

# Essential Hypertension –A Review Article

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**Abstract:**

Hypertension (HTN) or high blood pressure, sometimes called arterial hypertension, is a chronic medical condition in which the blood pressure in the arteries is elevated. Blood pressure is summarised by two measurements, systolic and diastolic, which depend on whether the heart muscle is contracting (systole) or relaxed between beats (diastole). This equals the maximum and minimum pressure, respectively. Normal blood pressure at rest is within the range of 100–140mmHg systolic and 60–90mmHg diastolic. High blood pressure is said to be present if it is often at or above 140/90 mmHg. Hypertension is classified as either primary (essential) hypertension or secondary hypertension. Hypertension puts strain on the heart, leading to hypertensive heart disease and coronary artery disease if not treated. Hypertension is also a major risk factor for stroke, aneurysms of the arteries (e.g. aortic aneurysm), peripheral arterial disease and is a cause of chronic kidney disease. Dietary and lifestyle changes can improve blood pressure control and decrease the risk of health complications, although drug treatment is still often necessary in people for whom lifestyle changes are not enough or not effective.

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**INTRODUCTION:**

Essential hypertension (also called primary hypertension or idiopathic hypertension) is the most common type of hypertension, affecting 95% of hypertensive patients,<sup>[1][2][3][4]</sup> it tends to be familial and is likely to be the consequence of an interaction between environmental and genetic factors. Prevalence of essential hypertension increases with age, and individuals with relatively high blood pressure at younger ages are at increased risk for the subsequent development of hypertension and it makes them suffer a lot. Hypertension increases the risk of cerebral, cardiac, and renal events.<sup>[5]</sup>

**ETIOLOGY:**

Etiological factors correlated with hypertension in adults have also been associated with blood pressure elevations in youth. Intrauterine malnutrition, family history of hypertension, obesity, particularly excess abdominal fat, insulin resistance, high dietary sodium intakes, low dietary intakes of calcium, potassium and magnesium, physical inactivity, high alcohol intakes, tobacco use, drug use (e.g., cocaine, ecstasy, anabolic steroids), emotional stress, diet pill use, oral contraceptives are the factors associated with development of hypertension.<sup>[6,7,8]</sup> An inadequate supply of nutrients may program changes in foetal structure and metabolism, increasing the risk of hypertension and other diseases in later life.<sup>[9]</sup> Hyperinsulinemia and insulin resistance are also associated with the development of hypertension which leads to many problems. The elevated plasma insulin levels may cause sodium sensitivity.<sup>[10,11]</sup> Adequate dietary potassium, calcium, and magnesium intakes have been associated with lower blood pressure in youth. Potassium and calcium intakes are below recommended levels, particularly in adolescent females, while median intakes of phosphorus and protein, which promote calcium loss, are high.<sup>[12]</sup> Lack of physical activity may increase the risk of developing hypertension by 20-50%.

**RISK FACTORS:**

Having a personal family history of hypertension increases the likelihood that an individual develops hypertension.<sup>[13]</sup> Essential hypertension is four times more common in black than white people, accelerates more rapidly and is often more severe with higher mortality in black patients.<sup>[14][15][16][17]</sup> Obesity can increase the risk of hypertension to fivefold as compared with normal weight, and up to two-thirds of hypertension cases can be attributed to excess weight. More than 85% of cases occur in those with a Body mass index greater than 25.<sup>[18]</sup> Another risk factor is salt sensitivity which is an environmental factor that has received the greatest attention. Approximately one third of the essential hypertensive population is responsive to sodium intake.<sup>[19]</sup> The increased sodium ion concentration stimulates ADH and thirst mechanisms, leading to increased reabsorption of water in the kidneys, concentrated urine, and thirst with higher intake of water. Also, the water movement between cells and the interstitium plays a minor role compared to this. The relationship between sodium intake and blood pressure is controversial. Reducing sodium intake does reduce blood pressure, but the magnitude of the effect is insufficient to recommend a general reduction in salt intake.<sup>[20]</sup> Renin elevation is another risk factor. Renin is an enzyme secreted by the juxtaglomerular apparatus of the kidney and linked with aldosterone in a negative feedback loop. In consequence, some hypertensive patients have been defined as having low-renin and others as having essential hypertension. Low-renin hypertension is more common in African Americans than white Americans, and may explain why African Americans tend to respond better to diuretic therapy than drugs that interfere with the Renin-angiotensin system. High renin levels predispose to hypertension by causing sodium retention through the following mechanism: Increased renin → Increased angiotensin II → Increased vasoconstriction, thirst/ADH and aldosterone → Increased sodium reabsorption in the kidneys (DCT and CD) → Increased blood pressure. Hypertension can also be caused by Insulin resistance and or hyperinsulinemia, which are components of syndrome

