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Research Article

NEW SLANT ON HYPERLIPIDEMIA: PREVENTION BY VITAMIN B-3 AND COMMON FRUIT ZIZIPHUS JUJUBA

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ABSTRACT

Coronary artery disease (CAD) is complication of primary or secondary hyperlipidemia. Etiological factors for hyperlipidemia include inherited genetic defects in low density lipoproteins (LDLs), persons accustomed to sit for prolong time, cigarette smoking, diabetes mellitus, and hypertension. This research work's aim was to compare hypolipidemic features of an allopathic agent vitamin B-3 and another medicinal plant Z. Jujuba. Study was conducted from January 2016 to June 2016 at Jinnah Hospital Lahore, Pakistan. 60 male and female hyperlipidemic patients age range from 20 to 70 years were selected from the hospital. Written and explained consent was taken from all patients. They were divided in two groups. Group-I was advised to take two grams vitamin B-3 in divided doses for the period of two months. Group-II was advised to take 500 grams of fruit Z. Jujuba daily for 60 days per their convenience. Their initial LDL and HDL cholesterol was determined by Friedwald's formula. After 60 days therapy, their post treatment lipid profile was measured and mean values with \pm SD were analyzed biostatistically by using SPSS version 2; 2010. Group-I which was on vitamin B-3 their LDL cholesterol decreased significantly and HDL cholesterol was increased significantly. In group-II patients LDL cholesterol was decreased significantly but HDL increase was not significant with p-value of >0.05 . It was concluded from the research study that vitamin B-3 is potent hypolipidemic agent as compared to medicinal plant Z. Jujuba.

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INTRODUCTION:

Antihyperlipidemic agents promote reduction of lipid levels in the plasma¹. Some antihyperlipidemic agents aim to lower the levels of low-density lipoprotein (LDL) cholesterol, some reduce triglyceride levels, and some help raise the high-density lipoprotein (HDL) cholesterol. Reducing the LDL cholesterol, they can cure both the primary and secondary hyperlipidemia²⁻⁷. Vitamin B-3 or Niacin, Statins, Fibrates, Bile Acid Binding Resins are main drug groups used in allopathy⁸⁻⁹. Basic problem with use of vitamin B-3 is its dose ie; 2 grams daily to lower cholesterol in plasma. In this dose

it causes flushing and urticaria¹⁰. Statins and Fibrates cause rhabdomyolysis and muscular pain¹¹⁻¹⁴. If used for long time, bile acid binding resins cause withdrawal by patient due to its metallic taste¹⁵. Alternative hypolipidemic therapy include medicinal herbs like Z Jujuba which reduce LDL cholesterol, triglycerides, total cholesterol and somewhat increase HDL cholesterol¹⁶. Active ingredients of Z Jujuba include colubrinic acid, zizyberenic acid, aliphatic acid, aliphatic acid, betulonic acid, betulonic acid, maslinic acid, oleanolic acid, oleanonic acid. These Zizyphus jujuba compounds were examined for their antioxidant

characteristics and proved mild to moderate free radicals scavenger compounds¹⁷⁻²⁰. Some researchers explained that, a number of compounds are present in *Z. jujuba*, including saponins, jujubosides and triterpenic acids which are antioxidant compounds in nature²¹. In some meta analysis studies it was proved that major hypolipidemic mechanism of *Z. Jujuba* is that compounds present in the plant bound with bile acids in intestine and excrete them out, thus interrupting enterohepatic circulation. This will cause hepatocytes to synthesize bile acids instead of cholesterol²².

MATERIAL/SUBJECTS/METHOD:

This work was conducted at Jinnah Hospital Lahore Pakistan from January 2016 to June 2016. 60 male/female hyperlipidemic patients were enrolled for study. Consent was taken from all participants. Research work permission were approved by ethics committee of the hospital. Both male and female patients suffering from primary or secondary hyperlipidemia were selected. The age limit for patients was 20 to 70 years. Alcoholic addictive patients, cigarette smokers, habitual to enjoy sedentary life, with impaired liver or renal functions were excluded from the research study. Baseline Lipid Profile was determined in Biochemistry lab of the Hospital. Serum cholesterol was estimated by enzymatic method. Serum HDL-cholesterol was determined by using kit Cat No: 303210040 by Elli Tech Diagnostic, France. Chylomicrons, low density lipoprotein and very low density lipoprotein are specially precipitated with phosphotungstic acid and magnesium ions can then be removed by centrifugation, while high density lipoproteins remain in the supernatant. Cholesterol included in this phase is measured by an enzymatic method. LDL-cholesterol was calculated according to Friedwald formula (described by laralaoi J et al²¹) i.e.; $LDL = TC - (TG/5 + HDL-C)$. Patients were divided in two groups, 30 patients in each group. Group-I was on Tab. Niacin 2 grams daily in three divided doses. Group-II was on Jujube 500 grams daily in three divided times to eat. They were advised to take this fruit for two months. Mean values \pm SD were taken for statistical analysis using SPSS version 26 (2015). Paired 't' test was applied to get significance changes in parameters before and after treatment. P-value >0.05 was considered as non-significant change, p-value <0.01 was considered as significant and p-value <0.001 was considered as highly significant change in the tested parameter.

