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To Study Effect of Garlic on Different Physiological and Biochemical Parameters in Metabolic Syndrome

[1]Kishori Lal, [2]Kavita Yadav

[1]Sr. Demonstrator, department of Biochemistry

[2]Assistant Professor, Department of Physiology

Govt. Medical College, Bharatpur

Correspondance Author: Kavita Yadav, Assistant Professor, Department of Physiology, Govt. Medical College, Bharatpur.

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Abstract: Metabolic syndrome consists of a constellation of metabolic abnormalities that confer increased risk of cardiovascular disease and diabetes Mellitus. The major features of the Metabolic syndrome includes: central obesity, Hyper triglyceridemia, Low HDL cholesterol, Hyperglycemia and Hypertension. The Aim of this study to investigating the effect of Allium sativum extract on the risk factors of metabolic syndrome in metabolic syndrome patients along with conventional treatment .

Keywords: Metabolicsyndrome,hyperglycemia,hypertension,obesity,triglycerides,cholesterol,HDL,LDL, allium sativum,diabeties mellitus.

Introduction: The metabolic syndrome (Syndrome X, Insulin resistance syndrome) consists of a constellation of metabolic abnormalities that confer increased risk of cardiovascular disease (CVD) and diabetes mellitus (DM).[(1)]Metabolic syndrome is also known as metabolic syndrome X, cardiometabolic syndrome, Reaven's syndrome (named for Gerald reaven) and CHAOS (in Australia).[(2)]The major features of the metabolic syndrome include Central obesity, Hyperglycemia, and Hypertension.[(1)]A meta analysis conducted by Zeng et al. in 2012 clearly illustrated that garlic therapy is more effective if used for a long term with higher baseline total cholesterol level.[(3)(4)]

Garlic is a bulbous perennial herb, Garlic contains at least 33 Sulfur compounds, several enzymes (allinase, peroxidases, myrosinase and other), 17 amino acids and minerals such as selenium.[(5)] According to Ayurvedic Pharmacology:- Properties of Allium sativum includes Guna, Rasa, Veerya Vipaka and Karma.[(6)] Garlic medicinal uses include Anti-Atherosclerotic, Anticoagulant, Anti- cancer, Antioxidant, Antibiotic, Antiparacitic, anti-inflammatory, Antihypertensive and in Glucose control.[(7,8,9,10,11,12)]

Material and method: This study was conducted in S.P. Medical College, Bikaner in 2014-15. All 100 patients were randomly selected from the Diabetes clinic that is situated in the Diabetes care and Research centre of P.B.M. hospital, Bikaner.

Informed consent was obtained from each participants before their recruitment. The subjects were divided into two groups. Group I patients were given conventional treatment only and serve as the control group. Group II patients besides conventional treatment were given Garlic Capsule & serve as the study group.

Procedure: Patient included in the study group were asked to take one garlic capsule twice a day after meal. Each capsule contain 250 mg extract of lasuna. Capsule taken three month s regularly.

Before starting garlic capsule base live parameters were taken for every patient i.e. waist hip ratio, body mass index, blood pressure, fasting blood sugar, lipid profile and glycosylated haemoglobin. Patients were evaluated after 3 month for these above mentioned parameter. These under control group were evaluated base line and after three months for these above mentioned parameter.

Exclusion criteria: Patients suffering from liver disease, arthritis, renal disease, mal-absorption, asthma, pulmonary tuberculosis, myocardial infection, heart lock disease and any other disease in addition to metabolic syndrome and non- cooperative patients with metabolic syndrome were excluded from the study.

Result: The present study show the comparison of mean value of systolic blood pressure & diastolic blood pressure between control group & study group. Systolic & diastolic blood pressure improved significantly in study group after garlic therapy.

Mean value of fasting blood sugar decreased by 22.66% in study group & 10.98% in control group. HbA_1c is decreased by 15.45% in study group whereas in control group, it is decreased by 3.19%.

Mean value of total cholesterol decreased by 9.97% in study group whereas in control group, it is decreased by 3.50%

Mean value of serum triglyceride decreased by 11.86% in study group whereas in control group, it decreased by 2.41%.

Mean value of HDL cholesterol increased 6.96% in study group whereas in control group, it increased by 1.58%.

Mean value of LDL cholesterol decreased by 15.36% in study group whereas in control group it decreased by 4.80%.

Mean value of VLDL cholesterol decreased by 11.89% in study group whereas in control group, it decreased by 2.41%.

Table no.-1 Effect of garlic therapy on Anthropometric and Biochemical parameters in study group.

		Base line		Post treatment		p value
		Mean	SD	Mean	SD	
BMI		28.4	3.6	27.45	3.46	<0.9
W/H ratio		0.95	0.056	0.93	0.059	<0.8
B.P. (mmHg)	SBP	151.16	8.9	139.88	8.09	<0.001
	DBP	96.16	6.67	87.96	5.85	<0.001
Glycaemic control	FBS	222.84	69.41	172.34	45.77	<0.001
	HbA_1C	9.25	1.62	7.82	1.46	<0.02
Lipid profile	TC	236.93	32.27	213.31	25.87	<0.001
	TG	195.96	48.78	172.171	47.95	<0.001
	HDL	36.76	4.06	39.32	3.21	<0.02
	LDL	160.97	29.11	139.46	23.03	<0.001
	VLDL	39.19	9.75	34.53	9.6	<0.02

Table 2. Comparison of Different Parameters between the Groups at Post – Treatment.

