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REVIEW ARTICLE

A SYSTEMATIC REVIEW ON HYPERTENSION AND ITS MANAGEMENT

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Abstract

Hypertension is a public health problem which has cut across all spheres of life and walks of life. From the literature review, the researcher has found that most hypertensive patients are less engaged in healthy behaviours because of knowledge deficit. The literature reviews also indicated that gender, age, level of education, lifestyle, and compliance to treatment regimen had significant association with healthy behaviours in patients with hypertension.

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Introduction:-

Hypertension is defined as a medical condition in which the blood pressure in the arteries is elevated exceeding 140 over 90 mmHg (Seham and Samira, 2015). High blood pressure is a common condition in which the long term force of blood pressure against the artery walls is high enough that it may eventually cause health problems such as heart disease (Mayo clinic, 2018; Nnatuanya et al., 2017; Nwovu et al., 201; Obeagu et al., 2016; Obeagu et al., 2018; Ozims et al., 2017).

Hypertension is a major worldwide public health problem because of its high prevalence with vascular disease, premature death, stroke, renal disease and retinopathy (Bani, 2017). According to American Heart Association, the estimated prevalence of hypertension worldwide was 73,600,000 (35,300,000 males and 38,300,000 females) (Maryet al., 2012).

According to World Health Organization, (2019) a review of current trend shows that the number of adult with hypertension increased from 594 million in 1975 to 1.13 billion in 2015, with the increase seen largely in low and middle income countries.

Adeloye et al. (2015) estimated about 20.8 million cases of hypertension in Nigeria among people aged at least 20 years in 2010 with a prevalence of 28.0% (24.6,31.9) in both sexes, 30.7% (24.9,33.7) among men and 25.2% (22.7,31.9) among women.

Various risk factors have been associated with hypertension such as; age - where majority of cases of uncontrolled hypertension are among elderly people, sex, race, decrease physical activity, obesity, smoking, dietary, hormonal changes, which plays key role in the development of hypertension and identifying these risk factors may help in

creating strategizing modalities for reducing preventable risk factors such as weight, excess salt intake, cigarette smoking and alcohol use (Seham and Samira,2015).

The goal of hypertension management is to prevent short and long term complications by achieving and maintaining the blood pressure at 140/90 mmHg or lower (Mersal and Mersal,2015).

Hypertension

World Health Organization (2019) stated that Hypertension or elevated blood pressure is a serious medical condition that significantly increases the risk of heart, brain, kidney and other diseases, with an estimated 1.13billion people worldwide have hypertension, most(two-thirds) living in low and middle income country. In 2015, 1 in 4 men and 1 in 5 women had hypertension; fewer than 1 in 5 people with hypertension have the problem under control. Hypertension, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure. Blood is carried from the heart to all parts of the body in the vessels. Each time the heart beats, it pumps blood into the vessels. Blood pressure is created by the force of blood pushing against the walls of blood vessels (arteries) as it is pumped by the heart. The higher the pressure, the harder the heart has to pump (WHO, 2020). Flow of blood is based on the beat of which the heart pumps blood, the pressure of the heart does not stay at the same level at all times and it varies based on activities at a particular point in time, Hypertension occurs as a result to long duration of abnormal pressure of the main arteries (Cunha and Mark, 2011).

Hypertension is grouped into two main categories. These include primary and secondary hypertension. Primary hypertension is also known as essential hypertension and it affects ninety-five per cent of persons suffering from the disease. Causes of hypertension are not yet known, however, factors as age, high salt intake, low potassium diet, sedentary lifestyle, stress as well as genes have been found as contributing to hypertension. High blood pressure occurring as a result to a consequence of another disorder or a side effect of medication is referred to as secondary high blood pressure. Such disorders may include renal failure or Reno vascular disease. This type of blood pressure is evident in about five to 10% of cases (Cunha and Mark, 2011).

