

The Difference of Nutritional Intake Insmoker and Non-smoker Adolescents

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Abstract The prevalence of adolescent smoker is increasing as they started smoke at an earlier age. Nicotine is one of substances in cigarettes that might decrease the appetite than decrease nutritional intake. The aim of this study to compare the nutritional intake in smoker and non smoker in adolescent. This analytical cross-sectional study was conducted during February to April 2016 on male adolescent aged 10-19 years in elementary and high school in Jatinangor, West Java, Indonesia. The single interviews 24-hours recall was performed to assess the nutritional intake. The 159 subjects were selected by random sampling, consisted of 78 smokers and 81 non-smokers. The mean difference of carbohydrate, protein and fat intake were analyzed using the t-test with a p-value <0.05 considered as significant. There were significant differences between smoker and non-smoker adolescent in the carbohydrate intake (131.52 g; 162.45 g), protein (36.10 g; 42.54 g) and fat (36.59 g; 40.98 g). It was concluded that there were significant differences in carbohydrate, protein and fat intakes in smokers and in non-smokers adolescents.

Keywords: adolescent, carbohydrate, fat, protein, smoker

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1. Introduction

Adolescence is a period in which a person experiences rapid change in several things, such as body size, body shape, physiology, psychology and social functions. Adolescence is a transitional period between childhood to adulthood. At this time, adolescents begin to act as adults by smoking [1]. Based on the World Health Organization, there are more than 150 million adolescent smokers worldwide, and it continues to increase [2]. Indonesian survey data show the prevalence of smokers is 34.7% meanwhile in West Java is 37.7% [3]. Sixty nine % of Indonesian adolescents are active smokers [4]. By the time the prevalence increased 13-15 years old male Indonesian adolescent smokers during the period of 3 years (2006-2009), which is from 24.5% to 41% [5,6]. The initial smoking age of 10-14 years by approximately 80% during the period of 9 years (2001- 2010). [3] The cigarettes contain 2000-4000 substances. Nicotine is one of the substances in cigarettes that can cause dependence effects [7]. The average content of nicotine in a cigarette is about 10 mg [2]. Nicotine can also increase energy expenditure and decrease appetite that can lose weight [8,9].

Smokers have lower weight than nonsmokers [10]. Stice et al said that the increase of body mass index (BMI) of people who smoke was lower than non-smokers [11]. Dana et al stated that smokers had less healthy eating

habits than nonsmokers [12]. There is no consistent evidence that smokers consume less food than non-smokers [10]. This study aimed to compare the nutritional intake between smoker and non smoker in adolescents.

2. Methods

This was an analytical observational cross-sectional study. The subjects were 10-19 years old male students. The subjects consisted of 5th-6th grade elementary school students (10-11 years old), 7th-9th grade junior high school (11-15 years old), and 10th-12th grade senior high school students (15-19 years old) selected randomly from 6 schools in Jatinangor, West Java, Indonesia. The study was conducted in February to April 2016. The inclusion criteria of this study were 10-19 years old male adolescent who were willing to be involved in this study. The exclusion criteria were adolescents who had a history of chronic diseases such as tuberculosis, chronic diarrhea, diabetes mellitus, chronic liver disease, chronic kidney disease, hypothyroidism or hyperthyroidism. The Ethics Committee of Medical Faculty, Universitas Padjadjaran, approved this study. Permission of primary data collection was requested to the Head of the Regional Development Agency for the Sumedang District and to the principal of each school.

The study process was done in two stages. The first stage was to identify the adolescents' smoking status

using a questionnaire. For the second stage, an interview was conducted using a single 24 hours recall to obtain the information on the subject's nutritional intake. The amount of carbohydrates, proteins, and fats, which were consumed by the subjects in grams. The t-test was used to determine whether there were significant differences in the nutritional intake between smoker and non-smoker adolescents. For the interpretation, we calculated the p value, if the p value > 0.05 then the difference is not significant, and vice-versa..

3. Results

There were 159 male students of elementary, junior, and senior high schools participated in this study. Seven eight subjects were smokers and 81 subjects were non-smokers. The majority of the subjects were 14-16 years old senior high school students. Most of the smokers were also from this group (Table 1).

