# EDITORIAL

## ENDEMIC GOITRE : A PREVENTABLE AND YET HIGHLY PREVALENT DISEASE IN SARAWAK

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### INTRODUCTION

Endemic goitre constitutes an important disease problem in many parts of the world. Kelly and Sneddon (1960), in an extensive review of the literature, estimated the number of goitrous subjects in the world to be about 200 million. Goitre has also been reported to be endemic in many areas of Southeast Asia including Sarawak in Malaysia (Fig. 1). Studies (Polunin, 1971; Alexander, 1979) indicate that the prevalence of goitres, among women 15 years and above, in most parts of Sarawak varies from 40 percent to 50 percent and that the most affected division in Sarawak is the 2nd Division with an average prevalence rate of 62 percent to 74 percent, while the Lubok Antu district of that division exhibits the very high rate of 99.5 percent (Maberly and Eastman, 1976). It is quite possible that this is one of the highest prevalence rates anywhere in the world, Kochupillai *et al.* (1973) having reported that the highest prevalence rate in the Himalayan region was 98 percent. Maberly and Eastman (1976) estimate the prevalence of neurological cretinism, in the highly goitrous Lubok Antu district, to be 3.6 percent.

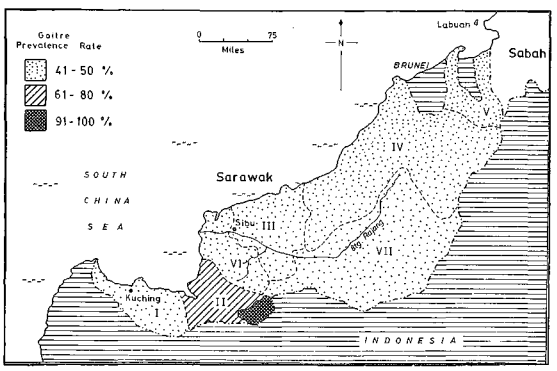


**Fig. 1 Map showing the prevalence rate of endemic goitre in the seven divisions of Sarawak.**

Iodine deficiency in pregnancy predisposes to the development of cretinism in the newborn with its characteristic dwarfism, while iodine deficiency in general tends to lead to myxoedema, deaf-mutism, ataxia and thyrotoxicosis. The goitre itself causes a great deal of disfiguration (Fig. 2) and much personal and social distress, while long standing nodular goitres can increase the risk of developing carcinoma. Very large goitres can cause tracheal and oesophageal obstruction requiring surgical removal which can be both difficult and expensive. However, perhaps the most important consequence of endemic goitre is the intellectual impairment that is associated with it.

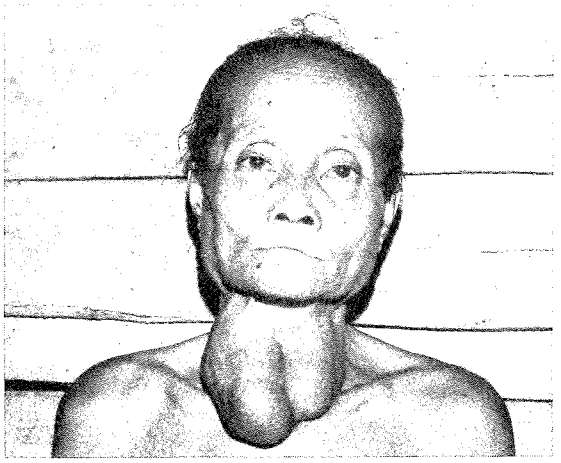

**Fig. 2 An iban woman with a large and disfiguring goitre.**

### IODINE DEFICIENCY

Endemic goitre is primarily due to iodine deficiency, although goitrogens can be an important contributory factor. Iodine is required by the body for the synthesis of thyroglobulin which in turn is required for the production of thyroid

hormones. It is estimated that the adult human body requires from 150-300 micrograms of iodine per day, and that this small but regular supply of iodine is vital to the functioning of the body. The requirements of children, adolescents, pregnant women and lactating women are probably greater. If this minimal amount of iodine is not supplied over a long period of time, the thyroid undergoes compensatory enlargement in an effort to synthesize thyroid hormones and a goitre consequently develops. (Fig. 2)

The soil, water, certain plant and animal foods, sea-foods and seaweeds are common sources of iodine. Sea algae have a high content of iodine and this is reflected in the high iodine content of sea fish and other seafoods. However, iodine present in the soil is continually being leached out by rain, floods and rivers. Consequently, in inland and upland areas such as the Himalayan and the Andean mountains, iodine in the soil is extremely low or absent. Similarly in Sarawak, which is mainly mountainous with fast flowing rivers and a heavy annual rainfall, the soil and water contain very little of the original iodine, with the exception of some 30 natural springs that are found in the Kelabit Springs area of the 5th Division and the adjoining area of the 4th Division. Ogihara *et al.* (1972) report that the mean iodine content of 6 rivers and streams in the inland Rajang basin of Sarawak was 0.3 micrograms/litre, as compared with a control of 3.4 micrograms/litre found in the tap water of the Honshin district in Japan.

