International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 2, February 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.2.2025.175

ORIGINAL RESEARCH

To assess the diagnostic profile of all lipid panel marker in the patients admitted in tertiary care rural hospital

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Received: 25Dec, 2024 Accepted: 26Jan, 2025

ABSTRACT

Background: Derangements of lipoprotein metabolism are a risk factor for several conditions apart from the most commonly associated cardio-metabolic disorders [1,2]. It has been demonstrated that high levels lipid panel markers of serum namely total cholesterol (TC), triglycerides (TG), LDL cholesterol, very-low-density lipoprotein (VLDL), low concentration of HDL cholesterol, along with increased body mass index (BMI) are significantly implicated in CHD [3].**Aims:** To assess the diagnostic profile of all lipid panel marker in the patients admitted in tertiary care rural hospital. **Materials and Methods:** Hospital based secondary data analysis from clinical records of IPD patients for whom lipid panel investigation was carried out during the period 2017 to 2018. A sample size of 300 was considered using prevalence of hypertension in the catchment area. The dataset of 300 patients was retrieved from HIS. The Analysis was done using Epi Info software.**Results:** Out of 300 population studied there were 250 patients having positive history out of them only any single parameter alteration was found in total 148 patients; two parameter alteration in 83 patients, three parameter alteration in 10 patient, and four parameter alteration in 6 patients.**Conclusion:** Because very few cases were found to have derangement of multiple parameters of the lipid panel, hence it seems that screening with most frequently affected marker like HDL-c and TG only for screening may be considered in this population.

Key words: Lipid panel, diagnostic profile, tertiary care hospital, HDL-c and triglycerides, cardiometabolic disorders

INTRODUCTION

Derangements of lipoprotein metabolism are a risk factor for several conditions apart from the most commonly associated cardio-metabolic disorders [1,2].It has been demonstrated that high levels lipid panel markers of serum namely total cholesterol (TC), triglycerides (TG), LDL cholesterol, very-low-density lipoprotein (VLDL), low concentration of HDL cholesterol, along with increased body mass index (BMI) are significantly implicated in CHD [3].

European Society of Cardiology has stressed upon various factors for individual risk scoring which included various demographic parameters including age, sex, obesity, addiction, relevant history of hypertension and other metabolic conditions particularly including the lipid derangement [4].There are various inconsistencies in defining Dyslipidaemia; however globally accepted guidelines as per NCEP ATPIII recommendations mentioned the cut-off value for each of the lipid panel markers: TC below 200 mg/dl, LDL cholesterol below 100 mg/dl, HDL cholesterol above 40 mg/dl and for TG the desired value is set at 150 mg/dl or below for the general populace [5].

Persons with increased blood cholesterol levels have been shown to have higher prevalence of hypertension, and also higher prevalence of hypercholesterolemia has been recorded in many hypertensive subjects indicating an important clinico-epidemiological link between these factors. Moreover, patients with both of these two conditions found to have three times higher prevalence of MI [6]. Previous

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study has reported the role of hypertension as a risk factor in metabolic syndrome in Indian context has been shown [7]. Smoking and alcoholism are two significant independent risk factors of CVD and quite remarkably both of these addictions are also shown to have effect on lipid panel parameters [8, 9].

MATERIALS AND METHODS

STUDY DESIGN: As per the objective of the study, a study was designed in the format of Hospital based secondary data analysis from clinical records of IPD patients for whom lipid panel investigation was carried out. Taking the advantage of the Lab information system (LIS) database which is an integral part of Hospital information system (HIS) all the relevant data was retrieved from HIS for whom lipid panel investigation was performed.

SAMPLE SIZE: Considering the prevalence of metabolic disorders in the catchment area of the hospital a sample size of 300 cases was considered to be included in the study with the investigation report of all the markers of lipid panel along with other relevant epidemiological and clinical history planned to be used in this study.

METHOD: After taking due permission from the hospital authority and following ethical norms of maintenance of the confidentiality of the data without any disclosure of personal identity of any subjects involved in the study, the dataset of 300 patients was retrieved from HIS and maintained in thedepartmental computer database for further analysis.

STATISTICAL ANALYSIS: Data was stored in Microsoft Excel sheet and analysed usingEpi info software. Frequency and percentage have been presented for categorical variables and Chi- square test was used to check the association

RESULTS

A cohort of 300 patients was selected for whom lipid profile investigation was carried out based on the available data from hospital information system of a tertiary care rural hospital set-up in central India.
For understanding the clinico-epidemiological correlates of altered lipid markers a descriptive statistical method was adapted.

1. DISTRIBUTION OF PATIENTS WHO HAD ONLY ALTERED SINGLE PARAMETER OF THELIPID PANEL

Out of 300 population studied there were 250 patients having positive history out of them only any single parameter alteration was found in total 148 patients; the distribution of these patients according to different individual parameters showed that 1 patient have raised cholesterol, 129 patients have lowered HDL, 17 patients have raised TG, and 1 patient have raised LDL. The figure below is displayed the same.

