

PROGRESS IN FOOD AND NUTRITION STUDIES
(2009-2013)

Editors:

Umi Fahmida

Judhiastuty Februhartanty

Daniel Sahanggamu

South East Asian Ministers of Education Organization
Regional Center for Food and Nutrition
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Compiled by:

Reny Fetimah Syahab

Ratna Wulanti

Yulia

Devita Kusuma Rahingtyas

FOREWORD

The vision of SEAMEO RECFON as a regional center for food and nutrition has been translated into activities of research, education, capacity building and information dissemination.

Research activity in particular, is a very important component for us to base our activity in implementing our programs of capacity building, education and training, and suggestions to policy makers.

In line with our 5-year development plan where we focus our research activity in maternal and child nutrition, this book provides you with various topics of our research in the past 5 years. We always welcome any suggestions to enrich our research in terms of topics, various age groups or different community settings.

We acknowledge and highly appreciate supports and collaborations we have gained from various institutions, which enabled us to conduct our research successfully. We look forward to have more collaborations in the future.

Director SEAMEO RECFON

Drupadi HS Dillon

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Nutrition Policy and Programs



~ Food and Nutrient Intervention ~

The SMILING project: a North-South-South collaborative action to prevent micronutrient deficiencies in women and young children in Southeast Asia.

Berger J¹, Blanchard G¹, Ponce MC², Chamnan C³, Chea M⁴, Dijkhuizen M⁵, Doak C², Doets E⁶, Fahmida U⁷, Ferguson E⁸, Hulshof P⁶, Kameli Y¹, Kuong K³, Akkhavong K⁹, Sengchanh K⁹, Le BM¹⁰, Tran TL¹⁰, Muslimatun S⁷, Roos N⁵, Sophonneary P⁴, Wieringa F¹, Wasantwisut E¹¹, Winichagoon P¹¹; SMILING Consortium Group. *Food and Nutrition Bulletin* 2013, 34(2): S133-9.

¹Institute of Research for Development, UMR Nutripass, Montpellier, France

²University of Amsterdam, Amsterdam, The Netherlands

³Ministry of Agriculture, Forestry and Fisheries of Cambodia

⁴Ministry of Health of Cambodia; National Maternal and Child Health Center, Phnom Penh, Cambodia

⁵University of Copenhagen, Copenhagen, Denmark

⁶Wageningen University, Wageningen, The Netherlands;

⁷SEAMEO-RECFON

⁸London School of Hygiene & Tropical Medicine, London, United-Kingdom

⁹Ministry of Health of Laos, National Institute of Public Health, Vientiane, Lao's PDR

¹⁰Ministry of Health of Vietnam, National Institute of Nutrition, Hanoi, Vietnam

¹¹Mahidol University, Institute of Nutrition, Bangkok, Thailand

Background:

The "Sustainable Micronutrient Interventions to Control Deficiencies and Improve Nutritional Status and General Health in Asia" project (SMILING), funded by the European Commission, is a transnational collaboration of research institutions and implementation agencies in five Southeast Asian countries--Cambodia, Indonesia, Laos PDR, Thailand, and Vietnam--with European partners, to support the application of state-of-the art knowledge to alleviate micronutrient malnutrition in Southeast Asia.

Objective:

The major expected outcomes are to improve micronutrient status on a large scale, to identify priority interventions in each Southeast Asian country, and to develop a road map for decision makers and donors for inclusion of these priority interventions into the national policy.

Methods:

SMILING has been built around a strong project consortium that works on a constant and proactive exchange of data and analyses between partners and allows for the differences in contexts and development stages of the countries, as well as a strong North-South-South collaboration and colearning.

Results:

The selection of Southeast Asian countries considered the range of social and economic development, the extent of micronutrient malnutrition, and capacity and past success in nutrition improvement efforts. SMILING is applying innovative tools that support nutrition policy-making and programming. The mathematical modeling technique combined with linear programming will provide insight into which food-based strategies have the potential to provide essential (micro) nutrients for women and young children. Multicriteria mapping will offer a flexible decision-aiding tool taking into account the variability and uncertainty of opinions from key stakeholders. The lessons learned throughout the project will be widely disseminated.

Keywords: Interventions, large-scale implementation, malnutrition, micronutrient deficiencies, policy, Southeast Asia

Acknowledgement: The SMILING project was funded by the European Commission in the 7th Framework Programme for Research and Technological Development (GA 289616).

Impact of daily versus weekly supply of locally produced Ready-to-Use Food on growth of moderately wasted children on Nias island, Indonesia

Purwestri RC, Scherbaum V, Inayati DA, Wirawan NN, Suryantan J, Bloem MA, Pangaribuan RV, Stuetz W, Hoffmann V, Qaim M, Biesalski HK, Bellows AC. ISRN Nutrition Volume 2013, Article ID 412145: 1-10

¹Department of Gender and Nutrition, Institute of Social Sciences in Agriculture, University of Hohenheim and Center of Gender and Nutrition Schloss, Museumfluegel, Stuttgart, 70593 Germany

²Institute for Biological Chemistry and Nutrition, University of Hohenheim, 70593 Stuttgart, Germany

³Study Program Nutrition, Faculty of Medicine, University of Brawijaya, Malang 65145, Indonesia

⁴Church World Service, Jakarta 12560, Indonesia

⁵Church World Service, New York, NY 10115, USA

⁶SEAMEO TROPMED Regional Centre for Community Nutrition, University of Indonesia, Jakarta 10430, Indonesia

⁷Institute of Nutrition, Friedrich-Schiller-University of Jena, 067743 Jena, Germany

⁸Department of Agriculture Economics and Rural Development, University of Goettingen, 37073 Goettingen, Germany

⁹Department of Public Health, Food Studies, and Nutrition, David B. Falk College, Syracuse University, NY 13244, USA

This study reports the outcomes of daily (semi-urban areas) and weekly (remote rural regions) programs for moderately wasted children supplemented with locally produced ready-to-use foods in the form of fortified cereal/nut/legume-based biscuits on Nias Island, Indonesia (RUF-Nias biscuit).

Thirty-four children in daily and twenty children in weekly programs aged 6 to <60 months with weight-for-height z-score (WHZ) ≥ 1.3 to < 1.2 SD were recruited (October 2007–June 2008) on Nias and admitted into existing nutrition centers in the Church World Service project area.

Individual discharge criterion was $WHZ < 1.5$ SD. Weight gain of the children in daily and weekly programs was 3.9 ± 3.8 and 2.0 ± 2.0 g/kg/day, respectively. A higher proportion of children in daily than weekly programs reached target WHZ (76% vs. 35%, $p = 0.004$). Weight gain at program discharge/closure was highly predicted ($r = 0.228$, $p < 0.001$) by compliance to RUF biscuits: high vs. low compliance resulted in a 1.33 (95% CI 0.16 to 1.53) g/kg/day higher weight gain.

Compliance and admission in daily programs were significant factors in reducing the risk of not reaching the discharge criterion. However, mothers complained more frequently about time constraints in the daily relative to weekly programs.

The influence of vitamin A status on iron-deficiency anaemia in anaemic adolescent schoolgirls in Myanmar

Htet MK^{1,2}, Fahmida U¹, Dillon D^{1,3}, Akib A³, Utomo B⁴, Thurnham DI⁵. *Public Health Nutrition* 2013 Oct 16:1-8.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Department of Health, Ministry of Health, Myanmar

³Faculty of Medicine, University of Indonesia

⁴Faculty of Public Health, University of Indonesia

⁵Northern Ireland Centre for Food and Health, School of Biomedical Science, University of Ulster, Coleraine, UK

Objective: The present study was conducted to investigate reasons for the high prevalence of anaemia among adolescent schoolgirls and to elucidate the role of vitamin A in contributing to Fe-deficiency anaemia (IDA).

Design: Among 1269 schoolgirls who were previously screened for anaemia (Hb < 120 g/l), 391 anaemic girls were further assessed for Fe, vitamin A and subclinical inflammation status. Fe and vitamin A indicators were corrected for inflammation and were compared in the Fe-deficient and non-deficient groups as well as between those with and without inflammation. Logistic regression was done to determine whether vitamin A status and subclinical inflammation were risk factors for Fe deficiency. The differences in Fe status among tertiles of vitamin A concentrations were assessed using ANOVA.

Setting: Myanmar.

Subjects: Adolescent schoolgirls (n 391).

Results: One-third of the anaemia (30.4 %) was IDA. Prevalence of low vitamin A status (serum retinol <1.05 μ mol/l) was 31.5 %. Fe and vitamin A status were significantly different between the IDA and non-IDA groups and also based on their inflammation status. Logistic regression showed that low vitamin A status was a significant predictor for being Fe deficient (OR = 1.81; 95 % CI 1.03, 3.19 and OR = 2.31; 1.31, 4.07 in the middle (1.056-1.298 μ mol/l) and low (1.056 μ mol/l) vitamin A tertiles, respectively). ANOVA showed that better Fe status was associated with a higher concentration of serum retinol but only in IDA.

Conclusion: Fe deficiency was not the main cause of anaemia in the present population. The role of vitamin A as well as other micronutrients should be taken into account in addressing the problem of anaemia.

Keywords: anaemia, iron deficiency, adolescents, Myanmar

Fermented soyabean and vitamin C-rich fruit: a possibility to circumvent the further decrease of iron status among iron deficient pregnant women in Indonesia

Wijaya-Erhardt M¹, Muslimatun S¹, Erhardt JG¹. *Public Health Nutrition* 2011, 14(12): 2185-96.

¹SEAMEO RECFON Regional Center for Food and Nutrition, University of Indonesia, Indonesia

Objective: Increasing the consumption of Fe-rich foods and thus improving Fe bioavailability without significantly increasing diet cost is the most sustainable intervention for improving Fe intake. We assessed the effect of supplementary food consisting of fermented soyabean (tempeh) and vitamin C-rich fruit consumed during pregnancy on maternal iron deficiency (ID).

Design: Pregnant women were randomly allocated by village into optimized diet and control groups. Supplementary food was given 6 d/week at home. The average weekly food provided comprised 600 g of tempeh, 30 g of meat, 350 g of guava, 300 g of papaya and 100 g of orange. Hb, ferritin and transferrin receptor (TfR) concentrations were measured at 12-20 and at 32-36 weeks of gestation.

Setting: Thirty-nine villages in Indonesia.

Subjects: Pregnant women (12-20 weeks of gestation, n 252).

Results: At baseline, mean Hb, ferritin and TfR concentrations and body Fe concentration were within the normal range and did not differ between groups. At near term, mean Hb, ferritin and body Fe decreased, whereas mean TfR increased significantly in both groups. The mean changes in Fe status were similar in both groups. In Fe-deficient women, consumption of an optimized diet was associated with smaller decreases in Hb (1.02 (95% CI 0.98, 1.07) g/l; P = 0.058), ferritin (1.42 (95% CI 1.16, 1.75) 3g/l; P = 0.046) and body Fe (2.57 (95% CI 1.71, 3.43) mg/kg; P = 0.073) concentrations, compared with a state of no intervention. Fe-deficient women at baseline benefited more from supplementary food compared with Fe-replete women.

Conclusions: Daily supplementary food containing tempeh and vitamin C-rich fruits during pregnancy might have positive effects on maternal ID.

Keywords: fermented soyabean, vitamin C-rich fruits, Fe status, pregnancy

Acknowledgement: The present research was supported by The Nestle Foundation (Switzerland) for the Study of Problems of Nutrition in the World.

The adequacy of micronutrient concentrations in manufactured complementary foods from low-income countries

Gibbs M¹, Bailey KB¹, Lander RD¹, Fahmida U², Perlas L³, Hess SY⁴, Loechl CU⁵, Winichagoon P⁶, Gibson RS¹. *Journal of Food Composition and Analysis*, 2011, 24(3): 418-26.

¹Department of Human Nutrition, University of Otago, Dunedin, New Zealand

²SEAMEO-TROPMED, Regional Center for Community Nutrition (RCCN), University of Indonesia, Indonesia

³Food and Nutrition Research Institute, Philippines

⁴Department of Nutrition, University of California, Davis, CA, USA

⁵International Potato Center (CIP), Kampala, Uganda

⁶Institute of Nutrition, Mahidol University, Salaya, Thailand

Iron, zinc, and calcium in complementary foods (CFs) are defined as problem micronutrients by the World Health Organization (WHO), as their concentrations in CFs fall below the calculated requirements for breast-fed infants of micronutrients obtained from CFs. Consequently, manufacturers often fortify plant-based CFs with these three micronutrients. We have analyzed concentrations of iron, zinc, calcium, and phytic acid (as hexa- and penta-inositol phosphates) in 57 cereal-based CFs purchased in five countries each in Africa and Asia. Molar ratios of phytate:iron, phytate:zinc, and phytate:calcium were also calculated.

Intakes of iron, zinc, and calcium from these CFs were then calculated assuming breast-fed infants aged 9–11 months consume the recommended daily ration size of CF (40 g/d; dry weight), and compared with WHO estimated needs from CFs. Even though manufacturers claimed to fortify 84% (48/57) of the CFs, 79%, 10% and 32% had molar ratios for phytate:iron, phytate:zinc, and phytate:calcium, respectively, above desirable levels.

Despite fortification, only 4% of the CFs met the WHO estimated needs for breast-fed infants aged 9–11 months for iron, 2% for zinc, and 4% for calcium. Appropriate fortification of cereal-based CFs is necessary to ensure they meet WHO estimated needs for iron, zinc, and calcium for breast-fed infants.

Keywords: Iron, zinc, calcium, phytate, micronutrients, complementary foods, infants, bioavailability, fortification, food composition, food analysis

Optimized complementary feeding improves the effect of iron supplementation on micronutrient status, gut microbiota and growth of 12-23-month old Myanmar children: a field randomized controlled trial

Hlaing LM^{1,2}, Firmansyah A³, Utomo B⁴, Fahmida U¹. Dissertation, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2014.

¹SEAMEO RECFON Regional Center for Food and Nutrition, Universitas Indonesia, Indonesia

²Ministry of Health, Myanmar

³Division of Pediatric Gastroenterology, Department of Child Health, Faculty of Medicine, Universitas Indonesia.

⁴Faculty of Public Health, Universitas Indonesia

Background: Local food-based complementary feeding recommendations (CFR) are required to reduce risk of micronutrient deficiencies especially iron deficiency (ID) among under-2-year children. Iron supplementation is widely used yet its potential effects on other micronutrients and growth are of concern. Iron fortification increased gut pathogens and hence iron supplementation may have similar impact on gut microbiota.

Objective: This randomized-controlled trial was conducted for 24 weeks among 12-23 month old children from Ayeyarwady, Myanmar to investigate effect of iron supplementation; given with or without optimized diet; on micronutrient status, gut microbiota and growth. Optimized CFRs were developed by Linear Programming approach.

Methods: Randomization by village for CFRs or non-CFRs, and by child (n=433) for iron or placebo, created: 1. *CFR+Fe* (n=112); 2. *CFR-alone* (n=112); 3. *Fe-alone* (n=105); 4. *Placebo* (n=104) groups. Mothers from CFR-groups received education on CFRs and children from Fe-groups received 15mg Ferric-Na-EDTA daily. Serum for ferritin, transferrin-receptor, zinc, CRP, AGP; stool for gut microbiota (*Bifidobacteria*, *Lactobacilli*, *Enterobacteriaceae*, *E.coli*, EPEC, EAEC, ETEC) were measured at baseline and endline.

Results: At baseline, 88.4% had anemia; 74.4% had ID, 68.9% had iron deficiency anemia (IDA), 41.3% had low serum zinc. Iron supplementation reduced anemia, ID and IDA whether or not it was given with optimized diet. However, iron supplementation alone increased risk of low serum zinc (OR=1.94) and stunting (OR=3.08). These adverse effects were not seen when it was given with optimized diet. No intervention effect was seen on gut microbiota.

Conclusion: In conclusion, iron supplementation should be given with optimized diet to reduce its adverse effect on other micronutrients and growth to best improve nutritional status of children.

Keywords: Complementary feeding recommendations, micronutrients, growth, gut microbiota, under-2-year children, Myanmar

Acknowledgement: The study was funded by German Academic Exchange Service (DAAD) scholarship and Nestle Foundation

The role of sub-clinical inflammation on the hemoglobin response, iron and vitamin A status of anemic Myanmar adolescent school girls during iron and vitamin A supplementations

Htet MK^{1,2}, Akib AAP³, Utomo B⁴, Dillon D¹. Dissertation, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2012.

¹SEAMEO RECFON Regional Center for Food and Nutrition, Universitas Indonesia, Indonesia

²Ministry of Health, Myanmar

³Faculty of Medicine, Universitas Indonesia

⁴Faculty of Public Health, Universitas Indonesia

Background: Anemia is one of the major nutritional problems in Myanmar. Information about sub-clinical inflammation (SCI), especially its role on the effect of iron supplementations to control anemia and iron deficiency is lacking.

Objective: The study aimed to identify the role of sub-clinical inflammation on iron status during iron supplementation.

Methods: A randomized, double-blinded, placebo-controlled experimental study was conducted in Myanmar (NCT 01198574) in 2010. Post-menarcheal anemic (Hb<120 g/L adolescent girls (n=402)) were recruited from 6 schools after screening among 1269 subjects. Deworming was done with a single dose of 400mg Albendazole. Subjects were assigned into one of four groups: folic acid group (2.5mg of folate), vitamin A group (15,000 IU of vitamin A and folate), iron folic acid (IFA) group (60mg elemental iron folate), and IFA+Vitamin A group (iron, vitamin A and folate) and treated for 12 weeks. Biochemical assessments were done at baseline, midline, and endline.

Results: Prevalence of anemia, iron deficiency and iron deficiency anemia reduced significantly in IFA+Vitamin A group. Despite low prevalence of SCI, negative effect of SCI was seen on changes in hemoglobin, serum ferritin and body iron store. Vitamin A had significant interaction effect with SCI and had contribution to iron supplementation. Weekly iron supplementation combined with vitamin A for 12 week significantly reduced the prevalence of anemia.

Conclusion: SCI had negative influence on iron supplementation. In the presence of SCI, addition of vitamin A showed a better response to iron supplementation.

Keywords: anemia, adolescent, iron supplementation, sub-clinic inflammation, Myanmar

Acknowledgements: The study was supported by DAAD scholarship and Nestle Foundation.

A system review on the micronutrients powder communication program in Praya Tengah, Lombok Tengah District

Erwin A¹, Wibowo L¹, Purnomosari L¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2010.

¹SEAMEO RECFON Regional Center for Food and Nutrition, Universitas Indonesia, Indonesia

²Health Polytechnic of Kendari

Background: UNICEF has integrated Micronutrient Powder (MNP) program on Chany (Community Health System Strengthening) program in Lombok Tengah district. In the implementation, communication program was embedded to enhance the compliance. However, there were findings that sometimes the program was not well designed or monitoring and evaluation system was not functioning.

Objective: To conduct a performance evaluation of MNP communication program in Praya Tengah, Lombok Tengah District.

Methods: Cross sectional study was conducted in 6 purposively sampled sub-districts in Lombok Tengah. Data was collected by interviewing 211 caregivers of underfive children, 30 Posyandu cadres and 2 Puskesmas staff, in-depth interviews with 10 cadre's coordinator and one district health office staff, also focus group discussions, observations and document review. Kielmann's operational (Health) System Review was used to assess presence, functioning and connectivity of essential component in the MNP communication program.

Results: A system MNP communication program did not function well and might not reach its potential benefit yet which leads to low compliance of beneficiaries on MNP. Caregiver's compliance was influenced by their children's compliance. Health managers and *Posyandu* cadres had perceived several reasons as problems on that program, i.e. most of the underfive children did not like MNP, and caregivers refused to force feed their child to eat the food mixed with MNP. Other reasons were lack of resources and poor management.

