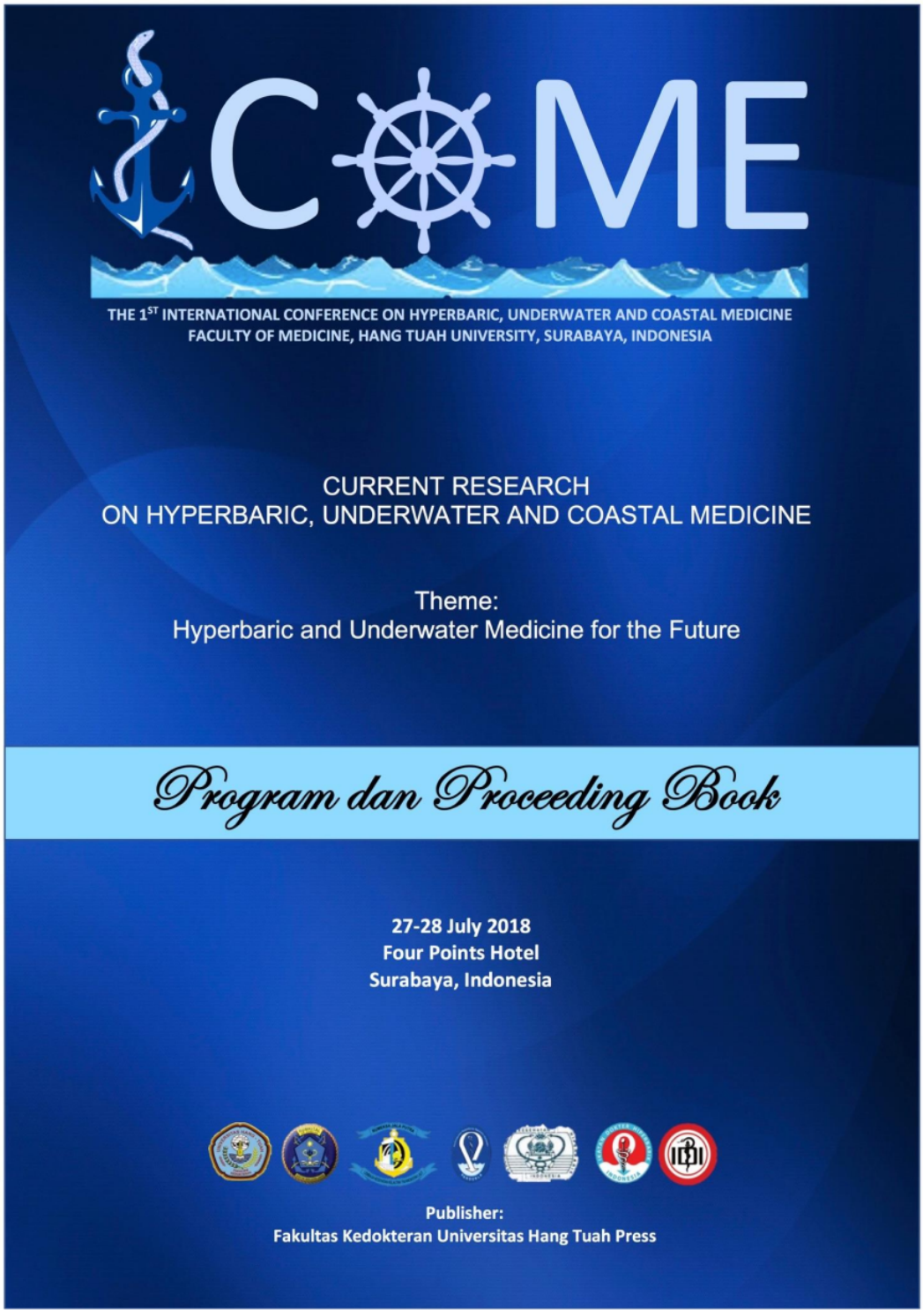
Urinary Iodine Excretion (UIE) of Elementary School Children in Coastal Areas of Gisik Cemandi Village, Sidoarjo District and Kedung Cowek Village, Surabaya City, East Java Province, Indonesia

by Wienta Diarsvitri, Devinta Akhlinianti, Ayu Fm., M. Fathi Ilmawan, Peppy Nawangsasi

