

Applying Health Belief Model among High Risk Hypertensive Clients

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Abstract

Background: Worldwide, recent reports indicate that more than one billion adults (more than a quarter of the world's population) had hypertension, **Aim:** evaluation the effect of application (HBM) amongst high risk hypertensive clients. **Research design:** quasi experimental design was used. **Sample:** included ten percent of total number 910 of clients who attended on out-patient clinic in the previous year (214-2015). **Setting:** the study was conducted at out patients' clinic of medicine affiliated to the Ain Shams University Hospital. **Tools:** three tools were used to collect data; **the first tool:** was a self-administered questionnaire for assessing socio-demographic characteristics of clients, and their knowledge about hypertension. **Second tool:** (HBM) related to hypertension. **Third tool:** physically assessment health status of clients measured (BP, pulse, weight, height). **Results:** study indicated that more than half of hypertensive clients had unsatisfactory knowledge related to hypertension and near three fifth of them with higher percentage in female. Post health belief model application, there was highly significant improvement in clients knowledge, attitude, and blood pressure. **Conclusion:** the study proved that used of HBM as framework that guide and help improvement in client's knowledge, attitude, and health status. **Recommendations:** the study recommended that design and implement different educational programs based on HBM for hypertensive client's and regarding to needs assessment for hypertension (e.g.: definition, classification, causes, signs/symptoms, diagnostic methods, complication, methods of early detection of client's at high risk, management) to improve the rate of compliance by improving client's consequences. Counseling hypertensive client's every time whenever they visit to physician to improve the compliance to antihypertensive drugs, therapeutic lifestyle modification, and other needed self-cares to control hypertension. Design and disseminate related booklets and brochures to raise client's knowledge regarding hypertension (detect, treating, controlling) as well the community social support network. Utilize different media channels such as T.V., to raise population awareness regarding hypertension, prevention and intervention.

Keywords: Hypertension, Health Belief Model, Uncontrolled hypertension, behavior.

Introduction

Hypertension (HTN) it is blood pressure that above normal for a sustained period. It is known as elevated arterial blood pressure is persistently, a systolic blood pressure at or above 140 or a diastolic blood pressure at or above 90 indicates HTN and generally develops over many years, and it affects nearly

everyone eventually. However, incidence of complications can be reduced through treatment, these including stroke, coronary heart disease, heart failure, and kidney disease (As many sufferers have no symptoms, it is known as the "silent killer") (NHLBI, 2016).

Hypertensive clients are considered to be at high risk for

cardiovascular event if they poorly controlled or uncontrolled HTN, inadequately adherence antihypertensive drugs and unhealthy life style, systolic blood pressure ≥ 180 mmHg and/or diastolic blood pressure ≥ 110 mmHg, and older patients with hypertension are at higher risk than younger patients (Candace, et al., 2013). While, long term variability in blood pressure is associated with cardiovascular and mortality outcomes, over and above the effect of mean blood pressure and short-term (ambulatory) BP variability is also associated with all-cause mortality but the association with CVD outcomes (Stevens, et al., 2016).

More than a quarter of the world's population had hypertension in 2016, and this is predicted to increase to 1.56 billion adults by 2025 in worldwide will have hypertension. Also known as hypertension, which will account for up to 50% of heart disease risk and 75% of stroke risk. 20% in developed nations, 80% in developing nations; highest prevalence will be in developing continents (e.g., Asia, Africa), the prevalence of hypertension has increased significantly over the past two to three decades, (World Hypertension League Organization, 2016).

Interesting, statistics of hypertension complication globally cardiovascular disease accounts for approximately 17 million deaths a year, nearly one third of the total deaths. Of these, complications of hypertension account for 9.4 million deaths worldwide every year. Hypertension is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke (National, Lung, Heart, and Blood Institution, 2016). Unhealthy diet was estimated to be related to about half of hypertension. About 30% related to increased salt consumption, and about 20% related to low dietary potassium duo

to low fruit and vegetables. Physical inactivity is related to about 20% of hypertension while obesity was related to about 30% of hypertension. Excess alcohol and fat consumption also causes hypertension (World Hypertension League Organization, 2016).

According to Egyptian Society for hypertension, (2016) the prevalence of hypertension in Egypt indicated that more than 26% of Egyptians adults are had with the hypertension, and are threatened with death because of their hypertension. In addition, two-thirds of patients hadn't control of the disease. Hypertension is the fourth leading causes of death among Egyptians, while ranked first chronic heart diseases, and ranked second the stroke. The number of deaths caused by hypertension in Egypt about 21 thousand and 300 citizens representing 4.6% of the total number of deaths, and Egypt occupies the 13th place in the list of top countries in the rates of death in the world as a result of developing hypertension.

The exact causes of hypertension are not known, but several factors and conditions may play a role in its development, including: smoking, being overweight or obese, lack of physical activity, too much salt in the diet with processed, fatty foods and insufficient fruit and vegetable consumption, too much alcohol consumption, stress. Poor controlled of hypertension is a significant public health concern all over the world, in term of morbidity, mortality, and economic burden (Kaplan, 2015).

The Health Belief Model (HBM) is an intrapersonal health behavior and psychological model that attempts to explain and predict health behaviors. This is done by focusing on the attitudes and beliefs of individuals. That has been commonly applied for promoting the uptake of health service and adoption of

health behaviors. The theory was later expanded to include analysis of sick role behaviors, which refer to noncompliance to prescribed medical regimens (Glanz et al., 2008).

The health belief model postulates that an individual's likelihood of engaging in a health related behavior is determined by his/her perception of the following six variables: Perceived susceptibility (perceived risk for contracting the health condition of concern); Perceived severity (perception of the consequence of contracting the health condition of concern); Perceived benefit (perception of the good things that could happen from undertaking specific behaviors); Perceived barrier (perception of the difficulties or obstacles to adopting the new behavior, and cost of performing behaviors); Cue to action (exposure to factors that prompt action); and Self-efficacy (confidence in one's ability to perform the new health behavior. Examples of other variable: age, sex, culture, educational level and past experiences. These six health determinants identified by health belief model together provide a useful framework for designing both long and short-term health behavior interventions (Glanz et al., 2008).

