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Dietary habits and nutritional status among school children in rural and urban areas: A comparative study from Bogor, Indonesia

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Abstract

When Indonesia was combating child undernutrition, overnutrition emerged which made the situation more complex. In fact, dwelling area like rural versus urban is one of the direct determinants which play a big role in shaping dietary habits and nutritional status in population. However, there is a lack of data that shows dieteray habits between urban and rural areas in Indonesia. This study aims to compare the dietary habits and nutritional status between children living in urban and rural areas in Bogor. This study was conducted using the cross sectional method with 77 urban and 65 rural children aged 9-12 years old in Bogor. Nutritional status was assessed by anthropometric measurements, i.e height for age Z-score and IMT for age Z-score. Dietary habit data were obtained by interviewing subjects using validated questionnaire and 3x24 hours food recall. The results showed that urban children had greater risk of being overweight and children living in rural areas had higher risk of being stunted. Children in urban areas showed better dietary habits indicated by greater number of children with regular consumption of breakfast, meat, dairy, and fruits. In conclusion, each area in Bogor showed different malnutrition issue, where higher incident stunting was found in rural area and higher incident of overweight was found in urban area. Therefore, different intervention seems urgent to be elaborated to alleviate the dual malnutrition among children.

Introduction

NCD-Risc (2018) reported that from 1975 until 2016 worldwide children obesity had increased significantly from 0.9% to 7.8% for girls and 0.7% to 5.6% for boys. Unfortunately, the decline of underweight children was lower than the escalated obesity. On the other hand, de Onis and Branca (2016) showed that stunting was the most prevalent of malnutrition in children. These facts indicated that the world has to deal with double burden malnutrition. World Health Organization (WHO, 2016) defines malnutrition as the existence of both undernutrition and overnutrition issues in one individual, household, or population. The low and middle income countries experience this double burden of malnutrition. In Argentina and Vietnam, stunting and underweight children are highly found in rural area and overweight children highly appeared in urban area (Garazza et al., 2016; Le Nguyen et al., 2013).

Indonesian Ministry of Health (IMH, 2013) reported prevalence of stunting among children aged 5-12 years old in Indonesia were 30.7% (IMH, 2013). This number had not changed so much compared to numbers in 2010

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and 2007 (IMH, 2007; IMH, 2010). This undernutrition issue was also experienced by other developing countries (Best et al., 2010). Indonesia decided to join on Scaling Up Nutrition Movement program and release the First 1000 Day of Life Movement to alleviate children undernourishment, in particular stunting and wasting (MCAI, n.d.). However, 18.8% of Indonesian children continued living with an overnutrition issue (IMH, 2013).

Stunting illustrates childrens' welfare and reflects childrens' failure to fulfill linear growth potential (de Onis & Branca 2013). Compared to the average child, children with under and over nutrition tend to have lower physical fitness, school performance, and brain function (Armstrong et al., 2016; Hjorth et al., 2016; Palupi et al., 2013). Overweight children are at greater risk of being overweight adults (Singh et al., 2008). They will have a higher probability of suffering from non-communicable diseases, for instance cardiovascular disease, type II diabetes mellitus, stroke, and hypertension (Reilly & Kelly, 2011). For that reason, children with malnutrition are predisposed to have low work productivity, hence enduring great economic loss (Duijvenbode et al., 2009; McGovern et al., 2017).

Consumption patterns as a direct determinant of nutrition is likely to be influenced by discrepancies of demography situation between urban and rural areas. The main reasons for this gap are the socioeconomic disparities between these areas, for instance income, occupation, and education levels (Sicular et al., 2007). The condition of ecology between these areas also plays a big role in shaping food consumption patterns in society. Thus, those populations are very likely to have different options of food groups which then might influence their consumption patterns (Dean & Sharkey, 2010; Fahlman et al., 2010). As an illustration, it was reported in India that urban community showed higher consumption of fruit and vegetable compared with rural community (Bowen et al., 2011; Yadav & Krishnan, 2008). In China, the higher rate of macronutrient consumption was represented in urban setting than in rural setting (Zhang et al., 2017).

However, there were still few evidences that were available in Indonesia about discrepancy of dietary habits and nutritional status between rural and urban school children. We hypothesised that there were differences of dietary pattern and nutritional status between urban and rural school children. The purpose of the study was to provide data of dietary habits with under and over nutrition incidence of school children in rural- and urban areas as a comparative study from Bogor, Indonesia. The results of the study were expected to support the formulation of effective solutions for alleviating children malnutrition.

