

NUTRITIONAL STATUS OF POOR FAMILIES IN NORTH JAKARTA**Sandjaja¹; Moesijanti Soekatri²; Yulianti Wibowo³; Basuki Budiman¹ dan Sudikno¹**¹Puslitbang Gizi dan Makanan, Bogor²Jurusan Gizi, Poltekkes Kemenkes, Jakarta II³SEAMEO Tropmed RCCN Universitas Indonesia**ABSTRAK****STATUS GIZI PADA KELUARGA MISKIN DI JAKARTA UTARA**

Dari berbagai masalah kekurangan zat gizi mikro di Indonesia, hanya kurang vitamin A (KVA), anemia khususnya akibat kurang zat besi, dan gangguan akibat kurang iodium (GAKI) saja yang sudah banyak diteliti. Prevalensi kekurangan zat gizi mikro tersebut masih tinggi sehingga menjadi masalah kesehatan masyarakat. Akan tetapi penelitian kekurangan zat gizi mikro yang lain masih terbatas. Selain itu kekurangan zat gizi mikro khususnya pada keluarga miskin masih belum banyak diteliti. Penelitian ini bertujuan mengetahui besaran masalah kekurangan zat gizi mikro di Jakarta Utara pada 300 keluarga miskin dan 100 keluarga hampir miskin di 4 kelurahan yang mempunyai anak balita. Semua anak balita menjadi sampel penelitian, sedangkan untuk kelompok umur lain yaitu anak usia sekolah, remaja, dan dewasa hanya diambil sub-sampel. Data yang dikumpulkan adalah konsumsi makanan dan darah vena untuk dianalisis kadar hemoglobin, serum ferritin, zat seng (zinc), dan asam folat, dan data morbiditas. Hasil penelitian menunjukkan konsumsi energi antara 1018 – 1702 kkal dan protein antara 26.7– 44.3 gram per hari. Konsumsi energi dan protein masih defisit terutama pada kelompok remaja dan dewasa. Menurut sosial ekonomi, konsumsi tersebut lebih rendah pada keluarga miskin dibanding keluarga hampir miskin. Prevalensi anemia pada keluarga miskin terendah pada remaja laki-laki (5,1%) dan tertinggi pada remaja perempuan (37,0%), sedangkan pada keluarga hampir miskin pada anak usia sekolah perempuan (13,3%) dan tertinggi pada wanita dewasa (27,8%). Prevalensi defisiensi besi pada keluarga miskin dan keluarga hampir miskin terendah pada dewasa laki-laki (0%) dan tertinggi pada remaja perempuan (37,0%). Defisiensi zinc terendah pada anak usia sekolah laki-laki (14,6%) dan tertinggi pada anak sekolah laki-laki (30,8%) dan wanita dewasa (38,9%).

Kata kunci: anemia, iron deficiency, zinc deficiency, poor family

BACKGROUND

Iron, iodine and vitamin A deficiencies are still the most prevalent micronutrient deficiency problems in Indonesia. Currently, more than 100 millions of Indonesian are at risk of IDA. The available information for IDA based on the National Health and Household Surveys (NHHS) from 1995 and 2001 shows that the trend in the prevalence of IDA for pregnant women from 50.9% (1995) to 40% (2001). For women aged 15-44 years, the prevalence reduced from 39.5% (1995) to 7.9% (2001).¹ This reduction is assumed to have been primarily due to iron supplementation activities which are aimed for pregnant and lactating women. IDA is also common among pre-school children, with a prevalence of 40% observed in 1992. Data collected in 1995 indicated no change in the prevalence, while more recent evidence indicated that the situation was deteriorating with almost half of all preschool children surveyed in 2001 having anemia

(48.1%). The problem is particularly high among younger children, under two years of age (>55%). These levels of anemia are higher than many countries in East Asia and the Pacific, except for Myanmar, Lao PDR, and Cambodia.² Among school-aged children, the prevalence of IDA in 1992 was 31% and increased to around 50% in 1995.³ Data from Central and East Java in 1998 indicated that the prevalence of IDA among secondary and high school girls was 57.4% and 80.2% respectively. The prevalence was even higher among girls at reproductive age who registered to marry.^{4,5} Although the prevalence is high, there is no supplementation program for school girls.

