

## Parent, Peer, and Economic Status on Fat Intake in Adolescents

### *Pengaruh Orang Tua, Teman Sebaya, dan Status Ekonomi terhadap Asupan Lemak pada Remaja*

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#### Abstract:

*Fat intake among adolescent is on rise. Excessive fat intake can contribute into obesity. Several environmental factors associated with fat intake, including peer support in adolescents. This study aims to verify the correlation between peer support and fat intake. Cross-sectional study, includes 120 adolescent aged 15 to 18 years old in Surabaya. Sociodemographic characteristics were gathered through structured interview using questionnaire. Peer support was assessed using self-administered questionnaire. Fat intake was obtained from recall 24 hours. Analysis data was using Pearson and chi square test. Of 120 adolescents, 66.7% have excessive fat intake and peer support score up to 10.52 ±2.92. Majority respondents have middle-high wealth index (96.7%), and highly educated parents for both father (75.0%) and mother (82.5%). However, there is no correlation between peer support and fat intake. Nevertheless, only mother's educational level has a significant association with fat intake ( $p = 0.004$ ). Education is an important factor in improving health outcomes through enhances knowledge and literacy including to limit fat intake. However, higher education merely is not adequate to ensure better health and nutrition awareness. As a result, it needs to be underscored for the government to establish regulations that support and offer nutritional education, including for parents of adolescents.*

**Key word:** Parent, Peer, Economic status, Fat Intake, Adolescent

## 1. INTRODUCTION

Fat is one of the macronutrients required for energy storage. The requirement for fat can be reached with 20 - 25% of total calories per day. The Ministry of Health recommends that fat consumption not exceed 67 grams per day, which is equivalent to five teaspoons of cooking oil [1]. The shift in dietary patterns is dominated by high-density foods which can contribute to excessive fat intake in modern society, including adolescents [2]. According the previous study, there is significant increasing fat intake for ten years (2007 - 2017) among adolescent. The total fat intake shows at 54.3 gram to 61.8 gram and energy from fat at 21.7% kcal to 25.2% kcal [3]. This is in line with other studies which found that only 24.9% of adolescents had a good proportion of nutritional balance, where this proportion tended to be more fat than other nutrients [4]. The average proportion of energy from fat in adolescents reaches 25 - 29%, it is more than recommendation from Indonesian Health Ministry (20 - 25%) [5].

Adolescence is a transitional phase between childhood and adulthood, that is frequently experience nutrition issues, including obesity [6]. Excessive fat consumption over a long period of time can cause obesity in adolescents [7]. Data from the Indonesian Health Survey from 2018 to 2023 shows a decrease in obesity prevalence of only 0.4% for ages 15-13 and 1.4% for ages 16-18 [8,9]. However, this rate of decline

has not yet reached the national target, where the target for obesity reduction is 3% by 2030 [10]. Adolescent with obesity have higher risk to develop some non-communicable diseases such as cardiovascular and diabetes type 2 in adulthood [11]. Therefore, it is important to tackle obesity among adolescents as a priority.

Through improving diet, especially by reducing excess fat intake to achieve optimal energy balance [12]. Fat consumption as part of a dietary pattern is frequently regulated by environmental factors [13]. Adolescents are a subpopulation that has attained cognitive independence in decision-making [14]. However, often their dietary preferences are still heavily influenced by environmental factors, such as family socioeconomic status and peer influence [15]. Developmentally, Parental support for the adolescent's fat intake begins in childhood and continues until the adolescent becomes more independent from their parents [16]. The economic issue has the ability to influence adolescent fat intake. It was because adolescents' economic condition reflected their purchasing power, particularly for food. Adolescents from higher socioeconomic backgrounds can spend more money on food with the pocket money they earn [15].

Peer pressure is another factor that can influence fat intake. As adolescent get older, they spend more time with their pals. Adolescents are more influenced by their peers than children and preadolescence.[14]. Therefore, peers also play a significant role in determining dietary preferences, particularly in influencing and shaping adolescent behaviour, either positively or negatively. Peer can influence to consume less fat or high-fat foods. However, research examining the relationship between peer support and fat intake among adolescents remains unclear. Therefore, further research in this area is needed. [17]. Considering the increased influence of peer support during adolescence and its potential to influence fat intake, it is important to examine how peer support may impact eating habits, particularly those related to fat intake, among adolescents. Therefore, the purpose of this study was to examine the correlation between peer support and fat intake among adolescents.

