



Factors related to fruit and vegetable consumption in adolescents

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ABSTRACT

Fruits and vegetables are good sources of fiber and are the most important among all fibers and other foods. The nutrients contained in fruits and vegetables have many benefits, especially for adolescents, especially in preventing degenerative diseases. The study sample totaled 120 students. Data analysis consisted of univariate analysis, bivariate analysis using chi-square statistical tests, and multivariate analysis using multiple logistic regression tests. The results showed that most adolescents consume less fruits and vegetables (78.3%). Based on bivariate analysis known that sex (p-value 0.423), nutritional knowledge (p-value 0.655), availability of fruits and vegetables (p-value 0.503), preference (p-value 0.474), fathers's education (p-value 0.471), maternal education (p-value 0.332), father's job (p-value 0.115), maternal employment (p-value 0.242),

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1. INTRODUCTION

Adolescent nutritional status is influenced by factors of eating behavior, psychology, biology, nutritional knowledge, socio-economics, body activity, and body metabolism (Adiningsih, 2003). There are quite a number of problems that have a negative impact on the health and nutrition of adolescents. Therefore, the needs of adolescents physically and psychologically must be considered. Physical needs can be fulfilled one of them through the fulfillment of the necessary nutrients. The speed of physical growth of adolescents is the second fastest after infancy. Approximately 20% of a person's height and 50% of their weight is achieved during this period. That is why sufficient nutritional intake is needed to ensure optimal growth (Khomsan 2004).

Compared to other sources of dietary fiber, vegetables and fruits are the best and main sources. These fibers are useful for preventing various degenerative diseases, such as colon cancer, diverticulosis, atherosclerosis, heart problems, diabetes mellitus, hypertension, and kidney stone disease. Vegetables and fruits are also a source of chlorophyll which plays a role in capturing free radicals in the body (Astawan, 2008). But unfortunately, the consumption of fruits and vegetables in adolescents is still relatively low. This is in line with the opinion of Arisman (2004) who said that the current diet of teenagers tends to consume less fruits and vegetables.

The need for vitamins, minerals and other nutrients can be found in fruits and vegetables. Without consuming fruits and vegetables, children's daily nutritional needs such as vitamin C, vitamin A, potassium and folate are not met. Therefore, fruits and vegetables are good food sources for children's nutritional needs for growth. Currently children may not appear to be at risk for their health, but current eating habits will develop for a better life as adults (Allen, 2005). Teenagers must also pay attention to their physical development and growth which is the second fastest after infancy.

According to Jahari and Sumarno (2001), the results of a national survey concluded that the Indonesian population still lacks fiber consumption. As many as 80% of Indonesia's population consumes fiber ≤ 15 grams/person/day, of which 60% consumes fiber ≤ 10 grams/person/day. While WHO recommends fiber intake of 25-

30 g/day (Almatsier, 2005). The problem of low fiber consumption is not only found in urban areas, but also found in rural areas. Even though the fiber consumption situation in rural areas is relatively better than in urban areas, in general it is still far from what was expected. This condition is of course very worrying for the Indonesian people, especially residents who live in rural areas.

In addition to the low level of fiber consumption, the prevalence of diseases due to lack of fiber consumption is quite high. The WHO report (2003) shows that as many as 31% of heart disease and 11% of strokes worldwide are caused by a lack of fruit and vegetable intake in the body. According to Veer et al (1999) that mortality from cardiovascular disease in the Netherlands can be prevented by around 6-28% by increasing fruit and vegetable consumption 1-2 times/day. Another impact mentioned since 1990 has been proclaimed in the Dietary Guidelines for Americans that the minimum recommendation for consuming fruit is 2 times/day and 3 times/day for consumption of vegetables or the equivalent of consuming fruits and vegetables 5 times/day. But various studies say that most teenagers cannot fulfill these recommendations.

Factors that influence a person's food consumption associated with nutritional status include family income, food prices, level of management of land and yard resources, family purchasing power, socio-cultural background, level of education and knowledge of nutrition, and number of family members (Apriadji, 1986).