RESULTS:

When results were compiled after statistical analysis it was observed that with 60 days therapy by vitamin B-3 LDL-cholesterol in 27 hyperlipidemic patients reduced 29.2 mg/dl and HDL increase in this group was 7.3 mg/dl. Three patients withdrew from the study in this group due to flushing in dependant parts of the body like hanging lower earlobes, tip of nose, testicles, fingers and palm of upper and lower limbs, female breast nipples. Basically it is not a adverse effect of vitamin B-3, rather it is beneficial effect of the vitamin. Because this flushing effect is produced by release of prostaglandin

D-2 from endothelium of blood vessels, which causes vasodilatory effect on dependent parts of human body. Other participants were counseled carefully regarding vitamin B-3 dose titration, ie starting from low dose to therapeutic dose. In group-2 (n = 30) two months therapy by *Z. Jujuba* reduced LDL-cholesterol from 198.82 ± 2.17 mg/dl to 190.91 ± 1.73 mg/dl, which is 7.9 mg/dl change in the parameter. HDL-cholesterol in this group increased from 38.6 ± 2.19 mg/dl to 41.9 ± 2.97 mg/dl, which is 3.3 mg/dl change in the parameter. Biostatistically it is non-significant change in the tested parameter of lipid profile. When analyzed in percentage change it was seen that vitamin B-3 reduced LDL cholesterol 13.9 % in 27 hyperlipidemic male and female patients in 60 days therapy. HDL cholesterol in this group increased was 4.0 %. In *Z. Jujuba* group LDL cholesterol reduction in 30 male and female hyperlipidemic patient's was 16.2 % and HDL cholesterol increase was 7.9 %.

DISCUSSION:

Myocardial infarction, congestive cardiac failure, cardiac arrhythmias, and hypertension are complications of coronary artery disease, which are initiated by formations of atherosclerotic plaques due to primary or secondary hyperlipidemia. We can prevent all these complications simply by lowering plasma lipids. LDL is main cause of oxidation which form foamy cells ie atheroma, which is stucked within inner walls of coronary arteries causing CAD. Simply by reducing bad cholesterol ie; LDL cholesterol and increasing good cholesterol ie; HDL cholesterol, we can prevent CAD. In our research study 2 grams of vitamin B-3 reduced LDL cholesterol in 60 days significantly. It also increased HDL cholesterol significantly. Palve T et al²³ and Salouit E et al²⁴ proved same results when they used 2 grams of vitamin B-3 in 66 hyperlipidemic patients, but Mao Ki et al²⁵ observed lesser effects of Niacin on HDL cholesterol, i.e. only 4.4 % increase in HDL cholesterol. Grams ET et al²⁶ explained different mechanisms of hypolipidemic response of vitamin B-3 on persons with different genetic code. One of the favorable mechanism for patients with CAD they described is fibrinolytic activity of vitamin B-3. In our results *Z. Jujube* fruit decreased LDL cholesterol is 7.9 mg/dl, which is significant change in the parameter. HDL cholesterol is not increased significantly in our results with p-value of >0.05 . Yulkat Y et al²⁷ and Saloiu TL et al²⁸ observed same reason of Jujube on LDL and HDL-cholesterol, which augment our results. Mekawali PO et al²⁹ observed more effects of Jujube as we observed in low density lipoprotein cholesterol. John DB et al³⁰ proved that if given in large amount *Z. Jujuba* can lower LDL cholesterol but HDL cholesterol is not increased remarkably. They also mentioned mode of action of *Jujuba* that it inhibit enterohepatic circulation of bile, causing synthesis of bile acids in liver, instead of cholesterol synthesis. Many researchers do not agree to replace allopathy related drug regimens for hyperlipidemia by medicinal plants due to wide variety of pharmacological actions of medicinal herbs. They do emphasize on more research work on medicinal herbs,

so that patient may not suffer from synergetic effects of foods and these herbs. We do agree with this new slant on medicinal herbs. Suleman T et al³¹ described hazards of food-herb interaction, when patients or even physicians/cardiologists are not so aware about combined effects of these foods and herbal medicines.

CONCLUSION:

It was concluded at end of the research work that Vitamin B-3 has remarkable beneficial effects on LDL-cholesterol reduction and HDL-cholesterol enhancing effect when compared with Z. Jujuba in hyperlipidemic patients.

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