The prevalence of iodine deficiency based on nationwide surveys among school children in 1980, 1998, and 2003 was 30.0, 9.8, and 11.0 percent.^{5,6}

A nationwide survey of vitamin A deficiency (VAD) in 1977/78 among preschool children revealed that the prevalence was higher than WHO criteria. The prevalence of X1B, X2/X3

was 1.19% and 9.8% respectively. In 1992/93 the prevalence of VAD revealed a dramatic decrease of VAD. The prevalence of XN, X1B, X2/X3 was 0.13%, 0.33%, and 0.5% respectively. In 2007, a survey of children 6-59 months old in 46 districts showed the prevalence of xerophthalmia was 0.13 percent, and low serum retinol below 20 µg/dL was 14.6 percent.⁷

There is no information on micronutrient deficiencies among poor and near-poor families and the high risk in nutritional deficiencies. The purpose of the study is to assess dietary intakes and micronutrient deficiencies particularly iron, zinc, and folic acid among poor and near-poor families in North Jakarta.

METHODS

The study was a cross-sectional study directed to be able to provide information on nutritional status of poor and near-poor families in North Jakarta. The reference population of the study is poor and near-poor families. The study population is poor and near-poor families who have children under five year old living in North Jakarta. Samples of the study are all members of selected poor families, particularly those with high risk of anemia (children under five years old, school teenagers, and women of reproductive age).

Two sub-districts out of six sub-districts in North Jakarta were selected based on the highest proportion of poor families. In each sub-district, two villages with high proportion of poor families were selected. A member of the study team got a list of all poor and near-poor families having children below five years old in 4 selected villages from sub-district officer, health centers, statistics office, or village staff. Verification of the list of poor families was performed by using poor family ID card. A total of 300 poor families were randomly selected by using ENA software for the study. For every three poor families selected, a near-poor family living next to the poor families was selected. In each of poor and near-poor family, the youngest children 12-59 months old were selected, while only sub-samples were selected for school children, teenagers, and adult.⁸

Data collected were socio-economic status of the samples, family and individual dietary pattern using 24-hour dietary food intake, and

blood specimen analysis (hemoglobin, ferritin, folic acid, and zinc). All data were collected by trained enumerators for socio-economic status and dietary recall, and trained phlebotomist for blood specimen.⁹

As procedures and minimize errors (ie. hemolysis), after taking blood, all vein blood was centrifuged directly on the field to get the plasma and blood serum. Serum of the blood was used to analyze serum zinc, plasma was used to analyze ferritin; whereas whole blood was used to analyze folic acid. Serum and plasma were transported in a cool box with cooling elements to appointed laboratory for analysis. Zinc assessment was done in the laboratory of SEAMEO Tropmed RCCN UI, while ferritin and folic acid were analyzed in the laboratory of PMI/Indonesian redcross. Before analysis, the sample of serum (for zinc) was stored in a frozen at – 20° Centigrade or less (in the plastic tubes only). Hemoglobin status to measure anemia status using Hemocue was also done to the subjects. External cuvette as control was applied everyday prior to use to calibrate the tools.

RESULTS

Dietary Pattern and Dietary Intake of Poor and Non-poor Families

Wheat flour based foods found frequently in the field were instant noodle, fresh noodle, bread, biscuits and snacks. Besides, wheat flour is also used for covering snacks such as *molen* banana, fried banana and fried *tempeh* (fermented soybean).

Instant noodles consist of 2 different types, the noodle that prepared with ingredients available in the pack with dried noodle and fried noodles. For fresh noodles, mostly it is consumed in the meals like meat ball noodle, chicken noodles, boiled noodles prepared by food vendors. A variety of bread is available including steam cake, were the kind of bread preferred by poor families especially sweet bread and filled bread. *Pukis* cake and *ca-kue* are grouped as snacks.

