

Analysis of Cigarette Puffs on Serum Cholesterol and Urea Level in Smokers and Non-Smokers with in VOM Area of Plateau State, Nigeria

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Abstract: A comparative study of Serum cholesterol and urea level of 100 subjects, consisting of 50 apparently smokers and 50 non-smokers as control was determined by Liebermann-Burchard reaction and Diacetylmonoxime method respectively. Mean serum cholesterol and urea levels in smokers (5.2mMol/L; 8.4mMol/L) and non-smokers (3.4mMol/L; 4.7mMol/L) with a degree of significance ($P < 0.05$) indicates significant statistical difference in cholesterol and urea levels between both groups. The difference in mean serum cholesterol and urea level in smokers was greater than those of non-smokers in the same age group. However, there was little difference in same parameters in smokers with different quantity of cigarette stick per day as compared with the observed slight increase in smokers with different duration.

Keyword: Serum Cholesterol, Urea, Cigarette, Smokers, Non-Smokers, Vom.

1. Introduction

The dangers associated with cigarette smoking as the most common type of tobacco use is estimated to be nine million annual mortality rate by 2030 if current trends is not cubed [1]. Cigarette smoking from lactating mothers is taken in by their babies as 0.5mg of nicotine is excreted per litre of breast milk [2-4]. High level of total serum cholesterol has repeatedly been shown to be associated undue susceptibility to coronary heart disease [5]. An immediate and highly significant increase in cholesterol after a single cigarette has been recently lasting for 90 minutes most of the test subjects [6]. The heavier the smoking, the higher the LDL/HDL and total cholesterol/HDL ratios [7]. Some of the oxidative damage to critical biological substances has been traced to the adverse effect of smoking [8]. Smokers of tobacco are prone to progression of diabetic neuropathy according to history, increasing blood urea level thus increasing the accumulation of cigarette constituents in the renal, circulatory and biliary systems also resulting in kidney cancer, other chronic renal diseases when compared with non-smokers [9-12]. Another comparison on the blood cigarette records that blood of cigarette smokers routinely displays decreased antioxidant capacity and increased oxidized lipids compared to non-smokers [13]. Chronic use of tobacco is usually linked to a variety of serious health complications associated with its smoking, including cardiovascular, respiratory, reproductive/fertility, neonatal and adolescent diseases [14-17]. Cigarette smoking is also associated with decreased concentration of serum vitamin C as preliminary reports have indicated adverse effects of smoking on the metabolism of vitamin C [18 India][19 India]. Smoking will continue to attract public attention due to its public health importance and particularly because of various harmful health effect associated with it [20].

1.1 Aims and objectives of Study:

The basis of the study is to further confirm the effect of smoking on the body serum urea and Cholesterol levels by way of determining and comparing such parameters on smokers and non-smokers also considering such study in a different geographical environment.

2. Geographical Location Of Vom

Vom, town, Plateau state, central Nigeria, situated on the Jos Plateau near the source of the Kaduna River, 18 miles (29 km) southwest of Jos town. It is the site of the National Veterinary Research Institute (1924) and of western Africa's first veterinary school (1942). Vom also has a government dairy; milk is supplied by Fulani herdsmen who graze their cattle on the tsetse-free plateau.

2.1 Agricultural Produce, Mineral Resources and Population

The volcanic soils around Vom are heavily farmed for sorghum, millet, acha (hungry rice), and potatoes and other vegetables. Tin and Columbite mining is important east of the town, and the minerals are sent to Jos for

smelting and via rail to Port Harcourt, 360 miles (580 km) south-southwest, for export. Pop. (latest est.) 11,264 [21].

3. Methods

3.1 Selection of Subjects

Study was carried out on a total number of 100 subjects (50 healthy smokers and 50 non-smokers as control) that are without history of obesity and Diabetes mellitus in order to avoid hyper lipidaemic cases for study. All subjects were males ranging from the age of 16years and above. They were also made up of students and staff of National Veterinary Research Institute (N.V.R.I) Vom and residents of K-Vom. A self-administered Questionnaire containing age, sex, amount of cigarette stick smoked per day, duration of smoking, history of diabetes mellitus, history of Oedema was given to each subject. However, ethical clearance was obtained from Jos University Teaching Hospital before commencement for this research.

3.2 Sample Collection

5ml of blood was collected from fasting subjects with a disposable syringe and a 21G needle within the morning hours by clean vene-puncture from the ante-cubital vein. Serum cholesterol and urea level subjects were determined by Liebermann-Burchard reaction and Diacetylmonoxime methods respectively. Statistical analysis of result was done using student T-test and Correlation coefficient.

4. Results

Mean SD and variance of serum level of cholesterol and urea in smokers compared with the control group non-smokers. Cholesterol concentration (Mmol/L) in smokers is significantly greater (5.2mmol/L) than that of the non-smokers (3.4mmol/L). Urea concentration in smokers is significantly greater (8.4mmol/L) than the control (4.7mmol/L) - Table 1

Compared mean of cholesterol and urea levels of smokers and non-smokers indicates that the cholesterol and urea concentration were statistically significant ($P > 0.05$) – Table 2.