Methods

The study used a cross-sectional method that compares dietary patterns and the nutritional status of school children from urban and rural area. One school from each area was selected using purposive sampling. We had conducted preliminary study prior to the main study. The observation on schools in each sub-district were conducted as the preliminary study. Pamijahan sub-district and Bogor Tengah sub-district were chosen as rural and urban area representation, respectively. Those areas were preferred as study location because they reflected urban and rural condition. Bogor Tengah sub-district as urban area was surrounded by many public places, had high density community, and set up as center of Bogor city. Pamijahan sub-district as rural area had low density community and was dominated by agricultural workers inhabitant. These descriptions of rural and urban area representative was according to Act No. 26 Year 2007 about Spatial Planning of Indonesia. Those two areas were 30 km separated. The study was conducted in April until May 2018 and had received approval from ethical clearance comittee of Bogor Agricultural University.#

The minimum subjects were obtained based on formula by Lemeshow et al. (1990).

$$n = \frac{Z^2_{1-\alpha/2} P(1-P) N}{d^2(N-1) + Z^2_{1-\alpha/2} P(1-P)} \quad (1)$$

The confidence (Z) was 95% and the power (d) was 10%. The proportion of students with BMI for age Z-score (BAZ) <-2 and >2 (P) in West Java was 27.7% (IMH, 2013). The student population in rural and urban school (N) were 209 and 313, respectively. In the end, minimum subjects that were needed to be fulfilled were 62 and 69 students from rural- and urban-area, respectively. The minimum subjects were 29.7% and 22.0% of total student population in rural and urban areas

Subjects that participated in the study were school children from 2 classes from each school, which were 4th and 5th grade students. They were chosen since they had better ability to communicate compared to the lower grader. In urban area, only 5th grade students participated because the 4th grade students had different study time sequence. The 6th grade students were excluded because they had to get intensive learning for national examination preparation. The classes were randomly

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Figure 1: A rural school in Bogor, Indonesia (Photo credits: Authors)

selected and all students in those classes participated in the study. In the end, there were 142 students that were eligible to follow and complete all the procedure consisting of 65 students from rural area and 77 students from urban area.

Data of dietary habits consisted of energy and macronutrient intake, adequacy of energy and macronutrient intake, and food consumption. Nutritional status data consisted of height and BMI measurement.

Energy and macronutrient intake

Data were obtained using 3x24 hours food recall interview to the subjects. The subjects were asked about what they consumed in the day before, started from waking up until going to sleep. For the veracity of the food size that were consumed, interviewer used food photo book in a digital form. This book was released by Indonesian Ministry of Health (IMH, 2014). The students were interviewed in 3 time phases of a month, which were in the beginning, middle, and the end of the month. This study also analysed the energy and macronutrient intake from breakfast and snack. Meal before 9 a.m. was considered as breakfast while the snack occasion was any consumption activities between the meals.

Adequacy of energy and macronutrient intake

The adequacy of subjects' intake were analysed by comparing total daily intake with individual requirement. Adequacy of energy and macronutrient intake from breakfast and snack occasions were calculated by comparing intake from breakfast and snack with individual requirement. Individual requirement was calculated by using estimated energy requirement formula (Institute of Medicine, 2005). Age, sex, height, and weight of each subjects became the consideration of the formula. Subjects were categorized adequate for achieving 90-110% individual requirement for total daily intake. Adequate breakfast and snack intake were achieved by meeting 15-30% and <15% individual requirement, respectively.

Food consumption

Data of food consumption were measured by interviewing the subjects using validated questionnaire. Subjects were asked how often they eat breakfast, snack, and food groups in the past week. Food groups that were asked consisted of sugar sweetened beverage, fast food, fruit, vegetable, meat, poultry, seafood, egg, dairy, and legume. Regular consumption was indicated by eating breakfast, snack, and food groups five times per week or more.

