

Levels of Blood Glucose and Body Mass Index of Some Nigerian Cigarette Smokers

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ABSTRACT

A total of 50 subjects (30 male smokers and 20 male non-smokers) were recruited for the study. Blood was collected for glucose assay and body mass index (BMI), BM1 was estimated based on body weight and height measures. Results show that cigarette smoking significantly ($p < 0.5$) lowers blood glucose (3.10 ± 0.37 mmol/L) when compared with control (non-smokers) value (3.49 ± 0.36 mmol/L). Changes in BMI measures were not significantly ($p > 0.05$) different. The mechanism of the effect of cigarette smoking on blood glucose should be investigated and observations documented.

Key words: Cigarette smokers, Body mass index, Glucose.

INTRODUCTION

Cigarette smoking has been reported to be harmful (Tziomalos and Charsoulis, 2004). Evidence suggests that smokers display features of metabolic syndrome (Targher, 2003). Several studies have demonstrated that cigarette smoking can severely reduce insulin sensitivity (Elliasson, 2003), indicating a much larger detrimental impact on blood glucose homeostasis (Kang, et al, 2009).

Hyperglycaemia may occur following nicotine administration in animals (Hazard and Vaille, 2000), and similar experience has been claimed for man following cigarette smoking (Walsh, et al, 2007). Surprisingly, little investigation of this potentially important effect of cigarette smoking has been undertaken. Indeed, observations from few studies remain contradictory and inconsistent (Janzon, et al, 2003).

Therefore, this study reports the changes in blood glucose and body mass index (BM1) of some Nigerian cigarette smokers. Apart from

contributing to the accumulating information regarding the effects of cigarette smoking on blood glucose and BM1, this study will provide some fundamental information that could help justify or refute the recommendations of many large centres in relation to smoking and glucose tolerance.

MATERIAL AND METHODS

Subjects

Fifty consenting male subjects in apparent good health comprising 30 cigarette smokers and 20 non-cigarette smokers were selected from Abraka Communities in Ethiope East Local Government Area of Delta State, Nigeria. The smokers have been smoking for between 2 - 10 years with a daily smoking rate of about 2-5 sticks. The smokers smoke all brands of cigarette available in their environment, though some prefer particular brands. The smokers and non-smokers were physically healthy and had no diagnosis of any disease. Their body weight and height were obtained order to calculate BM1.

Blood Sample Collection

About 3ml was collected by the venepuncture technique using 21 gauge hypodermic needle and syringe into fluoride oxalate centrifuge tubes. The samples were centrifuged at 1,200 x g for 5mins at room temperature to obtain plasma specimen which were stored frozen until required for analysis. The plasma samples were analyzed within 48 hours.

Determination of plasma glucose level

The level of plasma glucose was determined using the glucose oxidase method (Trinder, 1964).

Estimation of body mass index (BMI)

BMI was estimated using the measured weight and height as recommended.

$$\text{BMI} = \text{Body weight (kg)} / \text{height}^2 (\text{m}^2)$$

Statistics

The data obtained were analyzed by the student's t-test and level of significance was set at $p < 0.05$.

RESULTS

The results (level of smokers' blood glucose and estimates of body mass index) obtained from this study are presented in Table 1.0

Table 1: Levels of plasma glucose and body mass index estimates obtained from cigarette smokers and non-smokers

	Plasma glucose(mmol/L)	Body mass index(kg/m ²)
Cigarette smokers (n-30)	3.10±0.37*	20.38±2.25
Non-cigarette smokers (n-20)	3.49±0.36	20.41±2.69

Values are expressed in Mean ± SD for 'n' subjects

*Significantly different (lower) from control (non-smokers) value.

Table 1.0 shows the mean plasma glucose levels and BMI estimates for cigarette smokers and non-smokers. The mean plasma glucose level for the cigarette smokers was lower compared with the control (non-smokers) value, and this difference was significant ($p < 0.05$) using the student's t-test analysis.

DISCUSSION

Cigarette smoking induced significant change in blood glucose with no strong positive association with BMI. Among the Nigerian smokers studied, cigarette smoking reduced ($p < 0.05$) blood glucose, which is still an evidence of disturbed glucose metabolism.

The results differ from that of Walsh, et al, (2007), who reported a hyperglycaemic effect but observations from present study agree with those

of Kang, *et al.* (2009).

The adverse effect of cigarette on the smoking group had been suggested to be provoked by nicotine (Targher, 2003). Nicotine is an alkaloid with well recognized though somewhat unpredictable properties in man. When given parenterally, it has both stimulatory and depressant actions on autonomic ganglia and it increases catecholamine output.

Hyperglycaemia has occurred following nicotine's administration to animals and man (Haggard and Greenberg, 1999). The underlying mechanisms of the variations in the effect of cigarette on blood glucose deserve further investigations in order to unravel determinants and dependent factors, considering the implications of these noted aberrations in blood glucose homeostasis.

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