two days of high patients flow on outpatient clinics was detected. A list of the patients' names attending on those days was prepared. The participants were interviewed by the investigator to assess their health through measuring blood pressure, height, weight and BMI was calculated. **Results:** The mean total score of overall of fantastic lifestyle pretreatment of study group was 29.56±3.89, while post treatment was 35.39+3.92, with significant increased total score of overall of fantastic life style in study group post treatment compared with that pretreatment (P <0.001). **Conclusion:** Following healthy lifestyle, as being active on more than four days per week, weight loss, diet rich in fruits and vegetables, low sodium diet (BMI was a significant predictor), avoiding smoking, have been established as effective therapies to prevent and control hypertension stage1.

Keywords: HTN, SBP, DB, Lifestyle modification, Quality of life.

INTRODUCTION

Hypertension (HTN) is one of the commonest non communicable diseases that has been more prevalent nowadays than before [(1)]. Chronically elevated blood pressure (BP) in the systemic arteries is diagnostic of systemic arterial hypertension. The standard method of expressing blood pressure is as a ratio between the systolic and diastolic readings [(2)]. Hypertension affects 46% of adults in Africa, but only 35% of adults in the Americas have the condition. High-income nations have a lower prevalence of hypertension (35% vs. 40%) than low-income ones. In Egypt, 26.3% of the adult population has hypertension, making it a major public health concern. The leading preventable cause of death in the United States from cardiovascular disease was high blood pressure [(3)]. Hypertension was the cause of an increased number of events among women (32%) than among men (19%). The prevalence rises with age; half of Egyptians over 60 had hypertension. If your blood pressure is less than 120 over 80 millimetres of mercury, it was considered normal. When a person's blood pressure is between 120/80 mmHg and 138/89 mmHg, they were considered to be at risk for developing hypertension; when it rises beyond 140/90 mmHg, they are diagnosed with hypertension [(4)].

Primary (essential) hypertension and secondary hypertension are the two types of the condition. Primary hypertension accounts for more than 90% of all occurrences of hypertension; it has no clear identified etiology but was associated with known risk factors. Secondary hypertension accounted for the remaining 10% of instances and is caused by preexisting conditions such renal disease, cardiovascular disease (CVD), and coronary heart disease [(5)]. Some variables had been linked to primary hypertension, although the specific etiology was still unclear, there were several risk factors that had been associated with the condition. These elements may be broken down into two classes: those that can be changed and those that cannot [(6)]. Factors like age, sex, ethnicity, family history, and genetic make-up cannot be changed, but there were other, more manageable risks. In contrast, modifiable risk factors of hypertension are those that can be altered to avert the onset of the condition. Obesity, high-sodium diets, lack of physical activity, high-fat diets, cigarette use, and alcohol drinking were all preventable causes of disease [(7)]. Coronary heart disease (CHD), myocardial infarction (MI), stroke (CVA), hypertensive encephalopathy, acute versus chronic renal failure and death (typically from coronary heart disease, vascular disease, or stroke-related causes) had all been linked to uncontrolled hypertension [(8)]. Patient quality of life suffers when hypertension was present. Previous research has linked hypertension patients' comorbidities, diagnostic knowledge, and drug side effects to a substantial decline in health-related quality of life (HRQOL). The prevalence of hypertension and the general public's lack of knowledge about it inevitably had an effect on patients' quality of life [(9)].

A person's lifestyle is the result of their unique combination of personality traits, social interactions, and material and ecological constraints[(10)]. Changing one's way of life is the foundation of fighting and avoiding chronic disorders like hypertension [(11)].

Treatment of high blood pressure should include attention to how you live. If you're able to keep your blood pressure under control by healthy living choices, you may be able to put off or perhaps minimize the need for medication. Here are some ways to improve your lifestyle and reduce your blood pressure [(12)].

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A common side effect of being overweight is a rise in blood pressure. When you're overweight, your breathing is more likely to be interrupted during the night, leading to sleep apnea and a subsequent increase in blood pressure. One of the most helpful ways to manage blood pressure is to lose weight. Losing 1 kilogramme (approximately 2.2 pounds) of weight has been shown to lower blood pressure by roughly 1 millimetre of mercury (mm Hg) [13].

