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Research Paper

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Effect of Garlic [Allium Sativum] on Cardio-Respiratory Parameters and Lipid Profile in Smokers of Haryana Region

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ABSTRACT

Garlic has used throughout recorded history for both medicinal and culinary purposes. Garlic and its preparations have been widely recognized as agents for prevention and treatment of cardiovascular and other metabolic disease atherosclerosis, hyperlipidemia, thrombosis, hypertension and diabetes.

Introduction :- Nicotine is a hygroscopic, oily liquid that is miscible with water in its base form. As a nitrogenous base, nicotine forms salts with acids that are usually solid and water soluble. [1] Nicotine easily penetrates the skin. As shown by the physical data, free base nicotine will burn at a temperature below its boiling point, and its vapours will combust at 308 K (35 °C; 95 °F) in air despite a low vapour[2]. Because of this, most of the nicotine is burned when a cigarette is smoked; however, enough is inhaled to cause pharmacological effects. [3]

Smoking affects blood pressure and pulse rate:- It has since long been known that blood pressure and heart rate increase during smoking. These effects are specifically associated with nicotine while the other components of which more than a thousand have been isolated seem to be of minor importance. The rise in blood pressure is due both to an increase in cardiac output and total peripheral vascular resistance[4]. The blood pressure rise appears immediately and occurs before any increase in circulating catecholamines. [5]

In hypertensive patients the blood pressure lowering effect of beta-blockers may be partly abolished by tobacco smoking whereas alpha-receptor blockers seem to maintain the antihypertensive efficacy in smokers[6].

The Effects of Smoking on the Respiratory System:- Damage to the respiratory system from cigarette smoking is slow, progressive, and deadly. A healthy respiratory system is continuously cleansed. The mucus produced by the respiratory tubules traps dirt and disease-causing organisms, which cilia sweep toward the mouth, where it can be eliminated[7]. Smoking greatly impairs this housekeeping. With the very first inhalation of smoke, the beating of the cilia slows. With time, the cilia become paralyzed and, eventually, disappear altogether. The loss of cilia leads to the development of smoker's cough. The cilia no longer effectively remove mucus, so the individual must cough it up. Coughing is usually worse in the morning because mucus has accumulated during sleep[8].

The Effect of Smoking on Lipid Profile:-
Nicotine stimulates sympathetic adrenal system leading to increased secretion of catecholamine resulting in increased lipolysis and increased concentration of plasma free fatty acids (FFA) which further result in increased secretion of hepatic FFAs and hepatic triglycerides along with VLDL-C in the blood stream [9]. These changes contribute to the atherosclerotic potential of cigarette smoke.

Material and Method:-
Data was collected in Gold-Field Medical College & Research Centre, Faridabad,(Haryana) and it was analyzed by using statistical procedure. In the present study we have compared the various parameters before and after giving the garlic to male smokers.

The subject should be 40 male in number age between 18-60 years smoker to be taken.

Detailed history regarding-
Name of the patient

Age

Sex

Family history of diabetes,hypertention

Diabetes, hypertension

Weight- Taken by weighing machine, without shoes and in minimal possible clothing kilograms.

Height- Measured in centimeters without shoes in standing posture.

Body mass index (BMI)- weight (kg.)/ height$^{2\ (meter)}$

SAMPLE:
The sample was intravenous blood. The sample was taken from medial cubital vein. The sample (blood) was taken in a blood container and EDTA (ethylene Di methyl amine tetra acetate) (anticoagulant) was added to prevent of clotting. This blood was used for all tests except bleeding time, clotting time and Respiratory tests.

Fresh Raw garlic:
Raw fresh garlic weighing about 5-6gm would be given to the subject for eating daily for a month in smokers. After one month we have take following different parameters and compare before and after parameter.

CARDIAC PARAMETERS-
Pulse Rate-

Blood Pressure -

HEMATOLOGICAL PARAMETERS-
(A) Hemoglobin
(B) Bleeding Time
(C) Cloting Time

RESPIRATORY PARAMETERS-
(A) Forced Vital Capacity
(B) Peak Expiratory Flow Rate

LIPID PROFILE-
(A) Total Cholesterol
(B) High Density Lipoprotein
(C)Low Density Lipoprotein
(D)Triglycerides

Observations and Results
Results were analyzed by student's **'T'** test to compare the both parameters.

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The **P value** represent **probability** values for testing the simultaneous equality of the means and P values were considered to be statically significant. The values of all the parameters were presented as geometric means.

