International Journal for Pharmaceutical Research Scholars (IJPRS)

V-3, I-1, 2014 ISSN No: 2277 - 7873

RESEARCH ARTICLE

Effect of Cloves and Turmeric on Hyperlipidemic Diabetics

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Manuscript No: IJPRS/V3/I1/00119, Received On: 10/03/2014, Accepted On: 18/03/2014

ABSTRACT

Cloves essential oil is used as an anodyne (pain killer) for dental emergencies as carminative and to increase the hydrochloric acid in the stomach and to improve peristalsis. Recent research has revealed that turmeric is a natural wonder, proving beneficial in the treatment of many different health conditions from cancer to Alzheimer's disease. There are also evidences that spices can boost insulin function and lower cholesterol. Diabetes mellitus is potent, independent risk factors for cardiovascular disease. It has been projected that by 2020, chronic diseases will account for almost three quarters of all deaths worldwide and 71% of deaths due to ischemic heart disease,75% of death due to stroke and 70% of death due to diabetes will occur in developing countries. With this back ground, study was undertaken with the following objectives: (1) Prepared the spice capsules and supplement the diets of selected hyperlipidemic, diabetic adults for a period of three months and (2) Evaluated the effect using various parameters. The survey revealed that among the 45 adults with hyperlipidemic and diabetes mellitus a majority of 30.4% were in the age of 40-45 years, all the adults were literate. About 70% of the adults were either employed in private or government sector or engaged in business. 47% of the families were of joint type and 53% of them were nuclear type. .45%.The positive impact of spices on hyperlipidemic diabetic adults is encouraging and being a dietary intervention it is devoid of other possible side effects, proving that spices supplementation is a cost effective and sustainable strategy in the management of hyperlipidemia and diabetes mellitus.

KEYWORDS

Diabetes mellitus, Cardiovascular Disease, Alzheimer's Disease, Cholesterol

INTRODUCTION

Spices derived from root, barks, buds and fruits of plants have been used to preserve food, enhance their flavour and as remedies for a long list of ailments. Both herbs and spices referred as herbal remedies are excellent antioxidants, which work to neutralize the attack by free radicals against the body. Spices contain phytonutrients, which may prevent the mutation of healthy cells into cancerous cells.

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Cloves are the rich, brown, dried unopened flower buds of the clove tree syzygium aromatic. Cloves essential oil is used as an anodyne (pain killer) for dental emergencies as carminative and to increase the hydrochloric acid in the stomach and to improve peristalsis.

Recent research has revealed that turmeric is a natural wonder, proving beneficial in the treatment of many different health conditions from cancer to Alzheimer's disease. There are also evidences that spices can boost insulin function and lower cholesterol.

Diabetes mellitus (DM) and cardiovascular

disease (CVD) share several important characteristics .The occurrence of both the conditions increases with age and both are associated with an adverse lipid profile, obesity and a sedentary life style and the risk of both can be reduced by life style modifications of common risk factors. Diabetes mellitus is potent, independent risk factors for cardiovascular disease. It has been projected that by 2020, chronic diseases will account for almost three quarters of all deaths worldwide and 71% of deaths due to ischemic heart disease,75% of death due to stroke and 70% of death due to diabetes will occur in developing countries.

With this back ground study was undertaken with the following objectives:

- Prepare the spice capsules and supplement the diets of selected hyperlipidemic, diabetic adults for a period of three months and
- Evaluate the effect using various parameters.

Supplementation with spices namely cloves and turmeric on hyperlipidemic diabetic adults revealed that the blood lipid profile and sugar levels charged appreciably among the cloves supplemented group then turmeric supplemented group. This positive impact of spices on hyperlipidemic diabetic adults is encouraging and being dietary intervention it is devoid of other possible side effects, proving that spices supplementation is a cost effective and sustainable strategy in the management of hyperlipidemia and diabetes mellitus. Being a dietary source, it is needless to further emphasize the miraculous effect of spices in our daily dietaries.

MATERIALS AND METHOD

Forty five adults in the age group of 40-60 years with hyperlipidemia and diabetes, residing in Surat, were identified for the survey.