Conclusions: All of the essential system components on MNP communication program in Praya Tengah sub-district were deficient. To design effective communication program, a health planners should engage in activities oriented to gain understanding about what govern a caregiver's decisions to conduct a particular health-related behavior.

Keywords: micronutrients powder, communication, health system review, performance evaluation, underfive children, compliance

System review on distribution of Multiple Micronutrient Powder in Praya Tengah, Central Lombok District

Muharni^{1,2}, Dillon DHS¹, Pangaribuan RV¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2010.

¹SEAMEO RECFON Regional Center for Food and Nutrition, Universitas Indonesia, Indonesia

²Nutrition Department, Health Polytechnic of Riau, Pekanbaru

Background: Multiple micronutrients powder (MNP) have been showed successful in treating and preventing anemia with a cure rate of 49-91%. To establish an effective and efficient scale-up of MNP program, defining the proper delivery strategy or distribution system is required, hence high and equitable program coverage will be obtained and well maintained.

Objective: To review the implementation of existing distribution system of MNP program in relation to its coverage in Praya Tengah, Central Lombok District.

Methods: Cross sectional study conducted by interviewing 240 children aged 12-59 months, 48 Posyandu cadres and health service providers responsible for MNP program of Puskesmas, District Health Office (DHO) and UNICEF. To reveal the existing distribution system, in-depth interview, observation, document review were also executed. All data were descriptively analyzed. Health System Analysis was used to review the existing MNP distribution system.

Results: There was no mechanism of requesting system from Posyandu to DHO. The frequency of distribution was inconsistent, and there were no records of MNP logistic from DHO level to Posyandu. Posyandu was accessible by most cadres (95.8%) and mother/caregivers (78.3%). Planning and management in Puskesmas was poor, also lacks of effective supervision either to Posyandu or from DHO. About 79.2% Posyandu submitted last report of MNP distribution to Puskesmas. Most Posyandu (85.4%) had experienced MNP over stocking. Community participation on MNP distribution especially community leader was insufficient. Only 37.9% of targeted children received 60 sachets in the last six months.

Conclusion: Almost all essential components of MNP distribution system were deficient. As they were related to each other, any deficiency may give impact to others; consequently, coverage of MNP distribution was low .

Keywords: multiple micronutrient powder, health system review, distribution

Food-Based Intervention and Psychosocial Stimulation to Improve Growth and Development of <24mo Indonesian Children (FIRST Project)

Fahmida U¹, Kolopaking R¹, Santika O¹. Study Report 2012.

¹SEAMEO-RECFON, Regional Center for Food and Nutrition, University of Indonesia, Jakarta, Indonesia

²Faculty of Psychology, Universitas Islam Negeri Syarif Hidayatullah, Jakarta, Indonesia

Background: WHO has urged all developing countries to develop programmes to improve complementary-feeding practices for optimal growth and development of infants and young children. Population-specific complementary feeding recommendations (CFR), based on locally-available foods with minimal changes to local food pattern, will enhance the chances of programme success. As growth and development is inter-related, psychosocial stimulation was essential.

Objective: This study aims to see the effect on growth and development of community trial using CFR and psychosocial stimulation.

Methods: The study consisted of two phases: (1) Development of CFR and preparation of the nutrition education materials of CFR and stimulation, and (2) Intervention trial. The CFR was developed using linear programming (LP) approach. The 6 month intervention consisted: (1) Control, (2) Stimulation alone, (3) CFR alone, (4) CFR+stimulation groups. The CFR and stimulation were promoted via weekly home-visit and monthly interactive session with mothers. The study was conducted in East Lombok district, West Nusa Tenggara Province, Indonesia on 12-17month-old children. Nutrition knowledge, dietary intakes, hemoglobin, growth, HOME inventory score, Mental Development Index (MDI) and Psychomotor Development Index (PDI) of Bayley Scales of Infant Development II were assessed.

Results: After 6-month intervention, more mothers in CFR groups had higher nutrition knowledge and fed their children high diversity diet (80% vs 61%, $p<0.001$) with more animal protein (including the promoted nutrient-dense foods i.e. chicken liver, fish), plant protein, and fortified snacks. Psychosocial stimulation led to increased psychosocial care of mothers (HOME scores 26.7 vs 24.3, $p<0.001$). Endline hemoglobin, MDI and PDI scores were significantly influenced by baseline values but were not different from control group.

Conclusions: The CFR developed using LP significantly improves nutrient intakes while home stimulation improves the psychosocial care. The increase in hemoglobin and developmental outcomes however is not yet significant, suggesting longer period (>6 months) of intervention and more comprehensive assessment of iron status indicators.

Keywords: linear programming, complementary feeding recommendation, psychosocial stimulation, under-two-year-old children

Acknowledgement: The study was funded by Nestle Foundation

~ Nutrition and Health Promotion ~

Effect of an educational intervention related to health and nutrition on pregnant women in the villages of Central Java Province, Indonesia

Erhardt MW¹, Muslimatun S¹, Erhardt JG¹. *Health Education Journal* July 2014 73: 370-381, first published on May 22, 2013. doi: 10.1177/0017896913485741

¹SEAMEO RECFON Regional Center for Food and Nutrition, University of Indonesia, Indonesia.

Objective: To assess the effects of a health and nutrition educational intervention on maternal knowledge, attitudes and practices.

Design: Pre- and post-test design using structured interviews of pregnant women.

Setting: Thirty-nine villages in Central Java Province, Indonesia.

Method: Pregnant women ($N = 252$) at 12–20 weeks of gestation were randomly allocated at the village level into education intervention and control groups. Women in the intervention group received health and nutrition education, while those in control group did not. Educational sessions were provided monthly until delivery.

Results: After the intervention, women in the education group had better knowledge about the risks and consequences of getting worm infection and the causes, consequences and prevention of anaemia during pregnancy; expressed stronger intentions to feed colostrum (91.9% vs. 78.2%, $P = 0.003$); to breastfeed within one hour of birth (80.4% vs. 68.9%, $P = 0.004$); to breastfeed exclusively for six months (77.2% vs. 62.7%, $P = 0.014$); to breastfeed for 24 months ($P = 0.06$); and also had better knowledge of practices related to the early initiation of breastfeeding (0.5 hour [25th–75th 0.5–6] vs. two hour [0.5–17.5], $P = 0.052$); of 24-hour exclusive breastfeeding (51.2% vs. 31.1%, $P = 0.006$); of giving birth at health facilities (71.9% vs. 58%, $P = 0.024$); and of birth assisted by skilled birth attendants (90.1% vs. 81.5%, $P = 0.057$) than their control counterparts.

Conclusion: The reported change in knowledge, attitudes and reported practices may be attributable to the health and nutrition education provided during pregnancy.

Keywords: education, Indonesia, intervention, nutrition, pregnant woman

Do Indonesians follow its Dietary Guidelines? - evidence related to food consumption, healthy lifestyle, and nutritional status within the period 2000-2010

Usfar AA¹, Fahmida U². *Asia Pacific Journal of Clinical Nutrition* 2011, 20(3): 484-94.

¹Indonesian Danone Institute Foundation, Jakarta, Indonesia

²South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

Dietary Guidelines are sets of advisory statements that give dietary advice for population to promote nutritional well-being. They contain information on foods or behaviors that are encouraged and cautionary messages derived from scientific evidence-based reviews and specific local conditions.

The Indonesian Dietary Guidelines consisting of 13 messages that were publicized by the Ministry of Health in 1995 and have not been reviewed afterward in relation to nutritional status and health outcome of the population. By reviewing studies on different age groups in the past 10 years and comparing the results with the recommended guidelines, this paper aims to identify if messages have been successfully applied and if there are relevant issues not yet covered in the guidelines.

The reviews covered 29 out of 33 provinces, representing studies from sub-district or higher levels (district, provincial, national). Results showed that some messages have been better implemented than others; also that information for some messages was not available for which to conclude of its implementation.

In addition, some practices were identified which are prevalent in several age groups and have important public health consequence, but not yet included in the 13-guidelines. These include: smoking, increased intakes of fruit and vegetables, limited intakes of salt and sugar, increased intakes of foods rich in zinc and calcium (besides iron), hand-washing before food preparation and eating, and weight-monitoring. For infants and young children, nutrient density, feeding responsiveness and stimulation should be specifically highlighted. Based on the results, several recommendations in revising the guidelines were given.

Keywords: Dietary Guidelines, Indonesia, food consumption, healthy lifestyle, nutritional status

Reader's Opinion toward Book entitled "Breastfeeding: from Father for Mother and Baby"

Februhartanty J¹, Septiari AM¹, Destriatania S². *Jurnal Kesehatan Masyarakat Nasional* 2011, 5(4):153-60.

¹SEAMEO-TROPMED RCCN, University of Indonesia

²Faculty of Public Health, Sriwijaya University, Indonesia

Although fathers were known supportive in mothers' breastfeeding practice, they have limited access toward correct information about breastfeeding practice. Book can be a potential source of information for fathers. This preliminary study is aimed at exploring opinion about a book containing information about breastfeeding and the role of father from voluntary male and female readers as informants.

This study employed qualitative approach. Informants were recruited purposively based on their educational level, sex, marital status, parity, and fondness of book reading. Content analysis was employed for analysis. This study found that all informants stated that the book is important and beneficial, however, breastfeeding is as female domain. Having the book read, all informants agreed that fathers do play roles in breastfeeding practice, that is in this study found to be related to psychological support to the breastfeeding mothers.

It is suggested that this study needs to be followed up by other study to assess the effect of the book in improving the knowledge, attitude, and practice of the readers.

Keywords: book, breastfeeding practices, father's roles

Use of the self-regulatory approach to develop and evaluate the nutrition education effectiveness: elementary school-based program in mid-low income urban area of East Jakarta

Kolopaking R¹, Firmansyah A², Umar J³, Fahmida U¹. Dissertation, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2010.

¹SEAMEO-TROPMED RCCN, Universitas Indonesia

²Department of Pediatric, Faculty of Medicine, Universitas Indonesia

³Faculty of Psychology, Universitas Islam Negeri (UIN) Syarif Hidayatullah

Background: The school-aged years are critical time for delivering nutrition education to children. Study on nutrition education in Indonesia that focuses on developing skills and behaviors related to areas of food and eating habits, especially for urban children from mid-low income families, has not yet available.

Objective: The study aimed to identify the effectiveness of the program by assessing dietary intake as a combined measure of children's self-regulation on food choice, children's self-motivation, and maternal self-efficacy on the home food environment.

Methods: Self-regulatory approach and social cognitive learning technique were used for 3rd and 4th grades of mid-low income students in an urban area of Jakarta. Students received 24 in-class sessions, 45 minutes each session twice a week, for a 12-week intervention taught by nutrition professionals. Both school teachers and parents were involved in the program. Outcome evaluations were studied using a quasi-experimental design with the intervention (n=137) and comparison (n=120) groups combined for 3-assessment periods: pre-intervention, post-intervention and follow-up (12 weeks post-intervention).

Results: The results confirmed that nutrition education program with a self-regulatory approach had a significant effect in improving children's self-regulatory behaviors in terms of food choice and maternal self-efficacy on home food environment. It showed that the program had a significant sustainable effect in terms of improving children's dietary intakes.

Conclusions: The self-regulation model had relevant implications for developing and evaluating nutrition education interventions. There were two program approaches suggested; one is to modify maternal self-efficacy on the home food environment, another is to directly modify children's self-regulation on food choice.

Keywords: school-aged children, nutrition education, maternal self-efficacy, self-motivation, self-regulation

Acknowledgement: The study was funded by Indonesian Danone Institute

Promotion and Information Aspects of the International Code of Marketing of Breastmilk Substitutes in Selected Health Facilities, Banten Province

Rahayu RD¹, Februhartanty J¹, Basuki DN¹, Parady VA² Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Department of Communication, University of Indonesia

Background: The International Code of Marketing of Breastmilk Substitute (the Code) was developed to protect and promote breastfeeding by ensuring the appropriate marketing of breastmilk substitutes. Pregnant women and mothers of infant under 6 months old are exposed to the choices of their infant feeding while health facilities is a reliable source of infant feeding information and provide opportunities for companies to market their products, hence mothers as well as health workers should receive objective information about the products.

Objective: To assess the promotion of breastmilk substitutes, bottle and teats to mothers and health workers in the health facilities based on the Code.

Methods: Cross sectional study in selected health facilities in Banten province with quantitative and qualitative methods were employed to explore the implementation of the Code in promotion and information aspects. Data was collected by using the Interagency Group on Breastfeeding Monitoring (IGBM) protocol. Quantitative data collection was done by interviewing 152 mothers of infant under 6 months and 15 health workers. Qualitative data was obtain through interviews of 6 community personnel and observation in health facility and stores.

Results: As many as 23.7% of mothers received personal advice to use infant formula; 69.4% of them received product recommendation; 16.4% mothers received gift given mostly in stores, 11.2% received samples of breastmilk substitutes mostly given by the health workers. Almost a half of the health workers received visit and gift from infant formula company.

Conclusion. Violations in promotion and information aspects were found. Further reinforcement and development of new national regulations related to the marketing of breastmilk substitutes are needed.

Keywords: Breastmilk substitute, violation, promotion, sample, gift, health workers

Acknowledgements: This study was part of a bigger study supported by UNICEF in six provinces of Java Island to monitor the compliance of The International Code of Marketing of Breastmilk Substitute.

Knowledge, attitude and counseling skills of trained Cadres on infant and young child feeding (IYCF) in West Lombok District

Pardosi RBT¹, Muslimatun S¹, Iswarawanti DN¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Training on Infant and Young Child Feeding (IYCF) has been done to Posyandu cadres in West Lombok District. Studies revealed that Posyandu cadres lack of competency in doing their tasks. Most cadres never received any training while it was proven that training improves knowledge, attitude and practice. There is a need of a post-training evaluation on cadres' competencies, knowledge, attitude and counseling skills.

Objective: To assess knowledge, attitude and counseling skills of cadres who have completed training on IYCF counseling and its related factors in West Lombok district.

Methods: Cross sectional study in West Lombok District with 84 randomly selected cadres who have completed IYCF training was conducted. Knowledge and attitude were assessed through self-administered questionnaires, while counseling skill was assessed through video-recorded observation. The questionnaires were developed based on UNICEF and WHO module for counseling.

Results: Around 60% of cadres had good knowledge, 51.6% had favorable attitude, and 46.3% had good counseling skills. Nearly 90% of cadres claimed to have practiced the IYCF counseling upon completion of the training, but only 43.2% of them admitted to have done it for at least once a month. Good knowledge score was related with availability of training material counseling cards, also being trained by district and *Puskesmas* facilitators. Good counseling skill was related with educational level. More frequent practice of IYCF counseling was related with supervision received, and facilitation by trainers from *Puskesmas*.

Conclusions: Most cadres in West Lombok District had good knowledge, favorable attitude and good skill for IYCF counseling.

Keywords: Cadres, IYCF, Indonesia, training, knowledge, attitude, counseling skill

Acknowledgements: The study was funded by UNICEF Indonesia

Factors influencing infant feeding practices among non working mothers of children aged 6-11 months in urban slum area, Ancol village, North Jakarta

Suhartono GA¹, Santika O¹, Shankar A². Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

²School of Public Health, Division of Toxicological Sciences, Johns Hopkins University

Background: Poor breastfeeding and complementary feeding practice have been widely documented. Many factors influence the practices such as mother's age, knowledge, education and perception, cultural differences and beliefs. Infant who was born from mothers lived in urban slum area have higher possibility to have sub-optimal breastfeeding and practice of complementary feeding.

Objective: To describe Infant Feeding Practices (IFP) and factors influencing the practices among non-working mothers of children aged 6-11 months in urban slum area in North Jakarta.

Methods: Qualitative and quantitative cross-sectional studies were conducted in 2 hamlets and 1 area considered as an urban slum area on Ancol village, North Jakarta. Quantitative phase was conducted to 76 pairs of mothers-infants to assess mothers' practice on IFP based on WHO guidelines. Qualitative phase included in-depth interviews to 14 non-working mothers with good or poor IFP classified using Infant and Child Feeding Index to explore factors influenced mothers' practice on IFP.

Results: Around 25% of study subjects practiced pre-lacteal feeding and more than half of mothers practiced early introduction of complementary feeding. Internal-personal factors influencing mother's practice on IFP were cognitive/affective, outcome expectations or self-efficacy while socio-environmental factors included midwife's recommendation, hospital support/policy, and support from husband and grandmother's action.

Conclusions: Most of the IFP did not comply with WHO guidelines including practice of pre-lacteal feeding and early introduction of complementary food. Internal-personal and socio-environmental factors also influenced infant feeding practices performed by the mothers.

Keywords: infant feeding practices, non-working mothers, urban slum area, influencing factors

Acknowledgements: This study was a part of preliminary phase of cohort study of SPHERES Project in an urban slum area of Jakarta; a collaboration of SEAMEO RECFON and Harvard University School of Public Health

Factors related to cadres capacity building for educating caregivers on dietary management of child illness during diarrhea: a study in urban slum neighborhood, Ancol village, North Jakarta

Wijayanti HS¹, Wibowo L¹, Rimbamaja R². Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

²Lembaga Lapangan Kecil

Background: Cadres have potential role in urban slum because health inequalities and health problems in this setting are high. Cadres' performance on giving education was less satisfactorily studied. Capacity building is an important factor for improving cadres' performance, yet its implementation often did not equip cadres to play their role as intended.

Objective: To explore factors related to cadres capacity building on giving education about dietary management of child illness during diarrhea.

Methods: Qualitative and quantitative studies were conducted in Ancol slum area, North Jakarta. Quantitative data was obtained from 54 cadres through structure interview to assess factors related to cadres' practice on giving education. Qualitative data was obtained through observations to 35 cadres, 3 FGDs, and in-depth interviews to 11 cadres to explore factors related to capacity building. Fourteen caregivers were also in-depth interviewed on their perception towards cadres' performances. Recorded interviews and FGDs were transcribed in verbatim.

Results: Most cadres had some misunderstanding about dietary management of child illness during diarrhea and relied more on their experiences when giving education. Cadres' communication skills were lacking. For instance, they tended not to explore caregivers' problem. Some cadres were less confidence to give education. Cadres perceived differently about education task; some active, while others not. Cadres who have task on recording, usually became Posyandu committee. Their personal need drove them to contributing to the community and giving education more often. Cadres with better capacity and responsibility received more opportunity to join trainings. There was no supervision toward education practice in site during the observation. Caregivers had more interaction with cadres who had young children, but they questioned cadres' capacity.

Conclusions: Factors related to cadres' capacity building were knowledge, communication skills, and perceived role toward education practice, self-efficacy, cadres' characteristics, personal needs, organizational management, supervision, and caregivers' perception on cadres. These factors should be addressed during capacity building process.

Keywords: cadres, education performance, capacity building

Acknowledgements: This study was a part of preliminary phase of cohort study of SPHERES Project in an urban slum area of Jakarta; a collaboration of SEAMEO RECFON and Harvard University School of Public Health

The experience of breastfeeding problems during the first six months period among mothers having infants aged 6-12 months

Manjilala¹, Februhartanty J¹, Basuki DN¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2012.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Breastfeeding problems may relate to breastfeeding cessation, shorter breastfeeding periods or complement breastfeeding with formula milk or other food. Some studies have identified breastfeeding problems during the first six-months after delivery. However, information regarding when the problems occurred, how mothers managed and how its responded were still limited.

Objective: This study was aimed to describe experiences of breastfeeding problems during the first six months after delivery among mother having infant aged 6-12 months.