The work's focus is on assisting hypertension individuals in making positive changes to their daily routines in order to better their overall health. Our goals are to identify hypertension risk factors among patients at El Kabari General Hospital and Dessouk General Hospital, to evaluate the connection between lifestyle changes and better hypertension management in hypertensive patients, and to suggest a health education program to help those involved in the study achieve these goals. As for example weight loss, decrease salt intake, exercise regularly had been reported to help to normalize blood pressure in hypertensive patients[14]. From the above mentioned we conducted the research to uncover the effect of modifying life style on hypertensive patients.

The aim of the present study was to promoting health of hypertensive patients through improving their life style.

SUBJECTS AND METHODS

300 patients from two hospitals in the governorates of Alexandria and Kafr El-Shiekh were surveyed. Using a simple random sampling method, we selected two hospitals in the governorates of Alexandria and Kafr El-Shiekh. Subjects were selected using a systematic sampling strategy. Overwhelming patient traffic at outpatient clinics was seen on two separate days. The names of all the patients who had been there on those specific days were compiled into a master list. Every Nth person on a list was randomly picked to be a subject. The data collection process had begun after the protocol had been approved and continued until the necessary sample size had been reached.

A structured self-administrated questionnaire in Arabic language was used, which included three components; first part, sociodemographic data; age, sex, education, occupation and income; second part, assessment of hypertension that include question on diagnosis, management, complications, medications, adherence, knowledge and selfcare; and third part, assessment of life style questionnaire that include questions on family, friends, activity, nutrition, toxin, tobacco, type of personality, alcohol, sleep, seat belt, stress, insight and career. Scoring of questionnaire ranged from 0 to 50 as follow; in control (42 to 50), on the right track (35 to 41), fair (30 to–34), somewhat low (20 to 29), and in the danger zone (0 to 19).

Health educational program was conducted that included messages on weight loss, reduced sodium intake, increased physical activity and cessation of tobacco consumption and modifying their life styles. After duration of six months since start of data collection, the questionnaire was re administrated to assess health education program. Blood pressure, body weight and body height were measured before and after health education program. Blood pressure measurements were obtained, using a random-zero sphygmomanometer. After the participant sat quietly for 5 min, the observer measured BP in the right arm with an appropriately sized cuff. At each visit, two BP measurements separated by at least 30 s were obtained. SBP was the appearance of the first Korotkoff sound, and DBP was the disappearance of Korotkoff sounds. At each assessment point, BP was the mean of all available measurements (eight BPs across four visits prior to randomization and six BPs across three visits at the 6-month follow-up).

Body weight was measured using a calibrated scale, and height was measured using a wall-mounted stadiometer.

An Arabic language, structured, self-administered questionnaire was employed. These patients participated in a health education programme. The questionnaire, logistics, and whether or not any further data are required were all put to the test in a pilot study.

Ethical consent:

An approval of the study was obtained from Benha University Academic and Ethical Committee. Every patient signed an informed written consent for acceptance of participation in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical Methods

With the help of Statistical Package for the Social Sciences (SPSS, version 25.0, Armonk, NY: IBM Corp., USA), the obtained data were cleaned, coded, tabulated, and imported onto a personal computer. Quantitative data were presented as mean, standard deviation (SD), and range. Qualitative data were presented as frequency and percentage. The statistical significance of the difference in means between the study groups was determined using the Student T test. The degree of relationship between two numerical variables was evaluated using correlation analysis. To forecast risk variables, we employed generalized linear models, which are a kind of linear regression analysis. Two-tailed p values were used to determine statistical significance, and a value of p 0.05 was used throughout.

RESULTS

Sociodemographic data of all studied subjects are shown in **table (1).** The mean± SD age of the studied group was 58.80 ± 10.04. Greater percentage of the participants was females (72.0%), housewives (33%), university educated (49.0%) and more than half of the studied group (51.7%) received more than 5000 LE per month. The majority of the participants were not working (62.7 %).