However, the frequency of instant noodle are lower among poor families compared to biscuit and snacks consumption. In Table 2 below shows the consumption of wheat flour based food. The average consumption of instant noodles was 14.3 days per month more

frequent than fresh noodle and bread. Wheat flour based food frequently eaten is biscuits (17 days per months). For fried products, even it is frequently consumed, but the amount of wheat

flour is low because it is used just for covering the main foodstuff. In general, wheat flour based food frequency pattern is slightly higher in poor families than that in near-poor families.

Table 1
The Frequency Score of Wheat Flour based Food Consumed per Month
among The Poor and Near-Poor Families

Food items	Poor (<i>Gakin</i>)			Near-Poor (<i>Non-gakin</i>)		
	n1	Mean1	SD1	n2	Mean2	SD2
Instant noodle	291	14.3	9.8	92	12.9	9.7
Fresh noodle	170	6.2	5.0	70	6.8	6.3
Bread	214	11.8	10.1	82	8.8	8.2
Biscuit, crackers	184	17.0	11.2	59	12.8	10.6
Snacks' fries	253	17.6	11.1	88	14.3	10.9
Other snacks	132	13.3	9.0	42	11.6	9.0

Table 1 above shows food frequency questionnaires asking wheat flour based food. Among food items listed above, only noodles which contribute significantly to dietary intakes. Table 2 shows average weight of noodles consumed by the poor is 25.5 gram per capita

per day, slightly higher compared to that in near-poor families. The frequency of instant noodle among poor is 14.3 days every month compared to near poor which is 12.9 days per months.

Table 2
The Average of Instant Noodle Consumption among The Poor (gram/capita)

Consumption of noodles	Poor/ Near-poor	n	Mean	SD	SE
Consumption of instant noodle (gram/cap/day)	Poor	282	25.5	20.4	1.2
	Near-poor	85	22.7	24.8	2.7
The frequency score of instant noodles (times/ month)	Poor	282	14.3	9.8	.6
	Near-poor	85	12.9	9.7	1.04

Note: $t(95\%;365) = 0.281$ (ns); mean difference $= 2.87 \pm 2.658$

Among member of the family, the most frequent in noodle consumption is teenage girls in poor families as shown in Table 3. On the other hand, among near-poor families, not only teenage girls who like instant noodle, but also school-age boy and children under-five year old (Table 4). Instant noodle is usually consumed

with rice and possibly to be eaten three times a day.

Obviously food with variety of ingredients attracted poor community to consume instant noodle since this is relatively cheap, and the taste is available in many tastes replacing the other side dishes or vegetables.

Table 3
The Average of Frequency Score of Instant Noodle Consumption
among Poor Family Members

Age group	Mean	Std. Deviation
Men	15.1	10.39
Women	13.4	9.37
Teenage boy	13.9	11.51
Teenage girl	21.7	11.21
School-age boy	16.8	10.49
School-age girl	13.3	9.11
Under-five children	13.9	9.33

Table 4
The Average of Frequency Score of Instant Noodle Consumption
among Near-Poor Family Members

Age group	Mean	Std. Deviation
Men	11.6	9.73
Women	10.6	8.31
Teenage boy	8.7	.
Teenage girl	18.0	14.55
School-age boy	20.3	10.92
School-age girl	13.9	11.51
Under-five children	22.8	10.26

Individual wheat flour consumption

In wheat flour consumption, it seems that there is no different between poor and near-poor families in term of the existence of wheat flour in the meals.

The average consumption of wheat flour as shown in Table 5 varies among subject groups

from 44–82 grams per day. In relation to wheat flour consumption, the highest number of wheat flour consumption is found in teenagers aged 13-17 years old both in boys (79 grams/day) and girls (82 grams/day).

Table 5
The Amount (grams) of Wheat Flour Consumption among Subject Groups

Subject group	n	Mean (grams)	Standard Deviation
Family	135	96	77.6
Adult men	93	67	46.4
Adult women	152	51	34.7
Teenage boys	44	79	48.6
Teenage girls	29	82	58.6
School age boys	104	62	35.7
School age girls	87	63	44.9
Under five children	260	44	35.3
Total	904	62	50.4

The Table indicates that among other age groups, teenagers consumed more wheat flour than other groups.