Community health nurse are in strategic position to evaluate, monitor, facilitate adherence to health care plan and to promote health in these vulnerable populations by using the health belief model. Health promotion includes identifying barriers, empowering individuals through knowledge, as well as encouraging and educating positive health behaviors. Also nurse have an important role in helping hypertensive clients are primary focused on client teaching, counseling accepts, understand, and adhere toward increasing knowledge about hypertension, risk factors, associated diseases, hypertension control,

treatment regimen, smoking, exercise, stress and prevent complication (Connell, 2014).

Significance of study

Hypertension is a major health problem in worldwide, and its increasing epidemic is a serious warning to take more attention to this silent disease. It is strongly correlated with adverse outcomes such as stroke, ischemic heart disease, heart failure, and end stage renal disease. Globally, the overall prevalence of hypertension in adults aged 18 and over was around 23% in 2015 (WHO, 2016). Increases the number of people with hypertension in the world on one out of every five adults; the global burden of hypertension is projected to increase by 60% to affect approximately 1.6 billion adults worldwide by 2025 (World Hypertension League Organization, 2016).

Fortunately, hypertension is modifiable and preventable risk factors for various pathological conditions that cause premature morbidity and mortality in developing and developed countries. Each person affected by hypertension is unique and adopts a lifestyle consistent with their beliefs, perceptions and knowledge. Therefore, it is imperative that nurses know how to recognize them, providing care guided by their needs.

Aim of the study

The aim of this study is to assess the effect of application health belief model amongst high risk hypertensive clients through:

1-Assessing their knowledge related to hypertension

2-Design and implement health belief model based on previously detect

knowledge and health beliefs of hypertensive clients..

3-Evaluate the effectiveness of health belief model on their improvement of knowledge and health beliefs of hypertensive clients.

Research hypotheses

Application of health belief model for hypertensive clients will improve their knowledge and health beliefs related to hypertension, prevent them from high risk of hypertension and improve their high blood pressure to normal value

Subjects &Methods

Research design

This study is a descriptive analytic study.

A) Setting

This study was conducted in outpatient clinic of medicine affiliated to the Ain Shams University Hospital.

B) Subjects of study

A Purposive random sample was used to select a total number of 100 patients which represent 10 % according equation formal, of total number 910 were attended on medicine clinic and diagnosed with hypertension in year (2014-2015), according to the following inclusion criteria:

- Diagnosed with hypertension (systolic more than 180mmhg and diastolic more than 110mmhg diastolic).
- Age from 40 years old and over.
- Literate.
- Both gender.
- Accepted to participant in the study.

Technical design:

C) Tools of data collection:

The data was collected through the following tools:

First: Self-administered questionnaire it comprised two parts:

Part one: characteristics of the clients such as age, gender, marital status, living condition, place of residence, number of family member, number of rooms, housing type, educational level, occupation, and monthly income,

Part two: Knowledge assessment questioner: adopted from (Mohamed, 2007).

This questionnaire assess baseline knowledge of patients about hypertension; it was used as pre, posttest and after three months follow up. Its includes clients' level knowledge regarding his /her understanding to nature of the disease (definition, normal value, causes etc) (1Q-10 Q), treatment principles and the way of compliance with treatment regimen (11 Q -17 Q), (18 Q -34Q), life style and its consequences on hypertension (weight reduction, exercise, activity, smoking, stress and its relation with hypertension (35 Q-42 Q), risk factors and complication of hypertension (43Q-48Q).

Scoring systems of knowledge tool:

The knowledge tool was coded correct one for the correct answer, two for wrong and three for don't know or missed, total of 60% and above was considered unsatisfactory and less than 60% were considered satisfactory.

Second tool: Apply health belief model (Rosenstock et al., 1988).

Perceived susceptibility of negative consequences of hypertension was assessed in 4 items; Perceived severity of the consequences of hypertension was assessed in 5 items, Perceived benefits of the actions to recommended behaviors in managing hypertension were assessed in 7 items, Perceived barriers to change one's behaviors were assessed in 5 items, measured on a five-point Likert scale (Strongly Disagree to Strongly Agree). Cues to action, indicating how respondents receive instruction about hypertension, were assessed in 4 items, measured on a five-point Likert scale (Never, Rarely, occasionally, sometimes, and frequently). Self-efficacy or one's confidence in his or her ability to follow the recommended management behaviors was assessed in 6 items on a five-point Likert scale (Not at all, a slight chance, a 50/50 chance, a good chance, completely certain).

Scoring system possible responses were measured using a five-point likert scale (Strongly Disagree to strongly agree), also measured on a five-point likert scale (Never to frequently). A score was given for each response from 1 to 5 whereby higher scores indicated a stronger feeling of each variable. according to reliability test, The Cronbach's alpha of the full instrument was .765, and the Cronbach's alpha of various subscales were as follows: susceptibility. .571, severity. .774, cues to action. .688, benefits. .753, barriers. .747, and self-efficacy, .305.

Third tool: Physically assessment sheet to assess the health status of the clients with hypertension such as measuring of blood pressure, pulse, wt, ht to detect BMI etc...

a) Blood Pressure, measured with aneroid sphygmomanometer with an adult cuff and stethoscope by researcher. Two

numbers are recorded when measuring blood pressure: The higher number, or systolic pressure. And the lower number, or diastolic pressure. Both the systolic and diastolic pressures are recorded as (mmhg) (Millimeters of mercury). The normal range of blood pressure in client's hypertensive.

b) Weight was measured by using a bathroom scale; weigh is recording to the nearest 500gm. To assess clients' Body Mass Index "BMI", through measuring clients' body weight and height by calculating $BMI = \frac{\text{weight (kg)}}{\text{height (meter)}^2}$.