## **2. METHODS**

### **Study Design**

A cross-sectional study to assess the correlation peer support and fat intake among adolescent aged 15 – 18 years old in Indonesia. This study was conducted in Surabaya, one of metropolitan city with a higher of adolescent obesity prevalence than the national average [18]. This study has been implemented on September - December 2022.

### **Respondent**

The minimum sample size was calculated using the correlation formula for a single cross-sectional study. This study involved randomly selected public and private high schools. Twenty students were randomly selected from each school from the first and second grades. The total sample size for this study was 120 high school students, who were then referred to as respondent. In addition, respondent exclusion criteria included having a physical disability, following a certain diet, undergoing medical therapy, and being unable to communicate normally.

### **Study Procedure**

This study was approved by the Institutional Review Board from the Ethical Committee from Medical Faculty, University of Indonesia and Dr. Cipto Mangunkusumo General Hospital (FKUI-RSCM) with number KET-573/UN2.F1/ETIK/PPM.00.02/2022.

## Measurement

### A. Assessment of Fat Intake

Fat intake was assessed by nutritionist using 24-hours recall form. The recall was conducted on weekdays when they are in school. Before recall, nutritionist was trained Multiple-Pass Interviewing (MPI) method. This structured method uses 5 steps designed to ensure complete and accurate food recall to reduce bias in food recall [19]. During the data collection process, nutritionists used food picture books to help respondent estimate the portion sizes of the foods consumed.

### B. Assessment of Peer Support

Peer support is the influence of an adolescent's peers, which can take the form of emotional support, actions, material support, advice, or knowledge. To assess peer support, respondent will be asked to complete a peer support questionnaire and respond using a Likert scale. Peer support will be measured using four questions. The questions are as follows: *I have a friend who... eats a lot of fruit, vegetables, drinks water instead of soft drinks, and wants me to have breakfast every morning*. The score ranges from 0 (not very supportive) to 20 (very supportive). This instrument was adopted from School Physical Activity and Nutrition (SPAN) Survey and can be filled as self-administered questionnaire [20]. We also conducted the pre-testing to test the validity and reliability of questionnaires with Cronbach alpha 0.614.

## Data Collection

Before data collection, researcher give the inform consent to the adolescent's parent. If parent agreed to involve their adolescent join in this study, researcher give the informed assent to the adolescent about their willingness in this study. After that, data collection can be started with interviewed sociodemographic questionnaire and 24 hours recall and filled the peer support questionnaire.

Sociodemographic interviews were conducted to obtain respondent characteristics. The questionnaire included name, age, gender, parental occupation, and parental education level. Economic status was assessed using a wealth index consisting of ownership of electricity and household durable goods. A score of two was assigned to each durable good owned by the respondent and a score of one to each durable good not owned by the respondent. The total score for each respondent was multiplied by a coefficient obtained from the Indonesian Demographic and Health Survey (IDHS). The results were categorized into two groups (low-middle  $\leq 0.07$ ; middle-high  $\leq 1.26$ ) [21].

## Data Analysis

Univariate analysis was used to describe respondent' sociodemographic characteristics, such as age, gender, parental education, wealth index, peer support, and fat intake. The data was presented in the numerical and categorical. Numerical data were presented using means and standard deviations, while categorical data were presented using frequencies and percentages.

Bivariate analysis aims to determine whether the relationship between the independent and dependent variables is significant. This study uses several statistical tests depending on the type and distribution of the data. The correlation between peer support and fat intake will be analysed using Spearman's test. While, for parent's education level and wealth index categories on fat intake would be analysed using chi-square test. The signification was shown by p-value, if the p-value <0.05 is significant and vice versa. All statistical analyses in this study were performed using SPSS version 22.0 software for Windows (IBM Corp., Armonk, NY, USA).

### 3. RESULTS

#### Characteristics of Respondents

The study included 120 respondents with an average age of  $16.70 \pm 0.711$  years old. Most of respondent are female (56.7%) with middle-high wealth index (96.7%). The average peer support score is 10.52, where the range score from the minimum and maximum consist of 14.00 – 17.00. Higher peer support scores indicate greater support received for adopting healthier eating patterns in adolescents. The detail of characteristics respondents can be seen in the table below.