Hypertension is a public health problem and a term used to describe HBP. It is a condition that occurs as a result of repeatedly elevated blood pressure exceeding 140 over 90 mmHg whereby a systolic pressure above 140 with a diastolic pressure above 90. However, normal blood pressure is below 120/80; readings between 120/80 and 139/89 is called pre-hypertension. Systolic blood pressure is the pressure in the arteries as the heart contracts and pumps blood forward into the arteries whereas diastolic represents pressure as a result to relaxation of the arteries after contraction. (Cunha and Mark, 2011). It has been called a silent killer as it is usually without symptoms. Hypertension takes a long time before diagnosed thereby causing major health problems as stroke and other cardiovascular diseases. Damage to organs as the brain, heart, kidneys and eye and so on are the long term effect of high blood pressure disease.(Cunha and Mark, 2011).

Hypertension is a serious medical condition and can increase the risk of heart, brain, kidney and other diseases. It is a major cause of premature death worldwide, with upwards of 1 in 4 men and 1 in 5 women – over a billion people – having the condition. The burden of hypertension is felt disproportionately in low- and middle-income countries, where two thirds of cases are found, largely due to increased risk factors in those populations in recent decades (WHO, 2020). Diagnosis of high blood pressure is usually measured with a device called sphygmomanometer. This consist of an inflatable rubber cuff, an air pump and a column of mercury or a digital readout reflecting pressure in an air column as well as electronic blood pressure machines. The readings are widely expressed in millimetres of mercury or mmHg. Diagnosis of high blood pressure is not based on a single reading except when it is extremely high (above 170-180/105-110)

Hypertension is an important public health problem and the leading cause of cardiovascular disease globally; it accounts for about 6% of deaths worldwide and affects approximately 11–42% of Africans. Hypertension ranks first among non-communicable diseases in Nigeria with prevalence ranging from 8% to 46.4% in both men and women in rural and urban communities. A recent non-communicable disease survey in Abia State obtained a prevalence of 31.8% among 2999 respondents. Studies have shown that most people in the general population are not aware of their BP status. With relative lack of symptoms, most people with hypertension are unaware and some who are aware are non-adherent to prescribed pharmacologic and non-pharmacologic measures required for optimal BP control. There is poor awareness of BP status in the studied population especially among the males Awareness was

higher in females but did not differ significantly among the different age groups, educational status or occupations. One of the first steps toward the prevention of a disease is awareness of the disease (Okwuonuet al., 2016).

Increasing age is associated with a progressive rise in risk of vascular mortality with a 20 mmHg rise in SBP above 125 mmHg or 10 mmHg above DBP of 75 mmHg, and this observed risk is common among the elderly population. Despite the high burden of hypertension, most affected persons are not aware of its presence, thus increasing the occurrence of associated complications, particularly among elderly populations. Awareness of the diagnosis of hypertension is an important determinant of treatment and medication adherence. Awareness of hypertension is high in developed countries compared to developing nations. The knowledge and awareness of the diagnosis as well as of the risk associated with uncontrolled hypertension tend to enhance patients' adherence to lifestyle modifications and to medications (Rajiet al., 2017)

Causes of hypertension

The cause of hypertension is not yet known unless it is secondary high blood pressure. However, there are many underlying factors associated with the occurrence. These factors include: aging, excessive salt intake, sedentary lifestyle as well as genetic factors (Cunha and Mark, 2011).

In some patients, hypertension has been reported to be a psychosomatic or behavioural disorder, where its aetiology and prognosis have been linked to some psychological factors including personality traits. Personality traits refer to relatively stable emotional, cognitive, and behavioural differences among individuals and have been shown to be highly consistent across adulthood. The most common personality model explored has been the Big Five personality traits which suggests five broad domains used to describe human personality. The five dimensions comprising agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience have shown various associations with health outcomes in patients with hypertension and cardiovascular diseases (KretchyIet al., 2019).

Predisposing Factors:

1. Above 40 Years
2. Obesity
3. Intake of contraception
4. A high fat consume.
5. Stress at work and in the daily life.
6. Smoking.
7. Over-weight.
8. Lack of exercise.

