https://doi.org/10.29309/TPMJ/2023.30.06.7577

The Professional Medical Journal
www.theprofesional.com
2023, Volume, 30 Issue, 06

ORIGINAL ARTICLE

Frequency of dyslipidemia in patients with newly diagnosed essential hypertension in tertiary care center.

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Article Citation: Khan SA, Khan NJ, Rasheeq T, Ramzan F. Frequency of dyslipidemia in patients with newly diagnosed essential hypertension in tertiary care center. Professional Med J 2023; 30(06):814-819. https://doi.org/10.29309/TPMJ/2023.30.06.7577

ABSTRACT… Objective: To determine the frequency of dyslipidemia in adults with newly diagnosed essential hypertension. **Study Design:** Cross-sectional study. **Setting:** Medical Unit IV, Nishtar Hospital Multan. **Period:** 25th June, 2022 to 25th Dec, 2022. **Material & Methods:** Fasting blood samples were taken from an antecubital vein and collected in Vacutainer tubes that had an anticoagulant EDTA from an antecubital vein. An auto analyzer was used to perform an enzymatic analysis on fasting plasma total cholesterol (TC), low density lipoprotein (LDL), high density lipoprotein (HDL), and triglycerides (TG). **Results:** Among 332 study cases, 221 (66.6 %) were male patients while 111 (33.4 %) were female patients. Mean age of study cases was 50.01 ± 6.75 years. In our analysis, diabetes was found in 99 patients (29.8%). In 147 (44.3%) of the study cases, there was a family history of hypertension. Mean body mass index of our study cases was 27.56 ± 1.92 kg/m^2 and 136 (41.0 %) of our study cases were obese. Mean systolic blood pressure was 157.85±15.19 mmHg while that of diastolic blood pressure was 109.35 ± 8.56 mmHg. Mean fasting cholesterol level was 192.86±35.96 mg/dl, HDL 42.58±4.38 mg/dl, LDL 125.43± 10.39 mg/dl and mean triglyceride level was 135.86 ± 13.69 mg/dl and in 181 patients (54.5%) were having dyslipidemias. **Conclusion:** Among patients with essential hypertension in our investigation, dyslipidemia was observed to be very common. Smoking, diabetes, residential status, and male gender were all strongly linked to dyslipidemia. To prevent future unfavorable cardiac events, which will safeguard patients from acquiring cardiovascular diseases and enhance their quality of life, all clinicians caring for such patients should routinely check their lipid profiles.

Key words: Blood Pressure, Dyslipidemia, Essential Hypertension.

INTRODUCTION

Worldwide prevalence of hypertension exceeds beyond one billion and more than 45% of the adult population is suffering from this disease.[1] Essential hypertension or primary hypertension which has no clearly identifiable cause[2] constitutes 95% cases of hypertension in adults.[3] In Pakistan around 29.7% of the adult population suffers from hypertension with almost an equal male to female ratio.[4] Persistent hypertension can lead to multiple problems like myocardial infarction (MI), cardiac failure, kidney damage, eye damage and stroke.[5] Dyslipidemia is a state of abnormal levels of lipids with derangements in the cholesterol, low density lipoprotein (LDL), high density lipoprotein (HDL), very low density lipoprotein (VLDL) and triglycerides (TG) levels in the plasma, thus contributing significantly towards the cardiovascular diseases and is causing 2.6 million deaths and 29.7 million disability-adjusted life years globally.[6] The estimated prevalence rates of high TG, low HDL, high LDL and high Total Cholesterol among military personnel are 24, 28, 32 and 34%, respectively.[7] Various epidemiological studies including local studies show the co-existence of hypertension and dyslipidemia, in the range of 27-32%.[8] Zamili A[9] mentioned in his article that "lipitension" i.e coexisting dyslipidemia and hypertension in US population is estimated to be 31% prevalent. In a study conducted by Mashooq Ali Dasti et al the frequency of dyslipidemia was found to be 68.5 % of patients with essential hypertension.[10]