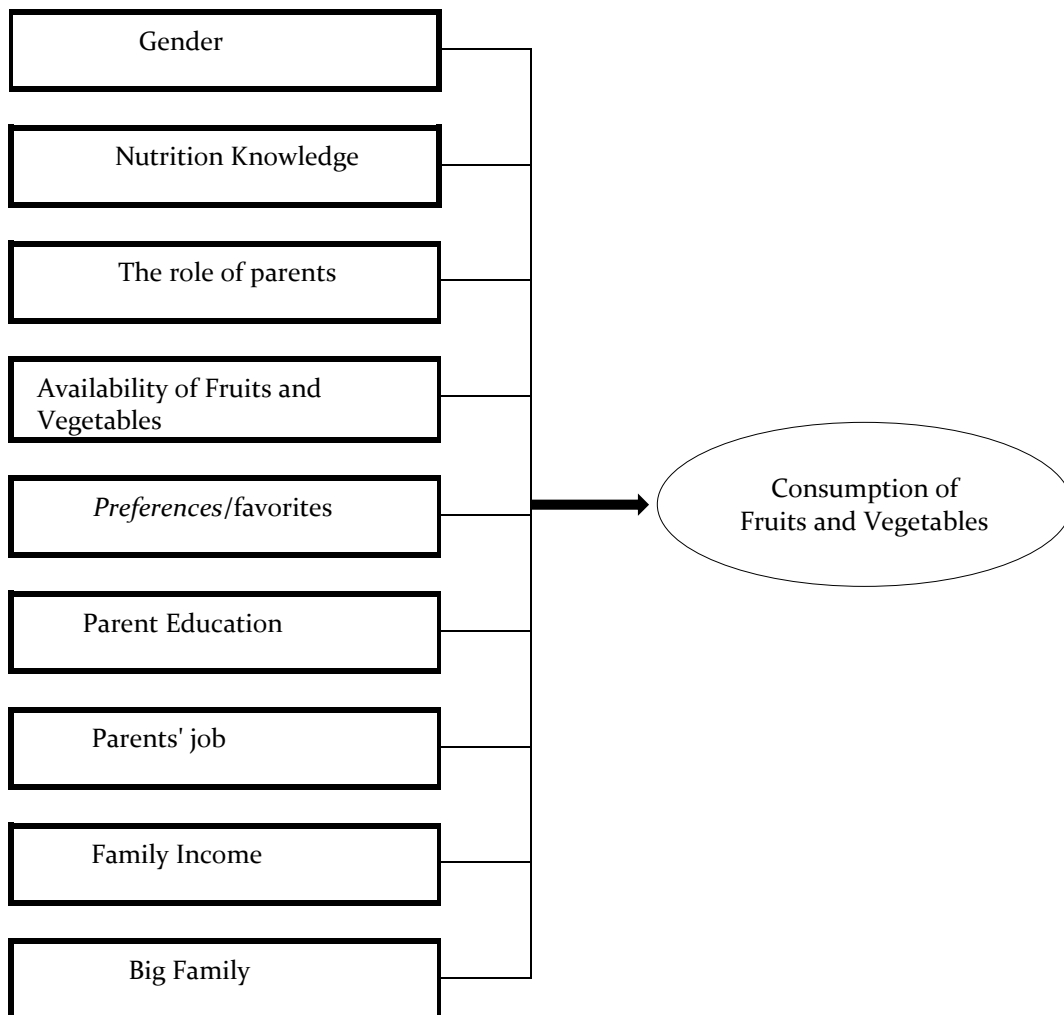
Several studies have shown that gender can affect fruit and vegetable consumption (Reynold, 1999). In a study conducted by Milligan et al (1998) in Australia, it was found that female adolescents (4.1%) consumed 2 fruits/day and vegetables 5 times/day higher than males (2.5%). However, a study in Augusta Georgia showed no relationship between gender and fruit and vegetable consumption (Domel, 1996).

2. RESEARCH METHOD

This research was conducted using a quantitative method with the aim of seeing and knowing the factors related to fruit and vegetable consumption in adolescents at SMAN 57 West Jakarta. This study uses a cross-sectional design or cross-sectional study, where data collection for independent variables and dependent variables is taken at the same time.