Even though iodine deficiency is the main cause of goitre in Sarawak, goitrogens seem also to play some role in its occurrence. Tapioca (cassava) has been implicated so have other known goitrogens such as cabbages and groundnuts. However, it is very clear that, in most parts of Sarawak, such goitrogens only play a small and unimportant role, and that iodine deficiency is the primary cause of endemic goitre in Sarawak. On the other hand, in the highly goitrous area of Lubok Antu, where rice crops are sufficient for only about 3 to 4 months of the year, and where tapioca is consumed in very large quantities, the combined factors create situations where the prevalence is almost 100 percent.

## SALT IODIZATION

Kimball (1953) reports that the first known controlled experiment to prevent goitre by the use of sodium iodine was made in 1916-20 and proved to be 100 percent efficacious. As early as 1915, it was already being taught that "endemic goitre is the easiest known disease to prevent". Since then, more than 25 countries around the world require the iodization of salt meant for domestic use. Examples include Switzerland, Columbia, U.S.A., Canada, Yugoslavia and Taiwan.

A voluntary salt iodization programme has been in existence in Sarawak since 1957, iodization plants having been installed in Kuching (1st Division) in 1957, and in Sibu (3rd Division) in 1959. These plants are for the iodization of coarse salt utilized by the rural people. The Medical Department provides these services free of charge but iodization itself is not required by law and is purely voluntary. Practically all the salt utilized in Sarawak is imported in two to three bulk shipments from Thailand. Some of this is iodized, particularly those passing through Sibu while a large proportion passing through Kuching and other parts such as Labuan in Sabah and Brunei, escape without being iodized. As a result, the iodization plant in Kuching is underutilized.

Consequently, it is not surprising to note that the highest proportion of provision shops found to be selling iodized salt (65 percent - 100 percent) were in the three divisions forming the Rajang river basin, Sibu being at the lower reaches of the Rajang (Table I), while the lowest proportion (3 percent and 5 percent respectively) were in the 1st Division and the 5th Division which are serviced through Kuching and Labuan/Brunei respectively (Yao, 1979). In the 2nd Division, which has the highest prevalence rate of goitres and in which is located the highly endemic Lubok Antu district, only 36 percent of provision shops sold any iodized salt. Thus, one is forced to conclude that the voluntary iodization scheme in operation in Sarawak since 1957 is less than successful and that urgent alternative measures must be taken if the prevalence of goitres is to be substantially reduced.

TABLE I
PERCENTAGE OF PROVISION SHOPS SELLING IODIZED AND NON-IODIZED SALT, ACCORDING TO THE DIVISION

| Division | No. of locations | Number of shops selling: Non-iodized salt only | Iodized salt only | Both kinds of salt | % of shops selling iodized salt |
|---|---|---|---|---|---|
| 1st | 9 | 28 | 0 | 1 | 3 |
| 2nd | 1 | 9 | 0 | 5 | 36 |
| 3rd* | 6 | 8 | 1 | 14 | 65 |
| 4th | 10 | 30 | 0 | 9 | 23 |
| 5th | 7 | 19 | 0 | 1 | 5 |
| 6th* | 6 | 3 | 7 | 11 | 86 |
| 7th* | 9 | 0 | 6 | 7 | 100 |
| All | 48 | 97 | 14 | 48 | 40 |

*The 3rd, 6th and 7th Divisions form the Rajang basin. Adapted from Yao (1979).

## LEGISLATION FOR SALT IODIZATION

Experience in many parts of the world indicate that where only partial iodization programmes are in operation, as in Sarawak, endemic goitre continues to be a major health hazard. Only when legislation requiring the iodization of all salt is effectively enacted, is the simple measure of iodization effective. It must be emphasized that all salt must be iodized and not merely table salt, refined salt or coarse salt. Merely requiring the iodization of one type of salt, such as table salt, will leave out the very large rural population who do not use such refined salt but who almost exclusively depend upon coarse rock salt for all their purposes including cooking and fish salting. The most effective single measure would be to legislate that all salts imported into Sarawak must be iodized, irrespective of whether it is refined, table or rock salt. Experience in several countries including Mexico, El Salvador, Guatemala and India (Alexander, 1979) indicate that iodine used in minute proportions required in salt iodization programmes is safe, and that the risk of a very slight increase in the incidence of thyrotoxicosis in the elderly is a small price to pay for the enormous benefits of goitre prevention. It is estimated that the iodization of all imported salts would raise the cost of salt by only 1 to 3 percent and that this would not have any effect on the retail price of salt. Each year, 35,000 newborns are added to the population of Sarawak. Their need to be protected against endemic goitre compels us to urge urgent and adequate action. Slow or inadequate measures can only mean that a few thousand more will join the ranks of the goitrous.

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