RISK FACTORS FOR CORONARY ARTERY DISEASES IN VEGETARIAN AND NON-VEGETARIAN POSTMENOPAUSAL WOMEN

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ABSTRACT

Sixty postmenopausal women (30 vegetarians and 30 nonvegetarians) in the age group of 50-60 years, clinically healthy from the various localities/strata were selected. Background information, physically activity pattern and anthropometric measurements of the subjects were recorded using an interview schedule. Blood pressure of the subjects was also recorded. The blood sample were analysed for glucose and lipid profile. The body weight of both vegetarians and nonvegetarians were found to be higher but prevalence of obesity was higher in nonvegetarians (17 vs 10%). Vegetarians were also reported to have significantly lower TSFT (12.97 vs14.37mm), MUAC(29.47 vs33.07cm) and per cent body fat (38.72 vs41.89%).Vegetarian postmenopausal women had significantly lower systolic (123.67 vs 145.33mm Hg)and diastolic blood pressure (83 vs96.33mm Hg).The lipid profile of vegetarians showed lower level of TC (185.30 vs 111194.72 mg%), TG (125.23 vs 139.17 mg%, LDL-C (112.92 vs 125.70mg%),TC?HDL-C(4.14 vs 4.81),LDL-C/HDL(2.53 VS 3.13) but significantly higher level if HDL-C (44.79 VS 41.16 MG %).

INTRODUCTION

Menopause is a reproductive milestone in a women's life. It is a natural ageing process that marks the end of women's reproductive years. It is the last stage of a gradual biological process in which the ovaries reduce their production of female sex hormones-estrogen and progesterone. Medical opinion has always projected menopause as malady because of its association with a variety of acute and chronical conditions. Living without protective effects of estrogen increases a women’s risk for developing serious medical complications such as cardiovascular diseases, osteoporosis and breast cancer. Ovarian production of sex hormones appears to naturally protect women from coronary heart disease presumably by promoting a favorable plasma and lipid profile and healthy circulation. Once a women reaches menopause, the risk of mortality due to coronary heart disease which is generally higher in men starts rising in women also. There are substantial evidences suggesting that vegetarianism is a healthy food practice which can lower the risk of a number of such chronic diseases. Vegetarian diet had a positive effect on various risk factors for coronary artery disease: these include lower average body weight, lower total cholesterol and LDL-cholesterol levels and lower blood pressure. In conjunction with a greatly way of life (more exercise, avoiding wrong practices), vegetarians had roughly 30 per cent reduction in overall mortality from coronary heart diseasea(Key et al 1999).

Evidence also suggests that vegetarians are leaner than nonvegetarian postmenopausal women. Hence leanness of vegetarian menopausal women also reduce the incidence of Grade II obesity, high blood pressure and diabetes mellitus as compared to nonvegetarian menopausal women, which are other factors that initiate and aggravate coronary artery diseases. Therefore, the present study was an attempt to compare the risk factors in vegetarian and nonvegetarian postmenopausal women.

MATERIAL AND METHODS

The study was conducted in Punjab state. Ludhiana city of Sixty (30 vegetarian and 30 nonvegetarian) clinically healthy postmenopausal women were selected from various localities/
strata. The required data were collected through personal interview technique using the especially
structured schedule. Background information of the subjects was recorded. Various anthropometric measurements viz. weight, height, mid upper arm circumference (MUAC), triceps skin fold thickness (TSFT) and waist-hip ratio (WHR) were recorded using standard methods. The per cent body fat was measured using Body Composition Analyzer-TBF-410. The Body mass index (BMI) of the subjects was also calculated and categorized (James et al 1988).

Blood samples were analyzed for glucose (Glucose oxidase method), total cholesterol (TS) and high density lipoprotein cholesterol (HDL-C) using enzymatic colorimetric method. On the basis of these tests low density lipoprotein cholesterol (LDL-C), very low density lipoprotein cholesterol (VLDL-C) and total cholesterol: HDL-C and LDL-C: HDL-C was calculated. The data were analyzed with the help of various simple statistical tools such as mean, standard error (SE), percentage etc. Student’s t’ test was used for comparison of means.