A compared mean serum cholesterol and urea level of smokers and non-smokers in the same age group was found to be higher in smokers than non- smokers – Table 3.

The cholesterol concentration of smokers and non-smokers in the same age group was found statistically significant ($P < 0.05$) - Table 4. On the other hand urea concentration of the first age group 0-19years and 40years and above were found to be insignificant ($P > 0.5$ whereas the 20-29years and 30-39years age group are significant at $P > 0.05$).

Table 5 shows the significance test comparing the mean of smokers of different age group. Mean cholesterol and urea levels by sway comparing 0-19years with 30-39years age group, 40 and above age group and 20-29years with 30-39years age group were all insignificant. The mean cholesterol level by comparing various age groups in non-smokers 0- 19years with 20-29years was significant ($P < 0.05$) but that of 20-29years with 40years and above was insignificant ($P > 0.05$).

Table 6 shows the mean, SD and variance of serum level of cholesterol and urea of smokers with different quantity of cigarette stick per day. The cholesterol level is slightly higher in those that smoke 11 cigarette sticks and above. On the other hand the urea level of those that consume 1-10sticks per day is a little bit higher (8.5mmol/L) than those that consume 11 sticks and above. Significance test table confirmed both to be statistically insignificant at ($P > 0.05$) - Table 7 and Table 8 illustrates slight increase in the mean serum cholesterol and urea with duration of smoking in a year, but the difference was mostly found to be insignificant, except for the mean cholesterol level in the first and fifth group which was found to be significant ($P < 0.05$) – Table 9.

Table 1: Mean, SD, variance of serum level of cholesterol and urea in smokers and non-smokers.

PARAMETER	SMOKERS				NON-SMOKERS			
	Sample	Mean	S.D	Variance	Sample	Mean	S.D	Variance
Cholesterol	50	5.2	0.8	0.6	50	3.4	0.7	0.5
Urea	50	8.4	2.4	5.6	50	4.7	1.2	1.6

Table 2: Significance test for comparing the mean of cholesterol and urea of smokers and non-smokers using student ‘T’ test at 0.05 (5%) level of significance.

Parameters	No. Of Subject	D/F	T-Cal	T-Tab	Probability	Remark
Cholesterol	100	98	23.8	2.0	$P < 0.05$	significant
Urea	100	98	4.5	2.0	$P < 0.05$	significant

Table 3: Mean, S.D, variance of serum level of cholesterol and urea of smokers and non-smokers in the same age group.

Age Group	Sample size	Parameter	Mean	S.D	Variance	Sample size	Parameter	Mean	S.D	Variance
0-19	2	Cholesterol	5.1	0.2	0.04	4	Cholesterol	2.4	0.04	0.0016
		Urea	9.5	4.0	16		Urea	4.5	0.7	0.49
20-29	27	Cholesterol	5.3	0.6	0.36	25	Cholesterol	3.5	0.8	0.64
		Urea	8.3	2.6	6.8		Urea	4.9	1.2	1.44
30-39	19	Cholesterol	5.2	1.0	1	15	Cholesterol	3.7	0.5	0.25
		Urea	8.5	1.7	2.9		Urea	4.2	1.2	1.44
40 ≥	2	Cholesterol	5.0	0.2	0.04	6	Cholesterol	2.8	0.4	0.16
		Urea	7.0	0.1	0.01		Urea	5.6	1.2	1.44

Table 4: Significance test for comparing the mean of smokers and non-smokers in the same age group

Age Group	Sample size	D/F	Parameter	T-Cal	T-Tab	Probability	Remarks
0-19	6	4	Cholesterol	91.9	2.776	P<0.05	Significant
			Urea	0.4	2.776	P>0.05	Insignificant
20-29	52	50	Cholesterol	12.367	2.021	P<0.05	Significant
			Urea	2.537	2.021	P<0.05	Significant
30-39	34	32	Cholesterol	2.828	2.042	P<0.05	Significant
			Urea	5.642	2.042	P<0.05	Significant
40 ≥	8	6	Cholesterol	30.907	2.447	P<0.05	Significant
			Urea	2.364	2.447	P>0.05	Insignificant

Table 5: Significance test for comparing the mean of smokers of different age group

Age	Sample size	D/F	Parameter	T-Cal	T-Tab	Probability	Remarks
0-19	29	27	Cholesterol	35.714	2.052	P<0.05	Significant
			Urea	0.105	2.052	P>0.05	Insignificant
20-29	21	19	Cholesterol	0.433	2.093	P>0.05	Insignificant
			Urea	0.088	2.093	P>0.05	Insignificant
30-39	4	2	Cholesterol	2.500	4.303	P>0.05	Insignificant
			Urea	2.364	2.447	P>0.05	Insignificant
40 ≥	46	44	Cholesterol	0.417	2.021	P>0.05	Insignificant
			Urea	0.835	2.021	P>0.05	Insignificant

Table 6: Mean, SD, variance of serum level of cholesterol and urea of smoker with different quantity of cigarette stick per day.