X, or the metabolic syndrome. Also, some authorities claim that potassium might both prevent and treat hypertension.<sup>[21]</sup> Cigarette smoking, a known risk factor for other cardiovascular disease, may also be a risk factor for the development of hypertension.<sup>[22]</sup> Several studies have shown that hypertensive patients and their children handle salt differently. It is suggested that due to the presence of a sodium transport inhibitor, leucocytes of hypertensive patients are found to have a reduced sodium pump activity.<sup>[23]</sup> This results in increased intracellular sodium leading to high intracellular calcium which is responsible for increased vascular tone. Due to abnormal sodium handling, renal sodium excretion is affected which leads to increase in extracellular fluid volume, an increased venous return and increased cardiac output. Autoregulation to achieve tissue perfusion leads to vasoconstriction and raised peripheral vascular resistance. Salt restriction interrupts pathophysiologic chain of events by lowering extracellular fluid volume and lowers blood pressure similar to diuretic therapy.<sup>[24]</sup>

#### PREVENTION:

It is therefore recommended that all cases of hypertension should restrict their sodium intake to approximately 6 Gms of sodium chloride salt or 2.4 Gms of sodium per day. In order to achieve that much sodium restriction, following measures should be adopted.<sup>[25]</sup> a) Reduce salt for cooking by 50%. b) Substitute natural foods for processed foods. c) Avoid salty snacks such as pickles, chutneys, pappad, salted nuts. d) Use salt substitutes containing potassium. f) Avoid medications such as antacids as these are rich in salt. It is now agreed that reducing salt intake is an essential. The universal recommendation is to consume less than 10 Gms of NaCl per day. WHO recommends 5 Gms or less especially in populations known to have a high salt intake or a high prevalence of blood pressure.<sup>[26]</sup> Chain smokers have a sustained increase in blood pressure. So prevention from smoking is must here. These are widely practised for stress reduction. So far no substantial evidence in support of benefits of yoga, meditation is available. Yet the availability of some controlled research, its overall cost-effectiveness and its lack of side effects make further investigations of yoga a topmost priority. Clinically several clinical trials are in progress.<sup>[27]</sup> Epidemiological studies have revealed a strong relation between obesity and hypertension. So maintaining the body fitness and preventing the body from obesity is very necessary.<sup>[28]</sup> Maintaining a good health and exercising regularly prevents hypertension. Eating a balanced diet and monitoring the blood pressure is very must.

#### TREATMENT:

Beta-blocker is one of a drug used to reduce hypertension. It works by making our heart beat more slowly and with less force, thereby reducing blood pressure. But they are found to be less effective than other treatments. Calcium channel blockers are very helpful because they keep calcium from entering the muscle cells of the heart and blood vessels. This method widens the arteries and reduces the blood pressure.

#### CONCLUSION

Adopting a healthy lifestyle is critical for the prevention of HBP and an indispensable part of managing it. We must think of these changes as a "lifestyle prescription" and make every effort to comply with them. If we have been diagnosed with high blood pressure, also called hypertension, or are concerned because we have some of the risk factors for the disease, we must understand this: while there is no cure, high blood pressure is manageable. Maintaining a healthy life style is necessary.