Methods: A cross sectional study in Turikale and Lau sub-district, Maros district, South Sulawesi Province was conducted to 205 randomly selected mothers of infants aged 6-12 months old using structured interviews. In-depth interview to three lactation counselors and observation to 4 Posyandu (Integrated Health Post) and 2 Puskesmas (Primary Health Care) were also conducted to complement the findings.

Results: Around 96.1%, 81.0% and 79.5% of mothers experienced breastfeeding problems at the period of 0-1 month, 1-3 months, and 3-6 months respectively. Sore nipple, tired and fatigue mothers, breast engorgement, sick baby, infant refusal to breastfed were problems persisted within six months. More than 80% of mothers cope with the problems by trying to get some help from others. However, only 22.9% of mothers sustained breastfeeding practices within the first six-months.

Conclusions: Breastfeeding problems were commonly experienced by mothers during the first six months after delivery and tended to decrease the rate of exclusive breastfeeding practice. There is a need to provide continuous support to breastfeeding mothers including empowerment of lactation counselors and improved IEC materials with issues related to breastfeeding problems.

Keywords: breastfeeding problems, breastfeeding knowledge, breastfeeding practices, exposure of information, breastfeeding support

Infant feeding practice of HIV-high-risk mothers in Bandung, West Java

Basuki DN¹, Februhartanty J¹, Septiari AM¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2010.

¹SEAMEO-TROPMED RCCN Regional Center for Community Nutrition, Universitas Indonesia

Background: Child's morbidity is also associated with infant feeding mode of mothers with HIV. Breastfeeding practice by HIV-high-risk mothers causes dilemma due to likelihood of nutritional inadequacy or HIV transmission risk. It was assumed that the transmission pathway through breastfeeding can be eliminated by providing subsidized replacement feeding. However, replacement itself poses potential danger toward child's survival.

Objective: To explore infant feeding practice of HIV risk mothers in Bandung

Methods: Descriptive observational study was performed to explore infant feeding practice from 9 HIV-high-risk mothers in Bandung. Data was collected through in-depth interviews and observation. Additional information was obtained from five health providers in charge of Prevention of Mother to Child Transmission (PMTCT) program and 3 FGD in the community. All interviews and FGD were recorded and transcribed in verbatim.

Results: Breastfeeding were practiced by HIV-high-risk mothers who had no knowledge of her HIV status. They breastfed their child because it was considered as norm. They also would not utilize information of infant feeding option if not endorsed by the health provider. Method of infant feeding was influenced by timing of mother's HIV status revealed. Mothers who have had awareness of her HIV status before delivery chose replacement feeding.

Conclusions: Aspects affecting the feeding practices included message of infant feeding endorsed by stakeholders, availability of trained counselors, timing of HIV status revealed, mother's willingness to comply, past feeding experience and feeding norm. Replacement feeding practice was far from the expected AFASS (acceptable, feasible, affordable, sustainable and safe) criteria.

Keywords: HIV, AFASS, infant feeding, qualitative, PMTCT

Menarche, nutritional status and lifestyle among adolescent girls aged 10-13 years in Central Jakarta

Fadhilah E^{1,2}, Muslimatun S¹, Februhartanty J¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2009.

¹SEAMEO-TROPMED RCCN Regional Center for Community Nutrition, University of Indonesia

²Faculty of Medicine, Brawijaya University

Background: Nutritional factor is considered as one of the strongest and most obvious environmental factors affecting timing of puberty. In urban adolescent, changes in lifestyle, including food habits are often more obvious. Mechanisms in pubertal development are genetically controlled and influenced by environmental factors such as metabolic, nutritional and psychosocial. Meanwhile, menarcheal age become earlier form year to year and have important health implications in later life.

Objective: To explore characteristic of adolescent girls aged 10-13 years in terms of their menarcheal status, nutrition, lifestyle and their associations.

Methods: A cross sectional study was conducted to 211 adolescent girls aged 10-13 years from 8 primary schools and one secondary school in Central Jakarta. Data was collected from a structured questionnaire, 24-h food recall, anthropometry assessment and physical activity assessment.

Results: The proportion of menarche among 10-13 years old girls was 28% and the mean of menarcheal age was 11.6 years old. The mean of estimated menarcheal age was earlier than the mean age at menarche of Indonesian adolescent girls in 2003 which was 12.2 years old, but it was not significant. About 72.5% of adolescent girls had normal BMI-for-Age Z score. More than half (58.3%) of adolescent girls had over fat. There was an association between menarche and nutritional status. Post menarcheal girls had higher percent of body fat and BMI-for-Age Z score. There was no association between menarche and physical activity level.

Conclusions: Menarcheal status was in line with the age and BMI-for-age but had no association with physical activity of the adolescent girls. There is a need of improving the food habit of these adolescent girls potentially through nutrition education.

Keywords: menarche, nutritional status, food habit, physical activity, adolescent girls, Indonesia.

Breastfeeding promotion for father using a book in Karawang, West Java

Februhartanty JF¹, Septiari AM¹, Destriatania S². *Research Report* 2011.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Faculty of Public Health, Sriwijaya University, Indonesia

Background: Fathers were identified as substantial social network agents on supporting breastfeeding practice. However, many interventions about breastfeeding practice were only addressed for mothers thus a fact of father's important role on breastfeeding practice became ignored.

Objective: To assess the effect of the intervention using a book about father's role in breastfeeding on father's knowledge, attitude, and practice.

Methods: This community experimental study involved 68 expectant couples each in control (mother received usual antenatal practice from midwives) and intervention (mother received usual antenatal practice from midwives, father received a book about breastfeeding and father's role in breastfeeding practice) groups. Random allocation was done at group level. Couples who attending midwife located in neighboring area were allocated randomly as either control or intervention group. Baseline and endline assessments were apart within one month. Reliability tests for knowledge and attitude questionnaires resulted Cronbach's alpha of 0.599 and 0.398 respectively. Chi-square tests were used to compare proportion of father's with good knowledge and attitude before and after the intervention between groups.

Results: Proportion of fathers with good knowledge in the intervention group increased significantly from 9.1% at baseline to 69.2% at endline. There was no significant improvement in the attitude. However, proportion of fathers who looked for information about infant feeding increased significantly from 45.5% to 67.7%.

Conclusions: Book was a potential channel for delivering information about father's role on breastfeeding practice. However, additional intervention may still be needed especially to make infant feeding a common discussion topic among fathers. Use of innovative channel of communication such as text message through mobile phone is worth exploring.

Keywords: breastfeeding, father's role, breastfeeding book, intervention, Karawang, West Java

Acknowledgements: The study was funded by Government of Indonesia

~Tools to Develop and Evaluate Food and Nutrient Intervention ~

Cost of the Diet (CoD) tool: first results from Indonesia and applications for policy discussion on food and nutrition security

Baldi G¹, Martini E¹, Catharina M¹, Muslimatun S², Fahmida U², Jahari AB³, Hardinsyah⁴, Frega R⁵, Geniez P⁶, Grede N⁶, Minarto³, Bloem MW⁶, de Pee S⁷. *Food and Nutrition Bulletin* 2013, 34(2): S35-42.

¹ United Nations World Food Programme, Jakarta, Indonesia

² South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

³ Indonesian Ministry of Health, Jakarta, Indonesia

⁴ Agricultural Institute Bogor (IPB), Bogor, Indonesia

⁵ Harvard University, Boston, Massachusetts, USA

⁶ the United Nations World Food Programme, Rome, Italy

⁷ the Friedman School of Nutrition, Tufts University, Boston, Massachusetts, USA

Background: The Minimum Cost of a Nutritious Diet (MCNut) is the cost of a theoretical diet satisfying all nutrient requirements of a family at the lowest possible cost, based on availability, price, and nutrient content of local foods. A comparison with household expenditure shows the proportion of households that would be able to afford a nutritious diet.

Objective: To explore using the Cost of Diet (CoD) tool for policy dialogue on food and nutrition security in Indonesia.

Methods: From October 2011 to June 2012, market surveys collected data on food commodity availability and pricing in four provinces. Household composition and expenditure data were obtained from secondary data (SUSENAS 2010). Focus group discussions were conducted to better understand food consumption practices. Different types of fortified foods and distribution mechanisms were also modeled.

Results: Stark differences were found among the four areas: in Timor Tengah Selatan, only 25% of households could afford to meet the nutrient requirements, whereas in urban Surabaya, 80% could. The prevalence rates of underweight and stunting among children under 5 years of age in the four areas were inversely correlated with the proportion of households that could afford a nutritious diet. The highest reduction in the cost of the child's diet was achieved by modeling provision of fortified blended food through Social Safety Nets. Rice fortification, subsidized or at commercial price, can greatly improve nutrient affordability for households.

Conclusions: The CoD analysis is a useful entry point for discussions on constraints on achieving adequate nutrition in different areas and on possible ways to improve nutrition, including the use of special foods and different distribution strategies.

Keywords: Cost of Diet, food and nutrition security assessment, fortification, linear programming, optimal diet, policy advocacy, 1,000 days intervention.

Development of food-based complementary feeding recommendations for 9- to 11-month-old peri-urban Indonesian infants using linear programming

Santika O¹, Fahmida U¹, Ferguson EL^{2,3}. *Journal of Nutrition* 2009, 139(1):135-41.

¹Southeast Asian Ministers of Education Organization Tropical Medicine (SEAMEO TROPMED) Regional Centre for Community Nutrition, University of Indonesia, 10430 Jakarta, Indonesia

²Department of Human Nutrition, University of Otago, Dunedin, New Zealand

³London School of Hygiene and Tropical Medicine, WC1E 7HT London, United Kingdom

Effective population-specific, food-based complementary feeding recommendations (CFR) are required to combat micronutrient deficiencies. To facilitate their formulation, a modeling approach was recently developed. However, it has not yet been used in practice. This study therefore aimed to use this approach to develop CFR for 9- to 11-mo-old Indonesian infants and to identify nutrients that will likely remain low in their diets. The CFR were developed using a 4-phase approach based on linear and goal programming. Model parameters were defined using dietary data collected in a cross-sectional survey of 9- to 11-mo-old infants (n = 100) living in the Bogor District, West-Java, Indonesia and a market survey of 3 local markets. Results showed theoretical iron requirements could not be achieved using local food sources (highest level achievable, 63% of recommendations) and adequate levels of iron, niacin, zinc, and calcium were difficult to achieve. Fortified foods, meatballs, chicken liver, eggs, tempe-tofu, banana, and spinach were the best local food sources to improve dietary quality. The final CFR were: breast-feed on demand, provide 3 meals/d, of which 1 is a fortified infant cereal; > or = 5 servings/wk of tempe/tofu; > or = 3 servings/wk of animal-source foods, of which 2 servings/wk are chicken liver; vegetables, daily; snacks, 2 times/d, including > or = 2 servings/wk of banana; and > or = 4 servings/wk of fortified-biscuits. Results showed that the approach can be used to objectively formulate population-specific CFR and identify key problem nutrients to strengthen nutrition program planning and policy decisions. Before recommending these CFR, their long-term acceptability, affordability, and effectiveness should be assessed.

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Development of Food Photograph Application (FPA) for Portion Estimation Tools in Jakarta

Adipraniastuti S¹, Fahmida U¹, Kekalih A². Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

²Community Medicine, Medical Faculty, Universitas Indonesia

Background: Expert experienced some limitations on using existing tools in dietary intake assessment, such as unstandardized food portion, incomplete food variation, and tools not portable. Food photographs is a very cost effective tool which has many advantages such as increasing accuracy, more portable, having many food and household (HH) measurement units.

Objective: To develop Food Photographs Application (FPA) as a tool for portion size estimation.

Methods: Quantitative and qualitative cross sectional study was conducted in Senen sub-district, Jakarta. It consisted of two stages: development and user opinion. Development was done through interviews with experts using Delphi techniques, secondary data analysis and observation to get list of food commonly consumed, food groupings, food portion and HH measurement unit. Photo taking was done using Nelson Guidelines (1994). FPA was developed in a software containing 201 food items with 354 items of food portion in various HH measurement units. User opinion on existing tools and FPA was addressed to dieticians, enumerators, and clients who had experience in using any tools for dietary intake assessment. Existing tools used as comparison were food model, HH measurement, leaflet/brochure, food sample and reference object.

Results: Dieticians (62.9%), enumerators (82.9%), and clients (42.9%) chose FPA rather than existing tools because FPA is more portable, have more complete food variation, various food portion and HH measurement unit.

Conclusions: Limitations of existing tools in dietary intake assessment on unstandardized food portion, incomplete food variation, and portability are covered by FPA. Nevertheless, FPA is expected to improve specifically to include mixed foods in various portions and be community-based.

Keywords: Food photograph application, development, portion size estimation

Acknowledgements: The study was supported by the Grand Research of Nutrition for Maternal and Child, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

Development of modified local nutrient-dense complementary foods recipes for 9-11 month old infants

Utami NH¹, Fahmida U¹, Santika O¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2011.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: One of the strategies to improve intake of problem nutrients was through low cost complementary foods, using locally available foods and simple food processing.

Objective: To develop modified local nutrient-dense complementary food recipes and to assess the acceptance of 9-11 months infants and their mothers towards the recipes.

Methods: Cross sectional study was conducted in East Lombok. The data collection including a series of market survey, 4 groups interviews with caregivers and cadres, recipe trials, recipe development, and 7-day household acceptability trial.

Results: Affordable recipes that corresponded to problem nutrients (iron, calcium, and Zinc) such as chicken liver and beef floss (*abon*) was well accepted by infants and mothers. While anchovy powder was less accepted. Recipes that mostly practiced by the household were fish meatballs and cap cay, while the least practiced recipe was chicken liver floss. Infants who consumed those recipes had significant improvement on the adequacy of energy, iron, calcium and zinc.

Conclusions: Varied food resources available in the local market can be potential for the improvement of complementary foods in the study area.

Keywords: local nutrient-dense complementary food recipes, infants, East Lombok, acceptability trial, nutrient adequacy

Acknowledgements: The study was funded by Government of Indonesia.

Food Safety and Food Security



~ Food Safety ~

Association of food-hygiene practices and diarrhea prevalence among Indonesian young children from low socioeconomic urban areas

Agustina R^{1,2,3}, Sari TP¹, Satroamidjojo S¹, Bovee-Oudenhoven IM^{4,5}, Feskens EJ³, Kok FJ³. *BMC Public Health* 2013,13: 977. doi: 10.1186/1471-2458-13-977.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Department of Nutrition, Faculty of Medicine, University of Indonesia

³Division of Human Nutrition, Wageningen University, Wageningen, The Netherlands.

⁴Top Institute Food and Nutrition, Wageningen, The Netherlands.

⁵NIZO Food Research, Ede, The Netherlands

Background: Information on the part that poor food-hygiene practices play a role in the development of diarrhea in low socioeconomic urban communities is lacking. This study was therefore aimed at assessing the contribution of food-hygiene practice to the prevalence of diarrhea among Indonesian children.

Methods: A cross-sectional study was conducted among 274 randomly selected children aged 12-59 months in selected low socioeconomic urban areas of East Jakarta. The prevalence of diarrhea was assessed from 7-day records on frequency and consistency of the child's defecation pattern. Food-hygiene practices including mother's and child's hand washing, food preparation, cleanliness of utensils, water source and safe drinking water, habits of buying cooked food, child's bottle feeding hygiene, and housing and environmental condition were collected through home visit interviews and observations by fieldworkers. Thirty-six practices were scored and classified into poor (median and below) and better (above median) food-hygiene practices. Nutritional status of children, defined anthropometrically, was measured through height and weight.

Results: Among the individual food-hygiene practices, children living in a house with less dirty sewage had a significantly lower diarrhea prevalence compared to those who did not [adjusted odds ratio (OR) 0.16, 95% confidence interval (CI) = 0.03-0.73]. The overall food-hygiene practice score was not significantly associated with diarrhea in the total group, but it was in children aged < 2 years (adjusted OR 4.55, 95% CI = 1.08-19.1).

Conclusions: Overall poor mother's food-hygiene practices did not contribute to the occurrence of diarrhea in Indonesian children. However, among children < 2 years from low socioeconomic urban areas they were associated with more diarrhea.

Keywords: Food-hygiene practices, young children, diarrhea, urban low socioeconomic areas, Indonesia

Acknowledgements: This study was funded by Top Institute Food and Nutrition, Wageningen, The Netherlands and the Ministry of National Education and Culture Republic of Indonesia. Doctorate scholarship was provided by the International Nutrition Foundation, USA.

Food and personal hygiene perceptions and practices among caregivers whose children have diarrhea: a qualitative study of urban mothers in Tangerang, Indonesia

Usfar AA¹, Iswarawanti DN², Davelyna D³, Dillon D¹. *Journal of Nutrition Education and Behavior* 2010, 42(1): 33-40.

¹Danone Institute Indonesia, Jakarta, Indonesia

²Southeast Asian Ministers of Education Organization - Tropical Medicine Regional Center for Community Nutrition, University of Indonesia, Jakarta, Indonesia

³Currently self-employed

Objective: To examine caregivers' perceptions and practices related to food and personal hygiene and its association with diarrhea in children 6 to 36 months of age who suffered recurrent diarrhea.

Design: This qualitative study, conducted in March and April 2006, used both in-depth interviews and direct observation data.

Setting: Urban Tangerang, near Jakarta, Indonesia.

Participants: Twenty-four mothers whose monthly household income was less than \$160 US and had latrines in their homes.

Phenomenon of interest: To examine the relationship between mothers' perceptions and behaviors related to diarrhea, food hygiene, and personal hygiene.

Analysis: Interview transcripts were analyzed based on the phenomenon of interest and coded for common themes.

Results: Mothers differentiated diarrhea episodes as either disease or nondisease. Most mothers associated the importance of food hygiene with disease prevention, contaminating agents, and health. Mothers commonly wiped cutting boards with a kitchen towel after slicing vegetables, whereas they washed the board with soap and water after cutting raw meat. Mothers perceived that the importance of personal hygiene was for maintaining health and cleanliness. The majority of mothers washed their hands without soap after performing housework and cooking.

Conclusions and implications: Improving mothers' knowledge while incorporating existing perceptions might lead to positive changes.

Keywords: hygiene, perception, practice, diarrhea, mothers

Acknowledgements: This study is part of a larger nutritional survey conducted by the Southeast Asian Ministers of Education Organization (SEAMEO) Tropical Medicine and Public Health (TROPMED) Regional Center for Community Nutrition (RCCN), Universitas Indonesia, and CARE International Indonesia, Tangerang.

The effectiveness of training on cadres' competencies in communicating safe complementary feeding to caregivers

Iswarawanti DN¹, Basuki E², Achmad, Muslimatun S¹. Dissertation, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2012.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

²Department of Community Medicine, Faculty of Medicine, Universitas Indonesia

³Fakultas Bahasa dan Seni, State of University Jakarta

Background: Information on training model development which uses systematic and scientific tools to improve cadres' competencies in communicating safe complementary feeding is limited.

Objective: This study aimed to develop a training model using Kemp's model to improve the competencies of cadres in communicating safe complementary feeding to caregivers.

Methods: The 2-phase study was conducted in Bekasi municipality. Phase 1 was a qualitative study which was developed using Kemp's model instructional design. Phase 2 was a quantitative study; included intervention through non-equivalent pre-test and post-test control group design. Participants on phase 1 were cadres of posyandu, health staff, and caregivers of children 6-24 months old; meanwhile participants on phase 2 were 70 (intervention) and 68 (comparison) cadres of posyandu.

Results: At phase 1, a training model was developed. The training materials consisted of trainer's handbook, participant's handbook, workbook, booklet, brochure and videos. Validation of training was done through the implementation of the Training of the Trainers (TOT) with an external educational expert to review the TOT implementation. At phase 2, the proportion of cadres who were competent in psychomotor and composite domain in the intervention group was significantly higher than that of the comparison group. The cadres who received training potentially had psychomotor (9.1 times) and composite (6.9 times) competencies more than cadres who only attended the seminar ($p < 0.001$).