Risk Factors

Non Modifiable Risk Factors

Family history (Family history of hypertension) Age (Age over 65 years)

Sex

Modifiable Risk Factors Obesity

Diet

Physical activity Smoking Alcoholism

High Risk Factors

A diet high in saturated fat

Excessive salt consumption

Overweight and obesity

A sedentary lifestyle and lack of exercise

Excessive alcohol consumption

Smoking

Un-managed stress

A family history of high blood pressure

Being over 65 years of age

Co-morbidities such as diabetes

Signs and Symptoms

It is asymptomatic but a person with hypertensive crisis (very high blood pressure) may experience;

Frequent Headache

Anxiety

Fatigue

Dizziness

Palpitations

Tachycardia (rapid heart rate)

Nosebleeds

Blurred vision

shortness of breath

Treatment of Hypertension

Goals of therapy

The ultimate goal in treatment of the hypertensive patient is to achieve the maximum reduction in the long-term total risk of cardiovascular morbidity and mortality. This requires:

treatment of all reversible risk factors identified including smoking, dyslipidaemia and diabetes mellitus;

appropriate management of associated clinical conditions such as congestive heart failure, coronary artery disease, peripheral vascular disease and transient ischaemic attacks;

Achieving office blood pressure values $<130/80$ mmHg for patients with diabetes mellitus or chronic renal disease. When home or ambulatory pressure measurements are used to evaluate the efficacy of treatment, daytime values around 10–15 mmHg lower for systolic blood pressure and 5–10 mmHg lower for diastolic blood pressure are the goal values.

Because most patients with hypertension, especially those aged ≥ 50 years, will reach the diastolic blood pressure goal once the systolic blood pressure is at goal, the primary focus should be on achieving systolic blood pressure goal (WHO, 2019).

Treating systolic and diastolic blood pressure to target is associated with a decrease in cardiovascular complications. This includes 35%–40% mean reduction in stroke incidence, 20%–25% mean reduction in myocardial infarction and $>50\%$ mean reduction in heart failure.

Non Pharmacological Management of Hypertension Lifestyle modifications

Adoption of healthy lifestyles by all individuals is critical in the prevention of high blood pressure and an indispensable part of the management of those with hypertension. Lifestyle modifications decrease blood pressure, enhance antihypertensive drug efficacy and decrease cardiovascular risk. Patients with prehypertension and no compelling indication (including heart failure, prior myocardial infarction or stroke, high coronary risk status, diabetes mellitus, chronic renal disease) respond well to lifestyle modifications and usually do not need drug therapy. For all other abnormal blood pressure categories, drug therapy is indicated if goal blood pressure is not achieved by lifestyle modification alone.

Cessation of smoking

This is probably the single most powerful lifestyle measure for the prevention of non-cardiovascular and cardiovascular diseases, including stroke and coronary heart disease. Although any independent chronic effect of smoking on blood pressure is small and smoking cessation does not lower blood pressure, total cardiovascular risk is greatly increased by smoking. In addition, smoking may interfere with the beneficial effects of some antihypertensive agents such as β -adrenergic blockers. When necessary, nicotine replacement or bupropion therapies should be considered since they appear to be safe in hypertension and to facilitate smoking cessation.

Weight reduction and physical exercise

Weight reduction reduces blood pressure in overweight patients and has beneficial effects on associated risk factors such as insulin resistance, diabetes, hyperlipidaemia and LVH. Attainment of ideal body weight is by no means necessary to produce lower blood pressure. Blood pressure is lowered by 1.6/1.1 mmHg for every kilogram of weight loss. Many hypertensive patients have much more than 10 kg of excess adiposity and many of them would no longer be hypertensive if they lost even this amount of body fat. The blood pressure lowering effect of weight reduction may be enhanced by a simultaneous increase in physical exercise. Thus, sedentary patients should be advised to take up modest levels of aerobic exercise on a regular basis such as brisk walking for at least 30 minutes per day, most days of the week. However, isometric exercise such as heavy weight-lifting can have pressor effect and should be avoided. When hypertension is poorly controlled, and always for severe hypertension, heavy physical exercise should be discouraged or postponed until appropriate drug treatment has been instituted and found to be effective.

