

Household Income and Unbalanced Diet Among Urban Adolescent Girls

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Abstract: Dietary intakes are important for adolescent girls' growth and development. Not all adolescents have an adequate daily intake, particularly in urban areas which have a high disparity of household income. This study was aimed to examine the relationship between household income and dietary intakes among adolescent girls in urban areas. This cross-sectional study included 132 subjects aged 12-16 years old, conducted in Junior high school in Surabaya City, East Java, Indonesia. Dietary intakes were obtained by using 24-hour dietary recall method. Spearman's rank correlation was applied to analyse the association between household income and dietary intakes. High disparity of household income was found in this study with median IDR 4,000,000 (~\$308). Adolescent girls had low dietary intakes with median as follows, energy 1235kcal, protein 45.1g, fat 46.1g, carbohydrate 141.6g, iron 5.0mg, calcium 182.8mg. The proportion of energy from carbohydrate was 49.5%, fat 34.9% and protein 14.8%. There was a significant correlation between household income with protein intake ($p=0.010$, $r=0.224$) and energy proportion from protein ($p=0.043$, $r=0.177$). Generally, adolescent girls eat an unbalanced diet, with less carbohydrate and high fat. Urban adolescent girls with low household income have a low protein intake.

1 INTRODUCTION

Dietary intakes are important for adolescent girls' growth and development. Adolescence is a crucial time for puberty and body image development. Negative body image, which includes body dissatisfaction, is a strong predictor of disordered eating behaviours. Bad eating behaviour can lead to malnutrition (Reel et al, 2015). Not all adolescents have an adequate intake (Badan Penelitian dan Pengembangan Kesehatan, 2014). Poor intake can lead to malnutrition (Branca et al, 2015), delay in or faster sexual maturation (Soliman et al, 2014), and not reaching optimal catch up growth (Modan-Moses et al, 2012). Adolescent eating behaviour is influenced by personal factors, physical, social environment (Salvy et al, 2012) and socioeconomic factors (El-Gilany and Elkhawaga, 2012).

There have been many studies about dietary intake and its determinants among female adolescents (de Andrade et al, 2016), including association between socioeconomics and diet quality (Darmon and Drewnowski, 2008). Few studies have been

conducted on dietary intake and its correlation with household income in Surabaya City with high income disparity. The purpose of this study was to examine the relationship between household income and dietary intakes among adolescent girls in urban area.

2 METHODS

This cross-sectional study included 132 subjects aged 12-16 years old, conducted in Santa Agnes and Unggulan Bina Insani junior high school in Surabaya City, East Java, Indonesia. The two school represent the diversity of household socio-economic in urban area (low-high income household). Dietary intakes were obtained by using 24-hour dietary recall method. Energy and nutrient intakes were calculated by Nutrisurvey (2007). Descriptive analysis was determined by median, minimum, maximum and proportion. Energy proportion from carbohydrate, fat and protein were categorised into

two groups (carbohydrate: <55% energy and ≥ 55% energy; fat: < 30% energy and ≥ 30% energy; protein: < 15% energy and ≥ 15% energy) (Hardinsyah et al, 2014). Spearman’s rank correlation was applied to analyse the correlation between household income and dietary intakes and p value <0.05 was considered statistically significant.

3 RESULTS

High disparity of household income and dietary intake was found in this study. Household income median was IDR 4,000,000 per month (1 USD = around IDR 13,000). The lowest household income was IDR 500,000 (≈\$38) and the highest was IDR 50,000,000 (≈\$3846) per month. Table 1 shows that dietary intake of adolescent girls in urban areas was below the adequacy level. Adolescent girls had low dietary intakes with median as follows: energy 1235kcal, protein 45.1g, fat 46.1g, carbohydrate 141.6g, iron 5.0mg and calcium 182.8mg. High disparity in dietary intake can be seen from the lowest intake and the highest intake.