The reason for the influence of the mass media variable was not included in this study because most of the media broadcast fast food advertisements and teenagers are more likely to be attracted by fast food consumption than fruit and vegetable information. The influence of peers is not included because it is homogeneous, where the population in this study is only in one place, namely at SMAN 57 where there is no variation in the influence of friends. Socio-cultural variables were not included in this study because they were not a priority intervention for researchers. Age was not included because it was homogeneous, all samples taken in this study ranged in age from 16-18

years and belonged to the adolescent category. Psychosocial development is not included because it is difficult for researchers to study because it relates to a person's psychology.



In this study, the authors determined the number of samples using the hypothesis test formula 2 proportions.

$$n = \frac{\{Z_{1-\alpha/2} \sqrt{2 P(1 - P)} + Z_{1-\beta} \sqrt{P_1(1 - P_1) + P_2(1 - P_2)}\}^2}{(P_1 - P_2)^2}$$

Information:

- n = sample size
- Z_{1-α/2} = Significance degree 5% (two tails) = 1.96
- Z_{1-β} = 90% test strength = 1.28
- P = 0.105
- P₁ = the proportion of fruit available at home every day to sufficient fruit consumption = 0.20% (Bahria,2009)
- P₂ = the proportion of unavailability of fruit at home every day against sufficient fruit consumption = 0.01% (Bahria, 2009)

3. RESULTS AND DISCUSSIONS

Description of Fruit and Vegetable Consumption of Youth at SMAN 57 West Jakarta

Consumption of fruits and vegetables in this study was categorized into two, namely insufficient and sufficient (Almatsier, 2001). Adolescents are said to be deficient if they consume fruit and vegetables <14 times/week or consume one of them, said to be sufficient if they consume fruits and vegetables ≥ 14 times/week. Fruit and vegetable consumption was obtained by means of interviews using the Food Frequency Questionnaire method. An overview of the adequacy of fruit and vegetable consumption for adolescents at SMAN 57 West Jakarta can be seen in table 5.2 below:

Table 1. Distribution of Respondents Based on Adequacy of Consumption of Fruits and Vegetables in Youth of SMAN 57 West Jakarta in 2011

Adequacy of Consumption of Fruits and Vegetables	Amount	Percentage
Not enough	94	78.3
Enough	26	21.7
Total	120	100

Based on table 5.2 it is known that out of 120 respondents, more students consumed less fruit and vegetables (78.3%), compared to students who consumed enough fruit and vegetables. The description of fruit and vegetable consumption separately is as follows:

Table 2. Description of Adequacy of Consumption of Fruits and Vegetables

Gender	Amount		Percentage	
	Fruit	Vegetable	Fruit	Vegetable
Not enough	93	87	77.5	72.5
Enough	27	33	22.5	22.5
Total	120	120	100	100

An Overview of Nutrition Knowledge in Adolescents at SMAN 57 West Jakarta

Nutritional knowledge is categorized into two, namely insufficient and sufficient. The respondent's knowledge is said to be lacking, if the respondent's answer is correct < median, it is said to be sufficient, if the respondent's answer is correct \geq median. The description of the distribution of respondents' nutritional knowledge can be seen in table 5.5 below:

Table 3. Distribution of Respondents Based on Nutritional Knowledge of Adolescents at SMAN 57 West Jakarta in 2011

Nutrition Knowledge	Amount	Percentage
Not enough	35	29.2
Enough	85	70.8
Total	120	100.0

Based on table 5.5, it is known that out of 120 respondents, more students have adequate nutritional knowledge (70.8%), compared to students who have less nutritional knowledge.

Description of Availability of Fruits and Vegetables in Youth of SMAN 57 West Jakarta

The availability of fruits and vegetables is categorized into two, namely rarely and frequently. It is said to be rare, if <7 days there are fruits and vegetables at home. It is said often, if ≥ 7 days fruit

and vegetables are available at home. The description of the distribution of fruit and vegetable availability for respondents can be seen in table 5.7 below:

Table 4. Distribution of Respondents Based on the Availability of Fruits and Vegetables in Youth of SMAN 57 West Jakarta in 2011

Availability of Fruits and Vegetables	Amount	Percentage
Seldom	87	72.5
Often	33	27.5
Total	120	100.0

Based on table 5.7 it is known that out of 120 respondents, there were more people who rarely had fruits and vegetables available (72.5%), compared to those who often had fruits and vegetables available.

