

Hypolipidemic Effect of Fenugreek and Turmeric on the Lipid profile: A Double Blind, Placebo Controlled Randomized Trial



Medical Science

KEYWORDS : Fenugreek, Turmeric, Dyslipidemia, Lipid profile

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ABSTRACT

Objective: To study the effect of Fenugreek and Turmeric on the lipid profile on hyperlipidemic patients.

Methods: This was a randomized controlled trial conducted among the patients of dyslipidemia. Subjects were selected from outdoor clinic. Subjects (30-60 yrs) with BMI>25, total Cholesterol > 200 mg/dl and / or triglycerides >150 mg/dl who had not been treated for dyslipidemia were included in the study. 1.6g aqueous extract (25 grams of Fenugreek powder) was given orally per day in the form of capsules. 1.4g aqueous extract (twelve grams of Turmeric) was given. Four capsules of 500 mg in two divided dose per day till two months. Placebo was given in the same way which was an inert material in nature to make the study double blind. Same color of capsule was used for all the three groups.

Results: Administration of Fenugreek and Turmeric has significantly lowered the levels of Total cholesterol; LDL cholesterol and triglyceride at 45 and 75 days. The HDL cholesterol levels showed slight increase at 45 days in both Fenugreek and Turmeric groups. The effects of Fenugreek and Turmeric were variable in lowering the total Cholesterol, Triglycerides and LDL. In terms of increasing HDL and decreasing VLDL, the effects of Fenugreek and Turmeric were comparable to each other. In the Placebo group, there was a mild reduction in the levels of cholesterol, triglycerides and LDL levels.

Conclusion: We found no significant difference their activities between each others, they can also be given in combinations with each other.

INTRODUCTION

Dyslipidemia, hypertension, and obesity, in conjunction with poor eating habits and sedentariness, constitute ideal conditions for the development of heart disease. These risk factors are not limited to adults - they are becoming increasingly frequent among children and adolescents. The worldwide trend is to investigate and prevent, correcting risk factors as early as possible. The PDAY (Pathological Determinants of Atherosclerosis in Youth) multicenter study focusing 3000 individuals from 15 to 34 years of age suggested that the prevention of heart disease should begin with teenagers, or at least young adults, controlling adult heart disease risk factors (Sawant et al, 2008).

Fenugreek (also known as *Trigonella foenum-graecum*) locally called as *methi*, is a well-known traditional medicinal herb found in South Asia mainly in India and Bangladesh possesses diverse biological activities and pharmacological functions. *T. foenum-graecum* seeds have been used as traditional medicines not only in diabetes but also in high cholesterol, inflammation and gastrointestinal ailments (Sharma et al, 1990). *T. foenum-graecum* seeds have also previously been shown to have hypoglycemic and hypocholesterolemic effects on type 1 and type 2 diabetes mellitus patients and experimental diabetic animals (Xue et al, 2007). However, the report published so far (Abou El-Soud et al., 2007; Annida et al, 2004) on the hypoglycemic effect of *T. foenum-graecum* could not establish the optimum dose-level for experimental subjects.

The medicinal plant Turmeric (also known as *Curcuma longa*), locally called as *haldi* has been proven effective in treating some of the most intense ailments afflicting the world today including: Arthritis, Cancer, Alzheimer's Disease, Diabetes, Multiple Sclerosis, Atherosclerosis, HIV/AIDS, Sex-

ually Transmitted Diseases (Hepatitis-C, Genital Herpes), Irritable Bowel Syndrome, Indigestion, Inflammation, Acne, Urinary Tract Infections, Kidney Infections, Gallstones, Anemia, Hemorrhoids, Liver Disease, Leprosy, Amenorrhea, Edema, Bronchitis, Common Cold, Headaches, Conjunctivitis, Bursitis, food poisoning, parasites, fever, diarrhea, poor circulation, lower back and abdominal pain. It can also be used as a mosquito repellent, wound healer, and immediate cure for scorpion stings. Turmeric helps balance the female reproductive and lactation systems, and in men it purifies and improves the health of semen. It is used to treat external ulcers that would not respond to other treatment (Frawley and Vasant, 1993; Nadkarni, 1976; Williamson, 2002). Due to its vast array of medicinal purposes and versatility, turmeric is one of the most important herbs in any natural medicine cabinet.

Since, Fenugreek and Turmeric both are most common herbs present in our kitchen since ages and they are consumed. They are cheaper, better and safer option, therefore, the present clinical trial was planned to study the effect of Fenugreek and Turmeric on the lipid profile on hyperlipidemic patients.