Details regarding the socio-economic characteristics, life style pattern like yoga, exercise, alcohol consumption, chewing habits, smoking, dietary pattern, food intake pattern, food included and food avoided, health status like general health, history of the present condition, diabetes/hyperlipidemic trait in the family, duration and treatment of the conditions, physiological symptoms experienced and diseases if any were obtained together with consumption of spices and awareness of the spices used for supplementation using an interview schedule.

Anthrometric measurements such as height, weight, body mass index, waist circumference, hip circumference, waist-hip ratio and blood pressure were recorded for all 45 hyperlipidemic diabetic adults selected for the supplementation study.

Biochemical tests which included blood haemoglobin, lipid profile, total cholesterol, triglycerides, HDL, LDL, VLDL cholesterol, fasting blood sugar, post parandial blood sugar and glycosylated haemoglobin were carried out for the selected adults. All these biochemical parameters were evaluated before and after the supplementation period of two months.

After an extensive appraisal of literature pertaining to spices, cloves and turmeric were selected for the present study. The spices were procured, cleaned, washed and allowed to dry under shade to remove the excess water and then dried using tray drier. The dried spices were pulverized, sieved and stored in air tight containers. The spice powders were made into capsules using special capsuling machines.

The selected 45 adults (45-60 years) with hyperlipidemia and diabetes mellitus were divided into three groups of 15 each out of which thirty adults constituted the two experimental groups who were given four grams each of cloves (HAD) and turmeric (HDB) in the form of four capsules daily (two after breakfast and two after dinner) for a period of three months. The remaining 15 adults constituted the control group (HDC). Who received four grams of roasted rice flakes flour in the form of capsules daily till the end of the supplementation period?

The effect of supplementation was evaluated using anthropometric measurements, clinical

and biochemical assessment before and after three months of supplementation.

RESULTS AND DISCUSSION

Socio Economic Background and Lifestyle Pattern

The survey revealed that among the 45 adults with hyperlipidemic and diabetes mellitus a majority of 30.4% were in the age of 40-45 years, all the adults were literate. About 70% of the adults were either employed in private or government sector or engaged in business.47% of the families were of joint type and 53% of them were nuclear type.

Prevalence of the metabolic disorder i.e. hyperlipidemia and diabetes mellitus was high income group (66%),yoga was practised by 45% of the adults either daily, weekly once or twice.35% of the adults did exercises regularly from ½ hours to 1 hours and 65% of adults did not do any exercise. Almost 75% of the adults had the habits of cigarette smoking with regards to the duration of alcohol consumption, 60% consumed for the past 10 years and regarding the frequency of alcohol consumption, 31% of the adults consumed regularly and 34% occasionally,56% of the adults did not have the habit of chewing either tobacco, pan masala or betel leaves.

Dietary Pattern and Medical History

61% of the adults surveyed were non vegetarians, all the men and women adults consumed three meals a day i.e. breakfast, lunch and dinner with a majority consuming either wheat or ragi based food items. 53% of adults included raw salad along with their diet. Cooking methods followed were steaming, roasting and boiling and for cooking various food preparations refined oil was used. Only 10% of the adults used olive oil for cooking. Majority of the adults consumed both tea and coffee either with or without sugar.

12% of the adults did not consume any beverage, about 69, 49, 32, 29 and 16% of adults consumed fruit juices, tender coconut water, health drinks, soups and green or black tea respectively.

Familial tendency of subject revealed that heredity played a vital role in the precipitation of disease at a younger age, with regards to the type of treatment a majority of adults under took allopathic treatments.45% of adults were aware that spices could help to control or fight against diseases. About 53% males and 50% females were aware that fenugreek mixed with jeera could control diabetes mellitus.

Food and Nutrient Intake of Selected Hyperlipidemic Diabetics

The mean nutrient intake of adults with hyperlipidemia and diabetes mellitus compared with RDA is present in Table I.