Individual dietary intakes

Dietary intake collected based on the 1 x 24 hour recall individually in all family members i.e. adult man, adult woman, teenage boy, teenage girl, school child-boy and school child-girls, and all children aged below 5 years. It is possible that in one family there was no teenager but there is school age child in the family or probably found teenager but no school child. But, for child under five years old (no matter whether boy or girls), all families must have at least one child since the criteria of selected family was the existence of "balita". The result on individual dietary intake both in poor families and near-poor families described as follow.

Macro-nutrients

Table 6 shows mean daily intake of energy, carbohydrate, protein and fat among different

age groups of poor families. Mean energy consumption of adult men was below (57-62%) recommended dietary allowances (RDA) of 2350-2550 kilocalorie (kcal), and adult women was also below (62-71%) RDA 1800-1900 kcal per day. Mean energy consumption of teenage boys was also below (54-55%) RDA of 2400-2600 kcal and teenage girls (59-63%) RDA of 2200-2350 kcal per day. Mean energy consumption of school-age boys and girls was also below (56-64%) RDA of 2050 kcal per day. Mean deficit in energy consumption in children below 5 years old was lower (65-101%) compared to other age groups. Mean protein consumption of adult men was below (60%) RDA of 60 grams, and adult women was also below (65%) RDA 50 grams per day. Mean protein consumption of teenage boys was also below (54%). RDA of 60 grams and teenage girls (59%) RDA of 50 grams per day. Mean protein consumption of school-age boys and girls was also below (61-70%) RDA of 45-50 grams per day.

Table 6
The Distribution of Macro-Nutrients Consumption among Studied Subject Group of Poor Family

Subject group	Energy (Kcal)	Carbo-hydrate (g)	Protein (g)	Fat (g)
	X \pm SD	X \pm SD	X \pm SD	X \pm SD
Adult men	1457 \pm 461	195.3 \pm 68.4	36.3 \pm 13.4	44.1 \pm 22.6
Adult women	1273 \pm 395	160.3 \pm 58.9	32.3 \pm 14.9	41.7 \pm 24.4
Teenage boy	1427 \pm 478	177.7 \pm 70.7	32.7 \pm 12.7	47.8 \pm 23.5
Teenage girl	1390 \pm 367	136.7 \pm 48.5	29.7 \pm 10.5	45.4 \pm 18.9
School-age boy	1315 \pm 399	156.7 \pm 52.1	31.7 \pm 11.1	46.1 \pm 23.0
School-age girl	1155 \pm 459	142.6 \pm 61.7	30.6 \pm 17.7	44.0 \pm 23.9
Under-five children	1018 \pm 643	115.7 \pm 47.5	26.7 \pm 18.5	36.8 \pm 32.8

Note : X = Mean
SD = Standard deviation

Table 7 shows the same figure in Table 1 of mean daily intake of energy, carbohydrate, protein and fat among different age groups of near-poor families. Mean daily dietary intakes in

near-poor families are higher compared to that in poor families in all age groups. However, the intakes were still below the RDA level.

Table 7
The Distribution of Macro-Nutrients Consumption among Studied Subject Group of Near-Poor Family

Subject group	Energy (Kcal) X \pm SD	Carbo-hydrate (g) X \pm SD	Protein (g) X \pm SD	Fat (g) X \pm SD
Adult men	1702 \pm 465	213 \pm 69	44.3 \pm 18.4	55.1 \pm 26.0
Adult women	1410 \pm 408	164 \pm 58	39.8 \pm 15.5	47.9 \pm 23.4
Teenage boy	1464 \pm 392	178 \pm 50	39.2 \pm 14.4	44.4 \pm 17.5
Teenage girl	1072 \pm 439	131 \pm 66	28.8 \pm 11.1	32.0 \pm 12.3
School-age boy	1408 \pm 446	178 \pm 56	37.9 \pm 18.0	47.0 \pm 23.3
School-age girl	1350 \pm 445	144 \pm 44	32.2 \pm 12.7	50.3 \pm 23
Under-five children	1178 \pm 427	128 \pm 49	36.1 \pm 17.7	44.1 \pm 23.1

