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Research Article

RISK OF ATHEROSCLEROSIS IN PATIENTS WITH HYPERTENSION

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Abstract:

Objectives: The aim of this research work was to assess the danger of atherosclerosis in the patients suffering from hypertension in the Allied Hospital Faisalabad, with the utilization of the ratio of cholesterol or HDL.

Methodology: We performed the gender-adjusted evaluation of the level of total cholesterol, lipoprotein's increased density & ratio of cholesterol/HDL on eighty-two patients of hypertension in which 45 were males and 37 were females and fifty-five were normotensive healthy control in which twenty-nine were males and twenty-six were females. The age of the participants was from 30 to 70 years. Methods of routinely employed enzymatic & phosphor-tungstate phosphor-molybdate were in use for the analysis of the total cholesterol & lipoprotein's high density correspondingly.

Results: The average total cholesterol as 4.90 ± 1.08 mmol/L & average total cholesterol/HDL ratio as 5.160 ± 1.89 were very high in the males with hypertension in comparison with the healthy controls (4.4 ± 0.99 mmol/L & 3.77 ± 1.25 correspondingly), whereas average concentration of HDL was much lower as 1.030 ± 0.33 in males with hypertension in comparison with their healthy controls (1.260 ± 0.39 mmol/L). Among females, the level of total cholesterol as 4.980 ± 1.02 mmHg, HDL ratio as 1.120 ± 0.39 mmHg & total cholesterol/HDL as 4.940 ± 1.82 were present with no much difference from 4.860 ± 1.05 mmHg, 1.290 ± 0.44 mmHg & 4.090 ± 1.32 correspondingly gathered from healthy controls. We do not observe any gender-adjusted disparity between case and control group.

Conclusion: The findings of this research work highlight the significance of routine evaluation of the levels of lipids in the patients suffering from hypertension particularly in male patients to discover the high risk of atherosclerosis & sequel of this complication.

KEY WORDS: Hypertension, Atherosclerosis, Complication, Cholesterol, Disparity, Correspondingly, Normotensive, Enzymatic & Phosphor.

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INTRODUCTION:

Inurement of tunica intima is the atherosclerosis & media of vessels motivated by the deposition [1-3] of plaques including the cholesterol & esters of cholesterol, materials of lipid and lipophages. It is major reason behind CVDs in the countries which are underdevelopment [4-6] but its occurrence is very low in our country Pakistan [7]. Whereas there are no confirm reasons of this disease of atherosclerosis, hypotheses as reaction to injury [3] and reaction to retaining hypothesis [8] self-sufficiently helps pathogenesis of this complication and ensures that atherosclerosis is the final outcome of the inflammatory incidents [2]. Hypercholesterolemia emerging from the improper cholesterol's mobilization is responsible for the initial stages of the atherosclerosis, which is a factor of risk for cardiovascular disease and it interrupts the regulation of the blood flow in the vessels [9].

Glass & Witzum [10] agreed that hypercholesterolemia is important enough to arouse the development of the abrasion even there is no availability of the other factors. The control of the accumulation of the cholesterol level in blood can control the occurrence of atherosclerosis & its sequels [11]. There is recommendation of the additives as garlic for the prevention of the atherosclerosis [12-13]. There is rise in the prevalence of the hypertension in our country Pakistan and global burden of this disease will reach to 29.0% in the year of 2025 [15]. This is also the matter of great concern that there is increase in the occurrence of the various heart diseases with the rise in the BP [4, 6, 16, 17]. One of the important reason of morbidity as well mortality in our continent is hypertension [18-20].

METHODOLOGY:

A sum of total one hundred and thirty-seven participants having age from thirty to seventy year of age were the part of this research work. There were eighty-two patients of hypertension and fifty-five normotensives in this research study. This research work was carried out in the Allied Hospital Faisalabad. The participants were hypertensive if the BP was 140/90 mmHg or above. The ethical

committee of the hospital gave the approval to conduct this research work. We took the written consent from all the participants of this research work. We also gave the brief introduction of the research study and its outcomes to the participants. All the hypertensive persons were available with the interference of the concentration of the serum lipid [21]. We collected all the information of the participants on a well-organized Performa separate for each patient.