Table 1: Mean nutrient intake of hyperlipidemic diabetic adults

Nutrients	RDA*	Mean intake	% Excess or deficit
Energy(kcal)	1500	1545	+3.0
Protein(g)	60	65	+3.3
Fat(g)	37	40	+8.1
Calcium(mg)	400	650	+62.5
B-carotene (mg)	2400	1550	-35.4
Thiamine(mg)	1.2	1.2	0
Riboflavin(mg)	1.4	1.3	-7.1
Vitamin-C(mg)	40	23	-42.5
Fibre(g)	40	15	-62.5

*ICMR (2004)

It is revealed that the intake of b-carotene, riboflavin, vitamin-C and fibre was found to be deficient ranging from 7.1% to 62.5%. Whereas the intake was slightly in excess by 3 to 8 % in the case of energy, protein and fat.

Supplementation of Cloves and Turmeric

Body Weight

Table II gives the changes in the mean body weight of the selected hyper lipidemic and diabetic adults.

The adults supplemented with cloves and turmeric showed a significant weight reduction (P<0.01) by 3.8 kg and 2.6 kg respectively over the three months period.

The reduction was more in the group supplemented with cloves then turmeric when the groups were when compared with control the reduction was statistically significant.

Clinical Symptoms

Initially, the triad symptoms of diabetes normally poly urea, polyphagia and polydypsia and another symptoms experienced by adults with hyper lepedimia and diabetes mellitus i.e. in some, oedema, headache, excessive sweetening, weight loss, constipation, giddiness, shivering, burning sensation, breathlessness, palpitation, hyper tension, inability to work were not seen after a period of three months of supplementation with cloves. Among the group, supplemented with turmeric, very few adults reported to have no symptoms after supplementation. No change was reported in the clinical symptoms in the control group.

Total Cholesterol

The total cholesterol levels of the hyperlipidemic diabetic adults before supplementation was 258.4 mg/dl in the cloves supplemented group, 251.2 mg/dl in the turmeric group and in the control group, it was 253.07 mg/dl which were above the normal desired level of < 200 mg/dl and placed in high risk group. A reduction in total cholesterol level to 205.6 mg/dl and 217 mg/dl was observed among the cloves and turmeric supplemented groups but no significant change was observed in the control group after a period of three months. The reduction in these groups was significant at 1% level (p<0.01).

Triglyceride

Serum triglyceride levels of the hyperlipidemic diabetic adults, supplemented with cloves, turmeric and control groups were found to be in the border line high category of 150 – 200 mg/dl initially ranging from 169.33 mg/dl to 170.07 mg/dl. After a period of three months of supplementation with spices namely cloves and turmeric, there was a mean reduction in the serum triglyceride levels by 32.8 mg/dl and 11.93 mg/dl respectively which was found to be statistically at 1% level.

HDL Cholesterol

The mean HDL cholesterol level initially in the cloves and turmeric supplemented group of hyperlipidemic diabetic adults were 38.94 mg/dl and 39.06 mg/dl respectively. Which were closer to the lower range of normal values of <40 mg/dl.

Table 2: Mean Body Weight (kg of the hyper lipidemic diabetic adults)

Groups	Mean ± SD			't' value	
	Initial (I)	Final (F)	Difference	I vs. F	Between Groups
Cloves (HAD)	72.47±5.97	68.60±5.00	-3.8±2.45	6.12**	HAD vs HDC 4.99**
Turmeric(HDB)	76.13±6.14	73.53±4,55	-2.6±2.75	3.66**	HDB vs HDC 2.40*
Control (HDC)	75.87±5.93	75.47±5.87	-0.4±2.06	0.75^{NS}	--

** - Significant at 1% level
* - Significant at 5%level
NS - Not Significant

Lipid Profile

Table 3: Presents the changes in the lipid profile of the adults with hyperlipidemic and diabetes mellitus before and after supplementation of cloves and turmeric capsules