Note : X = Mean

SD = Standard deviation

Vitamins and minerals

Table 8 below shows mean daily dietary intakes of vitamin A and C, and minerals of calcium, iron and phosphor of different age groups of poor families. The lowest and highest mean intake of vitamin A was found in school-age girls and adult women. However, vitamin A intakes in all age groups was lower than the RDA. Mean intake of vitamin C was found between 8.6-27.2 milligrams per day, where the intakes were still lower than RDA of vitamin C of

40-90 milligrams per day. Mean intake of calcium was found between 157-249 milligrams per day, where the intakes were still lower than RDA of calcium of 500-1000 milligrams per day. Deficit was also found in mean daily consumption of iron ranging from 6.5-8.9 milligrams per day while the RDA was between 8-26 milligrams per day. Deficit was also found in mean daily consumption of phosphor ranging from 332-401 milligrams per day while the RDA was between 400-1000 milligrams per day.

Table 8
The Distribution of Micro-Nutrients Consumption among Studied Subject Group of Poor Family

Subject group	Vitamin A total (SI) X \pm SD	Calcium (mg) X \pm SD	Vitamin C (mg) X \pm SD	Iron (mg) X \pm SD	Phospor (mg) X \pm SD
Adult men	2698 \pm 3902	195 \pm 105	23.4 \pm 25.8	8.9 \pm 4.0	401 \pm 169
Adult women	2885 \pm 4291	203 \pm 197	27.2 \pm 49.8	8.5 \pm 5.5	367 \pm 166
Teenage boy	1940 \pm 2794	157 \pm 82	13.1 \pm 23.6	7.8 \pm 3.5	367 \pm 156
Teenage girl	1790 \pm 1841	181 \pm 236	15.4 \pm 18.1	7.1 \pm 3.7	332 \pm 183
School-age boy	1648 \pm 2941	178 \pm 112	8.6 \pm 12.3	7.5 \pm 3.9	368 \pm 126
School-age girl	1607 \pm 2441	189 \pm 313	12.7 \pm 31.7	8.2 \pm 13.6	359 \pm 264
Under-five children	1937 \pm 3150	249 \pm 280	15.3 \pm 25.8	6.5 \pm 17.8	338 \pm 261

Note : X = Mean

SD = Standard deviation

Table 9 below shows the same figure of mean daily dietary intakes of vitamin A and C, and minerals of calcium, iron and phosphor of different age groups of near-poor families. Mean

daily dietary intakes in near-poor families are higher compared to that in poor families in all age groups. However, the intakes were still below the RDA level.

Table 9
The Distribution of Micro-Nutrients Consumption among Studied Subject Group of Near-Poor Family

Subject group	Vitamin A total (SI) X \pm SD	Calcium (mg) X \pm SD	Vitamin C (mg) X \pm SD	Iron (mg) X \pm SD	Phospor (mg) X \pm SD
Adult men	2764 \pm 2409	256 \pm 179	34.6 \pm 38.0	10.2 \pm 5.6	520 \pm 216
Adult women	2890 \pm 2110	252 \pm 157	34.5 \pm 41.4	9.3 \pm 5.6	485 \pm 206
Teenage boy	1494 \pm 1458	217 \pm 103	11.9 \pm 11.3	8.3 \pm 4.0	478 \pm 169
Teenage girl	1831 \pm 947	208 \pm 63	14.8 \pm 17.3	5.5 \pm 3.3	402 \pm 138
School-age boy	2082 \pm 2052	247 \pm 163	9.0 \pm 8.3	6.9 \pm 2.4	455 \pm 242
School-age girl	1641 \pm 1508	183 \pm 128	9.7 \pm 13.7	6.7 \pm 3.7	404 \pm 173
Under-five children	2893 \pm 6827	408 \pm 535	25.1 \pm 58.6	6.9 \pm 20.6	454 \pm 1016

Note : X = Mean

SD = Standard deviation

Micronutrient status of poor family members

Analysis of blood specimen taken is for determination of hemoglobin concentration, ferritin, zinc, and folic acid status of the subjects. Only sub-samples of each subject group were taken their blood specimen.