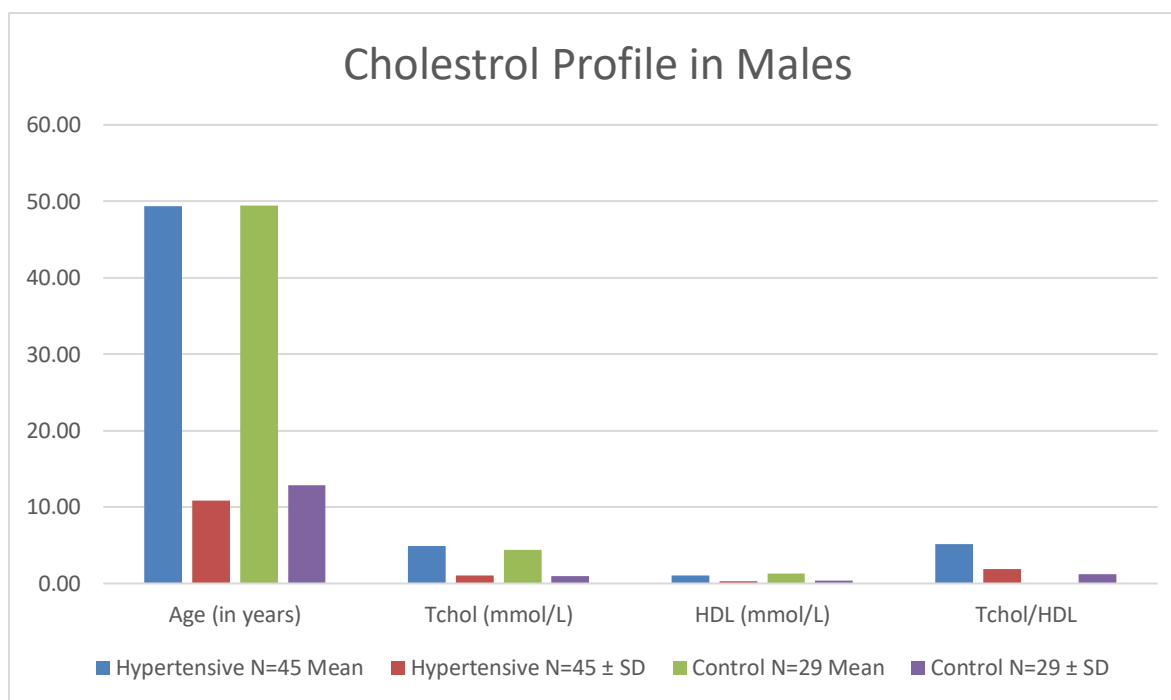
We collected the samples of blood in early morning from every participant. We took the sample from antecubital vein with the utilization of 2ml syringe from the patients when they were sitting in fully comfortable situation. We allowed the samples to clot and we collected the serum fraction after the centrifugation and then stored them in high frozen state in a special plastic tube. Prior to the real time of the examination, we allowed the samples to liquefy by keeping those samples at normal temperature. We analyzed the samples of serum for level of total cholesterol & HDL with the utilization of the enzymatic & phosphor-tungstate phosphor-molybdate precipitation procedures. Quantitation of level of total cholesterol & HDL carried out after complete development of the color with the utilization of the spectrophotometer at an absorbance of five hundred nm. Bio-stat statistical software of 2008 was in use for the comparison of various variables and the expression of the variables carried out into average and standard deviations with confidence interval of ninety-five percent.

RESULTS:

A sum of total one hundred and thirty-seven persons having age from 30 to 70 years in the Allied Hospital Faisalabad recruited for this research study. Eighty-two were the hypertensive persons and fifty-five were normotensives. There were forty-five males and thirty-seven females in the first group and there were twenty-nine males and twenty-six females in the second group. The average \pm standard deviation comparison of the levels of total cholesterol, ratio of total cholesterol/HDL and HDL for the male patients of both groups is available in Table-1.