Reduction of salt intake and other dietary changes

Reducing dietary sodium intake to no more than 100 mEq/L (2.4g sodium or 6g sodium chloride) reduces the blood pressure by an average of 4–6 mmHg. Patients should be advised to avoid added salt, to avoid obviously salted food (particularly processed foods) and to eat more meals cooked directly from natural ingredients containing more potassium. Hypertensive patients should also be advised to eat more fruit and vegetables, to eat more fish and to reduce their intake of saturated fat and cholesterol. This is well achieved by adoption of the Dietary Approach to Stop Hypertension (DASH) eating plan. The DASH diet is rich in fruits, vegetables and low-fat dairy foods including whole grains, poultry, fish and nuts, and is reduced in fats, red meat, sweets and sugar-containing beverages. It contains reduced amounts of total and saturated fat and cholesterol, and increased amounts of potassium, calcium, magnesium, dietary fibre and protein. Fruits and vegetables, including nuts, are responsible for at least half of the total effect of the DASH diet. Moreover, the DASH diet is reasonably low in cost. The combined effects on blood pressure of low sodium intake and the DASH diet are greater than the effects of either alone and are substantial.

Cessation of alcohol consumption

There is a linear relationship between alcohol consumption, blood pressure levels and prevalence of hypertension in populations. High levels of alcohol consumption are associated with a high risk of stroke, particularly so for binge drinking. Additionally, alcohol attenuates the effects of antihypertensive drug therapy. Heavy drinkers may also experience a rise of blood pressure after acute alcohol withdrawal. Hypertensive patients who drink alcohol should be advised to stop drinking. If they insist on continuing to drink they should be advised, in any case, not to consume more than 30 ml of ethanol (the equivalent of two drinks per day) in men and no more than 15 ml of ethanol (one drink per day) in women and lighter-weight persons. (One drink is 360 ml of beer, 150ml of wine and 45 ml of 80%-proof liquor).

Pharmacological management of hypertension

Thiazide diuretics. Diuretics, sometimes called water pills, are medications that act on your kidneys to help your body eliminate sodium and water, reducing blood volume. Thiazide diuretics are often the first, but not the only, choice in high blood pressure medications. Thiazide diuretics include chlorthalidone, hydrochlorothiazide (Microzide) and others. A common side effect of diuretics is increased urination.

Angiotensin-converting enzyme (ACE) inhibitors. These medications—such as lisinopril (Zestril), benazepril (Lotensin), captopril (Capoten) and others — help relax blood vessels by blocking the formation of a natural chemical that narrows blood vessels. People with chronic kidney disease may benefit from having an ACE inhibitor as one of their medications.

Angiotensin II receptor blockers (ARBs). These medications help relax blood vessels by blocking the action, not the formation, of a natural chemical that narrows blood vessels. ARBs include candesartan (Atacand), losartan (Cozaar) and others. People with chronic kidney disease may benefit from having an ARB as one of their medications.

Calcium channel blockers. These medications—including amlodipine (Norvasc), diltiazem (Cardizem, Tiazac, others) and others — help relax the muscles of your blood vessels. Some slow your heart rate. Calcium channel blockers may work better for older people and people of African heritage than do ACE inhibitors alone. Grapefruit

juice interacts with some calcium channel blockers, increasing blood levels of the medication and putting you at higher risk of side effects.

Additional Medications Sometimes Used To Treat High Blood Pressure

If you're having trouble reaching your blood pressure goal with combinations of the above medications, your doctor may prescribe:

Alpha blockers. These medications reduce nerve impulses to blood vessels, reducing the effects of natural chemicals that narrow blood vessels. Alpha blockers include doxazosin (Cardura), prazosin (Minipress) and others.

