

## EFFECT OF DIET ON THE ETIOLOGY AND TREATMENT OF ESSENTIAL HYPERTENSION: A REVIEW.

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### ABSTRACT

Essential hypertension or primary hypertension is a chronic elevation of the diastolic arterial pressure without a demonstrable cause. In this review it was established that excess salt intake, excess alcohol consumption, high calorific diet, high saturated fat and cholesterol diets, cigarette smoking, genetic, psychological, physiological and environmental conditions could lead to an increase in the diastolic arterial blood pressure which if not brought under control could be detrimental to health. Hence, diet modification has been found to play a tremendous role in keeping the blood pressure under control. Low-salt diets, low calorific diet, consumption of highly unsaturated fat and low cholesterol diets, less alcohol consumption, abstinence from cigarette smoking and other diet modifications have been found to help hypertensive patients return their blood pressure to normal as well as living a stress-free environment and also engaging in regular physical exercise.

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### INTRODUCTION

Hypertension is an abnormal increase in blood pressure, which if not regulated could lead to other several disorders. Hypertension means high blood pressure within arteries and arterioles (1). It is a very common disorder in industrialised societies generating a multitude of vascular complications such as heart failure, stroke e.t.c which until short time ago were often fatal.

No definition of hypertension is universally acceptable, however, any definition of hypertension must remain flexible as the blood pressure varies with age and sex, in most communities and even in the same individual (2)

A well-defined and more acceptable definition is that of the World Health Organisation, which defined hypertension as follows

- An adult is normotensive when his or her systolic arterial pressure is below 140mmHg and when his or her diastolic arterial pressure is below 90mmHg.
- An adult is hypertensive when his or her systolic arterial pressure is above 160mmHg and when his or her diastolic arterial pressure is above 95mmHg.
- When systolic arterial pressure lies between 140mmHg and 160mmHg and diastolic pressure is between 90mmHg and 95mmHg the term borderline Hypertension is used.

There are varieties of hypertension, there is permanent hypertension where both systolic and diastolic arterial pressures are permanently above normal values at all times during an active life. Labile hypertension is characterised by an occasional elevation of systolic or diastolic arterial pressure or both. There is also essential hypertension, which is a chronic elevation of the diastolic arterial pressure without a demonstrable cause. The mechanism underlying essential hypertension have not been fully elucidated but many theories exist such as excessive salt intake, diet, genetic, environmental, psychological and physiological factors.

The study of the spread of hypertension in different populations in recent years have provided a host of new insights into the natural history and consequences of hypertension as well as etiological factors. Studies of urban populations in Africa have shown that the blood pressure rises steadily with age due to excess salt, access to variety of diets and other factors (stress).

The objective of this review is to provide hypertensive patients with a cost-effective approach to the treatment of essential hypertension i.e. through diet modification and also to educate normal individuals on the roles diets as well as stressful environment play in the genesis of hypertension.

## DIETARY HABIT AND ETIOLOGY OF ESSENTIAL HYPERTENSION

One thing that still pose problems in the study of hypertension is trying to find the causes of primary or essential hypertension. In majority of cases about 90 percent of chronic diastolic hypertension are without a demonstrable cause and the condition is designated as essential hypertension(1).

The mechanism underlying primary hypertension have not been fully elucidated but many theories were found to abound such as genetics, environmental, psychological and physiological (2). Certain risk factors tend to aggravate essential hypertension, these include tobacco consumption, excessive alcohol consumption, carbohydrate, cholesterol, salt intake, overweight and diabetes.

**Excess Dietary Salt:** The relationship between salt intake and hypertension has been extensively studied from an experimental as well as from clinical and epidemiological point of view. Chronic ingestion of excess salt alone has produced hypertension in man and rats (3). Hypertension has been produced in normal human subjected to prolong administration of sodium (4). Sodium is a primary cause of hypertension because it causes fluid retention, which adds additional stress to the heart and the circulatory system.

Epidemiological surveys have provided circumstantial evidence of a correlation between salt consumption and hypertension. People in towns tend to eat more salt and their salt habit may partly explain why urban people have higher blood pressure than rural people (5).

**Dietary Fat and Cholesterol:** - cholesterol sometimes called animal fat is a class of water insoluble steroids which performs important biological role. The body can make more cholesterol than it needs and its content of cholesterol is a balance between synthesis, absorption, degradation and excretion (6). Most dietary cholesterol occurs as cholesterol ester which cannot be absorbed directly but is first hydrolysed to free fatty acid and cholesterol (6).