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Article received on: 08/03/2023
Accepted for publication: 19/05/2023

As we know that cardiovascular diseases are the most common cause of morbidity and mortality worldwide. New management strategies now focus on disease prevention and health promotion. However in third world countries like Pakistan, a little has been done on these strategic management options. It's the need of the hour that risk factor for sizeable non communicable diseases should be addressed. As dyslipidemia is one of the most modifiable risk factor for cardiovascular disease, its actual prevalence and magnitude and association with other modifiable risk factors should be looked for. In patients with essential hypertension, a diagnosis of diabetes mellitus is frequently established, however dyslipidemia is very infrequently investigated. This study will provide data regarding lipid profile in high risk group of our population. This will also assist in developing guidelines for early dyslipidemia detection, leading to target-oriented treatment that can improve blood pressure control, prevent the patient from developing potentially fatal consequences linked to hypertension and dyslipidemia, and enhance quality of life.

OBJECTIVE

To determine the frequency of dyslipidemia in newly diagnosed adults with essential hypertension.

MATERIAL & METHODS

This cross sectional study was carried out in Department of Medicine, Nishtar Hospital Multan from 25th June, 2022 to 24th December, 2022 after taking permission from Institutional Ethical Committee. (Ref No. 166 dated 17th January 2022).Written informed consent was taken from all patients. Sampling technique used was non-probability consecutive sampling and sample size was calculated by WHO sample size calculator, using formula for single proportion i.e. $N = [Z^2_{1-\alpha/2} P (1-P)] \div d^2$, Where $P = 0.685$, is the frequency of dyslipidemia in patients with essential hypertension[10], confidence interval is 95 % and absolute precision is 5%. Sample size was found to be 332 cases.

Essential hypertension was labelled when mean systolic arterial pressure (SAP) ≥ 140mmHg and mean diastolic arterial pressure (DAP) ≥ 90mmHg in the absence of identifiable cause. Dyslipidemia was labeled in the presence of fasting cholesterol ≥ 200 mg/dl, High density lipoprotein < 40 mg/dl, Low density lipoprotein ≥ 130 mg / dl, and Triglyceride ≥ 150 mg/dl. Presence of at least one of these was sufficient to diagnose dyslipidemia.

All patients of either gender having newly diagnosed essential hypertension falling between the age ranges of 20-75 years were included in the study. Participants having pregnancy, malignant tumors, and mental disorders or already taking lipid lowering medications and patients with hypertensive emergency (diastolic BP more than 120mmHg with target organ damage) were excluded from the study. Data was collected for sociodemographic characteristics including gender, age and familial history of hypertension, diabetes mellitus and smoking status by using a standard questionnaire. Blood pressure measurement was done with the help of a standardized mercury sphygmomanometer.

Three consecutive readings were recorded in sitting position after five minutes of rest and a mean value of the three readings was obtained. Fasting blood samples were collected for total cholesterol (TC), LDL, HDL and TG. All the information was collected in a pre-designed proforma. Data was analyzed by using Statistical Package for Social Science (SPSS) version 24. Quantitative data like age, body mass index, systolic blood pressure, diastolic blood pressure, waist circumference and fasting serum lipid levels was described using mean and standard deviation. Qualitative data like gender, smoking status, family history, diabetes mellitus and dyslipidemia were described as frequency and percentages. Stratification of dyslipidemia in hypertensive case with respect to age groups, family history, diabetes mellitus, BMI categories, and smoking status was done by using chi-square test. A p-value of ≤ 0.05 was taken as statistically significant.