RESULTS AND DISCUSSION

(A) Background Information: The data regarding background information of the subjects showed that 60 per cent vegetarians and 57 per cent nonvegetarians were in the age group of 50-55 years. All the subjects from both groups belonged to general category and a high percentage of vegetarians i.e. 67 percent were Hindu. Further, majority of the subjects (83 per cent vegetarians and 90 per cent nonvegetarians) were having nuclear family system with average family size of 6-8 members. The education level of majority of the subjects i.e. 47 per cent vegetarians and 50 per cent nonvegetarians was up to graduation.

(B) Life style and physical activity pattern: Physical activity is a pre-requisite for good health. The risk of obesity and cardiovascular diseases was found to be two fold in postmenopausal women who were physically inactive and following unhealthy practices as compared to those who were physically active (Grewal 2002). The observation on life style and physical activity pattern of the subjects revealed that all of them were engaged in sedentary life style pattern. The data further showed that 47 per cent vegetarians were doing mild exercise as compared to only 30 per cent of nonvegetarians. As majority of the subjects in the present study were observed to be housewives, therefore, the most of their time was spent in recreation. The data on sleeping hours of subjects revealed that 30 per cent vegetarians and 40 per cent nonvegetarians observed 5-6 hours of sleep followed by 7-8 hours in 37 per cent vegetarians and 33 per cent nonvegetarians.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Vegetarian (n=30)</th>
<th>Nonvegetarian (n=30)</th>
<th>t-value</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>67.60±4.45</td>
<td>69.40±4.11</td>
<td>1.63</td>
<td>50³</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.57±0.05</td>
<td>1.58±0.04</td>
<td>0.24</td>
<td>-</td>
</tr>
<tr>
<td>Body Mass Index (kg/m)</td>
<td>27.61±2.55</td>
<td>28.56±2.53</td>
<td>1.45</td>
<td>18.5-25²</td>
</tr>
<tr>
<td>Triceps skin fold thickness (mm)</td>
<td>12.97±0.72</td>
<td>14.37±1.33</td>
<td>4.11**</td>
<td>16.5³</td>
</tr>
<tr>
<td>Mid upper arm circumference (cm)</td>
<td>29.47±4.27</td>
<td>33.07±1.23</td>
<td>5.07**</td>
<td>28.5³</td>
</tr>
<tr>
<td>Waist-hip ratio</td>
<td>0.92±0.08</td>
<td>0.95±0.06</td>
<td>1.16</td>
<td>&lt;0.8⁴</td>
</tr>
<tr>
<td>Body fat (%)</td>
<td>38.72±3.22</td>
<td>41.89±4.26</td>
<td>3.25**</td>
<td>30</td>
</tr>
</tbody>
</table>

**Significant at 1%
³ICMR (2000)
²James et al (1988)
¹Jelliffe(1966)
⁴Ghafoorunissa and Krishnaswamy (2000)
(C) Anthropometric Measurements: The data regarding anthropometric measurements (Table 1) revealed that the mean body weight of nonvegetarians was higher (69.40±4.11kg) than that of vegetarians (67.60±4.45kg) but the difference was nonsignificant. A nonsignificant difference was also observed in the height of vegetarians and nonvegetarians i.e. 1.57±0.05 and 1.58±0.04m. The mean values of TSFT and MUAC in vegetarians (14.37 ±1.33mm and 29.47±4.27cm) were found to be lower than nonvegetarians (14.37 ±1.33mm and 33.07±1.23cm). However, the TSFT values in both the groups were than the standard value of 16.5mm but the values of MUAC were higher than the standard value of 28.5cm.

Further, a nonsignificant difference was observed in the values of WHR’s of vegetarians (0.92±0.08)and nonvegetarians (0.95±0.06). The body fat percentage of vegetarians (38.72±3.22)was found to be significantly lower than nonvegetarians (41.89±4.26)but both groups were observed to have higher body fat as compared to the standard value of 30 per cent.