Submission date: 25-May-2023 01:36PM (UTC+0700)
Submission ID: 2101432639
File name: 8._III.C.2.2.1_Prosiding-dr._Fathi.pdf (2.56M)
Word count: 3050
Character count: 21579


ICOME
THE 1ST INTERNATIONAL CONFERENCE ON HYPERBARIC, UNDERWATER AND COASTAL MEDICINE
FACULTY OF MEDICINE, HANG TUAH UNIVERSITY, SURABAYA, INDONESIA
CURRENT RESEARCH
ON HYPERBARIC, UNDERWATER AND COASTAL MEDICINE
Theme:
Hyperbaric and Underwater Medicine for the Future
Program dan Proceeding Book
27-28 July 2018
Four Points Hotel
Surabaya, Indonesia
Publisher:
Fakultas Kedokteran Universitas Hang Tuah Press

THE 1ST INTERNATIONAL CONFERENCE ON HYPERBARIC, UNDERWATER AND COASTAL MEDICINE (ICOME)
FACULTY OF MEDICINE, HANG TUAH UNIVERSITY, SURABAYA, INDONESIA

Current Research on Hyperbaric, Underwater and Coastal Medicine

Theme:
Hyperbaric and Underwater Medicine for the Future

Program and Proceeding Book

27-28 July 2018
Four Points Hotel
Surabaya, Indonesia

PUBLISHER:
FAKULTAS KEDOKTERAN UNIVERSITAS HANG TUAH PRESS

The 1st International Conference on Hyperbaric, Underwater and Coastal Medicine (ICOME)
Faculty of Medicine, Hang Tuah University, Surabaya, Indonesia

Current Research on Hyperbaric, Underwater and Coastal Medicine
Theme: Hyperbaric and Underwater Medicine for the Future
Progran and Proceeding Book

Publisher :
Fakultas Kedokteran Universitas Hang Tuah Press
Jalan Gadung No. 1 (Kompleks Barat RSPAL Dr. Ramelan)
Surabaya 60244.
Telp. 031-8438750, Fax. 031-8433626

First publication in December 2019.

Table of Contents

PROCEEDING

PROCEEDING

Urinary Iodine Excretion (UIE) of Elementary School Children in Coastal Areas of Gisik Cemandi Village, Sidoarjo District and Kedung Cowek Village, Surabaya City, East Java Province, Indonesia

Wienta Diarsvitri*, Devinta Akhlinianti, Ayu Fitria Marini, M. Fathi Ilmawan, Peppy Nawangsasi
Dept. of Community Medicine, Faculty of Medicine, Universitas Hang Tuah

*Corresponding autor: wienta.diarsvitri@hangtuah.ac.id

Abstract

Iodine deficiency disorders (IDD) caused a negative impact by inhibiting the physical growth and brain development of fetuses, infants, toddlers and children; and in the long term it will affect the quality of human resources. Based on the medical examination of elementary school childrens in the coastal area by medical student of Hang Tuah University in 2016, there were children with stunting and having enlargement of thyroid gland. Urinary Iodine Excretion (UIE) is one of the indicator of body's iodine adequacy. This study aimed to determine the prevalence of iodine deficiency by UIE in the 4th – 6th year-students at elementary schools in Gisik Cemandi Village, Sidoarjo Regency and Kedung Cowek Village, Surabaya City. This study used quantitative methods by measuring UIE, height, weight and palpation of the thyroid gland. UIE measurement was conducted at Balai Besar Laboratorium Kesehatan Surabaya.
Of the total 191 elementary chool chldrens, 61 children gave their urine samples. Girls had a lower median UIE (71.40 μg /L) than boys (72.35 μg /L). The prevalence of mild iodine deficiency in children with short height per age category was 24.5%, while normal height per age was 75.5%. A mild iodine deficiency prevalence in Gisik Cemandi Village was higher (94.7%) than in Kedung Cowek Village (83.4%). Majority of elementary school children in Gisik Cemandi Village, Sidoarjo Regency and Kedung Cowek Village, Surabaya City had a mild iodine deficiency with median UIE of 71.40 μg / L below the normal value of UIE for elementary school childrens based on WHO criteria (100- 199 μg /L). Accordingly, the related parties should give education and nutrition interventions to combat the iodine deficiency..