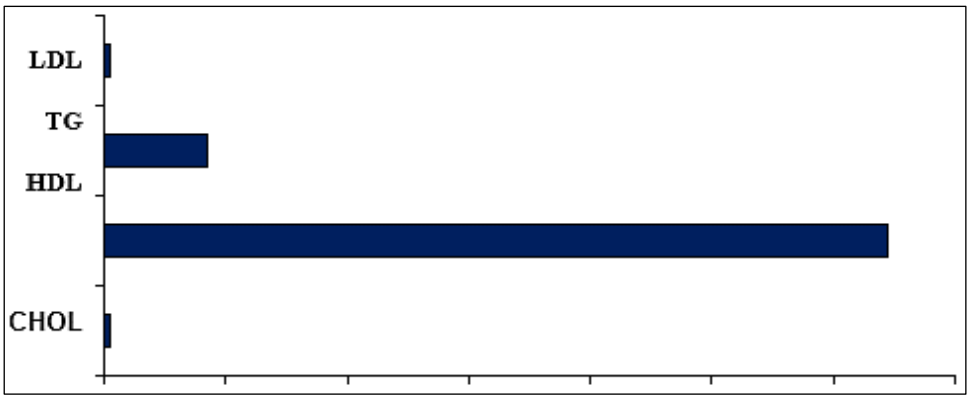

Fig 1: Distribution of cases with raised single parameter according to individualmarkers

Further distribution of these cases according to males and females has been shown in table below.

Table 1: Distribution of male/female dyslipidemic patients in each individual marker category

Gender	CH	HDL	TG	LDL
Male	0	93	9	0
Female	1	36	8	1

2. DISTRIBUTION OF PATIENTS WHO HAD COMBINATION OF ANY TWO ALTERED PARAMETERS OF THE LIPID PANEL

Out of 300 total cases, 250 dyslipidemic patients were studied for alteration in two parameters and it was found that 5 patient have raised CH+TG, 1 patient have raised CH+HDL, 15 patient have raised CH+LDL, 58 patients have raised TG + lowered HDL, 4 patients have altered HDL+LDL and 0 cases have altered TG+LDL level.

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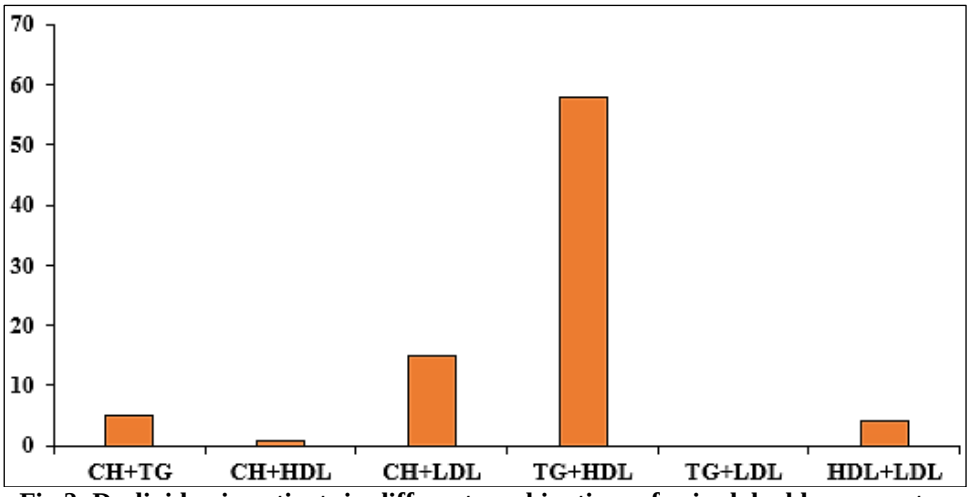

Fig 2: Dyslipidemic patients in different combinations of raised double parameter

When checked for representation of male/female among these dyslipidemic patients with altered double parameters following results were obtained as shown in the table below.

Table 2: Distribution of male/female dyslipidemic patients in each combination of double markers category

Gender	CH+TG	CH+HDL	CH+LDL	TG+HDL	TG+LDL	HDL+LDL
Male	1	0	7	41	0	3
Female	4	1	8	17	0	1

3. DISTRIBUTION OF PATIENTS WHO HAD COMBINATION OF ANY THREE ALTEREDPARAMETERS OF THE LIPID PANEL

Gender	CH+HDL+TG	CH+TG+LDL	TG+HDL+LDL	CH+HDL+LDL
Male	0	4	0	1
Female	0	5	0	0

Similarly, patients who had shown to have combinations of any three altered parameters it was found that only 1 patient have the combination of 3 parameters namely CH+HDL+LDL, and no patients have either raised levels of CH+HDL+TG or TG+HDL+LDL but 9 patients have raised CH+TG+LDL.

