IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e- ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 7, Issue 3 Ver. VIII (May-June .2018), PP 60-69
www.iosrjournals.org

Effect of Educational Program for Health Promoting Lifestyle among Patients with Hypertension

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Background: *Hypertension is a common health problem among adults, affecting approximately I billion individuals worldwide. Adopting healthy lifestyle behaviors is a vital issue in managing hypertension, since declines in the levels of awareness of hypertension even lower levels of control.* ***Aim of the study:*** *to evaluate the effectiveness of educational program for health promoting lifestyle among patients with hypertension.* ***Aquasi-experimental design*** *was used to conduct the current study in medical, cardiac and neurological outpatient clinics, at Benha University Hospital during the period from beginning of September 2016 till beginning of September 2017.* ***Subjects:*** *A sample of convenience of 104 patients recruited according to the study formula based on the total number of patients who admitted to the study settings during 2015.* ***Tools:*** *Three tools were utilized for data collection, 1) Structured interviewing sheet, 2) Hypertension Knowledge Level Scale (HK-LS) and 3) Health Promoting Lifestyle Profile II.* ***Results:*** *Showed that mean score regarding hypertension knowledge and health promoting lifestyle behavior were significantly higher after than before program with a negative and highly significant association between knowledge and health promoting lifestyle behavior as well as level of systolic blood pressure.* ***Conclusion:*** *Hypertension educational program was effective in promoting knowledge, behavior regarding healthy lifestyle and controlling hypertension among patients with hypertension.* ***Recommendation:*** *Increasing awareness about hypertension and importance of adopting healthy lifestyle in order to control the disease through health education programs to hypertensive patients were needed.*

Keywords: *Educational program, health promoting lifestyle, hypertension*

Date of Submission: 05-06-2018 Date of acceptance: 20-06-2018

I. Introduction

Hypertension is a global public health problem and known as a silent killer, considered as a one of major causes of premature death worldwide. It affects approximately 125 million individuals in the Eastern Mediterranean Region, with a several million new cases of hypertensi on and more of pre-hypertension. It is known as a condition in which the blood vessels have persistently raised pressure, increasing the pumping function of the heart and leading to hardening of the vessels and is defined as a systolic blood pressure equal to or above 140 mmHg and/or diastolic blood pressure equal to or above 90 mmHg ***(Lawes et al., 2008; National Heart, Lung and Blood Institute, 2016).***

Hypertension may have unknown cause (essential or idiopathic hypertension) or be associated with other primary diseases (secondary hypertension). It doesn't usually cause any obvious symptoms, if blood pressure is extremely high, there may be certain symptoms to look out for including: Severe headache, Fatigue or confusion, Vision problems, chest pain, difficulty breathing, irregular heartbeat, as well as pounding in chest, neck, or ears ***(Nordqvist, 2017).***

Although hypertension is a preventable and treatable disease but without treatment it leads to life threatening complications such as heart, kidney and brain disorders which in most cases result in client's disability. Current treatment guidelines for hypertension include antihypertensive medications and health-promoting lifestyle modifications ***(World Health Organization, 2013; Bunker, 2014).***

Lifestyle has always been a focus of health education and promotion. The World Health Organization considers lifestyle as the specific patterns of behavior events that result from the interactions between personal characteristics, social relations, environmental conditions, and socioeconomic circumstances ***(Kaufman et al., 2012).*** Good evidence to suggest that adopting healthy behaviors can add to the protective benefit of medication which is achieved by increasing the knowledge and awareness of the public and changing their attitude and practice ***(Hamer, 2010).***

Since, health promoting lifestyle (HPL) focuses on life promotion through lifestyle which consists of six aspects of "physical activity", "nutrition", "health responsibility", "spiritual growth", "interpersonal relations" and "stress management". This lifestyle promotes health and welfare and induces satisfaction, self-persuasion and self-improvement. Ideally, antihypertensive medications and lifestyle modifications successfully reduce BP to optimal levels ***(Tol et al., 2013).***

Meanwhile, nurses, as the greatest health profession group that have the closest communication with patients in health environments, compared to other members of the health care team, have a more comprehensive understanding of these patients' educational needs and they are more able to follow them up, manage their blood pressure and modify their lifestyle ***(Jafari et al., 2016).***

