LETTER-TO-EDITOR

Epidemiology of Goiters in Sri Lanka with Geographic Information System Mapping: Population-based Cross-sectional Study

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Dear Editor,

We read with interest the article by Chandrasinghe et al,[1] entitled "Epidemiology of Goiters in Sri Lanka with Geographical Information System Mapping: Population-based Cross-sectional Study" including 5,200 cases. We congratulate the authors for their mammoth effort in using geostatistical localization system for mapping the prevalence and geographical trends of goiters in Sri Lanka. In the context of developing countries, such path-breaking studies shall be of help in allocation of resources and also in emphasizing the other facets of the knife happy surgeons toward the society.

Iodine deficiency has always been a topic of interest because of its importance in medical and geographical scenario. Deficiencies of iodine, iron, folic acid, vitamin A, and zinc have been the leading five causes of micronutrient deficiencies which constitute a global public health problem.[2] Initially, iodine deficiency was corroborated with incidence of cretinism and goiter, but now the spectrum includes goiter, cretinism, hypothyroidism, brain damage, abortion, still birth, mental retardation, psychomotor defects, and hearing and speech impairment.[3] Iodine deficiency disorders constitute the single largest cause of preventable brain damage worldwide, leading to learning disabilities, and psychomotor impairment.[3,4] Around 2 billion individuals worldwide have insufficient iodine intake, with those in south Asia and sub-Saharan Africa particularly affected.

As in all countries, Sri Lanka also implemented the best strategy to control iodine deficiency through iodization of salt, which is one of the most cost-effective ways to contribute to economic and social development. After implementation of iodization in Sri Lanka, Fernando et al[5] observed, after initial fall in goiter, there is an increase in goiter due increased incidence of autoimmune thyroiditis, i.e., noticed due to increased urinary iodine levels and raised thyroid peroxidase (TPO) antibodies. Studies pointing toward excessive iodine intake as cause for autoimmune goiter.[6] These studies point toward requirement of further research in locating geographical distribution of iodination, prevalence of goiter, and TPO levels, and this may aid in selective iodine supplements that can be given to susceptible groups. So in this background, we find the present study design serves the purpose of providing geographical mapping of statistical parameters.

Geospatial analysis, the method for applying statistical analysis and other analytic techniques to data which has a geographical geomatics, enables a variety of capabilities designed to capture, store, manipulate, analyze, manage, and present all types of geographical data and utilizes geospatial analysis in a variety of contexts, operations, and applications. Geospatial analysis goes beyond two- and three-dimensional mapping operations and spatial statistics. Traditionally geospatial computing has been performed primarily on personal computers (PCs) or servers. Due to the increasing capabilities of mobile devices, however, geospatial computing in mobile devices is a fast-growing trend. The portable nature of these devices, as well as the presence of useful sensors, such as Global Navigation Satellite System (GNSS) receivers and barometric pressure sensors, makes them useful for capturing and processing geospatial information in the field. This enables us to conduct field studies with precision in geographical localization.[7]

Change in prevalence pattern of endemic goiter following iodine replacement requires constant surveillance, and this present study succeeded in providing information on current trends. Most of the population-based studies are based on school children because of logistical reason. Focusing on a sample representative of population is always a challenge, and this study design will attract most of the researchers. We have a few queries which may

be of interest. Did the authors address the issue of socioeconomic and cultural variations among different groups selected and also the reach of iodine supplementation? Did the authors measure urine iodine levels?

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Author Reply

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Thank you for your kind letter.

The question of deleterious effects of universal iodization of salt needs careful scrutiny.

In the population-based study we undertook, we did consider socioeconomic and cultural variations among various selected groups. But we could not discern any particular pattern in goiter prevalence.

The following paragraph summarizes the findings.

The ethnic distribution in the island according to 1981 census (latest available from Department of Census and Statistics) is 74% Sinhalese, 12% Sri Lankan Tamils, 7.5% Muslims, 5% Indian Tamils, 1.5% others.