Table-I: Cholesterol Analysis in HTN and Control Groups Among Males

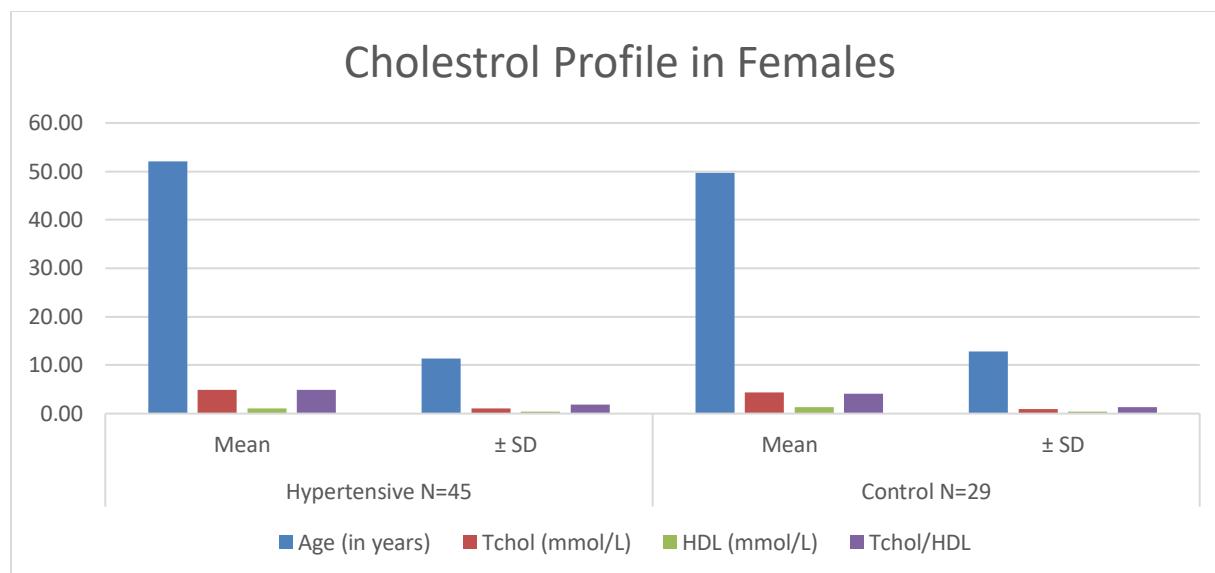
Parameters	Hypertensive N=45		Control N=29		P Value
	Mean	± SD	Mean	± SD	
Age (in years)	49.40	10.85	49.44	12.86	p>0.050
Tchol (mmol/L)	4.90	1.08	4.40	0.99	p>0.050
HDL (mmol/L)	1.03	0.33	1.26	0.39	p>0.050
Tchol/HDL	5.16	1.89	3.77	1.25	p>0.050



The findings displayed level of HDL as much lower {1.030 ± 0.33 mmol/L & 1.260 ± 0.390 mmol/ L}, whereas total cholesterol & ratio of total cholesterol/HDL were very high in the males with hypertension {4.9 ± 1.08 mmol/L & 5.16 ± 1.89 correspondingly}. Table-2 displays the comparison of average ± standard deviation in the females of both groups. There were not many disparities in the values of both groups.

Table-II: Cholesterol Analysis in HTN and Control Groups Among Females

Parameters	Hypertensive N=45		Control N=29		P Value
	Mean	± SD	Mean	± SD	
Age (in years)	52.00	11.36	49.65	12.86	p>0.050
Tchol (mmol/L)	4.90	1.08	4.40	0.99	p>0.050
HDL (mmol/L)	1.12	0.39	1.29	0.44	p>0.050
Tchol/HDL	4.94	1.82	4.09	1.32	p>0.050



Tables-3 & Table-4 display unique outcomes; a gender-adjusted comparison of average level of total cholesterol, level of HDL & ratio of total cholesterol/HDL in either patient with hypertension & healthy controls displayed that there is not much disparity attributable to gender in any category.

