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VARIATIONS IN BIOCHEMICAL PARAMETERS OF DIABETICS WITH AMLA AND PRANAYAMA

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ABSTRACT
Emblica officinalis (Amla) is widely used in the Indian system of medicine and to increase defense against disease. Vitamin C, tannins and flavonoids present in amla have very powerful antioxidant activities. Due to rich Vitamin C, amla is recommended in the treatment of Diabetes mellitus. Pranayama increases oxygen intake to enhance metabolisms and relieves stress and stain. To study the effect of Amla and Pranayama on type 2 diabetes mellitus (T2DM,) 120 T2DM subjects were selected from Acharya Nagarjuna University and Guntur of Andhra Pradesh The data was collected on general information, background information, clinical information, anthropometry and 24 hour dietary recall along with fasting blood sugar, lipid profile and glycated hemoglobin. During the course of supplementation no modification in the diet or medication was made for both experimental and control groups. The anthropometric measurements and Biochemical parameters like FBS, PPBS, HBA1C and lipid profile were monitored at the beginning, middle and end of supplementation period. Supplementation of one medium size Amla (35g) for 6 months and pranayama led to a significant decrease in the FBS, PPBS, HBA1C, Lipid profile values in the experimental group. There were no significant changes in the control group.

INTRODUCTION
To be healthy one should be free from diseases of body and mind. The whole universe is influenced by our mind. With the harmony of work in mind and all other organs of the body, man enjoys peace and happiness and will perform well his duties of life. But increased stress and strain deteriorating human health and increasing the metabolic disorders like Diabetes mellitus, Hyper tension etc. When stress and strain prevails, pancreatic dysfunction occurs. The insulin secreted by b-cells of Islets of Langerhans of pancreas may not be sufficient to take care of the blood glucose levels. Hence raise in blood sugar (more than 120mg/100ml) occurs which results in Diabetes mellitus.

Amla, being potential source of Vitamin C and poly phenols, possess properties like anti- oxidative, anti-inflamatory, anti- ageing, anti- diabetic, anti-atherosclerotic etc., Diabetes mellitus is a chronic disease which cannot be cured except in very specific situations. Management of diabetes makes blood sugar levels as close to normal as possible, without causing hypoglycemia. This can usually be accomplished with diet, exercise, and use of appropriate medications. Diabetes mellitus is a dreadful disorder that is brought about by the body's inability to convert blood sugar or glucose into energy. It also arises from the body's inability to manufacture insulin. There are a number of methods for controlling the symptoms and negative effects of diabetes. Among such are use of amla ad pranayama.

Amla, or Indian gooseberry, has been used by Indian doctors for many chronic conditions including blood sugar control. This edible fruit is well-known for its high content of vitamin C and its potent antioxidant activity, more potent than many other herbs. Due to its high content of vitamin C and polyphenols, amla extract is a potent antioxidant. It protects cells against free radical damage.

Emblica officinalis (EO) scientifically is the most widely used herb in the Ayurvedic system of medicine. Amla has said to be useful against many severe diseases, including diabetes, respiratory disorder, diarrhea, heart diseases, and dental disease. Amla cleanses the mouth, strengthens the teeth. The presence of amla results in an enhanced cell survival, decreased free radical production, and higher antioxidant levels. There are various classic Ayurvedic preparations, such as Chyawanprash, in which amla is used as a chief ingredient. It helps to improve intelligence and memory power. Triphala and Brahma Rasayana are other classic medicine in which amla is being used since time immemorial. Amla should be used

in various forms and preparations by dental patients for the maintenance of oral hygiene.

Relaxed and Concentrated state of mind is the aim of any form of meditation which creates calming effect on nervous system, brings balance between Sympathetic and Parasympathetic nervous systems. Both pranayama and amla play a vital role in control of several health disorders. Diabetes, being a metabolic disorder, can very well be controlled with these. Hence the present study was carried out to see the efficacy of Amla and Pranayama.

MATERIOLS AND METHODS

The study was conducted in Acharya Nagarjuna University as well as Guntur City. 120 patients of type 2 DM in the age-group of > 40 yrs were selected. Patients of nephropathy, retinopathy (proliferative) and coronary artery disease or any other complications of diabetes were excluded. The subjects were divided into two groups. One is Control group with 30 subjects were only having diabetes and this group is taken from Rajeev Gandhi Nagar, Mangal Das nagar, OldGuntur, Akulavarithota, Budampadu, Brahmanakoduru, Nehrunagar of Guntur and another one is Experimental group with 90 subjects. The experimental group was again divided into 3 sections. The first section of 30 subjects were Diabetes with Amla, this section taken from the Acharya Nagarjuna university, Guntur. Second section of 30 Subjects were Diabetes with both amla and Pranayama, this section is also taken from the Acharya Nagarjuna University, Guntur and the third section of 30 Subjects were diabetes with Pranayama and this section taken from the Arundelpet, Brundavan Gardens, Kothapet, Mangal Das nagar of Guntur.

First Section of Experimental group were supplemented with one medium size amla (35gms) every day. The second Section of experimental group were subjected to pranayama for 5 days in every month by yoga expert and practiced 1 hour every day in the morning. And at the same time after performing pranayama they were supplemented with one medium size amla (35gm). And the third Section of experimental group were subjected only to pranayama by yoga expert and practiced 1 hour every day in the morning. The Control group were on treatment and did not undergo any pranayama practice and amla supplementation.

Both the experimental and control groups were asked to continue same medications throughout the study period. Blood samples for RBS, PPBS, HBA1C, Lipid profile, Serum creatinine, blood Urea, were estimated before starting and in the middle and at the end of the programme.