SAMPLE 1 = Before taking garlic parameter

SAMPLE 2 = After taking garlic parameter

Data set of Pulse Rate

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
Pulse Rate	Sample 1	40	74.97	5.30	0.83	2.44	NO
	Sample 2	40	72.65	4.32	0.68		

The mean of sample 1 is 74.97 and the mean of sample 2 is 72.65. The values of Sample 2 are lesser than as compare to sample 1 and the p value of both samples is 2.44 so it is not statically significant.

Data set of Systolic Blood Pressure

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
SBP	Sample 1	40	120.37	8.72	1.38	3.17	NO
	Sample 2	40	114.30	5.79	0.91		

The mean of sample 1 is 120.37 and the mean of sample 2 is 114.30. The values of Sample 2 is lesser than as compare to sample 1 and the p value of both samples is 3.17 so it is not statically significant.

Data set of Diastolic Blood Pressure

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
DBP	Sample 1	40	80.37	8.11	1.28	0.03	YES
	Sample 2	40	76.62	6.34	1.03		

The mean of sample 1 is 80.37 and the mean of sample 2 is 76.62. The values of Sample 2 are lesser than as compare to sample 1 and the p value of both samples is 0.03 which is below the statically p value, so it is statically significant.

Data set of Hemoglobin

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
Hemoglobin	Sample 1	40	16.10	0.98	0.15	0.08	YES
	Sample 2	40	15.85	0.89	0.14		

The mean of sample 1 is 16.10 and the mean of sample 2 is 15.85. The values of Sample 2 are slightly lesser as compare to sample 1. The p value of both samples is 0.08 so it is statically significant.

Data set of Bleeding Time

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
Bleeding Time	Sample 1	40	3.5	0.84	0.13	0.20	NO
	Sample 2	40	3.6	0.77	0.12		

The mean of sample 1 is 3.5 and the mean of sample 2 is 3.6. The values of Sample 2 are slightly lesser as compare to sample 1 except mean. The p value of both samples is 0.20, it is not statically significant.

Data set of Clotting Time

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
Clotting Time	Sample 1	40	4.22	1.18	0.18	0.03	YES
	Sample 2	40	4.65	1.42	0.22		

The mean of sample 1 is 4.22 and the mean of sample 2 is 4.65. The values of Sample 2 are more than as compare to sample 1. The p value of both samples is lesser than of statically value, it is statically significant.

Data set of FVC

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
FVC	Sample 1	40	2.65	0.70	0.11	0.19	NO
	Sample 2	40	2.77	1.04	0.16		

The mean of sample 1 is 2.65 and the mean of sample 2 is 2.77. The values of Sample 2 are higher than as compare to sample 1. The p value of both samples is more as compare to statically value, it is not statically significant.

Data set of PEF

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
PEF	Sample 1	40	4.35	1.14	0.18	0.11	NO
	Sample 2	40	6.56	11.57	1.83		

The mean of sample 1 is 4.35 and the mean of sample 2 is 6.56. The values of Sample 2 are highly as compare to sample 1. The p value of both samples is 0.11, it is not statically significant.

Data set of Cholesterol

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
Cholesterol	Sample 1	40	167.3	16.43	2.59	3.8	NO
	Sample 2	40	166.3	16.64	2.63		

The mean of sample 1 is 167.3 and the mean of sample 2 is 166.3. The values of Sample 2 are slightly more as compare to sample 1. The p value of both samples is 3.8, so it is not statically significant.

Data set of Triglyceride

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
Triglyceride	Sample 1	40	101.14	30.86	4.88	0.01	YES
	Sample 2	40	100.04	29.08	4.59		

The mean of sample 1 is 101.14 and the mean of sample 2 is 100.04. The values of Sample 2 are lesser than as compare to sample 1. The p value of both samples is 0.01, so it is statically significant.

Data set of VLDL

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
VLDL	Sample 1	40	47.37	18.78	2.97	0.15	NO
	Sample 2	40	47.20	18.57	2.93		

The mean of sample 1 is 47.37 and the mean of sample 2 is 42.20. The values of Sample 2 are partly low as compare to sample 1. The p value of both samples is 0.15, it is not statically significant.

Data set of HDL

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
HDL	Sample 1	40	50.68	10.16	1.60	0.05	YES
	Sample 2	40	51.77	9.22	1.45		

The mean of sample 1 is 50.68 and the mean of sample 2 is 0.05. The values of Sample 2 are lesser than as compare to sample 1. The p value of both samples is below the level of .05, so it is statically significant.