Cholesterol is transported in the blood in association with protein molecules thus forming a lipoprotein complex. Included in the composition of fats circulating in the blood are high-density lipoprotein (HDL), low-density lipoprotein (LDL), very low density lipoprotein (VLDL). The HDL component is protective, against the production of atheroma whereas the LDL and VLDL fractions increase the risk of its development (7).

Hypertension has been found to predispose to arteriosclerosis and vice versa (8). Arteriosclerosis is the process in which the lining of the arteries thickens with deposition of fatty substance and cholesterol, the thickening often involve the whole circumference of the arteries and can cause all degree of narrowing and obstruction of the blood passing through the arteries, thus leading to high blood pressure.

**Tobacco Consumption:** - Cigarette smoking is one of the etiological factors that aggravate the occurrence of hypertension in males and sometimes in females (7). There is about four times greater chance of developing coronary disease among average cigarette smokers than non-smokers. The factors most important for total cardiovascular mortality in male hypertensive patients is concomitant cigarette smoking; hypertension plus smoking appears to be worse than hypercholesterolemia in association with hypertension (9).

Smoking a cigarette increases the pulse rate and the out-put of the heart as well as raising blood pressure (7).  
**Over Eating/Overweight:-** Over eating is obviously the cause of increased body weight and may lead to obesity. Obesity is associated with high blood pressure (10).

Consumption of high-energy diets such as fats and carbohydrates are responsible for high increase in body weight. Over eating may therefore be responsible for the increase among urban dwellers of the diabetes mellitus, which can raise blood pressure by various mechanisms (11).

**Excess Carbohydrate Intake:-** Carbohydrate is a high energy compound thus its excessive consumption could lead to over – weight which in itself could result to high blood pressure. Looking at the metabolism of carbohydrate, excessive consumption of carbohydrate means that it can be converted to fat because of interconversion between carbohydrate and Lipid metabolism. Excess carbohydrate intake leads to obesity, which is a risk factor in the development of high blood pressure (7).

**Alcohol Consumption:-** Blood pressure and drinking behaviour has been extensively studied. Men and women who were heavy drinkers were equally at risk for developing hypertension and that heavy drinker had a significantly

higher prevalence of hypertension than those who drink less (12) did. Alcohol can adversely affect the heart functioning of individuals with cardiac disease even at relatively low doses but the ready reversibility of this pathology usually allows people who don't drink heavily to escape serious consequences (12).

Ethanol raises the blood pressure (13), and it has been reported also that ethanol increases the blood fats (14).

#### **Other Factors**

Having discussed the roles diets play in the evolution of essential hypertension, it is informative to mention here that apart from what we take in through the mouth there are some other etiological factors which tend to aggravate or could lead to increase in blood pressure some of these factors include environmental factors such as stress, infections, affluence and lack of exercise (5)

### **MANAGEMENT AND TREATMENT OF ESSENTIAL HYPERTENSION**

Hypertension needs to be properly managed and treated to prevent complications or death. Certain factors must be put into considerations in the management and treatment of hypertension. These factors include the environment, diet routine, sex, extent of the disease and when to begin treatment.

The objectives of treatment are in two folds:

- (1) To lower blood pressure to normal or to the lowest level that the patient will tolerate without intolerable side effects.
- (2) To prevent, lessen or if possible reverse damage from the effects of increased pressure on the walls of blood vessels of the brain, heart and kidneys as well as to prevent severe hypertrophy of the left ventricles.

Devoting resources to the effective treatment of essential hypertension should be a priority because such treatment will reduce morbidity and mortality associated with hypertension and related cardiovascular disease. Clinical and epidemiological studies have demonstrated that treatment for hypertension should not be initiated unless diastolic blood pressure readings are 90 mmHg or greater on three successive office visits (15). Treatment of essential hypertension should be carried out in a stepwise manner using a non-pharmacological approach first then followed by drug therapy.

#### **DIET AND TREATMENT OF ESSENTIAL HYPERTENSION.**

**Reduction Of Sodium Intake:-** It has been demonstrated in both experimental and epidemiological studies that high level of dietary sodium can aggravate hypertension. A lot of achievements have therefore been made in trying to find out the effect of low-salt diet or free salt diet in hypertensive patients.

Diets very low in salt have become very firmly entrenched as a routine anti-hypertensive measure since the demonstration that such regimen achieves a significant reduction in blood pressure (4). The restriction of sodium intake is one of the dietary approaches to the control of hypertension that may be effective by themselves in the control of essential hypertension or that may work in conjunction with drug therapy (16). Sodium Chloride (NaCl) is the main preservative and food seasoning in the world. Effective Salt restriction therefore may require a substitute for conservation and flavouring in food processing, nitrosamines for example are suspected of causing gastric cancer (3). Excessively high salt consumption should be discouraged in hypertensive subjects because it appears to adversely affect the severity of existing hypertension (16).

