



A Pilot Clinical Study on Impact of Pranayama and Amla – an Approach Towards Control of Diabetes Mellitus

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ABSTRACT

Diabetes is a colossal worldwide health problem causing serious health complications. India has dubious distinction as the Diabetes capital of the world, there is a rise in the incidence of type 2 diabetes with the increase in age, physical inactivity and sedentary lifestyle. Hence, the present study was undertaken for 3 months to assess the impact of pranayama and amla in type 2 diabetes. We selected 30 type 2 diabetic patients in the age group of 40+ years from local areas of Guntur city. They were divided into experimental and control groups with 15 patients in each group. The data were collected on anthropometry and biochemical parameters to see the effect of pranayama and amla. The experimental group were taught pranayama by yoga expert and practiced for one hour every day in the morning and at the same time after performing pranayama they were supplemented with one medium size amla (35gm). The subjects have been done the biochemical parameters and anthropometric measurements were recorded before and after completion of study. The results showed significant decrease in metabolic parameters of the experimental group. However, there were no significant changes in the control group. Difference pertaining to anthropometric measurements was also noticed in experimental group compared to the control group.

Key words : Amla, Diabetes, Metabolic parameters, Pranayama.

Diabetes is a chronic metabolic disorder with absolute or relative deficiency or inefficiency of insulin (Larsen and Alper 2004). According to the World Health Organization (WHO), it is estimated that the global prevalence of Diabetes mellitus will be 380 million by 2025 (Magliano *et al.*, 2008). Type-2 Diabetes mellitus results from either β -cell insufficiency or insulin resistance. The incidence of type-2 diabetes is also increasing with the increase in age, physical activity and sedentary life-style (Dong Cheng 2005). The abnormalities in insulin resistance lead to the pathogenesis and progression of type-2 Diabetes mellitus and its complications such as hyper coagulation, chronic inflammation, endothelial dysfunction, increased oxidative stress, and impaired lung function, elevated sympathetic activity and reduced parasympathetic tone (Innes and Vincent 2007).

In addition, chronic psychological stress and negative mood states are strongly associated with insulin resistance, glucose intolerance, hypertension and cardiovascular diseases (Innes *et al.*, 2005). Interventions to reduce psychological stress in the management of type-2 Diabetes mellitus have been gaining interest worldwide

(Surgenor *et al.*, 2000). With no side effects and multiple collateral lifestyle benefits, pranayama appears safe, simple to learn, inexpensive to maintain and requires minimal equipment or professional personnel. However, there is significant evidence that pranayama will aid in the prevention and management of type-2 Diabetes mellitus (Mahapure *et al.*, 2008).

The fruit of the *Emblica officinalis* (family: Euphorbiaceae) plant, commonly known as 'Amla' or the Indian gooseberry, has been reported to contain constituents with variable biological activity (Snehal Ramesh 2011). Phytochemical investigations of the *E. officinalis* fruit show that it has a high concentration of polyphenol with low and high molecular weight gallotannins such as L-malic acid 2-O-gallate, mucic acid, chebulagic acid, furosin and geranin. Many such polyphenols are known to be present in *E. officinalis* and are reported to have glucose-lowering, insulinomimetic, lipid-lowering, anti-oxidant and cardio protective properties (Juree *et al.*, 2010).

This study was undertaken to see the effect of three months pranayama practices and amla on metabolic parameters like FBS, PPBS, HbA1C, lipid

profile and anthropometric measurements like weight, BMI, IBW Waist-hip ratio in type-2 diabetes patients.

MATERIAL AND METHODS

This prospective study was conducted for three months in Guntur city, Andhra Pradesh. We selected thirty type-2 diabetic patients in the age group of 40+ years from Guntur local areas of Arundel pet, Brodipet, Syamalanagar, Koritapadu, old Guntur and Nehru Nagar. The subjects were divided into experimental and control groups with 15 patients in each group. The data were collected on anthropometry to see the effect of pranayama and amla. The experimental group taught pranayama for five days a month by Yoga expert, thus a total of 15 days for 3 months. And 1 hour every day in the morning they practiced pranayama and at the same time after performing pranayama they were supplemented with one medium size amla (35gm). The control group was on same 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 FBS, PPBS, HbA1C, lipid profile were estimated and anthropometric measurements also recorded before the starting and at the completion of the study period. The data obtained was analysed using appropriate statistical methods like mean and standard deviation.

Pranayama techniques implemented

1. Anuloma - Viloma, 5-10 mins per day
2. Bhramari, 5-10 mins per day
3. Bhastrika, 3-5 mins per day
4. Ujjayi, 5-10 mins per day
5. Kapalbhathi, 5-7 mins per day
6. Nadi Sodhana, 5-10 mins per day
7. Shitali Pranayama, 3-5 mins per day
8. Digra Pranayama, 3-5 mins per day

RESULTS AND DISCUSSION

Table 1 shows that there was significant decrease in FBS, PPBS and HbA1C of experimental group. Similar significant change was also observed in Cholesterol, triglycerides and LDL. There was also significant increase in HDL levels of experimental group. However, there was no

significant change observed in all the parameters of the control group.

