

THE PREVALENCE OF ENDEMIC GOITRE IN THE TINJAR AREA, SARAWAK

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SUMMARY

The prevalence of goitre was investigated in a sample from six longhouses and five primary schools located at varying degrees of remoteness along the Tinjar river, Sarawak. Together with this, a survey was made on the type of salt used by the households. The main ethnic groups in these communities were the Kenyah/Kayan and the Iban.

The overall prevalence of palpable goitre detected from the age group 5-14 years were 71.7 percent and 77.0 percent for males and females respectively and 77.7 percent for females aged 15 years and above. The prevalence for both Iban and Kenyah/Kayan of either sex and for all age groups varied from 63.4 percent to 80.4 percent. The prevalence at each location did not differ significantly.

On questioning 126 households, only 9 (7.1 percent) used iodized salt whilst 74 (58.7 percent) households used only uniodized coarse salt and 7 (5.6 percent) used only uniodized fine salt. The remaining 36 (28.6 percent) households used both fine and coarse uniodized salt. Undoubtedly at this point in time legislation on "table" salt iodization must be interpreted to mean not only the iodization of fine table salt, but in the case of the rural longhouse communities as are found in the Tinjar area, the iodization of coarse salt as well.

INTRODUCTION

Endemic goitre is found in population groups where iodine intake is insufficient to meet metabolic requirements. Goitrogens are also known to play a contributory role in its aetiology. Previous studies have reported that goitre is endemic in Sarawak. Polunin¹ examined 692 children and 1058 women above 15 years of age in the inland regions of Sarawak. He found that the prevalence of goitre ranged from 34.5 to 80.7 percent. Maberly² in 1974 found a prevalence rate of 99.5 percent in a population of 167 in the interior of Lubok Antu.

Iodine prophylaxis was introduced in Sarawak in 1957. Iodized coarse salt has been made available from two salt iodization plants, one located in Kuching in the First Division and the other in Sibul in the Third Division. The salt, iodized at a concentration of 100 mg of potassium iodate per kg., is coloured green and is recognised as *garam hijau* by the local folk. The cost of operation of the plants and the transportation of salt from the plant to the shop outlets is borne by the Medical Department of Sarawak. The salt iodization programme in Sarawak has been applied solely on a voluntary basis but unfortunately, this voluntary scheme has not proven to be successful. Even though iodized salt has been made available for over 20 years, the prevalence of goitre in certain parts of Sarawak was still high due to poor distribution of iodized salt.¹

The present study investigated the current prevalence of goitre amongst communities in the Baram. The Baram basin is perhaps one of the most difficult areas in Sarawak, to provide essential health care services in view of the sparse and scattered community and difficult terrain. Our

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TABLE I
THE NUMBER OF PERSONS SAMPLED FROM EACH LOCATION
ACCORDING TO AGE AND SEX

Location *	Sample drawn from:		Number of persons sampled:					Total
	Long-house	Primary school	Male		Female		≥ 15 yrs	
			5-9 yrs	10-14 yrs	5-9 yrs	10-14 yrs		
L. Pana	+	+	17	15	11	16	22	81
L. Sobeng	+	+	17	13	18	12	33	93
L. Luyang @	+	-	19	27	32	46	48	172
L. Tisam	+	+	23	5	16	6	44	94
L. Jegan	+	+	18	58	16	34	25	151
L. Teru @	+	+	47	27	35	27	30	166
Total	6	5	141	145	128	141	202	757
			286		269			

* arranged in order of remoteness Long Pana being the most remote.

@ longhouses located close to *klinik desa* (community clinics)

focus of attention was the riverine communities on the Tinjar River, a tributary of the Baram River. The communities here are predominantly Kenyah and Kayan with a few Iban groups. The prevalence of goitre was also evaluated in terms of ethnic groups. Further we aimed to elucidate the frequency of use of iodized salt in those communities and to assess whether geographical location of a population on the Tinjar influenced the prevalence of goitre or the pattern of household salt usage.

METHOD

The prevalence of goitre in the riverine longhouse communities along the Tinjar River, Baram District, Fourth Division in Sarawak, was investigated as part of a nutritional and morbidity survey of these communities. A total of 286 males and 269 females aged five to fourteen years and 202 females aged fifteen years and above were examined. The sample was taken from six locations along the river so that the degree of remoteness varied, the degree of remoteness being related to the distance of the location to the district capital of Marudi. Long Pana was the most remote location, whilst the least remote was Long Teru. Community clinics (*Klinik desa*) are located at Long Luyang and Long Teru. Table I shows the sample examined at each location. Males below the age of 15 years and as many females as possible from each longhouse were examined together with the school children from the primary school located closest to the longhouse. The older females of each household

were questioned regarding the type of salt they used - whether they used fine or coarse salt and whether it was iodized.

