

# Lipid Profile in Supplementation Walnut and Almond in Hypertension Subjects

MOHAMMAD KAMRAN TAJ, ABDUL MAJEED CHEEMA, IMRAN TAJ HASSANI, TAJ MOHAMMAD HASSANI

## ABSTRACT

In present study the effects of walnut and almond in specific quantities have been explored on Balochistani (Pakistani) subjects eating natural Balochistani (Pakistani) diet, having hypertension history and taking medicine but without any atherosclerosis or metabolic disease. The study was conducted on 12 subjects having hypertensive history, who voluntarily participated in the study without any ethnic concern. All the subjects were fed a supplement of walnut and almond 25g each, daily in addition to their diet for a period of 4 weeks and all the subjects completed the nutritional supplementation of 4 weeks of the study. The lipid profile just prior to and after the completion of supplementation was assayed. Total serum cholesterol before and after supplementation was  $181.5 \pm 8.3$  mg/dl and  $194.2 \pm 6.8$  mg/dl respectively; and average variation of the fraction in each individual, a non significant increase of  $8.4 \pm 3.7\%$  had been observed. The fraction of LDL cholesterol was  $115.4 \pm 7.1$  mg/dl and  $121 \pm 4.3$  mg/dl before and after supplementation respectively, the analysis of this fraction demonstrated a negligible variation due to supplementation. HDL cholesterol value before supplementation was  $35.1 \pm 3.5$  mg/dl and after supplementation was  $35.6 \pm 3.1$  mg/dl. A minor increase of 3% of the fraction had been obtained after the analysis of considering prior value 100 and calculating the subsequent values. The concentration of VLDL prior to the supplementation was  $42.6 \pm 7.1$  mg/dl which was observed to be reduced to  $31.2 \pm 4.3$  mg/dl. In an analysis it was determined that the fraction had been significantly  $19.5 \pm 8.3\%$  lowered (Mann-Whitney Rank Sum Test  $P=0.03$ ) subsequent to the supplementation. The mean value of triglycerides prior to the supplementation was  $213.1 \pm 35.5$  mg/dl which was observed to be reduced to  $156.2 \pm 21.5$  mg/dl. The fraction was significantly  $19.5 \pm 8.3\%$  lowered subsequent to the supplementation compare to before it. In summation the supplementation of 4 weeks demonstrated increasing trend in total cholesterol, negligible effect on LDL cholesterol fraction, slight increase in HDL cholesterol fraction, significant reduction in VLDL fraction and the concentration of triglycerides. There had been ameliorating and healthier effect on the lipid profile of the hypertensive subjects following combined almond and walnut supplementations.

**Key words:** Hypertension, Lipid profile, walnut & almond

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## INTRODUCTION

Hyperlipidemia is a condition where the blood lipid parameters are elevated. The lipid fraction in circulating blood are very low density lipoprotein (VLDL) cholesterol, serum triglyceride (TG), high density lipoprotein (HDL) cholesterol, low density lipoprotein (LDL) cholesterol and serum cholesterol (Howland and Mycek 2006).

Until late eighties the researchers have been using allopathic/homeopathic medicines and various type of vegetables for the control of hyperlipidemia. During early nineties the researchers included use of nuts in their studies. Nuts are the seeds or dried fruits, frequent consumption of which reduces the risk

of coronary artery disease and alter blood lipids in normal and hypercholesteromic individuals under controlled and free living dietary condition (Sujatha and Stabate 2006).

In USA these studies were carried out in normal American men, while in Japan these studies included both men and women having normal Japanese diet, but without any previous history of eating nuts frequently, having no known food allergies, no smoking, no past hypertension (blood pressure) history, nor having any atherosclerosis or metabolic diseases and not taking medicine (Iwamoto *et al.*, 2002).

Since early nineties the researcher studies around the world have shown that walnut and almond intakes in specified quantities in additional to normal diet decrease the serum cholesterol in human beings.

The north-eastern districts of the Balochistan province are historically almond and walnut

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*Department and Faculty of Biotechnology & Informatics, Balochistan University of Information Technology and Management Sciences, Quetta.*

*Correspondence to Dr. M. Kamran Taj Lecturer, Email: kamrancasvab@yahoo.com*

producing area. Walnut and almond are excellent source of protein, carbohydrate, vitamins, minerals and fat.

Omega-3 essential fatty acid, a special type of protective fat that body cannot manufacture is present in walnut and almond. Studies show that a diet rich in omega- 3 fatty acid may help lower triglycerides and increase HDL cholesterol (the good cholesterol). Omega 3 fatty acids may also act as an anticoagulant to prevent blood from clotting (Tsang, 2005).

