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RESEARCH ARTICLE
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Administration of Iodized Salt, Counseling about Food Sources of Iodine and Goitrogenic, to Mothers who have Children in Primary School, Affect the Excretion of Urine Iodine

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ABSTRACT

To overcome the problem of iodine deficiency, administration of iodized salt, counseling of iodized food sources and goitrogenic food are very important. The goal is to change the consumption of iodized and goitrogenic food sources and consume the recommended iodized salt, so that iodine intake is fulfilled and urinary iodine excretion becomes normal. This study was an experimental research, using pre-test and post-test with control group design. The sample size was 60 students of elementary school, consisting of 30 students. students for the treatment group and 30 students for the control group. In the treatment group, the mothers of the students were given iodized salt to give to their children, provided counseling about food sources that are rich in iodine and which are goitrogenic. The parameters measured were the consumption of iodine, protein and urinary iodine excretion in the phase before and after being treated, with a span of time for 3 weeks. Data collection on nutrient consumption was done through recall once in 24 hours. The level of iodine in the urine was measured using spectrophotometry, and the consumption of goitrogenic sources was measured through observation at the time of recall. The data were analyzed using t-test. Based on the results of the study it can be concluded that in Sedau Village, Narmada District, West Lombok Regency; giving iodized salt, counseling about iodized and goitrogenic food sources to mothers who have children in primary school.

Keywords: iodized salt; counseling; food sources of iodine; goitrogenic; excretion of urine iodine

INTRODUCTION

Disorders due to iodine deficiency not only cause mumps and cretinism, but also affect the decrease in the body's resistance to disease; stunted brain development (intellectual) and potentially reducing the level of intelligence or Intelligence Quotient (IQ); low productivity; even cause birth defects, both physical and mental; and growth disturbance.(1) The occurrence of growth disturbances in children makes researchers interested in conducting research on the effect of iodized salt and counseling about food sources of iodine and goitrogenic substances to urine iodine excretion in primary school age children. Research on disorders due to iodine deficiency is often carried out in primary school-age children, aged 6-12 years because of their vulnerability to iodine deficiency considerations. Children in this age are in a period of growth and development, so attention to their nutritional needs is a strategic step, because the impact is directly related to the achievement of quality human resources.(2)

To overcome the problem of iodine deficiency, administration of iodized salt, counseling of iodized food sources and goitrogenic food are very important. The goal is to change the consumption of iodized and goitrogenic food sources and consume the recommended iodized salt, so that iodine intake is fulfilled and urinary iodine excretion becomes normal.

METHODS

This study was an experimental research, using pre-test and post-test with control group design. This research was conducted in Sedau Village, Narmada Subdistrict on elementary school students aged 9 to 12 years, or students in grades 4, grade 5 and grade 6, from May to August 20107. The sample size was 60 students, consisting of 30 students. students for the treatment group and 30 students for the control group. In the treatment group, the mothers of the students were given iodized salt to give to their children, provided counseling about food sources that are rich in iodine and which are goitrogenic.

The parameters measured were the consumption of iodine, protein and urinary iodine excretion in the phase before and after being treated, with a span of time for 3 weeks. Data collection on nutrient consumption was done through recall once in 24 hours. The level of iodine in the urine was measured using spectrophotometry, and the consumption of goitrogenic sources was measured through observation at the time of recall.(3) The numerical data were presented in the form of mean and standard deviation(4), then analyzed using t-test.

RESULTS

Table 1. The distribution of sex

Sex	Treatment group		Control group	
	Frequency	Percentage	Frequency	Percentage
Male	15	50	20	66.7
Female	15	10	10	33.3
Total	30	100	30	100

Table 2. The distribution of age

Age	Treatment group		Control group	
	Frequency	Percentage	Frequency	Percentage
<10 years old	6	20	3	10
10-12 years old	24	80	27	90
Total	30	100	30	100

Most of the respondents were 10 to 12 years old. This category was chosen with the consideration that children are more easily invited to communicate, especially regarding food consumption.

