

# Progress with Salt Iodization in China: The Elimination of Iodine Deficiency Disorder from 40% of the One Billion by Salt Iodization Programme

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## ABSTRACT

Iodine Deficiency Disorders (IDD) are still significant nutritional deficiency problems in China. Thirty of the total 31 provinces of China have IDD problems. More than 380 million of the people in China are at risk of IDD, accounting for 40% of the people at risk in the world. Before prophylaxis, there were 3.7 million endemic goiter patients in China. There were also at least 230,000 typical endemic cretins in China; most of whom were of a neurological type and some were of a myxedematous type. Besides the typical cretins, the so-called subclinical cretinism could be found in many endemias. The incidence might be 5-10 times that of the typical cretins. The high prevalence of this type of low-IQ children considerably impairs the quality of the people.

A national-scale salt iodization programme has been implemented since the eighties. In 1988, about 87% of the iodine-deficient people received iodized salt and now only 7 million goiter patients remain. Although remarkable progress has been made in IDD prophylaxis, it is still far from satisfactory. So far, at least 12% of the iodine-deficient people have not received the regular iodization programme. Although no new typical endemic cretins have been discovered, new subclinical cretins are still prevalent.

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## INTRODUCTION

Iodine Deficiency Disorders are severe nutritional problems in China. One third of the 1.14 billion population, i.e. 380 million, lives in iodine-deficient areas. This is almost the 40% of those suffering from IDD in the whole world and 80% of the Western Pacific Region. Among 31 provinces, autonomous regions and municipalities of China, only Shanghai Municipality has no IDD problem. Before the iodization programme, there had been 35 million endemic goiter patients and 250,000 typical endemic cretins in China. The latter may be greatly under-estimated due to the limited differential capacity of the primary health workers. Besides typical cretinism, quite a lot of primary school children have mild mental retardation, most probably caused by iodine deficiency, and now called subclinical cretinism. The prevalence of subclinical cretinism used to be 5-10 times that of typical cretinism in the endemic areas. The high prevalence of these children considerably impairs the quality of our population (Ma et al., 1981, 1985).

## IDD SITUATION IN THREE SIGNIFICANT ENDEMIAS

Chengde Prefecture was a severe endemia where the goiter rate was 50% and the typical cretin rate 2.3%. All the typical cretins had severe mental retardation with the most severe cases being idiots; 95% had hearing defects and 97.5% had speech defects and the most severe cases of these were complete deaf-mutes. In addition, 75% had neuromuscular defects. The subclinical cretins had obvious difficulty in learning. Some had remained in the lowest class for years. Although they were obedient pupils, they were sluggish and very rarely touched the ball even in ordinary games of basketball. Some of them had to be seated in the front row in the classroom, otherwise they were barely able to hear the teacher. In the primary school, there was 20% of this type of pupil. Although there were a number of other causes for this problem, all the other causes cannot result in such a high incidence (Lu et al., 1954).

Guizhou province had been a severe endemia of southern China. The goiter rate had not been high in

previous years because of the availability of high iodine content well-salt from Sichuan. The endemic goiter as well as the endemic cretinism suddenly flared up as an epidemic in 1956, because the low iodine content of sea-salt had been provided instead of the original well-salt. A survey in 1978 revealed that the goiter rate was 23% and cretin rate was 4%. All cretins were neurological and no cretin was over 14 years old.

Hotan Prefecture was one of the three significant IDD prefectures of Xinjiang of Western China. Endemic cretinism there was mainly neurological but a proportion was myxedematous. The reason for such a difference is still obscure.

## HISTORY OF SALT IODIZATION IN CHINA

A salt iodization programme was initiated in Yipinglang salt mine in Yunnan Province in the 1940s. Yunnan had previously been known to be a very severe endemic area and later IDD had apparently been controlled. Although the elimination of IDD had been given priority since the 50s, a large-scale salt iodization programme only began in the late 70s. In 1979, the National Council of China promulgated Document No. 269 entitled "Use of iodized salt as a main method of IDD control" and pointed out that the iodized salt programme was the joint responsibility of the Ministry of Public Health, Ministry of Light Industry, Ministry of Commerce and the Central Co-op. Since then, a routine coordination meeting among these bodies was held annually by the supra-ministerial Central Leading Group to solve the problematic points in the salt iodization programme. After that, the salt iodization program made remarkable progress. In 1985, about 87% of the iodine-deficient population received iodized salt after which there remained 13.9 million goiter patients. Unfortunately the Central Leading Group was disbanded in 1986 during a reform intended to simplify the administrative procedure and the Bureau of Endemic Diseases under the control of the Ministry of Public Health took over the role alone. Since then, coordinating the salt iodization work has been much more difficult. Since 1989, the iodized salt produced annually in China should have been sufficient for the population of 300 million, but due to the difficulty in distribution, more than 10% of the iodine-deficient population had not been iodized.

Some significant measures have been put into practice since 1990.

(1) Potassium iodate has been used instead of iodide and the iodine loss in transportation has been notably lessened.

(2) A three-step (factory-grocery-kitchen) monitoring of the iodine content of salt has gradually been set up as a priority in IDD control monitoring measures.

(3) A national administrative regulation of salt iodization has been formulated and put in action.

## PROBLEMS IN SALT IODIZATION IN CHINA

Although our salt iodization programmes are far from complete, we have made definite progress recently.

(1) We need 120 tons of iodine annually from Japan and at present we only import 80 tons due to financial problems. The iodine concentration of iodized salt is allowed to be around 10 ppm and some iodization plants have claimed that the iodine lost in processing is as high as 30%. This means that the iodine-deficient population is still barely receiving enough iodine.

(2) Although the goiter rate decreased and no more typical cretins were discovered, subclinical cretins were still fairly prevalent. Both types of cretin as well as the subclinical cretins have been completely eradicated in Switzerland after salt iodization. The difference between the two iodization programs possibly relates to the iodine content.

(3) Many loopholes were discovered during a reviewing of the nation-wide monitoring data of 1990. The iodine content of many iodized salts was not regulated; in many areas privately produced non-iodized salt flooded the markets.

## METHODS OF AMELIORATION

The Childrens Summit called for world-wide elimination of IDD by the year 2000. Of the billion IDD sufferers throughout the world, almost half of them are in China. Consequently, there is a great task ahead of us. Chinese IDD officers, IDD scientists and the foreign IWGIDD consultants recently conducted a review and made the following suggestions:

(1) The original Chinese criteria for the control of IDD is a preliminary standard of control. Those provinces which had met the original criteria should try to achieve the WHO criteria within the next five years. All the provinces of China should meet the WHO goal by the end of this century in order to eliminate IDD, including subclinical cretinism.

(2) Although an administrative regulation has been put in action, it has still not been made law which means that the police have no power to prevent those who violate the regulations by producing, transporting and selling non-iodized salt. Legislation to cover salt iodization is therefore still essential.

(3) Since it is not easy to set the supra-ministerial

leading group up again, the International Working Group for IDD Control in China has initiated annual meetings under the National Coordination Committee on Maternal-Childhood Affairs to regulate salt iodization problems.

(4) China is known to be rich in iodine resources in brines of gas and oil fields and also in the waste gas of phosphate ores. Exploration of these resources could reduce the expense of importing iodine. The international joint venture exploration will be beneficial to both China as well as to foreign enterprises.

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