Table 2 indicates a significant decrease in the weight, BMI, waist, hip and waist-hip ratio in experimental group. Such a significant change in the control group was not found.

Progress in understanding the metabolic staging of diabetes over the past few years have led to significant advances in regimen for treatment of this devastating disease (Tiwari and Madhu Sudhana Rao 2002). The most challenging goal in the management of patients of diabetes mellitus is to achieve blood glucose level as close to normal as possible. In the present study there was a significant decrease in FBS, PPBS, HbA1C, TC, triglycerides and LDL. There was also a significant increase in HDL in the experimental group who underwent the 2 months pranayama practice and consumption of amla.

The possible mechanisms of actions of pranayama in decreasing the blood sugar are- direct rejuvenation / regeneration of cells of pancreas due to abdominal breathing, which may increase utilization and metabolism of glucose in peripheral tissues, liver and adipose tissues through enzymatic process. (Dang and Sahay 1999) Muscular relaxation, development and improved blood supply to muscles might enhance insulin receptor expression on muscles causing increased glucose uptake by muscles and thus reducing blood sugar (Balaji *et.al.*, 2011).

From the results, it was clear that supplementation of amla showed a favorable impact on the FBS, PPBS, HbA1C, TC, triglycerides and lipid profile of the subjects. This could be due to the nutrient and phytochemical composition of amla. The fruit amla is the richest source of vitamin-c, containing more than 20 times that of orange. The gallo-tannins in the fruit preserve the vitamins under all conditions (Srivastu 2012). It is believed that what gold is to minerals, Amla is to the herbs. The edible fruit tissue contains protein concentration, ascorbic acid, minerals, aminoacids, phyllembin and curcuminoids which has direct effect on glucose metabolism. Thus amla may be used as a supportive therapy for diabetes (Chaudhuri 2003).

Addition to all the above effects, following pranayama and consuming amla, many patients reported a feeling of well-being, more relaxed and

Table 1. Metabolic parameters.

| S.No | Parameter | Experimental Group | | Control group | |
|------|---------------|--------------------|--------------|---------------|--------------|
| | | Initial | Final | Initial | Final |
| 1 | FBS | 227.66±38.67 | 178.06±25.76 | 200.62±62.22 | 206.86±26.20 |
| 2 | PPBS | 360.13±44.89 | 274.46±45.30 | 335.53±53.84 | 319.46±43.01 |
| 3 | HBA1C | 9.52±0.68 | 8.24±0.63 | 9.22±0.69 | 8.96±0.59 |
| 4 | Triglycerides | 209.4±30.34 | 163.33±25.38 | 239.12±85.36 | 229.26±68.35 |
| 5 | HDL | 37.9±5.72 | 44.4±3.96 | 38.33±6.17 | 42.13±5.84 |
| 6 | LDL | 164.6±3.96 | 137.33±28.35 | 159.8±28.13 | 132.86±29.16 |
| 7 | VLDL | 41.4±6.10 | 32.46±5.09 | 52.6±10.28 | 45.4±9.7 |
| 8 | T.Cholesterol | 243.46±29.85 | 214.2±29.0 | 251±32.37 | 220.4±30.55 |
| 9 | Urea | 39.2±4.19 | 35.8±4.49 | 40.8±7.29 | 37.93±3.39 |
| 10 | S.Creatinine | 1.04±0.17 | 0.92±0.14 | 1.04±0.24 | 0.95±0.20 |

Table 2. Anthropometric measurements.

| S.No | Parameter | Experimental Group | | Control group | |
|------|-----------|--------------------|-------------|---------------|-------------|
| | | Initial | Final | Initial | Final |
| 1 | Weight | 76.53±10.13 | 74.66±9.76 | 75.26±5.27 | 74.13±5.19 |
| 2 | Waist | 98.2±3.23 | 94.2±3.60 | 100.2±3.72 | 98.53±3.77 |
| 3 | Hip | 104.46±3.39 | 102.33±3.59 | 106.93±4.01 | 105.73±3.84 |
| 4 | W/H Ratio | 0.94±0.03 | 0.92±0.03 | 0.93±0.03 | 0.92±0.02 |
| 5 | BMI | 28.33±2.55 | 27.6±2.55 | 27.6±2.38 | 27.6±2.38 |

satisfied and a sense of relief from anxiety. Thereby concluding that there are significant benefits of pranayama practices and consuming amla on metabolic parameters and anthropometric measurements in type-2 diabetic patients.

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