Hemoglobin level

For hemoglobin assessment venous blood was used to measure hemoglobin concentration. Table 10 shows the cut-off point in determining anemia and iron deficiency among subject groups.

Table 10
Cut-off Point for Determination of Anemia and Iron Deficiency¹⁰

Subject group	Anemia Hemoglobin	Iron deficiency Plasma ferritin
Children 6-59 months	<11 g/dL	<15 ug/L
Children 5-11 years	<11.5 g/dL	<15 ug/L
Children 12-15 years	<12 g/dL	<15 ug/L
Lactating women	<12 g/dL	<15 ug/L
Pregnant women	<11 g/dL	<15 ug/L
Adult male	<13 g/dL	<15 ug/L
Adult female	<12 g/dL	<15 ug/L

¹⁰Ref: WHO, 2001

Table 11 shows that the prevalence of anemia in general is higher in poor families than in near-poor families in almost all subject groups except adult women. The highest difference in

prevalence of anemia is found among children aged below 5 years which is 36.4 percent in children living in poor families compared to 13.8 percent in children living in near-poor families.

Table 11
Prevalence of Anemia by Subject Group and Economic Status

Subject group	Prevalence of anemia	
	Poor	Near-poor
Adult men	8.2	*
Adult women	13.5	27.8
Teenage boys	5.1	*
Teenage girls	37.0	*
School age boys	16.3	15.4
School age girls	18.8	13.3
Under five children	36.4	13.8

Note: * not enough sample size

Ferritin

Plasma ferritin was analyzed using sandwich ELISA. The value of plasma ferritin was categorized following the guideline as shown in Table 5. As shown in Table 12 below, the prevalence of iron deficiency as measured

by low ferritin concentration varies between 0 to 27.5 percent. The highest prevalence of low ferritin was found in children below 5 years old (27.5%). In general, the prevalence of low ferritin level is slightly lower in subject of near-poor families.

Table 12
Prevalence of Iron Deficiency by Subject Group and Economic Status

Subject group	Prevalence of iron-deficiency (ferritin <15 ug/L)	
	Poor	Near-poor
Adult men	0.0	0.0
Adult women	9.0	16.7
Teenage boys	10.3	11.1
Teenage girls	37.0	*
School age boys	14.0	7.7
School age girls	22.9	20.0
Under five children	27.5	23.3

Note: * not enough sample size (< 20)

Zinc

Zinc status was classified into three categories, namely deficient for <10.7 umol/l,

normal for 10.7-20 umol/l, and high for >20 umol/l.^{11,12} Result of zinc analysis was presented in Table 13 below.

Table 13
Zinc Status by Subject Group in Poor Families

Subject group	Zinc status		
	Deficient	Normal	High
Adult men	19.7	73.8	6.6
Adult women	29.2	67.4	3.4
Teenage boys	30.8	59.0	10.3
Teenage girls	25.9	74.1	0.0
School age boys	14.6	82.9	2.4
School age girls	25.6	65.1	9.3
Under five children	26.9	65.5	7.6

Result of zinc status showed that most of the subjects had zinc in their blood in normal range. Table 14 shows that the prevalence of zinc deficiency among subjects in poor families varies from 14.6 percent in school-age boys and 30.8 percent in teenage boys. Table 9 below shows the prevalence of zinc deficiency among

subjects in near-poor families which varies between 26.7 percent in school-age girls to 38.9 percent in adult women. Comparing Table 8 and 9, the finding shows that in general, the prevalence of zinc deficiency tends to be higher in subjects of near-poor families.