MATERIAL AND METHODS

This was a randomized controlled trial conducted among the patients of dyslipidemia in a tertiary care teaching hospital in north India. The study was approved by the Ethical Committee of the Institute. The consent was taken from each participant before including in the study. Subjects were selected from outdoor clinic of Medicine Department. Subjects (30-60 yrs) with BMI>25, total Cholesterol > 200 mg/dl and / or triglycerides >150 mg/dl who had not been treated for dyslipidemia were included in the study. Pregnant & lactating women, any serious ailment or condition

of patient during trial, subjects taking contraceptive pills and undergoing hormonal therapy were excluded from the study. A total of 120 patients were included in the study randomized into 3 groups (40 in each group). The randomization was done using random number table and all the subjects were randomly divided into three groups. At the end of the study, 37 patients in Fenugreek, 35 in Turmeric and 39 in Placebo group completed the study.

1.6g aqueous extract (25 grams of Fenugreek powder) was given orally per day in the form of capsules. 1.4g aqueous extract (twelve grams of Turmeric) was given. Four capsules of 500 mg in two divided dose per day till two months. Placebo was given in the same way which was an inert material in nature to make the study double blind. Same color of capsule was used for all the three groups.

The baseline demographic and anthropometric data was collected. Fasting serum lipid profiles were measured at day 0, day 45 and day 75 of the study period. Total Cholesterol, Triglycerides and HDL cholesterol were estimated using diagnostic kits and values read from semi automated analyzer, while LDL and VLDL cholesterol levels were calculated from the primary measurements.

Statistical analyses

Lipid values are presented as mean±SD. Statistical analysis was carried out using ANOVA test. Single factor was used between groups and two factors, without replication for different time points. The Unpaired t-test was used to compare the lipid levels between study and placebo groups at different time periods. The categorical variable was compared by Chi-square test. The significance level was set at p<0.05.

RESULTS

There was no significant (p>0.05) difference in the demographic and anthropometric parameters among the groups showing the comparability of the groups (Table-1).

Administration of Fenugreek and Turmeric has significantly lowered the levels of Total cholesterol; LDL cholesterol and triglyceride at 45 and 75 days. The HDL cholesterol levels showed slight increase at 45 days in both Fenugreek and Turmeric groups. The effects of Fenugreek and Turmeric were variable in lowering the total Cholesterol, Triglycerides and LDL. In terms of increasing HDL and decreasing VLDL, the effects of Fenugreek and Turmeric were comparable to each other. In the Placebo group, there was a mild reduction in the levels of cholesterol, triglycerides and LDL levels (Table-2).

DISCUSSION

Fenugreek (*Trigonella foenum-graecum*L. *Leguminosae*) is one of the oldest medicinal plants, originating in India and Northern Africa. An annual plant, fenugreek grows to an average height of two feet. The leaves and seeds, which mature in long pods, are used to prepare extracts or powders for medicinal use. Applications of fenugreek were documented in ancient Egypt, where it was used in incense and to embalm mummies. In modern Egypt, fenugreek is still used as a supplement in wheat and maize flour for bread-making (Morcos et al, 1981). The hypoglycemic effects of fenugreek have been attributed to several mechanisms. Sauvaire et al demonstrated *in vitro* the amino acid 4-hydroxyisoleucine in fenugreek seeds increased glucose-induced insulin release in human and rat pancreatic islet cells (Sauvaire et al, 1998).

Fenugreek seeds lower serum triglycerides, total cholesterol (TC), and low-density lipoprotein cholesterol (LDL-C).

These effects may be due to saponin, which increase biliary cholesterol excretion, in turn leading to lowered serum cholesterol levels. The lipid-lowering effect of fenugreek might also be attributed to its estrogenic constituent, indirectly increasing thyroid hormone T4 (Stark and Madar, 1993).

Belguith-Hadriche et al (2010) also investigated the relationship between the lipid effects, the phenolic content, and the antioxidative effects of an ethyl acetate extract of fenugreek and found that administration of fenugreek ethyl acetate extract significantly lowered the plasma levels of total cholesterol.

Turmeric’s protective effects on the cardiovascular system include lowering cholesterol and triglyceride levels, decreasing susceptibility of low density lipoprotein (LDL) to lipid peroxidation, and inhibiting platelet aggregation. It is used to treat external ulcers that would not respond to other treatment (Frawley and Vasant, 1993; Nadkarni, 1976; Williamson, 2002). Due to its vast array of medicinal purposes and versatility, turmeric is one of the most important herbs in any natural medicine cabinet.

