



**CIGARETTE SMOKING IS DANGEROUS TO HEALTH: A BIOCHEMICAL STUDY IN
SOME CHRONIC MALE CIGARETTE SMOKERS IN OVOM NIGERIA**

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ABSTRACT

Cigarette smoking is an act which is associated with many disorders that are preventable. This study was aimed at assessing the status of some plasma biochemical parameters in chronic male cigarette smokers. Blood specimens were collected into lithium heparinized anticoagulated bottles from forty male subjects aged 18-30 years who are addicted to smoking of 10-15 cigarettes per day for a period of 6-10 years (experimental group) and another forty male subjects with no evidence of cigarette smoking, aged 18-30 years (control group). The blood specimens were spun and the plasma obtained were used for the quantitative measurement of urea, C-reactive proteins, uric acid, sodium, potassium and total testosterone using spectrophotometer S23A13192 model. The results revealed significant elevations ($p \leq 0.05$) in the plasma concentrations of C-reactive protein, sodium and potassium in the experimental group as compared with that of the control group while a significant decrease ($p \leq 0.05$) in the plasma concentrations of uric acid and total testosterone were obtained in the experimental group as compared with that of the control group. The results further revealed that there was no significant difference ($p \geq 0.05$) in the plasma concentration of urea in the experimental group compared with control group. In conclusion, this study has shown that smoking of 10-15 cigarettes per day for a period of 6-10 years has effects on the plasma concentrations of C-reactive protein, uric acid, sodium, potassium and total testosterone affirming its danger to human health. It is therefore recommended that smokers of 10-15 cigarettes per day for a period of 6-10 years should embark on routine laboratory investigations on the above mentioned significant plasma biochemical parameters in order to prevent any health problems that may subsequently lead to death.

KEYWORDS: Chronic cigarette smoking, danger to health, plasma biochemical parameters, Ovom, Nigeria.

INTRODUCTION

The inhalation and exhalation of fumes of cigarette is known as cigarette smoking, this act is one of the major causes of death all over the world.^[1,2] It has being reported by World Health Organization that five million of death in 2008 was caused by cigarette smoking and this death rate may increase to eight million per year as from 2030.^[3]

Cigarette smokers are liable to many health problems among which are cardiovascular diseases, respiratory disorders, peptic ulcer, cancer and gastroesophageal

reflux disease, others are blindness, bone matrix loss and hepatotoxicity.^[4,5]

The smoke generated from cigarette has been reported to contain more than 4,000 different chemicals out of which 400 have proven to be carcinogens. Besides, there are also many oxidants such as oxygen free radicals as well as aldehydes that are volatile in nature. All these are contributory to the major causes of damage to cellular constituents such as deoxyribonucleic acid, proteins and other opportune targets particularly cell membranes with the generated oxidative stress responsible for pathogenesis.^[6-8]

Taking into consideration the fatal effects of cigarette smoking on the health of humans as well as the associated increase in death rate of cigarette smokers, this present study therefore aims at assessing the status of some plasma biochemical parameters in chronic cigarette smokers of 10-15cigarettes/day for a period of 6-10 years within the studied community.

MATERIALS AND METHODS

A total of eighty apparently healthy male subjects residing in Ovom, Bayelsa state of Nigeria constituted the study population of this research work. These subjects comprised of forty chronic male cigarette smokers of 10-15 cigarettes/day for a period of 6-10 years, aged 18-30years (experimental group) and another forty male subjects who in the course of this study had no evidence of smoking cigarettes, aged 18-30years (control group).

As at the time of conducting this research work all the recruited subjects were free from any ailment and were not addicted to drugs and/or alcohol consumption before and during the course of this study thus ruling out the possibility of any effects of their lifestyle variables on the obtained results. Other physical data such as age, number of cigarettes smoked per day and number of years on cigarette smoking were also obtained from these recruited subjects whose consents and approval were sought before their blood specimens were collected for this research work. After this, 5ml blood specimen was collected from each of them into different lithium heparinized anticoagulated bottles respectively and carefully spun using a Gulfex Medical and Scientific Macro Centrifuge model 800D England with the obtained plasma used for the quantitative measurement of the following biochemical parameters using spectrophotometer S23A13192 model: urea, urease-berthelot colorimetric method as described in the 7th January, 2011 revised edition manual of Randox Laboratories Limited, 55 Diamond Road, Crumlin, County Antrim, United Kingdom, BT294QY.^[9] C-reactive protein, latex turbidimetry method as described in the manual of Spinreact Diagnostic kit, Spain.^[10-13] uric acid, enzymatic colorimetric method as described in the 20th October, 2009 revised edition manual of Randox Laboratories Limited, 55 Diamond Road, Crumlin, Company, Antrim, United Kingdom, BT294QY,^[14] sodium, colorimetric method as previously described by Maruna and Trinder and revised in the manual of Teco Diagnostic kit, Anaheim, California,^[15] potassium, colorimetric method as described in the manual of Teco Diagnostic kit, Anaheim, California,^[16] and total testosterone, enzyme linked immunosorbent assay (ELISA) method as described in the manual of Immunospec Corporation, 7018, Owensmouth Avenue, Suite 103, Canoga Park, CA, 91303.^[17]