Keywords: Iodine Deficiency, Ekskresi Urine Iodine, Elementary School Children

Background

Iodine deficiency may be caused by inadequacy of iodine intake or disruption in iodine absorption. Iodine deficiency brings negative effects on the growth and development of babies and children. In the long term, iodine deficiency may decrease the quality of human resources (Zimmermann & Boelaert 2015; Zimmermann 2009).

Indonesia was in the fifth rank in the prevalence of stunted children, after India, Nigeria, Pakistan and China (de Onis et al. 2012). The Indonesian basic health research conducted in 2013 reported 37.2% children under five years old were stunted (Kementerian Kesehatan RI 2013).

The decrease in the short term memory is often ignored by the society and considered normal in the iodine deficiency endemic areas, even though the deficiency may lead to the decrease of IQ and mental retardation (Piccone 2011).

Iodine deficiency is an indicator of adequate levels of iodine in the body. Elementary school children are susceptible to iodine deficiency due to their high metabolism related to their growth and development (Li and Eastman 2012).

This study was conducted to determine the prevalence of iodine deficiency in elementary school students in Gisik Cemandi Village, Sidoarjo District and Kedung Cowek Village, Surabaya City, East Java Province, Indonesia.

Methods

This study used quantitative methods by measuring sex, age, body weight, body height for age, body mass index (BMI) and urinary iodine excretion (UIE). The urine samples were sent to the health laboratory in Surabaya and analyzed using Amonium Persulfat method. The research was approved by the human research ethics committee of the Faculty of Medicine, Universitas Hang Tuah.

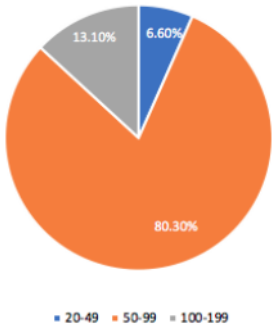
Results and Discussion

Of the total 191 elementary school students, their mean age was 11 years old, their mean weight was 31.8 kg, their mean height was 136.9 cm and their mean BMI was 16.7 kg/m^2.

Table 1. Characteristics of study subjects

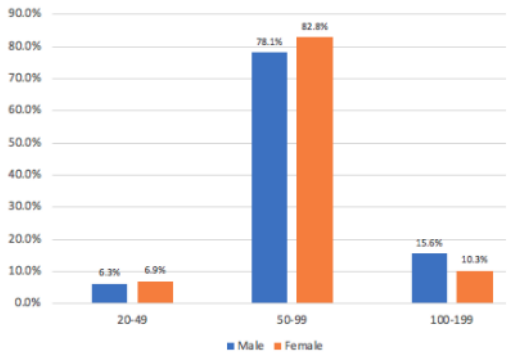
Characteristics	Mean	SD
Age	11.01	1.095
Weight	31.8272	9.04719
Height	136.9644	8.24615
BMI	16.7380	3.48089

There were 61 students who gave their urine samples, and their UIE results showed majority of study subjects (80.3%) had mild iodine deficiency with UIE between 50-99 μg/L, 13.1% had adequate iodine nutrition with UIE between 100-199 μg/L, and 6.6% had moderate iodine deficiency with UIE between 20-49 μg/L.