Table (1): Sociodemographic data of all studied participants

		Participants (N=300) Number (%)
Age	**25 – 39**	9(3%)
	40 – 54	82(27.3%)
	55 – 69	170(56.7%)
	≥ 70	39(13%)
	Range	28 – 83
	Mean ± SD.	58.80 ± 10.04
Sex	**Male**	84(28%)
	Female	216(72%)
Occupation	**house wife**	100(0.333%)
	Retired	88(0.293%)
	Worker/ Technician	82(0.273%)
	Clerk	30(0.1%)
Education	**Illiterate**	26(8.7%)
	Pre university	127(42.3%)
	University	147(49%)
Income	**<2000**	9(3%)
	2000-5000	136(45.3%)
	>5000	155(51.7%)
Onset	**1st time**	25(8.3%)
	<5 years	120(40%)
	>5 years	155(51.7%)
Drug adherence	**No**	68(22.7%)
	Yes	232(77.3%)
Number of drugs	**One**	219(73%)
	Two	80(26.7%)
	Three	1(0.3%)

There was a significant decrease in both systolic and diastolic blood pressure in study group post treatment compared with that pretreatment. **(Table 2).**

Table (2): Comparison of the studied cases according to blood pressure before and after the health education program

		Before	After	p
SBP (mmHg)	**Mean ± SD (range)**	141.70±7.95 (125-160)	136.80±9.10 (85-160)	**<0.001**
DBP (mmHg)	**Mean ± SD (range)**	91.60±6.65	87.23±7.37	**<0.001**

Regression analysis was conducted for prediction of increased SBP as well as DBP using age, gender, onset, BMI, drug adherence, number of drugs, life style as covariates. Higher BMI, lower fantastic life style score and less drug adherence were considered significant predictors of high SBP, while higher DBP was independently predicted by higher BMI, lower fantastic life style score and less drug adherence **(Table 3).**

Table (3): Prediction of higher SBP and DBP among all studied participants

	Prediction of higher SBP		Prediction of higher DBP	
	Univariable B (p)	**Multivariable B (p)**	**Univariable B (p)**	**Multivariable B (p)**
Age	0.061(0.57)		0.315(0.003)	0.094(0.227)
Sex	0.322(0.885)		0.54(0.808)	
Onset	1.997(0.283)		2.98(0.11)	
Baseline BMI	3.14(<0.001)	0.061(0.57)	4.043(<0.001)	3.786(<0.001)
Drug adherence	-3.497(0.006)	0.322(0.885)	-2.269(0.035)	-1.082(0.241)
Number of drugs	4.298(0.168)		2.762(0.242)	
Fantastic life style score	-3.026(<0.001)	3.14(<0.001)	-2.086(<0.001)	-1.879(<0.001)

B, regression coefficient.

There was significant increased total score of overall of fantastic life style in study group post treatment compared with that pretreatment **(Figure 1).** There were significant positive correlations between each of SBP and DBP with BMI, and significant negative correlations between fantastic life style score with each of SBP and DBP **(Figure 2).**

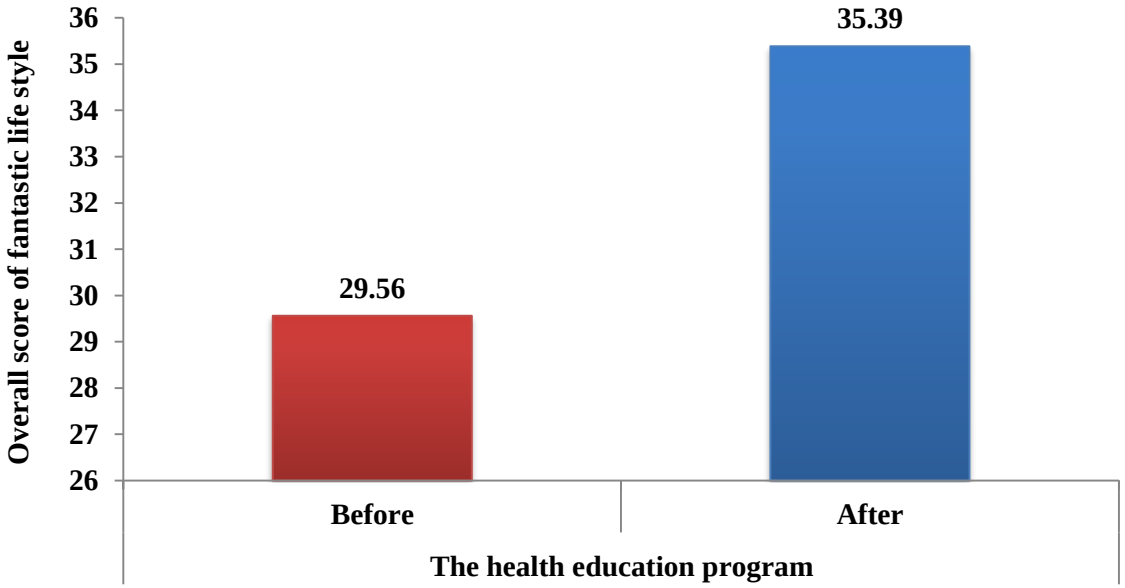

Figure (1): The overall score of fantastic life style before and after the health education program

