

Survey of Availability of Iodine-Enriched Salt in Sarawak

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Summary

Three hundred and forty five salt samples were randomly taken from 106 sources where iodised salts were supplied or put for sale in all areas gazetted as endemic goitre areas in Sarawak. The samples were analysed for the presence of iodine. In areas in Sibü, Sarikei and Kapit Divisions, 53 - 70% of salt put for sale were iodised while in the other 6 Divisions, it was less than 27%. As iodisation of salt is an interventive measure in addressing the goitre problem in the State, regular monitoring of iodisation facilities and iodine content of iodised salt in the affected areas is important to ensure the effectiveness of the programme.

Key Words: Endemic goitre, iodine-enriched dietary salt

Introduction

The problem of endemic goitre in Sarawak was first noted in the 1950s. The first documented survey by Polunin covering a fairly large accessible part of the State found a prevalence of 38% ranging from 34.5% to 80.7%¹. Studies in remote areas by Alexander², Chen and Lim³ and Yap⁴, revealed the prevalence of more than 30% endemic goitre. The use of iodised salt to control goitre was started in 1957 with the establishment of 2 salt iodisation plants located in Kuching and Sibü (Fig. 1). The plants, capable of iodising only coarse salt provided free iodisation services to salt dealers in the two main towns. Following the existing marketing pattern, the Kuching dealers were to supply the market in the Divisions of Kuching, Samarahan, Sri Aman, Miri, Bintulu and Limbang while the Sibü dealers were to supply the Divisions of Sibü, Sarikei and Kapit which geographically occupied the central part of the State. Since 1979, iodisation of salt also included those meant for distribution to the local people through

the medical facilities in the respective Divisions. This local production constituted the main source of iodised salt in the State. However a limited source of iodine-containing salt derived naturally from the water springs is found in the highlands of Miri Division.

To ensure iodised salt was sold in goitrous areas of the State, the legislation for the sale of iodised salts was enforced in 1983 under the Public Health Ordinance, 1962 (Sarawak) to cover gazetted areas for endemic goitre, identified earlier by the Medical Department⁵. Even though this legislation was later revoked through the introduction of the Food Act 1983, the amendment made in 1988 in the relevant section of the Food Regulation 1985 included in it the legislation with regards to iodised salt⁶. A survey to study the access to iodine-enriched salt by the people in the goitre-gazetted areas was therefore useful to assess the availability of dietary iodised salt where it was needed in relation to its existing production and legislation.

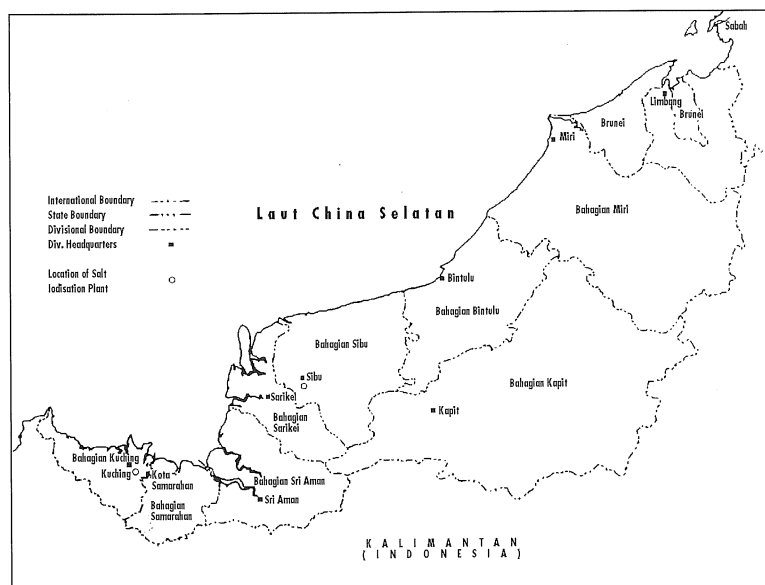


Fig. 1: Map of Sarawak showing the Divisional boundaries and locations of the salt iodisation plants