Graph 1. Distribution of UIE categories

The finding indicated that iodine nutrition in the two coastal villages were inadequate. This fact was affected by several factors, including goitrogenic substances (Wahyu et al 2014), lack of parental knowledge in the importance of iodine (Gatie 2006), the increase of the need and usage of thyroid hormone in children who were in the growth and developmental stage, low iodine content in the soil (Saidin 2009), deficiency of other nutrients such as calory, protein, vitamin A and selenium (Rintato 2003).



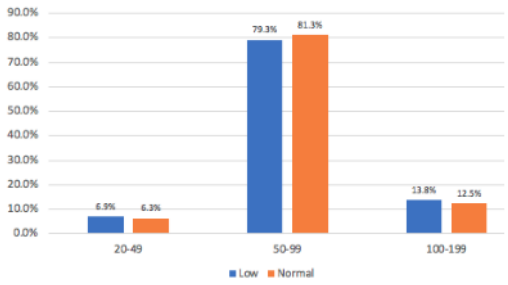
Graph 2. UIE distribution by sex

The median UIE in female students was 71.4 μg/L, and majority (82.8%) of female students had mild iodine deficiency with UIE between 50-99 μg/L. The median UIE in male students was 72.35 μg/L, and majority (78.1%) of male students had mild iodine deficiency with UIE between 50-99 μg/L. Thus, the prevalence of mild iodine deficiency was higher in female than in male students.

Several studies reported that females were at higher risk of getting thyroid disorder, due to estrogen role in increasing thyroid receptor in hypophyse that lead to increasing the need of iodine (Oribio et al. 2007). In addition, female students experienced growth spur earlier than male students (Mabruroh et al. 2011) that increase metabolism and the need of thyroid hormone (Johner et al. 2011). Therefore, UIE in females were lower than that in males.

In my study, students with BMI/age in the low category had median UIE of 64.4 μg/L. Those with BMI/age in the normal category had median UIE 75.55 μg/L. Students in both categories were having mild iodine deficiency (UIE between 50-99 μg/L).

UIE shows current iodine status, but anthropometry is affected by multifactors, including prenatal, postnatal, child, and pubertal nutritional and environmental conditions (Noor et al. 2012). Iodine deficiency may disrupt thyroid function. Thyroid hormone may affect growth hormone that converse thyroxine (T4) to T3 (Soetjiningsih 2004).



Graph 4. UIE distribution by BMI/Age

Conclusion

The present study found that majority of students in both coastal villages had mild iodine deficiency. Therefore, the primary health center should take immediate action to overcome the finding.

Acknowledgement

The author express gratitude to the Faculty of Medicine Universitas Hang Tuah, students, colleagues, Sedati dan Kenjeran public health centers.

References

de Onis, M., Blössner, M. & Borghi, E., 2012. Prevalence and trends of stunting among pre-school children, 1990–2020. Public Health Nutrition, 15(1), pp.142–148.

Gatie, AL. 2006. Validasi total goitre rate (TGR) berdasar palpasi terhadap USG tiroid serta kandungan yodium garam dan air di kecamatan Sirampog Kabupaten Brebes. Universitas Diponegoro, Semarang

Johner, SA. Et al. 2013. Iodine status in preschool children and evaluation of major dietary iodine sources: a German experience. Eur J Nutr 52(7), pp. 1711-9.

Kementerian Kesehatan RI. 2013. Riset Kesehatan Dasar tahun 2013, Jakarta.

Li, M. & Eastman, C.J., 2012. The changing epidemiology of iodine deficiency. Nature Reviews Endocrinology, 8, pp.434–440.

Mabruroh, F., Mulyani, EY., and Afif, I. 2011. Perbedaan tinggi badan anak sekolah dasar yang mengonsumsi iodium di Jakarta Utara. Nutrire Diaita 3(2), pp. 134-140.

Noor, Z., Vinenza, ER., Rahmatina, I. 2012. Hubungan kadar yodium urin dengan kejadian anemia dan tumbuh kembang remaja di daerah endemik GAKI Yogyakarta. Mutiara Medika 12 (2), pp. 79-87.

