

Effect of a Training Programme on Knowledge and Practice of Lifestyle Modification among Hypertensive Patients Attending Out-Patient Clinics in Lagos

Abstract

Background: Hypertension is the leading cause of cardiovascular disease and death in the world. Research shows that the best way to remediate this problem is through lifestyle modification, but the percentage of hypertensive patients with the right knowledge about life-style modification is very low. It is therefore imperative to develop different ways of improving the practice and knowledge of life-style modification. Consequently, this study aim to determine the effectiveness of a training programme on knowledge and practice of lifestyle modification among hypertensive patients. **Materials and Methods:** A quasi-experimental design was conducted with accidental sampling to select the sample size ($n = 30$). A modified structured questionnaire from World Health Organization (WHO), Hypertension Knowledge-Level Scale (HK-LS) were used to measure knowledge of hypertension, knowledge of lifestyle modification and practice. Tables, percentages, mean, Standard Deviation and t -test were used for data analysis at 0.05 levels of significance, through statistical package for the social science software. **Results:** The result showed that the t -test of the pre-knowledge about hypertension among hypertensive patients differed significantly from post-knowledge after intervention ($t = 4.90, p = 0.001$). In addition, there is significant different between the pre and post knowledge level about lifestyle modification after intervention ($t = 3.62, p = 0.001$). Significant different was also observed between the pre and post practice of lifestyle medication after intervention ($t = 3.56, p = 0.001$). **Conclusions:** The health care providers, especially the nurses, must provide a continuous and focused training programme for hypertensive patients in order to improve their knowledge and practice of lifestyle modification.

Keywords: Education, hypertension, knowledge, life style, Nigeria

Introduction

Hypertension is the most common non-communicable disease and the leading cause of cardiovascular disease in the world and many people with hypertension are unaware of their condition making treatment infrequent and inadequate.^[1] In terms of economic burden, poorly controlled blood pressure is a considerable important public health concern among older adult in the world. It has been proven that lifestyle modifications are capable of lowering hypertension.^[2] Despite this fact, it's been documented in several studies that most hypertensive patients don't have enough knowledge about lifestyle modification. In a study carried out in South-East Nigeria, it was revealed that about 87.10% of the participants were not aware of weight reduction, regular exercise, fruit intake,

cigarette smoking, and alcohol moderation as lifestyle modification therapy.^[3] Knowledge and practice of lifestyle modification among patients with high blood pressure has however been showed to be inadequate in some studies.^[4] In 2016, Jafari *et al.* postulated that having a partial knowledge and awareness alone will not lead to a change in health behaviours and practical application of knowledge.^[5,6] On the contrary to that, in UK, Nicoll and Henein revealed that many hypertensive patients are unwilling to accept that their lifestyle practices and suggest that health education about hypertension, its consequences and lifestyle modification must be considered.^[7] Therefore, this study aims to find out the effect of training programme on knowledge and practice of lifestyle modification among hypertensive patient.

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Materials and Methods

This is quasi-experimental design, which was conducted from December 2016 to July 2017 and adopted pre-test- post-test design, accidental sampling was used to select sample size of 30. The sample size was calculated according to slovin's formula, $n = \frac{N}{1 + e^2}$, where n = sample size, population size (N) = 32, and margin of error (e) = 0.05, with confidence level of 95%. The setting was Lagos University Teaching Hospital (LUTH), and the target population was male and female adult clients who have been diagnosed to be hypertensive and attending general and medical out-patient clinic in LUTH with a target population of 32.

The inclusion criteria were as follows: patients who were willing to participate in the study and who consented after carefully going through a detailed procedure of bioethical principles in conducting research studies on human participants, patients who were formally registered in the out-patient clinic and confirmed with their registration cards, and patients who were 21 years and above. The exclusion criterion was any patient with comorbidities that could limit him or her ability in participating in the training program and other activities of the study were excluded.

