

The Difference of Lipid Profile among Adolescent Smokers and Non-Smokers at Urban Area in Developing Country

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Abstract Objective Analyze the differences in TC, LDL, and HDL levels between smokers and non-smokers adolescent. **Study Design** This analytical cross-sectional study was performed during February to April 2016 in several senior high schools in Bandung. Subjects were adolescent, aged 15–18 years, who were divided into two groups: smokers and non-smokers using questionnaire. There were 206 boys included in this study, 162 met the inclusion criteria and 44 were excluded. Simple random sampling was performed to obtain 50 smokers and 50 non-smokers for our study. All data were analyzed for mean serum lipid profiles using chi square (χ^2) and MANOVA test with a p value <0.05 considered significant. **Results** The χ^2 analysis showed association between abnormal serum TC, LDL, and HDL levels with smoking status respectively (p=0.006, p=0.025, and p=0.006). MANOVA test results showed significant differences between smokers and non-smokers group in terms of mean±SD TC level (161.7±32.2 and 150.6±19.5), LDL (107.6±29.2 and 92.6±92.6), HDL (38,76±6.39 and 42.8±7.08)) with p value <0,05. **Conclusion** This study shows that serum TC, LDL, and HDL levels in smokers are statistically different compared to those in non- smokers adolescent.

Keywords: smoking, adolescent, lipid profile

Cite This Article: Rizki Handayani, Meita Dhamayanti, and Nanan Sekarwana, “The Difference of Lipid Profile among Adolescent Smokers and Non-Smokers at Urban Area in Developing Country.” *American Journal of Clinical Medicine Research*, vol. 4, no. 3 (2016): 43-46. doi: 10.12691/ajcmr-4-3-2.

1. Introduction

Smoking is one of the leading causes of death in the world that can be prevented. Most smokers begin smoking in adolescence and continue into adulthood [1]. The recent WHO report shows that smoking in the Indonesian teenagers has increased from 12.6% in 2006 to 23.5% in 2010 [2]. *Pusat Data dan Informasi* (Pusdatin) Indonesian Ministry of Health estimates the number of smoking >10 years citizen everyday in 2013 is 48.400.332 lives [3]. Global Youth Tobacco Survey 2014 stated that Indonesia is a country with the highest number of teenage smokers in the world [4]. Smoking in adolescent can be a gateway to other types of drug abuse and can cause various health problems, including frequent upper respiratory infections, delayed lung development, decreased maximum vital capacity, and lung cancer [5,6]. Smoking can also affects fat and lipoprotein metabolism. Smokers tend to have higher total cholesterol (TC), triglyceride (TG), and low density lipoprotein (LDL) level, and lower high density lipoprotein (HDL) than non smokers [7]. Studies on lipid levels of adolescent smokers have been conducted by Waqar, Afrin et al., and Prastyanto et al. [8,9,10]. A case control study, aged 12–19 years old, by Afrin et al. compared HDL level between adolescent smokers and non smokers, showing a significantly lower level of HDL in

adolescent smokers [9]. A cross sectional studies by Waqar (aged 14–19 years) and Prastyanto et al. (aged 15–18 years) showed higher levels of TG and LDL, and lower HDL in adolescent smokers [8,10]. Although studies regarding lipid profile in adolescents have been conducted previously, those studies did not analyze lipid profile simultaneously. This study analyzed lipid profile of adolescents simultaneously using multivariate analysis. The aim of this study was to determine the difference of TC, LDL, and HDL levels between adolescent smokers and non-smokers.

2. Methods

2.1. Setting

This cross-sectional study was performed from February to April 2016 in several middle class high schools in Bandung city, the second most densely populated city in country.

2.2. Inclusion and Exclusion Criteria

Subjects were adolescent, aged 15–18 years, who were divided into two groups: smokers and non-smokers. The smokers were defined as those who had smoke at least once every week for one last year. Subjects who were obese, had chronic illness such as diabetes mellitus, liver