II. Significance of the Study

Hypertension is a chief public health care in both developing and developed countries. It affects approximately I billion individuals worldwide. Hypertension is an urgent health problem in Egypt with prevalence rate of 26.3% among the adult population, its incidence increases with aging, around 50% of Egyptians over the age of 60 years have hypertension, besides, it was concluded that there are declines in the levels of awareness of hypertension and even lower levels of control ***(Hasan et al., 2014).***

As well as (***Ribeiro et al., 2015)*** approved in their study that, educational interventions can positively modify patients' beliefs, which in turn can lead to a change in patient behavior, such as improvement in adherence to a therapy proposed by the healthcare professional and a possible effect on variables related to the disease, such as blood pressure levels. This may also affect, in the long term, progression of the disease and the prevalence of associated conditions related to hypertension, such as heart attacks and stroke. So, the present study intended to evaluate the effectiveness of educational program for health promoting lifestyle among patients with hypertension.

AIM OF THE STUDY

The aim of the present study was to evaluate the effectiveness of educational program for health promoting lifestyle among patients with hypertension. Through,

- Assessing hypertension knowledge among patients with hypertension
- Assessing health promoting lifestyle behavior among patients with hypertension
- Evaluating the effectiveness of educational program on knowledge, health promoting lifestyle behavior and its association with blood pressure control

III. Research Hypotheses

To fulfill the aim of this study the following research hypotheses were formulated:

H_1 – Mean score of knowledge among patients with hypertension post program will be significantly higher than the mean score before program.

H_2 – Mean score of health promoting lifestyle behavior among patients with hypertension post program will be significantly higher than the mean score before program.

H_3 – There will be significant association between knowledge and health promoting lifestyle behavior as well as level of blood pressure among patients with hypertension

IV. Subjects and Methods

5.1 – ***Research design*****:** Quasi-experimental design was utilized to conduct the current study.

5.2- ***Setting:***

This study was conducted in medical, cardiac, and neurological outpatient clinics at Benha University Hospital.

5.3- ***Subjects*****:**

A- ***Type*****:** Convenient sample

B-*Size*: The sample size was calculated based on the previous year census report of admission in medical, cardiac and neurological outpatient clinic from ***Benha University Hospital Census, 2015.*** The total number of subjects comprised 104 hypertensive patients attending the study settings (medical outpatient clinic were 75 patients & cardiac outpatient clinic were 24 patients, whereas, there were 5 patients were enrolled from neurological outpatient clinic), utilizing the following formula ***(Yamane, 1967)***

$$n = \frac{N}{1+N\,(e)^2}$$

Where:

n= sample size

N= total population (140)

e= margin error (0.05)

The patients had been selected according to the following criteria: Age 20 years or older, both sexes (male and female), diagnosed with hypertension for at least six months, able to communicate, accept to participate in the study, while excluded patients who are diagnosed as serious cardiac problems such as myocardial infarction.

5.4- Tools of Data Collection

***Three tools were utilized for data collection*.**

Tool (I): Structured interviewing questionnaire sheet: it was developed by the researchers, and was divided into three parts:

Part 1: Concerned with socio-demographic characteristics of the study subjects including; age, gender, marital status, residence, education level, occupation, income.

***Part 2*:** Health related data such as; Co morbidity, time since diagnosis, smoking and drinking habits, etc.

Part 3: Physiological measurements which include: Measurement of blood pressure by sphygmomanometer, lipid profile {total cholesterol with normal value (< 200 mg/ dl), low density lipoprotein(60-130 mg/dl), high density lipoprotein (60 mg/dl) and triglyceride level (< 150 mg/ dl)}, and BMI, which was measured through measurement of weight; using bath scale, which was calibrated "0". Measurement of height; was determined by using a measuring tape. Then, Body mass index was calculated for each woman using the following formula: BMI = weight (in kilograms / height (in meters) ^{2}, which classified into normal weight 18.50 - 24.99 kg/m2, over weight ≥25.00 kg/m2,pre obese 25.00 - 29.99 kg/m2, obese ≥30.00 kg/m2 {***World Health Organization (WHO), 2013}.***

Tool (II): Hypertension Knowledge Level Scale (HK-LS) it was adopted from (***Erkoc et al., 2012),*** The maximum score was 22 for the entire scale, 2 for "definition", 4 for "medical treatment", 4 for "drug compliance", 5 for "lifestyle", 2 for "diet", and 5 for "complications" sub-dimensions. The minimum score was zero for the entire scale and for all sub-dimensions. The expression was incorrect for 9 items. Each correct answer was worth 1 point. Incorrect statements were encoded inversely to the other items.