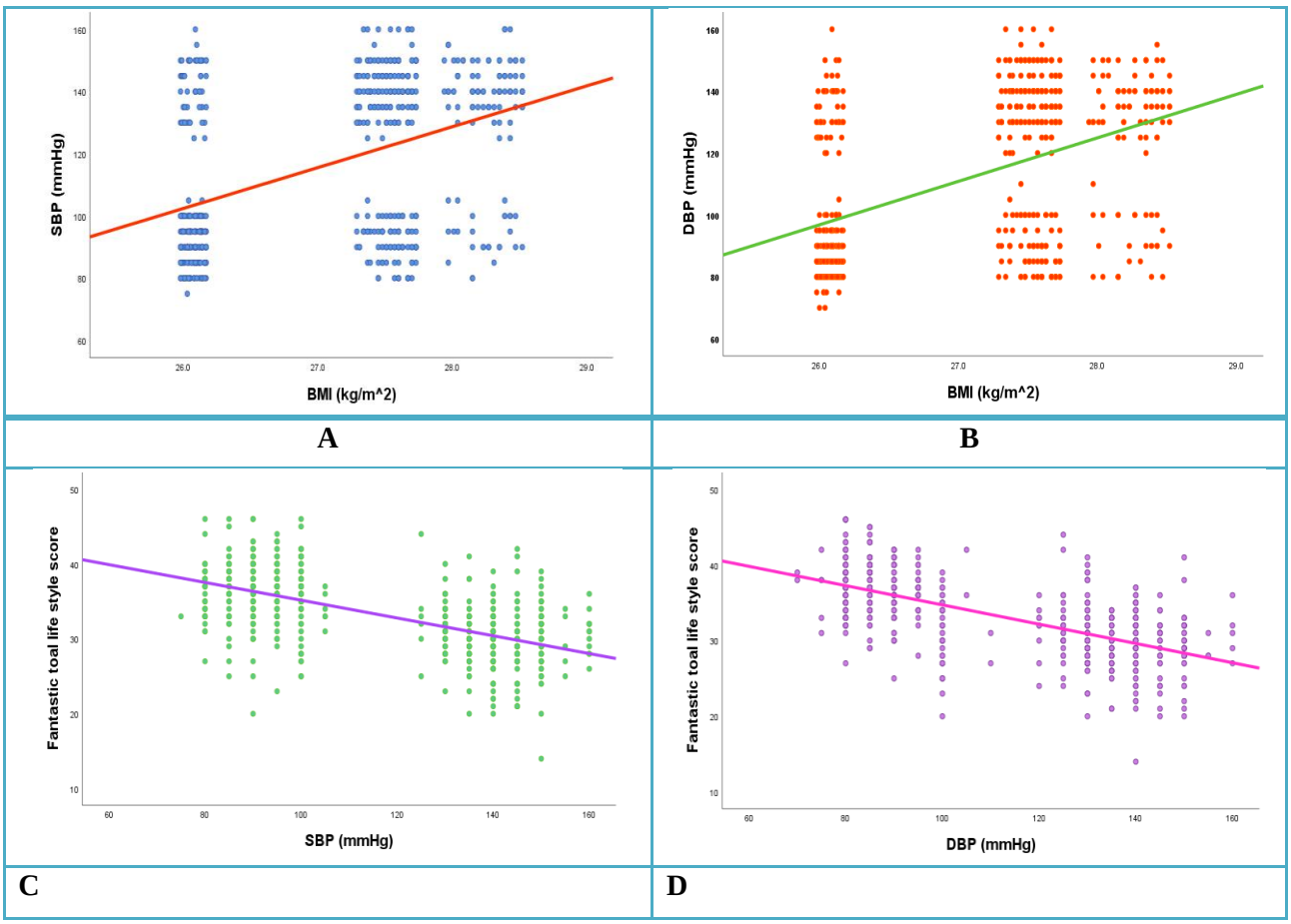

Figure (2): Correlations of (A) SBP with BMI, (B) DBP with BMI, (C) fantastic life style score with SBP; (D) fantastic life style score with DBP

DISCUSSION

High blood pressure is one of the major risk factors for developing cardiovascular disease, cerebral infarction, heart failure, and kidney failure [15]. Although medication is still an important part of hypertension disease treatment, lifestyle changes, also known as non-pharmacologic therapy, are often suggested as a first line of defence [16]. Systolic and diastolic blood pressure were both shown to be significantly lower in the treatment group compared to the pretreatment group. This corroborated the findings of **Ahmed *et al.*** [7]**,** who saw a significant drop in the mean values of SBP and DBP in both groups after therapy.