RESULTS

Our study comprised of a total of 332 patients. Of these 332 study cases, 221 (66.6 %) were male, while 111 (33.4 %) were female. Mean age of study

cases was 50.01 ± 6.75 years (with minimum age of study cases was 38 years while maximum age was 60 years). Our study results have strongly suggested that majority of study cases i.e. 173 (52.1 %) were aged more than 50 years. Of these 332 study cases, 148 (44.6 %) were from rural areas and 184 (55.4 %) were from urban areas. Poor socioeconomic status was noted in 143 (43.1%) while 189 (56.9%) belonged to average income families. Diabetes was found in 99 (29.8 %) of study cases. Family History of hypertension existed in 147 (44.3 %) of study cases. Mean systolic blood pressure of our cases was 157.85±15.19 mmHg while mean diastolic blood pressure was 109.35 ± 8.56 mmHg. Mean fasting cholesterol level was found to be 192.86±35.96 mg/dl, HDL 42.58±4.38 mg/dl, LDL 125.43± 10.39 mg/dl and mean triglyceride level was found to be 135.86 ± 13.69 mg/dl and dyslipidemia was present in 181(54.5%) patients. Dyslipidemia was stratified with regards to gender, age, and residential status, and diabetes, family history of hypertension, obesity and smoking. Dyslipidemia among newly diagnosed hypertensive patients was found to be statistically significant among males, rural residents' subgroup, diabetics and smokers.

Variables		Frequency (%)
Gender	Male	221 (66.6%)
	Females	111 (33.4%)
Residence	Rural	148 (44.6%)
	Urban	184 (55.4%)
Dyslipidemia	Yes	136 (45.3%)
Age Groups	≤50 years	159 (47.9%)
	>50 years	173 (52.1%)
Diabetes	Yes	99 (29.8%)
	No	233 (70.2%)
Family H/O HTN	Yes	147 (44.3%)
	No	185 (55.7%)
Smoking	Yes	86 (25.9%)
	No	246 (74.1%)
Socioeconomic Status	Poor	143 (43.1%)
	Average	189 (56.9%)
Obesity	Yes	136 (41.0%)
	No	196 (59.0%)

Table-I. Demographic properties of study population (n=332)

Dyslipidemia	Frequency (%)
Yes	181 (54.5%)
No	151 (45.5%)
Total	332 (100%)

Table-II. Distribution of dyslipidemia among cases (n = 332)

Variables		Total		
	Groups	Yes	No	P-Value
Gender	Male (N=221)	139	82	0.000
	Female (N=111)	42	69	
Age Group	≤50 years (N=159)	87	72	0.996
	>50 years (N=143)	94	79	
Residence	Rural (N=148)	101	47	0.000
	Urban (N=184)	80	104	
Diabetes	Diabetics (N=99)	33	66	0.001
	Non-Diabetics (N=233)	148	85	
Family H/O Hypertension	Hypertensive (N=147)	74	73	0.184
	Non-HTN (N=185)	107	78	
Obesity	Obese (N=136)	78	58	0.433
	Non-Obese (N=196)	103	93	
Smoking	Smokers (N=86)	62	24	0.000
	Non-Smokers (N=246)	119	127	
	Non-Smokers (N=246)	119	127	

Table-III. Stratification of various factors with dyslipidemia in patient with newly diagnosed essential hypertension

DISCUSSION

The two main cardiovascular disease risk factors are hypertension and dyslipidemia.[11] It is routinely noted that hypertension and dyslipidemia coexist in clinical practice.[12] Population-based epidemiological studies have found a connection between increasing blood lipid levels and a steady increase in blood pressure (BP). It has been postulated that hypertension and dyslipidemia have a common pathophysiological linkage in obesity, which is dysregulated adipocytokine release from adipose tissue.[13] Moreover, abnormalities in lipid profile are associated with structural and functional changes in vessel walls and hence result in accelerated atherosclerosis. People who have dyslipidemia may find it more difficult to manage their blood pressure as a consequence of these anatomic and pathophysiological changes in vessels, which make them prone to develop hypertension.

Three hundred and thirty two patients who met our study's inclusion criteria was our study population. Of these 332 study cases, 221 (66.6 %) belonged to male gender while 111 (33.4 %) were females. According to Soomro et al.[14] 91 and Dasti et al.[15] male gender distribution in study cases was 60%, which is parallel to findings of our study. Qiu L[16] from China has also reported that male patients were more than female patients in study population.