A modified structured questionnaire from World Health Organization (WHO), Hypertension Knowledge-Level Scale (HK-LS) was used to measure knowledge of hypertension, knowledge of lifestyle modification and practice. The data gathering tools were the demographic characteristic questionnaire, knowledge of hypertension, knowledge of lifestyle modification and practice scale. The knowledge of hypertension scale includes 20 items with maximum and minimum scores of 20 and 0, respectively. Scores 15-20 indicate high knowledge, 10-14 indicate moderate knowledge, and scores <10 indicate low knowledge.^[8] The knowledge of lifestyle modification scale includes 14 items with maximum and minimum score of 14 and 0, respectively. Scores 12-14 indicate high knowledge, 8-11 indicate moderate knowledge and, scores <7 indicate low knowledge of lifestyle modification.^[8] The practice of lifestyle modification scale includes 12 Multiple Choices Questions (MCQs) with maximum and minimum score of 96 and 0, respectively. Score ≥ 48 indicate positive practice and scores ≤ 47 indicate negative practice of lifestyle modification.^[8] The HK-LS is a global standardized tool which was designed and reported by sultan *et al.* in 2012. The reliability and content validity of the scale were obtained as 0.82 and 60.3% respectively.^[8] Furthermore, the psychometric properties of the questionnaire was checked by an expert in the field, using face and content validity criteria and the reliability of the instrument was established through a pretest method by administering 15 questionnaires to both male and female hypertensive patients with the same criterion attending physician clinic in Crystal Specialist Hospital Akowonjo, Lagos. In this way, Cronbach Alpha co-efficient was used to test reliability

using 10 well-filled questionnaires. The value obtained was 0.79, which indicated high reliability of the instrument. There were three phases in this study. Phase 1: This was for mobilization. Three major events took place in this phase; the researcher met with the consultants and nurses in General out-Patient Department (GOPD) and Medical out-Patients (MOP) clinics in LUTH to explain the purpose of the study and its benefits at the first week of the study. This was also to seek their cooperation for the success of the study. The researcher and research assistances visited the clinics Monday to Friday, in the second week of the study, to listen to health talk given to the patients by nurses and other health personnel, gaps were identified which was used to modify the training modules [Table 1]. Interested participants were selected for the study after seeking their consent. Further selection of interested participants continued in the third week. Questionnaires were administered as a pretest instrument to the clients attending hypertension clinic in the hospitals. The results from this phase were also used to modify the training program for better intervention. Participants were follow-up via phone calls (at least a call per week for the period of the training) and text messages, reminding them to come for the training programme. Phase2: Three weeks training program was planned and applied to the group, participants were met with at the seminar room of the clinic. In the first week of the training, 18 participants were available on the first day of the training programme using teaching aids, others were follow-up and this yielded another 12 attendee for the training which covers the first module, week two and three follow-up produced good results as 24 participants were available for the training which covers the second, third and fourth modules using teaching aids. 6 other participants were given training at different occasions in other to meet up with the sample size. Phase 3: after the application of training program for experimental group, a post-test was conducted with the same questionnaire used for pre-test. Data obtained were coded and analyzed using the Statistical Package for Social Science (SPSS) version 21.00 statistical software (IBM corp. released 2012. IBM SPSS statistics for widows, version 21 Armonk, NY: IBM Corp). Variables and research questions were analyzed using descriptive and *t*-test statistics.

Ethical considerations

Ethical approval for this study was obtained from three institutional ethical committees where the study took place, with approval reference BUHREC608/16 on November 30th, 2016, Babcock university, REF: LREC/06/10/77 and REF: ADM/DCST/HREC/APP/1398 from LUTH on 5th January 2017. The interviewer explained the importance and what the participants and others stand to benefit from the study. Therefore, obtained informed consent from the participants before the study commences. The participation in the study was voluntary, and they have the right to pull out from the study at any level as the study progresses.

Table 1: Training Programme module about lifestyle modification among Hypertensive Patients