Conclusions: The developed training model using the Kemp's elements as the instructional design was proven to be effective in improving the competencies of the cadres in communicating safe complementary feeding to caregivers.

Keywords: cadres, communication, competencies, complementary feeding, food safety, instructional design, training

Acknowledgements: This study was funded by Nestle Foundation

Contribution of street food to nutrient intake and contaminant exposure among school children at Senen sub-district, Jakarta

Ekawidyani KR^{1,2}, Fahmida U¹, Rospita L¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2012.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

²Department of Community Nutrition, Faculty of Human Ecology, Bogor Agricultural University

Background: School children spend most of their daily activity at school. They need adequate nutrient to provide growth, body maintenance and daily activities. Street food can provide some nutrient for their daily need, although its safety is still doubtful due to possible presence of chemical contaminants.

Objective: To assess contribution of street food to nutrient intake and contaminant exposure among school children at Senen sub-district, Jakarta, Indonesia.

Methods: A cross sectional study with 8 schools purposively selected and 76 school children from grade 4-5 randomly selected was employed. Several methods were used, such as structured interview for students and street food sellers, food checklist, repeated 24 hour food recalls, anthropometric measurement and chemical analysis of contaminants.

Results: Street foods contributed to 35% of energy, 35.9% of carbohydrate, 37.6% of protein and 44.9% of fat of school children. Contaminants found in street foods were formaldehyde (0.29-75.75 mg/kg), cyclamate (277.64-1207.8 mg/L) and lead (below 0.1 mg/kg). The median formaldehyde exposure did not exceed the safety level (4.65 mg) for average body weight of 31 kg. The mean cyclamate exposure also did not exceed the safety level for average body weight of 341 mg. Using WHO cut-off, 68.4% of subjects were exposed to formaldehyde and 65.8% were exposed to cyclamate below their individual safety level. However, some subjects were exposed to formaldehyde (9.2%) and cyclamate (11.8%) above their individual safety level.

Conclusions: Street food contributes more than one third of daily macronutrient intake. Contaminants found were formaldehyde, cyclamate and lead. More than three-quarters of subjects were exposed to formaldehyde and cyclamate.

Keywords: cyclamate, formaldehyde, nutrient intake, school children, street food

Food safety knowledge and practices and their related factors among orphanage food handlers in DKI Jakarta Province

Ermayani E¹, Surono I¹, Dillon DHS¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2011.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Improper food preparation and handling increase the possibility of food borne disease (FBD) outbreaks. Orphanage is a potential place for FBD incidence especially caused by food handlers. Food handlers in orphanage play important role since they are responsible for food preparation and handling. Having food handlers with good knowledge and practice are compulsory to protect children in orphanage from FBD.

Objective: To assess knowledge and practice on food safety and their related factors of food handlers at orphanages in Jakarta.

Methods: A cross sectional study was conducted by involving 90 food handlers from 41 registered orphanages. Data was collected through observations and interviews on food preparation and handling. Observations to some practices and facilities were done prior to the interview. The data was analyzed for descriptive statistic. Logistic regression was also performed to obtain significant factors which influence the practice of food handlers.

Results: Almost all food handlers never attended training on food safety. Food safety knowledge of the orphanage food handlers was in average level. However, their knowledge on microbial hazard was mostly lacking. Food safety practices of orphanage food handlers were generally improper. Personal hygiene practice especially hand washing was poorly implemented. Among factors of the practices assessed, knowledge and workload were significant factors to the practice of food preparation and handling among the food handlers.

Conclusions: With sufficient knowledge, food handlers practice on food preparation and handling was generally still improper. Increasing exposures which could give impact on food safety knowledge of food handlers is one important thing to be considered by orphanage.

Keywords: food safety, knowledge, practice, food handlers, orphanage

Acknowledgements: The study was funded by Ministry of Education, Government of Indonesia

Hazard Analysis Critical Control Point study of foods for 6-24 months old children and food handler's practices in Bekasi, West Java

Rospita L¹, Iswarawanti DN¹, Santika O¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2009.

¹SEAMEO-TROPMED RCCN Regional Center for Community Nutrition, Universitas Indonesia

Background: Food borne illness at home may happen as a result of eating foods from unsafe food preparation practices. To address error in hygienic practices, there is a need to apply Hazard Analysis Critical Control Point (HACCP). However, the application of HACCP system to domestic kitchen, presents unique challenges due to lack of well-defined food flow diagram and wide variety of knowledge, practices, equipment and environment condition.

Objective. To develop HACCP data sheet and assess food handler's practices on food for children aged 6-24 months old in Bekasi municipality.

Methods: A cross sectional study was conducted among 210 randomly selected food handlers of 6-24 months old children in Bekasi, West Java. The subjects were recruited based on health post records. Focus Group Discussions were also done with 6-15 food handlers. HACCP data sheet development was conducted through literature review.

Results: The study found 10 foods mostly consumed by 6-24 months old children were spinach soup, vegetable soup, cooked rice, *nasi tim*, biscuit, ready to eat rice porridge, instant porridge, fried *tempe*, fried fish, and egg omelet. The Critical Control Points commonly found were cooking, holding, storing, reheating, purchasing, preparation, and addition of ingredients after heat treatment. The knowledge of the food handlers on food safety matter was generally good. The observed practices which need proper intervention included not thoroughly cooking; not eating cooked food promptly; not reheating properly; not reading expiry date; not observing broken package; and improper hand washing.

Conclusions. Food handlers' practices were in contrast to their knowledge, attitude and facility availability. HACCP approach does have potential benefit for domestic food preparation which can be used to obtain information on domestic hazards and risks to formulate realistic control measures and provide information on which specific education program can be based.

Keywords: HACCP, food safety, food handler, knowledge, attitude, food preparation, practice

Acknowledgements: This study was funded by Ministry of Education, Government of Indonesia

Knowledge, attitude and practice of hygiene and health of people living on Code river side in Yogyakarta: a case study on food safety, impact on diarrhea and nutritional status of young children

Surono IS¹. *Research Report*, 2011.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

Background: Code riverside in Yogyakarta is mostly used for domestic, industrial and agricultural activities. Wastes from these activities are generally directly discharged into the river and have bad impact on the quality of river water. However, availability of clean water and adequate sanitation facilities are essential to prevent diseases transmitted through water and food, particularly diarrheal diseases of the people living at the riverside.

Objective: To determine pollution level of Code River, Yogyakarta and to investigate knowledge, attitude and practice on hygiene and health also impact on diarrhea and nutritional status of young children living on the riverside.

Methods: A cross-sectional survey was conducted to 120 parents with under-five children living at Code riverside Yogyakarta. The survey included interviews using structured-questionnaire, anthropometric assessment, observation and water analysis. Water samples were taken from the water sources in the household, mostly from well water. Laboratory assessment was done for microbiological water contaminant, total coliform and fecal coliform by membrane filtration method.

Results: Kaparakan Kidul village has the highest contamination of coliform and fecal coliforms (103-106 cfu/100 ml and 104-106 cfu/100 ml of tested water samples). Frequency and episodes of diarrhea in children under-five from households living under Mergangsan health center work area was the highest (65% of under-five children from the households suffered from diarrhea, an average of 2-3 times a month has diarrhea, for 3-4 days a week). Malnutrition among children under-five in the target area of Mergangsan health center was strongly influenced by inadequate availability of clean water, very high contamination of total coliforms and fecal coliforms, resulting in diarrheal disease infection. Communities living at Code riverside only considered physical condition of the water and had not realized the importance of water safety for everyday purposes.

Conclusions: Code River side has been contaminated by fecal coliform, and diarrhea incidence may coincide with the water contaminated with fecal coliform. This condition may be due to infiltration of high level fecal coliform contaminated river water into the well water.

Keywords: water safety, fecal coliform, diarrhea, riverside, Yogyakarta

Acknowledgements: This study was funded by Ministry of Education, Government of Indonesia

~ Food Economics and Food Security ~

Demand analysis for strategic food in Indonesia during economic crisis and its implication on food consumption among households with children under two years

Mauludyani AVR¹, Fahmida U¹, Santika O¹. *Gizi Indonesia* 2013, 36(1): 37-44

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

The objective of the study is to analyze demand elasticity for strategic foods during economic crisis and its implication on food and nutrient consumption among household in Indonesia. This ecological study was conducted to 14,767 households owned children less than two years included in National Socioeconomic Survey 2007. Analysis was conducted by using econometric model of Double-Log Regression in SAS program. Result of analysis showed that the own-price elasticities were all found to be negative as expected, meaning that increased price of strategic food tended to reduce its demand.

In conclusion, the effect of food crisis was visible to most of the strategic foods which their demand tended to be highly affected by price changes. This effect was mostly seen in rural and low income households which had limited income to purchase food. Improved income tended to increase demand of strategic foods. Demand on protein sources was highly affected by income changes.

Keywords: demand analysis, strategic food, food consumption, nutrient intake.

Adolescent girls food security: a qualitative study on individual understanding of daughters and mothers in Timor Tengah Selatan District, East Nusa Tenggara Province

Fatmaningrum D¹, Roshita A¹, Februhartanty J¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Experience of food insecurity among adolescent girls had great consequences on health status while adolescent represent a period of window opportunity for preparing towards a healthy adulthood. Food insecure adolescent girls tend to have a poor dietary intake which is a determinant factor of undernutrition. However, there are limited studies on food insecurity and the consequences for adolescent especially in developing countries, including Indonesia.

Objective: To explore the individual understanding, both daughters and mothers, on food security among adolescent girls in a rural area of Timor Tengah Selatan District, East Nusa Tenggara Province, Indonesia.

Methods: A qualitative study was conducted in 13 villages of Timor Tengah Selatan District with 11 girls aged 10-13, 5 girls aged 14-15, and 4 girls aged 16-19 years old. In-depth interviews were also conducted to 5 girls' biological mothers to obtain more comprehensive insights. All interviews were recorded with the consent of the informants and verbatimly transcribed.

Results: The girls had similar understanding with their mothers in terms of intra household food distribution and food stability. However, mothers were not aware of their daughters' efforts on accessing foods and anxiety on having limited food. In the effort to access foods, the girls substituted their staple foods with other available foods at home when the family faced inadequate and unstable food stock, they also neglected other type of foods besides staples.

Conclusions. The girls' coped with food insecurity mainly by altering staple foods into a different type to maintain their daily diet, and missing out other food groups in the diet. As this community faced limitedly diversified food crops, increasing variety of food crop in their field is recommended. Nutritional and agricultural education are also needed to overcome the lean season.

Keywords: adolescent girl, food security, Indonesia, staple food, dietary diversity

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Demand analysis for strategic food and its relationship with undernutrition prevalence among children under two years in Indonesia

Mauludyani AVR¹, Fahmida U¹, Santika O¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2011.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Household (HH) tend to reduce quantity and quality of food consumed in the face of higher food price. The inadequate food intake as the impact of food price is worse in children, especially the under-two.

Objective: To identify relationship of strategic food expenditure and income with undernutrition prevalence among children under-two years in Indonesia.

Methods: This study employed a secondary data analysis using data extracted from National Socioeconomic Survey (Susenas) and National Basic Health Research (Riskesdas) year 2007. Statistical analysis was carried out with SAS ver. 9.0. Economic model of double-log regression (DLR) was used to analyze demand elasticity of strategic foods. Result was presented based on region (urban, rural, urban+rural) and income class.

Results: Reduction of demand in response to increased price of strategic foods was higher in rural and among low income HH than that in urban and higher income HH. Most strategic foods tend to have increased demand as response to higher income, except for corn and cassava. Higher proportion of manufactured complementary foods (CF) and plant protein expenditure was significantly associated with lower risk of high stunting prevalence. Higher proportion of sugar and cooking oil expenditure was significantly associated with higher risk of high wasting prevalence. Higher proportion of manufactured CF and plant protein expenditure and lower proportion of sugar and cooking oil were significantly associated with lower risk of high underweight prevalence.

Conclusions: The effect of food crisis was visible to most of the strategic foods whose demand tended to be highly affected by price changes. The effect was mostly seen in rural and low income HH which had limited resources to purchase food.

Keywords: demand analysis, strategic food, consumption, children under-two

Food security of households attached to male and female migrant workers: determinants and impact on nutritional status of the children

Andrias DR¹, Famida U¹, Santika O¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2010.

¹SEAMEO-TROPMED RCCN Regional Center for Community Nutrition, Universitas Indonesia

Background: Remittances contributed to the economic improvements of household (HH), which may also improve HH food security status. Nowadays, Indonesia has sent high number of migrant workers abroad. There is culturally constructed roles that men and women play to influence the way in which they invest the remittances hence HH food security may also be influenced by gender out migration.

Objective: To compare HH food security among household attached to male and female migrant workers, its determinant factors and impact on child nutritional status.

Methods: A cross sectional study was conducted to randomly selected 225 HH attached to male migrant workers and 225 HH attached to female migrant workers, who had children aged 6 months-10 years and has been working as migrant worker for at least 6 months. Food security status was assessed using US-Household Food Security/Hunger Survey Module (US-FSSM).

Results: Risk of HH attached to female migrant workers to be food insecure was 2.72 times higher than that of male migrant workers. HH income per capita less than IDR 500,000; non/semi permanent housing, had less than 3 food groups available, coping score more than 20 and own less than 5 kind of electronic goods increased the risk of HH to become food insecure. Nutritional status in under-five children were not significantly different among two groups.

Conclusions: Gender of the migrant worker is a predictor of HH food security status. HH food security and gender of migrant worker were not significant predictors of child's nutritional status. Gender is related to care and resources for care which were associated with nutritional status.

Keywords: household food security, migrant worker, remittance, child care, nutritional status

~ Psychosocial and Socio-economic Factors of Nutrition ~

Child feeding practices in families of working and nonworking mothers of Indonesian middle class urban families: what are the problems?

Roshita A¹, Schubert E², Whittaker M². *Ecology of food and nutrition* 2013, 52: 344-70.

¹SEAMEO RECFON Regional Center for Food and Nutrition, University of Indonesia, Indonesia

²School of Population Health, University of Queensland, Australia

This study aims to explore the feeding practices in families of working and nonworking mothers with children (aged 12-36 months) of different nutritional status and types of domestic caregiver in Indonesian urban middle class families. It was designed as a qualitative multiple case study. Mothers and caregivers from 26 families were interviewed in depth, and caregivers were categorized as family and domestic-paid caregivers. The result suggested that offering formula milk to young children was a common practice, and there was a high recognition and familiarity toward a range of formula milk brands. Mothers reported challenges in encouraging their children to eat, and in some cases they appeared to lack knowledge on overcoming their child's feeding problem. The findings suggested the need to address the child feeding problems experienced by mothers in order to overcome the double burden of child nutrition in Indonesia.

Keywords: child feeding, working mothers, Indonesia, child nutrition

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Child-care and feeding practices of urban middle class working and non-working Indonesian mothers: a qualitative study of the socio-economic and cultural environment

Roshita A¹, Schubert E², Whittaker M². *Maternal and Child Nutrition* 2012, 8(3):299-314.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

²School of Population Health, University of Queensland, Australia

The double-burden problem of malnutrition in many developing countries is occurring against a backdrop of complex changes in the socio-economic and cultural environment. One such change is the increasing rate of female employment, a change that has attracted researchers to explore the possible relationships between maternal employment and child nutritional status.

The present study employs a qualitative approach to explore the socio-economic and cultural environments that may influence child-care practices in families of working and non-working mothers with children of different nutritional status and types of domestic caregiver. It was conducted in Depok, a satellite city of Jakarta, Indonesia, and was designed as a case study involving 26 middle class families. The children were categorized as underweight, normal weight and obese, and caregivers were grouped as family and domestic paid caregivers.

Twenty-six mothers and 18 caregivers were interviewed. Data were analysed by the constant comparative approach. The study identified five emerging themes, consisting of reason for working and not working, support for mother and caregivers, decision maker on child food, maternal self-confidence and access to resources. It confirmed that mothers and caregivers need support and adequate resources to perform child-care practices regardless of the child nutritional and maternal working status.

Further research is required into how Indonesian mothers across a range of socio-economic strata can have increased options for quality child-care arrangements and support with child feeding. Additionally, this paper discussed the importance of enhanced dissemination of health information addressing both child underweight and obesity problems.

Keywords: child care, child nutrition, feeding practices, maternal employment, urban Indonesia.

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Profiles of eight working mothers who practiced exclusive breastfeeding in Depok, Indonesia

Februhartanty J¹, Wibowo Y¹, Fahmida U¹, Roshita A¹. *Breastfeeding Medicine* 2012 ,7(1):54-9.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

Exclusive breastfeeding practice is generally low because of multifaceted factors internally within mothers themselves and also the surroundings. In addition, studies have consistently found that maternal employment outside the home is related to shorter duration of exclusive breastfeeding. With all these challenges, it is interesting that there are some mothers who manage to exclusively breastfeed their infants. Therefore, this report aims at exploring the characteristics of working mothers who are able to practice exclusive breastfeeding. The original study population was non-working and working mothers who have infants around 1 to 6 months old. The study design is an observational study with a mixed methods approach using a quantitative study (survey) and qualitative methods (in-depth interview) in sequential order. In addition, in-depth interviews with family members, midwives, supervisors at work, and community health workers were also included to accomplish a holistic picture of the situation. The study concludes that self-efficacy and confidence of the breastfeeding mothers characterize the practice of exclusive breastfeeding. Good knowledge that was acquired way before the mothers got pregnant suggests a predisposing factor to the current state of confidence. Home support from the father enhances the decision to sustain breastfeeding.

Infant feeding practices among mildly wasted children: a retrospective study on Nias Island, Indonesia

Inayati DA¹, Scherbaum V², Purwestri RC³, Hormann E,⁴ Wirawan NN⁵, Suryantan J⁶, Hartono S⁶, Bloem MA⁷, Pangaribuan RV⁸, Biesalski HK², Hoffmann V³, Bellows AC³. *International Breastfeeding Journal* 2012, 7(1):3. doi: 10.1186/1746-4358-7-3.

¹ Department of Gender and Nutrition, Institute of Social Sciences in Agriculture, University of Hohenheim

² Institute for Biological Chemistry and Nutrition, University Hohenheim, Stuttgart, Germany

³ Institute for Social Sciences in Agriculture, Center Gender and Nutrition (430b), University Hohenheim, Fruwirthstrasse

⁴ The European Institute for Breastfeeding and Lactation, Kramsach, Austria

⁵ Faculty of Medicine, Study Program Nutrition, University of Brawijaya, Malang, Indonesia

⁶ Church World Service, Jakarta, Indonesia

⁷ Church World Service, New York, USA

⁸ SEAMEO-TROPED Regional Centre for Community Nutrition, Jakarta, Indonesia

Background: This study investigated the infant feeding practices of participating mothers who were recruited into a research project aimed at improving the nutritional status of mildly wasted children (-1.0 to -1.5 Weight-for-Height Z-scores) aged 6 to 60 months on Nias Island, Indonesia.

Methods: Cross-sectional, questionnaire-based interview of mothers of the index children ($n=215$) who were admitted to the community program for mildly wasted children in the study area. Four focus groups and twenty in-depth interviews were conducted to explore further information on infant feeding practices in the study area.