Table-III: Sex-adjusted Comparison of the Cholesterol in Hypertensive Subjects.

Parameters	Male N=45		Female N=37		P Value
	Mean	± SD	Mean	± SD	
Age (in years)	49.4	10.85	52	12.86	p>0.050
Tchol (mmol/L)	4.9	1.08	4.98	0.99	p>0.050
HDL (mmol/L)	1.03	0.33	1.12	0.44	p>0.050
Tchol/HDL	5.16	1.89	4.94	1.32	p>0.050

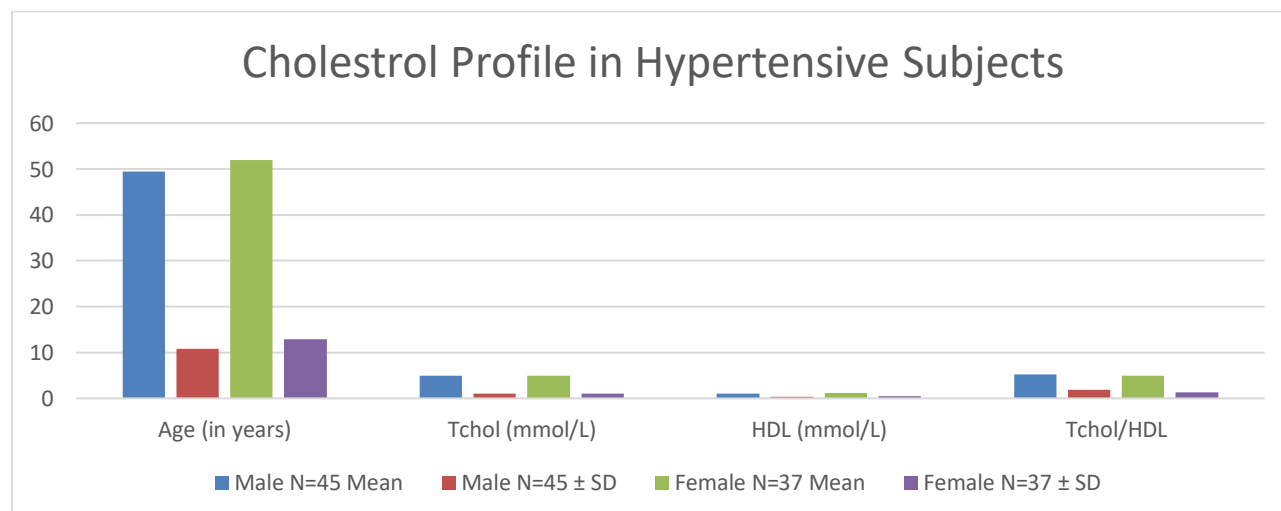
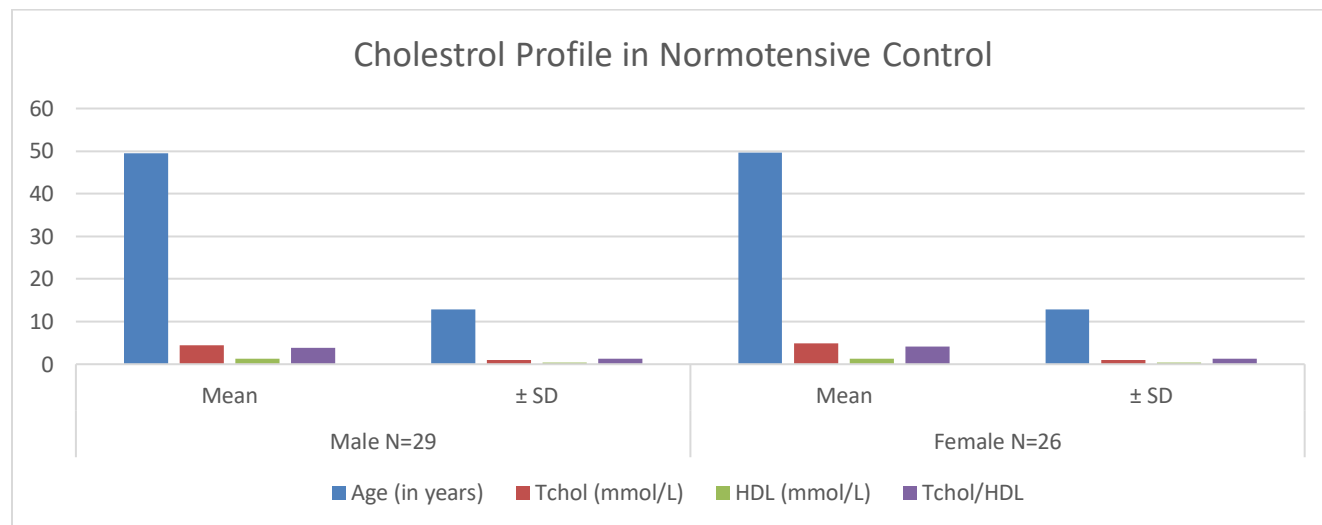