Table 3. The consumption of goitrogenic food in the treatment group

Goiterogenic consumption	Treatment group		Control group	
	Frequency	Percentage	Frequency	Percentage
Yes	22	73	7	23
No	8	27	23	77
Total	30	100	30	100

Table 4. The consumption of goitrogenic food in the control group

Goiterogenic consumption	Treatment group		Control group	
	Frequency	Percentage	Frequency	Percentage
Yes	19	63	17	56
No	11	37	13	44
Total	30	100	30	100

In this study obtained data on goitogenic food consumption based on the results of recall and observation in the treatment group after being counseled about iodized and goitrogenic food sources. In the phase before treatment goitrogenic food consumption was 73%, while in the phase after treatment it managed to decrease to 23%. Whereas in the control group, there was a slight decrease from 63% to 56%.

Table 5. Urinary iodine excretion in the treatment group

	n	Mean	Standard deviation	p-value
Before	30	97.29	29	0.00
After	30	239.08	871	

Table 6. Urinary iodine excretion in the control group

	n	Mean	Standard deviation	p-value
Before	30	117.30	11.85	0.00
After	30	243	92.2	

In the treatment group, there were significant differences in the level of urinary iodine excretion, which was marked by p-value = 0.00. The same thing also happened in the control group (p-value = 0.00).

Table 7. Distribution of protein consumption

Category	Treatment group				Control group			
	Before		After		Before		After	
	n	%	n	%	n	%	n	%
Mild deficit	21	70	17	56	25	83	24	80
Normal	9	30	10	33	5	17	6	20
Exceeding adequacy	0	0	3	11	0	0	0	0
Total	30	100	30	100	30	100	30	100

Protein deficiency will cause high T3 and free T4. With the feedback mechanism on TSH, the hormones from the thyroid gland will eventually decrease. In this study, especially in the treatment group, there was a significant difference ($p < 0.05$), between before and after treatment, as indicated by an increase in the average protein intake from 47.91 µg / L ± 6.54 to 50.15 µg / L ± 12.52; while in the control group, almost no change occurred. Analysis of differences in urinary iodine excretion in the two groups showed that the administration of iodized salt, counseling about the consumption of iodized and goitogenic food sources affected urinary iodine excretion.

DISCUSSION

Goitrogenic is a substance that can inhibit the production or use of thyroid hormone. Substances that are goitrogenic many contained in food ingredients, such as cassava, sweet potatoes, cabbage, beans and mustard greens.[5] In this study obtained data on goitogenic food consumption based on the results of recall and observation in the treatment group after being counseled about iodized and goitrogenic food sources. In the phase before treatment goitrogenic food consumption was 73%, while in the phase after treatment it managed to decrease to 23%. Whereas in the control group, there was a slight decrease from 63% to 56%.

In the treatment group, there were significant differences in the level of urinary iodine excretion; the same thing also happened in the control group, but with a lower level of change. Iodine intake in daily food affects the adequacy of iodine in the body, the results of 24-hour recall in the treatment group did not differ statistically, but had a higher increase than the control group, which was limited in accordance with the daily iodine adequacy rate, which was recommended.[6]

Protein deficiency can affect various stages of hormone formation from the thyroid gland especially the hormone transport stage. T3 and T4 are bound by protein in serum, but only 0.3% T4 and 0.25% T3 are free.[7] Protein deficiency will cause high T3 and free T4, with a feedback mechanism in TSH, so that hormone levels from the thyroid gland eventually decrease. In this study, the treatment group experienced a significant change after being given an intervention, and this was also shown by an increase in the average protein intake, whereas in the control group there was almost no change. According to Mardiyanti[8], lack of protein consumption, especially related to iodine, has nothing to do with the incidence of menarche in adolescents aged 12 years.

The results showed that administration of iodized salt, counseling about iodine and goitogenic food sources to mothers who have children in primary school, significantly influence the excretion of urine iodine. According to Mutalzimah[9], iodine intake is associated with urinary iodine excretion, but goiter is not related to iodine intake.

CONCLUSION

Based on the results of the study it can be concluded that in Sedau Village, Narmada District, West Lombok Regency; administration of iodized salt, counseling about 'food sources of iodine' and goitrogenic, to mothers who have children in primary school, affect the excretion of urine iodine.

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