Tool (III): Health Promoting Lifestyle Profile II (HPLPII): A self-administered questionnaire assesses the individual's health-promoting attitudes and behaviors related to healthy lifestyle. It was developed by ***(Walker et al, 1995)***, and translated into Arabic and tested for its validity and reliability by ***Abd El-Hameed (2011).*** The respondents' healthy lifestyles was measured through six subscales that measure the dimensions of a health promoting lifestyle with number of items involved within each subscale including; Health responsibility (3, 9, 15, 21, 27, 33, 39, 45, 51), nutritional habits (2, 8, 14, 20, 26, 32, 38, 44, 50), physical activity (4, 10, 16, 22, 28, 34, 40, 46), spiritual growth (6, 12, 18, 24, 30, 36, 42, 48, 52), interpersonal relations(1, 7, 13, 19, 25, 31, 37, 43, 49) , and stress management(5, 11, 17, 23, 29, 35, 41, 47). The total number of items is 52. The HPLP II is a summated behavior-rating scale. It uses a 4-point ordinal response format to measure frequency of self-reported health promotion behavior. Each item had four possible responses: 1 (never), 2 (sometimes), 3 (often), and 4 (routinely). A score for overall health promoting lifestyle behaviors was obtained by calculating a mean of the individual's responses to all 52 items: Six subscale scores were obtained similarly by calculating a mean of the responses to each subscale items, the higher the mean score obtain, higher is the index of health-promoting lifestyle ***(Walker et al., 1995).***

Tool validity

The content validity was done through five panels of expertis in medical and nursing for face and content validity, and their opinions were requested via an assessment form. The experts were asked to grade each item as "essential," "useful but inadequate" or "unnecessary". Modification was carried out according to the panel's judgment on the clarity of sentences and appropriateness of content. The percentage of consensus among experts regarding structured interviewing questionnaire was 98%, Hypertension Knowledge Level Scale (HK-LS) was 98% and Health Promoting Lifestyle Profile II (HPLPII) was 99%.

Pilot study

It was conducted on 10% of the total sample (11 patients), and they were excluded from the study sample. In order to test the feasibility and reliability of tools. It revealed that, internal consistency for structures interviewing questionnaire was (r= 0.90, 0.91, and 0.95, respectively). Regarding cronbach alpha values for Hypertension Knowledge Level Scale (HK-LS), were as follows: 0.82 for the entire scale, 0.92 for the definition, 0.59 for medical treatment, 0.67 for drug compliance, 0.77 for lifestyle, 0.72 for diet, and 0.76 for complications sub-dimension in the initial test ***(Erkoc et al., 2012)***. In addition Health Promoting Lifestyle Profile II related cronbach alpha was 0.92 for the total scale and ranged from 0.65 to 0.83 for the subscales ***(Nassar and Shaheen, 2014).***

5.5 Ethical considerations:

This study was conducted under the approval of the Faculty of Nursing Ethics Committee, Benha University. An explanation about the purpose of the study was given to participants, and they were also informed that they could withdraw from the study at any time before the completion of the study. After agreement for Participation in the study, participants were asked to sign a consent form. Moreover, they were reassured that all information gathered would be confidential and used only for the purpose of the study.

5.6 Field of work

Data were collected in the following sequence

An official permission to carry out the study was obtained from pertinent authorities after explanation of its purpose. Then, structured interview was conducted individually for patients eligible for the study (fulfilled the inclusion and exclusion criteria) in order to explain the purpose of the study, assure confidentiality and to obtain informed written consent.

- Data collection extended over a period of one year from beginning of September 2016 to beginning of September 2017, and data was collected for three days weekly from 9am to 1 pm.

***Procedures*:**

The health promoting lifestyle program comprised the following phases:

A- Assessment Phase:

Each patient with hypertension was interviewed individually before applying the planned program to collect the baseline patient's data using all study tools. This interview took about 25 to 30 minutes.

B- Implementation phase

The developed lifestyle program was implemented for the studied patients individually in the outpatient clinics. It was conducted in 3 sessions, which was implemented during their follow up period, where they were scheduled to be followed each two weeks. The first session was carried out during assessment phase, involved (overview about hypertension) and the second session involved (preventive measures, and pharmacological & non pharmacological treatment) while the third involved (detailed measures for healthy lifestyle modifications). Each session took about 30 to 35 minutes. The instructional booklet was given to each patient under the study to help for reviewing and support teaching at home.

