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Editorial Open Access

# The Quest for a Miracle Cure

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## Editorial

The word goiter was first coined in the early 17th century, and derives its origin from the French word goître. Goitre, itself, comes from the Latin word guttur, meaning throat [1]. In the early 1900s, iodine deficiency was recognized to be a reversible cause of goiter formation [2]. Over the course of time, numerous interventions and iodination programs have fought worldwide to provide adequate iodine supplementation. Although there has been tremendous success on the global front, goiters are unfortunately still prevalent in the northern submontane region of the Indian sub-continent [3]. This is indeed alarming, as goiter formation secondary to iodine deficiency and the subsequent impairment of thyroid hormone production, has been associated with deafness, mutism, cretinism, and a host of other mental and physical developmental abnormalities [4]. All these, in turn, can become a source of significant morbidity and perhaps even mortality.

Given the fact that iodine deficiency has been largely eliminated in the developed world, one must ask why India continues to tackle this remediable issue? Disturbingly, we are not alone. Countries like Bangladesh, Bhutan, Burma, Indonesia, Nepal, Sri Lanka and Thailand also face a challenge with regards to Iodine Deficiency Disorders (IDD). It has been estimated that in this combined region, approximately 277 million individuals are at the risk of developing IDD. Around 102 million have an established goiter and an additional 1.5 million suffer from cretinism [5].

First and foremost, the key to answering this question lies in understanding the prevalence of endemic goiter in India. One of the most classical belts for goiter formation is an area ranging from the southern slopes of the Hindu-Kush mountains to the foothills of the Himalayas [6]. This region is extremely hilly in nature, and encompasses the states of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Uttar Pradesh and Assam. Attempts have been made to fortify salt, but the consumption of iodized salt is low at the population level [7]. Having said this, iodine deficiency affects the rest of the country as well, in varying degrees [8]. According to the Coverage Evaluation Survey conducted in 2009, 91% of households in India have access to iodized salt. However, only 71% of these consume an adequate amount. A remaining 9% of the population consumes unfortified salt. Further more, there are wide rural and urban disparities in the household coverage of adequately iodized salt (66.1% in rural areas vs. 83.2% in urban areas). Ample variation in terms of household coverage was also seen across different states in India; Chhattisgarh (31.6%), Karnataka (35.5%) and Jharkhand (41.4%) are the worst affected, with Manipur (98.3%), Meghalaya (98%) and Nagaland (97.1%) having nearly 100% coverage [9].

So, what is currently being done to address this issue? In 1992, the National Goitre Control Program was renamed the National Iodine Deficiency Disorder Control Program (NIDDCP). The main objectives and focus of this mission consisted of conducting surveys to assess the amplitude and severity of IDD in the country, ensuring the iodization of salt, and conducting follow up assessments every 5 years. This initiative was also responsible for promoting awareness of IDD and providing education at the grassroot level [10]. The program has had mixed results. As with any intervention, the success or failure of such a venture depends on the participation and support of the general public. Unfortunately, perceptions vary greatly in India with regards to iodine deficiency and the development of a goiter. Often, large goiters are regarded as a "natural" phenomenon and only a small percentage of those affected seek medical attention [11]. This clearly hampers any efforts to encourage iodine intake.

Aside from public perception, iodine supplementation has also been fraught with mechanical challenges in the production of iodized salt. The majority of salt used in areas with iodine deficiency, with the exception of the rock salt produced in a small area of Himachal Pradesh (Mandi), is obtained from the solar evaporation of brine. Uniform iodization of this crude salt has proved to be a difficult task. Secondly, there is a substantial loss of iodine from iodized salt in damp weather, moisture and direct sunlight. Salt storage facilities, especially in remote areas, may not be equipped to store iodized salt in the required environment. The vast climatic changes in the Indian subcontinent further add insult to injury [12].

Cooking methods in India vary across the different states and have their own implications. Information regarding the retention of iodine in food, during the cooking process, is limited. One study determined that the mean ± SD retention of iodine, in 140 of the most commonly cooked Indian recipes, was 60 ± 21%. The frequency distribution revealed very high retention (>80%) in 20% of the recipes, moderate retention (20–40%) in 15.7% of the recipes, and very low retention (<20%) in 5.7% of the recipes. A relationship was also noted between iodine levels in the food and the time at which salt was added to the cooking process. Interestingly, pressure cooking seemed to lead to maximum iodine retention, whereas the minimum level was observed after shallow frying in oil. Additionally, the iodine content of household drinking water also varied tremendously. Levels ranged from 1.3 µg/l in Meghalaya to 23.3 µg/l in Tamil Nadu [13].

There is also a tremendous cultural belief in alternative medicine and home remedies. Ayurvedic medicine, originating in 1400 BC, refers to a goitre as 'galaganda rog.' According to this branch of alternative medicine, supplements like kelp, watercress, swamp cabbage, kanchanara (Bauhinia variegata) and bladderwrack (Fucus vesiculosus) help treat thyroid related disorders. Guggulu (Commiphora mukul) is used to increase the basal metabolic rate in hypothyroid patients, while bugleweed (Lycopus virginicus) is prescribed to those with hyperthyroidism. Interestingly, punarnava (boerhaavia diffusa Linn) is a diuretic, prescribed to reduce edema in

the setting of thyroid dysfunction [14]. This stems from the belief of ancient Indian physicians, who believed that edema, pitting or non-pitting, was the root cause of a goitre [15]. The efficacy of these treatment modalities have not been documented in large clinical trials.

Even at the turn of the 21st century, India's quest for the miracle cure to iodine deficiency disorders remains unfulfilled. Several roadblocks, ranging from patient beliefs to developing processes that ensure the adequate iodization of salt, stand in the way. These barriers are not ours alone. For example, faced with a similar situation, health care professionals in the Southern Xinjiang province of China iodinated irrigation water. This has proved to be both efficacious and cost effective [16]. Therefore, it may be time to rethink our strategy and develop new policy. Only then will we be able to eliminate IDD, decrease morbidity and improve the health of generations to come.

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