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Pure Sodium and Neurological Health

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ABSTRACT

From time immemorial, mankind is dependent upon natural sources of water like springs, sweet water lakes, and rivers rich in micro and macro-nutrients as well as natural salt obtained from lakes, sea or rocks containing a large number of essential trace elements, micro and macro-minerals. This natural dependence over millions of years has played a decisive role in the biological evolution of the human body. In the last 6-7 decades, there have been large scale changes in dietary patterns and a large section of the global population has moved from natural water to processed water and natural salt to table salt for various reasons. These dietary changes have deprived the population from daily default intake of trace elements, micro and macro-nutrients leading to incidence and prevalence of several non-communication diseases.

Keywords: Pure sodium, Neurological disorders, Hypomagnesaemia

INTRODUCTION

Sodium and other trace elements like magnesium, potassium, and calcium play vital roles in biochemical processes within the human body. From time immemorial, mankind is dependent upon natural sources of water like springs, sweet water lakes, and rivers rich in micro and macro-nutrients as well as natural salt obtained from lakes, sea or rocks containing a large number of essential trace elements, micro and macro-minerals. This natural dependence over millions of years has played a decisive role in the biological evolution of the human body. In the last 6-7 decades, there have been large scale changes in dietary patterns and a large section of the global population has moved from natural water to processed water and natural salt to table salt for various reasons. These dietary changes have deprived the population from daily default intake of trace elements, micro and macro-nutrients leading to incidence and prevalence of several non-communication diseases.

Empirical clinical data suggest that 1956 initiative of the Government of India to introduce nationwide pure sodium salt laced with iodine to tame thyroid disorders primarily in goitre prone areas [1], led to an increase in prevalence of neurological disorders and paradoxically thyroid disorders spread more wildly instead [2]. India is estimated to have prevalence of neurological diseases on the average of 23,940 per million populations and a total of about 30 million in 2014 which amounts to about 2.4% of the population [3]. Situation in the western countries is more worrisome on the neurological front compared to India. According to a New American Neurological Association Study, the burden of neurological diseases was nearly $789 billion in 2014. In 2011, the US had about 32% of the population suffering from one or more of >1000 neurological diseases [4]. A new analysis of mortality has indicated that the number of deaths in England relating to neurological disorders rose by 39% between 2001 and 2014 and during same time deaths of people with epilepsy increased by 70% while deaths in the general population fell by 6%; rate of neurological mortality in the most deprived areas nearly three times that in the least deprived [5].

ANALYSIS AND INFERENCES

An enormous gap between prevalence of neurological disorders in developed countries like the USA and UK and developing countries like India compel for etiology study of the disease.

It is well known that hypomagnesaemia is one of the major causes for large scale prevalence of a variety of neurological disorders. Incidentally, serum magnesium level test does not fall in the category of regular diagnostic tests and rarely physicians ask for it even when neuro-disorder like Alzheimer's disease, Parkinson's disease, persistent headaches, or seizure's patients do not respond to usual

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traditional treatments.

According to the National Institute of Health (NIH), USA, magnesium plays a significant role in more than 300 biochemical reactions in the human body. Besides signaling, it regulates blood pressure, heart beats and maintains bone strength. Magnesium is essential for production of parathyroid hormone (PTH) that maintain blood calcium.

Recommended daily allowance for magnesium increases with the increasing age since birth and saturates over 50 years of age at 420 mg for males and 380 mg for females. Himalayan rock salt [6] contains 86 additional trace elements including magnesium compared to pure sodium table salt. Magnesium content in rock salt is about 80-100 times more compared to table and Celtic salt contains more than 200 times. Above data led to the conclusion that a rich and fanciful diet with pure sodium is not alone sufficient to keep neurological disorders at bay. Despite availability and intake of natural resources and supplements for countering magnesium deficiency, there is increasing prevalence of the disease in developed countries. It is because everyone in developed countries also can't afford magnesium supplemented food on a regular basis unless magnesium deficiency is diagnosed at the health clinic.

