



The Relationship between Smoking and blood glucose at random in engineering student USU in 2016

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Abstract : Smoking is one of serious health problems. The number of smokers in Indonesia increase each day. According to WHO's data, Indonesia is the third country with the largest number of smokers in the world after China and India. The larger the number of smokers, the larger the number disease caused bit as well. One of them is diabetes mellitus. Nicotine which contained in cigarette can affect insulin action system and can impair sensitivity of insulin which increase the levels of blood glucose. The purpose of this study was to look at the correlation between smoking and blood glucose levels and to see if there is a difference between blood glucose levels in light smokers with moderate-heavy smokers. This research is an analytic with cross sectional study design. The result of this research show that the average blood glucose level when it's on the subject is 98.67 mg / dl. Based on Kolmogorov-Smirnov test results, there is no association degree of smoking with blood glucose levels ($p = 0.081$). Chi Square test results also showed no association between any type of cigarettes with KGD ($p = 0.229$), and there is no association between the length of time a person smoking with any KGD when ($p = 1.000$).

Keywords : smoking, blood glucose at random, student.

I. Introduction.

According to the World Health Organization (WHO), Indonesia is the country with the third largest number of smokers after China and India. Increased consumption of cigarettes have an impact on the higher burden of disease caused by smoking, and increased mortality due to smoking. In 2030 an estimated mortality rate of smokers in the world will reach 10 million people and 70% of them come from developing countries. Currently 50% of tobacco deaths are in developing countries. If current trends continue, 650 million people will be killed by smoking, half of productive age and will lose the young age of 20 to 25 years. According RISKESDAS 2013 increased the number of smokers in Indonesia in 2013 compared to 2007. Smoking raises the burden of health, social, economic and environment not only for smokers but also for others. The economic burden arising from expenses to buy cigarettes as well as the cost of treatment for diseases caused by cigarettes. Meanwhile, from the aspect of health, smoking causes cardiovascular disease, cancer, respiratory disease, interfere with pregnancy, peptic ulcers, osteoporosis and etc.¹

Various studies have shown that smoking also raises the tendency to raise blood sugar levels resulting in increased incidence of type 2 diabetes mellitus, smoking contributes to the development of insulin resistance which will increase the incidence of cardiovascular disease. Effects of acute smokers are generating failure event a significant and impaired glucose tolerance in chronic smokers will produce a state of hyperinsulinemia. Research also proves that smoking causes acute failure of the insulin work

Cause by low glucose uptake in areas perifer.² Another study conducted by Syed Tausif Ahmed and Muhammad Asif Memon in Pakistan, showed that smoking was not associated with incident diabetes. The study concluded that there was no relationship between blood glucose, BMI, hematocrit, and hemoglobin in smokers and not smoker.³

Method

This research study is an analytic cross section. Research was conducted on students who smoke in the faculty of engineering USU is still active start November 2016 - December 2016.

The number of samples in this study were 58 people, who have met the inclusion and exclusion criteria. The criteria for inclusion are USU engineering faculty male students who smoked, and willing to become respondents to sign a consent form. Exclusion criteria were Suffer metabolic diseases, especially diabetes mellitus, are undergoing treatment (consumption of drugs that can affect blood glucose levels), a former smoker, obesity (measured by BMI). Respondents filled in a questionnaire that includes questions smoking habits: the number of cigarettes smoked per day, duration of smoking, cigarette type, type of disease ever suffered, as well as the consumption of drugs - drugs. Degrees smokers are classified into light smokers (1-10 cigarettes smoked per day), moderate smokers (11-20 cigarettes per day) and heavy smokers (more than 20 cigarettes per day). Types of cigarettes are grouped into white cigarettes and kretek cigarettes. As well as old smoke grouped into smoke <5 years with smoke > 5 years.

Blood glucose levels were measured through examination as respondents in the venous blood biochemistry laboratory FK USU. Data were analyzed by computerized using the chi-square test and the mean difference test.

Results and Discussion

Table 1. The frequency distribution of the subject based on the degree of smokers

Degrees Smokers	Frequency	Percentage
Mild	32	55,2 %
Moderete	19	32,8 %
Severe	7	12,1 %
Total	58	100 %

Based on the number of cigarettes smoked each day, the smokers were divided into three, namely mild smokers, moderate, and severe. Subject of the study were 32 people (55.2%) were mild smokers, while 19 subjects (32.8%) were smokers and the rest were 7 (12.1%) were severe smokers. From this data it can be concluded that the subject was mild smokers more than moderate smokers and heavy.

Table 2. Relations degree of smoking with random blood glucose levels

Degrees Smokers	Normoglikemia		Hiperglikemia		Total		p-value
	N	(%)	N	(%)	n	(%)	
Mild	32	55,2	0	0	32	55,2	0,081
Moderete	19	32,8	0	0	19	32,8	
Severe	5	8,6	2	3,4	7	12,1	
Total	56	96,6	2	3,4	58	100	

Based on Table 2, the results obtained Kolmogorov Smirnov test showed the p value was not significant ($p > 0.05$), indicating that there is no relationship between smoking and random blood glucose levels. This is according to research conducted by syedtausif and muhammadasifmemon in pakistan, which indicates that there is no relationship between smoking and the hemoglobin, hematocrit and blood glucose³. But according to the american journal of clinical nutrition smoking is associated with increased blood glucose levels through the resistance mechanism insulin⁴.