Table-IV: Sex-adjusted Comparison of the Cholesterol in Normotensive Control Subjects.

Parameters	Male N=29		Female N=26		P Value
	Mean	± SD	Mean	± SD	
Age (in years)	49.44	12.86	49.65	12.86	p>0.050
Tchol (mmol/L)	4.4	0.99	4.86	1.05	p>0.050
HDL (mmol/L)	1.26	0.39	1.29	0.44	p>0.050
Tchol/HDL	3.77	1.25	4.09	1.32	p>0.050



DISCUSSION:

Lipid's involvement, particularly cholesterol [1-3, 8] in the vascular complication of atherosclerosis is the key point of many research studies and it also leads to various heart diseases [4-6]. But the data on this particular subject is much deficient in our country Pakistan. This research work conducted to assess the level of total cholesterol, HDL & ratio of total cholesterol/HDL which are best tools of assessment to determine the danger of atherosclerosis in the patients suffering from hypertension. We observed that there is strong association of the hypertension with the high levels of total cholesterol, ratio of total cholesterol/HDL & much low level of HDL in the male patients. This is the matter of great concern because various research works have incriminated that high level of cholesterol in serum is the reason of the complication of atherosclerosis, though there is very high reduction in the occurrence of this complication with the utilization of the healthy diet and moderate modifications in the style of life [12, 22-24]. HDL is very vital parameter for the control of the danger of atherosclerosis [25, 26].

The level of HDL is always low in the patients of hypertension according to a research study [27]. Lee

[16] observed that low level of HDL may display a lower but yet high danger of CHD. Wilson [4] concluded that the frequency of various diseases of heart has very strong association with the particular categories of level of total cholesterol, HDL, LDL & BP whereas Tannasescu [28] concluded the strong association of the increased cholesterol of serum with the high risk of cardiovascular diseases in the patients suffering from Type-2 diabetes. There is an influence of the serum cholesterol may on the regulation of BP by adrenergic stimulation [9]. The comparison of the levels of HDL & total cholesterol in the females suffering from hypertension & their healthy controls displayed no linked alterations in various parameters.

CONCLUSION:

The results of much high levels of total cholesterol, Total cholesterol/HDL & low HDL in the patients with hypertension show the high danger of atherosclerosis & other vascular abnormalities. The reason behind this fact is that there is direct association of the total cholesterol with high accumulation risk, HDL restricts this steady deposition and the ratio of these two values shows the overall influx & efflux of cholesterol from the vulnerable vessels. There should be an emphasis in

routinely evaluating the profile of the serum lipid in all persons suffering from hypertension to reduce the occurrence of vascular abnormalities.

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