Table 1. Characteristics of the Subjects

Characteristics of the subjects	Smoker				Total
	Yes (n=78)	%	No (n=81)	%	
Age (year)					
10-13	7	8.97	35	43.21	42
14-16	16.4	52.56	37	45.68	78
17-19	15.1-18.5	38.46	9	11.11	39
School level					
Elementary	6	7.7	21	25.92	27
Junior High	23	29.48	34	41.97	57
Senior High	49	62.82	26	32.09	75

Note: n: total subjects.

Table 2. The Comparison of Nutritional Intake Between Smoker and Non-Smoker Adolescents

Nutritional Intake	Smoker		p value*
	Yes (78)	No (81)	
Carbohydrate (g)	131.53	162.45	0.00
Protein	36.10	42.54	0.00
Fat	36.59	40.98	0.003

* The t-test analysis.

The total carbohydrate intake in smoker adolescents were 131.53 g and non-smoking adolescents were 162.45 g. The difference in carbohydrate intake between the two groups was 30.92 g. The p-value is 0.000, which indicates that there is a significant difference in the carbohydrate intake between both groups. The total protein intake in smoker adolescents were 36.10g and non-smoker adolescents were 42.54 g. The difference in protein intake between the two groups is 6.44 g. The p-value is 0.000, which indicates that there is a significant difference in protein intake between both groups. The total fat intake in smoker adolescents were 36.59 g and non-smoker adolescents were 40.98 g. The difference in fat intake between both groups was 4.39 g. The p-value was 0.003,

which indicated that there was a significant difference in fat intake between both groups (Table 2).

4. Discussion

The study found that smoker adolescents were mostly 14 to 16 years old. This was similar with the study by the GYTS that found the increased prevalence of smokers were mostly in age group 13-15 years old [6,8]. The youngest smoker was 10 years old. The presence of smokers in the age group 10-13 years old, proved that the initial age to start smoking became younger compared with previous years [6].

There were significant differences in carbohydrate, protein, and fat intake between smoker and non-smoker adolescents, as associated with previous studies which stated, the nicotine contain in cigarette may decrease appetite [8,9]. The effect of nicotine in decreasing appetite has influenced most smokers, especially adolescent smokers [13]. Decrease in appetite may affect a person's nutritional intake. Hence, smokers have a lower nutritional intake compared to non-smokers. Nicotine has several mechanisms in decreasing appetite. It may increase leptin concentration and or accelerate leptin-receptor-mediated signaling cascade. Leptin is a peptide which synthesis and release is controlled by the adipose tissue. Leptin receptor activation in central and peripheral nervous system could decrease appetite and increase energy expenditure [14]. Nicotine is also known to decrease appetite by affecting the pathways in the hypothalamus that control eating habits [15].

The results of this study did not support nor reject any previous study. Previous studies showed inconsistent results in proving that smokers consume less nutritional intake compared to non-smokers [10]. A study by Dana et al only stated that smokers had less healthy eating habit [12].

The other factors that might lead to low nutritional intakes are socioeconomic condition such as parents' income and education level. Parents' income may influence food supply and family with high socioeconomic status tends to have better food supply. Parents' education may also influence parenting pattern, nutrition knowledge, and food supply [16]. This study found most smoking adolescents came from a smoking household. At least one of the households was a smoker. This is one of the reasons for the increasing number of adolescent smoker. Families with smoking heads of household have lower allocation for food availability compared to families with non-smoking heads of households [17].

5. Discussion

It was concluded in this study that there were significant differences in nutritional intake between smoker and non-smoker adolescents. The nicotine or other factors such as social, economic, and environmental factors might influence the difference in nutritional intake. The limitation of this study was not conduct matching on socioeconomic factor; which could be one of the confounding factor. Another factor that may lead to bias in this study was the researchers only used single 24 hours recall as a tool to measure food intake..it is recommended to perform further investigation on other factors that might influence a

person's nutritional intake, such as socioeconomic factor. The use of multiple 24 hours recall and food model is highly suggested to obtain better result in measuring the nutritional intake.

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