The lifestyle modification program was developed by the researcher based on review of current literature. A booklet containing the content of the program, it was written in a simple Arabic language and supplemented by photos and illustrations to help the patient understanding of the content involved: definition of hypertension, risk factors of incidence of hypertension, signs and symptoms of hypertension, Preventive measures for hypertension, Pharmacological and non pharmacological treatment and components of healthy life style (dietary control, physical exercise, stress management, risk behavior avoidance, and self monitoring)

c- Evaluation phase

Immediately after implementation of the lifestyle program, each patient in the study was interviewed to evaluate knowledge using tool (II) (Hypertension knowledge, structured interview schedule).

After three months from implementation of the intervention, evaluation of patients was done in the outpatients clinics using the study tool (I) (part 3) physiological measurements (blood pressure measurement) tool (II) (Hypertension knowledge, structured interview schedule), and Tool (III) (Health Promoting Lifestyle Profile II).

After six months, study subjects were reevaluated by the researcher using the study, tool (I) (part 3) physiological measurements (blood pressure measurement, lipid profile & body mass index) and Tool (III) (Health Promoting Lifestyle Profile II).

V. Data Analysis

The collected data were tabulated and statistically analyzed using an IBM computer and the statistical package for social science (SPSS) advanced statistics, version 20 (SPSS Inc., Chicago, IL). Numerical data were expressed as mean and standard deviation. Qualitative data were expressed as frequency and percentage. For quantitative data, paired t test was used for comparison between two study periods. One-way ANOVA for repeated measures in the studied group at different time intervals. Pearson method was used to test correlation between numerical variables. A p-value < 0.05 was considered significant, and <0.001 was considered highly significant.

Results

Table 1. Presents sociodemographic data of patients under the study, it was observed that, the mean age of participants was (39.86±10.28) years. It also shows that (70.2%) were male and (73.1%) were married, and slightly higher than three fifths (62.5%) were living in rural area, (63.5) % had secondary level of education, (43.3%) were working in public sectors and (68.3%) had insufficient income

Table 2. Reveals health related data of the studied subjects which indicated that, (83.7%) had co morbid disease and (43.3%) were diagnosed with hypertension since one year to less than two years. Also, there was (90.4%) had headache as the main presenting symptom among of patients, (53.8%) continue smoking and(86.5) % were never drinking alcohol.

Table 3. Points out difference between blood pressure measurements throughout study periods. It was concluded that, there was a statistical significant difference between baseline measurement and periods of three as well as six months after program.

Table 4. Shows that, there is a highly statistical significant difference (p= <0.001 **) in both lipid profile and body mass index corresponding to the studied group between baseline measurement and six months after program.

Table 5. Presents the mean score of knowledge about hypertension, where time-related changes were highly statistically significant within the studied subjects. Indicating, that the knowledge in reached to highest mean 15.92±1.41 immediate post program, then it began to slightly decrease till the last period 13.51±1.35.

Table 6. Represents Difference between the mean score of health promoting lifestyle behavior throughout study period. indicating that, there is a highly significant statistical difference between preprogram period and at each of (three & six months) after program (p value = <0.001**)

Table7. Reveals that, there is a negative significant statistical association between systolic blood pressure after 6 months of program and health promoting lifestyle behavior as well as hypertension knowledge (p value= <0.001** & 0.033*, respectively).

Table (1). Distribution of the Studied Sample According to Their Socio-Demographic Characteristics (n =104).

Socio-demographic characteristics	(No.)	(%)
Age / years		
< 30	9	18.8
30-<45	35	43.8
45+	17	21.2
Mean ±SD	39.86±10.28	
Gender		
Male	73	70.2
Female	31	29.8
Marital status		
Not married	28	26.9
Married	76	73.1
Residence		
Urban	39	37.5
Rural	65	62.5
Level of Education		
Illiterate	12	11.5
Basic education	5	4.8
Secondary education	66	63.5
University education	21	20.2
Occupation sector		
Public sector	45	43.3
Private sector	38	36.5
businessman	11	10.6
Not working	10	9.6
Income		
Not sufficient	71	68.3
Sufficient	33	31.7

Table (2). Distribution of the Studied Subjects According to Their Health Related Data (n=104).