Goals	Learning content
After the health teaching, the participant will be able to:	WEEK ONE
1. Have sufficient knowledge about hypertension.	1. Definition: Hypertension is the term used to describe high blood pressure. Blood pressure is a measurement of the force against the walls of your arteries as your heart pumps blood through your body. The top number is called the systolic blood pressure, and the bottom number is called the diastolic blood pressure.
2. To be aware of the risk of having hypertension.	2. Normal range for blood pressure Normal blood pressure is when your blood pressure is lower than 120/80 mmHg most of the time, and High blood pressure (hypertension) is when your blood pressure is 140/90 mmHg or above most of the time. If your blood pressure numbers are 120/80 or higher, but below 140/90, it is called pre-hypertension.
3. To know the different ways on how to control or prevent hypertension.	3. Causes, incidence, and risk factors: Many factors can affect blood pressure, including; How much water and salt you have in your body The condition of your kidneys, nervous system, or blood vessels The levels of different body hormones You are more likely to be told your blood pressure is too high as you get older. This is because your blood vessels become stiffer as you age. When that happens, your blood pressure goes up. You have a higher risk of high blood pressure if you: Are obese Are often stressed or anxious Drink too much alcohol (more than one drink per day for women and more than two drinks per day for men) Eat too much salt in your diet Have a family history of high blood pressure Have diabetes Smoke
	4. Types of hypertension: Most of the time, no cause of high blood pressure is found. This is called essential hypertension. High blood pressure that is caused by another medical condition or medication is called secondary hypertension.
	5. Causes of secondary hypertension: Chronic kidney disease Disorders of the adrenal gland (pheochromocytoma or Cushing syndrome) Pregnancy Medications such as birth control pills, diet pills, some cold medications, and migraine medications Narrowed artery that supplies blood to the kidney (renal artery stenosis) Hyperparathyroidism.
	6. Symptoms: Most of the time, there are no symptoms. For most patients, high blood pressure is found when they visit their health care provider or have it checked elsewhere. Because there are no symptoms, people can develop heart disease and kidney problems without knowing they have high blood pressure. If you have a severe headache, nausea or vomiting, bad headache, confusion, changes in your vision, or nosebleeds you may have a severe and dangerous form of high blood pressure called malignant hypertension.
	7. Signs and tests: Your health care provider will check your blood pressure several times before diagnosing you with high blood pressure. It is normal for your blood pressure to be different depending on the time of day. Blood pressure readings taken at home may be a better measure of your current blood pressure than those taken at your doctor's office. Make sure you get a good quality, well-fitting home device. It should have the proper sized cuff and a digital readout.

Contd...

Table 1: Contd...

Goals	Learning content
	<p>8. Complications:</p> <p>When blood pressure is not well controlled, you are at risk for: Bleeding from the aorta, the large blood vessel that supplies blood to the abdomen, pelvis, and legs</p> <p>Chronic kidney disease</p> <p>Heart attack and heart failure</p> <p>Poor blood supply to the legs</p> <p>Stroke</p> <p>Problems with your vision.</p> <p>9. Prevention:</p> <p>Adults over 21 should have their blood pressure checked regularly. Lifestyle changes may help control your blood pressure.</p> <p>WEEK TWO</p> <p>10. Recommended Treatment:</p> <p>The goal of treatment is to reduce blood pressure so that you have a lower risk of complications. You and your health care provider should set a blood pressure goal for you. If you have pre-hypertension, your health care provider will recommend lifestyle changes to bring your blood pressure down to a normal range. Medicines are rarely used for pre-hypertension but medication plus lifestyle modification is required for a confirmed case of hypertension.</p> <p>Lifestyle modification</p> <p>You can do many things to help control your blood pressure, including</p> <ol style="list-style-type: none"> 1. Eat a heart-healthy diet, including potassium and fibre, and drink plenty of water. 2. Exercise regularly: at least 30 minutes of aerobic exercise a day. 3. If you smoke, quit: find a program that will help you stop. 4. Limit how much alcohol you drink: one drink a day for women, two a day for men. 5. Limit the amount of sodium (salt) you eat: aim for less than 1,500 mg per day. 6. Reduce stress: try to avoid things that cause you stress. You can also try meditation or yoga. 7. Stay at a healthy body weight: find a weight-loss program to help you, if you need it. <p>Your health care provider can help you find programs for losing weight, stopping smoking, and exercising. You can also get a referral from your doctor to a dietician, who can help you plan a diet that is healthy for you.</p> <p>11. Medication:</p> <p>There are many different medicines that can be used to treat high blood pressure. Often, a single blood pressure drug may not be enough to control your blood pressure, and you may need to take two or more drugs. It is very important that you take the medications prescribed to you. If you have side effects, your health care provider can substitute a different medication.</p> <p>WEEK THREE</p> <ol style="list-style-type: none"> 1. Benefits of adherence to lifestyle modification 1.Prevent hypertension 2.Helps to control primary and secondary hypertension 3.Helps to reduce the risk of cardiovascular diseases such as stroke, 4.Significant drug cost reduction 5. Effect on other conditions, such as diabetes and hypercholesterolemia 6. Avoidance or delay of drug treatment with its potential for adverse effects. 7. Helps to enhance the effectiveness of hypertension medications <p>Cooking Tips on various food</p> <p>Tips on purchasing processed foods</p>

Results

Table 2 shows that the greater numbers of the participants were female 70.00% in the group. This may be due to the

fact that female termed to visit the clinics more, unlike male who pays more attention to their cars and electronics. Majority, 70% were married. Also majority, though below average, 43.30%, have tertiary education. Greater

percentages of the participants (76.70%) were Christians. 93.30% are 46.70% in the group are Yoruba. This is due to the fact that this study was carried out in South-west Nigeria where the majority are Yoruba.

