



STUDY THE RELATION OF DIETARY SALT INTAKE AND HYPERTENSION

Author:

¹Dr. Pramod Prakash Kanap, ²Dr. Manoja Joshi

¹Ph.D. Scholar- Department of Kriya Sharir, Tilak Maharashtra Vidyapeeth, Pune

²Ph.D. Guide - Department of Kriya Sharir, Tilak Maharashtra Vidyapeeth, Pune

Abstract:

The close relationship between dietary salt intake and hypertension is widely recognized and supported by numerous epidemiological, clinical, and experimental studies. An excessive consumption of salt (NaCl) not only increases the blood pressure and incidences of blood pressure, but also associated with the increase in morbidity and mortality from cardiovascular disorders, such as the risk of stroke, left ventricular hypertrophy and proteinuria. Prolonged reduction in dietary salt intake induces the relevant lowering of blood pressure in both hypertensive and normotensive individuals. Depending upon the baseline blood pressure and degree of salt intake reduction. Systolic blood pressure can be lowered by 4 to 8 mm of Hg. A dietary salt reduction of 3 g/day predicts a fall in blood pressure of 3.6-5.6/1.9-3.2 mm of Hg (systolic/diastolic) in hypertensive and 1.8-3.5/0.8-1.8 mm of Hg in normotensives.

Key Words:

Hypertension, Dietary salt, Blood pressure, Diastolic, Heart, Normotensive.

Introduction:

Definition of hypertension:

Persistent increase in systolic arterial blood pressure is known as hypertension. Clinically, when the systolic blood pressure rises above 90 mm of Hg and diastolic blood pressure rises above 90 mm of Hg, it is considered as hypertension. If there is increase only in systolic blood pressure, it is called as systolic blood pressure. [1,2] The British Hypertension Society defines hypertension as a BP >140/90 mmHg. [3]

Hypertension is classified as primary (essential) or secondary hypertension. About 90-95% of cases are primary, defined as elevated blood pressure in absence of any underlying disease. The lifestyle factors that increases the risk includes excess salt intake, obesity, smoking and alcohol consumption. The remaining 5-10% cases are secondary, defined as hypertension due to some underlying diseases, such as chronic kidney disease, endocrine disorder, neurogenic diseases, excess use of OCP's etc. [1,3]

JNC VII criteria for classification of hypertension: [3]

Sr. No.	Category	Systolic (mm of Hg)	Diastolic (mm of Hg)
1	Normal	<120	<80
2	Pre- hypertension	120-139	80-89
3	Hypertension		
	a) Stage I	140-159	90-99
	b) Stage II	≥ 160	≥ 100

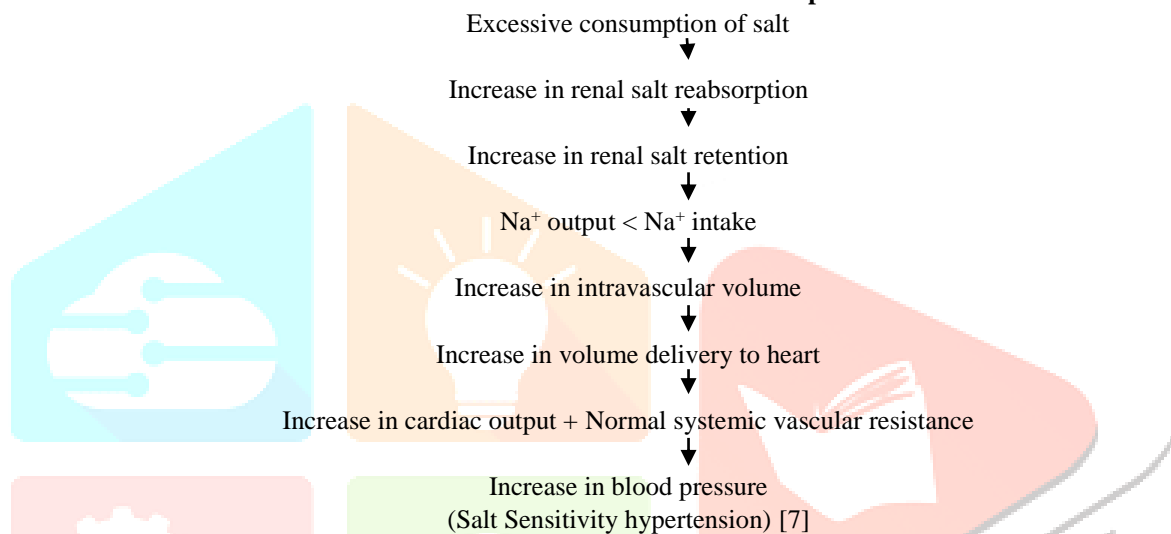
Salt:

