EFFECTS OF NIGELLA SATIVA AND SUNFLOWER OIL DIET ON WEIGHT OF ALBINO RATS

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ABSTRACT… Objective: To study the effects of nigella sativa and sunflower oil on weight of albino rats. **Study Design:** Experimental study. **Period:** 1996 to 1997. **Setting:** PGMI, Lahore. **Material & Methods:** A study was conducted to determine the effects of nigella sativa and sunflower oil diet intake on body weight in albino rats. Fifty six albino rats with equal number of males and females were selected for the study, they were divided into four different groups, Control groups I and III were given diet (20%), high fat diet supplemented with bile salt (1% colic acid) and antithyroid drug (0.5% propylthiouracil).The experimental group II and IV were given the above diets with supplemented nigella sativa. The high fat diet when given at different intervals increased the body weight as compared to baseline level. **Results:** The high fat diet when given at different intervals increased the body weight as compared to baseline level. The high fat diet with propylthiouracil and bile salt also increased the body weight and the increase was more as compared to previous groups. The supplements of nigella sativa in the groups decreased body weight significantly as compared to the control groups, which was significantly increased in all the experimental groups as compared to the control groups. **Conclusions:** These observation confirm that nigella sativa decreased body weight. The above effects will be beneficial for patient with obesity. On the basis of these findings conclusions are made, that nigella sativa has got body weight reducing effects. Both nigella sativa and sunflower oil have got low atherogenic index (TC/HDL) and may be recommended in hyperlipidaemic obese patients or normal individuals. Nigella sativa has got weight reducing potential thus affecting obesity and may indirectly prevent atherosclerosis. Nigella sativa is curative remedy for all diseases except death, is the saying of our Holy Prophet Hazrat Muhammad Sallallaho Alaihe Wasalam.

Key words: Nigella Sativa, Sunflower Oil

INTRODUCTION

Obesity and Coronary heart disease CHD, are major global health problem. High intake of fat is a risk factor for the development of CHD, obesity[1]. Excess eating of sweets and fatty foods, lack of exercise and excess sleep leads to obesity. Honey, herbs, guggul, silageet and certain fruits, in association with exercise may be protective[2].

High plasma cholesterol was positively related to the risk of CHD,Obesity[3,4]. Saturated fats and cholesterol in the diet play a major role in the aetiology of hypercholesterolemia and act as a risk factor for CHD, Obesity[5,6,7] reported the elevation of plasma cholesterol is usually due to an increase in the level of low-density lipoprotein cholesterol (LDL-c).

Polyunsaturated fat diet decreases plasma cholesterol level and beta lipoprotein when substituted for saturated fats[8,9,10].

Saturated fats and cholesterol in the diet cause rise in serum cholesterol while diets low in saturated fat and cholesterol decrease cholesterol level in human beings[11], while low fat, low cholesterol or polyunsaturated fat diet decrease plasma cholesterol level[12]. Polyunsaturated fatty acids (PUFA) lower triglyceride (TG), very low density lipoprotein cholesterol (VLDL-c), low density lipoprotein cholesterol (LDL-c) and also high density lipoprotein cholesterol (HDL-c)[13].

Tayyab et al (1991)[14] observed that saturated fats raised the serum total cholesterol (TC), mono-unsaturated fatty acids (MUFA) increased HDL-c; PUFA decreased both TC and HDL-c.

Elevated LDL-c and decreased HDL-c in plasma have been independently attributed to be associated with increased risk for CHD in man.

Obese people tend to have relatively high triglyceride (TG) and low HDL-c. Obesity raises LDL-c levels high

level of serum TG is also considered a major risk factor in the pathogenesis of CHD[15]. The Nigella sativa has innumerable effects, cholerectic activity[17].

It has been reported our Holy Prophet Hazrat Muhammad Salallah-u-alai-hi wasalam said, that the black seeds (Nigella sativa) is a remedy for every disease except death" 16(Bukhari 1985). Hence a study was planned to assess the effect on weight in albino rats fed on high sunflower oil diet and Nigella sativa. If significant reduction of weight is observed, this will be of great help to the patients of obesity.

MATERIAL AND METHODS

PLAN OF STUDY

The albino rats were obtained from the Pakistan of scientific and industrial Research (PCSIR) laboratories complex, Lahore .Fifty six albino rats, with equal number of males and females were selected for the study. The weights of each rat ranged from 150-200 grams and their ages at the start of the study were 8 weeks. They were divided into four groups, each group consisting of equal number of male and female rats. Both sexes were kept in separate cages in the animal house of Postgraduate Medical Institute, Lahore. Each albino rat was weighed at the zero, 12th and 24th weeks of the study. Each group of animals was given separate diet starting at zero week and continued for a period of 24th weeks, hygienic conditions and optimum temperature (24˚+2˚C) was maintained for all albino rats. These animals were provided prepared diets and fresh drinking water daily. Weight were done at zero, 12th and 24th weeks of study.