Mean age of patients in our setting was 50.01 ± 6.75 years. Results in our research showed that major proportion of our study sample i.e. 173 (52.1 %) had age ≥50 years. Zamili A[9] study also reported 51.27 ±10.40 years mean age of patients suffering from essential hypertension and dyslipidemia that is consistent to our finding. In contrast, Tang N et al.[17] in China noted 66.5±10.5 years mean age which is higher than we found in our settings. This difference may be due to late age onset of hypertension in Chinese population due to their lifestyle and diet differences.

Mean systolic blood pressure of our study cases was 157.85±15.19 mmHg while that of diastolic blood pressure was 109.35 ± 8.56 mmHg. In a Nigerian study[18], mean systolic BP and mean diastolic BP were found to be 151.55+ 12.96mmHg and 92.18+ 12.36mmHg which are similar to our results. Otsuka T et al.[19] noticed that mean systolic BP was 118±11mmHg and mean diastolic BP was 70±9 mmHg in their study cases. Sánchez-Íñigo et al.[20] noticed BP readings in Spain similar to those seen by Otsuka T in Japan. These levels are quite higher than our results. Probable reason for this discrepancy seems to be the late diagnosis of hypertension in our setting when compared to Japanese and Spanish settings. Both Japanese and Spanish studies also noticed that BP level rises with increase in total cholesterol (TC), LDL-cholesterol and triglycerides. However, our study didn't address this aspect of study.

In our study we noticed that dyslipidemia was present in 181(54.5%) patients. Gul MM et al.[21] has also discovered that frequency of dyslipidemia is 55% in our local population. He D et al.[22] 64.54% discovered that dyslipidemia was present in 64.54% cases. Al-Mahmood AA et al.[23] carried out a study in India and observed that dyslipidemia was present in 65.5% of hypertensive patients. These results are consistent with our findings and indicate a high proportion of hypertensive population is suffering from dyslipidemia.

In our settings, we noticed that fasting cholesterol level on average was 192.86±35.96 mg/dl, average HDL was 42.58±4.38 mg/dl, while LDL mean was 125.43± 10.39 mg/dl and triglyceride level mean was 135.86 ± 13.69 mg/dl and dyslipidemia was present in 181 (54.5%). In Spain, Sánchez-Íñigo et al.[20] noticed that total cholesterol among study cases was 243.0±44.3 mg/dl and LDL- cholesterol was 160.3±41.0 mg/dl. These levels were slightly higher than our study cases. This difference may be because of difference in ethnicity and dietary habits. Fujita M et al.[24] noticed that mean LDL-C was 112mg/dl that is close to our results. A peculiar feature of our study is that we have identified high risk groups who have higher chances of coexisting dyslipidemia and hypertension (Lipitension). All those hypertensive patients of male gender, having history of diabetes and smokers tend to have high probability of dyslipidemia.

CONCLUSION

Patients with essential hypertension in our study had a very high frequency of dyslipidemia. Smoking, diabetes, residential status, and male gender were all strongly linked to dyslipidemia. All clinicians treating such high risk patients should monitor their lipid profile on regular basis to avoid future adverse cardiac events which will protect them from developing cardiovascular diseases and improve their quality of life. By identifying dyslipidemia in hypertensive patients at an early stage will help controlling two modifiable risk factors for cardiovascular diseases and in return will reduce overall cardiovascular disease burden.

LIMITATION OF STUDY

We did not study frequencies of various patterns of dyslipidemia with respect to hypertension so it is not possible to comment which pattern of dyslipidemia is more frequent in hypertension. Moreover, association of dyslipidemia with duration of hypertension cannot be assessed as we took newly diagnosed hypertensive patients in our study. Further studies are required to establish these relations.

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3	Talha Rasheeq	Data analysis, Proof reading.	
4	Faisal Ramzan	Data collection, Manuscript writing.	