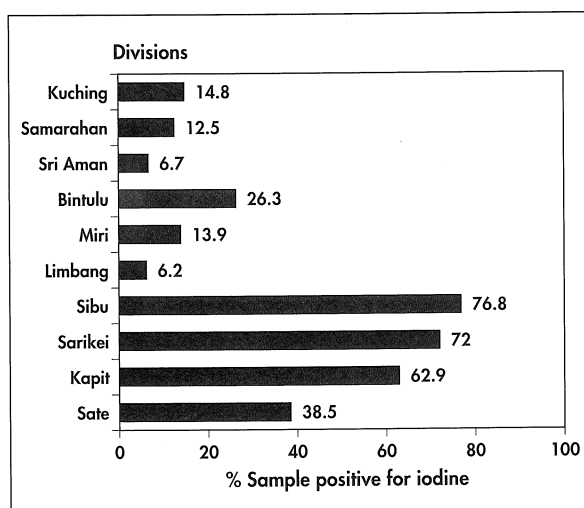


Fig. 2: Percentage salt sample positive for iodine by Division, Sarawak

Materials and Methods

All localities under the previously gazetted areas of the Public Health Ordinance 1962 (Sarawak) were selected for the survey. In each locality, the sources where salt were available for domestic consumption were identified, namely the medical facilities where iodised salt was provided free to patients, boarding schools where it was part of the food rations, and sundry

shops where it was part of the retail goods for sale. Random samples of 50 - 100 grams salt (of either fine or coarse type) were collected from each source by the local health inspectorate staff, packed in polythene bags and sent to the Food Laboratory of the Medical Department in Kuching. As there was no requirement by law in Malaysia to label date of manufacturing or expiry date of iodised salt or table salt, the samples were taken "as and where found" irrespective of date of manufacture or length of storage or type of storage. The samples were analysed for the presence of iodine using "A Field Test for Detecting Iodine enriched Salt" recommended by Dustin and Ecoffey⁷ which is used to detect the presence of the iodate ion over a range of officially recommended levels of iodisation (6 - 130 mg potassium iodate per kilogram of salt). The level of iodisation used in the Sarawak production was 50 - 100 mg potassium iodate per kilogram of salt, which was within the detection range of the test kit utilised.

Results

Three hundred and forty-five samples of salt were taken for analysis. These were from 61 medical facilities, 95 boarding schools and 189 sundry shops in 106 localities identified. The medical facilities referred to comprised of Klinik Desa (Rural Clinics), isolated Klinik Kesihatan

Ibu dan Kanak-kanak (isolated maternal and child health clinics), Dispensari Kecil (Subdispensaries) and Village Health Teams (mobile clinics). Most of the sundry shops were located in the villages, including a number from the local bazaar (small town serving a subdistrict). 62.9 - 76.8% of samples taken from areas in Sibul, Sarikei and Kapit were positive. While in areas in Kuching, Sri Aman, Samarahan, Bintulu, Miri and Limbang, only 6.2 - 26.3% of samples were positive. On the average in the State, only 38.5% of the samples were found to contain iodine (Fig. 2). Samples taken from the medical facilities showed 67.2% positive for iodine, from schools 41.1% and from the shops 28.0% (Table I).

It is to be noted that the test only indicated the presence of iodate ion and quantitation of the salt samples tested was not done. However the level of iodisation used in the Sarawak production was within the detection range of the test kit utilised.

The percentage of salt containing iodine in the Divisions which have their main supply either from the Kuching or Sibul iodisation plants is shown in Table II.

Discussion

The study indicated that the iodisation capacity of the Kuching plant was less efficient compared to the Sibul plant as less than half of the samples distributed to the medical facilities were found to contain iodine. The very low percentage from schools and shops in Kuching, Samarahan, Sri Aman, Miri, Bintulu and Limbang Divisions revealed that the local market had little iodised salt for consumption. This was in contrast to the finding in Sibul, Sarikei and Kapit Divisions where the iodised salt were obtained from the Sibul plant. The differences in iodised salt in medical facilities compared to those in shops and schools for both plants (Table II) would suggest greater deterioration in iodised salt if kept in shops or schools compared to the medical facilities. However, as labelling of expiry date on salt or iodised salt packet was not mandatory, it was not possible to obtain the date of manufacture or the length of storage of the samples taken.