Alpha-beta blockers. In addition to reducing nerve impulses to blood vessels, alpha-beta blockers slow the heartbeat to reduce the amount of blood that must be pumped through the vessels. Alpha-beta blockers include carvedilol (Coreg) and labetalol (Trandate).

Beta blockers. These medications reduce the workload on your heart and open your blood vessels, causing your heart to beat slower and with less force. Beta blockers include acebutolol (Sectral), atenolol (Tenormin) and others. Beta blockers aren't usually recommended as the only medication you're prescribed, but they may be effective when combined with other blood pressure medications.

Aldosterone antagonists. Examples are spironolactone (Aldactone) and eplerenone (Inspra). These drugs block the effect of a natural chemical that can lead to salt and fluid retention, which can contribute to high blood pressure.

Renin inhibitors. Aliskiren (Tekturna) slows down the production of renin, an enzyme produced by your kidneys that starts a chain of chemical steps that increases blood pressure. Aliskiren works by reducing the ability of renin to begin this process. Due to a risk of serious complications, including stroke, you shouldn't take aliskiren with ACE inhibitors or ARBs.

Vasodilators. These medications, including hydralazine and minoxidil, work directly on the muscles in the walls of your arteries, preventing the muscles from tightening and your arteries from narrowing.

Central-acting agents. These medications prevent your brain from signalling your nervous system to increase your heart rate and narrow your blood vessels. Examples include clonidine (Catapres, Kapvay), guanfacine (Intuniv, Tenex) and methyl dopa.

Complications

1. Heart attacks
2. Stroke
3. Heart failure
4. Aortic dissection (splitting of aorta)
5. Kidney damage
6. Vision loss
7. Erectile dysfunction (a type of impotence)
8. Memory loss
9. Fluids in the lungs
10. Diseases of the peripheral arteries

Conclusion:-

Gender, age, level of education, lifestyle, and compliance to treatment regimen had significant association with healthy behaviours in patients with hypertension.

Knowledge and perception about hypertension is good with fair drug compliance and attitude towards its management. Thus, health educational materials, intense behavioural modifications and incorporating health literacy and competence will bring benefit to the participants to prevent the complications of hypertension and for good adherence to treatment.