In India, incidence and prevalence of hypomagnesaemia related neurological diseases advancing from urban to rural areas with the onslaught of iodized table salt through state promulgation of ban on natural salt consumption. Extreme remote rural populations which are economically poor still depend upon natural sea salt being significantly cheaper in cost compared to branded iodized salt and as a blessing in disguise they are almost untouched by the rampant neurological diseases of city dwellers.

So far, the US Food and Drug Administration could understand and identify 60 elements of the natural salt as essential nutrients. In June 2016, the US National Research Council labelled just 29 of these 60 micro and trace elements as "possibly" or "probably" essential and beneficial to human health [7]. These include bromine, boron, chromium, calcium, copper, fluoride, iodine, iron, manganese, magnesium, molybdenum, potassium, phosphorus, selenium, silver, sulphur, and zinc. The 14% fraction of natural salt consisting of micro and macro-minerals and trace elements (MMTE) that contains these 29 identified essential elements is large enough to ignore and neglect. Iodized salt making removes MMTE from sea salt and rock salt that contribute about 14% by weight and substituted with pure sodium. This large substitution of essentials minerals and trace metals by NaCl causes major changes in body electrolytes composition leading to impairment of various fundamental biochemical body processes which have been identified to be more than 300 in the human body such as functioning of Na^+/K^+ pump, calcium pump and various thermodynamic and biological functions of the body system. Study of functional impairment of various body processes like Na^+/K^+ pump, calcium pump, proton pump and transport mechanism of electrolyte ions has been attempted on the basis of principles of physics [7]. The Na^+/K^+ pump has a "housekeeping" role rather than a direct role in brain signaling; this is the long-held, entrenched viewpoint. However, novel research upon cerebellar Purkinje neurons suggests that the Na^+/K^+ pump may have a direct role in brain coding and computation [8]. Precisely controlled movements of ions into and out of cells and organelles are essential for all life. For example, in cells ion flows mediate processes as disparate as signaling, pH balance, volume regulation, and the cell cycle, and in higher organisms they underlie fertilization, immune responses, secretion, muscle contraction, and all electrical signals in nerves, muscles, and synapses. Complete supplementation of MMTE is not only difficult but expensive as well and thus out of reach for everyone even in developed countries. Surely pure sodium table salt creates electrolyte imbalance due to stripping of MMTE. Finally, it is concluded that pure table salt plays a vital role in the prevalence of neurological diseases and needs to be replaced by natural sea salt or rock salt for combating prevalence of neurological diseases the world over.

CLINICAL VALIDATION

1. A male patient (General Medical Practitioner) aged about 76 years, suffering from Parkinson's disease and dementia for over 17 years reached a position where he could not turn slippers upside up with his feet. He was switched over from iodized pure sodium salt to Himalayan pink rock salt for about a year with no medication changed. Within a span of about seven months, he reported significant improvement in his physical activities and was able to turn his slippers upside up and overall quality of life and was surprised with the detrimental effect of pure sodium salt.
2. Improvement in quality of life in case of depression and migraine patients is remarkable and some of them quickly get freed from anti-depressants and analgesics.
3. In one typical case, a female patient aged 45 years who was almost in vegetative state responded positively when put on the natural salt and magnesium food supplements within six days of treatment.

Interestingly it is found that the response of younger adults is faster than the older once. An elementary demographic study strongly reveals a prominent incidence of neurological disorders in Indian cities where almost 100% of population depend upon pure sodium salt compared to almost non-existence of the disease in rural areas where population still depend upon raw sea salt due to economic reasons. This preliminary study and clinical outcome suggest a definite role of pure sodium salt on incidence and growing neurological disorders, whose effective solution appears to exist in humble natural salt. In India, salt manufacturing companies that were tirelessly advertising for pure iodized

sodium salt till 2-3 years ago have recently launched many new products based on natural sea salt and rock salt sending price of natural salts skyrocketing.

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