According to the scale of BMI was divided into four categories which were adopted from (NHLBI, 2009) BMI divided to:

Criteria for under normal weight <18.4 kg/cm², normal weight 18.5kg-24.5kg/cm², overweight 25kg-29.5kg/cm², moderate obese 30kg-34.5/cm², severe obese 35kg -39.9kg/cm², very severe obese >40kg/cm²

C) High measurement is centimeters and millimeters. High was record to the nearest 1cm. There are 10mm in each centimeter and 100cm in each meter .

Scoring system:

Questionnaire about Body Mass Index (BMI), it varies between 0, 1, 2, 3 and 4 in respect to the following grades equivalent to; 0=(18.5:24.9 kg/cm²) normal weight, 1=over weight (25:29.9kg/cm²), 2=moderate obese (30:34.9 kg/cm²), 3=severe obese (35:39.9 kg/cm²), and 4=very severe obese (over 40 kg /cm²), according to

Validity test content:

The content validity was established by a panel of 5 expertise (four professors nurses and one physicians), who reviewed the tools for clarity, relevance, comprehensives, understanding, applicability and simplicity for

implementation and according to their opinion some modifications were applied.

Face validity verifies that, the instrument look like, it was valid or gavethe appearance of measuring the content desired for a study, and while content –related validity examines the extent to which the method of measurement includes all the major elements relevant to contrast being measured.

Reliability testing was done using Cronbach's alpha coefficient test which revealed that each of the three tools consisted of relatively homogenous items as indicated by the moderated to high reliability.(Alpha =0.843).

II) Operational design

Pilot study:

A pilot study was carried out on nine clients with hypertension from outpatient clinic affiliated to ain shams university hospital fulfilling the inclusion criteria. The aim of pilot study was to evaluate the content clarity and simplicity of the language used according to analysis of pilot study results. Necessary modification were carried out used on findings of pilot result analysis to develop the final form of the tools, as regarding to this some words changed to simple language, some questions excluded not understanding, also some open end questions converted to close ended or multiple choice questions. This number of pilot study was excluded from actual simple.

Ethical consideration

Approval was obtained from the authorities of the faculty of nursing, Ain shams University, and then written official letter sent to the director of outpatient clinic of Ain Shams University Hospital, include the title and purpose of study was submitted from concerned authorities in outpatient's clinic to get approval for data collection to conduct

the study. Then take permission from directors of clinic in which the study was applied, who in his concern calling head nurse of the clinic to share and facilitate in solving any administrative problems like allocated and organized place for interviewing with clients.

Prior to the study, a permission from clients to conduct the study has been taken, they were informed about, aims, methods, anticipated benefits and absence of potential hazards have to be explained to assure clients about the safety of the study, and to let them obtain real participation in the research process and to inform them about their rights to terminate the session at any time.

Field work:

Official permission were taken from director of outpatient Ain Shams University Hospital. Interview firstly with director and head nurse of the outpatient clinic to introduce the importance and objectives of research. then start to take oral consent from every participant who accepted to participate in study. Also they were reassured that the information used to improve their case prevalence.

The actual data collection was carried out from December 2016/to June/2017 as period of examination and holidays was excluded.

The clients interviewed in the outpatient clinic waiting room they were waiting for measuring blood pressure, diagnostic test and other therapeutic measures, 3days per week, from 9am, to 2 pm through six months.

Implementation of the model took 15 hours per week for 12 weeks divided into 6sessions 4 sessions for theory 2session for practice, varied in time from (30 min to 1.5min).according to its content and the teaching method will use the lecture group, discussion, teaching material will use Arabic booklet and picture.

Program Description

Preparatory phase:

Included " the applying health believe model among high risk hypertensive clients. This model may be useful to the clients particularly regarding the benefits of, barriers to, intended behavior change. They received health education intervention sessions based on the Health Belief Model conceptual framework. Education content not only information about hypertension but also focused on rising their perception about their susceptibility to it, its severity and how to overcome the these threat by improving their confidence in their ability to control. similarly increase their positive beliefs toward the benefits of control in hypertension. Reduce salt intake, reduce fat dairy product intake, lots fruits and vegetable, regular physical exercise, lose weight, get regular check-ups, improve medication adherence, and stress reduction to control and lower hypertension on how to assess each component of the model. The nursing program was designed by researcher.

Phase two: Model implementation

At the begging of the assessment phase the clients were requested to fill the knowledge assessment questioner posed in the first session. The first session included introduction into teaching session and pre assessment of knowledge level of hypertension, health belief model for hypertension, measuring blood pressure, and estimate body mass index. The second session: understand basic knowledge about definition of hypertension, category types of hypertension, causes of hypertension, sign and symptoms, assessment measure for evaluating the condition of client, and complication of hypertension. Third session include compliance for medication, types of healthy proper diet, reduce salt, stop smoking and alcohol, weight reduction, regular exercise and physical activity, reduction caffeine drink. Four and five session include coping with stress and

anxiety, relaxation, and deep breathing techniques.

Program implementation based on conducting session plans using different educational method and media in addition to use of guiding booklet specifically designed.

Phase three: model evaluation - six session.

This phase aimed to evaluate the level improvement in hypertension client's knowledge, health practice, and change their life style to avoid consequences of health problem through implementation of the program. This was done through giving post –test similar to the pre – test and re – assessment of blood pressure and body mass index, evaluation administered to study subjects after completion of the program in order to estimate the effect of program on hypertension clients knowledge and practices related to hypertension and measuring the effect of applying the health belief model in order to improve their health status and healthy practice.

III) Statistical design:

Data were analyzed using SPSS (the Statistical package for Social Science for windows) version 20.0, in which data presented in the form of numbers, percentage values, mean value, and standard deviation, then graphic presentation of the important results. Using appropriate statistical method. the following statistical techniques was used:

The statistical analysis included

- Arithmetic mean (X)
- Standard deviation (SD)

Comparison of proportion: qualitative variables expressed as percentages are compared in different groups using the chi-square test (X²).