Overview of Bivariate Analysis Results

Bivariate analysis was used to see the possible relationship between the independent variables and the dependent variable using the Chi Square test analysis. Through the chi square statistical test a Pvalue will be obtained, which in this study used a significance level of 0.05. Research between two variables is said to be meaningful if it has a Pvalue of 0.05 which means H_0 is rejected and H_a is accepted and is said to be meaningless if it has a Pvalue > 0.05 which means H_0 is accepted and H_a is rejected. Furthermore, the results of the bivariate analysis will be explained as follows:

Relationship between Nutritional Knowledge and Consumption of Fruits and Vegetables

The results of the analysis of the relationship between variables of nutritional knowledge and fruit and vegetable consumption in adolescents at SMAN 57 West Jakarta in 2011 can be seen in table 5.16 below:

Based on table 5.16, it is known that the respondents who consumed less fruit and vegetables were found more in students who had adequate nutritional knowledge (80%), compared to students who had insufficient nutritional knowledge (74.3%). Based on the statistical test results obtained Pvalue of 0.655. This shows a Pvalue > 0.05 , thus there is no relationship between nutritional knowledge and fruit and vegetable consumption.

To see the multivariate model, bivariate analysis was first performed between gender, nutritional knowledge, parental roles, fruit and vegetable availability, preferences, family characteristics, and family size with fruit and vegetable consumption variables. The stages of multivariate analysis carried out were selecting candidates to enter the model. In this study there are four variables that will be tested as candidates to enter the model, namely the role of parents, father's occupation, mother's occupation, parents' income. To select model candidates, only variables that have a Pvalue < 0.25 will be included in the multivariate model. The results of selecting candidate models can be seen in table 5.27 below:

Table 5. Selection of Independent Variable Candidates to Enter the Multivariate Model

No	Variable	P-Value
1	Gender	0.423
2	Nutrition Knowledge	0.655
3	The role of parents	0.031*

4	Availability of Fruits and Vegetables	0.503
5	Favorite	0.474
6	Father's Education	0.471
7	Mother's Education	0.332
8	Father's occupation	0.115*
9	Mother's job	0.242*
10	Parents Income	0.023*
11	Big Family	0.796

Based on table 5.27, it is found that among the 11 independent variables, there are four variables that have a Pvalue <0.25. Therefore, the variables that will be included in the model are the variables of parental roles, father's occupation, mother's occupation, and parental income.

Development of a Determinant Prediction Model for Consumption of Fruits and Vegetables

In this modeling all candidate variables are tried together. Independent variables were entered into the model, then variables with insignificant Pwald values (Pwald > 0.05) were removed from the model sequentially starting from the variable with the largest Pwald value. The results of modeling can be seen in table 5.28 as follows:

Variable	Model 1	Model 2	Model 3
The role of parents	0.040	0.039	0.031
Father's occupation	0.384	-	-
Mother's job	0.199	0.182	-
Parents Income	0.039	0.020	0.023
Constant	0.587	0.079	0.162

Based on table 5.28, it is known that this study has three models, the first model shows that the variable father's work and mother's work have a Pvalue > 0.05 and the father's work variable has the greatest Pvalue, so that the next model does not include the father's work variable. Then in the second model, the results of the analysis show that the mother's occupation variable has a Pvalue > 0.05, so that the next model does not include the mother's occupation variable. Furthermore, in the third model, the results of the analysis show that the variable parental role and parental income have a Pvalue of 0.031 and 0.023, respectively. This shows that the variable parental role and parental income is thought to have a relationship with fruit and vegetable consumption in adolescents at SMAN 57 West Jakarta in 2011.

Compilation of the Final Model

After analysis, it turns out that the role of parents and parental income are the main risk factors for fruit and vegetable consumption in adolescents, so the model can be seen in table 5.30 as follows:

Variable	B	Wald	Pwald	OR	95% CI
Income Parent Role	1,077	4,677	0.031	2,935	1.106-7.790
Parent	-0.733	5,178	0.023	0.480	0.256-0.903
Constant	-0.856	1,957	0.162	0.425	

Based on the results of the analysis, it was obtained an OR value of 0.480, meaning that students whose parents' income was low had the opportunity to consume less fruits and vegetables by 0.480 times compared to those whose parents' income was high. So it can be concluded that the variable parental role and parental income are two variables that are thought to have a relationship with fruit and vegetable consumption in adolescents at SMAN 57 West Jakarta in 2011.