Table 1. Characteristics of Respondents (n = 120)

Variables	Mean $\pm$ SD	n (%)
Age	$16.70 \pm 0.711$	
Gender		
- Female		68 (56.7)
- Male		52 (43.3)
Wealth Index		
- Low-Middle		4 (3.3)
- Middle-High		116 (96.7)
Peer support	$10.52 \pm 2.92$	
Fat Intake (g) per day	$86.12 \pm 46.79$	
- <67 g		40 (33.3)
- $\geq 67$ g		80 (66.7)

The fat intake was categorized into two types. The categorized based on the recommendation from Indonesia's Health Ministry. Respondent who consumes more than 67 grams of fat, can be categorized as having excess fat intake. According to the present study, majority respondents have excessive fat intake (66.7%).

Then, in this study also explored regarding the characteristics of respondent's parent. The variables of characteristics consist of education attainment and occupation either for both of father and mother. The data is dominated by fathers and mothers with an education level of 12 years or more, respectively (75%) and (82.5%). The detail of variables can be seen in this table below.

**Table 2. Characteristics of Respondents' Parent (n = 120)**

Variables	Father		Mother	
	n	%	n	%
Parents' education				
< 12 years	21	17.5	20	16.7
≥ 12 years	90	75.0	99	82.5
N/A (pass away)	9	7.5	1	0.8
Parent's occupation				
Civil servant	6	5.0	5	4.2
Private sector employee	50	41.7	13	10.8
TNI / POLRI/ ABRI	7	5.8	0	0
Entrepreneur	31	25.8	13	10.8
Labor	2	1.7	0	0
Retired	2	1.7	2	1.7
No work	1	0.8	78	65.0
Others	12	10.0	8	6.7
N/A (pass away)	9	7.5	1	6.7

Parent's education (educational attainment < 12 years is maximum graduated from junior high school = 1, educational attainment ≥ 12 years is at least graduated from senior high school or degree = 2)

The occupation of father is dominated by private sector employee (41.7%), while for mother was majority have no job (65.0%). Then, it is followed by as entrepreneur (25.8%) for father, and as private sector employee and entrepreneur (10.8%) for mother. In this data can be conclude that most of breadwinners for adolescent is father.

### Factor Associated on Fat Intake

There are several environment factors that have potential to influence the fat intake in adolescents. They are peer support, parent's education level, and wealth index categories. Based on the Kolmogorov-Smirnov test the peer support score and fat intake were not normally distributed. Hence, the test statistic was using spearman. Results in this study was not found a significant correlation between peer support and fat intake ( $p$ -value > 0.05). Table of analysis data can be seen in this below.

**Table 3. Correlation between peer support and fat intake among adolescents (n = 120)**

Peer support	Fat Intake	
	r	p-value
	0.046	0.618

Peer support: support for healthy diet by peer (higher score, higher support)

Another factor that has been assessed in this study namely parent's education and wealth index categories on fat intake. According to the table 4, there are differences number of respondents among education of father and mother as well as wealth index.

We have selected cases that have no N/A answer. We selected cases that had no N/A answers. After selecting the cases, only 111 adolescents answered their father's education level, 119 adolescents answered their mother's education level, and all adolescents were able to answer questions about wealth. The analysis data showed there was no significant correlation between father's education and fat intake. Furthermore, there is no significant association between wealth index and fat intake. There are more than 5% probability of coincidence in that relationship. The coincidence can be caused by other confounder variables.

**Table 4. Parent's Education and Wealth Index on Fat Intake among Adolescents**

Variables	Fat Intake (g/day)		p-value
	< 67 g n (%)	≥ 67 g n (%)	
Father's education level (n = 111)			
< 12 years	7 (18.4)	14 (19.2)	0.923
≥ 12 years	31 (81.6)	59 (80.8)	
Mother's education level (n = 119)			
< 12 years	12 (30.8)	8 (10.0)	0.004*
≥ 12 years	27 (69.2)	72 (90.0)	
Wealth Index Category (n = 120)			
Low-Middle	2 (5.0)	2 (2.5)	0.600
Middle-High	38 (95.0)	78 (97.5)	

\*p-value <0.05

Among those associations, only mother's education level that is found a significant relationship with fat intake. Based on the table above, 69.2% of mothers with a high level of education (≥ 12 years) had adolescents with a fat intake of no more than 67 grams. However, 90% of mothers with a high level of education also had adolescents with excessive fat intake (≥ 67 g). While this is a significant difference compared to mothers with a low level of education (< 12 years), this finding suggests that education alone is not sufficient to control fat intake.