Proper significant test used for analysis of results, for examples: chi-square, t-test, and Anova.

Limitation of the study:

-Non adherence to time table of each session.

-The distance between the homes of some patients was long, which wasted more time than allowed for the study and made arrangement for group sessions difficult.

-Intervention of some clients' relative during filling the questionnaire.

-Very few researches about applying health belief model among high risk hypertensive clients.

-The absence of a specific and suitable place for data collection.

Result

Assessment Client's Socio-Demographic Characteristics:

Table (1): Distribution of the studied sample according to their socio-demographic characteristics (n=90). Table Shows that 35.6% of the study sample their age ranged between 40-50 years old, 58.9% were females, and 38.9% level educations of them were secondary of education, and 46.7 % of them were married. Related to occupation 51.1% of them employee, 87.8% were not sufficient for life requirement, 76.7% of them lived with their family, and 81.1.7% resident at urban while, 18.9 % live in rural area. Concerning family members 67.8% of them had a family form of 3- 5 members, 83.3% of them lived in 1-3 rooms at home, and 65.6% of them accommodation type it rent.

Table (2): Distribution of the studied sample according to their total knowledge related to understating nature of hypertension, compliance therapeutic

regimen and proper way, life style and risk factors pre, post & follow-up model application (n=90). Table shows that there was improvement of correct answer from pre to post and follow up after health belief model implementation. This mean that, the total unsatisfactory knowledge increased to satisfactory knowledge from 57.8% to 78.9 and 83.3% pre, post, and follow up. Also, there was a statistically significant between pre & post health belief model implementation ($p < 0.0001$).

Table (3): Distribution of the studied sample according to their health status in pre and follow-up health belief model application n=90. Table (3): Shows that 63.3% of the study sample there family member with hypertension, 51.1% were of them first degree from their family, and 57.8% of them don't constantly visit doctor, 61.1% can't control in his/her blood presser, 58.9% don't keep measure blood pressure, 36.7% with chronic disease diabetes, 33.3% measure blood pressure in hospital, 75.6% treatment with medication, 57.8% not perform medical examination, and 36.7% with moderate obese pre health belief model application and there were improvement in post health belief model application. There were no statically difference regarding to chronic diseases (DM, CHD, stroke, CKD), where measure blood pressure, prescribed treatment, and BMI.

Table (4): Mean distribution of physical health condition of the studied sample pre and follow up after health belief model application (n=90). Table showed that there was a statistical significant regarding to change Mean and SD blood pressure, pulse pre and follow up after health belief model application except height, weight, BMI ($p < 0.0001$).

Table (5): Distribution of studied sample according to their health belief regarding to hypertension pre and follow up after health belief model application (n=90).

Table (1): Distribution of studied sample according to their socio- demographic characteristics (n=90).

Items	N	%
Age		
40 -<50	36	40
50 -<60	44	48.9
≤60	10	11.1
Gender		
Male	37	41.1
Female	53	58.9
Level of education		
Read and write	22	24.4
Secondary of education	35	38.9
University education	33	36.7
Other mention	0	0
Marital status		
Single	17	18.9
Married	46	51.1
Divorced	11	12.2
Widowed	16	17.8
Occupation		
Employee	41	45.6
Professional	18	20.0
House wife	19	21.1
Retirement	12	13.3
Monthly income		
Sufficient for life requirement	11	12.2
not sufficientfor life requirement	79	87.8
Living condition		
Live with family	69	76.7
Live alone	16	17.7
Live with others	5	5.6
Place of residence		
Rural	17	18.9
Urban	73	81.1
Number of family member		
<3members	27	30
3-5members	61	67.8
≤6members	2	2.2
Accommodation type		
Rent	59	65.6
Ownership	23	25.5
Itinerant	3	3.3
Combined	5	5.6

Table (2): Distribution of the studied sample according to their total knowledge related to understating nature of hypertension, compliance therapeutic regimen and proper way, life style and risk factors (n=90).

	Pre		Post		Follow-up		Chi-square									
	Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		pre & post		Post1 & Follow-up					
	N	%	N	%	N	%	N	%	X ²	P-value	X ²	P-value				
1-Understanding nature to hypertension	52	57.8	38	42.2	23	25.6	67	74.4	15	16.7	75	83.3	19.223	<0.001**	2.135	0.144
2- Therapeutic regimen & proper way of compliance	48	53.3	42	46.7	15	16.7	75	83.3	19	21.1	7	7.9	26.593	<0.001**	0.580	0.446
3-Lifestyle of clients with hypertension:	59	65.6	31	34.4	20	22.2	70	77.8	17	18.9	73	81.1	34.313	<0.001**	0.306	0.580
4-Risk factors and consequences	51	56.7	39	43.3	18	20.0	72	80.0	10	11.1	80	88.9	25.593	<0.001**	2.707	0.100
Total	52	57.8	38	42.2	19	21.1	71	78.9	15	16.7	7	8.3	25.329	<0.001**	0.580	0.446

Differences are statistically significant (p<0.0001)

Figure (1):

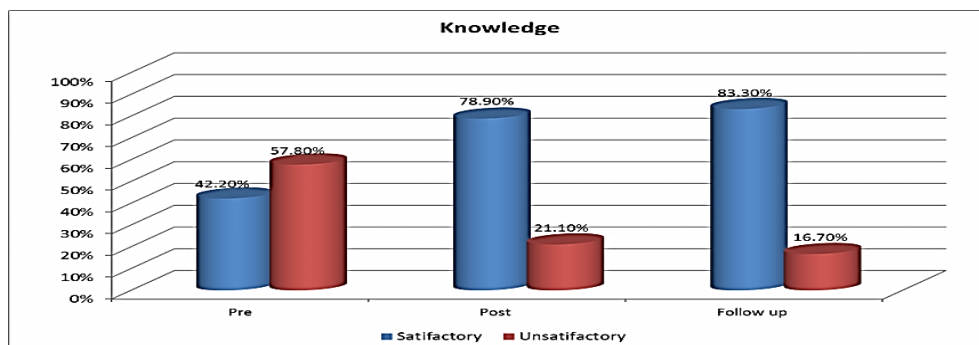


Table (3): Distribution of studied sample according to their health belief regarding to hypertension pre and follow up-model application (n=90).