In this study, Fenugreek and Turmeric has significantly lowered the levels of Total cholesterol; LDL cholesterol and triglyceride at 45 and 75 days. The HDL cholesterol levels showed slight increase at 45 days in both Fenugreek and Turmeric groups. In the present study, there was no significant change in the level of HDL in Fenugreek group which was similar to the other studies (Bordia et al, 1997; Prasanna, 2000; Belguith-Hadriche et al, 2010).

In the present study, there was no significant difference between Fenugreek and Turmeric groups for the hypolipidemic effect, hence both can be applicable in dyslipidemia as therapeutic agents.

CONCLUSION

We found no significant difference their activities between each others, they can also be given in combinations with each other.

Conflict of interest: None

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Table-1: Demographic and anthropometric profile of patients

	Fenugreek (n=37)	Turmeric (n=35)	Placebo (n=39)	p - value ¹
Age in years, mean±SD	46.67±12.24	45.56±13.26	44.23±12.45	>0.05
Male gender, no. (%)	17 (45.9)	16 (45.7)	14 (35.9)	>0.05
Height	161.00±9.57	156.33±10.12	162.71±7.09	>0.05
Weight	77.14±16.93	68.67±7.51	72.00±8.62	>0.05
Waist circumference	102.43±14.75	97.33±4.04	111.14±8.49	>0.05
Hip circumference	107.57±11.80	100.33±1.53	103.11±8.12	>0.05
MUAC	32.00±3.96	30.00±2.65	34.14±3.08	>0.05
BMI	34.73±3.95	34.45±5.85	34.33±3.45	>0.05
WHR	0.95±0.06	0.97±0.05	0.93±0.04	>0.05

¹ANOVA test

Table-2: Effect of fenugreek and Turmeric on lipid levels

	Fenugreek	Turmeric	Placebo
TC			
0 Day	226.66±37.49	242.29±57.55	199.41±51.93
45 Day	193.91±31.22 ⁵ (13.3%)	190.65±38.97 ⁶ (19.9%)	194.09±48.26 (0.7%)
75 Day	177.00±28.01 ⁶ (20.7%)	171.90±35.66 ⁶ (27.3%)	189.04±47.50 (1.3%)
TG			
0 Day	189.46±60.46	244.04±111.80	196.29±48.80
45 Day	162.70±57.41 ⁶ (13.9%)	180.61±44.82 ^{1,4} (19.9%)	189.90±45.38 (2.0%)
75 Day	137.03±48.33 ^{2,6} (26.5%)	148.34±30.10 ^{2,5} (27.3%)	194.01±52.15 (4.5%)
HDL			
0 Day	48.61±14.81	49.95±21.11	50.63±9.19
45 Day	49.78±11.78 (-5.5%)	48.60±12.35 (-3.3%)	50.50±8.62 (-0.2%)
75 Day	48.94±12.08 (-3.1%)	49.26±12.09 (-4.1%)	50.36±8.53 (1.1%)
LDL			
0 Day	140.16±31.20	133.90±43.91	109.52±54.61
45 Day	111.59±25.89 ^{1,4} (17.8%)	117.66±30.31 ⁵ (6.7%)	106.94±52.69 ¹ (.2%)
75 Day	100.66±28.74 ^{3,5} (25.9%)	100.28±28.48 ^{3,6} (21.6%)	105.35 ³ ±52.23 (1.1%)
VLDL			
0 Day	37.89±12.09	48.84±22.44	39.26±9.76
45 Day	32.54±11.48 ⁶ (13.9%)	36.21±9.32 ⁵ (20.8%)	37.93±9.08 (3.1%)
75 Day	27.41±9.67 ^{2,6} (26.5%)	31.32±6.64 ^{2,6} (30.4%)	38.60±10.46 ² (1.6%)
TC/HDL			
0 Day	4.99±1.44	5.27±1.53	3.99±1.06
45 Day	4.00±0.71 ⁴ (16.5%)	4.06 ⁴ ±0.94 (23.3%)	3.93±1.14 (1.9%)
75 Day	3.78±0.94 ⁵ (23.0%)	3.61±0.89 ⁵ (31.7%)	3.82±1.05 (4.3%)

Between groups at follow-ups ¹p<0.05, ²p<0.01, ³p<0.0001 (compared with Placebo), Within group from 0 day to follow-ups: ⁴p<0.05, ⁵p<0.01, ⁶p<0.0001, values in the parenthesis are the average percent change from 0 day to subsequent follow-ups

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