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Investigating Potential of Garlic (*Allium Sativum*) on Cardio-Respiratory Parameters and Lipid Profile of Smokers in Moradabad Region Uttar Pradesh

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Abstract: ***Background:*** ***Garlic (Allium sativum) is used as spice and medicinal herb. Most recent research on garlic has used garlic in the form of tablets, fresh, raw, boiled, cooked and dried23are widely used for certain therapeutic purposes including lower blood pressure and improving lipid profile24y.*** ***Aims:*** ***To determine the effect of garlic on cardio-respiratory parameters and lipid profile in smokers.*** ***Materials and Methods****: fourty male in number between eighteen to sixty year age, smokers to be selected for the study. Cardio-respiratory parameters and lipid profile test was done by conventional method.* ***Results:*** ***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 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.*** ***Conclusion:*** ***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.***

Keywords: Garlic, Blood-Pressure, Lipid Profile

1. Introduction

Garlic (*Allium sativum*) is used as spice and medicinal herb. Most recent research on garlic has used garlic in the form of tablets, fresh, raw, boiled, cooked and dried are widely used for certain therapeutic purposes including lower blood pressure and improving lipid profile[1,2]. The relationship between smoking and cardiovascular disease has been examined by word wise studies. Because of smoking around 114, 000 people die every year in UK. For every smoking related death about 20 others smokers are suffering from a smoking related disease. Tobacco smokes contain nicotine the powerfully addictive drug. Tar a carcinogenic agent carbon mono oxide that decrease oxygen supply to the body, increase heart rate and blood pressure.[3] . 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.[4] 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[5]. Because of this, most of the nicotine is burned when a cigarette is smoked; however enough is inhaled to cause pharmalogical effect[6]. 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[7]. It is paradoxes that while smoking actually increase blood pressure; a slightly lower blood pressure level has been found among smokers than nonsmokers in larger epidemiological studies. Because blood pressure may increase after cessation of smoking, a smoke quitting program should not postpone initiation of antihypertensive treatment in patients otherwise in need of such treatment[8]. 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. Smoking greatly impairs this housekeeping. With time, the cilia become paralyzed and eventually disappear together. The loss of cilia leads to 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. Lipid profile is a group of tests that include total cholesterol, LDL (Low density Lipoprotein), Cholesterol, HDL (High Density Lipoprotein) Cholesterol and triglycerides which are done to know about the patients risk for heart disease. It is clear that it is bad for health and causes serious health consequences. Its main negative effect is it affects the lipid profile of body system. The aim of the study is to determine the effect of garlic on cardio-respiratory parameters and lipid profile in smokers.

Parameters		No.	Mean	SD	SE Mean	*P value*	*Statically Significant*
Pulse Rate	Sample .1	40	74.97	5.13	0.83		
	Sample .2	40	72.65	4.32	0.68	2.44	NO

2. Material and Methods

A total of fourty male in number between 18-60 year age, smokers to be selected for the study. Blood sample was collected in an EDTA vial. This blood sample was used for all tests except bleeding time and respiratory test. Raw fresh garlic weighing about 5-6 gm. would be given to the subject

for eating in daily morning for a month.Data was compile at Post-Graduate Dept. of Physiology, Teerthanker Mahaveer Medical College & Research Centre, Moradabad Uttar Pradesh. It was analyzed by using statistical procedure. The **"p" value** represent **probability** values for testing the simultaneous equality of the means and **"p" values** were considered to be statically significant.

3. Result

Results were analyzed by student's 'T' test to compare the both parameters. The values of all the parameters were presented as geometric means.

Sample 1 = Before taking garlic
Sample 2 = After taking garlic

Table 1: Data set of Pulse Rate

SD- Standard deviation, **SE**- standard error.
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 not statically significant.

Table 2: Data set of Systolic Blood Pressure

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
Sytolic blood presure	Sample .1	40	120.37	8.72	1.38	3.17	NO
	Sample .2	40	114.30	5.79	0.91		

SD- Standard deviation, **SE**- standard error.
The mean of sample 1 is 120.37 and the mean of sample 2 is 114.20 The values of Sample 2 are lesser than as compare to sample 1 and the "P" value of both samples is 3.17. So it not statically significant.

Table 3: Data set of Diastolic Blood Pressure

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
Diastolic blood presure	Sample .1	40	80.37	8.11	1.28	0.03	YES
	Sample .2	40	76.62	6.34	1.03		

SD- Standard deviation, **SE**- standard error.
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, So it is statically significant.