#### REFERENCE

- Carretero OA, Oparil S (January 2000). "Essential hypertension. Part I: definition and etiology". *Circulation* 101 (3): 329–35. doi:10.1161/01.CIR.101.3.329.PMID 10645931. Retrieved 2009-06-05.
- Oparil S, Zaman MA, Calhoun DA (November 2003). "Pathogenesis of hypertension". *Ann. Intern. Med.* 139 (9): 761–76. Doi:10.7326/0003-4819-139-9-200311040-00011.PMID 14597461.
- Hall, John E.; Guyton, Arthur C. (2006). *Textbook of medical physiology*. St. Louis, Mo: Elsevier Saunders. p. 228. ISBN 0-7216-0240-1.
- "Hypertension: eMedicine Nephrology". Retrieved 2009-06-05.
- Essential hypertension: The Lancet". Retrieved 2009-06-01.
- Bartosh SM, Aronson AJ. Childhood hypertension: an update on etiology, diagnosis, and treatment. *Pediatr Clin North Am* 1999;46(2):235-252.
- Carretero OA, Oparil S. Essential hypertension. Part I: definition and etiology. *Circulation* 2000;101(3):329-335
- Osmond C, Barker DJ. Fetal, infant, and childhood growth are predictors of coronary heart disease, diabetes, and hypertension in adult men and women. *Environ Health Perspect* 2000;108 Suppl 3:545-553.
- National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. Fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. *Pediatrics* 2004;114(2):555-576. <http://www.pediatrics.org/cgi/content/full/114/2/S2/555>
- Carretero OA, Oparil S. Essential hypertension. Part I: definition and etiology. *Circulation* 2000;101(3):329-335.
- Contreras F, Rivera M, Vasquez J, De la Parte MA, Velasco M. Diabetes and hypertension physiopathology and therapeutics. *J Hum Hypertens* 2000;14 Suppl 1:S26-31.
- Federation of Associated Societies for Experimental Biology. Third Report on Nutrition Monitoring in the United States. Vol. 1. Washington, DC: US Government Printing Office; 1995.
- Loscalzo, Joseph; Fauci, Anthony S.; Braunwald, Eugene; Dennis L. Kasper; Hauser, Stephen L; Longo, Dan L. (2008). *Harrison's principles of internal medicine*. McGraw-Hill Medical. ISBN 0-07-147691-1.
- Loscalzo, Joseph; Fauci, Anthony S.; Braunwald, Eugene; Dennis L. Kasper; Hauser, Stephen L; Longo, Dan L. (2008). *Harrison's principles of internal medicine*. McGraw-Hill Medical. ISBN 0-07-147691-1.
- Haffner SM, Lehto S, Rönnemaa T, Pyörälä K, Laakso M (July 1998). "Mortality from coronary heart disease in subjects with type 2 diabetes and in nondiabetic subjects with and without prior myocardial infarction". *The New England Journal of Medicine* 339 (4): 229–239. doi:10.1056/NEJM199807233390404. PMID 9673301. Retrieved 2009-06-08.
- Lindhorst J, Alexander N, Blignaut J, Rayner B (2007). "Differences in hypertension between blacks and whites: an overview". *Cardiovasc J Afr* 18 (4): 241–7. PMID 17940670. Retrieved 2009-06-01.
- Jump up^ Burt VL, Whelton P, Roccella EJ, et al. (March 1995). "Prevalence of hypertension in the US adult population. Results from the Third National Health and Nutrition Examination Survey, 1988-1991". *Hypertension* 25 (3): 305–13. doi:10.1161/01.HYP.25.3.305.PMID 7875754. Retrieved 2009-06-01.

18. Haslam DW, James WP (2005). "Obesity". *Lancet* 366 (9492): 1197–209. doi:10.1016/S0140-6736(05)67483-1. PMID 16198769.
19. [http://www.jstage.jst.go.jp/article/jphs/100/5/370/\\_pdf](http://www.jstage.jst.go.jp/article/jphs/100/5/370/_pdf) A Missing Link Between a High Salt Intake and Blood Pressure Increase: Makoto Katori and Masataka Majima, Department of Pharmacology, Kitasato University School of Medicine, Kitasato, Sagamihara, Kanagawa, Japan February 8, 2006
20. Jürgens G, Graudal NA (2004). "Effects of low sodium diet versus high sodium diet on blood pressure, renin, aldosterone, catecholamines, cholesterols, and triglyceride". In Graudal, Niel Albert. *Cochrane Database Syst Rev* (1): CD004022. doi:10.1002/14651858.CD004022.pub2. PMID 14974053.
21. Eva May Nunnelley Hamilton, M.S., Eleanor Noss Whitney, Ph.d, R.D., Frances Sienkiewicz Sizer, M.S., R.D. (1991). *Fifth Edition Annotated Instructor's Edition Nutrition Concepts & Controversies*. West Publishing Company. ISBN 0-314-81092-7. OCLC 22451334.
22. Halperin RO et al.; Michael Gaziano, J.; Sesso, H. D. (2008). "Smoking and the Risk of Incident Hypertension in Middle-aged and Older Men". *American Journal of Hypertension* 21 (2): 148–152. doi:10.1038/ajh.2007.36. PMID 18174885.
23. Edmondson RSP, Thomas RD, Hiltin PJ, Patric PJ, Partic J, Jones NF. Abnormal leucocyte composition and sodium transport in essential hypertension. *Lancet* 1975;1:1003-1005
24. Dustan HP, Tarazi RC, Bravo EL. Diuretic and diet treatment of hypertension. *Arch Intern Med* 1974;133:1007-13.
25. Anand M Paul. Life style management in Hypertension in International monograph edited by M. Paul Anand and Aspi Bilimoria, IJCP Group of Publications, 1999,214-22.
26. World Health Organization - Primary prevention of essential hypertension report of a WHO Scientific Group. Geneva, Switzerland: World Health Organization; Technical Report Series 1982,678.
27. Nakao M, Nomura S, Shimosawa T, Fujita T, Kuboki T, et al. Blood pressure biofeedback treatment, organ damage and sympathetic activity in mild hypertension. *Psychother Psychosom* 1999;68:341-7
28. Bray GA. Risks of obesity. *Endocrinol Metab Clin N Am* 2003; 32:787-804.