EFFECTS OF SUNFLOWER SEEDS ON CHOLESTEROL AND TRIGLYCERIDES LEVELS IN PATIENTS WITH DYSLIPIDEMIA

CHEENAM BHATIA* and LEENA PARIHAR*

*Department Of Clinical Nutrition, Fortis Escorts Hospital, Amritsar, Punjab, India
†Department Of Botany, Seth G.Lbhani S.d (p.g.) College, Sri Ganganagar, Rajasthan, India

1. Introduction

Dyslipidemia also known as hypercholesterolemia can be referred to as an increase in the serum cholesterol level [14]. Cholesterol is a waxy substance that is not only present in some foods like egg yolk, dairy, meat, fish, poultry but is also produced by the body itself. But studies have shown that not all the cholesterol is fatal to one’s health. The body needs some amount of cholesterol for various purposes like building membranes of cells, formation of some hormones, and also aids in fat digestion by producing certain important components. When the cholesterol levels are raised in the body above the given range the individual is more prone to develop a cardiac disorder [3].

Dyslipidemia is one of the prime reasons causing various cardiovascular diseases. Problem usually arises when cholesterol gets accumulated in the arteries that play a role in supplying blood to the heart. The artery walls usually narrows with the abnormal accumulation of cholesterol which hardens the intima of the artery wall as it forms clumps – called plaque. As the lump size increase, the blood flow to the heart decrease as dogging occurs in the arteries. The restricted blood flow to the heart leads to angina-type of a chest pain that advances to a condition called MI i.e. myocardial infarct which is commonly known as a heart attack [3].

Cholesterol being of an oily consistency is insoluble in water. In the blood plasma the only way cholesterol can be transported is with the help of lipoproteins which are specific protein particles. The lipoproteins can be divided into four categories on the basis of their existing density: VLDL (Very Low Density Lipoprotein), LDL (Low Density Lipoprotein), IDL (Intermediate Density Lipoprotein) and HDL (High Density Lipoprotein) respectively. These lipoproteins are the carriers of cholesterol all over the body. When the level of cholesterol increases so does that of the lipoproteins. The increase in the levels of the lipoproteins apart from that of HDL (also known as the good cholesterol) particularly LDL-cholesterol has been known to lead to various cardiovascular problems like atherosclerosis [2]. The increased levels of LDL accredited to the consumption of inappropriate diet, thyroid, diabetes, obesity, genetic diseases etc. [3].

A higher level of triglyceride in the blood serum can also lead to a sudden progression of heart disease or even cardiac arrest. Triglycerides are a class of lipid (fat) present in your blood. When an individual ingests food the body converts the additional calories that it doesn’t need to triglycerides which are then stored in the fat cells. The hormones tend to release the triglycerides in between meals for energy. If on a regular basis the intake of energy is higher than the output it can lead to a condition known as Hypertriglyceridemia. Triglycerides are not same as cholesterol as the former stocks non-utilised calories and supplies energy to the body whereas the latter works up on producing certain hormones and building cells [11].
The sunflower seeds prove to be a phenomenal source of minerals, vitamins, calories and essential fatty acids. The seeds of the beautiful sunflower are majorly utilized in the edible oil extraction all over the world commercially. The seeds can be eaten as an edible snack too [1].

Sunflower plant is tall, erect, herbaceous annual plant that belongs to the family Asteraceae of the genus, Helianthus. The botanical name of the sunflower seeds is Helianthus annuus. First time the seeds were found to be originated in Middle America. From this region it spread world-wide as an important commercial crop [1].

The sunflower seeds are not only nutty and delectable but also acknowledged as health food worldwide. The calorie dense seeds get large part of its calories from the fatty acids. Especially the seeds are rich in PUFA (poly-unsaturated fatty acids) specifically linoleic acid that that accord about 50 % fatty acids in them. Apart from this mono-unsaturated fatty acids (MUFA) mainly Oleic acid is also found in the seeds in a considerable amount. Research suggests that food amounts of MUFA and PUFA in the diet might prevent various cardio vascular disorders and deranged lipid profile [12].

Just like other nuts the sunflower seeds also are an impressive source of proteins with good quality amino acids like tryptophan present in it. In children, tryptophan is considered to be integral especially for growth. Additionally, these seeds possess certain poly-phenol compounds like caffeic acid, quinic acid and chlorogenic acid which are known to be health promoting. These possess various anti-oxidants that help the body get rid of toxic oxidant molecules [12][15].

The sunflower kernels consist of considerable amounts of B-complex vitamins. Being specific they contain good amounts of folic acid, pyridoxine (Vitamin B6), niacin, riboflavin, thiamine (Vitamin B1) and pantothenic acid [9]. Many essential minerals like Iron, Magnesium, Selenium, zinc, copper and Calcium are also highly concentrated in the sunflower seeds. All these minerals are known to play major and vital roles in the body like- enzyme synthesis, bone mineralization, hormone production, regulation of metabolic functions, red blood cell production, cardiac and skeletal activities [17].

The objective of the present study was to analyze the effects of sunflower seeds on the cholesterol and triglyceride levels of patients with dyslipidemia. The Cholesterol evaluation includes – Total Cholesterol and Triglyceride level.

**MATERIALS AND METHOD:**

The samples of sunflower seeds were brought from the regional community market at Amritsar, Punjab, India. Around 130-200 mg average weight was recorded for the seeds. The seeds procured were placed in airtight container in sealed plastic bags until required.