Results: Retrospective results indicated that 6% of the mothers never breastfed. Fifty two percent of mothers initiated breastfeeding within six hours of birth, but 17% discarded colostrum. Exclusive breastfeeding until 6 months of age was practiced by 12%. Seventy-four percent of the mothers offered supplementary liquids besides breast milk within the first 7 days of life, and 14% of infants received these supplementary liquids from 7 days onwards until 6 months of age. Moreover, 79% of the infants were given complementary foods (solid, semi-solid, or soft foods) before 6 months of age. About 9% of the children were breastfed at least two years. Less than one in five of the mildly wasted children (19%) were breastfed on admission to the community program. Qualitative assessments found that inappropriate infant feeding practices were strongly influenced by traditional beliefs of the mothers and paternal grandmothers in the study areas.

Conclusion: Generally, suboptimal infant feeding was widely practiced among mothers of mildly wasted children in the study area on Nias Island, Indonesia. To promote breastfeeding practices among mothers on Nias Island, appropriate nutrition training for community workers and health-nutrition officers is needed to improve relevant counseling skills. In addition, encouraging public nutrition education that promotes breastfeeding, taking into account social-cultural factors such as the influence of paternal grandmothers on infant feeding practice, is needed.

Keywords: breastfeeding, complementary foods, infant feeding, wasted children, Nias island

Undernutrition prevalence among children under two years old in Indonesia during economic crisis and its related factors

Mauludyani AVR¹, Fahmida U¹, Santika O¹. *Jurnal Gizi dan Pangan* 2012, 7(3): 169-74.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

The objective of this study was to assess undernutrition prevalence among children under-two years in Indonesia and its related factors. This ecological study was conducted to 437 districts using data extracted from nationally representative surveys, which were National Socioeconomic Survey (Susenas) and National Basic Health Research (Riskesdas) year 2007. Overall, prevalence of High Stunting (HS), High Wasting (HW), and High Underweight (HU) was 46.9%, 59.5%, and 17.2%, respectively. Median prevalence of inadequate intake of energy, protein, iron, and zinc were 33.3%, 11.1%, 81.8%, and 55.6%, respectively. Median prevalence of Acute Respiratory Infection (ARI) was 15.9%, while the median prevalence of diarrhea was 13.0%. Median proportion of low education of the mother was 46.9%. Prevalence of HS was associated with household income, low education proportion of mother, and proportion of food expenditure. Prevalence of HW was associated with prevalence of inadequate energy intake and proportion of food expenditure. Prevalence of HU was associated with proportion of low education of mother and proportion of food expenditure.

Keywords: children under-two years, economic crisis, undernutrition

Maternal self-efficacy in the home food environment: a qualitative study among low-income mothers of nutritionally at-risk children in an urban area of Jakarta, Indonesia

Kolopaking R¹, Bardosono S², Fahmida U¹. *Journal of Nutrition Education and Behaviour* 2011, 43(3):180-8.

¹Southeast Asian Ministers of Education Organization - Tropical Medicine Regional Center for Community Nutrition, University of Indonesia, Jakarta, Indonesia

²Clinical Nutrition Department, University of Indonesia, Jakarta, Indonesia

Objective: To explore the factors that encompasses maternal self-efficacy in providing food for the home.

Methods: In-depth interviews were conducted with 19 mothers of nutritionally at risk children in an urban area of East Jakarta, Indonesia. This study was based on Social Cognitive Theory, Family Stress Models, and Ecological Frameworks. Data collection was coded and analyzed using the Grounded Theory Method.

Results: Most mothers felt secure in providing food for their families knowing that their relatives and neighbors would support them if they lacked the money to buy food; however, most of them did not supply appropriate meals in terms of nutrient content, variety, and timing.

Conclusion and Implications: Maternal self-efficacy was mainly characterized by practical issues concerning the preparation of food at home and a lack of knowledge of health and nutrition. Family-based interventions are needed to enhance competence in providing nutritious food from available resources.

Keywords: home food environment, maternal self-efficacy, children

Factors associated with Stunted-Child/Overweight-Mother Pairs within Households (SCOWT) in urban and rural region of Indonesia: a multilevel analysis of individual, household, and community factors

Novrianto Y¹, Khusun H¹, Wiradnyani LAA¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

Background: The prevalence of Stunting-Child-Overweight-Mother (SCOWT) starts to increase in Indonesia. Factors influencing SCOWT remain under-explored since most studies focused more on individual and household factors, while there is also no clear pattern about prevalence of double burden of malnutrition in urban and rural region.

Objective: To investigate the explanatory factors of stunted-child/overweight-mother pairs at individual, household and community level in urban and rural region as compared to normal pairs (non-stunted-child and normal-BMI-mother pairs).

Methods: Secondary data analysis was conducted using Basic Health Research Indonesia (Riskesdas) 2010 and Village Potential Statistic of Indonesia (Podes) 2011 as data sources. The subjects were households with children under-two years in Indonesia i.e. 585 urban and 556 rural household pairs. Multilevel logistic regression was performed to investigate the differences in potential explanatory factors of SCOWT pairs. This study used two level random intercept models.

Results: The Median Odd Ratio (MOR) for SCOWT in urban and rural regions were 2.2 and 1.3. After inclusion of child characteristics, MOR became 2.6 and 2.0 respectively. After being adjusted with maternal characteristics, MOR became 2.7 and 2.5. None of the community characteristics in the study explained the variation of SCOWT at community. Without considering any covariates, there was a community level variance which explained SCOWT in urban and rural regions.

Conclusions: SCOWT in urban and rural region of Indonesia was strongly explained by and related to child and maternal characteristics, but the variation was different between communities. The roles of community characteristics need further exploration. To tackle the double burden of malnutrition in both regions, prenatal and postnatal interventions may be considered.

Keywords: stunting child overweight mother (SCOWT), urban and rural region, multilevel analysis

Nutritional status and feeding practice of children aged 0-59 months living in orphanage in Jakarta

Wandini K¹, Wiradnyani LAA¹, Santika O¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2012.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

Background: Children living in an orphanage are the most vulnerable and disadvantaged members of the community who are susceptible to disease and might suffer nutritionally, meanwhile adequate nutrition during early childhood is fundamental for child's development. However, research and accurate data about orphanage children are still limited.

Objective: To explore nutritional status and feeding practice received by orphanage children aged 0-59 months in Jakarta.

Methods: A cross sectional study was conducted in three orphanages in Jakarta that specifically accommodate under-five children. Subjects were 144 under-five children, 62 caregivers in the orphanages, vice of the orphanage, staff or health service and food handler. Structured and in-depth interviews, anthropometric assessment, food record, observation and secondary data were used methods for data collection. Nutrient intake data was analyzed by using Nutrisurvey program for Windows 2004.

Results: Around 21.9% of children were underweight, 35.2% were stunting, and 6.5% were wasting. Almost 90% of children had adequate protein and vitamin A, but more than 90% had zinc inadequacy. Several inappropriate feeding practices received by children included inappropriate type of food, inappropriate responses from caregiver during feeding and improper feeding during illness and recovery. There were 71.5% of children who suffered from ARI, 22.2% from diarrhea and 18.8% from ARI and diarrhea. Inappropriate practices of food handling such as the use of bottle feeding, no hand washing by children nor caregivers when serving food or feeding the children were also found.

Conclusions: Undernutrition was prevalent among orphanage children which were classified as high public health problem based on WHO classification. Inappropriate feeding practices were also found that could affect actual intake of children.

Keywords: orphanage, under-five, nutritional status, dietary intake, feeding practices, ARI, diarrhea

Intake of nutrient dense foods of children aged 12-23 months from traditional and manufactured foods: a study in different socioeconomic status in urban area of Bandung

Rahingtyas DK¹, Februhartanty J¹, Fahmida U¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2011.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: The first 2-year of life is a critical period as adequate nutrition is very important to ensure optimal achievement. However gastric capacity of children in this age limits the amount of food consumed. Nutrient dense foods contributed from traditional and manufactured foods may be the way to fulfill children's nutrient requirements.

Objective: To investigate intake of nutrient dense foods contributed by traditional or manufactured foods among children aged 12-23 months within different socioeconomic status (SES) in urban area of Bandung.

Methods: A cross sectional study was conducted in a sub-district of Bandung City with 323 caregivers of children aged 12-23 months recruited based on their Socioeconomic Status (SES). Data were collected by structured and in-depth interviews, single 24-hour recall, anthropometric measurement, focus group discussion, and observation. Indicators used were nutrient intake, nutrient-dense food intake, SES, history of feeding practice, and resources of care. Quantitative data were analyzed using descriptive, parametric, and non-parametric statistics. A food with Nutrient Density Score (NDS) >1 was considered as a good nutrient source.

Results: According to NDS range, traditional foods contributed more nutrient density than those of manufactured foods. However, the preference of caregivers to give traditional foods was less than that of manufactured foods. However, the diet quality of the children in all SES in terms of protein, calcium, zinc, iron, and vitamin A dense foods was dominated by manufactured foods, particularly manufactured milk.

Conclusions. Nutrient dense foods contributed by traditional foods were dominantly obtained from animal source food, while manufactured foods were obtained dominantly from fortified products. Caring resources and socioeconomic circumstances of the family tended to influence caregivers' preferences on selecting food for children.

Keywords: nutrient dense food, nutrient density score, traditional food, manufactured food, socioeconomic status, caring resources

Feeding practices among mothers of children aged 2-5 years old in five villages under Karawang International Industrial City (KIIC) Corporate Social Responsibility (CSR) Program

Nirmala IR¹, Februhartanty J¹, Wiradnyani LA¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2010.

¹SEAMEO-TROPED RCCN Regional Center for Community Nutrition, University of Indonesia

Background: Appropriate feeding practices are fundamental for child's growth and development. Feeding practices pose several challenges because of the unique characteristics of children aged 2-5 years old.

Objective: To investigate factors influencing and hindering feeding practices among mothers of children aged 2-5 years old in five villages under KIIC CSR program.

Methods: A cross sectional study was conducted to 202 randomly selected mothers of children aged 2-5 years old. Data were collected through interview, intake of the children using single 24-hour dietary recall, anthropometric measurement of mothers, and observation on feeding responsiveness. Feeding practices included five indicators: children's dietary diversity score, meals and snacking frequency, cooking method, feeding responsiveness, and feeding during illness and after recovery.

Results: Most of mothers (73.3%) had lack of varied cooking methods, 65.3% had inappropriate feeding responsiveness, and 50.5% had poor feeding practice during illness or after recovery. Energy and nutrient intake were low to meet the Indonesian RDA and 60.4% had poor knowledge on feeding practices. Mother's favorable attitude, good knowledge, and exposure to information increased the likelihood of having good feeding practice. Mothers with health problems, living with extended family and having 3 or more children decreased the odds of having good feeding.

Conclusions: Feeding practices in this area was relatively poor indicated by monotonous cooking methods, inappropriate feeding responsiveness and poor feeding practice during illness/after recovery. Influencing factors for feeding practices were mothers' good knowledge, favorable attitude and exposure to information while health problem, living in extended family, and having 3 or more children as hindering factors.

Keywords: feeding practices, mothers of children aged 2-5 years old, knowledge, attitudes, KIIC.

Nutrition and Diseases



~ Nutrition and Infectious Diseases ~

Randomized trial of probiotics and calcium on diarrhea and respiratory tract infections in Indonesian children

Agustina R^{1,2}, Kok FJ³, van de Rest O², Fahmida U¹, Firmansyah A³, Lukito W¹, Feskens EJ², van den Heuvel EGHM⁴, Albers R⁵, Bovee-Oudenhoven IM^{6,7}. *Pediatrics* 2012,129(5): e1155-64.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Division of Human Nutrition, Wageningen University, Wageningen, Netherlands

³Faculty of Medicine, Division of Pediatric, Gastroenterology, Department of Child Health, University of Indonesia

⁴FrieslandCampina Research, Deventer, Netherlands

⁵Unilever Research and Development, Vlaardingen, Netherlands

⁶Top Institute Food and Nutrition, Wageningen, Netherlands

⁷NIZO food research, Ede, Netherlands

Objective: To investigate the effects of calcium and probiotics on the incidence and duration of acute diarrhea and acute respiratory tract infections (ARTIs) in low-socioeconomic communities of Jakarta, Indonesia.

Methods: We conducted a 6-month, double-blind, placebo-controlled study in 494 healthy children aged 1-6 years who received low-lactose milk with low-calcium content (5.10(8) mg/day, n = 124), regular calcium content (RC; 140 mg/day, n = 126), RC with 5.10(8) colony-forming units per day of *Lactobacillus casei* CRL431 (casei; n = 120), or RC with 5.10(8) colony-forming units per day of *Lactobacillus reuteri* DSM17938 (reuteri; n = 124). Number and duration of diarrhea and ARTIs episodes were primary and secondary outcomes, respectively.

Results: Incidence of World Health Organization-defined diarrhea (≥3 loose/liquid stools in 24 hours) was not significantly different between RC and LC (relative risk [RR]: 0.99 [95% confidence interval (CI): 0.62-1.58]), between casei and RC (RR: 1.21 [95% CI: 0.76-1.92]), or between reuteri and RC (RR: 0.76 [95% CI: 0.46-1.25]) groups. Incidence of all reported diarrhea (≥2 loose/liquid stools in 24 hours) was significantly lower in the reuteri versus RC group (RR: 0.68 [95% CI: 0.46-0.99]). Irrespective of the definition used, reuteri significantly reduced diarrhea incidence in children with lower nutritional status (below-median height-and-weight-for-age z score). None of the interventions affected ARTIs.

Conclusions: RC milk, alone or with L casei, did not reduce diarrhea or ARTIs in Indonesian children. L reuteri may prevent diarrhea, especially in children with lower nutritional status.

Keywords: acute diarrhea, calcium, children, developing country, probiotics, Indonesia, *Lactobacillus casei* CRL431, *Lactobacillus reuteri* DSM17938

Acknowledgements: This trial was funded by the Top Institute Food and Nutrition, FrieslandCampina Research, and Unilever Research and Development Doctoral scholarship (R. Agustina) was provided by the International Nutrition Foundation, USA.

Zinc and vitamin A supplementation fails to reduce sputum conversion time in severely malnourished pulmonary tuberculosis patients in Indonesia

Pakasi TA^{1,2}, Karyadi E^{1,8}, Suratih NM³, Salean M⁴, Darmawidjaja N⁵, Bor H⁶, van der Velden K⁷, Dolmans WM⁷, van der Meer JW⁸. *Nutrition Journal* 2010, 9: 41.

¹SEAMEO TROPMED RCCN and formerly joint research with, University of Indonesia, Jakarta, Indonesia;

²Department of Community Medicine, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia;

³Department of General Medicine, WZ Johannes General Hospital, Kupang, Indonesia;

⁴Department of Radiology, WZ Johannes General Hospital, Kupang, Indonesia;

⁵Kefamenanu General Hospital, North Middle Timor District (TTU), Indonesia;

⁶Department of Primary and Community Care, Radboud University Nijmegen Medical Center, Nijmegen International Center for Health Systems Research and Education, Netherlands

⁷Department of Internal Medicine, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

⁸Department of Public Health, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Background: A previous study showed that combination of zinc and vitamin A reduced sputum conversion time in pulmonary tuberculosis (TB) patients.

Objective: We studied the efficacy of which single micronutrient contributed more to the sputum conversion time.

Methods: In a double-blind randomized community trial, newly sputum smear positive pulmonary TB patients were assigned randomly to receive zinc, vitamin A, zinc + vitamin A or placebo on top of TB treatment. Patients were asked to deliver their sputum on weekly basis to measure positivity of the bacteria. Nutritional status, chest x-ray, hemoglobin, C-reactive protein (CRP), retinol and zinc level were examined prior to, after 2 and 6 months of treatment.

Results: Initially, 300 patients were enrolled, and 255 finished the treatment. Most patients were severely malnourished (mean BMI 16.5 ± 2.2 Kg/m²). Patients in the zinc + vitamin A group showed earlier sputum conversion time (mean 1.9 weeks) compared with that in the other groups; however the difference was not significant. Also, no benefit could be demonstrated of any of the used supplementations on clinical, nutritional, chest x-ray, or laboratory findings.

Conclusions: This study among severely malnourished TB patients, did not confirm that single or combined supplementation of zinc and vitamin A significantly reduced sputum conversion time or had other significant benefit.

Acknowledgements: This study was carried out with financial support from the Canadian International Development Agency (CIDA) through World Vision International, Indonesia: Food Integrated to Hinder Tuberculosis Project (the WVI—FIGHT Project) in East Nusa Tenggara

Vitamin A deficiency and other factors associated with severe tuberculosis in Timor and Rote Islands, East Nusa Tenggara Province, Indonesia.

Pakasi TA^{1,2}, Karyadi E^{1,7}, Wibowo Y¹, Simanjuntak Y¹, Suratih NM³, Salean M⁴, Darmawidjaja N⁵, van der Meer JW⁶, van der Velden K⁷, Dolmans WM⁶. *European Journal of Clinical Nutrition* 2009, 63(9): 1130-5.

¹SEAMEO TROPMED RCCN and formerly joint research with, University of Indonesia, Jakarta, Indonesia;

²Department of Community Medicine, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia;

³Department of General Medicine, WZ Johannes General Hospital, Kupang, Indonesia;

⁴Department of Radiology, WZ Johannes General Hospital, Kupang, Indonesia;

⁵Kefamenanu General Hospital, North Middle Timor District (TTU), Indonesia;

⁶Department of Internal Medicine, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

⁷Department of Public Health, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Background: Plasma zinc and vitamin A concentrations have been reported to be low in tuberculosis (TB) patients in some studies, although it is not clear whether this constitutes a risk for a more severe clinical presentation among TB patients. The acute phase reaction may also deplete zinc and vitamin A in the plasma. Therefore, we further studied these associations.

Methods: We carried out a cross-sectional study among newly diagnosed sputum smear-positive TB patients in East Nusa Tenggara. The patients were categorized as either mild TB when Karnofsky Score (KS) > or =80 or severe TB (KS <80). Body mass index (BMI), mid upper arm circumference (MUAC), chest radiograph, and the results of hemoglobin, erythrocyte sedimentation rate, albumin, C-reactive protein (CRP), zinc and vitamin A in plasma were correlated with TB category.

Results: A total of 300 TB patients participated in the study (63% male and 37% female), and were categorized as mild TB (53%) or severe TB (47%). Vitamin A, hemoglobin and plasma albumin were significantly lower, and CRP was significantly higher, in severe TB than in mild TB, and the active lesion area on the chest radiograph was greater among severe TB patients. In a multiple regression analysis, after adjustment for CRP, low vitamin A (beta=3.2, 95%CI (confidence interval) 1.6-4.9, P=0.000) but not zinc, correlated with the severity of TB. MUAC was better than BMI as a predictor of TB severity (beta=1.3, 95%CI 0.6-6.2, P=0.000).

Conclusions: Severe TB was associated with vitamin A deficiency. MUAC can be applied as a measure of TB severity.

Keywords: vitamin A; zinc; CRP; MUAC; severity; tuberculosis

Acknowledgements: This study was carried out with financial support from the Canadian International Development Agency (CIDA) through World Vision International, Indonesia: Food Integrated to Hinder Tuberculosis Project (the WVI—FIGHT Project) in East Nusa Tenggara

Malnutrition and socio-demographic factors associated with pulmonary tuberculosis in Timor and Rote Islands, Indonesia

Pakasi TA^{1,2}, Karyadi E^{1,4}, Dolmans WM³, van der Meer JW³, van der Velden K⁴. *The International Journal of Tuberculosis and Lung Disease* 2009,13(6): 755-9.

¹SEAMEO TROPMED RCCN and formerly joint research with, University of Indonesia, Jakarta, Indonesia;

²Department of Community Medicine, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia;

³Department of Internal Medicine, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

⁴Department of Public Health, Radboud University Nijmegen Medical Centre, Nijmegen, The Netherlands

Objective: To identify nutritional and socio-demographic factors for the development of tuberculosis (TB) in Timor and Rote Island, Indonesia, so that intervention programmes can be developed to address these factors.