Total Health beliefs model	Pre		Follow up		Chi-square	
	N	%	N	%	X ²	P-value
Agree	41	45.6	58	64.4	6.504	0.039*
Undecided	16	17.8	10	11.1		
Disagree	33	36.7	22	24.4		
Total	41.0	45.6	55	61.1		

Differences are statistically significant (p<0.0001).

Figure (2): Distribution of the studied sample according to their total health beliefs related to hypertension pre model application (n=90).

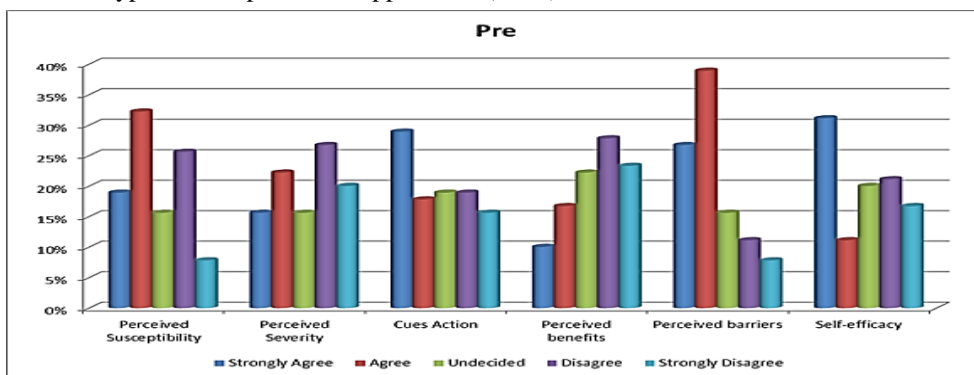


Table (4): Distribution of the studied sample according to their health status in pre and follow-up health belief model application (n=90).

	Pre		Follow up		Chi-square X ²	P-value
	N	%	N	%		
Is there a family member with high blood pressure						
Yes	57	63.3				
No	33	36.7				
if yes, what is kinship						
No	33	33.7				
first degree	46	51.1				
Others	11	12.2				
Do you constantly visit doctor						
Yes	38	42.2	74	82.2	23.704	<0.001**
No	52	57.8	16	17.8		
Can you control high blood pressure						
Yes	35	38.9	70	77.8	25.095	<0.001**
No	55	61.1	20	22.2		
Do you keep measuring your blood pressure						
Yes	37	41.1	69	76.7	23.498	<0.001**
No	53	58.9	21	23.3		
If yes, attendance is						
Not measure	53	58.9	20	22.2		
every month	7	7.8	5	5.6		
once a week	3	3.3	23	25.6		
first month	4	4.4	4	4.4	63.015	<0.001**
Irregularly	10	11.1	12	13.3		
when needed	8	8.9	11	12.2		
Daily	5	5.6	15	16.7		
Where do you measure blood pressure						
At home	5	5.6	11	12.2		
In the hospital	30	33.3	35	38.9	0.104	0.991
in the pharmacy	29	32.2	14	15.6		
Outpatient Clinics	26	28.8	30	33.3		
What treatment is prescribed to you by your doctor						
treatment with medicines	68	75.6	68	75.6	0.000	1.000
Drug treatment and diet	22	24.4	22	24.4		
Do you perform the required medical examinations						
Yes	38	42.2	76	84.4	34.545	<0.001**
No	52	57.8	14	15.6		

Differences are statistically significant ($p < 0.0001$)

Table (5): Mean distribution of physical health condition of the studied sample pre and follow up after health belief model application ($n=90$).

	Pre			Post 3			T-test	
	Mean	±	SD	Mean	±	SD	T	P-value
Height	162.45	±	5.61	162.45	±	5.61	0.000	1.000
Weight	78.11	±	15.96	74.43	±	15.86	1.551	0.123
BMI	29.65	±	6.13	28.17	±	6.11	1.627	0.105
Systolic blood pressure	154.44	±	13.91	134.56	±	15.89	8.933	<0.001**
Diastolic blood pressure	94.94	±	12.91	83.06	±	10.24	6.846	<0.001**
Pulse	89.89	±	9.94	83.96	±	8.76	4.248	<0.001**

Differences are statistically significant ($p < 0.0001$)

Table (6): Relation between socio-demographics data of studied sample and their knowledge related to hypertension pre health belief model application ($n=90$).

Items	Pre Total Knowledge						Chi-square	
	Satisfactory		Unsatisfactory		Total		X ²	P-value
	N	%	N	%	N	%		
Sex								
Male	15	40.5	22	59.5	37	100.0	0.073	0.787
Female	23	43.4	30	56.6	53	100.0		
Age								
20 < 30	5	41.7	7	58.3	12	100.0		
30 < 40	2	13.3	13	86.7	15	100.0	7.328	0.120
40 < 50	14	43.8	18	56.3	32	100.0		
50 < 60	12	57.1	9	42.9	21	100.0		
≤60	5	50.0	5	50.0	10	100.0		
Marital status								
Single	6	35.3	11	64.7	17	100.0		
Married	30	65.2	16	34.8	46	100.0	24.138	<0.001**
divorced	0	0.0	11	100.0	11	100.0		
widowed	2	12.5	14	87.5	16	100.0		
Living condition								
live with family	35	50.7	34	49.3	69	100.0	9.312	0.010*
live alone	3	18.8	13	81.3	16	100.0		
live with other	0	0.0	5	100.0	5	100.0		
Residential area								
Rural	7	41.2	10	58.8	17	100.0	0.009	0.923
Urban	31	42.5	42	57.5	73	100.0		
Accommodation type								
Rent	26	44.1	33	55.9	59	100.0		
ownership	7	30.4	16	69.6	23	100.0	5.508	0.138
itinerant	3	100.0	0	0.0	3	100.0		
combined	2	40.0	3	60.0	5	100.0		
Level of education								
read and write	0	0.0	22	100.0	22	100.0		
secondary education	11	31.4	24	68.6	35	100.0	38.957	<0.001**
university education	27	81.8	6	18.2	33	100.0		
Occupation								
Employee	21	51.2	20	48.8	41	100.0		
Professional	4	22.2	14	77.8	18	100.0	4.907	0.179
House wife	9	47.4	10	52.6	19	100.0		
Retirement	4	33.3	8	66.7	12	100.0		
Monthly income								
Sufficient	7	63.6	4	36.4	11	100.0	2.356	0.125
not sufficient	31	39.2	48	60.8	79	100.0		
Number of family member								
<3members	11	40.7	16	59.3	27	100.0	0.078	0.962
3-5members	26	42.6	35	57.4	61	100.0		
≤6members	1	50.0	1	50.0	2	100.0		
Number of rooms								
1-3rooms	35	46.7	40	53.3	75	100.0	3.644	0.056
≤3	3	20.0	12	80.0	15	100.0		

