Research Paper

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The Effect Of Supplementation of Barley On the Lipid Profile of Mild Hypercholesterolemic Adults.

Home Science

KEYWORDS : Hypercholesterolemia, Barley β glucan.

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ABSTRACT

The study aims to determine the effect of supplementation of barley to mild hypercholesterolemic adults. Cardiovascular disease is one of the most common causes of death in the developing countries. The soluble β – glucan of oats and barley is considered to be due to cholesterol reduction in animals and humans. A sample size of 20 individuals has been taken with the age limit of 40 to 60 years for this research.

The supplementation of barley bun containing 40 grams of barley is recommended for these samples for 60 days. It has been observed that the cholesterol level is nailed down by 10 to 12 % in 60 days, due to the uninterrupted supplementation of Barley to the selected samples. Hence it was found that supplementation of barley would cause a significant reduction in the cholesterol levels with no side effects but good for health is acceptable.

INTRODUCTION

The foundation of health is vitality and that is something that no medical checkup can reveal. Health is not a virtue signifying absence of disease. It is something positive, implying an abundance of vitality, vigour and youthfulness. Physical stamina, mental alertness and clarity and spiritual poise are the blessings of good health (Mahtani, 2005).

Cardiovascular disease [CVD], primarily in the form of heart disease and stroke, causes more deaths, than any other disease and is observed in both men and women, irrespective of race or ethnicity. Death caused by cardiovascular disease and coronary heart disease (CHD) can be correlated with metabolic syndrome, a condition that is increasingly prevalent and now affects approximately 25 percent of the adult population. This condition is characterized by a cluster of metabolic dysfunctions that may include abdominal obesity, atherogenic dyslipidemia, elevated blood pressure, insulin resistance and glucose intolerance (Pins J.J, 2006).

Modifying risk factors like smoking cessation, decreased saturated fat intake, physical activity and control of diabetes mellitus offers the greatest potential for reducing cardiovascular disease incidence, morbidity, disability and mortality.

Diet plays a key role in modifying several major risk factors, including high blood pressure, high cholesterol and excessive body weight. Additionally, in individuals with metabolic syndrome, dietary interventions that positively influence lipids,

glucose metabolism and body weight may help prevent or delay the development of diabetes and cardiovascular disease (Behall K.M, 2006).

Major health organizations are increasingly recognizing the cardiovascular benefits of high fiber intake. The American Heart Association dietary guidelines assert that a healthy diet including a variety of high fiber foods is the foundation for achieving and maintaining cardiovascular health.

Soluble fibers in particular, including pectin from fruits and β – glucans found in barley and oats, can lower total and low density lipoprotein cholesterol levels, improve blood glucose regulation, and promote satiety. Soluble fiber intake may also prevent the increase in triglycerides and reduction of high density lipoprotein cholesterol that sometimes occur with diets rich in carbohydrates (especially from refined grains) (Brown.L, et al, 1999 and Burger. W.C et al, 1984).

Barley has high amounts of soluble fiber, but is not extensively consumed in the diet. The addition of barley to a healthy diet may be effective in lowering total and low density lipoprotein cholesterol in both men and women (Behall. K.M, 2004).

Barley is less expensive when compared to many cereals, so it can be incorporated in the diet and it could reduce the onset of cardiovascular disease. A combination of factors and mechanisms appears to contribute to the reduction of lipids observed after consumption of barley (Pomeran.Z.Y, 1974 and Mishra, R.P, 1996).

MATERIALS AND METHODS

The present study involves pre-test and post-test experimental design without control design for determining the effect of supplementation of barley. The study consisted of twenty subjects served as an experimental group who received barley bun for a period of 60 days. Purposive sampling was employed for selecting the subjects for the study. Purposive sampling involves purposive or deliberate selection of particular units of the universe for constituting a sample which represents the universe (Kothari, 2004).

Twenty mildly hypercholesterolemic subjects in the age group of 40 to 60 years were selected from residents of Chennai area for the study. The subjects were visited by the investigator for collecting the general information and to explain about the study. Barley bun was supplemented to the selected subjects and the blood analyses was done prior to and after supplementation by a qualified laboratory technician. The lipid profile analysis was done using "Liquid Gold Kit" and was recorded on 0^{th} day and 61^{st} day of the supplementation period.

The data collected were analyzed using statistical methods like arithmetic mean, standard deviation, student t test and pearson correlation.