The study also revealed the amount of iodised salt processed by the Kuching and Sibul plants. As shown in Table III, the Sibul plant accounted for 91% of the

Table I
Number and percentage of salt samples positive for iodine by Division

Division	No. of Samples taken and Iodine positive by source											
	Medical Facilities			Schools			Shops			Total Samples		
	Total	No.	%	Total	No.	%	Total	No.	%	Total	No.	%
		Positive	Positive		Positive	Positive		Positive	Positive		Positive	Positive
Kuching	2	1	50.0	5	1	20.0	20	2	10.0	27	4	14.8
Samarahan	5	3	60.0	6	0	0.0	13	0	0.0	24	3	12.5
Sri Aman	10	2	20.0	17	2	11.8	33	0	0.0	60	4	6.7
Bintulu	1	1	100.0	3	0	0.0	15	4	26.7	19	5	26.3
Miri	9	5	55.6	10	0	0.0	24	1	4.2	43	6	13.9
Limbang	4	1	25.0	5	0	0.0	7	0	0.0	16	1	6.2
Sibul	13	13	100.0	21	18	85.7	35	22	62.9	69	53	76.8
Sarikei	5	3	60.0	10	8	80.0	10	7	70.0	25	18	72.0
Kapit	12	12	100.0	18	10	55.6	32	17	53.1	62	39	62.9
State Total	61	41	67.2	95	39	41.1	189	53	28.0	345	133	38

Table II
Percentage iodine-containing salt by Divisions

Division	Main source of supply	% Iodine - containing salt		
		Supplied directly from iodisation plant		Supplied from market
		Medical facilities	Schools	Shops
Kuching, Samarahan, Sri Aman, Miri, Limbang and Bintulu	Kuching plant 12.2%	41.9%	6.5%	6.3%
Sibu, Sarikei and Kapit	Sibu plant 70.5%	93.3%	73.5%	59.7%

Table III
Production of iodised salt, Divisional medical stores
Kuching and Sibu, 1980 - 1987

Years	Production of iodised salt (kilogram)			
	Kuching plant		Sibu plant	
	For salt dealers	For medical facilities	For salt dealers	For medical facilities
1980	11,620	30,663	532,227	56,839
1981	12,600	19,682	495,817	15,671
1982	65,240	58,575	685,227	19,609
1983	26,600	43,350	627,191	4,245
1984	350	0	589,549	4,946
1985	10,500	46,470	683,491	6,404
1986	15,400	74,166	717,455	5,298
1987	23,940	53,065	654,318	3,530
Subtotal	166,250 (34%)	325,971 (66%)	4,985,265 (98%)	116,542 (2%)
Total	492,221 (9%)		5,101,807 (91%)	

Sources: 1. Kuching divisional medical store report on iodised salt production 1980-1987
2. Sibu divisional medical store report on iodised salt production 1980-1987

total state production in 1980 - 1987, producing mainly for salt dealers while the rest of the state production i.e. 9% was produced by the Kuching plant. The latter produced substantially for the medical facilities i.e. 66%. Evidently there was good market demand in the Divisions of Sibul, Sarikei and Kapit, which explained the high proportion of iodised salt available in the market there.

The survey has revealed a number of problems in the efforts to provide dietary iodine through iodine-enriched salt. There is a need to monitor regularly the salt iodisation facilities and iodisation processes to ensure quality of iodisation. There is also a need to monitor the iodine content of iodised salt along the distribution line on a regular basis to ensure maximum impact of this interventive strategy in overcoming endemic goitre. Where supplies to the northern divisions of Limbang, Miri and Bintulu are met with logistic problems, the feasibility for a new salt iodisation plant strategically located in Miri could be

looked into. Because of the serious problem of endemic goitre in the state, the alternative of mandatory importation of only iodised salt as table salt can be explored too.

Finally a systematic and widespread health education campaign can be introduced to create greater awareness among the communities and call for better commitment among the salt dealers in the iodisation of salt.

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References

1. Polunin IV. Endemic Goitre in Malaysia. Assignment Report 1970; 5602 - E (0081): 1-22, WHO Regional Office for the Western Pacific, Manila.
2. Alexander GH. Endemic Goitre and Salt Iodisation in Sarawak, Malaysia. Assignment Report 1979; MAA/NUT/001:1-10 WHO Regional Office for the Western Pacific, Manila.
3. Chen CY, Lim PE. The Prevalence of Endemic Goitre in the Tinjar Area, Sarawak. *Med J Malaysia* 1982;37(3) : 265-9.
4. Yap SB A Study of The Prevalence of Endemic Goitre in an inland Iban community, Sarawak. *Med J Malaysia* 1985;40(3) : 243-6.
5. Government of Sarawak. The Public Health Ordinance, Ninth Schedule to Ordinance No 24 1962 : 96.
6. Government of Malaysia. The Food Regulation 1985 Iodised Salt Regulation No 285(3), Kuala Lumpur, 1994.
7. Dustin JP, Ecoffey IP. A Field Test for Detecting Iodine-enriched salt. *Bulletin of the WHO* 1978;56(4) : 657-8.