No of Cigarette per day	Sample size	Parameter	Mean	S.D	Variance
1-10	38	Cholesterol	5.2	0.7	0.5
		Urea	8.5	2.6	6.6
11 ≥	12	Cholesterol	5.3	0.8	0.6
		Urea	8.0	1.5	2.4

Table 7: Significance test comparing the mean of smokers at different smoking level

Sample size	D/F	Parameter	T-Cal	T-Tab	Probability	Remark
50	48	Cholesterol	0.523	2.021	P>0.05	Insignificant
50	48	Urea	0.392	2.021	P>0.05	Insignificant

Table 8: Mean, SD, variance of serum, level of cholesterol and urea in smokers at different duration.

(Years)	Sample size	Parameter	Mean	S.D	Variance
1-5	9	Cholesterol	5.4	0.4	0.1
		Urea	7.6	3.3	11.0
6-10	24	Cholesterol	0.5	0.5	0.3
		Urea	8.0	1.5	2.4
11-15	7	Cholesterol	5.2	1.3	1.6
		Urea	8.2	2.5	6.3
16 ≥	10	Cholesterol	5.8	0.8	0.6

Urea	8.4	2.3	5.3
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Table 9:Significance test for comparing means of smokers of different duration.

Duration(yrs)	Sample	D/F	Parameter	T-Cal	T-Tab	Probability	Remark
1-5	33	31	Cholesterol	5.737	2.042	P<0.05	Significant
			Urea	0.295	2.042	P>0.05	Insignificant
6-10	16	14	Cholesterol	0.330	2.145	P>0.05	Insignificant
			Urea	0.137	2.145	P>0.05	Insignificant
11-15	19	17	Cholesterol	2.076	2.110	P>0.05	Insignificant
			Urea	0.198	2.110	P>0.05	Insignificant
16 ≥	31	29	Cholesterol	0.329	2.045	P>0.05	Insignificant
			Urea	0.202	2.045	P>0.05	Insignificant

5. Discussion

Smokers exhibited higher mean cholesterol level compared to that the non-smokers (5.2mMol/L and 3.4mMol/L respectively) – Table1. This agree with [22] [23] 6.9mMol/L; 6.5mMol/Land Abdul Fatah 1994 5.5mMol/L; 3.3mMol/L. This difference was found to be significant (P<0.05) – Table 2.

Smokers have higher mean cholesterol level compared to the non-smokers irrespective of the age group, as the difference between the mean cholesterol value in smokers and non-smokers respectively were 0-19 years (5.1mMol/L;2.4mMI/L), respectively, 20-29 years (5.3mMol/L;3.5mMol/L), 30-39 years age group were (5.2mMol/L:3.7mMol/L), and 40 years and above(5.0mMol/L;2.8mMol/L) – Table 3. These values also agree with [22]whose submission was 0-20 years (5.2mMol/L and 3.1mMol/L), 20-24, 30-34 and 40-44 for the first age group, 5.2mMol/L for second group, 6.4mMol/L for the third group and 7.0mMol/L for the last group.

The non-smokers have a pattern in the level of their cholesterol according to age group. The values increases from childhood to the adolescent stage and falls sharply to 2.8mMol/L in adulthood, thus agrees with the work of [23].

Study also showed significant difference between mean cholesterol mean urea in smokers and non-smokers of the same age group (P<0.05). Mean cholesterol level of smokers of different age group presented a significant difference between 0-19 years and that of age group and 20-29 years age group, 20-29years age group and 40 ≥years while insignificant in other age groups.

There was slight increase in the mean serum cholesterol and urea levels of those who smoke 1-10 cigarette sticks per day and 11 ≥ sticks of cigarettes, but with insignificant difference of P>0.05 – Tables 6 and7.

Results further showed that, mean total cholesterol values in smokers of 1-5 years(5.4mMol/L) and 6-10years (5.0mMml/L) was significantly different at P<0.05, as compared to other age groups which was insignificant. Observation that the duration smoking of age 16 ≥ years having high cholesterol value(5.8mMol/L)as illustrated in Table 8 buttresses the fact that, the duration of smoking affects the serum cholesterol level [6].

6. Conclusion

The basis of the study also was to see if smoking has any effect on serum urea level. Study confirms that the serum cholesterol and urea level is increased in smokers than in their non-smokers. The significant value of high serum cholesterol level in smokers could be linked to impaired renal function. Furthermore, the longer one engages in the smoking habits, the higher the serum cholesterol level. In other words, duration of smoking also affects the serum cholesterol level. However, considering this study in relation to other similar works on same in various part of the globe, smoking affects the serum cholesterol and urea level irrespective of different geographical environment.

Conflict of Interest: No conflicting interest

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