The population along the Tinjar is predominantly Kenyah and Kayan even though Ibans and Chinese may also be found particularly in the lower reaches of the Tinjar. As the Kenyah and Kayan are similar in many respects, for the purposes of this report, they will be grouped together. Most longhouses were chiefly of the same ethnic group even though some degree of intermarrying does occur. Thus, of the six longhouses that were selected along the Tinjar River, five were predominantly Kenyah/Kayan whilst a sixth, Long Tisam, was an Iban longhouse. As primary schools included boarders from neighbouring longhouses, our sample of 757 school children includes eight Chinese and Penan school children, there being a total of 549 Kenyah/Kayan children and 200 Iban children as shown in Table II.

Thyroid size was determined visually as well as by palpation and graded into the following categories:

Grade 0: No visible enlargement; isthmus impalpable

Grade P & I: No visible enlargement; thyroid palpable

Grade 2: Visible enlargement of thyroid (Fig. 1)

Grade 3 & 4 : Gross visible enlargement of at least the size of the clenched fist of the subject.

TABLE II
TOTAL NUMBER OF PERSONS SAMPLED
ACCORDING TO ETHNIC GROUP, AGE AND SEX

Ethnic Group	Number of persons sampled:			Total
	Male 5-14 yrs	Female 5-14 yrs	Female ≥ 15 yrs	
1. Iban	93	63	44	200
2. Kenyah/ Kayan	188	203	158	549
3. Others	5	3	-	8
Total	286	269	202	757

RESULTS

The overall prevalence of goitre for the sample was 71.7 percent for males and 77.0 percent for females for the age group 5 to 14 years and 77.7 percent for females aged 15 years and above. Table III shows the goitre rates by age group, sex and location. At all locations the incidence of goitre for the age group 5-14 years for either sex and for females 15 years and over were above 60 percent. Using the Chi-square test of significance it was found that the differences in the prevalence of goitre between each location for either sex were not statistically significant ($p > 0.05$).

Table IV gives the prevalence of goitre according to ethnic group. The incidence of goitre for both Iban and Kenyah/Kayan of either sex and for all



Fig. 1 Grade 2 enlargement of the thyroid in an Iban woman.

age groups varied between 63.4 percent and 80.4 percent.

From the survey on household salt usage, it was found that of 126 households questioned, only 9

TABLE III
THE PREVALENCE OF GOITRE IN THE SAMPLE (GRADE P AND ABOVE)
BY AGE, SEX AND LOCATION

Location	Number (%) of persons with goitre				
	Male		Female		
	5-9 yrs *	10-14 yrs *	5-9 yrs *	10-14 yrs *	≥ 15 yrs
L. Pana	13 (76.5)	11 (73.3)	10 (90.9)	12 (75.0)	19 (86.4)
L. Sobeng	14 (82.4)	12 (92.3)	16 (88.9)	10 (83.3)	27 (81.8)
L. Luyang	12 (63.2)	24 (88.9)	28 (87.5)	38 (82.6)	38 (79.2)
L. Tisam	14 (60.9)	4 (80.0)	9 (56.3)	5 (83.3)	30 (68.2)
L. Jegan	12 (66.7)	44 (75.9)	9 (56.3)	30 (88.2)	20 (80.0)
L. Teru	26 (55.3)	19 (70.4)	25 (71.4)	15 (55.6)	23 (76.7)
Total	91 (64.5)	114 (78.6)	97 (75.8)	110 (78.0)	157 (77.7)
	205 (71.7)		207 (77.0)		

* The differences in the prevalence of goitre between each location for either sexes for the combined age group 5-14 years were not statistically significant ($p > 0.05$).

TABLE IV
THE PREVALENCE OF GOITRE (GRADE P AND ABOVE) BY AGE, SEX AND ETHNIC GROUP

Ethnic group	Age group (yrs)	Sex	Number with goitre	Prevalence (%)
Iban	5-14	Male	59	63.4
	5-14	Female	47	74.6
	≥ 15	Female	30	68.2
Kenyah/ Kayan	5-14	Male	143	76.1
	5-14	Female	160	78.8
	≥ 15	Female	127	80.4
Total			566	75.6

(7.1 percent) used iodized salt, showing that 92.9 percent of households did not use iodized salt. Seventy-four (58.7 percent) households used coarse salt while 7 (5.6 percent) used only fine salt and 36 (28.6 percent) used both fine and coarse salt (Table V), indicating that the iodization of coarse salt will remain an important factor in any attempt to control endemic goitre in the Baram.