Nutritional status

Nutritional status data were obtained by direct measurement included body height and weight. The heights of the subjects were measured using microtoise with 0.1 cm accuracy and 2 meters of measurement capacity. Digital scale with 0.1 kg accuracy and 170 kg capacity was used to measure weight of the subjects. Before the measurements were conducted, subjects were asked to remove their shoes, socks, watch, and belt. Nutritional status of the subjects were categorized as stunting if height for age Z-score <-2.0. Meanwhile, overweight/obese children were defined as BAZ > 2.0. WHO Anthrop

Table 1: Subject distribution based on sex and age

	Urban	Rural
Sex		
Boys	32 (41.6%)	34 (52.3%)
Girls	45 (58.4%)	31 (47.7%)
Age		
9	0 (0.0)	8 (12.3%)
10	31 (39.3%)	26 (40.0%)
11	46 (58.2%)	25 (38.5%)
12	2 (2.5%)	6 (9.2%)
Total	77 (100%)	65 (100%)

Plus was applicated to calculate the Z-score of height for age and BMI for age. All data collection were conducted by trained enumerators who were qualified to do interview and anthropometric measurement.

Data analysis

Energy and nutrient intake was examined by Nutrisurvey 2007 that was completed by Indonesian food databases. Food commodities that were not available on the database were added to the software. For ready-to-eat foods, nutritional value of the foods were recorded from its food label. For self made foods, the nutritional value were obtained by inputing the recipe to the software.

Independent t-test analysis was used to examine the mean difference of nutrient intake, and Z-score of HAZ (Height for Age Z-score) and BAZ between children living in urban- and rural-areas. Chi square analysis was used to examine adequacy level of nutrient intake, food consumption, and nutritional status betweeen urban and rural children. Correlation siginificance was confirmed as p-value was below 0.05. All data analysis were done using SPSS 20.0.

Results

Distribution of the subjects based on sex and age was presented in Table 1. There were 77 (54.2%) students living in urban areas. A higher number of boys was presented in rural areas, while there were a greater number of female students in urban areas. However, the number of 9 years old students was only demonstrated in rural areas because there were no 4th grade students that participated in urban area.

Table 2 reports that there were significant differences of HAZ and BAZ between urban and rural children groups. Rural groups had significantly lower HAZ than the urban one. Similar trends were also shown from the BAZ indicator. Rural groups had significantly lower BAZ compared to urban groups. Stunting was largely shown in rural areas, while overweight was highly demonstrated in urban areas (Table 3). Nonetheless, there were 33.8% of stunted children in rural areas, where more than one-third of them were severely stunted. Along with the high percentage of overweight of urban students, there were urban students that still suffered from being underweight. The total intake and adequacy of total daily, breakfast, and snacks are given in table 2. Regarding total daily energy and macronutrient intake, all indicators appeared to be significantly different. Urban groups had significantly higher total intake of energy, protein, fat, and carbohydrate. Breakfast contributs significantly to higher protein intake for urban groups compared to rural groups, while snacks contributs significantly higher protein and fat intake for urban groups compared to rural areas.

Both groups showes protein intake that was below recommendation (<90%) and fat intake that is above the recommendation (>110%). All nutrient contribution from breakfast occures in both areas presented above 15% where the recommendation was addressed.

By categorizing the adequacy level of total daily, breakfast, and snack intake, Table 4 showes the percentage of students who fulfilled the recommendation from total daily, breakfast, and snack intake. The number shown below presents the number of students that consumes adequate energy and macronutrient in each occasion. Students with adequate total daily intake of energy and

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Table 2: Mean value of HAZ, BAZ, intake, and adequacy of energy and macronutrient from total-, breakfast-, and snack-intake

Indicators (unit)	Urban		Rural		Total		P-value
HAZ	-0.28±1.2		-1.60±0.97		-0.90±1.29		0.000*
BAZ		0.31±1.61		-0.28±1.07		0.03±1.42	0.010*
Total Daily	Intake	Adequacy (%)	Intake	Adequacy (%)	Intake	Adequacy (%)	
Energy (k cal)	1815.57±63.03	96.42±36.05	1365.80±47.20	87.18±24.92	1568.3±43.5	92.19±31.69	0.000*
Protein (g)	58.33±2.08	71.06±27.30	36.18±1.53	52.35±17.99	44.9±1.6	62.49±25.22	0.000*
Fat (g)	64.29±2.93	143.34±63.27	46.49±2.23	117.85±46.14	52.1±2.1	131.67±57.33	0.000*
Carbohydrate (g)	231.26±8.96	93.63±36.16	207.15±6.84	92.91±26.16	215.1±5.9	93.30±31.87	0.009*
Breakfast	Intake	Adequacy (%)	Intake	Adequacy (%)	Intake	Adequacy (%)	
Energy (kcal)	425.33±20.94	23.86±9.66	454.13±16.25	26.75±8.46	432.10±13.24	25.17±9.21	0.609
Protein (g)	14.38±0.62	17.57±6.42	11.05±0.59	16.31±7.06	12.25±0.44	17.00±6.72	0.000*
Fat (g)	13.65±1.44	36.32±25.05	16.48±1.15	42.73±22.97	14.03±0.90	39.23±24.26	0.614
Carbohydrate (g)	57.86±2.62	22.73±9.17	56.83±2.31	25.75±8.39	56.98±1.76	24.10±8.92	0.539
Snack	Intake	Adequacy (%)	Intake	Adequacy (%)	Intake	Adequacy (%)	
Energy (k cal)	478.10±33.33	27.55±18.02	373.22±2.74	25.13±8.39	396.65±21.37	26.45±15.46	0.144
Protein (g)	11.62±0.87	15.51±10.53	6.43±0.67	10.96±7.74	8.30±0.60	13.43±9.60	0.000*
Fat (g)	16.61±1.23	40.69±27.29	11.88±0.93	31.38±19.21	13.33±0.84	36.43±24.30	0.001*
Carbohydrate (g)	62.20±5.41	28.97±20.60	60.15±3.74	29.64±13.87	60.10±3.41	29.28±17.78	0.885