**Abstinence From Cigarette Smoking:-** Excessive tobacco consumption have been found to aggravate hypertension (9). These epidemiological findings make it clear that hypertensive patients particularly males should not smoke cigarette. Compulsive smokers may find it more difficult in giving up cigarettes than the compulsive eater is, in decreasing his food intake, such a person can thus change to pipe or cigar if he finds quitting cigarette smoking difficult, this is because most of the smoke in pipe and cigars are not inhaled thus reducing the amount of tobacco consumed (17). Smoking reduction was found to reduce blood pressure and prevent incident of coronary heart disease.

**Weight Reduction:-** Being over weight has been shown to give rise to hypertension. There is a clear-cut relationship between body weight and the prevalence of hypertension (11). Weight control however is more difficult to achieve than the restriction of dietary salt, this is because most processed and commercially prepared foods are loaded with calories as they are with salt thus, the patient who wishes to lose weight will have a difficult time if he or she has no

time or no one to carefully prepare food for him at home (11). To avoid being over-weight, too much of high energy diet should be avoided and regular exercise should be adhered to (11, 18)

**Alcohol Reduction:-** Alcohol in small amount does not appear to be harmful but excessive consumption of ethanol may render an individual hypertensive (13). Heavy drinkers have been found to have higher prevalence of hypertension than those who drink less (12). As a result hypertensive patients should take little or no alcohol.

**Low-Fat Diets:-** Excess fats and cholesterol intake have been found to lead to the development of hypertension and hence coronary heart disease. Thus, the dietary advice for hypertensive patients is to reduce the intake of saturated fat. The blood pressure of hypertensive patient was significantly reduced by reducing dietary fat intake from about 37 to 25 energy percent (19). Low-fat diets are required to reduce atherosclerosis and it appears warranted to prescribe them to patients under 60 years with established hypertension since atherogenesis is accelerated by hypertension. Therefore, hypertensive patients can reduce their high blood pressure by feeding on low-fat diets.

**High Intake of Dietary Fibre:-** Fibres in general are capable of adsorbing water and this leads to gel-like structures that form a plant fibre matrix in the gastro-intestinal tract of humans and some animals that cannot break them down because of the absence of essential enzymes such as cellulase and pectinase. There are some diseases associated with low fibre these include constipation, hypercholesterolemia, ischemic heart disease (20). Extensive studies have established the hypocholesteremic effects of certain plant fibre and other food products high in fibre (21). Patients with cardiovascular problems have also been treated by increasing and improving on the dietary fibre but with reduced salt and increased exercises and the blood pressure of patients with essential hypertension fell rapidly to normal (22).

Apart from the diet therapy there are some other non-pharmacological approach that could help to reduce blood pressure, stress is an important factor to be considered in hypertension (5). People tend to move from a less stressful environment to a stressful environment (rural to urban) and hence they become hypertensive. These people should learn to avoid stressful conditions by changing their lifestyle. They should take regular unhurried meals, try to avoid worry, allow themselves plenty of leisure time and generally use moderation in all things. Lack of exercise could enhance hypertension therefore, regular exercise is essential it keeps the circulatory system healthy (23). These and other modification of the daily life pattern help in the management of mild hypertension.

### DISCUSSION/CONCLUSION

In health, diet or food plays an important role in maintaining a normal health. According to the general saying that good food means good health hence, in order to live a healthy life one should pay much attention to the food one eats.

Various diseases have been found to be responsive to diet modification such as diabetes mellitus, obesity, kwashiorkor, hypertension to mention a few.

As a result of high cost of anti-hypertensive drugs and the severe negative effect of these drugs it is now imperative to embrace non-pharmacological approach in the treatment of mild hypertension.

In the treatment of hypertension, it was reported that diet therapy should precede drug therapy and that drug therapy should be commenced where diet therapy fails (22).

Some dietary modification which have been found to help reduce the occurrence of high blood pressure include, reduction of salt intake reduction in cigarette smoking, consumption of low calorific diets and increase dietary fibre.

In addition to diet modification, hypertensive patients should also try and modify their environment and avoid stressful environment because the movement of people to the cities from their traditional homes will expose them to different food habits, new pattern of life and even new stresses thereby leading to increase in their blood pressures. Likewise regular exercise is essential in preventing high blood pressure (23) because it keeps the circulatory system healthy and promoting a tranquil outlook on life is of primary importance in reducing and preventing hypertension.

Conclusively, we advise hypertensive and normal persons to make moderation their watch word in the food they eat and in the things they do. They should as well take regular exercise necessary and adhere strictly to the advice of their doctor or dietitian.

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