Statistical analysis: The results of this research work were expressed as mean and standard deviation while the differences between the groups were assessed by

Student's "t" test. Statistically the results were considered significant at $p \leq 0.05$

RESULTS AND DISCUSSION

In this study the mean values of the plasma biochemical parameters measured in the chronic male cigarette smokers of 10-15 cigarettes/day for a period of 6-10 years (experimental group) were compared with the mean values of the non cigarette smokers (control group) as shown in Table 1

The results showed that the mean value of plasma urea in the chronic male cigarette smokers of 10-15 cigarettes/day for a period of 6-10 years (experimental group) was not statistically significant ($p \geq 0.05$) as compared with that of the non cigarette smokers (control group) as shown in Table 1. This finding which is confirmed in this study shows that chronic cigarette smoking of 10-15 cigarettes/day for a period of 6-10 years has no effect on the concentration of plasma urea.

The mean value of plasma C-reactive protein in the chronic male cigarette smokers of 10-15 cigarettes/day for a period of 6-10 years (experimental group) showed statistical significant elevation ($p \leq 0.05$) as compared with that of the non cigarette smokers (control group) as shown in Table 1. This finding is confirmed in this study and may be suggestive of the systemic response of the chronic male cigarette smokers to chemicals generated from the smoke of the cigarette which in turn would have caused damage to some cells thus resulting into inflammatory condition with the subsequent release of interleukin 6 (IL-6) and other cytokines which triggers the synthesis of C-reactive protein by the liver. The resultant rate of C-reactive protein synthesis in inflammatory conditions is proportional to the severity and persistence of the causative factors as reported by some researchers.^[18,19]

The mean value of plasma uric acid in the chronic male cigarette smokers of 10-15 cigarettes/day for a period of 6-10 years (experimental group) was significantly lower ($p \leq 0.05$) as compared with that of the non cigarette smokers (control group) as shown in Table 1. This finding is in agreement with the research work of^[20] who reported a decrease in the plasma concentration of uric acid in cigarette smokers. This however, may be linked to the long period of cigarette smoking which had led to the systemic bioaccumulation of the chemicals generated from the cigarette smoke, a situation which is suggestive to influence a significant inhibitory effects in the synthesis of uric acid.

The data from this study showed that the mean value of plasma sodium in the chronic male cigarette smokers of 10-15cigarettes/day for a period of 6-10 years (experimental group) was significantly elevated ($p \leq 0.05$) as compared with that of the non cigarette smokers (control group) as shown in Table 1. This finding is in agreement with the research work of^[21] who reported an

elevation in the plasma concentration of sodium in cigarette smokers.

The data from this study went further to reveal significant elevation ($p \leq 0.05$) in the mean value of plasma potassium in the chronic male cigarette smokers of 10-15 cigarettes/day for a period of 6-10 years (experimental group) as compared with that of the non cigarette smokers (control group) as shown in Table 1. This finding is in agreement with the research work of^[22] who reported an increase of plasma potassium level in cigarette smokers. This however, may be due to tissues and cells damage caused by chemicals in the cigarette

smoke which in turn had resulted into cellular contents leakage alongside potassium into the plasma.

The mean value of plasma total testosterone in the chronic male cigarette smokers of 10-15cigarettes/day for a period of 6-10 years (experimental group) showed a significant decrease ($p \leq 0.05$) as compared with that of the non cigarette smokers (control group) as shown in Table 1. This finding which is confirmed in this study has revealed that the smoke of cigarette may have some chemicals that play significant inhibitory role in the synthesis of total testosterone.

Table-1: Results of plasma biochemical parameters in chronic male cigarette smokers of 10-15 cigarettes/day for 6-10 years (experimental group) compared with the male non cigarette smokers (control group).

Parameters	Control Group (n=40)	Experimental Group (n=40)
Urea (mmol/l)	4.25±0.14	4.27 ±0.16
Crp (mg/l)	0.48±0.07	*17.35 ±2.14
Uric acid (µmol/l)	344.00 ± 2.97	*176.00 ±1.79
Sodium (mEq/l)	145.26±3.74	*178.42 ±6.60
Potassium (mEq/l)	4.00±0.33	*5.84 ±0.91
Total testosterone (ng/ml)	3.72±0.94	*1.78 ±0.64

Values are mean and S.D. determination at $p \leq 0.05$, * represents statistically significant mean values, n represents the number of subjects, Crp represents C-reactive proteins.

CONCLUSION

In conclusion, this present study has shown that chronic cigarette smoking of 10-15 cigarettes per day for a period of 6-10 years has significant effects on the plasma concentrations of C-reactive proteins, uric acid, sodium, potassium and total testosterone.

RECOMMENDATIONS

It is therefore recommended that:

- Chronic cigarette smoking of 10-15 cigarettes per day for a period of 6-10 years should be discouraged so as to prevent any fatal health problems that may subsequently be associated with death.
- Efforts should be put in place by the appropriate agencies to enlighten cigarette smokers on the need to go for routine measurements of plasma biochemical parameters such as C-reactive proteins, uric acid, sodium, potassium and total testosterone and these parameters should be brought to normal concentrations if found elevated and/or decreased.

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