Like other parts of the world, the coronary disease syndrome due to elevated hyperlipidemia is common feature particularly amongst elderly human beings in Balochistan province. Due to long distance and poor means of communication individuals with coronary disease syndrome are either unable to get access to recognized cardiovascular disease control institution or are not able to bear the cost of expensive medicines recommended by the physicians for hyperlipidemia control. This situation motivated me to find out a cheap less complicated mode of treatment through exploring the effects of walnut and almond feeding in limited quantities on Balochistani individuals.

## MATERIAL AND METHODS

The samples were collected from 12 selected men and women from varying locations in Quetta city. The study protocol was approved by the Balochistan University of Information and Management Sciences, faculty of biotechnology and informatics.

During 4 weeks study, the subjects took their daily normal meals at home under the supervision of the researcher. The diets consumed during the study consisted of natural and common food items, prepared and cooked in customary ways. The percentage of energy from protein, carbohydrate, total fat and dietary fiber did not change during the dietary period. During experimental period the diets of subjects were not identical except walnut and almond. All subjects were given walnut and almond 25g each daily as supplement divided into morning, noon and at night share. The walnut and almond were purchased from local market of Quetta (Balochistan) Pakistan.

Before start of diet a 6 ml venous blood sample was collected from each subject after overnight (12 hour) fasting. After centrifuge to obtain serum, further determination of concentrations of, serum cholesterol, serum triglyceride, HDL-cholesterol, LDL-cholesterol and VLDL-cholesterol was done at Agha Khan Lab Quetta. For the final result once again the blood samples were collected. Blood pressure was measured with manual sphygmomanometer (Japan).

The initial blood pressure readings of subjects were recorded 3 days before initiating dietary period. The first reading was taken in the morning, the second at noon and third at night and finally all the three readings were averaged. Statistical analysis included t test for the comparison of change in outcome variables in response to dietary treatment and diet period for the two period crossover design, with methods described by sigma stat.

## RESULTS AND DISCUSSION

A number of studies have examined lipid profile response to dietary incorporation of walnut and almond but to our knowledge, this may be the first study when walnut and almond were consumed together in equal amount in hypertensive subjects.

The results of this study yield several important conclusions. Walnut and almond had favorable effect on plasma lipids in hypertensive subjects. The supplement feeding of walnut and almond resulted in significant reduction of VLDL cholesterol, serum triglyceride with some increase in HDL cholesterol in the blood of subjects under study .However in case of serum cholesterol and LDL cholesterol levels the results were not sufficiently convincing mainly due to non replacement of fat from the diet and also non reduction of energy in the normal diet.

The supplementation of walnut (25g/d) and almond (25g/d) had marked reduction in VLDL cholesterol and serum triglyceride fraction. In most of the subjects both VLDL cholesterol and serum triglyceride fraction had been lowered by more than 25%. It was found that the fraction had been significantly  $19.5 \pm 8.3\%$  lowered subsequent to the supplementation. Zibaenezhad *et al.* (2003), reports feeding 20 g of walnut oil decrease plasma triglyceride concentration by 17%. Spiller *et al.* (2003), confirms use of almond butter in diet resulting in reduction of VLDL (-15%) and TG (-18%).

The results of LDL cholesterol and serum cholesterol are essentially not compromising with those reported by Sabate *et al.* (1993) and Iwamoto *et al.* (2002), that walnut diet lowered LDL cholesterol 8-9% in men and 10.6% in women.

Who detected 12.4 and 16.3% reduction of total and LDL cholesterol, respectively, in American men when 84g/d walnut replaced 20% of the energy from fat for 4 weeks in National Cholesterol Education Programme Step 1 diet. In present study there had been no effect on LDL fraction of the cholesterol and a non significant increase in total cholesterol had been observed. In the study of Sabate *et al.*,(1993) more than three time alone walnut had been supplemented and in this study almond were included along the walnuts.

The combination of walnut and almonds seem to have provided the dual beneficial effect of lowering of VLDL and triglyceride. As it has been reported in separate studies of walnut effect on plasma triglyceride levels; as Zibaenezhad *et al.* (2003), reported that feeding 20 g of walnut oil decreased plasma triglyceride concentration by 17% and of almond on VLDL as Spiller *et al.* (2003), confirmed that use of almond butter in diet resulting in reduction of VLDL (-15%) and TG (-18%).

A slight increase in HDL has been observed in the present study; this slight increase is still noticeable as the supplementation has made minor improvement instead of any adverse effect on HDL target.

The study has reflected the ameliorating effect of the walnut and almond combination on the important targets of the lipid profile in the local hypertensive subjects. Further planned studies will certainly be more useful in assessing the amount and combinations for better results in the regard.

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