Data set of LDL

Parameters		N0.	Mean	SD	SE Mean	P value	Statistical significance
LDL	Sample 1	40	84.44	9.63	1.52	0.01	YES
	Sample 2	40	83.65	9.66	1.52		

The mean of sample 1 is 84.44 and the mean of sample 2 is 83.65. The values of both sample is partly equal. The p value of both samples is 0.01, so it is statically significant.

Discussion*:*

In the present study we have investigated the changes of Cardiac parameters, Haematological parameters, Respiratory parameters and Lipid profile in smokers.

Change in cardiac parameters:-

In the present study the p value (p=0.03) of Diastolic blood pressure is lesser than as compare to statically value (p=<0.05). so garlic are significantly. **Leoper and DeBray et al.**[10] recognized the hypotensive effect of garlic has reviewed the earlier literature, including his own investigations on 26 patients. Blood pressure reduction was observed in 85% of the patients, the average decline being 12.3 mm Hg systolic (SBP) and 6.5 mm Hg diastolic (DBP) blood pressure, over one-quarter of the subjects experienced a decline in SBP of 20 mm Hg or more. Pektov (1979)[11] has also cited several studies, mostly from the Soviet Union and Bulgaria, which indicate that garlic and its extracts exhibit antihypertensive activity. Besides subjective improvement, the results of these studies indicated a moderate hypotensive effect involving a drop in SBP of 20–30 mm Hg and in DBP of 10–20 mm Hg. Another study in China (1986) [12]on 70 hypertensive patients who were given garlic oil equivalent to 50 gm of raw garlic/day, 47 patients showed moderate to marked reduction in blood pressure .

No significant changes were observed in pulse rate and systolic BP, when compared with control.

In the present study according to BMI observation in obesity the p value of diastolic blood pressure (p=0.03) are significantly as compare of underweight and normal subject.

The effect of garlic on blood parameters in the present study is similar to the previous studies.

Change in hematological parameters:-

In the present study major changing in hemoglobin and clotting time. In Hb p value (p=0.05) is lesser than compare of statically value and p value of CT are also lower compare of statically value, so garlic is significantly. **Iranloye B.O**. **et al**.[13] Some hematological parameter was investigated in rats fed with garlic juice (200mg/kg) daily for thirty days. Garlic feeding for 30 days significantly (P<0.05) increased the red cell count, haemoglobin concentration and the PCV when compared with the control [14].

No significant changes were observed in Clotting Time, when compared with control.

In the present study according to BMI observation in obesity the p value of hemoglobin concentration (p=0.01) are significantly as compare of underweight and normal subject.

In underweight p value of clotting time (p=0.02) are significantly as compare of obesity and normal subject.

The effect of garlic on hematological parameters in the present study is slightly similar to the previous studies.

Change in lipid profile:-

In this study p value of triglyceride (p=0.01) is lesser than as comparison of statically value (p<0.05). The p value of HDL (p=0.05) is also similar to the statically p value and the p value of LDL (p=0.01) is lower than as compare of statically p value (p<0.05), so garlic is significantly. The effect of garlic extracts on lipid profile observed by **Khalid S. Al-Numair et al.**[15] in male a high cholesterol diet. Garlic extract significantly increased (p < 0.05) plasma HDL-Cholesterol and decreased plasma TC, LDL-Cholesterol and TG as well as liver TC and TG as compared with positive control (group II). No significant difference was observed in plasma LDL-Cholesterol, HDL-Cholesterol as well as plasma and liver TG between the rats ingested with high or low dose of garlic extracts [16].

No significant changes were observed in CL and VLDL, when compared with control.

In the present study according to BMI observation in obesity the p value of cholesterol (p=0.01), p value of triglyceride (p=0.03), p value of VLDL (0.03) and value of LDL (0.04) are significantly as compare of underweight and normal subject.

In underweight p value of HDL (p=0.04) are significantly as compare of obesity and normal subject.

In normal subject p value of VLDL (p=0.05) and p value of HDL (p=0.03) are significantly as compare of underweight and obesity.

The effect of garlic on lipid profile in the present study is similar to the previous study.

Conclusion

Our study shows effect of garlic on blood parameters, cardiac parameters, respiratory parameters and lipid profile smoker. Majority of parameters shows higher values in sample 1 parameters as compare of sample 2 values, which are taken before the garlic, but after take the garlic some values in sample 1are lower than as compare of sample 2 values.

In cardiac parameters pulse rate and systolic blood pressure does not show statically significant but diastolic blood pressure are statically significant.

In this final this research study, Garlic is main beneficial for human beings. Its main beneficial effect for decrease the lipid levels in obese persons, decrease the blood pressure in hypertension patient and increase the functional respiratory capacities.

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