Differences are statistically significant ($p < 0.0001$)

Discussion

HTN is a chronic medical condition and is one of the most common life threatening non-communicable disease in worldwide. It is important public health challenge remains in worldwide because of the most important risk factors for cardiovascular morbidity and mortality which results from target – organ damage in the heart, kidney, and eyes. It is an asymptomatic condition, symptoms do not arise unless the complications develop which result in delayed diagnosis and treatment or uncontrolled (*WHO, 2017*).

Part I: Assessment of Studied Client's Socio-Demographic Characteristics:

Regarding to the socio-demographic characteristics of the hypertensive clients in the study sample, findings the current study revealed that half of the hypertensive clients were in age group their age ranged between 50 - <60 years old with the mean about nearly fifty four years (**table 1**). This finding in the same line with *Renu et al. (2014)* who conduct study on hypertensive clients to detect Prevalence of Hypertension Among Adults In An Urban Area of Jammu In India who stated that mean age of studied sample 54.5years. While, this result was contraindicated with *Kamran et al. (2014)* who conducted cross sectional study on 671 hypertensive patients in Iran for Determine of Patient Adherence To Hypertension Medications: Application of Health Belief Model Among Rural Patients reported that the mean age 36.2 ± 13.9 year. This may be attributed to HTN was not only the disease which is seen in elderly people but was also prevalent among the adult age groups.

Finding of the current study revealed that more than half of the studied sample were females (**table 1**). This finding acceptance with result of study in Egypt about Factors Affecting Treatment Adherence among Hypertensive Patients to Anti-Hypertensive Medications and Lifestyle Modification by *Salah, (2018)* who state that females constituted more than half of the sample study as there percentage fifty two percentage. From my point of view this prevalence between female may be duo to pregnancy, used combined oral contraceptives increase risk of hypertension, and menopause increase the risk of developing high blood pressure in women.

In relation to hypertensive clients educational level, the result of this study found that more than one third of study sample were moderate education, and more than half of studied sample were married (**table 1**). This result is in contrast with *Mohsen, (2015)* who conducted study about Factors Affecting Compliance of Hypertensive Patients toward Therapeutic Regimen in Egypt the finding on their study showed that more than half of participants patients without formal education level and married. This could be attributed to low level of education affects people's health which hinders the understanding information about hypertension and consequently hinders the compliance to the treatment, and increasing their exposure to risk factors of hypertension. On other hand , *Schwandt et al. (2010)* who conducted study in United States about Marital Status, Hypertension, Coronary Heart Disease, Diabetes, and Death among African American Women and Men: Incidence and Prevalence in the Atherosclerosis Risk in Communities Study Participants pointed that marital status is associated with health, and there are relationship between marital status

and change in marital status on three cardiovascular outcomes (hypertension, CHD, and diabetes) as well as all-cause mortality. This could be attributed to financial problem, social needs or marital disruption, and with many demands that add more burden on individual leading to stressful situation, anxiety, a feeling of instability greater risk for unhealthy behaviors (smoking, unbalanced diet, mainly salt used), result in the increase in blood pressure, so the prolonged periods of increasing blood pressure finally lead to the development of hypertension.

Concerning the hypertensive client's occupation, the result of this study showed that less than half were employee (**table 1**). These result is similar to study done by *Oghenkero et al., (2015)* who conducted a cross sectional study to detect Prevalence of Hypertension & Its Correlates among Employees of Tertiary Hospital In Yenagoa, Nigeria, *Alireza et al. (2016)* & *Salah, (2018)* those showed that the majority of their studies were employee. This could be attributed to the job strain at the workplace, more prolonged period's exposure to work related to stress, lack physical activity, and unhealthy nutrition is associated with the development of hypertension.

Regarding the hypertensive client's monthly income, the result of this study found that majority of them complains from inadequate income (not enough even basic needs) (**table1**). This result agreement with the study carried out by *Ibrahim, (2015)* at Cairo University Hospital In Egypt to Assessment of Life Style of Patient Newly Diagnosis With Hypertension who showed that the most of studied subjects they have not enough income and have no insurance. Also, this result go in same line of *Ibrahim,(2018)* who conducted study at the outpatient clinics at Ain Shams University in Egypt to Identify Factors Affecting Adherence

of Hypertensive Patients to Anti – Hypertensive Medications and Life Style Modification and founded that the majority of subjects sample were had inadequate monthly income. This result can be explained as those clients might be suffering from low socioeconomic status and decrease in financial resources that don't allow clients to buy the medication, different nutrients, and medical care follow up where these can directly and significantly affect their compliance with a healthy lifestyle and adherence of drugs; also poor economic growth in Egypt has resulted in an increase in the poverty level.