Methods: In a case-control study, we enrolled new sputum smear-positive pulmonary TB patients as cases, and neighbours matched for sex and age as controls. Data obtained included history of TB, socio-demographic factors and nutritional status.

Results: In the study, 121 TB patients and 371 controls participated. The mean age was 30 years: 56.3% were male and 43.7% female. Of the TB patients, 87% had malnutrition compared to 33% among controls. The mean body mass index (BMI) of the patients was significantly lower than that of the controls (16.1 +/- 2.3 kg/m²) vs. 19.4 +/- 3.0 kg/m²). Factors associated with the development of TB were BMI (OR 0.5, 95%CI 0.4-0.6), family history of TB (OR 3.2, 95%CI 1.6-6.4), living in an extended family (OR 2.7, 95%CI 1.5-4.8), being non-indigenous to Timor and Rote Islands (OR 2.9, 95%CI 1.2-6.8) and being unemployed (OR 3.8, 95%CI 1.7-8.6).

Conclusion: Among patients with active pulmonary TB, the prevalence of malnutrition was very high. Malnutrition, which is a general problem for the whole community and particularly among people not indigenous to Timor and Rote, should be addressed in the fight against TB.

Keywords: malnutrition, socio-demographic factors, tuberculosis

Acknowledgements: This study was carried out with financial support from the Canadian International Development Agency (CIDA) through World Vision International, Indonesia: Food Integrated to Hinder Tuberculosis Project (the WVI—FIGHT Project) in East Nusa Tenggara

Effects of daily multi-micronutrient supplementation on nutritional and health status in elderly

Kusumaratna RK^{1,2}, Isbagio H³, Utomo B⁴, Lukito W¹. Dissertation, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2009.

¹SEAMEO-TROPMED RCCN, University of Indonesia

²Public Health Department, Faculty of Medicine, Trisakti University

³Department of Internal Medicine

⁴Faculty of Public Health, University of Indonesia

Background: Life expectancy improvement also means greater numbers of older people facing infectious and chronic health problems. Nutrient deficiency and immune dysfunction in the elderly result in high prevalence of acute infections, especially upper respiratory infection.

Objective: The study aimed to determine the effect of multi-micronutrient supplementation on nutritional and health status, including upper respiratory infections among healthy free-living elderly.

Methods: The study design was a community-based double-blind controlled trial involving 296 free-living elderly, aged >60, in Mampang Prapatan, South Jakarta. Participants were randomly allocated to receive 40mg elemental zinc, 120mg ascorbic acid, 6mg α -carotene, 15mg α -tocopherol and 400 μ g folic acid (intervention group) or 400mg calcium carbonate (placebo group). Both supplements were taken daily for six months. Nutritional and health status were measured before and after supplementation. Poisson regression analysis was used to evaluate the effects of daily-multi-micronutrient supplementation on the incidence and prevalence of the infection.

Results: Daily multi-micronutrient supplementation for six months among healthy free-living elderly enhanced nutrient intakes, comprising total energy and carbohydrate intake, and concentration of α -carotene, vitamin A and total protein, but not significantly. Daily multi-micronutrient supplementation reduced the incident rate ratio of subjects with upper respiratory infection (IRR=0.2405; 95% CI: 0.0037-0.4773) and cough symptom (IRR=0.2405; 95% CI: 0.09-0.77). In subjects with low hemoglobin in the intervention group, the T-lymphocyte numbers were significantly increased.

Conclusions: Multi-micronutrient supplementation was proven to reduce the incidence of upper respiratory infections. However, reduction of incidence rate ratio in this study is not sufficient to justify multi-micronutrient supplementation in primary health care settings in Indonesia.

Keywords: upper respiratory infection, elderly, free-living, multi-micronutrients, South Jakarta

Exploration of caregivers' decision making on dietary management of children aged 6-23 months with diarrhea in urban slum, North Jakarta

Dibyareswati AD¹, Wibowo L¹, Santika O¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Most of diarrhea control programs only emphasized hydration therapy and neglected the diet. Practice of reducing food intake during diarrhea in children by the caregiver still remains. This will decline the opportunity of infant and young child to obtain sufficient, both quantity and quality food during and after diarrhea and has great consequences on child's growth and development.

Objective: To get more clear information about caregiver's practice on child's dietary management during diarrhea.

Methods: A qualitative longitudinal study was conducted in Ancol village, an urban slum area in North Jakarta, among children aged 6-23 months with diarrheal cases, followed up from an ill-health condition to recovery and then during healthy stages. The respondents were 7 children with the diarrhea disease and 7 children during recovery period. The data were collected using observation, in-depth interview, and 24-h recall dietary assessment.

Results: Caregivers implemented Diarrhea Management of Child Illness (DMCI) practices without adequate knowledge, based on belief or previous experience. Exposure to information came from neighbors, family and health workers. Most caregivers reduced their child's meal portion during diarrhea in response to child's poor appetite. They also thought breastmilk alone was adequate for the child during diarrhea.

Conclusions: Loss of appetite of children who suffered diarrhea, caregiver's knowledge, experience and exposure to information influenced inappropriate DMCI practices. Caregivers need to increase their awareness of infant's appetite, actively maintain their child's hydration and give sufficient feeding during diarrhea.

Keywords: child diarrhea, infant feeding, urban slum, Indonesia

Acknowledgements: This study was a part of preliminary phase of cohort study of SPHERES Project in an urban slum area of Jakarta; a collaboration of SEAMEO RECFON and Harvard University School of Public Health

Study on nutritional status and infectious diseases among children aged 12-59 months old who received full doses compared to those who received half dose/no vitamin A capsules in urban poor area of Jakarta

Putriani SD¹, Muslimatun S¹, Khusun H¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2012.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Many studies showed various results on the effect of vitamin A supplementation on nutritional status and infectious diseases. There were inconsistent results of the effect of vitamin A supplementation on reducing infectious diseases and improving growth of children.

Objective. To compare nutritional status and infectious diseases among children aged 12-59 months who received full doses and half/no dose of vitamin A capsules in urban poor area of Jakarta.

Methods. Comparative cross sectional study was conducted in urban poor area Paseban, Senen sub-district, Jakarta. Subjects were children aged 12-59 months recruited through simple random and purposive sampling; 224 children received full doses and 205 children received half/no dose. A single 24-h vitamin A semiquantitative (VASQ) recall was used for assessing vitamin A intake. Vitamin A status was determined from serum retinol concentration using HPLC method. Anthropometric measurements included body weight and length/height. Infectious diseases included diarrhea, acute respiratory infection, and measles.

Results: The mean serum retinol concentration was $0.95 \pm 0.24 \mu\text{mol}^{-1}$ for children in the full dose group and $0.95 \pm 0.27 \mu\text{mol}^{-1}$ for those in the half/no dose group. Nutritional status of children who received full dose and half/no dose were not significantly different ($p > 0.05$). No differences were found in serum retinol concentration in both groups ($p > 0.05$). Prevalence of infectious diseases (diarrhea, ARI, measles) was not significantly different between both groups ($p > 0.05$). Caregivers from full dose group were significantly more exposed to information about vitamin A supplementation from health providers compare with half/no dose group ($p < 0.05$).

Conclusions: There were no overall differences in nutritional status among children who received full doses and those who received half/no dose of vitamin A capsules nor on prevalence of infectious diseases.

Keywords: nutritional status, infectious diseases, health providers, knowledge, utilization of health services.

Exploration of Myanmar rural caregivers' concepts on childhood diarrhea disease (3-23 months) and its case management related to oral rehydration solution (ORS) use and feeding

Zaw KM¹, Wibowo L¹, Kielmann AA. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2011.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Diarrheal disease (DD) still remains a leading cause of childhood deaths eventhough Oral Rehydration Therapy (ORT) had been shown to be a life-saving treatment. Part of the problem is associated with inadequate management of DD derives from locally prevailing perception. Influence of local beliefs on the conceptualization of disease's causation, socio-economic background, subsequently affects health seeking behavior.

Objective: To explore Myanmar rural caregivers' concepts and case management in childhood (aged 3-23 months) diarrhea disease.

Methods: A qualitative cross sectional study was conducted in purposively selected 6 rural villages of Ah-Lan-Kone village, to 13 caregivers of children aged 3-23 months. Data were collected by in-depth interviews, informal conversations and observations. Two-day 24-h dietary recall was done to see dietary intake pattern of the child. Secondary caregiver and health personnel were interviewed to complement the information. All data were transcribed in verbatim. Dietary intake data was analyzed with Nutrisurvey (2004) using food composition table from East Asia, Thailand, ASEAN and India.

Results: The community has lack of knowledge about DD and lack of appreciation of its morbidity and mortality risk factors. Their conceptualization and internalization were affected by specific socio-cultural environment and had different biomedical concept which led them to receive or seek improper treatment for childhood diarrhea. There was discrepancy of conceptualization among community and health care providers. Improper health care was practiced by the health care providers.

Conclusions: Some of diarrhea-related concepts in the community were potentially harmful and inappropriate. Lower level of health care providers were inadequately prepared and supervised by higher level staffs to take on challenge of managing DD.

Keywords: diarrhea, concept, discrepancy, case management, childhood diarrhea

Acknowledgement: This research was supported by the DAAD (Germany) as a part of the scholarship of MSc. degree.

~ Nutrition and Non-Communicable Diseases ~

The empowerment model toward type 2 diabetes mellitus adults to enhance vegetable in achieving glyceimic control

Yen TS¹, Basuki ESM², Setiabudy R², Lukito W¹. Dissertation, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2014.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

²Faculty of Medicine, Universitas Indonesia

Background: Dietary pattern high in fiber and green leafy vegetable shown to have inverse association with lower risks of type-2 diabetes mellitus is also considered as a lifestyle that requires behavior modifications to lead to the changes. The Empowerment Model for health provider consisting of coaching skill based on Porter and Lawler motivational method, Kotter's leadership model, and creative kitchen were developed to achieve better glyceimic control.

Objective: This study aimed to investigate effectiveness of the Empowerment Model in enhancing vegetable intake in type-2 diabetes mellitus adults.

Methods: Pre-test using mix method study design was conducted. Qualitative study was embedded within quantitative study which was a randomized controlled trial. Subjects were employees of PT Telkom Indonesia or their family members. As many as 84 subjects following clustered random sampling were divided into intervention (42 subjects) and control groups (42 subjects). Intervention group received the Empowerment Model and control group applied conventional counseling, both were done in weekly meeting with trained health providers for 12 weeks.

Results: There was a significant difference in change of vegetable intake of the intervention group compared to the control group ($p < 0.001$). HbA1c decreased significantly in the intervention group compared to the control group ($p = 0.009$). The significant differences also shown in the intervention group with decreasing of fasting blood glucose ($p = 0.034$), postprandial blood glucose ($p = 0.006$), and decreased waist circumference ($p = 0.044$). Henceforth, health provider's positive attitudes defined subject's attitudes in creating adherence during coaching sessions.

Conclusions: The Empowerment Model has successfully been developed and significantly enhance vegetable intake and improve glyceimic control in type-2 diabetes mellitus adults.

Keywords: type 2 diabetes mellitus, the empowerment model, vegetable intake, HbA1c

Food consumption of obese and normal women of reproductive age in an urban slum area in Central Jakarta

Yulia¹, Khusun H¹, Fahmida U¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

Background: Obesity is also found in low socioeconomic status (SES) in developing countries including Indonesia. In women of reproductive age (WRA), risks of obesity are higher since implication affects both mother and baby. People in low SES have limited resources to access treatment for non communicable disease (NCD). Many factors are related to food intake and an increased risk of obesity.

Objective: To compare food consumption among obese and normal WRA (19-49 years) in urban slum areas in Central Jakarta.

Methods: A cross sectional study comparing food consumption among 103 obese and 104 normal WRA (19-49 years) in three urban slum areas in Central Jakarta was done. Single 24-hour recall was used to study energy intake, macronutrient intake (carbohydrate, protein and fat) and energy density. Qualitative food frequency questionnaire (FFQ) was used to study dietary patterns which were defined by Principal Component Analysis (PCA).

Results: Obese women have significantly higher intake in energy (2016.4±563.6 vs 1793.6±451.2 g), carbohydrate (263.9±77.0 vs 237.6±63.0 g) and fat (83.1±31.3 vs 70.2±26.1 g) compared to their normal counterpart, while protein intake (59.4±19.1 vs 55.9±18.5 g) and energy density (2.13±0.55 vs 2.05±0.45 Kcal/g) were not significantly different. Two dietary patterns were found, subjectively named: “more healthy” and “less healthy” pattern. “Less healthy” pattern was characterized by consumption of fried foods (snacks, soybean, roots and tubers) and meat/poultry, while “more healthy” pattern by fish and seafood, vegetables, eggs, milk/milk products and non-fried snacks.

Conclusions: Food consumption among obese and normal WRA in this study was different in terms of energy, carbohydrate and fat. “More healthy” pattern more likely characterized diet of normal WRA while “less healthy” pattern characterized the diet of obese WRA.

Keywords: dietary patterns, energy density, food consumption, intake, obesity

Acknowledgements: The study was funded by Ministry of Education, Government of Indonesia

A comparison of serum vitamin D concentration between women with normal and preeclamptic pregnancy

Dillon D ^{1,2}, Sofiyana H ² Research Report, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Department of Nutrition, Faculty of Medicine, Universitas Indonesia

Objective: Preeclampsia is a characterized by high blood pressure and proteinuria during pregnancy. Micronutrient deficiency during pregnancy is postulated to be one factor contributing to the occurrence of preeclampsia. Vitamin D deficiency may cause endothelial dysfunction resulting in increase blood pressure. This study aimed to investigate serum vitamin D concentration of women with normal and preeclamptic pregnancy.

Subjects and Methods: A comparative cross-sectional study aiming at comparing serum vitamin D concentration between women with normal and preeclamptic pregnancy was conducted in Tarakan hospital, Jakarta. The study involved 33 women with normal pregnancy and 33 women with preeclampsia, who visited the hospital consecutively. Assessments of age, parity, gestational age, MUAC were performed. Vitamin D intake was estimated using semi-quantitative FFQ method. Serum 25(OH) concentration was analyzed using ELISA method.

Results: No differences of mean age, parity nor gestational age were observed between normal and preeclamptic pregnancy. More (64%) women with history of multiparity suffered from preeclampsia as compared to those with normal pregnancy (36%). All subjects did not consume vitamin D supplements during the previous month. MUAC, vitamin D intakes and serum vitamin D concentration did not differ between the two groups. More (50%) proportion of women with preeclampsia vitamin D deficiency as compared to 33% of women with normal pregnancy.

Conclusion: There was no difference of serum vitamin D concentration between women with normal and preeclamptic pregnancy. A cohort study to investigate the influence of vitamin D status is proposed.

Keywords: preeclampsia, vitamin D, Indonesia.

Acknowledgements: Government of Indonesia for funding.

A comparison of serum magnesium concentration between women with normal and preeclamptic pregnancy

Dillon D^{1,2}, Pandjaitan BA² Research Report, 2013.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Department of Nutrition, Faculty of Medicine, Universitas Indonesia

Objective: Preeclampsia contributes to intrauterine growth retardation, prematurity and intra uterine fetal death. Magnesium deficiency is postulated as the cause of preeclampsia. High blood pressure as the paramount sign of preeclampsia is the result of failure to regulate vascular tonus. Magnesium has a role in regulating vascular tonus, therefore, is used as therapy to reduce high blood pressure in patients with preeclampsia and eclampsia. This study aimed to explore serum magnesium concentration of women with normal and preeclamptic pregnancy.

Subjects and Methods: A cross-sectional study aimed to compare serum magnesium concentration between women with normal and preeclamptic pregnancy was conducted in Tarakan hospital, Jakarta. The study involved 23 normal pregnancy and 23 preeclamptic pregnancy, who visited the hospital consecutively. Assessments of age, parity, gestational age, MUAC were performed. Magnesium intake was estimated using semi-quantitative FFQ method. Serum magnesium concentration was analyzed using colorimetry method.

Results: Women with normal and preeclamptic pregnancy did not differ in mean age, parity, gestational age and MUAC. More proportion of mild preeclampsia was observed among the women with preeclampsia. There was a tendency that more women with preeclampsia were with >35 years of age as compared to women with normal pregnancy. Women with normal pregnancy consumed more magnesium food source as compared to women with preeclampsia. All subjects had normal serum magnesium concentration, and serum magnesium concentration did not differ between the two groups. There was a tendency of negative correlation between systolic blood pressure and magnesium intake among preeclampsia. While a significant correlation was observed between magnesium intake and serum magnesium concentration ($p=0.04$; $r = -0.43$)

Conclusion: Serum magnesium concentration did not differ between women with normal and preeclamptic pregnancy. Further study using intracellular magnesium concentration as biomarker is considered.

Keywords: preeclampsia, magnesium, Indonesia.

Acknowledgements: Government of Indonesia for funding.

Relationship between intakes of different fatty acids and hyperinsulinemia in abdominal obese men in Jakarta

Syauki AY^{1,2}, Fahmida U¹, Lukito W¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2009.

¹SEAMEO-TROPMED RCCN, Universitas Indonesia

²Nutrition Department, Faculty of Medicine, Hasanuddin University

Background: The cause of insulin resistance remains unclear, but it is believed that overweight, physically inactive and intake of excessive amount of fat are determinants of insulin resistance. Waist circumference is considered as good predictor of insulin sensitivity. However, data on relationship between intake of fatty acids and insulin resistance in Indonesia are very limited.

Objective: To determine association between intake of different fatty acids and insulin level in abdominal obese adult men in Jakarta.

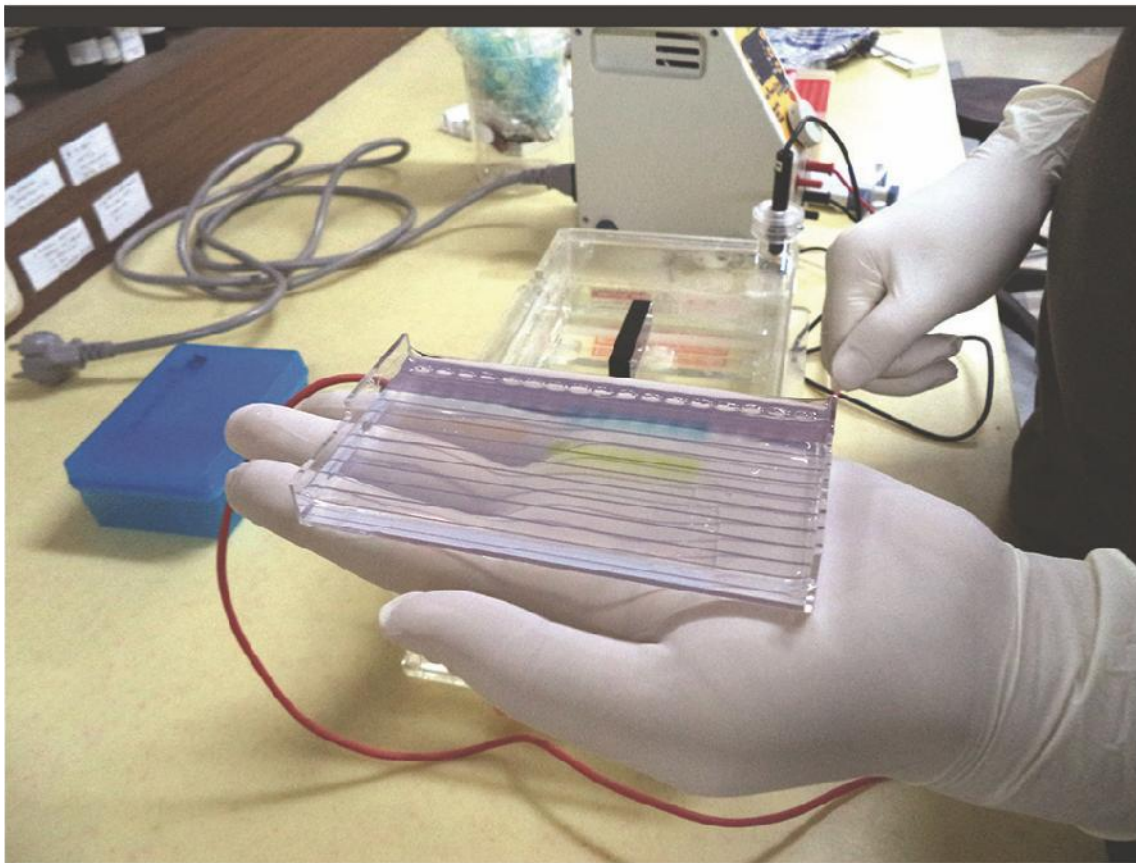
Methods: A cross-sectional study was conducted in East and Central Jakarta, to 126 men aged 30-50 with abdominal obesity, who passed screening procedure through clinical and blood assessment. Dietary fatty acids were obtained through validated fat semiquantitative FFQ. Anthropometric assessments were done to obtain body weight, height, and waist circumference. Biochemical assessments were undertaken to obtain fasting plasma insulin, glucose, free fatty acid (FFA), and lipid profile. Global Physical Activity Questionnaire and STEPS questionnaire were used to obtain data on physical activity, smoking habit, alcohol use, fruit and vegetable consumption.