Table 3 shows that 70% in the group answered that the best cooking method is not frying. 53.30% in the group attest boiling or grilling as the best method. 60% answered that individual with hypertension should not eat too much salt even when they are on medications. Table 4 shows that 56.70% have good knowledge about lifestyle modification pre-test and 80% have good knowledge about lifestyle

modification after training program. 13.30% have poor knowledge pre-test and poor knowledge is completely eliminated after the application of training program (0%).

Table 5 shows increase in practice (adequate ≥ 41) from 56.70% to 76% at the experimental group after application of training program which is relatively high when the scores are comparing with each other. Inadequate practice (0-47) reduced from 43.30% to 24%.

Finally, Table 6 shows that, there is a statistical different between pre- and post-knowledge of hypertension with $t = 4.9$, $p = 0.001$ after intervention. The study also show that the level of knowledge about lifestyle modification improved after intervention among the experimental group with $t = 3.62$, $p = 0.001$. Decisively, the study show that the practice of life style modification is low in the pre-test while there is a significant improvement in post- test after application of training program among the group, with t and p value of ($t = 3.56$, $p = 0.001$).

Table 2: Socio-demographic data of Hypertensive Patients Attending out-Patient Clinics in Lagos, Nigeria

Variable	Experimental (N=30) (%)
21-30	2 (6.70)
31-40	5 (16.70)
41-50	4 (13.30)
51-60	15 (50.00)
61-70	4 (13.30)
Male	9 (30.00)
Female	21 (70.00)
Christianity	23 (76.70)
Islam	7 (23.30)
Yoruba	14 (46.70)
Igbo	12 (40.00)
Hausa	3 (10.00)
Other	1 (3.30)
No formal education	3 (10.00)
Primary	5 (16.70)
Secondary	7 (23.30)
Tertiary	13 (43.30)
Post graduate	2 (6.70)
Single	5 (16.70)
Married	21 (70.00)
Widow	4 (13.30)
Total	30 (100.00)

Discussion

The study shows that there is fair knowledge about hypertension among the group but the knowledge about lifestyle modification is very low. In 2015, Abd El-Hay and Mezeyan findings contradict this present finding. They opined that many patients diagnosed with hypertension are not aware of it, and this is because most times hypertension does not come with symptom particularly in early phase, hence leading to delay diagnosis which might have caused complications without awareness.^[9] This study also shows that there is a relationship between the intervention and knowledge about hypertension. This is in agreement with the fact that there is a relationship between knowledge the training programme as supported by Precede-proceed theory.^[10] The participants knowledge about lifestyle modification which is low and inadequate practice of lifestyle modification seen among the participants of this

Table 3: Pre intervention knowledge about lifestyle modification among Hypertensive Patients Attending out-Patient Clinics in Lagos, Nigeria

Knowledge about lifestyle modification	Experimental Group (N=30) (%)
For individuals with increased blood pressure, the best cooking method is frying?	21 (70.00)
For individuals with increased blood pressure, the best cooking method is boiling or grilling?	16 (53.30)
Individuals with increased blood pressure can eat salty foods as long as they take their drugs regularly?	18 (60.00)
Individuals with increased blood pressure must eat fruits and vegetables frequently?	19 (63.30)
The best type of meat for individuals with increased blood pressure is red meat?	21 (70.00)
The best type of meat for individuals with increased blood pressure is white meat?	18 (60.00)
Individuals with increased blood pressure must not smoke?	20 (66.70)
Individuals with increased blood pressure can drink alcoholic beverages?	11 (36.70)
Been overweight can likely lead to developing high blood pressure?	20 (66.70)
Do you believe exercise can reduce blood pressure?	21 (70.00)
People who are on their feet most of the day will not benefit from more exercise?	14 (46.70)
Walking briskly for 30 min 3 times a week can lower BP?	16 (53.30)
Stress is not a risk factor for hypertension?	13 (43.30)
No need for regular check-ups when I take my hypertension drugs	20 (66.70)

Table 4: Summary of responses on knowledge about lifestyle modification pre intervention