Table 14
Zinc Status by Subject Group in Near-Poor Families

Subject group	Zinc status		
	Deficient	Normal	High
Adult men	25.0	66.7	8.3
Adult women	38.9	50.0	11.1
Teenage boys	33.3	55.6	11.1
Teenage girls	*	*	*
School age boys	30.8	46.2	23.1
School age girls	26.7	66.7	6.7
Under five children	30.0	53.3	16.7

Note: * not enough sample size (< 20)

High prevalence of zinc deficiency in both poor and near-poor families may be caused by factors influencing zinc absorption including other minerals and trace elements, proteins, vitamins, phytic acid, physiological factors, and disease process. Some dietary minerals may alter zinc absorption. Many studies found that iron has been shown to interfere with zinc absorption. Inhibitory factors for zinc absorption are also found in soy protein (high phytate content) such as coffee, tea, various bean etc.

Folic acid

For folic acid assessment venous blood was used to measure folic acid concentration. Table 15 shows the mean of folic acid concentration in adult women and children under five years old living in poor and near-poor families. It shows that there is similarity of folic acid in poor and non-poor families. No deficient was found both groups. The deficient status of folic acid is less than 7 nmol/L.¹³

Table 15
Distribution of Folic Acid Status by Subject Group and Economic Status

Subject group	Folic acid status nmol/L (X ± SD)	
	Poor	Near-poor
Adult women	13.2 ± 3.84	-
Under five children	14.0 ± 4.62	13.7 ± 4.20

Clinical assessment

Clinical assessment was applied to the selected target prior to blood taken. It is primarily intended to assess the general physical condition of the subject as well as to

screen whether the subject is eligible to be taken their blood. Clinical assessment was done by medical doctor in the respective health center. Morbidity status was collected within last month prior to the clinical examination.

Table 16
Morbidity Status by Subject Group of Poor Families in The Last One Month*

Disease	Subject group			
	Children under-five	School-age children	Teenagers	Adults
Fever	49.2	32.3	24.2	17.7
Runny nose	68.3	35.4	25.8	25.3
Cough	67.2	43.8	30.3	24.7
Diarrhea	19.7	4.2	10.6	3.2
Skin diseases	4.9	6.3	4.5	4.4
Ear infection	1.1	0.0	0.0	0.6
Mouth infection	2.7	3.1	4.5	1.3
Eye infection	1.6	0.0	0.0	0.6
Others	4.9	6.3	10.6	23.4

Table 17
Morbidity Status by Subject Group of Near-Poor Families in The Last One Month*

Disease	Subject group			
	Children under-five	School-age children	Teenagers	Adults
Fever	51.4	32.1	45.5	6.7
Runny nose	51.4	35.7	36.4	20.0
Cough	51.4	42.9	36.4	23.3
Diarrhea	8.6	7.1	0.0	6.7
Skin diseases	2.9	3.6	0.0	3.3
Ear infection	0.0	0.0	0.0	0.0
Mouth infection	2.9	3.6	0.0	0.0
Eye infection	0.0	0.0	0.0	3.3
Others	5.7	3.6	18.2	20.0

* Multiple answers

Table 16 and 17 shows the morbidity status during one month period preceding clinical examination in poor and near-poor families. The Table shows that most commonly symptoms of diseases of children aged below five years is fever (49.2-51.4%), running nose (51.4-68.3%), and cough (51.4-67.2%).

About 27 percent of them having the diseases had not yet been treated. Some people just bought medicine from nearby small kiosk. Among subject screened, about 91% were eligible to be taken their blood. Among

groups, under five years old children, who consider as group at health risk, were found to have higher proportion ($p<0.05$) of having those diseases compared to other groups.

DISCUSSION

The most serious problem faced by Indonesia in launching program for reducing micronutrient deficiency is lack of appropriate data for sound policy and planning.

The persistent problem of anemia for all age groups might be related to several issues, such as low compliance on iron supplementation; problem of interaction between macro and micronutrients, and within micronutrients; insignificant effect of iron fortification just started in 1999/2000; as well as poverty problem.

