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RESEARCH ARTICLE

Lipid profile, thyroid profile, and eating behavior in prehypertensive women

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ABSTRACT

Background: Hypertension is a common health problem in developed countries. Individuals with systolic blood pressure (BP) between 120 and 139 mmHg or diastolic BP between 80 and 89 mmHg are categorized as prehypertensive. This group is at high risk for developing essential hypertension and cardiovascular diseases. **Aims and Objectives:** To observe lipid profile, thyroid profile, and eating behavior in prehypertensive women. **Materials and Methods:** Thirty cases of prehypertensive women between the age of 25 and 50 years and 30 age-matched non-prehypertensive women were included in the study after obtaining written informed consent. Thyroid profile, total cholesterol (TC), triglycerides (TG), high-density lipoprotein (HDL), and low-density lipoprotein (LDL) were estimated by standard methods. Eating behavior was assessed using eating attitude test-26 (EAT-26). Data were analyzed using SPSS 20.0. Student's *t*-test was applied to observe the significance of difference. $P < 0.05$ was considered significant. **Results:** Significantly lower levels ($P < 0.001$) of HDL, significantly higher ($P < 0.001$) LDL, very LDL, TG, and TC were observed in prehypertensive women when compared with healthy controls. Thyroid profile and were not significantly different between control and prehypertensive women. **Conclusion:** High lipid profile was observed in prehypertensive women when compared with healthy controls. We recommend further detailed studies in this area to understand the underlying mechanisms.

KEY WORDS: Prehypertension; Lipid Profile; Thyroid Profile; Women

INTRODUCTION

Throughout the world, the prevalence of non-communicable has increased. In India, hypertension is a major public health problem.[1] 7th report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure (BP) defined that systolic BP (SBP) 130–139 mmHg or diastolic BP (DBP) 80–89 mmHg fall into the category of prehypertensive based on the evidence of a modest increase in cardiovascular risk among individuals with such level.[2] It was reported that in low- and middle-income countries, major risk factors for cardiovascular disease are hypertension and dyslipidemia.[3] The prevalence of heart diseases is rapidly increasing in developing countries.[4] Hypertension increases the risk of developing atherosclerosis. Increase in the total cholesterol (TC), triglycerides (TG), very low-density lipoprotein (VLDL), and decreased high-density lipoprotein (HDL) levels were reported in both prehypertensive women and hypertensive women.[5] Studies have shown strong association between the thyroid secretion and BP. Decrease

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in the thyroid hormone secretion was reported to increase the BP in relation with age. Hypothyroidism decreases the dopaminergic activity, which in turn increases the activity of sympathetic nervous system and increases the BP.[6] Binge eating disorder was reported in patients with hypertension.[7] The current study was undertaken to observe lipid profile, thyroid profile, and eating behavior in prehypertensive women.

MATERIALS AND METHODS

The present study was conducted at Little Flower Hospital and Research Centre, Angamaly, in collaboration with Saveetha Medical College, Saveetha University, Chennai. 30 cases of prehypertensive women between the age of 25 and 50 years and 30 age-matched non-prehypertensive women were included in the study after obtaining written informed consent. The following criteria were followed while selecting the cases.

Inclusion Criteria

Individuals with a SBP of 120–139 mmHg or a DBP of 80–89 mmHg, not suffering from any other disease, under no medication, and not practicing any stress management techniques were included in the study.

Exclusion Criteria

Pregnancy or postpartum <3 months and body mass index >40 kg/m² were excluded from the study. All the participants were advised to continue their routine habits and diet throughout the study.

The effective variable on BP was controlled as much as possible. However, individual differences, incidents, and daily stress, and also the way individuals adapted themselves with life affairs were uncontrollable variables of the study.

Outcome Measures

TC was estimated by cholesterol oxidase - phenol + aminophenazone method, TG was estimated by glycerol-3-phosphate oxidase - phenol + aminophenazone method, HDL and low-density lipoprotein (LDL) were estimated by precipitation method. T4 and thyroid-stimulating hormone (TSH) were estimated by ABBOT (CMIA) method.

Data Analysis

Data were analyzed using SPSS 16.0 version. Student's *t*-test was used to observe the significance of difference between the control and prehypertensive groups. $P < 0.05$ was considered as significant.

RESULTS

Results were presented in Table 1. Significantly lower levels ($P < 0.001$) of HDL, significantly higher ($P < 0.001$) LDL, VLDL, TG, and TC were observed in prehypertensive women when compared with healthy controls. Thyroid profile and eating attitude test-26 (EAT-26) were not significantly different between control and prehypertensive women.

DISCUSSION

Altered lipid metabolism is more common in hypertensive patients when compared to normotensives. Positive correlation was reported between BP and lipid levels.[8] It was reported that TC, TG, and virtually all fractions of lipoproteins are abnormal in hypertensive patients than in the general population.[9-12] Studies have consistently reported higher levels of serum TC, TG, and LDL concentrations in hypertensive patients than normotensives.[13-15] In the present study, we compared the thyroid profile, lipid profile, and eating behavior in prehypertensive and normal healthy women to learn the effect of these parameters on prehypertensive women. There was a significant correlation between the higher levels of cholesterol, triacylglycerol, VLDL, and LDL with high levels of BP wherein low levels of HDL were noted. Further, thyroid profile when compared showed no statistically significant, but we noticed 4 (13.3%) women out of 30 prehypertensive women showed high TSH levels with low T4 presenting a hypothyroid status. When the same group was compared to eating behavior 7 (23.3%) out of 30 prehypertensive women showed overeating patterns but was not statistically significant. This gives a clear explanation that prehypertension is prone to cardiovascular disorders as it is associated with the risk factors. The normal subjects showed no significant correlation with these parameters. From the above-mentioned data, it is learnt that there are

Table 1: Lipid profile, thyroid profile, and eating behavior in prehypertensive and control groups

Parameter	Control	Prehypertensive	*P*
HDL	49.17±4.24	43.03±7.59	0.0003***
LDL	96.20±15.03	135.40±15.94	0.0001***
VLDL	20.57±7.88	28.10±5.05	0.0001***
TG	89.10±20.28	135.23±32.40	0.0001***
Total cholesterol	166.10±19.08	190.20±15.24	0.0001***
T3	95.86±11.20	102.42±25.99	0.2089
T4	6.66±1.02	6.64±1.18	0.9473
TSH	1.03±0.41	0.85±0.36	0.0719
EAT-26	10.53±2.22	11.73±3.26	0.1011

HDL: High-density lipoprotein, LDL: Low-density lipoprotein, VLDL: Very low-density lipoprotein, TG: Triglycerides, TSH: Thyroid-stimulating hormone, ***$P < 0.001$

several stimulating factors, leading to hypertension some of those would be eating disorders, hypothyroidism, obesity, and abnormal lipid profile. The studies conducted in America listed the risk factors such as diabetes mellitus, obesity, and hypercholesterolemia associated with prehypertension. The study suggests prehypertensive subjects to be screened for the cardiovascular risk factors.[16] Regular physical activity, controlled diet, reduced stress would further reduce the incidents and prevalence of prehypertension in the individuals.

Limitations

Limitations of the present include the subjects represented by this study were women from Angamaly, Kerala, India, thus, the results cannot be generalized to other cities, cultures.

CONCLUSION

We have observed significantly lower levels of HDL and higher levels of LDL, VLDL, TG, and TC in prehypertensive women when compared with healthy controls. Thyroid profile and EAT-26 were not significantly different between control and prehypertensive women. We recommend further detailed studies and multicenter studies for better understanding of the links, which helps to plan and develop effective treatment procedures for the benefit of population in general.

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