* p-Value < 0.05 means significant difference of intake between area

Adequacy was obtained by comparing intake with individual requirement in each nutrient

protein are significantly higher in urban areas. Regarding the breakfast occasion, there were more students in rural areas who consumed adequate energy. For snacks, there are more students in rural areas whose consumption exceeds the recommended carbohydrate intake levels. Table 5 showed the differences of dietary habits between urban and rural students. It is apparant that students living in urban area had higher chance to consume breakfast, meat, dairy, and fruit regularly.

Discussion

The purpose of this study is to analyze the difference between dietary habit and under- and over-nutrition incidences of urban and rural school children. The result provides new confirmation of double burden malnutrition that is occured in Bogor, West Java, Indonesia. This study supported the data that stunted children were highly found in rural areas compared to urban areas, like previous studies had documented either in Indonesia (Mahmudiono et al., 2017; Rachmi et al., 2016) or worldwide (Nabag 2011; Cesani et al., 2013). Overall, stunting prevalence (19.0%) was lower compared with the national number (30.7%), despite rural stundents showed higher percentage of stunting than the national number (IMH, 2013). Numerous studies examined some correlation between environmental factors and stunting incidence in rural areas, namely parental education, family

Table 3: Differences of nutritional status based on HAZ and BAZ between urban- and rural-area

Indicators (%)	Urban	Rural	Total	OR
HAZ				
Severely stunting	0.0	9.2	4.2	N/A
Stunting	6.5	24.6	14.8	5.348*
Normal	93.5	66.2	81.0	1
BAZ				
Severe thinnes	2.6	0.0	1.4	N/A
Thinnes	3.9	4.6	4.2	1.109
Normal	71.4	93.8	81.7	1
Overweight	22.1	1.5	12.7	18.868*
Obesity	0.0	0.0	0.0	N/A

* p-Value < 0.05 means significant difference of intake between area
OR that was shown compared with normal group

income, and food access (Quansah et al., 2016; Tessier et al., 2008; Muthuri et al., 2014). Moreover, this study confirmed that the overweight issue was appeared to be higher in urban children, same as what happened in other developing countries (Chen et al., 2011; Le Nguyen et al., 2013).

Act No. 26 Year 2007 about Spatial Planning of Indonesia stated that rural area in Indonesia were characterized by domination of agriculture activity among the habitants. The food environments of rural and urban areas might be different because of their demographic, occupation, and sociology (Ratcliffe et al., 2016; Kennedy et al., 2009; Dean & Sharkey, 2010). Tessier et al. (2008) reported that availability of supermarket as diverse food source were higher in urban area. This condition may lead to the consumption of more diverse food and resulting in better food pattern. But along with supermarket, there were also more fast food restaurants, corner stores, and convinience stores found in urban school area. These stores provided higher chance for urban students to consume foods that were sold by those stores (Martinez-Donate et al. 2016; Monge-Rojas et al. 2013). Other than that, many foods were more easily accessed by urban residents because of the affordability. Family with lower income appeared to have lower consumption of fruit and vegetable because they needed to spare more money to buy fruit and vegetables (Miller et al. 2016). A study case conducted in West Java showed that the marketing of vegetable commodities consisted of many levels of distributor. The marketing was started from farmers, collectors, groceries, market scalpers, wholesalers, and ended up with retailers that traded to the consumers. This multilevel network of marketing explained why vegetable commodities could be difficult to afford for rural residents, although most of them worked as the major actor of vegetable producer. There were only few farmers that sold the products directly to consumers (Permana et al., 2006).