EXPERIMENTAL DIETS

Four different diets were prepared. These included the control diet A contained high 20% sunflower oil, and experimental diet B included 20% sunflower with powdered Nigella sativa. The diets C contained 20% sunflower oil, 1% cholic acid and 0.5% propylthiouracil in diet, and diet D contained 20% sunflower oil, 1% cholic acid, 0.5% propylthiouracil with Nigella sativa. Minerals and vitamins mixtures were prepared and mixed with diet according to the recommendation. The prepared diets were stored in refrigerator at -4˚C in clean closed glass containers. Weighed quantity of diet was placed in each cage container daily in the morning and evening throughout the study period. The tap water in the bottles was also changed daily. Nigella sativa in a dose of 30% mg/kg body weight of albino rat.

Weighed respective diets, weights at 0,12th and 24th weeks of study were recorded.

GROUPING OF ALBINO RATS BASED ON DIET

As mentioned above to fifty six albino rats included in the study were divided into four groups. Each group comprised of 14 albino rats with seven males and seven females. The male and female animals were kept in group wise in separate cages.

PREPARATION OF NIGELLA SATIVA SEED'S POWDER

Nigella sativa seeds were washed with tap water and dried. The dried seeds were powdered in electrical grinder and kept in clean, air tight, glass bottles in a refrigerator. It was mixed in diet, in a dose of 30mg / kg body weight of albino rats.

FEEDING OF ANIMALS

Four different diets were kept in separate covered containers, stored at dry and cool place. To each group the respective diet was given twice daily at 9 AM and 9 PM. Fresh tap water was changed daily in clean bottles.

WEIGHT MEASUREMENT OF ALBINO RATS

Albino rats weights were recorded at the age of 8 weeks (O) week and then at 20 weeks (12) weeks and last at 32 weeks (24) weeks and comparison of weight between different groups are shown in Table. Regardless of their sex, the mean+SD) body weight of all control and experimental groups were increased at 12 and 24 weeks. The gain in weight was statistically highly significant in all groups, but it was most marked in control groups I and II, followed by groups III and IV.

THE RESULTS AND OBSERVATION OF WEIGHTS MEASUREMENT ARE GIVEN FOLLOWS

Nigella sativa had weight reducing effects and hypotriglyceridaemic effect. These findings in the

present study are consistent with those reported by Shabir (1995). This weight reducng and hypotriglyceridaemic effect of Nigella sativa is possibly due to the cholerectic activity of Nigella sativa as reported by El-Dakhakhany (1982) and Brunton (1991). The results are in agreement with the results obtained by Shephered et al (1980) and Hostmark (1982), who observed that polynusaturated fat has hypotriglycridaemic effect. Our study indicates that high fat polyunsaturated oil decreases weight by reducing the plasma TG level probably due to antagonism. The results are in confirmation with Hostmark (1982).This weight reducing effects and hypocholesterolaemic effect of Nigella sativa is possibly due to cholerectic activity of Nigella sativa as reported by El-Dakhakhany (1982). The cholerectic function of Nigella sativa is either by reducing the synthesis of cholesterol by hepatocytes or decreasing its fractional reabsorption from small intestine and thus following the serum cholesterol level (Brunton 1991). These results regarding the effects of sunflower oil are in agreement with Grundy (1987) while high fat diet decrease HDL-c (Bananoma (1988) and Rader (1993).These observations shows that Nigella sativa has weight reducing effects by decreasing TG, Cholesterol, and LDLc and increasing HDLc effects. Similar effects of Nigella sativa on weight reducing and lowering TG, LDL-c level were previously reported by the other workers, (Shaikh 1995).When Nigella sativa is given in combination with higher concentration of polyunsaturated fat like sunflower oil (20%), it significantly lowers weight by lowering serum cholesterol LDL-c, and serum TG level, and increasing HDLc, while those individuals who are predisposed to CHD or suffering with obesity problem, all these effects are beneficial.

Group I (20% Sunflower Oil High Fat Diet)

Table shows the mean ± SD of body weights of the 20% sunflower oil group or I control group animals on 0,12 and 24 weeks, were 180.48+8.44, 26412.7+3.90 and 362.16+3.36 grams respectively. The changes in weights were statistically highly significant. There was a gradual increase in the body weight. The changes in weights were statistically highly significant. The increase in weight in this group was marked as compared to other groups.

Group II (20% Sunflowers Oil High Fat Diet with Nigella sativa).

In group II, the mean body weights +SD on the 0,12 and 24 weeks were 178.4+ 7,8 ,262.14+4.73 and 360.24+4.38. grams respectively, the weight in this group decreased by addition of Nigella sativa.