## 4. DISCUSSION

### Characteristics of Adolescent

The study's sample was dominated by female adolescents. Most respondents also had a middle to upper-income level. The economic status of urban communities can influence purchasing power, including food. Higher household economic status corresponds to higher food purchasing power [22]. However, this is not always directly proportional to food diversity [23]. It may be caused the food prices in urban area tend to be more expensive than in rural area [24]. There are certain foods that are affordable for most of urban people, such as energy-dense food that contain high carbohydrate, sugar, and fat [25].

In this study, the majority of adolescent had excessive fat intake, indicated by consuming more than 67 grams of fat per day, exceeding Indonesian Ministry of Health's recommendation. This result aligns with previous research that also found 65% adolescent had excessive fat intake [26]. The dietary consumption can be influenced by some factors, including the snacking habit [27].

Another study that has been conducted in Indonesia showed there are 54.2% adolescent have snacking habits [27]. Snacks are an effortless and quick way to satisfy cravings. Snacks are small quantities of food consumed in between main meals. They can be savory or sweet and sometimes provide energy. Large quantities of high-energy snacks significantly increase fat consumption. Snacking is also a common part of adolescent eating habits [28].

Eating habits have also become a nutritional problem in adolescents [29]. Uncontrolled eating habits can lead to excessive energy consumption and potential obesity. adolescents who overeat will consume excess calories, which will be stored as fat in their bodies, in addition to consuming high-fat foods. This condition, over a long period of time, can contribute to childhood obesity [30]. Therefore, it is important to regulate the eating habit among adolescent, that is commonly also influenced by environment factor such as parent, peer and economic status [31].

### **Peer support, father's education, and wealth index on fat intake**

Adolescents can spend more their time with peers [32]. Therefore, peer support is considered to be able to influence on attitudes of adolescents, including the eating habit [31]. However, in this present study, not found a significant correlation between peer support and fat intake. This result is in line previous study in Surabaya that also found peer influence is not significant correlate with any domestic foods such as meatball (p-value = 0.935), fried rice (p-value = 0.545), as well as instant noodle (p-value = 0.737). A different result with other foods, particularly on the western foods such as french fries (p-value = 0.016), beef burger (p-value = 0.029), chicken burger (p-value = 0.025) and waffle (p-value = 0.014) [33]. It may be related with certain foods has a prestige value [34]. Some of adolescent get peer influence through foods that can add a social value of individual [35,36]. Generally, food that has social value contain high-fat, sugar or sodium, that is categorized as unhealthy foods [33,37]. Regarding the social influence, it depends on the definition. In most cases, peer influence is more related with encouragement to have unhealthy eating habit [17]. Meanwhile, in this study, peer support was assessed to determine whether the greater the peer support, the healthier the eating habits. The association between peer support and healthier eating habits is relatively rare and not culturally relevant, particularly in urban communities [38].

Global research shows that parents play a key role in shaping eating habits. Parental background can also be a factor in obesity through eating habits [39]. A father's education level can impact a household's economic status. This is likely due to the fact that most fathers in Indonesia are breadwinners and heads of households [40,41]. Although education can influence on knowledge and mindset of father, most of fathers are not involved in determining food preference or eating habit for adolescent at the household level [42]. It is in line with the study from [43] that also found no significant result between father's education and nutritional status in adolescents.

According to a prior narrative review, men are less conscious of the need to encourage adolescents to eat healthily and frequently delegate this responsibility to their spouses, who provide as the family's primary caregivers [44]. Whereas, if a father can be involved in parenting and making food choices at home, it creates a greater opportunity to improve adolescent eating patterns at the household level [45]. Nonetheless, several studies still found that mothers have more impact on their adolescents's diet than fathers [46]. The impact of father's education will be more noticeable on the type of work and economic level of the household [40]. Through economic status, this will affect purchasing power and food security at the household level, where these

conditions can contribute to eating habits, food preferences, and dietary diversity among adolescents [47].