Variables	No.	%
Presence of Co morbidities		
No	17	16.3
Yes	87	83.7
Time since diagnosis		
<1 year	22	20.12
1-<5 year	45	43.3
5 years & more	37	35.6
Complaints#		
Headache	94	90.4
Dizziness	48	46.2
Palpitation	44	42.3
Blurred vision	47	45.2
Nausea and vomiting	56	53.8
Fatigue	69	66.3
Confusion	39	37.5
Smoking		
Never	31	29.8
Smoking but quit now	17	16.3
Continue to smoke	23	53.8
Drinking alcohol		
Never	90	86.5
Monthly	9	8.7
2or 4 times in a month	5	4.8

Not mutually exclusive

Table (3). Difference between the mean scores of Blood pressure for the studied patients throughout and 6 months after the implementation of program) (n=104) measurement periods (before program, 3 months,

Blood pressure		$\bar{X}$ ± SD	t- test 1 (P. Value 1)		t- test 2 (P. Value 2)	
			Systolic pressure	Diastolic pressure	Systolic pressure	Diastolic pressure
Baseline (Pre program)	Systolic pressure	160.19±8.64	19.39 (<0.001**)	16.10 (<0.001**)	21.01 (<0.001**)	16.63 (<0.001**)
	Diastolic pressure	100.87±6.69				
3 month (after program)	Systolic pressure	144.71±5.69				
	Diastolic pressure	90.53±1.83				
6 month (after program)	Systolic pressure	144.18±5.27				
	Diastolic pressure	90.34±1.59				

T. test1 = difference of mean score between pre and 3 months after program
T.test2= difference of mean score between pre and 6 months after program
(**) Highly Statistically Significant at ≤0.001

Table (4). Difference between the mean scores of physiological measurements (lipid profile & BMI) for the studied patients at pre program, and 6 months after the implementation of program) (n=104)

Items	Physiological Measurements Score			
	Pre program	After 6 months	t- test	P Value
	$\bar{X}$ ± SD	$\bar{X}$ ± SD		
Cholesterol	245.39±3.17	229.88±6.64	25.61	<0.001**
Triglyceride	289.71±41.75	176.51±10.39	32.09	<0.001**
HDL	32.13±1.54	39.14±3.14	-24.63	<0.001**
LDL	174.79±7.74	146.69±8.49	36.90	<0.001**
BMI	33.59±6.79	33.37±6.39	2.82	0.006*

(**) Highly Statistically Significant at ≤0.001 (*) Statistically Significant at ≤0.05
(BMI) Body Mass Index

Table 5. Mean Score of Knowledge About hypertension throughout pre program, immediate post, 3 months and 6 months after implementation of program (n=104)

Items	Knowledge Mean Score					
	Pre Program	Immediate post	After 3 months	After 6 months	ANOVA test	p value
	$\bar{X}$ ± SD	$\bar{X}$ ± SD	$\bar{X}$ ± SD	$\bar{X}$ ± SD		
Nature of the disease	1.52±0.59	2.00±0.00	2.00±0.00	2.00±0.00	68.850	<0.001**
Hypertensive medications	0.86±0.35	3.38±0.75	2.97±1.21	2.67±1.28	410.050	<0.001**
Complaints or compliance	0.35±0.71	2.69±0.59	2.23±0.42	2.00±0.00	229.190	<0.001**
Healthy behaviors or life style	1.38±0.49	3.76±0.79	3.00±0.00	3.00±0.00	586.023	<0.001**
Nutritional habits	0.00±0.00	1.38±0.53	1.04±0.19	0.87±0.44	1201.111	<0.001**
Complication	0.29±0.46	4.12±0.98	3.64±1.24	2.00 ±0.00	562.452	<0.001**
Total knowledge	4.39±1.20	15.92±1.41	14.88±1.46	13.51±1.35	1664.75	<0.001**

(**) Highly Statistically Significant at ≤0.001

Table (6). Difference between the mean score of health promoting lifestyle behavior among the studied patients with hypertension throughout pre program, 3 months and 6 months after implementation of program (n=104)