Students were at an age where their dietary patterns were highly influenced by school food environment. For that reason, school acted a significant role to shape eating habits of students (Briefel et al., 2009). From 1997 until 2006, school children presented an increasing trend of calorie intake that was contributed from fast food (Poti & Popkin, 2011). Furthermore, students tended to have lower intake of fruit and vegetable that started from 1st grade and became worse in adolescent time (Albani et al., 2017). The differences of dietary patterns between urban and rural areas had been recorded in numerous studies. Differences of breakfast habits between urban and rural children that was presented in this study had been reported inversely compared to studies in Australia (Bolton et al., 2016), Scotland (Levin, 2013), and Iran (Maddah, 2008). Their studies showed that urban children had higher chance to have breakfast regularly. The attitude of students' parents might confirm why this study

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Table 4: Prevalence of stunting, overweight, and adequacy level of energy and nutrient from total daily-, breakfast-, and snack-intake between urban- and rural-area

Indicators (unit)		Urban		Rural		Total		OR
	Stunting	5	6.5	22	33.8		19.3	7.353*
	Over-weight	17	22.1	1	1.5		12.5	18.133*
Total intake								
Energy	Deficient	41	53.2	56	86.2	97	68.3	0.209*
	Normal	28	36.4	8	12.3	36	25.4	1
	Exceed	8	10.4	1	1.5	9	6.3	0.438
Protein	Deficient	30	39.0	57	87.7	87	61.3	0.123*
	Normal	30	39.0	7	10.8	37	26.1	1
	Exceed	17	22.1	1	1.5	18	12.7	0.252
Fat	Deficient	37	48.1	49	75.4	86	60.6	0.529
	Normal	20	26.0	14	21.5	34	23.9	1
	Exceed	20	26.0	2	3.1	22	15.5	0.143*
Carbohy-drate	Deficient	48	62.3	52	80.0	100	70.4	0.484
	Normal	21	27.3	11	16.9	32	22.5	1
	Exceed	8	10.4	2	3.1	10	7.0	0.477
Breakfast intake								
Energy	Inadequate	19	25.0	3	4.8	22	15.8	6.667*
	Adequate	57	75.0	60	95.2	117	84.2	
Protein	Inadequate	12	15.8	5	7.9	17	12.2	1.175
	Adequate	64	84.2	58	92.1	122	87.8	
Fat	Inadequate	28	36.8	8	12.7	36	25.9	4.010*
	Adequate	48	63.2	55	87.3	103	74.1	
Carbohy-drate	Inadequate	21	27.6	9	14.3	30	21.6	2.291
	Adequate	55	72.4	54	85.7	109	78.4	
Snack intake								
Energy	Adequate	15	19.5	4	6.2	19	13.4	3.690*
	Exceed	62	80.5	61	93.8	123	86.6	
Protein	Adequate	24	31.2	21	32.3	45	31.7	0.949
	Exceed	53	68.8	44	67.7	97	68.3	
Fat	Adequate	14	18.2	13	20.0	27	19.0	0.889
	Exceed	63	81.8	52	80.0	115	81.0	
Carbohy-drate	Adequate	14	18.2	3	4.6	17	12.0	4.593*
	Exceed	63	81.8	62	95.4	125	88.0	

*p-value < 0.05, means significant difference between area
For total daily intake, *p-value < 0.05 means significant difference between area compared with normal group
Total daily intake categorized as adequate group for fulfilling 90-110% individual requirement. Adequacy below 90% is categorized as deficient and above 110% is categorized as exceed
Breakfast intake was categorized as adequate for fulfilling 15% or more of individual requirement
Snack intake was categorized as adequate for fulling 15% or less of individual requirement

Table 5: Difference of student number consuming frequently food group selected between two areas