Results: Intake of total fat, SFA, MUFA and PUFA (% of total calories) were found higher than that of PERKENI/NCEP/AHA/ADA recommendations (41.23% , 21.51% and 9.32%), except PUFA intake based on PERKENI (6.87%). Intake of omega-3 and omega-6 PUFA did not meet requirement suggested by IOM. Hypercholesterolemia and hypertriglyceridemia were found among subjects. Mean fasting plasma insulin was found within desirable range (7.63 u/L).

Conclusions: There is no correlation between intakes of different fatty acids and insulin levels in abdominal obese adult men, but FFA plasma were positively correlated with PUFA intake (% of total calories) ($r_p=0.190$, $p<0.05$) and fasting plasma glucose ($r_p=0.193$, $p<0.05$).

Keywords: fatty acids intake, insulin, abdominal obese

Nutrigenomics / Nutrigenetics



~ Nutrigenomics/Nutrigenetics and Child Cognition ~

LCPUFA intake, its plasma concentration and the moderation effect of FADS gene polymorphism among 12-16 months old children in East Lombok, Indonesia

Yudisti MA¹, Fahmida U¹, Suryandari DA. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2014.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), Universitas Indonesia

²Faculty of Medicine, Universitas Indonesia

Background: Long Chain Polyunsaturated Fatty Acids (LCPUFAs) are known as key nutrient for brain development and cognitive function which is intermediated by plasma level. Plasma level in blood is mentioned as a good biomarker of related dietary fatty acids intake. However, role of individual factors particularly gene polymorphism also plays role on their relationship.

Objective: To assess LCPUFAs intake, its plasma level, and the moderation effect of Single Nucleotide Polymorphism (SNP) in fatty acid desaturase (FADS) gene on their relationship.

Methods: A cross sectional study was conducted among 115 children aged 12-16 month living in Suralaga sub-district, West Nusa Tenggara Province. Their usual intakes of LC PUFAs were assessed using semiquantitative FFQ. SNP genotyping analysis was done by Taqman Assay method and genotyped for rs174468 (G>A). Plasma LCPUFAs were measured by gas chromatography. Multiple regression model was used to test association between PUFA intake and plasma concentration.

Results: Usual intake of LCPUFAs were lower than recommendation (EPA=22%, DHA=25%, N-6-LC PUFA=58%, and N-3-LC PUFA=37%). Association between LCPUFAs intake and plasma concentration were weak and not significant, but it tended to be positively correlated. Despite comparable intake of LC PUFAs, children who have allele A had much higher plasma level ($p<0.05$ for total LC PUFAs and N6-LC PUFA). Allele A on this SNP might be related to a good response for dietary intake or efficient metabolism of LCPUFAs.

Conclusions: AG children tend to have much higher plasma concentration than GG children. Allele A on this SNP might be related to a good response for dietary intake or efficient metabolism of LC PUFAs.

Keywords: children, polyunsaturated fatty acids, intake, plasma, polymorphism.

Acknowledgements: This study was a baseline part of NUPICO (Can Nutrigenomics/Nutrigenetics Help Explain the Mixed Results on Effect of LCPUFAs and Iron on Child Cognition) project which was conducted in Suralaga sub-district, East Lombok District, West Nusa Tenggara Province.

Genetic variants of FADS gene cluster, plasma LC-PUFA levels and the association with cognitive function of under-two-year-old *Sasaknese* Indonesian children*

Umi Fahmida *et al.* Research Report, 2012

Background/Aims: Long-chain polyunsaturated fatty acids (LC-PUFA) is essential for child cognition. Genetic variation in fatty acid (FA)desaturase enzyme (FADS) has been recognized as an important effect modifier in the relation between LC-PUFA and child cognitive function. This study aimed to identify the distribution of genetic variant (genotype) SNP rs174468 and to assess plasma FA and developmental outcome by the genotype among under-2 year old *Sasaknese* Indonesian children.

Methods: Data was collected at baseline of a randomized trial (NUPICO, clinicaltrials.gov NCT01504633) in East Lombok district, Indonesia. Breastfed, 12-17 month old children were recruited and 206 subjects were included in the study. Child cognition was assessed as Bayley Mental Developmental Index (MDI).

Results: Only two genotypes were found (90.3% GG homozygotes GG, 9.7% AG heterozygotes) and minor allele A was significantly associated with higher level of arachidonic acid (20:4 n-6), n-6 LC-PUFA and FADS1 index. MDI score was associated with a FADS2 index (DHA:EPA ratio) but not genotype.

Conclusions: FADS2 index was associated with cognitive function. No difference was found between children with GG and AG genotypes who were all breastfed and not low birth weight despite difference in FADS1 index, AA and n-6 LC-PUFA.

Keywords: cognitive function, FADS, Indonesia, LC-PUFA, under-two-year-old children

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~ Nutrigenomics/Nutrigenetics and Diseases ~

Vitamin D status and polymorphism in tuberculosis patients.

Dillon D^{1,2}, Anastasia M², Sutoyo DK³. Research Report, 2010.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Department of Nutrition, Faculty of Medicine, University of Indonesia

³Department of Pulmonology, Faculty of Medicine, University of Indonesia

Objective: Micronutrient deficiency commonly exists among tuberculosis patients. Vitamin D plays a role in the immunological process of tuberculosis, and needs the involvement of vitamin D receptor. Polymorphism of VDR gene *Fok I* results in less VDR formation, and may influence the role of vitamin D in activating macrophage to fight against TB bacil. This study aimed at investigating vitamin D status and VDR *Fok I* genotype of Indonesian pulmonary TB patients.

Subjects and Methods: This cross sectional study involving 70 TB patients and 64 voluntarily healthy subjects with normal liver and renal function was conducted in a lung outpatient clinic in Persahabatan hospital Jakarta. Vitamin D intake was determined using semi-quantitative FFQ method, and serum 25 OH vitamin D concentration was determined using ELISA method, while VDR gene by PCR-RFLP method.

Results: Prevalence of TB patients with BMI<18.5 was 66%, while 71% of TB patients was vitamin D deficient. When comparing with 64 healthy volunteers matched with age and sex, the prevalence of BMI<18.5 was 10.9% and none of them was vitamin D deficient. More polymorphism of gene VDR *Fok I* ($p<0.01$) was observed among normal subjects compared to TB patients. The risk of TB patients was 21.9 ($p<0.0001$; 95%CI: 4.7 to 101.9) to suffer from vitamin D insufficiency, 25.1 ($p<0.0001$; 95%CI: 5.7 to 110.8) to suffer from vitamin D deficiency, and 0.58 ($p<0.039$; 95%CI: 0.34 to 0.97) to have an inadequate vitamin D intake compared to normal subjects.

Conclusion: Vitamin D deficiency is a serious problem amongst TB patients in Indonesia. Further study on polymorphism on the ability of tuberculosis patients to fight against tuberculosis bacil is considered.

Keywords: vitamin D, polymorphism, tuberculosis, Indonesia

Acknowledgements: Government of Indonesia for funding.

~ Probiotics/ Prebiotics ~

Novel probiotic *Enterococcus faecium* IS-27526 supplementation increased total salivary sIgA level and bodyweight of pre-school children: a pilot study

Surono IS^{1,2}, Koestomo FP³, Novitasari N³, Zakaria FR³, Yulianasari⁴, Koesnandar². *Anaerobe* 2011 Dec; 17(6):496-500.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Agency for the Assessment and Application of Technology-Center for Bioindustrial Technology, Puspiptek Raya, Serpong, Tangerang, Indonesia

³Department of Food Technology and Human Nutrition, Bogor Agricultural University, Darmaga Campus, Bogor, Indonesia

⁴Teluk Naga Public Health Center, Tangerang, Banten Province, Indonesia

Enterococcus faecium IS-27526 is a novel probiotic isolated from dadih, an Indonesian traditional fermented buffalo milk. A 90 days randomized double-blind placebo-controlled study of pre-post trial was conducted in pre-school children with two groups, placebo and probiotic group. Ultra High Temperature low fat milk was used as a carrier in each group.

The aims of this study were to investigate the effect of *E. faecium* IS-27526 in milk on humoral immune response and on bodyweight of pre-school children. Total serum IgA and total salivary sIgA were measured by sandwich ELISA. The bodyweight of young children was measured.

The results showed that total serum IgA did not significantly increase in the probiotic group compared with the placebo group. Total salivary sIgA level and the bodyweight significantly increased ($p < 0.05$) in probiotic groups compared to the placebo. Changes of total salivary sIgA level were significantly higher in underweight children supplemented with probiotic. Weight gain was observed significantly in children with normal bodyweight supplemented with probiotic. Neither mortality nor weight loss was recorded throughout the study.

Taken together, novel probiotic *E. faecium* IS-27526 has significant positive effects on humoral immune response, salivary sIgA, in underweight pre-school children, and on weight gain of pre-school children.

Keywords: Dadih, novel probiotic, salivary sIgA; *Enterococcus faecium* IS-27526, weight gain; pre-school children

Effect of Oxygenated Water and Probiotic Administration on Fecal Microbiota of Rats

Surono IS^{1,2}, Khomsan A², Sobariah E², Nurani D³. *Microbiology Indonesia* 2010, 4(1): 17-21.

¹SEAMEO-TROPMED RCCN, Universitas Indonesia

²Department of Community Nutrition, Faculty of Human Ecology, Institut Pertanian Bogor

³Institut Teknologi Indonesia, Serpong, Tangerang

Oxygenated water is water with increased concentration of physically dissolved oxygen, and can perform all the same functions as the oxygen absorbed through the lungs. Several structures of human organs participate in the absorption and transportation of the oxygen, including the villi and cells containing mitochondrion in the small intestine as well as the lymph system.

The aim of this in vivo study were three folds, to validate the support of oxygenated water on viability of probiotic bacteria in the GUT, to suppress the fecal coliform, and to study the effect of oxygen concentration on the profile of fecal microbiota. There were one control group and three probiotic groups of 5 rats each based on strain of probiotic supplementation, control without probiotic (a₀), *Lactobacillus casei* commercial strain (a₁), *Lactobacillus* sp. IS-7257 (a₂) and *Lactobacillus* sp. IS-27560 (a₃). Each group was treated with three variable treatments, without oxygenated water supplementation (b₀), supplemented with oxygenated water at 50 ppm (b₁), and at 80 ppm (b₂). Fecal samples were collected before (c₀), after 3 days (c₁), 7 days (c₂) supplementation, followed by 3 days after returning back to normal diet (c₃), analysed by culture dependent analyses for viable fecal lactic, coliform and fecal anaerobic bacteria.

Supplementation of oxygenated water at 50 ppm, significantly increase fecal lactic acid bacteria of all probiotic groups after 3 and 7 days ($P < 0.05$); 80 ppm oxygenated water tends to lower the fecal coliform ($P < 0.1$), while oxygenated water administration gives no effect on fecal anaerobic bacteria. As a conclusion, 50 ppm oxygenated water administration significantly increased viable fecal lactic acid bacteria in probiotic groups. On the other hand, 80 ppm oxygenated water administration tends to lower the fecal coliform bacteria. No effect of administration probiotic and/or oxygenated water on viability of fecal anaerobic bacteria.

Keywords: oxygenated water, probiotic, in vivo, viable fecal microbiota, dadih

Acknowledgements: This study was supported by PT Tirta Alam Semesta

Effect of supplementation probiotic *L. plantarum* on cellular immune responses of children under two years

Surono IS¹. *Research report*. 2010

¹SEAMEO-TROPMED RCCN, University of Indonesia

Background: *Lactobacillus plantarum* IS-10506, Indonesian isolates from curd has been proven have potential to stimulate the immune response, antimutagenic, antimicrobial; therefore has potential as a probiotic. Based on results of previous research and scientific evidence, it is necessary to study the function of probiotic *L.plantarum* IS-10506 in Indonesian children aged 1-2 years for its role in enhancing cellular immune response.

Objective: To analyzed the effect of supplementation probiotic *L.plantarum* IS-10506 on cellular immune responses of TGF- γ 1 dan TNF- α of children under-two years.

Methods: A cross sectional study was conducted to 20 under-two years old children in Larangan, Cileduk Tangerang who were measured for cellular immune response (TGF- γ 1 and TNF- α). The study was designed as randomized double blind placebo controlled pre-post trial with four treatments: microencapsulation probiotic supplementation of 700 mg (10^8 cfu/ml) and 22 mg of zinc-sulfate and microencapsulation placebo probiotic supplementation of 700 mg and 22 mg maltodextrin. Data were collected from structure-interview, anthropometric measurement, blood and stool analysis (base line and endline), dietary intake with 24-h food recall and food record.

Results: Percentage of weight gain was higher in probiotic group compared to placebo group (5-13% vs 3-10%). Increase in TGF- γ 1 values in probiotic group (67%) had better tendency compared with placebo group (27%). Reduction in TNF- α values in probiotic group (66%) was comparable with the placebo group (54%). There were no significant correlation found between TGF- γ 1 vs TNF- α in placebo and probiotics group ($\rho=0.164, p =0.631$ and $\rho=0.483, p=0.187$).

Conclusions: There was improvement in weight gain, food intake and defecation patterns of subjects on treatment with probiotic. Supplementation with probiotic *L.plantarum* IS-10506 showed better result compared with placebo.

Keywords: immune response, *Lactobacillus plantarum* IS-10506, probiotic, supplementation, treatment

Acknowledgement: This research was funded by Government of Indonesia

Effect of zinc supplementation and zinc and probiotic combination *L. plantarum* on cellular immune responses of children under two years old

Surono IS¹. *Research report*. 2010

¹SEAMEO-TROPMED RCCN, University of Indonesia

Background: Probiotics have not been routinely recommended in the treatment of diarrhea despite recent studies proving its benefits against diarrhea. *Lactobacillus plantarum* IS-10506, Indonesian isolates from curd has been proven to have potential as probiotics. It is necessary to study the function of probiotic *L.plantarum* IS-10506 in enhancing cellular immune response so it can be used as a basis for utilization of local probiotics.

Objective: To analyze the effect of zinc supplementation and zinc and probiotic combination *L. plantarum* on cellular immune responses of TGF- α 1 and TNF- α of children under-two years.

Methods: A cross sectional study was conducted to 20 under-two years children in Larangan, Cileduk-Tangerang who were measured for their humoral immune response (fecal sIgA) and cellular immune response (TGF- α 1 and TNF- α). The study was designed as *randomized double blind placebo controlled pre-post trial* with two treatments: supplementation of 22 mg of zinc-sulfate and microencapsulation probiotic supplementation of 700 mg (10^{10} cfu/day) and 22 mg of zinc-sulfate. Data was collected from structure interviews, anthropometric measurement, blood and stool analysis (base line and endline), dietary intake using 24-h food recall and FFQ.

Results: Height and weight of subjects in zinc and zinc-probiotic groups increased (87.5% and 81.8%, respectively). Increase in TGF- α 1 values in probiotic group (67%) had better tendency compared with placebo group (27%). Reduction in TNF- α values in probiotic group (66%) was comparable with percentage of placebo group (54%). No significant correlation between TGF- α 1 vs TNF- α and sIgA vs TNF- α in placebo and probiotics group ($\rho=0.164, p=0.631$ and $\rho=0.483, p=0.187$; $\rho=-0.164, p=0.631$ and $\rho=-0.333, p=0.381$)

Conclusions: There was improvement in weight gain, food intake and defecation patterns of subjects on treatment with zinc or zinc-probiotics. Supplementation with zinc and probiotic *Lactobacillus plantarum* IS-10506 showed better result compared with zinc supplementation only.

Keywords: immune response, *Lactobacillus plantarum* IS-10506, probiotic, supplementation, treatment, zinc, zinc-probiotic

Acknowledgement: This research was funded by Government of Indonesia

Best Practices in Nutritional Assessment



Microcytic anaemia predominates in adolescent school girls in the delta region of Myanmar

Htet MK^{1,2}, Dillon D^{1,3}, Akib A³, Utomo B⁴, Fahmida U¹, Thurnham DI⁵. *Asia Pacific Journal of Clinical Nutrition* 2012, 21(3): 411-5.

¹South East Asian Ministers of Education Organization (SEAMEO), Regional Center for Food and Nutrition (RECFON), University of Indonesia

²Department of Health, Ministry of Health, Myanmar

³Faculty of Medicine, University of Indonesia

⁴Faculty of Public Health, University of Indonesia

⁵Northern Ireland Centre for Food and Health, School of Biomedical Science, University of Ulster, Coleraine, UK

Objective: Anaemia is one of major nutritional problems in Myanmar affecting all age groups. However, there is lack of recent information and a study was conducted to acquire information on the current status of anaemia among adolescent schoolgirls in Nyaung Done township, Ayeyarwady division where an intervention study was planned.

Subjects and Methods: A cross-sectional survey was conducted on 1269 subjects to obtain complete blood count, anthropometry and socioeconomic characteristics were obtained by questionnaire. Using red cell indices, we applied Bessman's, and Green and King's index classification to differentiate the types of anaemia. Electrophoresis was also done on a subsample (n=228).

Results: Stunting was 21.2% and wasting was 10.7% respectively. Prevalence of anaemia was 59.1% and was mainly microcytic. Green and King's index showed 35.8% were iron deficient. Electrophoresis revealed 36 cases of Hb E haemoglobinopathy in the subsample.

Conclusion: Anaemia is still a major nutrition problem in Myanmar. The reasons for this high prevalence should be explored and properly addressed. The study highlights the need for a comprehensive and large scale survey for the anaemia control programme in Myanmar.

Keywords: anaemia, haemoglobinopathy, Myanmar, adolescent, schoolgirls

Acknowledgements: The study was supported by DAAD scholarship and Nestle Foundation.

Nutrition and health baseline survey in ADP-WVI area Merauke District

Wibowo L¹, Santika O¹, Harmiko MP². *Jurnal Gizi dan Pangan* 2012, 7(1): 11-8.

¹South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

²World Vision Indonesia

This survey was conducted to estimate levels of health and nutrition problems as well as the associated factors among under-five children in the Area Development Program (ADP) of World Vision Indonesia and Wahana Visi Indonesia in Merauke district. As many as 30 Posyandus were randomly selected as the cluster units where the information was collected among under-five children and their mothers (n=542). From this survey we estimated the prevalence of underweight, stunted, wasted, and anemic children were 11.7%, 21.0%, 7.5%, and 73.7% respectively. It was assumed that these nutritional problems were associated with several factors such as: family income, mother's literacy, knowledge and practices of mothers on health and nutrition, as well as the existing nutrition and health program implementation.