Table 1: Median of household income and dietary intake

Variable	Median (min; max)
Household income (IDR/month)	4,000,000 (500,000; 50,000,000)
Dietary intake	
Energy (kcal)	1235 (374; 4027)
Protein (g)	45.1 (8.8; 171.5)
Fat (g)	46.1 (4.2; 185.1)
Carbohydrate (g)	141.6 (24.9; 821.0)
Iron (mg)	5 (0.8; 71.0)
Calcium (mg)	182.8 (25.6; 1886.8)

Based on the proportion of energy from carbohydrate, fat and protein, adolescent girls have an unbalanced diet. Table 2 shows that energy proportion from carbohydrate was 49.5%, fat 34.9% and protein 14.8%. More than half of adolescent girls have a low energy proportion from carbohydrate and protein, contrarily with energy proportion from fat. Generally, adolescent girls eat an unbalanced diet with less carbohydrate, protein and high fat.

Table 2: Energy proportion

Energy Proportion (%)	n (%)
Carbohydrate	
< 55% energy	85 (64.4)
≥ 55% energy	47 (35.6)

Median (min; max)	49.5 (10.9; 90.5)
Fat	
< 30% energy	48 (36.4)
≥ 30% energy	84 (63.6)
Median (min; max)	34.9 (4.5; 70.9)
Energy Proportion (%)	n (%)
Protein	
< 15% energy	69 (52.3)
≥ 15% energy	63 (47.7)
Median (min; max)	14.8 (2.7; 28.5)

Correlation between variables in this study can be seen in Table 3. Protein intake (p=0.010, r=0.224) and energy proportion from protein (p=0.043, r=0.177) have a positive correlation with household income. There was no significant correlation for energy, fat, carbohydrate, iron and calcium with household income.

Table 3: Correlation between dietary intake, energy proportion and household income

Variable	r	p
Intake of energy (kcal)	0.083	0.346
Intake of fat (g)	0.054	0.535
Intake of protein (g)	0.224	0.010
Intake of carbohydrate (g)	0.054	0.535
Intake of iron (mg)	0.159	0.069
Intake of calcium (mg)	0.025	0.780
Energy proportion from carbohydrate (%)	-0.043	0.627
Energy proportion from fat (%)	-0.009	0.920
Energy proportion from protein (%)	0.177	0.043

4 DISCUSSION

Household income of adolescent girls are very diverse, from IDR 500,000-50,000,000. This high disparity income can lead to high differences of food access. The median of adolescent household income was higher than Surabaya minimum wages (IDR 3.296.212). Higher incomes enhanced the sustainability of food access (Adom, 2014).

Table 1 shows that adolescent nutrient intake was below the recommended dietary allowance (RDA). RDA for adolescent girls was: energy 2125kcal, protein 69g, fat 72g, carbohydrate 292g, iron 26g and calcium 1200mg. Low nutrient intake can cause suboptimal growth (Alshammari et al, 2017) and development (Solimin et al, 2014).

Unbalanced diet among adolescent girls is found in this study with a high energy proportion from fat

(>30%) and low energy proportion from carbohydrate (<55%) and protein (<15%). Adolescents eat a lot of fried food, so they have a high energy proportion from fat. Table 3 shows that there was a significant association between protein intake and energy proportion from protein with household income. This implies that parents with higher incomes can fulfil their children's protein intake better than those of low incomes. Animal sources of protein have a better quality than non-animal protein. But, animal protein prices are more costly than non-animal. Muzayyanah et al. (2017) revealed that increase in household income can improve the animal protein consumption. Darmon and Drewnowski (2008) in their review stated that socioeconomic status can influence diet quality and diet cost. People with lower socioeconomic status have a lower diet quality than higher ones. There was no significant association between other nutrient intake with household income. This may be because a result of the homogeneous data of nutrient intake.

Limitation of this study was dietary intake collected using 24-hour recall. This method has recall bias and is not representative for micronutrient intake. The trained enumerator questioned and probed to reduce the recall bias and food picture were used to visualise the portion size.

5 CONCLUSIONS

Adolescent girls in urban area eat an unbalanced diet, with high fat and less carbohydrate. Urban adolescent girls with low household income have a low protein intake.

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