



TO EVALUATE THE EFFECT OF GINGER (*ZINGIBER OFFICINALE*) ON BODY MASS INDEX AND STATUS OF C-REACTIVE PROTEIN IN DIABETES MELLITUS

Bharti Maan

M.Sc (Medicine) Physiology, Department of Physiology, S.P. Medical College, Bikaner.

Abhishek Acharya*

Senior Demonstrator, Department of Physiology, R.N.T. Medical College, Udaipur.

*Corresponding Author

ABSTRACT

Diabetes mellitus (DM) commonly referred to as diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. C-reactive protein (CRP), is a marker of systemic inflammation, is emerging as an independent risk factor for cardiovascular disease. Previous study showed that serum CRP levels are elevated in patients with impaired glucose tolerance (IGT) or diabetes. Aim of present study was to see the effect of Ginger (*Zingiber officinale*) on body mass index and status of C- Reactive Protein in Diabetes Mellitus. Selected patients were divided randomly in two groups each comprised treatment and served as the control group. GROUP I- These patients were taken conventional treatment and served as the control group. GROUP II- Patients besides conventional treatment were given *Zingiber officinale*(Ginger) powder and served as the study group. Our study reflects that ginger therapy had shown significant effect on C-Reactive protein ($P<0.05$) in study group after Ginger powder supplementation.

KEYWORDS : Diabetes mellitus (DM), Body Mass Index (BMI), C- Reactive Protein (CRP).

INTRODUCTION

Diabetes is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.¹ The metabolic dysregulation associated with DM causes secondary patho-physiologic changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the health care system.

C-reactive protein (CRP), is a marker of systemic inflammation, is emerging as an independent risk factor for cardiovascular disease.^{2,3} It has also been reported that serum CRP levels are elevated in patients with impaired glucose tolerance (IGT)⁴ or diabetes.⁵ A few prospective studies have shown that increased CRP levels are an independent risk factor for future diabetes.^{6,7} Normal concentration in healthy human serum is usually lower than 4.9 mg/L, slightly increasing with aging. Higher levels are found in late pregnant women, active inflammation, bacterial infection, severe bacterial infections, tissue injury (post-operation), trauma and burns.

Ginger is an underground rhizome of plant *Zingiber officinale* belonging to the family Zingiberaceae and it is one of the most widely consumed spices worldwide. It has a long history of use as herbal medicine to treat a variety of diseases including nausea and vomiting, constipation, indigestion (dyspepsia), pain, and cold induced syndromes. More recently, it was reported that ginger also possesses anti-cancer, anti-clotting, anti-diabetic, anti-inflammatory, and anti-oxidative characteristics, since it can scavenge superoxide anion and hydroxyl radicals.⁸

MATERIAL AND METHODS

This study was conducted in the Department of Physiology, S.P. Medical College, Bikaner Patient were selected from the Diabetic clinic that is situated in the Diabetes Care and Research Centre of P.B.M. Hospital, Bikaner.

The study has been undertaken to observe the effect of Ginger in pre-diabetic and diabetic patients of middle age group 36-55 years. Ginger supplementation was given for 3 months and data was collected at before supplementation of ginger and after 3 months of ginger supplementation.

EXCLUSION CRITERIA:- Patients suffering from liver disease, arthritis, pulmonary tuberculosis, malabsorption, alcoholism, asthma, myocardial infarction, heart block disease and non-operative patients were excluded from the study.

METHOD

The selected patients were divided randomly into two groups each comprising of 50 patients.

Group I -In this group diabetic patients who were on conventional treatment were served as a control group.

Group II -In this group diabetic patients who were on conventional treatment along with supplementation of ginger powder and served as a study group.

Dried rhizomes of ginger (*Zingiber officinale*) was purchased from a local market in Bikaner. The ginger rhizomes was finely ground and then prepared as tablets containing 2 gram ginger powder in each tablet or it is taken orally directly without prepared in capsule.