This survey concluded that the nutrition problems in the study site were categorized as a public health concern. Thus, as the recommendations, two strategies to alleviate the local nutrition and health problems were proposed: direct and indirect. The direct approach is mainly focus on the improvement of implementation existing nutrition and health programs (i.e. GMP, high dose vitamin A program, promotion of proper child feeding, etc.). Prior to that, a health system review must be carried out to identify the presence and functioning of the essential system components. Indirectly, a program need also to be carried out through multisectoral and community participation based on the government's leadership for the sake of alleviating poverty and illiteracy as the major underlying factors of malnutrition.

Keywords: malnutrition, children underfive years, anemia, quality of heath service, Merauke

Validity of Food Photograph Application (FPA) as portion estimation tools of women at reproductive age and infants age 6-11 months, in Senen Sub-District, Central Jakarta

Septriana¹, Fahmida U¹, Kekalih A². Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2013.

¹SEAMEO-RECFON, Universitas Indonesia

²Community Medicine, Medical Faculty, Universitas Indonesia

Background: Three dimensional food models was the most well known and commonly used to improve validity and reliability of dietary assessment result. But it has limited food variation, portion size and tendency to underreporting of intakes. FPA is sets of photographs depicting different amount of foods, developed in software can be run in portable media tablet and netbook and has been built as tools to estimating portion size which improved dietary intake assessment. Nevertheless, its validity as a tool to estimating portion size to improve dietary intake assessment need to be assessed.

Objective: To assess the validity of FPA as tools to estimate portion size among women at reproductive age (WRA) and infants aged 6-11 months compare with weighed food record (WFR) as a golden standard.

Methods: A cross sectional study assessing food intake of 57 WRA, 57 infants aged 6-8 months and 56 infants aged 9-11 months in Kelurahan Kenari, Paseban, and Kramat, Senen sub-district, Jakarta was done using WFR, and then 24-h food record using FPA and three dimension food models.

Result: FPA covered 86.24% of all weighed food items. Portion size estimated using FPA were not significantly different with actual weight using WFR. No significant regression trend between weight difference and mean weight between FPA and WFR, the differences were within $\pm 20\%$ of actual weight. Mean nutrients intake estimated using FPA were not significantly different with WFR.

Conclusion: FPA as a portion size estimation tool can provide better estimation and in addition can be used to assess mean nutrient intake. The use of FPA to estimate portion size is comparable with the actual portion size intake using WFR.

Keywords: Food Photograph Application, women of reproductive age, weighed food record

Acknowledgements: The study was supported by the Grand Research of Nutrition for Maternal and Child, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia.

Sensitivity and specificity of dietary diversity indicator to estimate nutrient intake adequacy of children aged 24-59 months in Bandung City

Marlina L^{1,2}, Muslimatun S¹, Achadi E¹. Master Thesis, Study Program in Nutrition, Faculty of Medicine, Universitas Indonesia, 2011.

¹SEAMEO-RECFON, Universitas Indonesia

²Directorate of Nutrition, Ministry of Health Indonesia

Background: There is a validated Dietary Diversity Score (DDS) for indicating dietary diversity in infant and young children. However, it has not been validated for other age groups. Several studies in developing countries have assessed usefulness of DD as a proxy indicator of nutrient intake adequacy. Study from different geographic and cultural setting will be very useful to enrich the evidence.

Objective: To assess applicability of DD indicator to estimate nutrient intake adequacy of children aged 24-59 months in Bandung City.

Methods: A cross sectional study with randomly selected 300 mothers of children aged 24-59 months from 30 Posyandu from 9 sub-districts in Bandung was done. Data were collected through structure interviews, 2 non-consecutive repeated 24-h food recall within time span of 6-19 days. Spearman and Pearson correlations were used to assess the relationship between DDS and Food Variety Score (FVS) with Nutrient Adequacy Ratio (NAR) and Mean Adequacy Ratio (MAR). Sensitivity and specificity analysis were done to determine the most appropriate cut-off points of DDS to identify children with high probability of inadequate intake.

Results: Pearson correlation between MAR and DDS was 0.354 ($p < 0.001$); Spearman correlation between MAR and FVS was 0.270 ($p < 0.001$). All NAR of nutrients had significant correlation with DDS. MAR increased with increasing FVS and DDS. The best cut-off points for MAR $\geq 70\%$ was 6 for DDS (sensitivity 59.7%, specificity 68.7%) and 9 for FVS (sensitivity 55.2%, specificity 63.9%).

Conclusions: Score 6 for DDS could fulfill 59.7% of sensitivity and 68.7% of specificity to identify MAR $\leq 70\%$. There was a significant correlation between DDS with nutrient intake adequacy of children. DDS was better predictor of nutrient intake adequacy than FVS.

Keywords: children aged 24-59 months, dietary diversity score, nutrient adequacy, urban area.

Acknowledgements: This study was supported by SEAMEO-RECFON UI and Ministry of Health Indonesia

Study of iodine status adequacy on pregnant women in urban Surabaya

Buanasita A¹, Muslimatun S², Andriyanto¹. *Research Report*. 2011

¹Surabaya Nutrition Academic, East Java, Indonesia

²South East Asian Ministers of Education Organization (SEAMEO) Regional Center for Food and Nutrition (RECFON), University of Indonesia

Background: Pregnant woman is one of vulnerable groups for Iodine Deficiency Disorder (IDD). Since iodine is needed for brain development of fetal and newborn infants, iodine deficiency may bring adverse effects for pregnant women and the birth outcome.

Objective: This study aimed to investigate iodine status of pregnant women and coverage of iodized salt in Surabaya.

Methods: A cross sectional study involving 360 pregnant women aged 18-40 years at their 8th-40th week pregnancy was done in urban Surabaya. Urban Surabaya was selected for its relatively good iodine status. If pregnant women had iodine deficiency in this area, problems of iodine in other areas could be predicted as worse. Consumption of food diversity on pregnant women was assessed through recall of 14-food group-consumption in last 24 hours.

Results: Median of urinary iodine excretion (UIE) was 227.5µg/L and 20.7% of pregnant women had UIE level <150µg/L. Households using adequately iodized salt (>= 30ppm) were 46.9%. About 80% of pregnant women consumed supplements, however none supplement contained iodine. Milk for pregnant women was consumed by 45.2% of the women who contributed to 48 µg iodine intake. Iodine level of pregnant women was adequate; however sufficient iodized salt coverage at household level was only 46.9%.

Conclusions: Monitoring on iodine status has to be improved to ensure sufficient iodine availability and its good status. Further research on pregnant women about iodine status and effects for mothers and their infants based on UIE is recommended.

Keywords: IDD, Surabaya, iodine status, pregnant women, urinary iodine excretion, iodized salt.

Acknowledgements: The study was funded by Government of Indonesia

~ ANNEXES ~

ANNEXES

SEAMEO RECFON RESEARCH DISSEMINATION 2009 – 2013

Oral Presentation

Event	Title of Presentation	Presenter
International Conference on Food Security and Nutrition (ICFSN) Dubai, United Arab Emirates Desember 2-4, 2013	Inadequacy of Macronutrient and Micronutrient Intake Children Aged 12-23 Months Old: An Urban Study in Senen Sub-District, Central Jakarta, Indonesia	Dewi Fatmaningrum
IUNS 20 th International Congress of Nutrition Granada, Spain September 15-20 2013	Mother's Positive Attitude and Familiarity Towards Formula Milk May Contribute to Low Dietary Diversity amongst Indonesian Urban Young children	Airin Roshita
	Sea Country Situations for Micronutrients: Priority Problems and National/ Specific Programs	Siti Muslimatun,
	Probiotics Lactobacillus reuteri DSM 17938 and Lactobacillus casei CRL 431 Modestly Increase Growth, not Iron and Zinc Status, Among Indonesian children	Rina Agustina
	Complementary Feeding Recommendations from Locally Available Foods	Umi Fahmida
Corporate on Child Poverty and Social Protection Jakarta, Indonesia. September 10-11, 2013	Groundwork for Strengthening Rural Health System: How to Revitalize the Roles of Village Midwives.	Lindawati Wibowo
Forum nasional IV jaringan Kebijakan, , Kupang, East Nusa Tenggara, Indonesia September 4-6, 2013	Antara Peraturan dan Realita: Sudahkah Ditelaah sebagai Relativitas? Studi Kasus Program Bidan Desa di Tingkat kabupaten	Lindawati Wibowo
International Conference and Exhibition on Probiotics, Future of Probiotics Vision and Opportunity Texas, United States of America, 19-21 November 2012	Novel Probiotics L. Plantarum IS-10506 and Zinc Supplementation Enhance Humoral Immune Response and Nutritional Status of Children Younger than Two	Ingrid S. Surono

Event	Title of Presentation	Presenter
Medical Faculty Eskisehir Osmangazi (INF Scholarship) Istanbul, Turkey, 2012	Effects of probiotics and calcium on diarrhea and respiratory infections: Randomized trial in Indonesian children Probiotics prebiotics in pediatrics	Rina Agustina
The 1 st International Symposium on Health Research and Development The 3 rd Western Pacific Regional Conference on Public Health Bali, 16-18 November 2011	Potency of local wisdom, probiotic today and tomorrow	Ingrid S. Surono
FASEB summer research conference entitled "probiotics, intestinal microbiota & the host :Physiological and clinical implementations Arizona, 24-29 July 2011	Immunomodulatory properties of novel lactobacillus plantarum IS-10560 in vivo and in Indonesia young children	Ingrid S. Surono
The XI Asian Conress of Nutrition Singapore, 13-16 July 2011	Why do the high educated population in developing country obese? An exploration of mediating variables using data from a 14 years longitudinal study in Indonesia	Helda Khusun
Nutrition in infancy and childhood : Biocultural Perspective Grange Over Sands, Cumbria, UK, June 8-10 2011	Strategic roles of fathers in optimizing breasfeeding practices : a study in an urban setting of Jakarta	Judhiastuty Februhartanty
	Exploration of infant feeding practice among HIV high-risk mothers in Bandung, West Java	Dian Nurcahyati Basuki
XXXII International Congress on Microbial Ecology in Health Athena,Greece. September 6-9, 2010	Safety and immunomodulatory properties of Enterococcus faecium IS-27526 in Indonesian young children	Ingrid S. Surono
The 4 th International Conference in Anand Agriculture University India, 11-13 December 2009	Probiotic function of Indonesian indigenous strains from Dadih of West Sumatra	Ingrid S. Surono
The 1 st International Symposia Society of Microbiology Indonesia Surabaya, 20-21 November 2009	Effect of oxigenated water and probiotic administration on fecal microbiota of rats	Ingrid S. Surono

Event	Title of Presentation	Presenter
ISN 2009 Makasar Makasar, 10-13 October 2009	Probiotic, a promising functional food in improving nutritional status of young children	Ingrid S. Surono
	Malnutrition and infectious diseases : Do we need another long journey for long term solutions?	Widjaya Lukito
	Early initiation of breastfeeding: knowledge and perception among urban Jakarta couples	Andi Mariyasari Septiari
ICN 2009 Bangkok Bangkok, 4-9 October 2009	The cost-to-nutritional benefits of alternative intervention strategies to improve the nutrient intake of Indonesian children	Umi Fahmida
5 th Conference of the Asian Federation of Societies for Lactic Acid Bacteria Singapore, 1-3 July 2009	Indonesian perspective on scientific dossier for regulatory of probiotics foods	Ingrid S. Surono

Poster Presentation

Event	Title of Presentation	Presenter
IUNS 20 th International Congress of Nutrition Granada, Spain September 15-20 2013	Micronutrient status and immunity: A case study among Indonesian active pulmonary tuberculosis patients.	Drupadi Dillon
	A Shift in Occupational Physical Activity and Animal Protein Consumption Lead to Overweight among Rural Indonesian Adult Men	Helda Khusun
	The Effect of Training Delivery Method on the Competencies of Community Health Workers in Communicating Safe Complementary Feeding	Iswarawanti DN
	Knowledge Venture for Fathers to Support Breastfeeding: Step-by-Step Investigations in Indonesian Urban Setting	Judhiastuty Februhartanty
	Child Complementary Feeding Practices and Their Potential Determinants in Indonesia: A Review of Literature	Judhiastuty Februhartanty
	Unskilled Labor Working Mothers are at Greater Risk for Poor Child Protein Intake and Dietary Diversity	Aria Kekalih
	Alarming Rate of Anaemia among Under Two Year Old Children	Lwin Mar Hlaing ,
	Appropriate Frequency of Antenatal Visits and support from husband is associated with better compliance with maternal iron supplementation in Indonesia.	Luh Ade Wiradnyani
	Role of Sub-Clinical Inflammation on Iron Supplementation	Min Kyaw Htet
	The Influence of Vitamin a Status on Iron-Deficiency Anaemia in Anaemic Adolescent Schoolgirls in Myanmar	Min Kyaw Htet
Ratio of Micronutrient Intake from Animal to Non-Animal Source	Siti Muslimatun	

Event	Title of Presentation	Presenter
	Foods and Linear Growth of 1-5 Years Old Children in Indonesia.	
	Nutritional Status and Feeding/Nutrition Practices of Children and Women in Three Districts of Indonesia	Siti Muslimatun
	Current Glycemic Control Among the Middle Class Indonesian Diabetic Subjects.	Tan Shot Yen
	Sub-clinical inflammation, LC PUFA and Effect of Iron Supplementation in Under-Two-Year-Old Indonesian Children	Umi Fahmida
	Monitoring the Compliance to The International Code of Marketing of Breastmilk Substitutes: Labelling Violations in Indonesia	Judhiastuty Februhartanty
The 6 th Asian Conferences on Food and Nutrition Safety Singapore, 26-28 November 2012	Effectiveness of Training on Cadre's Competencies in Communicating safe Complementary Feeding to Caregivers	Dwi N. Iswarawanti
	Factors Affecting Food Safety Knowledge and Practices of Orphanage Food Handlers in Jakarta	Evi Ermayani
The 4 th World Congress of Pediatric Gastroenterology Hepatology and Nutrition Taipei, Taiwan, 2012	A Double-Blind, Randomized Trial of Lactobacillus reuteri DSM 17938, Lactobacillus casei CRL 431 and Calcium on Diarrhea Duration and Severity in Indonesian children	Rina Agustina
The 3 rd Moniqa International Conference on Food Safety and Consumer Protection Varna, Bulgaria 27-29 September 2011	Food handlers knowledge on safe food preparation and handling for 6-24 months old children: study in three different environmental settings	Lina Rospita
Conference "Diet and Optimum health on food safety and consumer protection Oregon, 13-16 September 2011	Vitamin D and Genetics: A profile of Indonesian Pulmonary TB Patients	Drupadi HS Dillon
The XI Asian Conress of Nutrition Singapore, 13-16 July 2011	Iron-zinc supplementation, psychosocial care and their	Umi Fahmida

Event	Title of Presentation	Presenter
	interaction: effect on cognitive function of infants	
Nutrition in infancy and Childhood: Bio-Cultural Perspectives Grange Over Sands, Cumbria, UK, June 8-10, 2011	Exclusive breastfeeding practice among working and non working mothers	Judhiastuty Februhartanty
7th Asia Pacific Conference on Clinical Nutrition (APCCN 2011) Bangkok, Thailand, 5-8 Juni 2011	Nutritional status in addition to oral hygiene contributes to the occurrence of primary dentition caries among Indonesian preschoolers	Paulus Daniel Sahanggamu
The II World Congress, on Public Health Nutrition Porto, Portugal, September 25-26 2010	Nutrition security and food security in seven districts in NTT province, Indonesia: status, causes and recommendation for response	Siti Muslimatun
	Pregnancy weight gain among women receiving supplementary food with Tempe and Vitamin C-rich fruit in Indonesia: a randomized controlled trial	Siti Muslimatun
	Menarche, nutritional status and lifestyle among adolescent 10-13 years in central Jakarta	Eriza Fadhillah
20th IUHPE World Conference on Health Nutrition Geneva, Switzerland July 11-15 2010	Implementing early initiation of breastfeeding practice: how far the Jakarta urban couples knowledge and perception support it?	Andi Mariyasari Septiari
	Improving Exclusive breastfeeding practice: How to get the fathers involved?	Judhiastuty Februhartanty
	Developing and Evaluating nutrition education program for mid-low income elementary school children in an urban area of Jakarta Indonesia	Risa Kolopaking
	Mothers Either Working or not can Practice Exclusive Breastfeeding	Judhiastuty Februhartanty
Join Int'l Tropical Medicine Meeting Bangkok (1-3 December 2009)	Sub-clinical Infections : the Hidden Factors that interfere with the nutritional status in apparently	Min Kyaw Htet

Event	Title of Presentation	Presenter
	Healthy Population	
ISN 2009 Makasar Makasar(10-13 October 2009)	The Effect of Multiple Micronutrient on Pregnancy Weight Gain in Lombok	Helwiyah Umniyati
	Does Hepcidin Interfere With the Hemoglobin Increase of Indonesian adolescent girls after 12 weeks of iron Supplementation? A Preliminary study	Drupadi HS Dillon
	Maternal and Children Health and Nutrition Situation after Emergency period in Four Districts, Aceh Province, Indonesia	Otte Santika
ICN 2009 Bangkok Bangkok (4-9 October 2009)	Effects of Local-Based Food Supplementation Program Integrated with Posyandu Tumbuh Kembang Anak on Nutritional Status of Underweight Children in West Java, Indonesia	Umi Fahmida
	Iron Status of Pregnant Women in two Geo-Climatic Areas in Indonesia	Widya Rahmawati
	Is Vitamin A- Fortified Cooking Oil Effective? A Case In Makasar City, Indonesia	Endang Achadi
	Sixteen week of Iron Supplementation Given to Indonesian Adolescent Girls is Insufficient to reach Optimal Iron Stores	Drupadi dillon
	South East Asian Nutrition Leadership Program (SEANLP):Building Leadership in Nutrition in South East Asia	Siti Muslimatun
	Food poverty and food insecurity in Sumba Island, East Nusa Tenggara Province, Indonesia	Rosnani V. Pangaribuan
	Community-based education intervention for Promotion Breastfeeding and anemia prevention in Indonesian pregnant women	Maria Wijaya-Erhardt

Event	Title of Presentation	Presenter
	Health workers knowledge and practice towards food safety Implementation	Letiza Sampetoding
	Working mothers and child food intake the importance of maternal engagement in determining the quality and availability of child food intake among urban Indonesian households	Airin Roshita
	Food poverty line in relation to food expenditure equivalency in Sumba Island, Esat Nusa Tenggara Province	Rosnani V. Pangaribuan
	Associations amongs nutritional status, salivary immunoglobulin A Response to Streptococcus mutans and Primary dentition caries among Indonesian Preschoolers	P. Daniel Sahanggamu
	Strategic roles of fathers in optimizing breastfeeding practices: a study in an urban setting of Jakarta	Judhiastuty Februhartanty
	Food based complementary feeding recommendation (CFR) for 9-11 month old peri urban Indonesian infants develop using linier programming to optimizing child feeding: comparison of rapid assessment procedure and survey result	Otte Santika
	A new software developed for emergency nutrition assessment	Juergen G. Erhardt
	Factors hindering and facilitating exclusive breastfeeding practice among working and non working mothers in Depok	Judhiastuty Februhartanty
	Comparison of physical activity between normal and underweight (mild and moderate) adult male worker based on the WHO BMI cut-off point	Lupi Purnomosari

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