Group III(20% Sunflower Oil High Fat Diet, 1% Cholic acid, and 0.5 Propylthiouracil)

+Table. Comparison of mean+sd weight (grams) of different groups at 0, 12 and 24 weeks Male rats, Female rats, Total rats

Groups									
	0 week	12 weeks	24 weeks	0 week	12 weeks	24 weeks	0 week	12 weeks	24 weeks
I.	180.48+9.7	265.7+4.35	363.05+3.45	178.53+7.19	262.55 +3.46	363.28+3.82	180.48+8.44	264.12+3.90	362.16+3.36
II.	178.33+8.67	264.70+4.19	360.17+3.82	178.33+8.60	259.58+5.28	360.31+4.94	178.4+7.8	262.14+4.73	360.24+4.38*
III.	179.86 +8.84	255.61+4.45	337.11+3.81	179.86+8.84	255.62+4.2	335.64+4.17	181.8+6.94	255.61+4.83	336.37+3.99
IV.	180.63+3.49	254.66+4.38	335.46+3.06	178.36+6.65	253.69+3.02	334.3+2.9	179.49+5.07	254.17+3.70	334.09+2.98*

Key for groups:

I. Control group fed on 20% sunflower oil diet,

II. Experimental group fed on 20% sunflower oil diet with Nigella sativa,

III. Control group fed on 20 % sunflower oil diet 1% cholic acid 0.5% propylithiouracial.

IV. Experimental group fed on 20% sunflower oil diet, 1% cholic acid. 0.5 % Propylthiouracial with Nigella sativa.

**P<0.0005 significant, + plus minus*

The mean+ SD body weights were 181.8+6.94, 255.61+4.83 and 336.37+3.99 grams at 0, 12 and 24 weeks respectively. The rise in weights were statistically highly significant.

Group IV (20% Sunflower Oil High Fat Diet, 1% Cholic acid, and 0.5 Propylthiouracil with Nigella sativa).
The Mean +SD weights were 179.49+5.07 , 254.17+3.70 334.09+2.98 grams at 0, 12 and 24 weeks respectively. The weights in this group decreased by addition of Nigella Sativa.

DISCUSSION

Enriched fatty diets usually cause elevation of plasma total cholesterol (TC), low-density lipoprotein cholesterol (LDL-c) and Triglyceride so increase in weight gain development of atherosclerosis and leads to coronary heart disease (CHD) (Apgar et al 1987, Grundy 1987, Havel and Rapport (1995). Cholesterol (TC) has received too much importance because of its strong and consistent association with CHD.

The significant elevation of LDL-c and Triglyceride is positively associated while elevation of high density lipoprotein cholesterol (HDL-c) is negatively associated with the development of CHD and obesity (Segal 1993). High total cholesterol, LDL-c levels and TG increase the risk of cardiovascular disease (CVD) and obesity(McNamara and Howel 1992, Klag et al 1993). Low HDL-c are necessarily at risk of premature CHD and obesity (Rader et al 1993) Ascherio et al (1995).

SUMMARY AND CONCLUSIONS

Atherosclerosis, obesity are diseases entirely based upon hyperlipidaemias, hypercholesterolaemia and hypertriglyceridaemia. Coronary heart disease (CHD) which most commonly follows atherosclerosis is a worldwide life threating problem. These metabolic states are associated with multiple factors including dietary habits. Various methods such as intake of cholesterol sequent rants medicines which increase the excretion of cholesterol or decrease the synthesis of cholesterol have emerged for lowering cholesterol levels in body also have various side effects Ingredients are under trial pertinent to cholesterol lowering effects Nigella sativa is a curative remedy for all diseases, except death is the saying of our Holy Prophet Hazarat Muhammad Salalah-o-allaihe- w-salam (peace be upon him).Having studied the uncountable effect of Nigella sativa e.g. its use as a medicine for treatment starting from simple cold to jaundice, from expulsion of kidney stones to abortion was tried to study its hypolipidaemic and hypocholesterolaemic effects.

To investigate the effect of Nigella sativa and various concentration of sunflower oil on body weight of albino rats fatty diets were given to 84 albino rats. The rats were divided into four groups, two control as well as two experimental groups. The control groups were given, high fat diet (20%) and high fat diet supplemented with 1% colic acid and 0.5% antithyroid drug (propylthiouracil). The experimental groups were given the above diets with supplemented Nigella sativa.

The high fat diet when given at different intervals decreased weight significantly as compared to baseline levels. The high fat diet with propylthiouracil and bile salt also increased the weight . The supplements of Nigella sativa in the groups decreased all the weight significantly as compared to the control groups. These observation confirm that Nigella sativa decreases weight, total cholesterol, LDL-c and triglycerides levels, while it increases the HDL-c level. The above effects will be beneficial for patients with Obesity and CHD. On the basis of these findings following conclusions are made:

1. Nigella sativa has got weight reducing effects.
2. Nigella sativa has got TG, TC and LDL-c lowering and HDL-c raising effect.
3. Both Nigella sativa and sunflower oil have got low atherogenic index (TC/HDL) and may be recommended in Hyperlipidaemic, Obesity and CHD patients or normal individuals.

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PREVIOUS RELATED STUDIES

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