The sunflower seeds were positioned on the turntable plate of the oven (Model: Samsung, CE104VD, 230 V-50 Hz, 2450 MHz, 100-900 W-6 Levels) after being placed in a single uniform layer in the 12 cm diameter Pyrex petri dishes. The contents of the dishes were then roasted at 150ºC for 10 min. Once the roasting was done the seeds were kept to cool at room temperature [18].

The sample patients (n=60; 26 females and 34 males) were selected with the age ranging from 45-55 years from the state of Punjab (the sample patients were selected under the knowledge of administration). The group of sample patients were classified into two groups: control and case group (each group-n=30). The control group was given only the required diet counselling whereas the case group were administered 2 gm of sunflower seeds in addition to the required diet counselling.

The pre-supplementation data in both groups- case and control was collected with the help of a self-prepared questionnaire. 24 hour recall method was used for conducting the dietary survey. The anthropometric measurements and biochemical parameter estimation was conducted which included measurement of height, weight and BMI in the former and recording the serum cholesterol and triglyceride level in the latter [6] [8].

The roasted sunflower seeds were fed to the control group for a period of 6 months. The pre and post supplementation data was recorded and the serum cholesterol levels with the triglyceride levels were checked at each month’s end. The data collected was put to statistical analysis to find out the result [8]

**RESULTS:**

The effect of control and sample intervention has been studied on a group of 30 patients and data so obtained regarding the cholesterol and triglycerides levels is presented in Table 1. With control intervention a gradual decrease (significant; p<0.05) was observed in cholesterol after the third visit, whereas in the case group a significant difference was observed at every visit as shown in Fig.1 and Fig.2 which can be attributed to the intervention of sunflower seeds in their diet. Similarly, in case of triglycerides, the levels with control intervention decreased gradually (significant; p<0.05) but only after the fourth visit, whereas in the case group a significant difference (p<0.05) was observed from the second visit itself as shown in Fig.3 and Fig.4. The rapid and significant decrease in the triglyceride levels in the case group in comparison to the control group can again be accredited to the intervention of sunflower seeds.

**Table: 1. Effect of sunflower seeds on Cholesterol and LDL levels**

<table>
<thead>
<tr>
<th>Cholesterol</th>
<th>Triglycerides</th>
<th>Control</th>
<th>Case</th>
<th>Control</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>235.06± 24.23</em></td>
<td>259.10± 35.97*</td>
<td>203.16± 29.16*</td>
<td>230.70±128.88*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>220.16± 11.79*</td>
<td>222.63± 23.80*</td>
<td>184.93± 19.40*</td>
<td>208.70±15.26*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>213.66± 9.03*</td>
<td>192.03± 13.63*</td>
<td>171.16± 10.58*</td>
<td>192.37±11.54*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>209.36± 8.64*</td>
<td>188.50± 7.49*</td>
<td>160.13± 5.15*</td>
<td>176.03±12.84*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>199.13± 2.94*</td>
<td>186.03± 4.94*</td>
<td>156.25± 3.62*</td>
<td>156.27±9.70*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>198.36± 2.48*</td>
<td>184.60± 4.35*</td>
<td>153.13± 2.13*</td>
<td>145.07±7.07*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As per the results the sunflower seeds have proved to show a positive and a better effect in reducing the Cholesterol levels in patients with dyslipidemia along with a good decrease in triglycerides which otherwise might lead to hardening of the arteries and hence lead to cardiac disorders or even myocardial infarct. Just half a spoon of sunflower seeds every day provides the recommended level of proteins, vitamins, minerals and phenolic anti-oxidants [15].

Amongst other studies, flax seeds were used to analyse their effectiveness to reduce the deranged cholesterol levels. A randomised crossover design was put to use in the study where 9 obese and dyslipidemic were selected who were made to consume 40g of ground flax seeds every day for 84 days which included a 4 week washout period. The result of the study did not support the decrease in the cholesterol level strongly as per the antioxidant activity of flax seeds [13].

In another study, the effect of fenugreek was analysed on the cholesterol and blood sugar levels. The fenugreek seeds were powdered and around 15 gm was soaked in water and administered to the patients. The results showed a good decrease in the insulin level in NIDDM patients but no statistical significance was found. Also, fenugreek was not found to show any good effect on the lipid levels 3 hrs post meals. A potential benefit in the treatment of diabetes was found but no effect was found in dyslipidemia [10].

In the above studies, flax seeds do not show a good effect whereas fenugreek seeds do show a good effect but only on the blood glucose levels but does not show good effect in consideration to the heart health. Also, fenugreek seeds used in the study is about 15gm per day which is much higher that the quantity of sunflower seeds shown in the present study (2gm). Sunflower seeds have about 3 grams of fiber and 5 grams of protein in an ounce of kernels apart from the other benefits [17]. Thus, a small amount of sunflower seeds taken on a regular basis say being added on top of salads, in the vegetable mixtures, in oats or other cereals or can be taken as it is as a health snack (in moderation).
CONCLUSION:

The crunchy, nutty and delicious sunflower seeds are highly considered to be a great health food. They are energy dense seeds; 100 g seeds provide about 583 calories. Along with this, they are phenomenal source of health benefiting antioxidants, minerals, vitamins and nutrients. Sunflower Seeds with a mild nutty taste and a wide range of the above mentioned nutrients can serve as a filling as well as a nutritious food. With respect to the gathered results in the study, sunflower seeds can be recommended as a great household and a natural remedy to render control over the cholesterol and triglycerides levels in patients with Hypercholesterolemia.

References