Based on the OR values of the two variables that are thought to be related to fruit and vegetable consumption in adolescents at SMAN 57 West Jakarta in 2011, it can be seen which variable is most related to fruit and vegetable consumption. The greater the OR value, the greater the effect. Based on table 5.28, it can be seen that the OR role of parents has the greatest value. Thus the role of parents is the variable most related to fruit and vegetable consumption in adolescents at SMAN 57 West Jakarta in 2011. From the results of the multivariate analysis as a whole, the regression equation obtained is as follows:

With this equation model, it is possible to estimate fruit and vegetable consumption using the variables of the role of parents and family income. This equation shows that insufficient fruit and vegetable consumption will turn into sufficient fruit and vegetable consumption by 1.077 times if students whose parents have advocated fruit and vegetable consumption, insufficient fruit and vegetable consumption will turn into sufficient fruit and vegetable consumption by 0.733 times if the student's parents have high income. The greater the beta (B) value, the greater the relationship with fruit and vegetable consumption.

Based on the analysis carried out, it is known that the determinant coefficient (negelkerke R square) shows a value of 0.149 meaning that the regression model obtained can explain 14.5% of the variation in the dependent variable of fruit and vegetable consumption. Thus, the variable parental role and parental income can only explain the variation in fruit and vegetable consumption variable of 14.5%. While 85.5% is explained by other variables (results attached).

Based on the results of research at SMAN 57 West Jakarta in 2011, it was found that 94 students (78.3%) consumed less fruit and vegetables. This number is more than students who consume less fruits and vegetables, namely 26 people (21.7%). The lack of consumption of fruit and vegetables by students can be seen during research. It is known from several sellers around the school that provide fruit juice and pop ice, that more students buy pop ice than fruit juice.

Based on the results of the analysis, the types of vegetables that were not consumed the most were papaya leaves (69.2%), katuk (66.7%), eggplant (62.5%), urap (61.7%), karedok (60%), lettuce (58.3%), young jackfruit (57.5%), and chayote (55%). The types of fruits that were not consumed the most were kedondong (65%), pickles (58.3%), jackfruit (55.8%), and guava (55%). The types of fruits most often consumed are oranges, mangoes, papayas and guavas as well as vegetables such as spinach and kale. Judging from its availability, the reason for these fruits and vegetables is consumed because they are the easiest to obtain and are available almost all year round. Besides this, the price is also relatively cheap.

4. CONCLUSION

Students who consumed less fruit and vegetables were 78.3%, while students who consumed enough fruit and vegetables were 21.7%. Students with female gender are 55%, while students with male gender are 45%. Students' sufficient knowledge of nutrition is 70.8%, while students' nutritional knowledge is lacking by 29.2%. Parents of students who suggested consuming fruit and vegetables were 52.5%, while parents of students who did not recommend consuming fruit and vegetables were 47.5%. Students whose availability of fruits and vegetables rarely amounted to 72.5%, while students

whose availability of fruits and vegetables often amounted to 27.5%. Students who like to consume fruit and vegetables are 77.5%, while students who do not like to consume fruit and vegetables are 22.5%. Father's education with higher education is 80%, while with low education by 20%; Mother's education with higher education is 67.5%, while those with low education are 32.5%. 8.

The fathers of students who work are 95%, while the fathers of students who do not work are 5% ; 53.3% of student mothers who work, while 46.7% of student mothers who do not work. Students who have parents' income in the high category is 65%, the medium category is 25.8%, while the low category is 9.2%. Students who have large families in the large category are 57.5%, while students who have large families in the small category are 41.7%. Based on the results of the bivariate analysis, it was found that the factors related to fruit and vegetable consumption were the role of parents and parental income. Meanwhile, factors that were not related to fruit and vegetable consumption were gender, knowledge of nutrition, role of parents, availability of fruits and vegetables, preferences, father's education, mother's education, father's occupation, mother's occupation, parental income and family size.

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