Social sector including preventive-promotive health and nutrition in general is put as a low priority by a local government. Some local government may set nutrition as priority program, however with wrong policy due to misconception of nutrition. This problem affects strategy of micronutrient program at local level.

The strategy for controlling micronutrient deficiencies is the same as other countries: food diversification, supplementation, and fortification¹⁴. The food diversification strategy comprising nutrition education, food production, supply and consumption. Since better food consumption (food diversification) mostly dependent on income, efforts to diversify food consumption will be hampered by the fact that the incidence of poverty increased during and after economic crisis (30-40%).

The second program in fortification is iron and zinc fortification in wheat, which was started in 1999. Recent data indicates increasing trend of wheat consumption (mostly in the form of noodle), in all economic strata of the Indonesian people in the form of noodle.¹⁵

In the context of micronutrient program, data collection capability should be directed towards relevant issues of food-based (dietary guidelines), fortification and supplementation. For example for fortification program, collection of food consumption pattern data of various economic strata, culture and areas is a prerequisite.^{9,14}

This study shows that between near poor and poor families, the consumption of almost all macronutrients is slightly higher among near poor compared to poor families except in teenage girls and in teenage boys on fat intake, but this difference is not significant statistically. Among poor and near poor family, the food pattern and the quantity are similar but all is under the Recommended Dietary Allowances (RDA) for Indonesians.

The average consumption of wheat flour among subject groups was varied from 44 – 82 grams per day, with mean of 62

gram/capita/day. These data were a bit different to the figure reported by Flour Fortification Initiative.¹⁶ In that report, Indonesia as one of the mandatory flour fortification countries in the South East Asia had wheat flour consumption close to 50 gram/capita/day, whereas Philippines had wheat flour consumption more than Indonesia, about 80 gram/capita/day. Comparing 5 countries that have mandatory fortification (added iron or/and folic acid) in wheat flour, namely Canada, USA, Australia, Philippines and Indonesia, the consumption of wheat flour in Indonesia is the lowest.¹⁶ With the mean intake of 51 gram, it may contribute about 0.102 mg of folic acid (mandatory is 2 ppm for folic acid¹⁷). Since Indonesia has not have Folic Acid Recommended Dietary Allowance (RDA), we use folic acid US RDA. The RDA for adult women was about 400 microgram or 0.4 mg. This means, about 1/4 of folic acid RDA had been contributed by fortified wheat flour. In addition, for children under five, who was the highest consuming noodles among family's member in near poor, the mean intake was 44 microgram or 0.04 mg and the US RDA was between 150-200 microgram per day or 0.15-0.2 miligram. This means about 1/4 to 1/5 of RDA was contributed from fortified wheat flour consumption. In facts, the blood assessment indicates that all subjects were in a normal range (N = 2.7-17.0 nanogram/ml). This figure is probably due to contribution of folic acid from wheat flour such as snack fries, biscuits, and noodles among poor and near poor families. According to FFI report, the trend of noodles consumption increases every year, especially in Indonesia and Vietnam. This indicates that fortified wheat flour would be giving more benefit especially for iron, zinc, vitamin B1 and B2, and folic acid.

In term of frequency, the snacks' fried was more popular among poor and near poor due to more practice and cheaper compared to noodles. However, comparing poor and near poor families, the consumption of instant noodle was higher in poor (25.5 gram) than near poor (22.7 gram) as also the frequency of consuming noodle, higher in poor (14.3%) than near poor (12.9%).

Anemia is mostly found in teenage girls (37.0%) in poor as also show they had very low ferritin (37.0%). This indicates that the anemia is due to lack of iron. The zinc deficiency occurred

mostly at teenage boys (30.8%) in poor families, whereas in near poor families, mostly found in adult women (38.9%). Since these problem are commonly found among children and women childbearing age, the mandatory fortification regulation for wheat flour is still needed. This study convinces that beneficial of mandatory with 5 selected nutrients is really valuable and goes to the all age groups, especially the poor and near poor who are vulnerable to have micronutrient deficiency.

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