DISCUSSION

The prevalence of goitre detected by the present study is high with the rate of palpable goitre being 71.7 percent in males aged 5 to 14 years and 77.0 percent in females for the same age. There has so far been one other study by Anderson³ reporting goitre in the Baram. This was centred on a group inhabiting the middle Baram region. Figures from the present study are higher than the 59.0 percent reported by Anderson.³ It should be noted that the age of the children sampled in that study was 7 to 8 years. The Tinjar is a tributary of the Baram and is relatively more inaccessible with a sparse population. For women above 15 years of age, the present survey records an incidence of goitre of 77.7 percent. Anderson reported a rate of 50.0 percent in a group of 142 from the middle Baram.³ Comparing the present results with those from other surveys of other divisions, we can see (Table VI) that the Tinjar has a higher prevalence of goitre. The prevalence of goitre for both Iban and Kenyah/Kayan in the present study of the Tinjar area, are higher when compared with the rates among the Bidayuh, Kejaman and Iban as reported by Polunin¹ (Table VII). This is consistent with the fact that iodised salt from the Kuching plant did not reach the consumers of the Baram and the 5th Division.

TABLE V
THE TYPE OF SALT USED BY LONGHOUSE COMMUNITIES, TINJAR TIVER, BARAM

Location	No. (%) of sampled households using:				Total
	Non-iodized salt:			Iodized salt:	
	Fine only	Coarse only	Both fine and coarse		
L. Pana	0	4	10	0	14
L. Sobeng	4	16	0	1	21
L. Luyang*	2	8	6	3	19
L. Tisam	0	27	4	2	33
L. Jegan	0	9	7	0	16
L. Teru*	1	10	9	3	23
Total	7 (5.6)	74 (58.7)	36 (28.6)	9 (7.1)	126 (100)

* longhouses located close to *klinik desa* (community clinics)

The prevalence of goitre at each location did not statistically differ in a significant manner. This is not surprising when the type of salt available in the longhouse are examined. Out of the sample of 126 households only 9 (7.1 percent) used iodized salt. In fact all 9 households had had a pregnant woman recently who had received, during the antenatal care, supplies of iodized salt. Further, six of nine households using iodized salt were from Long Luyang and Long Teru, the two locations where community clinics (*klinik desa*) are situated. No other households used or possessed iodized salt. The importance of providing iodized salt to antenatal mothers cannot be underestimated as intellectual impairment of infants is prevented by the prenatal administration of iodine.

The fact that 74 households (58.7 percent) used only uniodized coarse salt is important as it implies that legislation requiring the iodization of "table" salt must be interpreted to include not only the iodization of fine salt but, in the case of rural longhouse communities as are found in the Tinjar area, the iodization of coarse salt as well.

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TABLE VI
PREVALENCE OF GOITRE IN THE INLAND PARTS OF THE VARIOUS DIVISIONS
OF SARAWAK IN RECENT YEARS

Division	Area	Source	Sex	Age (yr)	Sample No.	Prevalence per 100
First	-	Polunin, 1971 ¹	Female	10-14	273	49.8
				≥ 15	157	52.2
Second	-	Polunin, 1971 ¹	Female	10-14	147	38.8
				≥ 15	161	80.7
	(interior)					
	Lubok Antu	Maberly & Eastman, 1976 ²	Both	11-89	167	99.5
	(interior)					
	Lemanak	Alexander, 1979 ⁴	Female	≥ 15	75	93.3
	(coastal)					
	Rubu,	Maberly & Eastman, 1976 ²	Both	11-89	39	74.0
	Bajong		Both	11-89	122	3.0
Third	-	Polunin*, 1971 ¹	Female	10-14	252	34.5
				≥ 15	589	55.2
	Kanowit	Alexander, 1979 ⁴	Female	≥ 15	137	47.4
Fourth	Kanowit town	Alexander, 1979 ⁴	Both	7-12	542	0.7
	mid-Baram	Anderson, 1979 ³	Both	7-8		59.0
			Female	≥ 15	142	50.0
			Both	0-6	556	30.4
	Tinjar	Present study	Female	10-14	110	78.0
				≥ 15	157	77.7
			Male	10-14	114	78.6
Fifth	-	Polunin, 1971 ¹	Female	10-14	20	45.0
				≥ 15	151	45.0
Seventh	Sut & Mujong	Anderson, 1978 ⁵	Female	≥ 15	106	30.2
			Both	0-6	414	7.0

* The Third Division studied by Polunin has now been subdivided into the III, VI and VII Divisions.

TABLE VII
PREVALENCE OF GOITRE AMONG DIFFERENT
ETHNIC GROUPS OF SARAWAK IN RECENT YEARS

Ethnic group	Source	Sex	Age (yr)	Sample No.	Prevalence per 100
Bidayuh	Polunin, 1971 ¹	F	10-14	113	61.1
			≥ 15	98	59.2
Kejaman	Polunin, 1971 ¹	F	10-14	14	35.7
			≥ 15	76	63.3
Iban	Polunin, 1971 ¹	F	10-14	141	46.8
			≥ 15	572	68.0
Kenyah/ Kayan	Present study	F	5-14	160	78.8
(Tinjar)			≥ 15	127	80.4
Iban	Present study	F	5-14	47	74.6
(Tinjar)			≥ 15	30	68.2

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⁵ Anderson A J U. Nutrition of Iban children of the Sut and Mujong Rivers, 1978 (cyclostyled report, Medical Department, Sarawak, Malaysia).