Distribution of the subjects according to BMI: The results of the present study (Fig 1) revealed that majority of vegetarians and nonvegetarians (73% each) were overweight. Further, in case of vegetarians 10 per cent of vegetarians were found to be obese (BMI>30) and 17 per cent had normal BMI i.e. 18.5-25. Whereas in case of nonvegetarians 17 per cent were obese and only 10 per cent were normal. The high percentage of overweight subjects in both the groups may be attributed to the sedentary life style pattern and high intake of fat, milk and milk products. The prevalence of obesity in the present study was found to be higher in nonvegetarians as compared to vegetarians. The less prevalence of obesity among vegetarians may in itself a reason for greater longevity (Wienpahl et al 1990).

(D) Blood Profile of the Subjects: The data revealed that the mean systolic blood pressure of vegetarians and nonvegetarians was (123.67±8.09 and 145.33±10.42 mmHg) which was normal in case of vegetarians and high in nonvegetarians. A significantly lower diastolic blood pressure of 83.00±7.83 mmHg was observed in vegetarians as compared to 96.33±4.90 mmHg in nonvegetarians. Similar results have been reported by Willet and Boston (1999). The data further revealed that fasting blood glucose level of 60th vegetarians (87.73±5.81 mg/dl) and nonvegetarians (90.57±5mg/dl)was in between the normal range of 80-115 mg/dl.

(E) Lipid Profile of the Subjects: The data regarding lipid profile (Table 2) revealed that TC level of vegetarians and nonvegetarians were 185.30±9.31 and 194.72±7.70 mg% which was on the borderline of at risk of
hypercholesterolemia in nonvegetarians. Vegetarians were found to have significantly (P ≤ 0.01) lower TC level as compared to nonvegetarians. This may be attributed to the exclusion of animal products from their diet. The mean triglycerides (TG) level was 125.23±7.63 and 139.17±10.17mg% in vegetarians and nonvegetarians. It was found that the value of TG was more towards the borderline of standard value (150 mg%) in case of nonvegetarians.

The findings regarding low density lipoprotein cholesterol indicated that the mean LDL-C level in vegetarians and nonvegetarians was 112.92±8.57 and 125.70±9.57mg%. On comparing with standard value of 130mg%, nonvegetarians were found on at risk borderline whereas vegetarians had lower LDL-C concentration. The mean VLDL-C level of vegetarians and nonvegetarians was 27.59±2.83 and 27.84±2.18mg% and difference was found to be insignificant between both the groups. Further, mean HDL-C level in vegetarians and nonvegetarians was 44.79±2.43 and 41.16±5.39mg% which was below the suggested standard value of 50. However, vegetarians had significantly (P ≤ 0.01) higher HDL-C concentration than nonvegetarians.

Total cholesterol: HDL-C ratio in vegetarians and nonvegetarian was 4.14±0.22 and 4.81±0.70 which was below the standard cut off point. The data showed that vegetarians had significantly (P ≤ 0.01) lower total cholesterol: HDL-C ratio (4.14 vs 4.81). Toohey et al (1998) also reported the lower ratio in vegetarians than nonvegetarians (3.75±0.12 vs 4.51±0.01 mmol/l). LDL-C: HDL-C ratio in vegetarians and nonvegetarians was 2.53±0.22 and 3.13±0.6. The ratio was to be higher in nonvegetarians. Similarly, Melby et al (1994) has also reported the lower ratio in vegetarians as compared to nonvegetarians.

The comparison of lipid profile of vegetarians and nonvegetarians showed that vegetarians had significantly lower concentration of total cholesterol, triglycerides and low density lipoprotein cholesterol (LDL-C). Whereas high density (HDL-C) was significantly higher in vegetarians. The lower level of blood lipids in vegetarians as compared to nonvegetarians postmenopausal women has also been reported by Melby et al (1994) and Kiraliyadda et al (2003).
CONCLUSION
From the above results it may be inferred that the prevalence of obesity was higher in nonvegetarians. They were found hypertensive with mean blood pressure of 145/96 mmHg. The lipid profile of nonvegetarians was also on at risk of coronary heart disease. This emphasis the need to impart concerted nutrition education to the menopausal women.

REFERENCES