Oribio, RU., et al. 2007. The prevalence of iodine deficiency and its correlation with goiter size in the goitrous population of Paracelis, Mountain Province. SLU College of Medicine Research Journal, 1 (january), pp. 29-38.

Piccone, BN (2011). The silent epidemic of iodine deficiency. Life Extension (October), pp. 9-11.

Rinanto, MJ. 2003. Faktor resiko kekurangan iodium pada anak sekolah dasar di Kecamatan Solo Kabupaten Boyolali. Universitas Diponegoro, Semarang.

Saidin, S. 2009. Correlation between geography and environmental factors with iodine deficiency disorders. Media Litbang Kesehatan XIX(2), pp. 101-108.

Soetjiningsih. 2004. Buku ajar tumbuh kembang remaja dan permasalahannya. Jakarta: Sagung Seto.

Wahyu, F, et al. 2014. Eksplorasi kearifan lokal masyarakat dalam mengonsumsi pangan sumber zat goitrogenik terhadap gangguan akibat kekurangan iodium. Jurnal Kesehatan Masyarakat Nasional Vol 8.

Zimmermann, MB. 2009. Iodine deficiency. Endocrine Reviews 30(4), pp. 376-408.

Zimmermann, MB and Boelaert, K. 2015. Iodine deficiency and thyroid disorders. The Lancet Diabetes and Endocrinology 3(4): 286-95.

ISBN: 978-623-93960-1-5

Urinary Iodine Excretion (UIE) of Elementary School Children in Coastal Areas of Gisik Cemandi Village, Sidoarjo District and Kedung Cowek Village, Surabaya City, East Java Province, Indonesia

ORIGINALITY REPORT

10%	8%	5%	1%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.mdpi.com Internet Source	1%
2	www.balimedicaljournal.ejournals.ca Internet Source	1%
3	www.nature.com Internet Source	1%
4	ojs2.e-journal.unair.ac.id Internet Source	1%
5	www.thieme-connect.com Internet Source	1%
6	www.tribunnewswiki.com Internet Source	1%
7	Maria Andersson. "Influence of Iodine Deficiency and Excess on Thyroid Function Tests", Endocrine Updates, 2010 Publication	1%

8	go.gale.com Internet Source	<1 %
9	repository.umi.ac.id Internet Source	<1 %
10	Kathleen L. Caldwell. "Iodine Status of the U.S. Population, National Health and Nutrition Examination Survey, 2005–2006 and 2007–2008", Thyroid, 02/16/2011 Publication	<1 %
11	jech.bmj.com Internet Source	<1 %
12	journals.sagepub.com Internet Source	<1 %
13	www.kemhan.go.id Internet Source	<1 %
14	D Halim, E J Sihning, Tehupuring. " The Effect of Roselle ( ) Flower Extract To The SGPT Activity In Male Wistar Rats ( ) Induced By High Dose Paracetamol ", IOP Conference Series: Earth and Environmental Science, 2019 Publication	<1 %
15	nutriweb.org.my Internet Source	<1 %
16	www.suarantb.com Internet Source	<1 %

17	biomedpharmajournal.org Internet Source	<1 %
18	epdf.tips Internet Source	<1 %
19	repository.upnvj.ac.id Internet Source	<1 %
20	"Nutrition and Health in a Developing World", Springer Science and Business Media LLC, 2017 Publication	<1 %
21	A W Van Der Wal, P J A M Van Ooij, J A De Ru. "Hyperbaric oxygen therapy for sudden sensorineural hearing loss in divers", The Journal of Laryngology & Otology, 2016 Publication	<1 %
22	Tillmann Wallborn, Mandy Vogel, Antje Kneuer, Michael Thamm, Katalin Dittrich, Wieland Kiess, Jürgen Kratzsch. "Spot urine iodine levels below the WHO recommendation are not related to impaired thyroid function in healthy children and adolescents", European Journal of Nutrition, 2020 Publication	<1 %

Exclude quotes	On
Exclude bibliography	On
Exclude assignment template	On
Exclude matches	Off