Parameters		Control group		Study Group		p value
		Mean	SD	Mean	SD	
BMI		29.11	4.96	27.45	3.46	<0.8
W/H ratio		0.94	0.05	0.93	0.059	<0.9
B.P. (mmHg)	SBP	150.84	8.06	139.88	8.09	<0.02
	DBP	93.52	6.3	87.96	5.85	<0.05
Glycaemic control	FBS	184.12	53.43	172.34	45.77	<0.001
	HbA_1C	8.8	1.68	7.82	1.46	<0.2
Lipid profile	TC	235.07	28.54	213.31	25.87	<0.01
	TG	189.84	61.19	172.71	47.95	<0.01
	HDL	37.32	2.5	39.32	3.21	<0.1
	LDL	159.78	26.94	139.46	23.03	<0.05
	VLDL	37.97	12.24	34.53	9.6	<0.1

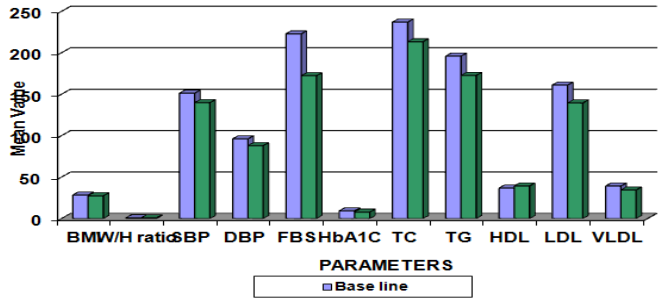
Table 3. Comparison of Systolic B.P. For The Two Groups According To Their Age Group.

Age group	Control Group			Study Group		
	Initial	Final	p value	Initial	Final	p value
≤40	149.50±5.74	144.50±3.41	<0.02	147.20±7.56	138.40±6.23	<0.001
41-50	158.09±9.64	152.70±9.16	<0.02	150.89±8.82	139.11±7.89	<0.001
51-60	151.27±6.28	147.45±4.82	<0.02	147.85±7.23	137.08±9.08	<0.02
61-70	156.67±7.94	151.78±8.09	<0.001	156.22±11.55	143.78±8.57	<0.001
>70	160.67±8.33	154.67±8.08	<0.001	155.60±4.77	144.40±3.85	<0.001
Total	155.8±8.76	150.84±8.06	<0.01	151.16±8.9	139.88±8.09	<0.001

Table 4. Comparison of Diastolic B. P. For The Two Groups According To Their Age Group

Age group	Control Group			Study Group		
	Initial	Final	p value	Initial	Final	p value
≤40	92.0±5.89	90.0±5.16	<0.8	94.80±4.15	85.60±3.58	<0.01
41-50	97.56±7.26	95.56±7.13	<0.7	95.55±7.18	88.55±6.64	<0.02
51-60	92.0±2.97	89.45±4.30	<0.1	94.77±4.36	86.92±4.44	<0.001
61-70	95.33±5.38	93.55±4.77	<0.5	97.25±9.62	87.75±7.36	<0.01
>70	98.0±0	97.33±2.31	<0.5	102.0±5.83	92.80±2.68	<0.001
Total	95.52±6.2	93.52±6.3	<0.1	96.16±6.67	87.96±5.85	<0.001

Graph No.-1 Effect Of Garlic Therapy On Anthropometric And Biochemical Parameters In Study Group



Discussion

The present study observed that lipid profile improved significantly in study group after garlic therapy for 3 months.

The mechanism of hypocholesterolemic action of garlic extract is due to inhibition of HMG-coA reductase activity, Garlic supplemental enhanced the excretion of natural steroids and bile acids & possibly decreased activity of lipogenic enzyme glucose-6 phosphate dehydrogenase & malic dehydrogenase. The triglyceride lowering effect of garlic appear to be due to inhibit of de-novo fatty acid synthesis.[13]

In recent years, garlic has been focus of attention because of its potential role in the prevention of various aspects of cardio vascular disease.[14,15]

Garlic's blood pressure lowering effects appear to be a contribution of a number of mechanisms/factors.[16] The first proposed mechanism is garlic's ability to indirectly & directly increase the activity & vasodilator properties of nitric oxide.[17]

Secondly, a reduction in AT-II will decrease adrenal gland production of aldosterone.[18]

Diabetes mellitus the most common endocrine disorder that affect more then 194 million people worldwide. If nothing is done to control this disease, the number will exceed 333 million by 2025.[19]

The hypoglycaemic action of garlic could possibly be due to an increase in pancreatic secretion of insulin from B cells, or enhancement of insulin sensitivity.[11, 20]

Metwally (2009) also reported that feeding of garlic to the fish Tilapia Nilotica significant reduced glucose level.[21]

In our study waist – hip ratio & BMI not improved significantly in study group after 3 month garlic therapy.

Conclusion

Metabolic syndrome major features include:- central obesity, hypertriglyceridemia, low high – density lipoprotein cholesterol, hyperglycemia and hypertension.

1. Garlic (Allium sativum) therapy had good glycemic control,
2. FBS and HbA_1c improved significantly in study group.
3. Systolic and diastolic blood pressure improved significantly in study group after garlic therapy.
4. Lipid profile improved significantly in study group after garlic therapy.
5. Waist – hip ratio & BMI improved significantly in study group after garlic therapy.
6. Garlic therapy can be used as an adjunct with diet & medicines in management of metabolic syndrome.
7. Such studies should be further encouraged as medicinal herbs constitute the cornerstone of traditional medicinal practice worldwide.
8. The garlic therapy is quite beneficial in prevention of metabolic syndrome it is an adjunct therapy, quite cheaper, safe, non-toxic and non-invasive.

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