The current study finding demonstrated that more than two third of study sample living with family (**table 1**). This result was in same line with the study carried out by *Hae-Ra et al. (2013)* to assess Influence of living arrangements on the management and control of hypertension: A mixed-methods study of Korean American elderly who showed that more than half of study sample living with family. Also, stated that living arrangement was significantly associated with a number of demographic and disease-related factors.

Regarding the hypertensive client's place of residence, the result of this study found that more than two thirds live in urban areas. This result accordance with *Kamran, (2014), & Salah, (2018)* those found that the majority of study sample live in urban area. Also, These result goes on line with *Bollampally et al. (2016)* who conducted a prospective observational study in the in- patient department of Gandhi hospital to Assessment of patient's knowledge, attitude and practice regarding hypertension in India mentioned that the high prevalence of hypertension in urban population and the increasing prevalence of hypertension is attributed to

urbanization sedentary habits, lack of physical activity, obesity, and exposure to persistent stress. From my opinion this indicates that high prevalence of hypertension in urban area might be due to impact of stressors on clients' health such overcrowdings and poor healthy lifestyle.

The current study finding demonstrated that more than two thirds of clients the number of family members consist of 3-5 members. These results go in line with *Mohamed, (2007)* who conduct study in Egypt to evaluate the Impact of Educational Program to Therapeutic Regimen among Patient with Arterial Hypertension & *Ibrahim, (2015)* who stated that there is relation between the family numbers and hypertension prevalence for people. While, *Kannana & Satyamoorthy, (2014)* who conducted study about An Epidemiological Study of Hypertension in Rural Household Community in Japan mentions that the increased family size has got a positive association with hypertension and the difference was found to be highly significant. This could be attributed to financial problems, family conflict and overcrowded which lead to increase blood pressure and affect antihypertensive drug, lifestyle control or adherence. Also, family members share behavior, lifestyle, environments that can influence their health and their risk for disease development.

Part II: Assessment client's knowledge related to nature of hypertension, therapeutic regimen and proper way of compliance, life style, risk factors and consequences:

As regarding total knowledge related to understanding nature of hypertension, compliance therapeutic regimen and proper way, life style, and risk factors of hypertension and their

consequences the current study revealed the more than half of client's total knowledge about hypertension was unsatisfactory knowledge before health belief model application and the percentage of satisfactory clients improvement after health belief model application to the majority of them and increased to most of them in follow up, and there are significant improvement between pre and posttest and no significant between posttest immediate and follow up (table 2). These findings are supported by *Mohamed, (2007)*, *Hasan et al. (2014)*, *Ibrahim, (2015)* *Bayomi & Wael, (2016)* & *Khorsandi, (2017)* those stated that the provision of more education about hypertension improved in knowledge score from weak to good after educational intervention as well as increased in their awareness and practice toward hypertension prevention behavior. Also, this result agree with *Khalil & Tartour, (2017)* who conducted study on hypertensive patients in hypertension clinic at Zagazig university hospital in Egypt to determine level of hypertensive patients knowledge about hypertension, and evaluate the effectiveness of using health belief model knowledge and compliance to treatment and showed that marked improvement in their knowledge about hypertension and compliance to treatment after received educational intervention, and there changes between pre and posttest results with a statistical difference between both.

Part III: Assessment Health Belief of Clients Related to Hypertension:

Regarding to health belief model pre and follow up 3 months there are statistical significant between pre and follow up (table 3). This result goes in line with *Hasan et al. (2014)* showed that the efficacy of health belief model in promotion of behavior associated with blood pressure control. Similarly increase

their positive belief toward the benefits of control in hypertension. While, *Khorsandi et al. (2017)* mention that there was a relation between individuals' health beliefs and their health behavior. Also, revealed that the educational intervention based on the HBM increased mean score of health beliefs in the hypertensive people as well as their awareness and practice. On other hand, *Ariane et al. (2014)* who conducted a cross sectional study on hypertensive patients in health centers in Fortaleza at Brazil for identify the lifestyle of hypertensive patients, focusing on their health behaviors in light of the health belief model and revealed that the health belief model contributes to the adoption of a healthier life style, with a focus on adherence to the treatment and more effective nursing care can be obtained when beliefs about susceptibility and severity of the disease and the benefits and barriers to care are considered and direct patients' approach, assisting in the identification of their lifestyle and improving their quality of life.

Part IV: Assessment physical health status of clients Pre / follow up health belief model application:

Regard physical health status in pretest before health belief model application, the present study indicated that about nearly two third of the studied sample had their family member hypertension and more than half of them were first degree of family (table 4). This result was in accordance with *Ranasinghe et al. (2015)* that conducted a cross sectional study in Sri Lanka at South Asian for describes the influence of family history on hypertension prevalence and associated metabolic risk factors and reported that the prevalence of hypertension were significantly higher in patients with a family history and presence of family history in parents.

Concerning the hypertensive client's medical care follow up more than half not constantly visited doctor, and can't control in high blood pressure (table 4). This could be due to poor knowledge about hypertension risk factors including poor adherence to medications, healthy life style, lack time and cost were tends to poor BP control. This result agree with *Teshome et al. (2018)* who conducted a cross sectional study on 392 hypertensive patients who were on treatment and follow-up at a district hospital in Northwest Ethiopia for assess the prevalence and associated factors of optimal BP control among hypertensive patients and mentioned that the higher proportion of hypertensive patients of the study sample were remain with un-controlled BP.

Regarding to measuring blood pressure, the results of this study showed that more than half don't keep measure blood pressure, one third measured blood pressure at hospital, and more than half don't perform the required medical examination (**table 4**). This could be due to poor awareness of hypertensive clients about hypertension and follow up, medical and physical examination cost, and lack time and motivation. This result in the same line with *Ahmed et al. (2013)* that conducted a cross sectional study in two tertiary hospital at Riyadh, Jeddah to assess the prevalence, awareness, and attitude related to hypertension among the health professionals and stated that the majority of the sample had irregular for their medical examination follow up and irregular monitor of blood pressure.