Salt or sodium is an essential electrolyte to life in human beings, composed of sodium (40%) and chloride (60%). Salt is involved in regulating the blood pressure. In general, the average daily salt intake is more than 6 g (2400 mg of sodium). The World Health Organisation (WHO) dietary salt recommendations, that adults consume <5 g/day of salt (<2000 mg/day of sodium) and children can consume lower amounts because of lower energy intake. High sodium consumption and insufficient potassium intake have been linked to high blood pressure and increased risk of heart disease, stroke, and renal diseases. To prevent and manage these diseases associated with excess salt consumption, the WHO set a global target of reducing dietary salt intake by 30% by 2025. [5,6]

Meta-analysis and systematic reviews examining the relationship between the blood pressure and salt, it was suggested that the reduction of dietary salt intake up to 6 g/day could help to reduce the systolic/diastolic blood pressure by 7/4 mm of Hg in hypertensives and 4/2 mm of Hg in normotensives. [5]

Correlation of salt intake to blood pressure:

Meta-analysis and systematic reviews examining the relationship between the blood pressure and salt, it was suggested that the reduction of dietary salt intake up to 6 g/day could help to reduce the systolic/diastolic blood pressure by 7.11/3.88 mm of Hg in hypertensives and 3.57/1.66 mm of Hg in normotensives. [4,5]

Mechanism of action of sodium on blood pressure:

The renin-angiotensin-aldosterone system (RAAS) and sympathetic nervous system also play a major role in regulating sodium-blood pressure response. [6]

Salt intake reduction on blood pressure according to age:

Usually occurs in midlife or later, but it has also been documented in overweight adolescents. Blood pressure in children follows a tracking pattern that continues in the 4-5th decade of life. In children aged between 8-16 years, sodium intake reduction of 45% yielded a reduction in blood pressure of 1.17/1.29 mm of Hg. In infants, sodium intake reduction of 54% yielded a systolic blood pressure reduction of 2.47 mm of Hg. [4]

Older persons are more prone than that of younger. Sodium reduction of 1.5 g/day lowers systolic blood pressure of older persons aged between 55-76 years by 8.1 mm of Hg and adults aged between 23-41 years by 4.8 mm of Hg. In normotensives, blood pressure decreased by 7.0 and 3.7 mm of Hg in persons aged above 45 and below 45 years respectively. For persons aged between 60-80 years, salt intake reduction corresponds to a blood pressure reduction of 10/4 mm of Hg for a 100 mmol/day reduction in urinary sodium excretion. [4]

Other factors affecting salt sensitivity blood pressures are:

- 1) Sex: females > males.
- 2) Race: more prevalent in African Americans, considered a 'hallmark' of 'black hypertension'
- 3) Weight: overweight persons are more prone to salt sensitivity blood pressure.
- 4) Renal insufficiency: e.g. low nephron mass, nephritis, renal injury etc.
- 5) Genetic abnormalities
- 6) Exogenous agent: e.g. DOCA (Deoxycorticosterone acetate) [4,5,6]

Non-blood pressure related effect of dietary salt:

High intake of dietary salt may directly increase the risk of,

- Stroke
- Left ventricular hypertrophy
- Proteinuric renal diseases
- Myocardial infarction

- Cardiac failure [4,6]

Adverse effect of salt reduction:

For moderate salt reduction, there is no detectable change in plasma renin activity or total cholesterol, triglycerides and low- or high-density lipoprotein cholesterol. But the severe restriction of dietary salt intake has major effect on procreation, gestation, and lactation. [4]

Conclusion:

The moderate reduction of dietary salt intake is an effective measure to reduce the blood pressure. A reduction in dietary salt from the current intake of 9-12g/day to the WHO recommended level of less than 5g/day can have favourable effects on cardiovascular health. dietary salt reduction not only reduces blood pressure of hypertensive individuals already receiving medical therapy but also delays or prevents the incidences of hypertension in normotensive individuals. Thus, WHO recommended to reduce dietary salt intake to tackle various non-communicable diseases.

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