

## THE PREVALENCE OF ENDEMIC GOITRE AMONG SCHOOL CHILDREN IN SOME PARTS OF SUMATRA, JAVA AND BALI, INDONESIA +)

Djumadiaz Abunain\*, Sumilah Sastroamidjojo\*\*, Arifin Surjadi\*\*  
Aris Halim\*\* and F.J. Maspaitella\*

*Suatu penyelidikan gondok endemik pada anak-anak Sekolah Dasar dilakukan di empat propinsi di daerah-daerah yang dikenal sebagai daerah endemik dalam bulan Juli dan Nopember 1972. Pemeriksaan dilakukan terhadap sejumlah 6703 anak-anak sekolah dari 46 Sekolah Dasar yang terdapat di 39 desa di berbagai tempat di propinsi-propinsi Sumatra Utara, Sumatra Barat, Jawa Timur dan Bali.*

*Penentuan tingkat pembesaran kelenjar gondok, didasarkan atas klasifikasi yang dianjurkan oleh Seminar on Goitre Control yang diselenggarakan oleh W.H.O. di New Delhi dalam tahun 1967.*

*Penyelidikan ini menunjukkan bahwa angka prevalensi penyakit gondok pada anak-anak sekolah di empat propinsi berkisar antara 62.1 per cent di Sumatra Utara dan 89.4 per cent di Sumatra Barat. Walaupun Sumatra Barat menunjukkan angka prevalensi tertinggi, percentase gondok yang tampak pada anak-anak yang diperiksa tidak mempunyai gondok yang tergolong tingkat 3.*

*Penelitian yang mendalam dan intensif dianjurkan sebelum dilaksanakan program pencegahan gondok endemik dengan jodisasi garam.*

by various authors. In 1966, Suwondo et al pointed out that it is still a public health problem in East Java as indicated by its high prevalence in school children of two villages in Kediri and the widespread of geographical origin of patients with goitre at the Municipal Hospital, Surabaya and the Baptist Hospital, Kediri.

Distribution of iodized salt was introduced in Indonesia in 1927 as prophylaxis of goitre in endemic areas. However, during and after the Second World War iodized salt was practically not available in sufficient quantity to meet the needs of the people living in the endemic areas of Indonesia. During the last few years iodized salt was no longer manufactured at the government plant in Madura. Very few recent information were available on the prevalence of endemic goitre in the absence of salt iodization in the last decades.

The purpose of the study was to find out the prevalence of goitre among school children living in the known endemic area preliminary to an epidemiological study on endemic goitre to be carried out as a base for the future control of the disease in Indonesia.

An intensive literature study on the prevalence and geographical distribution of endemic goitre all over the world by Kelly and Snedden (1960) has shown that few countries appear to be free from endemic goitre.

In Indonesia centres of endemic goitre, summarized in details by the above authors from studies made mostly in 1930's are found through out the Indonesia archipelago, Sumatra, Java, Bali, Timor, Kalimantan, Sulawesi and West Irian. It was stated that the incidence in some places were more than 80 per cent in women and 60 per cent in men. In Java among the school children in Kediri the rates were normally about 60 per cent or higher. Incidence of 18 to 63 per cent was found in several places of West Irian as reported by Gunawan and van Rhijn (1971).

Endemic goitre is still one of the main nutrition problems in Indonesia as reported

\*\* Nutrition Department, Medical Faculty, University of Indonesia Jakarta.

Institute of Nutrition, Ministry of Health, Jakarta.

+) Presented at the Second Asian Congress of Nutrition, Manila 12 - 17 January 1973.

## MATERIALS AND METHODS

## RESULTS

A survey was carried out among school children in the reported endemic areas in the provinces of North Sumatra, West Sumatra, East Java and Bali.

A total of 6703 school children attending 46 primary schools located in 39 villages of different localities in the four provinces, were examined in July and November, 1972.

Questionnaires were filled out for each individual to provide information on age, sex, clinical examination familial goitre. Separate record was made of general information on each village.