	Parameters	Mean ± SD			't' value	
		Initial (I)	Final (F)	Difference	I vs. F	Between groups
Total Cholesterol	Cloves (HAD)	258.40±11.85	205.60±8.77	-52.80±11.57	17.66**	HDA vs. HDC 15.77**
	Turmeric (HDB)	251.20±12.05	217.0±11.03	-34.20±7.85	16.86**	HDB vs. HDC 13.96**
	Control (HDC)	253.07±7.59	252.40±8.86	-0.67±4.37	0.59^{NS}	HDA vs. HDB 4.98**
Triglyceride	Cloves (HAD)	173.33±13.85	140.53±8.42	-32.80±7.05	18.00**	HDA vs. HDC 13.85**
	Turmeric (HDB)	170.80±10.97	158.87±10.33	-11.93±4.37	10.58**	HDB vs. HDC 6.78**
	Control (HDC)	177.07±12.12	178.67±12.74	+1.60±6.06	1.02^{NS}	HDA vs. HDB 9.41**
HDL Cholesterol	Cloves (HAD)	38.94±2.97	43.20±2.22	+4.26±1.76	9.35**	HDA vs. HDC 8.02**
	Turmeric (HDB)	39.06±1.62	40.36±1.54	+1.30±0.75	6.68**	HDB vs. HDC 4.06**
	Control (HDC)	38.93±1.74	38.91±2.17	-0.02±0.85	0.33^{NS}	HDA vs. HDB 5.79**
LDL Cholesterol	Cloves (HAD)	184.79±10.27	134.29±9.22	-50.50±11.69	16.72**	HDA vs. HDC 14.92**
	Turmeric (HDB)	177.98±11.47	144.87±10.03	-33.11±8.12	15.77**	HDB vs. HDC 13.10**
	Control (HDC)	178.73±8.18	177.76±9.16	-0.31±4.67	0.26^{NS}	HDA vs. HDB 4.57**
VLDL Cholesterol	Cloves (HAD)	34.67±2.77	28.11±1.68	-6.56±1.41	18.00**	HDA vs. HDC 14.48**
	Turmeric (HDB)	34.16±2.19	31.77±2.07	-2.39±0.87	10.58**	HDB vs. HDC 7.45**
	Control (HDC)	35.41±2.42	35.73±2.55	+0.48±1.15	1.61^{NS}	HDA vs. HDB 9.42**

** - Significant at 1% level
NS - Not Significant

Table 4: Blood Parameters of Hyperlipidemic Diabetic Adults: N=45

Parameter	Mean ± SD			't' Value	
	Initial (I)	Final (F)	difference	I vs. F	Between groups
Fasting blood sugar(mg/dl)					
Cloves (HAD)	163.93±7.71	124.2±3.73	-39.73±7.91	19.45**	HADvs HDC 18.31**
Turmeric (HDB)	165.07±9.91	149±9.66	-16.07±7.51	8.28**	HDBvs HDC 7.89**
Control (HDC)	165.87±9.24	165.33±9.48	+0.4±2.16	0.72NS	HADvs HDB 8.12**
Post Parandial Blood Sugar (mg/dl)					
Cloves (HAD)	265.33±19.33	215.67±15.18	-42.47±28.66	5.73**	HDAvs HDC 4.83**
Turmeric (HDB)	261.27±15.74	239.47±19.4	-21.8±9.2	9.17**	HDBvs HDC 5.99**
Control (HDC)	259.53±13.31	254.67±14.97	-4.87±5.21	3.62**	HADvs HDB 2.57**
Glycosylated Haemoglobin (Percent/100 ml)					
Cloves (HAD)	8.1±0.48	7.25±0.6	-0.85±0.86	3.79**	HDAvs HDC 3.64**
Turmeric (HDB)	8.15±0.45	7.95±0.41	-0.2±0.16	4.97**	HDB vs. HDC 4.07**
Control (HDC)	7.85±0.43	7.84±0.41	-0.01±0.07	0	HAD vs. HDB 2.78*

** Significant at 1% level

- Significant at 5% level
- NS-not significant

After three months of supplementation an increase of 4.26 mg/dl and 1.3 mg/dl were observed in the HDL levels among cloves and turmeric supplemented group.

LDL Cholesterol

The mean LDL cholesterol levels in the cloves and turmeric supplemented groups of hyperlipidemic diabetic adults were found to be in the high risk category of 160 to 189 mg/dl initially ranging from 177.74 mg/dl to 184.79 mg/dl. After supplementation with spices for two months there was a maximum reduction in the LDL cholesterol levels in the cloves group by 50.5 mg/dl. This was found to be significant at one percent level.