Reference:-

1. Adelaye, D., Catriona, B., Aderemi, A.V., Thompson, J.Y. and Obi, F.A. (2015). An estimate of the prevalence of hypertension in Nigeria: a systematic review and meta-analysis” *J Hypertens.* 33(2):230-242.
2. Bani, A.(2017). Prevalence and Related Risk Factors Of Essential Hypertension In Jazan Region, Saudi Arabia. *Sudanese Journal Of Public Health.* 6(2): 45-50.
3. Chijioke C., Anakwue R, Okolo T, Ekwe E, Eze C, Agunyenwa C, Nwosu N, Amah C, Nwadike K, and Uduenna C. (2016). Awareness, Treatment, and Control of Hypertension in Primary Health Care and Secondary Referral Medical Outpatient Clinic Settings at Enugu, Southeast Nigeria. *International Journal of Hypertension* accessed <https://doi.org/10.1155/2016/5628453>
4. Chimberengwa PT, Naidoo M, (2019). Knowledge, attitudes and practices related to hypertension among residents of a disadvantaged rural community in southern Zimbabwe. *PLoS ONE* 14(6): e0215500. Accessed 15 July, 2020 <https://doi.org/10.1371/journal.pone.0215500>
5. Cunha, J. P. and Marks, J.W. (2011). High blood pressure (hypertension). Available: http://www.medicinenet.com/high_blood_pressure/article.htm.
6. Kumanan T., Pirasath S. and Guruparan M. (2017). A Study on Knowledge, Awareness, and Medication Adherence in Patients with Hypertension from a Tertiary Care Centre from Northern Sri Lanka” *International Journal of Hypertension*, vol. 2017, Article ID 9656450, 6 pages, 2017. <https://doi.org/10.1155/2017/9656450>
7. Mayor Clinic Staff (2018). High blood pressure (hypertension) retrieved on 20 July, 2020
8. From <https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/diagnosis/treatment/drc-20373417>
9. Mary Beth, M.R., Low, S.Y. and Chung, P.Y. (2012). Study To Assess The Knowledge Self-Blood Pressure Monitoring Among Hypertensive Patients In Selected Wards Of The Hospital Lam Wah Ee, Malaysia, *School Of Health Science, International Medical University Kuala Lumpur, Malaysia*, *Ie JSME.*6(2):43-45
10. Mersal, F.A. and Mersal, N.A. (2015). Effect of Evidence Based Lifestyle Guidelines On Self Efficacy Of Patients With Hypertension” *International J. Of Current Microbiology and Applied Science*, 4(3):244-263.
11. Nnatuanya, I.N., Obeagu, E.I., Nnatuanya, C.I.C., Ogar, O.A., Stephen, E.C. and Onah ,A. (2017). Evaluation of Alpha One Anti-Trypsin and Haptoglobin in Hypertensive Patients in Obeagu, E.I., Ezimah, A.C.U. and Obeagu, G.U. (2016). Erythropoietin in Hypertension: A Review. *J. Biol. Chem. Research.* 33 (1): 261-278.
12. Nwovu, A.I., Obeagu, E.I., Obeagu, G.U. and Nnadiokwe, O.I. (2018). Evaluation of platelet and prothrombin time in hypertensive patients attending clinic in Federal Teaching Hospital Abakaliki. *Open Acc Blood Res Transfus J.*1(5):555571.
13. Obeagu, E.I., Ezimah, A.C.U. and Obeagu, G.U. (2016). Erythropoietin in hypertension: A review. *J. Biol. Chem. Research.*;33(1):261-278.
14. Obeagu E.I., Chijioke, U.O. and Ekelozie I.S. (2018). Hypertension a great threat to human life. *Int. J. Adv. Res. Biol. Sci.* 5(10): 159-161.
15. Obeagu, E. I., Chukwueze, C. M., Ibekwe, A. M. and Famodimu, I. P. (2022). Evaluation of Haematological Parameters of Hypertensive Patients Based on Gender in Federal Medical Center, Owo, Ondo State. *Asian Hematology Research Journal*, 6(2), 23-26.
16. Okwuonu, C.G., Ojima, N.E., Chimezie, O.J., Madudonu, U., Ogbulafor, N. and Ogah, O.S. (2016). Awareness of blood pressure status, undiagnosed hypertension and proteinuria among adults in Umuahia, South-East Nigeria. *Sahel Med J* 19:82-8.
17. Ozims S.J., Eberendu I.F., Amah H.C., Nwosu D.C., Obeagu E.I., Ibanga I.E., Agu G.C., Uhegbu U., Ihekaire D.E., Amah C.C., Obasi C.C., Agwadike E.O., and Obioma- Elemba J.E. (2017). Prevalence of hypertension among adults aged 30- 69 years who used Imo state specialist hospital, Owerri, Nigeria from 2009-2013. *Int. J. Curr. Res. Med. Sci.* 3(11): 71-82.
18. Raji, Y.R., Abiona, T. and Gureje, O.(2017). Awareness of hypertension and its impact on blood pressure control among elderly Nigerians: report from the Ibadan study of
19. aging. *Pan African Medical Journal.*27:190.
20. Seham, A.A. and Samira, E. E (2015). Knowledge and perceptions related to Hypertension, lifestyle behaviour modification and challenges that facing hypertensive patients. *Journal of Nursing and health science.* 4(6):15-126.
21. WHO (2020). Hypertension. https://www.who.int/healthtopics/hypertension/#tab=tab_1
22. WHO (2019). Hypertension. <https://www.who.int/news-room/factsheets/detail/hypertension>.