It is commonly established in the literature that diet quality and socioeconomic status (SES) are positively correlated [48]. Household economic status can be measured using a wealth index. Economic status is not always determined by income, but also by the material goods owned [49]. The higher the level of household welfare, the greater the potential for adolescents to buy food [50]. Adolescents from lower SES are more likely to consume high-fat, sugary, or high-sodium foods, which tends to be an unhealthy eating habit. That phenomenon is due to most of the unhealthy food choices having affordable prices [51]. However, the present study did not find a significant association between wealth index and fat intake in adolescents. The result of this study is similar to a study from Turkey that also found no significant relationship between socioeconomic status and eating habits [52]. Moreover, awareness or knowledge level about healthy foods also can influence food choice among adolescents. Even if adolescents with high SES are not complemented by adequate nutritional education, they will tend to have an unhealthy eating pattern [53]. Adolescent dietary disparities based on socioeconomic status must be verified by high-level research involving more food groups [54]. Economists have discovered that when other characteristics such as education and nutritional awareness are included into consideration, income gaps become less significant. Recent research has revealed a wide range of food environment measurements. Food prices alone cannot clarify poor nutritional consumption [55]. In this case it can be seen that the food situation is multifactorial, and economic status does not always become a direct determinant. In addition, the less variety of economic status in this sample is a limitation of this study.

### **Mother's education and fat intake**

Mothers' education has a greater influence on their children's eating habits. It may be due to the mother's education has effect on nutrition knowledge [56]. In the previous study, between high and low nutritional knowledge groups, only the mother's education level showed a significant difference. According to the study, mothers with higher education levels can reduce the chance of unhealthy dietary patterns in adolescents by 74% [57]. A similar finding from in this study, that showed a significant association between mother's education level and fat intake.

However, data depicts the differences perspective. Mother with high education level not only have adolescent with fat intake less than 67 gram per day, but many also have adolescent with excessive fat intake. This finding is consistent with another study that discovered women with higher levels of education are 0.409 times more likely to have overweight or obese adolescents than mothers with lower levels of education (OR=0.409, 95% CI=0.225-0.742) [7]. Mother's educational attainment can have a direct impact on children's eating habits. Because mothers are closer to their children and can supply the essential food without limiting their intake. The availability of food in the home is greatly influenced by parents, who also have the power to impose dietary restrictions on their children [7,58]. The results of research by Feng et al. found that mothers with higher education were 2,170 times more likely to have overweight adolescents compared to mothers with only low education [59]. One possible explanation for this result may be that there is another factor that can contribute directly toward dietary intake in adolescents.

A study from Wageningen University, in its multivariate analysis, when the variable of parental education level was employed as a control, the effect of nutritional literacy

remained substantial, demonstrating that nutritional literacy still plays an independent role [56]. This is a noteworthy finding because it implies that, while higher levels of general education are beneficial, improving nutrition-specific knowledge is still necessary. These findings highlight the need of promoting nutrition literacy in policy agendas, since it can have a direct and statistical impact on health outcomes like dietary intake [60]. Higher education is not sufficient to guarantee increased health awareness or optimal feeding practices among mothers. As a result, it is essential for the government to develop policies that promote and provide nutritional education [61].

However, this study also has some limitations. First, the respondents in this research were less variety, particularly related their characteristics. This causes lack of generalization. Second, the peer support questionnaire does not consider negative impact on eating habit. the content becomes less relevant to the habits of the respondents in this study. Where, peer commonly encourage for negative impact on eating habit. Third, due to cross-sectional study design cannot depicts a possible causal relationship between peer support and fat intake. These limitations can be a reference for further research in these areas.

## 5. CONCLUSION

There is no significant correlation between peer support and fat intake. Compared with other factors, only education attainment of mother that have a significant association with fat intake in adolescents. The important finding underscores that parent education in beneficial to determine the food intake for adolescents. A woman, either as housewife or working mom, needs have higher education. Because education is an essential social factor for favorable health outcomes since it enhances knowledge, health literacy, and improved healthy choices including to regulate fat intake. Nonetheless, higher education only is not sufficient to guarantee increased health and nutrition awareness. As a result, it is essential for the government to develop policies that promote and provide nutritional education including for adolescent's parent.

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