Knowledge about lifestyle modification	Experimental Pre (N=30) (%)	Post (N=25) (%)
Poor knowledge (0-7)	4 (13.30)	0 (0.00)
Moderate (7-10)	9 (30.00)	4 (16.00)
Good (12-15)	17 (56.70)	21 (84.00)
Total	30 (100.00)	25 (100.00)

Table 5: Summary of responses on practice of lifestyle modification post intervention

	Experimental	
	Pre (N=30) (%)	Post (N=25) (%)
Practice lifestyle modification		
Inadequate practice (0-47)	13 (43.30)	6 (24.00)
Adequate practice (≥ 48)	17 (56.70)	19 (76.00)
Total	30 (100.0)	25 (100.00)

Table 6: *t*-test analysis for knowledge and practice

Variables	Max score	Min score	Mean (SD)	<i>t</i>	<i>p</i>
Knowledge	About	Hypertension			
Pre	18.00	0.00	11.24 (4.75)	4.94	0.001
Post	20.00	4.00	17.04 (3.46)		
Knowledge	About	Lifestyle Modification			
Pre	14.00	5.00	8.84 (4.25)	3.61	<0.001
Post	15.00	3.00	12.56 (2.90)		
Practice	Of	Lifestyle Modification			
Pre	63.00	19.00	43.04 (12.58)	3.56	0.001
Post	75.00	34.00	55.40 (11.98)		

study is in agreement with the submission of Okwuonu, Emmanuel and Ojimadu, 2014, who found that in south East, Nigeria, majority of the participants were not aware that exercise, moderate alcohol consumption and salt restriction have great effect on blood pressure control.^[3] Likewise, it was further found that they were not also aware of the roles of unsaturated oil, reduction in diary food, fruits and vegetables play in the control of blood pressure. Hence there was negative correlation between the level of practice and blood pressure control.^[11]

Lack of awareness of lifestyle modification and inability to practice was identified to post a barrier to hypertension control. The findings suggested that there is inadequate levels of knowledge and practice of non-drug intervention to achieve the ultimate goal of improving health by controlling hypertension. Therefore public education campaigns regarding compliance non-drug intervention should be encouraged.^[12] In other words, this lack of knowledge about lifestyle modification has been due to lack of health seeking behavior of the patients or lack of adequate information on the part of the health personnel.^[13] This is also supported by of Tilahum, Tesemman and Gizaw, 2015, who posited that advice given on lifestyle modification is not enough

to affect their practice behavior and knowledge but reinforcement and motivation in the form of training.^[14] The inadequate practice showed in this study further buttress the fact that doctors and nurses' advice given on lifestyle modification is not enough to affect their practice, behavior and knowledge.^[14] This is supported by the study carried out in US which says, the fact that hypertension treatment is focused on pharmacotherapy, advice on dietary adjustment and training on lifestyle modification is usually over looked by the health personnel leading to lack reinforcement, which will ultimately lead to inadequate practice of lifestyle modification.^[15] These findings is also synonymous to a study that says despite participants understanding that lifestyle modification controls hypertension and prevents complications, practice is less among hypertensive patients.^[16] Furthermore, the post-test score for practice of lifestyle modification showed adequate improvement among the participants, and also indicate that there is improved knowledge about hypertension, lifestyle modification and practice. This is an indication that the training programme was very effective and agree with the fact that when enough time is given to divulging relevant information on the importance of lifestyle in the control of blood pressure, it can lead to a better practice of lifestyle modification.^[14] These findings also in agreement with a study showed that more than 50% of the participants will adopt lifestyle modification once they have information about the effects.^[17] Likewise, the findings above further support the importance of a focused training programme to improve knowledge of hypertension, and practice of lifestyle modification. This study substantiates a study which stated that increase in knowledge about the role of lifestyle in the occurrence of high blood pressure would cause people to start modifying their lifestyles and enhance their preventive.^[4] Also, incongruence with a study who found out that the hypertensive patients become aware of lifestyle modification, more than 50% will adopt it.^[18]

Finally, some limitations were encountered in the course of the study despite the research objectives being met. First, it was difficult randomizing the participants because the number of patients seen at the general out-patients clinic per day who met the inclusion criteria was few. Hence, accidental sampling method was used, which could limit the generalization of this study. Secondly, having all the patients in one session for the training programme and for posttest was difficult, hence, the participants were taking in sessions, which could also affect the result.