Following parameters were recorded:-

1. Body mass index (BMI)
2. C-Reactive Protein

RESULTS

Table 1: Mean value of BMI, pre and post test in the control and study group

Parameter	Control group		Study group	
	Group I (Mean±SD)		Group II (Mean±SD)	
	Pre-test (0 month)	Post-test (3 month)	Pre-test (0 month)	Post-test (3 month)
BMI (kg/m ²)	24.26±3.282	23.91±3.219	24.34±3.503	24.12±3.471

Table 2: Represent the CRP, pre and post test in the control and study group

Parameter CRP	Control group				Study group			
	Group I				Group II			
	Pre-test (0 month)	Post-test (3 month)	Pre-test (0 month)	Post-test (3 month)	Pre-test (0 month)	Post-test (3 month)	Pre-test (0 month)	Post-test (3 month)
Status	+	-	+	-	+	-	+	-
No. Of subjects	14	36	0	50	20	30	4	46

Table-1 shows the mean BMI in Group I at 0 month was 24.26±3.28 kg/m² and at 3 month was 23.91±3.21 kg/m² In group II at 0 month test was 23.34±3.50 kg/m² and at 3 month was 24.12±3.47 kg/m². In group III at 0 month was 23.03±3.61kg/m² and at 3 month was 22.79±3.53kg/m².

Table 2:- depicts CRP in the Control and study group:-

In control group (group I) at 0 month 14 subjects were positive and 36 were negative and at 3month 0 subjects were positive and all 50 were negative

In study group (group II) at 0 month 20 subjects (40%) were positive and 30 subjects (60%) were negative and at 3 month 4 subjects (1%) were positive and 46 subjects (99%) were negative.

DISCUSSION

Diabetes is recognized as one of the leading causes of morbidity and mortality in the world, while about 2.5 to 7% of the world's population has been diagnosed with diabetes mellitus, it is still expected to increase in future (Abo *et al.*, 2008).⁹ In spite of the fact that synthetic drugs such as insulin-like substances are the most important therapeutic agents known to medicine, researchers have been making efforts to find insulin-like substances from plant sources for the treatment of diabetes (Rafiq *et al.*, 2009).¹⁰ Recent scientific investigation and clinical studies had confirmed the efficacy of some medicinal plants and herbal preparations in the improvement of normal glucose homeostasis.

Herbal therapies have been used in patients with insulin-dependent and noninsulin-dependent diabetes (Mukherjee *et al.*, 2006).¹¹ The herbal drugs have been prescribed widely because of their effectiveness, fewer side effects and relatively low cost (Venkatesh *et al.*, 2003).¹²

Kota *et al.* (2012)¹³ found that there were an association between hyperglycemia and decreased body weight of diabetic animals, DM induced reduction in body weight, and the body's inability to store or use glucose causes hunger and weight loss.

In our study, after three month of treatment, ginger powder produce highly significant improvement in CRP.

In agreement with our findings, some of the included studies have reported that ginger (*Z. officinale*) reduces inflammatory markers.¹⁴ Arablou *et al.* indicated that consumption of ginger powder for 12 weeks can reduce CRP significantly in patients with type 2 diabetes.¹⁵ Their findings are in line with the result of Atashak *et al.*, 2016¹³⁸ which showed that consumption of 1 g of powdered ginger daily for 10 weeks led to a 27.6% reduction in mean CRP levels in obese men.

CONCLUSION

Our study reflects that ginger therapy had shown significant effect on C-Reactive protein ($P < 0.05$). Ginger therapy can be used as an adjunct with diet and drugs in managements of diabetes mellitus. Such studies should be further encouraged as medicinal herbs constitute the cornerstone of traditional medicinal practice worldwide. The Ginger therapy is relatively cheap, easily available and represent a great deal of untapped reservoir of drugs and the structural diversity of their component molecules makes a valuable source of novel lead compounds. It possess important phytochemical or nutraceutical property and can be used as an alternative in management of various diseases with diet and drugs.

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