The number of relatives and friends within the study group grew significantly after therapy, compared to before. Nonetheless, **Pirkle *et al.*** [17] showed that having many friends was inversely related with hypertension that was neither treated nor diagnosed.

This study revealed that the nutrition scores of the study group improved significantly after therapy compared to their pre-treatment values. High-quality diets, such the Mediterranean diet and those with a higher HEI score, are associated with reduced blood pressure (BP) in both normotensive persons and hypertensive patients who are already taking antihypertensive medication. Both men and women who managed their diets had higher KHEI ratings compared to those who did not [18], indicating that they were more adherent to the hypertension diet plan. Consequently, good food management practices and eating a healthy diet on one's own would help with blood pressure management [19]. Moreover the study group's tobacco score was much higher after therapy than before it. These results are consistent with a descriptive, analytical study by **Esteche *et al.*** [20]**,** which found that smoking cessation could be important for the control of arterial hypertension, including a significant reduction in the proportion of smokers, drug abusers, and coffee, tea, and cola consumers post-treatment compared to that pretreatment. Study participants' Alcohol scores did not change significantly before and after treatment. Which supported another study[21].

Furthermore, the sleep scores of the study group members improved significantly after therapy compared to their scores before treatment which in accordance with **Lo *et al.*** [22] who revealed that, poor sleep quality was significantly associated with a greater likelihood of hypertension. **Grace and his colleagues**[23] reported that the 10-week intervention programme substantially reduced BMI, systolic blood pressure, and low-density lipoprotein cholesterol, in addition to significant weight and BMI reductions following the health education programme. After receiving therapy, participants in the current research reported much higher levels of satisfaction with their lives than they had before. Changing one's way of life may help lower blood pressure without the need of drugs [24].

This study revealed that SBP was positively correlated with BMI, whereas DBP was positively correlated with both age and BMI while male and female systolic and diastolic blood pressure were shown to increase with age, a finding supported by a statistically significant association that **Dua *et al.*** [25] the possible explanation was different nature of patients. Both systolic and diastolic blood pressure were positively correlated with pulse rate, fat percentage, and body mass index.

Moreover, the present study reported that significant negative correlation with age, onset, and BMI. Fantastic lifestyle score showed significant negative correlation with SBP and DBP, that was in accordance with **Niu *et al.***[26] who showed that, the high-risk genetic risk score (GRS) was found to be associated with elevated blood pressure and hypertension and the healthful lifestyle correlated with diastolic blood pressure (DBP) level. A higher lifestyle score (i.e., healthier lifestyles) was associated with a lower risk of hypertension and lower blood pressure levels, suggesting that lifestyle can influence the risk of hypertension and blood pressure.

An SBP prediction regression analysis was performed. Predictors of high SBP included a greater body mass index, a less-than-fantastic lifestyle score, and a lower rate of medication adherence. Height > 178 cm, weight > 91 kg, and a level of office DBP > 80 mmHg were determined by **Radchenko and colleagues**[27] to be independent predictors of elevated SBP. The likelihood of having a high SBP was increased by more than a factor of 10 when two or more of these were present. Specificity was 88.2% while sensitivity was 92.6%.

Our study's limited by the fact that there was difficulty to follow participants post treatment so drop outs were neglected. BP measuring practices vary widely from institution to hospital. This suggests that the techniques of assessment can introduce some bias into the established causality between lifestyle events.

CONCLUSION

Modifying one's way of life is the bedrock of care for chronic conditions like hypertension. Stage 1 hypertension may be prevented and controlled by adopting a healthy lifestyle, which includes regular physical activity (at least four times per week), weight reduction, a diet high in fruits and vegetables, a low-sodium diet, and a ban on smoking. High systolic and diastolic blood pressure are predicted by a less-than-fantastic lifestyle score.

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Author contribution: Authors contributed equally in the study.

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