Conclusion

The health care providers, especially the nurses, should provide a continuous, focused health education and training for the hypertensive patients to empower them in practicing positive health behaviors that will help them control their blood pressure. Based on the findings of this study, the following recommendations are made; the

health sector should intensify effort on health educating the populace on the type of lifestyle that put them at risk of developing hypertension through regular jingle via mass media. Other recommendation is that more time be given to this assignment; more than the usual 10-15 minutes' health talk at the medical out-patient clinics and should be more focused and intentional towards promoting lifestyle modification. Finally, the result of this study provides an evidence for responsiveness to change in knowledge and practice of life-style modification after an educational training was introduced. In this respect, holding educational training program is a basic instrument that can be used to effect positive behavioural changes needed in management of hypertensive patient. Life style modification is the way to go, if management of hypertension and other non-communicable diseases would be effective.

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Conflicts of interest

Nothing to declare.

References

- Gowshall M, Taylor-Robinson SD. The increasing prevalence of non-communicable diseases in low-middle income countries: The view from Malawi. *Int J Gen Med* 2018;11:255.
- Al-Wehedy A, Abd Elhameed SH, Abd El-Hameed D. Effect of lifestyle intervention program on controlling hypertension among older adults. *J Educ Pract* 2014;5:61-71.
- Okwuonu CG, Emmanuel CI, Ojimadu NE. Perception and practice of lifestyle modification in the management of hypertension among hypertensives in south-east Nigeria. *Int J Med Biomed Res* 2014;3:121-31.
- Jafari F, Shahriari M, Sabouhi F, Farsani AK, Babadi ME. Effects of a lifestyle modification program on knowledge, attitude and practice of hypertensive patients with angioplasty: A randomized controlled clinical trial. *Int J Community Based Nurs Midwifery* 2016;4:286-96.
- Nelson M. Drug treatment of elevated blood pressure. *Aust Prescr* 2010;33:108-2.
- Agyei-Baffour P, Tetteh G, Quansah DY, Boateng D. Prevalence and knowledge of hypertension among people living in rural communities in Ghana: A mixed method study. *Afri Health Sci* 2018;18:931-41.
- Nicoll R, Henein MY. Hypertension and lifestyle management: How useful are the guidelines? *Br J Gen Pract* 2010;60:879-800.
- Abd El-Hay SA, Mezayen SE. Knowledge and perceptions related to hypertension lifestyle behavior modification and challenges that is facing hypertensive patients. *IOSR J Nurs Sci (IOSR-JNHS)* 2015;4:15-26.
- Porter CM. Revisiting precede-proceed: A leading model for ecological and ethical health promotion. *Health Educ J* 2016;75:753-64.
- Gao Y, Chen G, Tian H, Lin L, Lu J, Weng J, *et al.* Prevalence of hypertension in China: A cross-sectional study. *PloS One* 2013;8:e65938.
- Olorunfemi O, Ojewole F. Medication belief as correlate of medication adherence among patients with diabetes in Edo State, Nigeria. *Nurs Open* 2018;6:197-202.
- Kahan S, Gielen AC, Fagan PJ, Green LW, editors. *Health Behavior Change in Populations*. JHU Press; 2014.
- Tilahun T, Tesemma S, Gizaw D. Knowledge, attitude and practice of non-pharmacologic therapy among hypertensive patients in Bishoftu, Ethiopia. *J Health Med Nurs* 2015;19:2422-8419.
- Alhalaiqa F, Al-Nawafleh A, Batiha AM, Masa'deh R, AL-Razek AA. A descriptive study of adherence to lifestyle modification factors among hypertensive patients. *Turk J Med Sci* 2017;47:273-81.
- Durai V, Muthuthandavan AR. Knowledge and practice on lifestyle modifications among males with hypertension. *Indian J Community Health* 2015;27:143-9.
- Yang MH, Kang SY, Lee JA, Kim YS, Sung EJ, Lee KY, *et al.* The effect of lifestyle changes on blood pressure control among hypertensive patients. *Korean J Family Med* 2017;38:173-80.
- Ike SO, Aniebue PN, Aniebue UU. Knowledge, perceptions and practices of lifestyle-modification measures among adult hypertensives in Nigeria. *Trans Royal Soc Trop Med Hyg* 2010;104:55-60.
- Baliz Erkoc S, Isikli B, Metintas S, Kalyoncu C. Hypertension knowledge-level scale (HK-LS): A study on development, validity and reliability. *Int J Environ Res Public Health* 2012;9:1018-29.