Classification of goitre size as recommended by the Seminar on Goitre Control, held in New Delhi in 1967 was used for classifying the degree of thyroid enlargement. Nodular goitre was separately recorded.

The prevalence of goitre among school children in each of the four provinces is presented in Table 1. The rate varies from 62.1 per cent in North Sumatra to 89.4 per cent in West Sumatra.

The rate in the eight villages in Bali varied from 45 to 95 per cent but mostly higher than 70 per cent. In East Java the rates in school children of seven villages were mostly above 85 per cent. In seven out of eleven villages in West Sumatra, the rates were above 90 per cent, while the lowest rate was 71.2 per cent.

In school children of eleven villages of North Sumatra. The rate varied from 32.8 to 80.4 per cent; in six villages the rates were above 70 per cent.

Table 1. Prevalence of goitre among school children in North Sumatra, West Sumatra, East Java and Bali (per cent).

Province	Number examined	Percentage with goitre	C l a s s					Nodular
			0	1	2a	2b	3	
N. Sumatra	1783	62.1	37.9	51.3	10.0	0.2	0	0.6
W. Sumatra	2223	89.4	10.6	72.1	16.2	0.9	0	0.1
East Java	1713	83.2	16.8	46.7	30.2	2.8	0	3.5
Bali	984	79.5	20.5	60.4	17.2	0.8	0	1.1

Table 2. Prevalence of goitre among school children in North Sumatra, West Sumatra, East Java and Bali by sex.

Province	Number examined	B o y s		Number examined	G i r l s	
		Percentage with goitre	Percentage with goitre		Percentage with goitre	Percentage with goitre
North Sumatra	874	59.8		909	65.2	
West Sumatra	1080	85.2		1143	93.4	
East Java	950	82.6		763	85.2	
Bali	586	79.5		398	79.4	

Is it also shown in Table 1, that the percentage of children with visible goitre (Class 2a and 2b) was higher in East Java than in the other three provinces, though West Sumatra showed the highest total prevalence rate.

However, none of the children examined in the four provinces had goitre classified as Class 3. Nodules were seen in 3.5 per cent of the children examined in East Java, while lower rates below 1 per cent were found in the other provinces.

Table 2 shows the prevalence rate in both sexes. The percentages of children with goitre in the four provinces were higher in girls than boys, but significant difference was found only for West Sumatra.

The percentage of children with visible goitre classified as class 2a and 2b was more than two times higher in girls than boys in West Sumatra.

The rates in various age groups and sex are shown in Table 3. In the age group 13–16 years there were only few children 16 years of age, so that this age group is represented mostly by children age 13 to 15 years. In children of North Sumatra the rates were high in the age group 10–12 and 13–16 years for both sexes.

However, the rate of visible goitre of class 2a was increasing with age only from 6.4 per cent in boys of 7–9 years of age to 7.6 per cent in the age group 13–16 years while in girls the increase was from 9.3 per cent in the age 7–9 years to 31.1 per cent in the age 13–16 years.

13–16 years for both sexes. No increase of

class 2a goitre was noted with the increasing age in boys. In children of East Java the highest total prevalence rate was observed in boys in the age group 7–9 years and tend to decrease at the older age groups, while in girls the highest rate was in the age group 10–12 years and the lowest in the age group 13–16.

However, a marked increase of rates with age was noted in girls from 17.8 per cent in the age 7–9 years to 29.5 per cent in the age group 13–16 years.

The highest total prevalence rate was found in the age group 7–9 present in children of Bali and decrease with age in both sexes; similar trend was noted in the rates of class 2a goitre. Class 2a goitre, however, were 26.7 per cent in boys and 37.3 per cent in girls of 7–9 years of age and tend to decrease to 25.8 per cent in boys and to 34.3 per cent in girls of 10–12 years and to 20 per cent and 30 per cent in boys and girls respectively in the age group 13–16 years.

Regarding to familial goitre, 25.2 per cent of the school children in Bali mentioned others in the family with goitre; while in East Java, West Sumatra and North Sumatra it was mentioned respectively by 13.4 per cent, 9.7 per cent and 9.7 per cent the children.