Table 3. Relationship types of cigarettes with random blood glucose levels.

Random blood glucose levels							
Types of Cigarettes	Normoglikemia		hiperglikemia		Jumlah		p-value
	N	(%)	N	(%)	N	(%)	
Kretek	26	46,4	2	7,1	28	48,3	0,229
Putih	30	53,6	0	0	30	51,7	
Total	56	100	2	7,1	58	100	

Chi Square test produces a value $p = 0.299$ for the relationship type of cigarette with random blood glucose levels. This shows that there is no relationship between the type of cigarettes with random blood glucose levels. This contrasts with research conducted by Farida soetiarto in the article entitled "mengenallebihjauhrokokkretek", which indicates that the nicotine content in kretek cigarettes is higher than in white cigarettes. Based on this study found that nicotine levels in kretek cigarettes more nearly 5 times more than white cigarettes, whereas the levels of tar in kretek cigarettes more 3-fold compared to white cigarettes⁵ According to research conducted by Chiolero et al 2016, stated that nicotine can cause the incidence of high insulin resistance, so people who use kretek cigarettes to have high blood glucose levels compared with those who use white cigarettes⁴.

Table 4. Relationship smoking duration with random blood glucose levels Random blood glucose levels

Smoking duration	Normoglikemia		Hiperglikemia		Total		p-value
	N	(%)	n	(%)	n	(%)	
<5 years	37	63,8	1	1,7	38	65,5	1,000
>5 years	19	32,8	1	1,7	20	34,5	
Total	56	96,6	2	3,4	58	100	

For a long relationship of smoking with blood glucose levels when it was found that the value of $p = 1.000$. This suggests that smoking duration was not associated with random blood glucose levels. This research has been carried out in line with the study by Thomas et al in birmingham. This research was conducted in a cohort. Subject active smokers and passive smokers at follow-up for 15 years, the results showed a high incidence of insulin resistance in the group of smokers (hazard ratio 1.65, 95% CI) 6. It can be concluded that the old smoke are at high risk for glucose intolerance if longer exposure to cigarette smoke (active smokers and passive smokers) over 15 years. While in this study there was no subject who smoked more than 15 years, because the subject is still mostly 20s. However this is not in accordance with The American Journal of Clinical Nutrition stating that acute smokers can also generate events that can lead to insulin resistance incidence of metabolic syndrome and diabetes mellitus type 2⁴. Similarly, research conducted by Xi-Tao Xie et al, who get nicotine that both acute and chronic exposure, can inhibit the action of insulin, which then develop into insulin resistance and lead to diabetes mellitus type 2⁷.

Table 5. Differences in the group of smokers KGD as mild, moderate and severe.

Degrees Smokers	N	Means blood glucose at random	p-value
Mild	32	83,5	0,01
moderate	19	100,3	
Severe	7	163,2	
Total	58	98,6	

Obtained the result that there are differences in the average - average blood glucose levels as between light smokers with heavy smokers ($p = 0.001$) and between smokers moderately heavy smokers ($p = 0.001$). But there is no difference in the average - average blood glucose levels between light smokers with moderate smokers ($p = 0.98$). This is according to research conducted by Xi-tao XIE et al, who found that heavy smokers (at least 20 cigarettes per day) are at high risk for the occurrence of insulin resistance. His research, was concluded that heavy smokers have a higher risk of suffering from insulin resistance (61%), while less than 20 cigarettes per day correlated only by 29% to get the risk of insulin resistance. While ex-smokers have a risk only by 23%⁷.

Conclusions

There was no association between smoking and blood glucose levels while. There is a significant difference - average levels of blood glucose when the light with the heavy smokers and the smokers are by weight.

References

1. Riset Kesehatan Dasar. Perilaku merokok masyarakat Indonesia. Riset Kesehatan Dasar; 2013
2. Kapor D., Jones T.H., smoking and hormone in health and endocrine disorders; EJE, 2005. 495
3. Ahmed S.Y, Memon A.M., smoking and its relationship with blood pressure, blood glucose and blood parameters in patient with coronary heart disease. Pak J physiol. 2008. 7
4. Chiolero A, Faeh D, Paccaud F, Cornuz J., Consequences of smoking for body weight, body fat distribution, and insulin resistance. Am J Clin Nutr. 2008.
5. Soetiarto F., Mengenal lebih jauh rokok kretek. Media litbangkes Vol.V no.04, 1995.
6. Houtson KT et al., Active and passive smoking and development of glucose intolerance among young adult in a prospective cohort. BMJ, doi:10.1136
7. Xie X, Liu Q, Wakui M., impact of cigarette smoking in type 2 diabetes development. Acta pharmacol sin. 2009
