

Salt and Cardiovascular Diseases- It's time to take Control of it

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In 1726 Jonathon Swift mentioned in Gulliver's travels,¹ "I was at first at a great loss for salt; but custom soon reconciled the want of it; and I am confident that the frequent use of salt among us is an effect of luxury, and was first introduced only as a provocative to drink; except where it is necessary for preserving of flesh in long voyages, or in places remote from great markets. For we observe no animal to be fond of it but man." Two hundred years after that in 1930, Mahatma Gandhi led >100 000 people on Salt Satyagraha in which protesters made their own salt from the sea, in defiance of the salt tax imposed by the British Empire. When asked why he chose salt as the focus of the action, he stated, "next to air and water, salt is perhaps the greatest necessity of life." In fact for several million years, the ancestors of humans, like all other mammals, ate a diet which contained a very small amount of salt that existed in natural foods, i.e. 0.5 g of salt (0.2 g sodium) per day. Only about 5000 years ago, the Chinese discovered that salt could be used to preserve foods. Salt then became of great economic importance and the most taxed, traded commodity in the world, with intake reaching a peak around the 1870s.²

The current salt intake in many countries is between 9 and 12 g/day.³ In Bangladesh average daily salt intake is 10-15 g.⁴ This large increase in salt intake is relatively recent in evolutionary terms. It presents a major challenge to the physiological systems to excrete these large amounts of salt through the kidneys. The consequence is a gradual rise in blood pressure, thereby increasing the risk of stroke, heart attack, heart failure, and renal disease. Furthermore, a high salt intake may have direct effects on stroke, left ventricular hypertrophy, progression of renal

disease and proteinuria, independent of but additive to the effect of salt on blood pressure. There is also evidence that a high salt intake is associated with a higher risk of renal stones and osteoporosis, and probably is a major cause of stomach cancer.⁵

The earliest comment relating dietary salt intake to hypertension was by the Chinese medical doctor in 2698-2598 BC (Huang Ti Nei Ching Su Wen; The Yellow Emperor's Classic of Internal Medicine): "therefore if large amounts of salt are taken, the pulse will stiffen or harden".⁶ Studies on the deleterious effect of salt intake on blood pressure in humans have been carried out extensively for the past several decades. Migratory studies have also provided evidences of a relationship between habitual salt intake and blood pressure. A carefully controlled study from Kenya showed that population groups that migrated from areas with lower salt intake to areas with higher salt intake have reported increases in blood pressure.⁷

INTERSALT study also indicates that blood pressure increases with age only if accompanied by increased salt intake.⁸ The frequency of acute coronary events also rise significantly with increasing sodium excretion in patients with ischaemic heart disease. High sodium intake predicts mortality and risk of coronary heart disease, independent of other cardiovascular risk factors, including blood pressure.⁹

Data from the Trials of Hypertension Prevention (TOHP) I and TOHP II indicated that the optimum amount of sodium intake should be in the range of 2.0-4.0 g/day. Moreover, they demonstrated that additional sodium intake of 2 g is associated with 1.65 million cases of cardiac death.¹⁰

In Finland, the first country to have organized an intervention to reduce salt intake at the national level, salt intake has decreased by 3 g/day between 1978 and 2002. During the same time period blood pressure decreased significantly and cardiovascular mortality and stroke declined by 60%.¹¹ In Great Britain, between 2003 and 2011 salt intake decreased by 1.4 g per day and was associated with a significant decrease in blood pressure and cardiovascular events.¹² These examples demonstrate the feasibility of reduction of salt intake to improve cardiovascular health.

DASH trial (Dietary Approaches to Stop Hypertension)-Sodium trial⁴⁰), a 12-week well controlled feeding trial provided the most robust evidence about the effect of salt intake on human blood pressure. There was a greater reduction in systolic pressure when blood pressure was initially high and in women, but most importantly the blood pressure lowering effect of reducing the salt intake was observed in all categories of the population, in particular in normotensive as well as in hypertensive people. The DASH-sodium trial supports that a low sodium diet leads to lower blood pressure. This observation is very important for the public health issue of lowering salt intake.¹³

The 2010 World Health Organization's (WHO) global status report on non communicable diseases urged Member States to take immediate actions in reducing salt intake to a level of less than 5.0 gm salt or 2000 mg of Sodium. It will prevent 2.5 million annual death from cardiovascular diseases. Salt reduction was recommended as one of the top three priority actions to reduce premature mortality from NCDs by 25% by 2025. To achieve this, the WHO recommended a 30% reduction in salt intake by 2025 with an eventual target of 5 g per day for adults and lower levels for children based on calorie intake.¹⁴

These guidelines haven't mentioned any lower limit of salt intake. And some studies suggested that a diet too low in sodium in general population, specially in normotensive people, represent a risk and eventually increase the mortality risk (so called J curve).¹⁵ But it was clearly negated by other studies and meta analysis.¹⁶ During generalized reduction of salt intake we should also keep in mind that in many of the countries daily iodine demand of the people is met by fortification

of table salt with iodine. So reduction of salt intake may lead to iodine deficiency. In some elderly patients with hypertension and heart failure, salt reduction may lead to reduced taste for food. This may cause malnutrition in this group of population. In most of the patients taste sensitivity returns to normal within few weeks after salt restriction (Hedonic shift). So this interim period needs continuous supervision and motivation.

To reduce salt intake in general population consumers must have some knowledge regarding this. In a study by Zaman et al., published in this journal, showed that though most of the teachers in a health institute know that salt intake is harmful for health. Even then 30-50% of them continue taking salt and salt containing diets. For generalized implementation of low salt intake habit some knowledge should be dissipated among the consumers. Like -

1. Consumers need to know the recommended level of salt intake and the health risks of high salt intakes. They should also know that taking salt in any form, directly or with processed food, is harmful to health.
2. They should know how to identify the food with high salt and how to choose a lower salt product by comparing food label information. The majority of salt in Western diets comes from processed foods, while in developing countries the majority of dietary salt is added to food during food preparation.
3. They should know how to reduce the amount of salt used in the cooking by alternative means, like by using herbs and spices.

Health administration should work on it by –

- I) Developing and implementing policies and plans that help communities in reducing salt consumption to the levels recommended by WHO;
- II) Raising awareness on health benefits of dietary salt reduction;
- III) Identifying of the main sources of salt in the diet and letting the general people know about it;
- IV) Working with the food and beverage industry to reduce the salt content of their products;
- V) Conducting studies to monitor the intake of sodium by using the 24-hour urinary assessment.

Although, the term “salt” is commonly used and understood by consumers, the term “sodium” is often provided on food labels. Lack of understanding of the relationships between the two terms means consumers are unlikely to be able to convert the information on food labels (expressed as sodium) into information about salt. Food industries should provide the information both in the form of sodium and salt content of the food. They should have actively participate in this program by raising awareness of the consumers; by labeling the food with high salt content as ‘Harmful for Health’, as it is now being used in case of tobacco products. Food industries should also come forward by voluntarily reducing the salt content of processed foods. Salt with low sodium content has also been tried to curve the high sodium intake of the people in some countries. But it would be expensive for generalized implementation and will take time to implement, as the technology should be made available.

We also need more studies to determine the lowest level of recommended salt intake, as currently it is recommended to reduce below 5 gm of salt or 2000 mg of sodium but no lowest level is mentioned. Every country and region should have their own strategy to identify the foods with high salt intake and how to reduce its consumption. Health administration, clinicians, manufacturers and consumers should work together to reduce the salt intake to a recommended healthy level.

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