The current study finding that more than two thirds hypertensive clients treatment with medication (**table 4**). This result agree with *Aduragbenro et al. (2016)* that conducted retrospective study on 162 hospitalized patients with hypertension in a tertiary health care

center in Nigeria to assessed the pattern of drug use and blood pressure (BP) control among in-patients with hypertension and stated that one hundred and fifty three of patients were on antihypertensive drugs and blood pressure control were achieved in less than half of the patients' population.

The finding of this study revealed that, more than one third were with chronic disease diabetes mellitus and with moderate obese (**table 4**). This result could be due to bad habits of in the lifestyle of Egyptians that are affected on health. This study contrast with *Mohamed et al. (2018)* who conducted a cross sectional study on 600 of population in Meet El Moze village in Menofia governorate, Egypt to measure the prevalence of hypertension and its risk factors among residents of a village and to describe the quality of life among the study population and reported that the majority of studied sample over weight and obesity and with diabetes mellitus.

While, post health belief model application there were improvements in compliance of almost of clients health status follow up and there are statistical significant improvement between pretest and follow-up (**table 4**). This result agree with *Hassan et al. (2014) & Ibrahim, (2015)*, those revealed that after intervention program based on health belief model for hypertensive patients, the mean scores of awareness and various structures of health increased significantly. Also, stated that educational intervention resulted increased of patient knowledge about hypertension, enhancing awareness, behavior and significantly improved of compliance to all hypertensive treatment regimens. This could be to that the educational program is based on clients' needs.

The finding of this study revealed that the mean of hypertensive clients weight was seventy eight kilogram ,the mean of the height was one hundred and sixty two cm, and the BMI was twenty nine and sixty five (**table 5**). These results were in the same line with *Newsome, (2012)* who carried study to investigate the racial and ethnic differences in strength of the association between hypertension and body mass index in African –American, Caucasian ,& Hispanic adults in United States and stated that the mean of hypertensive patient weight seventy five, the mean of height one hundred sixty two point three ,and the mean of BMI twenty nine point two.

Furthermore, the results of this study showed that the mean of systolic blood pressure one hundred eighty six, the mean of diastolic blood pressure ninety eight, and the mean of pulse ninety seven (**table 5**). This result disagree with *Ibrahim, (2018)* who stated that the mean of systolic blood pressure one hundred and fifty eight, the mean of diastolic blood pressure eighty seven, and the mean of eighty two.

Regarding to body mass index, blood pressure, heart rate there are blood pressure control is main finding in the present study which revealed significant decline in systolic and diastolic blood pressure among client's at follow- up evaluation (**table 5**). This study agree with *Bayomi & Wael, (2016)* that founded that education based on health believe model improved lifestyle patterns and compliance to medication correlated significantly with control of systolic and diastolic blood pressure which mean that adherence to treatment associated with better blood pressure control. While, *Mohsen, (2015)* recommended that on their study the nurses should give health education to patients to every clinic visit

about the therapeutic regimen including medications, diet, exercise and activity, early warning signs, self-care and precipitating factors that should be avoided. Also, follow-up for the patients' by a community health nurse should be done periodically.

Part VI: Statistical Association among the Study Variables:

Statistical relation among study variables of the present study indicated a significant relation between client's pretest health belief model and their age, level of education, marital status, & living condition (table 6). The same pattern of relation was addressed by *Bayomi & Wael, (2016)* who results indicated that there is relation between patient's education and patient's knowledge awareness, Awareness about being hypertensive as factor that contributes to the control of blood pressure. Also, the relation between marital and treatment compliance was observed, married participant were more compliant with treatment. On other hand, *Khorsandi et al. (2017)* found that in participants' knowledge and performance had a significant relationship with their a educational level. Including hypertension, are in direct relationship with the patients' educational level. Also, stated that an increase in the educational level is accompanied by higher awareness, more sense of responsibility, self-efficacy improvement, and an increase in judgment and decision-making ability. More knowledge and awareness would lead to a better practice; married individuals are more concerned with self-care and self-regulatory behaviors due to the vital role of family in informational, value, and emotional support. Demographic are factors that contribute to control of blood pressure.

Conclusion

On light of the result and answer on research hypothesis the study was concluded that:

High risk hypertension was prevalent with higher percentage in female, less education, employee, living with family.

The findings of the current study proved highly statistically significant differences in client's knowledge pre& post health belief model application.

The study revealed highly statistical difference at $p < 0.001$ between pre health believe model application and marital status, living condition, and level of education .

The study revealed highly statistical difference at $p < 0.001$ between post health believe model application and age, marital status, living condition, and level of education.

The study revealed highly statistical difference at $p < 0.001$ between pre ,post ,and follow up knowledge of hypertensive clients before and after health belief model application and gender , age, marital status, living condition, occupation ,monthly income, and number of family member.

The study revealed no statistical difference between knowledge follow up and weight, BMI, blood pressure, and pulse.

The study revealed no statistical difference between health belief model application follow up and weight, BMI, blood pressure, and pulse.

On light of the present study finding following recommendations are suggested:

- Design and implement different educational programs based on health belief

model for hypertensive clients and regarding to needs assessment for hypertension disease.

- Provision of educational booklets for high risk hypertensive client's as a guide and reference is very important to motivate them for continuity of knowledge regarding hypertension as well the community social support

- Continues education to hypertensive client's every time whenever they visit to physician to improve the compliance to antihypertensive drugs, lifestyle modification, and other needed self-cares to control hypertension.

- Regarding the health belief model also suggests that benefits and barriers of changing health behavior must be taken into consideration.

Further recommendations:

- Investigation for the correlation between improvement of compliance and quality of life.

- Collaboration with physicians in their clinical trials, for longer duration and larger number of subjects for generalization of findings.

- Further research the impact of self-efficacy on training and guidance method, goal setting practices and individualized training program.

- Expand and standardize adequate assessment of hypertension and its complication indicators include mortality, incidence, prevalence, disability, and risk behavior.

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