Items	Health promoting lifestyle behavior mean score				
	Pre Program	After 3 months	After 6 months	t- test 1 P Value 1	t- test 2 P-value2
	$\bar{X}$ ± SD	$\bar{X}$ ± SD	$\bar{X}$ ± SD		
Health response	16.27±2.02	30.53±2.19	26.31±0.94	-49.87 <0.001	46.013 <0.001
Physical activity	12.89±2.95	25.04±1.82	23.28±1.39	-38.81 <0.001	-32.55 <0.001
Nutritional habits	19.91±4.25	28.75±3.00	27.66±0.88	-17.48 <0.001	-18.78 <0.001
Spiritual growth	20.19±4.51	27.47±1.95	26.49±1.37	18.16 <0.001	19.99- <0.001
Personal relations	17.48±2.29	26.34±2.08	26.18±1.02	-28.301 <0.001	35.170 <0.001
Stress management	13.63±3.06	25.44±1.90	22.96±0.79	-33.17 <0.001	29.33- <0.001
Total	101.010±9.37	163.57±7.23	152.88±3.92	-55.62 <0.001	-51.09 <0.001

T. test1 = difference of mean score between pre and 3 months after program
T.test2= difference of mean score between pre and 6 months after program
(**) Highly Statistically Significant at ≤0.001

Table (7) : Correlation between systolic blood pressure after 6 months post program and (hypertension knowledge as well as health promoting lifestyle behavior)(n=104).

r-\ p values / *Variables*	*Systolic blood pressure*	
	r-test	***P-value***
Health promoting lifestyle behavior	-0.358	***<0.001****
Knowledge	- 0.209	***0.033****

** = Highly statistically significant at ≤0.01 (*) Statistically Significant at ≤0.05
Weak = indicates (r < 0.5) Good = indicates (r > 0.5-0.75)
Fair = indicates (r = 0.5) Very good = indicates (r >0.75)

VI. Discussion

The study aimed evaluate the effectiveness of education program on knowledge and practice of health promoting lifestyle behavior among patients with hypertension and its association with blood pressure control. According to general characteristics of the studied sample, the present study results showed that, the age of studied sample was ranged from 30-<45 years in more than 2 fifths with mean age of 39.86±10.28, this is attributed to the age related changes in arterial stiffness and decreased elasticity, and less than three quadrants of them were male. This may be due to females are protected by estrogen hormone while they still have periods.

These findings were similar to that of **(Saleem et al., 2011)** who pointed out that the mean age of their studied group was (39.02±6.60) with a higher percent of them were male, but were not in accordance with (**Mersal and Mersal, 2015)** who stated that, less than one third of studied sample were male. As well, the present study revealed that more than three fifths had secondary education, and less than three quadrants of studied sample were married. These findings were in the same line with (**Jarelnape, 2016)** who found that more than three fifths of the studied groups had secondary education, and more than three quadrants were married (72%).

The current study revealed that more than two fifth of studied subject had diagnosed with hypertensive since less than two years. These findings were consistent with **Sabouh et al., (2011)** who mentioned that about three fifth had hypertension since less than ten years. The present study also showed that more than two thirds of studied subject were at risk of obesity, and more than half had continued to smoke. These findings were consistent with **Kumer et al., (2010)** who said that More than 80% of people with hypertension have additional comorbidities, such as obesity. Similarly **Rosenet al. (2006)** found in their study that approximately 20% were treated for hypercholesterolemia, and one-half of all participants were either former or current smokers.

The present study revealed that there were highly significant difference in systolic and diastolic blood pressure measurements in term of improvement after 6 months of program implementation (P<0.001), approving that adopting healthy life style could effectively control blood pressure. This finding is supported by **Daniali et al. (2017),** in a study about the impact of educational intervention on self-care behaviors in overweight hypertensive women: A randomized control trial, who reported that before intervention, there was no significant difference between the mean of systolic BP between study and control groups (0.148), while results show that there is a significant difference between systolic BP of intervention and control group overall (P = 0.045). Additionally **Ebrahem et al. (2017), concluded that** there is a highly statistically significant reduction of the mean score of systolic blood pressure (SBP), diastolic blood pressure (DBP), and weight from pre-intervention to post-intervention (p = .000). This indicates an improvement of the SBP, DBP and weight following the nursing intervention.