RESULTS

	Diabetes with amla			Diabetes with amla & pranayama			Diabetes with pranayama			Control group		
	I	M	F	I	M	F	I	M	F	I	M	F
weight	73.2	70.9	67.3	71.7	67.5	60.6	69.1	67.5	65.2	63.4	62.5	61.9
waist	94.3	92.7	89.3	96.1	94.8	92.7	91.9	90.7	89.8	90.5	89.4	88.1
Hip	100.9	99.0	94.0	101.1	99.7	96.2	101.5	100.2	97.9	98.9	97.4	96.0
wt/Hip	0.93	0.93	0.94	0.95	0.95	0.96	0.90	0.90	0.91	0.89	0.89	0.91
BMI	25.9	25.1	23.8	26.4	24.8	22.3	26.4	25.7	24.8	25.2	24.9	24.7
RBS	166.1	141.4	114.9	180.1	155.3	137.7	175.2	157.8	136.4	177.5	166.7	158.5
PPBS	260	213.4	164.1	269.7	246.4	219.3	294.4	259.7	221.7	285.7	268.1	255.2
HBA1C	8.0	7.31	6.58	8.22	7.77	7.15	8.41	7.68	6.91	8.37	8.04	7.79
TG	146.0	119.5	99.9	133.8	124.4	111	139.7	123.5	110.5	119.3	110.9	104.7
HDL	34.2	39.4	49.5	34.3	39.0	47.8	33.7	36.9	44.4	34.3	30.3	24.6
LDL	186.2	171.6	154.8	156.3	143.7	132.9	155.4	137.8	124.1	159.4	143.7	132.4
VLDL	28.8	23.9	20.6	28.1	25.4	23.5	27.5	24.9	22.7	22.7	21.2	19.9
S.cho	249.8	234.6	213.8	215.8	205.2	185.7	211.8	196.3	181.9	217.6	198.1	170.4
S. Cr	1.04	1.02	0.74	1.25	1.14	1.01	1.22	1.11	0.95	1.20	0.88	0.67
S.urea	38.9	34.5	30.2	39.6	34.3	30.8	38.5	35.4	32.6	38.6	36.6	35.5

BMI = BODY MASS INDEX
IBW = IDEAL BODY WEIGHT
RBS = RANDOM BLOOD SUGAR
PPBS = POST PRONDIAL BLOOD SUGAR
HbA1C = GLYCOSILATED HAEMOGLOBIN
TG = TRIGLYCERIDES
HDL = HIDENSITY LIPO PROTEINS
LDL = LOWDENSITY LIPO PROTEINS
VLDL = VERY LOWDENSITY LIPOPROTEINS
S.CHO- SERUM CHOLESTEROL
S. CR- SERUM CREATININE
S.UREA- SERUM UREA
I -Initial Values
M- Middle values
F-Final values

It was shown from the table that the group with both amla and pranayama has shown good results compared to other two as both are very effective than the single administration either with amla or pranayama. All the

parameters levels were drastically reduced in a group with Amla and pranayama followed by group with Amla followed by group with Pranayama.

DISCUSSION

All the levels of RBS, PPBS, HbA1C, TG, HDL, LDL, VLDL, SERUM CHOLESTEROL, SERUM CREATININE, SERUM UREA were drastically reduced in a group with Amla and pranayama followed by group with Amla followed by group with Pranayama. Am,la and Pranayama are wonderful choices to diabetics.

Within the Indian tradition, meditation has been a subject of deep study, Research and experiment from times immemorial. One of the important features of yoga was "concentration" aimed at "mental control" .As the home land of yoga discipline, Indias contribution for the world wide spread of yoga is immeasurable. Today meditation and yoga are effective ways of stress management. In psychological Jargon, they are "self regulation strategies" (Shapiro and Giber, 1978).

The results are in support of other studies also. Amlas are potential sources of natural antioxidants which have free radical scavenging activity and might be used for reducing oxidative stress in diabetes. (Kusirisin et.al, 2009)

Poltanov et.al (2009), evaluated the chemistry and antioxidant properties of four commercial amla fruit extracts. All extracts produced positive responses in the total phenol, total flavonoid and total tannin assays. The presence of predominantly polyphenolic analytes, e.g. ellagic and gallic acids and corilagin, was confirmed.

A study in animals shows this herbal supplement to play a role in reducing the oxidative damage from high blood sugar. Amla extracts reduce oxidative stress in streptozotocin-induced diabetic rats. Rao et.al,, 2005, studied the antioxidant properties of amla extracts and their effects on the oxidative stress in streptozotocin-induced diabetes were examined in rats. Amla extracts showed strong free radical scavenging activity and significantly alleviated various oxidative stress indices of the serum of the diabetic rats.

In rodent studies, amla has been found to be helpful as an antioxidant, for cholesterol and blood sugar control, for memory, and the use of amla was helpful in delaying development of diabetic cataract in rats. Ascorbic acid and other polyphenols present in the natural formulation of amla show much superior antioxidant activity. (hopde et.al, 2001).

Hence, it may be concluded that both amla and pranayama are showing their potentialities on control of Diabetes mellitus. Amla, with its nutritional properties shown magnificent results. Pranayama calms body and mind. Person's physical efficiency and cognitive skills will increase by doing this. Apart from Diabetes, these two- Amla and Pranayama also cure other health ailments and increases longevity of the individual. As prevention measure, normal individuals also follow these to keep away the onset of diabetes and other health issues.

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