The ethnic distribution of the sample is 92.7% Sinhalese, 5.6% Muslims, 1.4% Tamils, and 0.3% others. The ethnic distribution does not mirror the national figures possibly because the north, where significant number of Tamils lived, was excluded due to change in demography due to immigration and migration and also because of the random selection of Grama Niladari (GN) area based on PPS (Palliative Performance Scale) score (Graph 1).

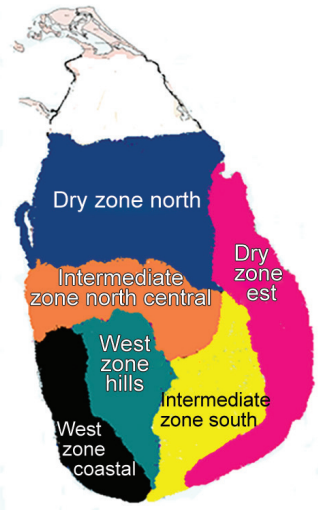
In the sample of 5,200, all communities were represented and the values calculated can be interpolated to obtain national figures. Majority were from rural areas.

This reflects the fact that 85% of the Sri Lankan population lives in villages, and hence the sample is representative of the national picture. There are several methods of assessing socioeconomic status, such as family income, parental education level, expenditure on food items, and parental occupation. Declared income was used as a proxy measurement of social status being cognizant of the limitations. Based on declared income, more than 83% of the study population is from the poor socioeconomic group earning rupees 10,000 or less (less than US$10).

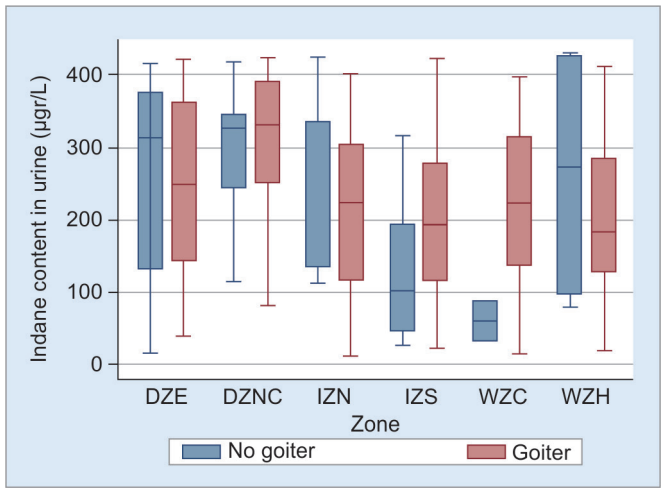
This is consistent with the rural dwelling seen above as the rural communities tend to earn less. Goiter is a commoner in the poor socioeconomic setting (Knudsen, 2003).[1]

In terms of educational level, more than 50% of the study population had at least primary education (up to grade 8). This is consistent with the general education level of the country and the free education system in the country. Females being slightly better educated than males.

About 99.5% of the population consumed iodized salts. The International Council for Control of Iodine Deficiency Disorders (ICCIDD) figures available suggest Sri Lanka has achieved the goals of iodization set by the ICCIDD; Bhutan appears to be only remaining South Asian country to do so.



Graph 1: Geographical map based on rainfall pattern diving the country to six zones drawn up for the purpose of study using other maps (except the north)



Graph 2: Urine iodine content in population
DZE: Dry Zone East; DZNC: Dry Zone North Central; IZN: Intermediate Zone North; IZS: Intermediate Zone South; WZC: Wet Zone Coastal; WHZ: Wet Zone Hills

Yes, we did measure the urinary iodine. We also measured the water iodine and inorganic content serum thyroid-stimulating hormone (TSH) and also did Fine needle aspiration cytology (FNAC) in the field.

The following graph gives the figures for urinary iodine, proving that the population is no longer iodine-deficient and the possibility of overiodization of certain populations (Graph 2).

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