A lower reduction was found in the turmeric supplemented group (33.11 mg/dl).LDL cholesterol level in the control group did not show any change .The reduction in the LDL cholesterol level in the spices supplemented groups compared with control group was found to be significant at one percent level. Maximum reduction was seen in the cloves supplemented group.

VLDL Cholesterol

The mean initial VLDL cholesterol levels in the experimental and control group of hyperlipidemic diabetic adults were 34.46 mg/dl (cloves group) and 34.16 mg/dl (turmeric group) and 35.41 mg/dl (control group) which were

closer to the higher range of normal values. On supplementation with spices, a maximum reduction of 6.56 mg/dl was seen in the cloves supplemented group, which was in the desirable range bringing out the potentials of cloves.

The mean VLDL cholesterol levels were reduced by 2.39 mg/dl in the turmeric supplemented group. The decrease in the VLDL cholesterol levels between initial and final values was significant at one percent level in the experimental groups whereas the difference in the control group was not significant.

Blood Parameter

Table-4 presents the levels of various blood parameters among hyperlipidemic diabetic adults before and after supplementation of spices.

Fasting Blood Sugar

The initial mean fasting blood sugar level in the control and experimental groups of hyperlipidemic diabetic adults were 163.93 mg/dl in the cloves group, 165.07 mg/dl in the turmeric group and 165.87 mg/dl in the control group which were well above the normal range of 80-115 mg/dl6, adults in the supplementation group improved their fasting blood sugar levels after two months period.

A maximum reduction of fasting blood sugar level was seen among the cloves group with 39.73 mg/dl. The fasting blood sugar levels were brought to normal among cloves supplemented group bringing out the impact of supplementation of spices and were significant at one percent level whereas the difference in the control group was not significant.

Post Prandial Blood Sugar

The mean post prandial blood sugar levels of hyperlipidemic diabetic adults before supplementation were 265.33, 261.27 and 259.53 mg/dl respectively in the cloves. Turmeric and control groups which was much higher than the normal range of 120 to 160 mg/dl. There was a reduction observed in the post prandial blood sugar levels due to supplementation with spices over a period of two months.

Glycosylated Haemoglobin

The mean glycosylated haemoglobin levels of hyperlipidemic diabetic adults were 8.1, 8.15, 7.85 percent/100 ml among cloves, turmeric and control groups respectively. Which were nearer to poor control levels of more than 8 percent / 100 ml initially7?

A reduction of 0.2 to 0.85 percent /100ml after a period of two months of supplementation was observed in the experimental groups and was found to be statistically significant at one per cent level. No change was observed in the control group.

CONCLUSION

Supplementation with spices namely cloves and turmeric on hyperlipidemic diabetic adults revealed that the blood lipid profile and sugar levels changed appreciably among the cloves supplementation group then turmeric supplemented group.

This positive impact of spices on hyperlipidemic diabetic adults is encouraging and being a dietary intervention it is devoid of other possible side effects, proving that spices supplementation is a cost effective and sustainable strategy in the management of hyperlipidaemia and diabetes mellitus. Being a dietary source, it is needless to further emphasize the miraculous effect of spices in our daily dietaries.

REFERENCES

1. Alqareer, A., Alyahya, A., & Andersson, L. (2006). The effect of clove and benzocaine versus placebo as topical anesthetics. *Journal of dentistry*, *34*(10), 747-750.
2. Platel, K., & Srinivasan, K. (2004). Digestive stimulant action of spices: a myth or reality?. *The Indian journal of medical research*, *119*(5), 167-179.
3. ICMR, *Nutrient requirements and RDA for Indians*. 2004, ICMR, New Delhi.

4. Bamji, M.S., Rao, N.P., & Reddy, V. (2003). *Text book of Human Nutrition,* Oxford and IBH publishing co. pvt. ltd., New Delhi, 362.

5. Trivedi, G., Kullz, M. and Huz, L. (1978). Procedure for determination of blood parameters. *Clin. chem., 34,* 345.