## DISCUSSION

High prevalence rate of goitre among the school children in the four provinces as found in this survey suggest that the problem is still unchanged in most of the endemic areas

Table 3. Prevalence of goitre among school children of North Sumatra, West Sumatra, East Java and Bali age (per cent).

Age (yrs)	N. Sumatra		W. Sumatra		East Java		Bali	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
7 – 9	56.4	59.0	86.9	93.5	84.1	85.1	89.8	84.7
10 – 12	63.9	71.2	86.4	95.2	79.8	87.2	75.7	71.8
13 – 16	53.2	74.6	77.3	88.0	65.5	78.0	51.1	68.4

In children of West Sumatra the total prevalence rate were higher in the age groups 7–9 and 10–12 years than those in the age group

in Indonesia. By the fact that none of the children had class 3 goitre and the greater proportion were with palpable goitre of class 1,

the villages covered by the survey are not the most highly goitre endemic areas of Indonesia. However, practically nearly all school children in the survey areas are at risk, as indicated by relatively few children were found without goitre.

Higher prevalence of visible goitre among children of East Java suggest that the intensity of iodine deficiency is greater in East Java than the others.

Although school children surveys could not show the whole picture of the problem, they give some indication on the present situation in the area concerned. The Seminar on Goitre Control held in New Delhi in 1967 considered that iodine prophylaxis must be introduced in areas where the prevalence rates of palpable and visible goitre in the school age population exceed 30 per cent. Results obtained from this survey revealed that such a programme should be considered by the Government of Indonesia in its Second Five Year Development Plan 1974 - 1979.

However, intensive and careful study is highly required before its implementation. At present most salt available in the local market for consumption are produced by salt farmers scattered in various places, particularly along the northern sea shore of Java. Consideration of other feasible measures in highly recommended before the implementation of salt iodization could be done.

### SUMMARY

A survey on endemic goitre in school children was carried out in the known endemic area in four provinces in July and November 1972.

A total of 6703 school children attending 46 primary schools located in 39 villages of different localities of the provinces of North Sumatra, West Sumatra, East Java and Bali were examined.

The survey shows that the prevalence rate of goitre in school children of the four provinces varies from 62.1 per cent in North Sumatra to 89.4 per cent in West Sumatra. Although West Sumatra showed the highest total prevalence rate, the percentage of children with visible goitre is highest in East Java. None of the children examined had goitre classified as class 3.

Intensive and careful study is highly recommended before the implementation of iodine prophylaxis.

### ACKNOWLEDGEMENTS

This study was made possible by the contribution of the Directors and staff of the Health Services and the Administrative Officers at the provincial and regency level in the four study areas. We would like to express our sincere gratitude for their invaluable cooperation and help.

We are very much indebted to Mr. B. Dolok-saribu, B.Sc. and Mr. P. Purba, B.Sc. N. Sumatra Provincial Health Services; Miss Fitriati, W. Sumatra Provincial Health Service; Mr. Sugito, B.Sc. Dr. Beny Sugianto and Mr. Jusuf, East Java Provincial Health Service, Mr. IGAK Witanaja MPH and Mr. IGP Djiwa. MPH Bali Provincial Health Service, for their contribution and cooperation in the execution of the field work.

### REFERENCES

- Gunawan, S., and van Rhijn, M. (1971) Strüma dan cretinisme di Irian Barat. Kump. Cera-mah KOPAPDI-1, 16-21
- Kelly, F.C., and Snedden, W.W. (1960) Prevalence and geographical distribution of Endemic goitre. In Endemic Goitre, Geneva, 167
- Perez, C., Scrimshaw, N.S. and Monoz, J.A. (1960) Technique of Endemic Goitre Surveys. In Endemic Goitre, WHO, Geneva
- Soewondo, H., Donosepoetro, M., and Kellog (1966) F. Endemic goitre in East Java Am. J. Trop. Med. and Hyg., 15, 117-119
- World Health Organization (1967) Report of a Seminar on Goitre Control WHO., New Delhi