RESULTS AND DISCUSSION

The results from the lipid profile analysis showed that there was a 5 percent significant reduction in total cholesterol, low density lipoprotein, very low density lipoprotein, high density lipoprotein and triglycerides and 1 percent significant reduction in total cholesterol: high density lipoprotein, high density lipoprotein: low density lipoprotein (Table 1)

The Table -1 shows the mean values of total cholesterol before and after barley bun supplementation. The values were 215.65 mg/dl and 201.40 mg/dl respectively on 0^{th}day and after 60^{th} day of supplementation. The't' value was found to be 13.012 which was significant at 5 percent level. Lupton J.R et al (1994) in his study has shown that serum cholesterol reductions was greater than 20 percent in hyperlipidemic adults consuming 16 g/day of beta – glucan, as part of a diet containing a range of cholesterol lowering foods. Truswell. A (2002) in his study conducted with 25 people having mild cholesterol levels (ranging between 200 – 240 mg/dl), showed that the participants after giving a diet rich in β–glucan had lowered their overall cholesterol levels by 10 percent and low density lipoprotein (LDL also known as the bad cholesterol that build up within artery walls and promotes atherosclerosis) was dropped by 17 percent among the people who consumed beta – glucan from barley for

the same period. HDL cholesterol before the supplementation period was found to be 39.80 mg/dl supplementation of barley bun slightly increased to 41.20 mg/dl after supplementation. There was 5 % significant reduction in LDL, VLDL and triglycerides. Barley beta – glucan in human clinical trials gives an average 7 – 10 percent reductions in total and LDL – cholesterol in mildly or moderately hypercholesterolemic persons, over a dose range of 3 – 8 g/day

Freedman et al (2003) reported that men with relatively high concentrations of either small HDL or large VLDL particles were 3 to 4 times more likely to have extensive coronary artery disease than were men with concentrations below average.

Barley β – glucan fiber has been shown to reduce total and LDL cholesterol and improve glucose metabolism in different populations in various studies. Therefore, barley foods and functional foods containing extracted barley β – glucan should be considered safe and effective options for improving lipids in moderately dyslipidemic men and women. (Hallfrisch J et al, 2003).

Study done by Behall K.M (2004) showed that, overall the subject's cardiovascular risk factors improved with decreased total cholesterol , LDL and total cholesterol/HDL cholesterol ratio due to the supplementation of barley for a period of 8 weeks. These results indicate that barley may be an effective addition to a healthy diet to lower total cholesterol, LDL and LDL: HDL in both men and women.

CONCLUSION

Cardiovascular disease is one of the most common causes of death in the developing countries. Most attention concerning the reduction of serum cholesterol levels by dietary treatment has been paid on soluble cereal fibers. The soluble β – glucan of oats and barley is considered to be due to cholesterol reduction in animals and humans (Anderson et al, 1990 and Behall et al, 2004). Consumption of barley containing foods and the associated soluble fiber significantly improved several cardiovascular disease risk factors. These results show the potential to moderate several health risk factors through changes in food and nutrient intake without changing energy intake. The highest β – glucan intake resulted in the greatest reduction in total and LDL – cholesterol concentrations and total: HDL cholesterol.

The effect of supplementation was emphasized as there was a 5 percent significant reduction in total cholesterol, low density lipoprotein, very low density lipoprotein, high density lipoprotein and triglycerides and 1 percent significant reduction in total cholesterol : high density lipoprotein, high density lipoprotein : low density lipoprotein

Table – 1: Comparison of lipid profile before and after supplementation of barley bun

Parameter	Period	Mean ± SD (mg/dl)	't' value	Pearson Correlation
Total Cholesterol	Before After 60 days	215.65 ± 7.74 201.40 ± 7.94	13.012	0.8
HDL	Before After 60 days	39.80 ± 2.76 41.20 ± 2.59	6.009	0.9
LDL	Before After 60 days	145.20 ± 7.42 132.50 ± 8.33	10.459	0.8
Triglycerides	Before After 60 days	197.10 ± 21.56 183.43 ± 19.21	12.174	1.0
VLDL	Before After 60 days	36.05 ± 4.21 35.06 ± 3.95	6.045	1.0
Total Cholesterol:HDL	Before After 60 days	5.45 ± 0.51 4.91 ± 0.42	2.779	1.0
LDL : HDL	Before After 60 days	3.67 ± 0.36 3.23 ± 0.31	2.830	1.0

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