Table 4: Data set of Hemoglobin

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
Hemo Globin	Sample .1	40	16.10	0.98	0.15	0.08	YES
	Sample .2	40	15.85	0.89	0.14		

SD- Standard deviation, **SE**- standard error.
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 and the "P" value of both samples is 0.08 So it is statically significant.

Table 5: Data set of Bleeding Time.

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
Bleeding Time	Sample .1	40	3.5	0.84	0.13	0.20	NO
	Sample .2	40	3.6	0.77	0.12		

SD- Standard deviation, **SE**- standard error.
The mean of sample 1 is 3.5 and the mean of sample 2 is 3.6. The values of Sample 2 are higher as compare to sample 1 and the "P" value of both samples is 0.20, So it not statically significant.

Table 6: Data set of Clotting Time

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
Clotting Time	Sample .1	40	4.22	1.18	0.18	0.03	YES
	Sample .2	40	4.65	1.42	0.22		

SD- Standard deviation, **SE**- standard error.
The mean of sample 1 is 4.22 and the mean of sample 2 is 4.65. The values of Sample 2 are higher as compare to sample 1 and the "P" value of both samples is 0.03, So it is statically significant.

Table 7: Data set of FVC.

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
FVC	Sample .1	40	2.65	0.70	0.11	0.19	NO
	Sample .2	40	2.77	1.04	0.16		

SD- Standard deviation, **SE**- standard error.
The mean of sample 1 is 2.65 and the mean of sample 2 is 2.77. The values of Sample 2 are higher as compare to sample 1 and the "P" value of both samples is 0.19, So it not statically significant.

Table 8: Data set of PEF

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
PEF	Sample .1	40	4.35	1.14	0.18	0.11	NO
	Sample .2	40	6.56	11.57	1.83		

SD- Standard deviation, **SE**- standard error.
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 and the "P" value of both samples is 0.11, So it not statically significant.

Table 9: Data set of Cholesterol

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
Cholesterol	Sample .1	40	167.3	16.43	2.59	3.8	No
	Sample .2	40	166.3	16.64	2.63		

SD- Standard deviation, **SE**- standard error.
The mean of sample 1 is 167.3 and the mean of sample 2 is 166.3. The values of Sample 2 are lesser than as compare to sample 1 and the "P" value of both samples is 3.8, So it not statically significant.

Table 10: Data set of Triglyceride

Parameters		*No.*	*Mean*	*SD*	*SE Mean*	*P value*	*Statically Significant*
Triglyceride	Sample .1	40	101.14	30.86	4.88	0.01	YES
	Sample .2	40	100.4	29.08	4.59		

SD- Standard deviation, **SE**- standard error.

The mean of sample 1 is 101.14 and the mean of sample 2 is 100.4. The values of Sample 2 are lesser than as compare to sample 1 and the "P" value of both samples is 0.01 So it is statically significant.

Table 11: Data set of VLDL

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
VLDL	Sample .1	40	47.37	18.78	2.97	0.15	NO
	Sample .2	40	47.20	18.57	2.93		

SD- Standard deviation, **SE**- standard error.

The mean of sample 1 is 47.37 and the mean of sample 2 is 47.20. The values of Sample 2 are lesser than as compare to sample 1 and the "P" value of both samples is 0.15, So it not statically significant.

Table 12: Data set of HDL.

Parameters		*No.*	*Mean*	*SD*	*SE Mean*	*P value*	*Statically Significant*
HDL	Sample .1	40	50.68	10.16	1.60	0.05	YES
	Sample .2	40	51.77	9.22	1.45		

SD- Standard deviation, **SE**- standard error.

The mean of sample 1 is 50.68 and the mean of sample 2 is 51.77. The values of Sample 2 are higher as compare to sample 1 and the "P" value of both samples is 0.05, So it is statically significant.

Table 13: Data set of LDL

Parameters		No.	Mean	SD	SE Mean	P value	Statically Significant
LDL	Sample .1	40	84.44	9.63	1.52	0.01	YES
	Sample .2	40	83.65	9.66	1.52		

SD- Standard deviation, **SE**- standard error

The mean of sample 1 is 84.44 and the mean of sample 2 is 83.65. The values of Sample 2 are lesser than as compare to sample 1 and the "P" value of both samples is 0.01 So it is statically significant.

4. Discussion

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 is significantly. **Leoper and DeBray et al**.[9] 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)**[10] 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)**[11]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**.[12] 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 hemoglobin concentration and the PCV when compared with the control[13]. 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.**[14] 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[15]. 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

5. 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. Garlic is main beneficial for human beings. Its main beneficial effect for decrease the lipid level in obese persons, decrease the blood pressure in hypertension patient and increase the functional respiratory capacities.

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