As regards the Lipid profile mean score pre and post educational program, the present study showed that total cholesterol (TC), triglycerides (TG), and LDL levels decreased. The differences were statistically significant (P=<0.001) in hypertensive subject after 6 months from the program. The current study findings was congruent with (**Anuradha et al., 2015),** who reported that mean serum total cholesterol values (TG), and LDL levels were statistically highly significant(p<0.001) in hypertensive subject compared to the healthy control subjects. Also, **Saha et al. (2006**), stated that there were highly significant relation (p<0.001) in serum total cholesterol level, serum TG level, and serum LDL-c inhypertensive subjects as compared to the healthy controls.

In the present study HDL levels increased and the difference was significant at 6 month evaluation (P=<0.001). our finding show a relation with **Sarwar et al. (2014),** who found that level of HDL cholesterol was significantly lower in hypertensive patients as compared to control subjects (p<0.05). Pearson's correlation analysis reveals that HDL cholesterol was inversely correlated with systolic and diastolic blood pressure in both patient and control groups.

Regarding patients knowledge mean score pre and post program, the scores for total and all items of knowledge of the studied sample increased significantly immediately after applying sessions where P- values were found to be (p=<0.001). The improvement was slightly decreased in all items of knowledge after 6 months but remain differ statistically significant as in before program p values were found to be (p=<0.001). These significant differences reflect the effect of the program and the interest of the studied subject to gain knowledge about the disease. Similar finding was reported by **Parvan et al, (2016) in a study about** The effect of an Educative Intervention about Blood Pressure Control on levels of Knowledge and Self Efficacy in Patients Undergoing Hemodialysis: A Randomized Clinical Trial, who found by comparing levels of knowledge pre and post intervention, the results showed an increase in knowledge in the intervention group, whilst in the control group it had also increased slightly. There is a statistical significant difference in the mean levels of knowledge before and after the intervention. Moreover, **Jarelnape (2016)** who reported that the mean knowledge score was 1.73 ± 1.17before starting the program, improved to 3.41 ± 1.07after the program. There is a significant difference (P = 0.000 < 0.05). Also, **Korah (2016)** who stated that the mean score of knowledge in the pretest was 36.30±4.16 whereas in the post test the mean score of knowledge was 45.93 ± 4.71.found to statistically significant at p <0.001

In relation to health promoting lifestyle behavior, the present study revealed that mean scores for total and all dimensions of lifestyle patterns were improved significantly in the study group at 3 months post sessions and the improvement maintained at 6 month evaluation (P= 0.000), which may reflect the strong association between the increased awareness and adopting healthy behavior. This finding was in the same line with (**Al-Wehedy et al., 2014),** who reported that the total and all dimensions of lifestyle patterns show significant improvement in the study group compared with the control group. Also, **Bahadori et al (2014),** stated that the

quality of life dimensions (including general health, vitality, physical function, role physical, bodily pain, mental health, social function, and role emotional) had been improved after the educational intervention. These differences were statistically significant before and after the intervention ($P < 0.001$).

Finally, the current study revealed a negative and significant statistical association between systolic blood pressure after 6 months of program and both of health promoting lifestyle behavior as well as hypertension knowledge, this emphasis the importance of awareness and adopting health promotive behavior in managing blood pressure, this was supported by **(Rujiwatthanakorn et al., 2011),** who concluded in their study that the program was effective in enhancing subjects' knowledge regarding hypertension, as well as self-management and control of their blood pressure.

VII. Conclusion

The educational program was effective in improving knowledge and health promoting lifestyle behavior among the studied subjects. Where, their mean scores were significantly increased after implementation of program, which was associated with a significant improvement in blood pressure measurements at the end of study period, indicating control of blood pressure.

VIII. Recommendations

Based on the results of the study, the following recommendations are suggested :

1. Increasing awareness about hypertension and importance of adopting healthy lifestyle to control the disease through health education programs to hypertensive patients were needed.
2. Acquaint all health care team with updated information regarding hypertension knowledge including health promoting lifestyle behavior.
3. Complying with Follow up visits to the clinic is important in order to determine the progress of patient's condition and assure their adherence with promoting healthy lifestyle for avoiding incidence of complications.

IX. Acknowledgement

We would like to extend our deep thanks to all health personnel in the out patients clinics of Benha university Hospital as well as the patients involved in the study for their cooperation in the fulfillment of this study.

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Samah Saied Sabry "Effect of Educational Program for Health Promoting Lifestyle among Patients with Hypertension"." IOSR Journal of Nursing and Health Science (IOSR-JNHS) , vol. 7, no.3 , 2018, pp. 60-69.