Variable		Urban		Rural		Total		Odd Ratio	P-Value
		n	%	n	%	N	%		
Breakfast	< 4x/week	9	11.7	27	41.5	36	25.4	0.186	0.000
	> 4x/week	68	88.3	38	58.5	106	74.6		
Snacking	< 4x/week	48	62.3	35	53.8	83	58.5	1.419	0.393
	> 4x/week	29	37.7	30	46.2	59	41.5		
Fast Food	< 4x/week	72	93.5	64	98.5	136	95.8	0.026	0.297
	> 4x/week	5	6.5	1	1.5	6	4.2		
SSB	< 4x/week	63	81.8	49	75.4	112	78.9	1.469	0.411
	> 4x/week	14	18.2	16	24.6	30	21.1		
Vegetable	< 4x/week	50	64.9	49	75.4	99	69.7	0.605	0.202
	> 4x/week	27	35.1	16	24.6	43	30.3		
Fruit	< 4x/week	56	72.7	58	89.2	114	80.3	0.322	0.019
	> 4x/week	21	27.3	7	10.8	28	19.7		
Meat	< 4x/week	71	92.2	65	100	136	95.8	N/A	0.031
	> 4x/week	6	7.8	0	0.0	6	4.2		
Poultry	< 4x/week	63	81.8	60	92.3	123	86.6	0.375	0.085
	> 4x/week	14	18.2	5	7.7	19	13.4		
Seafood	< 4x/week	73	94.8	61	93.8	134	94.4	1.197	1.000
	> 4x/week	4	5.2	4	6.2	8	5.6		
Egg	< 4x/week	58	75.3	52	80.0	110	77.5	0.763	0.550
	> 4x/week	19	24.7	13	20.0	32	22.5		
Dairy	< 4x/week	27	35.1	53	81.5	80	56.3	0.122	0.000
	> 4x/week	50	64.9	12	18.5	62	43.7		
Legumes	< 4x/week	63	81.8	50	76.9	113	79.6	1.350	0.534
	> 4x/week	14	18.2	15	23.1	29	20.4		

*p-value < 0.05, means significant difference between area
SSB is sugar sweetened beverage
N/A is not available

showed different results from other studies. Parents of rural children didn't have strong attitude that breakfast was important for children. The similar results with other studies were mostly showed by intake of animal source foods that were significantly higher consumed by urban children (He et al., 2013; Itoi et al., 2012, Herrador et al., 2016). However, in this study, only consumption of meat and dairy that showed the differences significantly. Different from animal based food, plant based food were consumed highly in rural children (Herrador et al., 2016). Total Diet Study in Indonesia (IMH, 2014) revealed that more plant based protein foods were consumed compared with animal based protein foods.

Dietary intake as one of direct determinants of nutritional status were intensely explored among researchers.

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Beyond energy intake, protein intake was investigated deeply on how it's associated with stunting incidence in children. It were ranging from energy and protein intake, adequacy, and consumption protein source foods, for instance milk and meat (Iannotti & Lesorogol, 2014; Sekiyama et al., 2012; Mwaniki & Makhoka, 2013, Berg et al., 2018). Regarding the relationship between intake with area setting, this study presents the lower intake of energy and nutrient in rural area students. These findings are similar with other studies that reveal the higher intake of energy and macronutrient in urban children (Zhang et al., 2017; Liu et al., 2008). Concerning overweight incidence in school age children, Fidler Mis et al. (2017) showed how sugar sweetened beverage caused obesity in children by increasing BMI and waist circumference. Fast food as a popular dish among students also contribute to overweight incidence in children for its high calorie density. More frequent fast food consumption is associated with higher risk of being overweight (Braithwaite et al., 2014).

Dietary habits and nutritional status of school children might be highly influenced by school food environment. Besides teacher, street food vendors that are available in schools affect students' behaviour on snack consumtption. Manulu and Su'udi (2016) conducted a review study about monitoring policy for improving food safety on street vendors. It was reported that the policies to create socialization programs were sufficient, but the implementation was not well coordinated among authorities. Furthermore, the availability of a school canteen which provides healthy and hygiene foods need to be emphasized. The school canteen that is supervised by school accomodates students to consume healthy food.

Conclusion and Recommendations

In summary, this study confirmed the hypothesis that school children from different environment showed different dietary habits and nutritional status. The stunting incidence was significantly higher in rural area and overweight was higher in urban area. Other than that, total daily intake of energy was higher in urban area. Dietary habits of urban children were better that were indicated by higher chance to have regular breakfast and consumption of fruit, dairy, and meat. This evidence might be led by environmental condition that was shaped by family income, education, and cultural believe. A comprehensive policies need to be implied in each dwelling area as students have different dietary patterns, especially in school environment where education process are mostly taken. Teachers as the major educator in school play important role to relay the information about nutrition. Nutrition intervention is not only required for students, but also parents as the main nutrition provider.

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Conflict of Interests

The authors hereby declare that there is no conflict of interests.

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