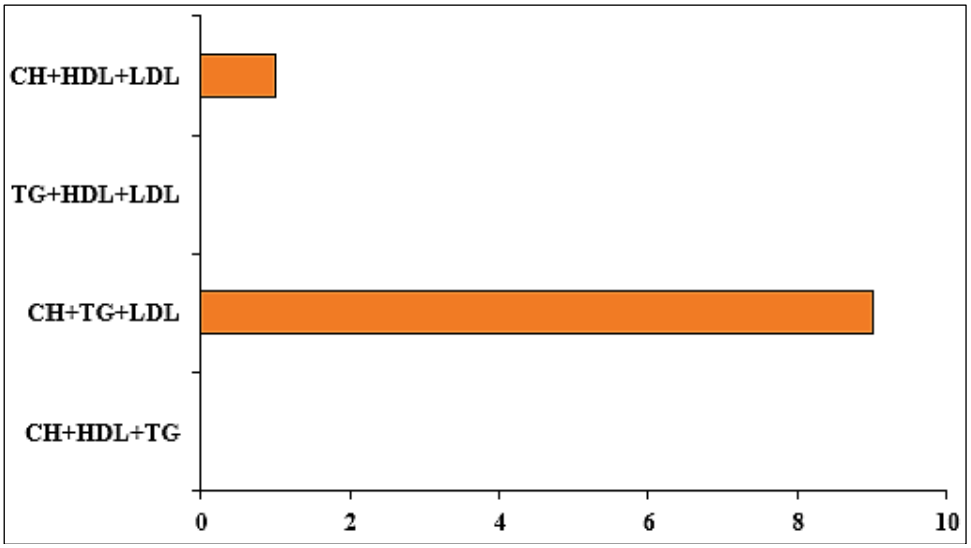

Fig 3: Distribution of dyslipidemic patients with combinations of altered triple parameters

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4. DISTRIBUTION OF PATIENTS WHO HAD COMBINATION OF ALL FOUR ALTERED PARAMETERS OF THE LIPID PANEL

Out of all dyslipidemic patients only 6 cases were found to have altered CH+HDL+TG+LDL combination that is all the parameters to be altered (since VLDL is calculated directly from TG, hence it is also altered). Among them 5 were male and 1 was female.

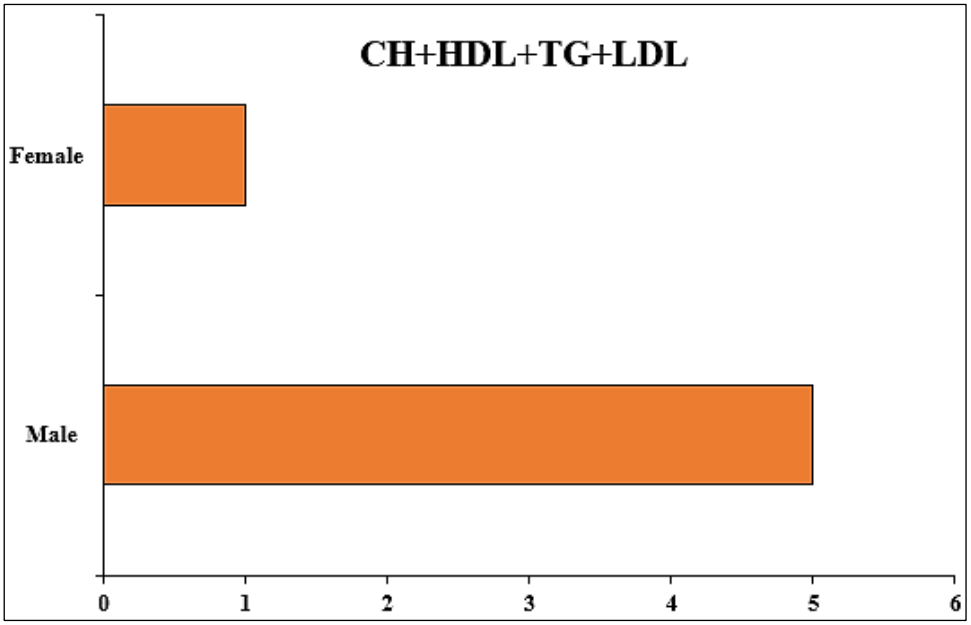

Fig 4: Distribution of dyslipidemic patients among males and females withcombinations of all the parameters of lipid panel

5. PATTERN OF DISTRIBUTION OF CASES OF DERANGED INDIVIDUAL LIPID PANEL MARKERS IN DIFFERENT AGE GROUPS OF THE POPULATION

The distribution pattern of deranged lipid panel markers were found among various age groups according to decade wise categories are given in the following table.

Table 3: Pattern of distribution of cases of deranged lipid panel markers in various age groups

AGE	CH	HDL	TG	LDL
10-20 YRS	0	1	1	1
21-30 YRS	0	5	2	0
31-40 YRS	4	18	12	4
41-50 YRS	9	38	20	9
51-60 YRS	15	58	32	13
61-70 YRS	9	44	22	9
71-80 YRS	0	26	6	0
81-90 YRS	1	9	1	1

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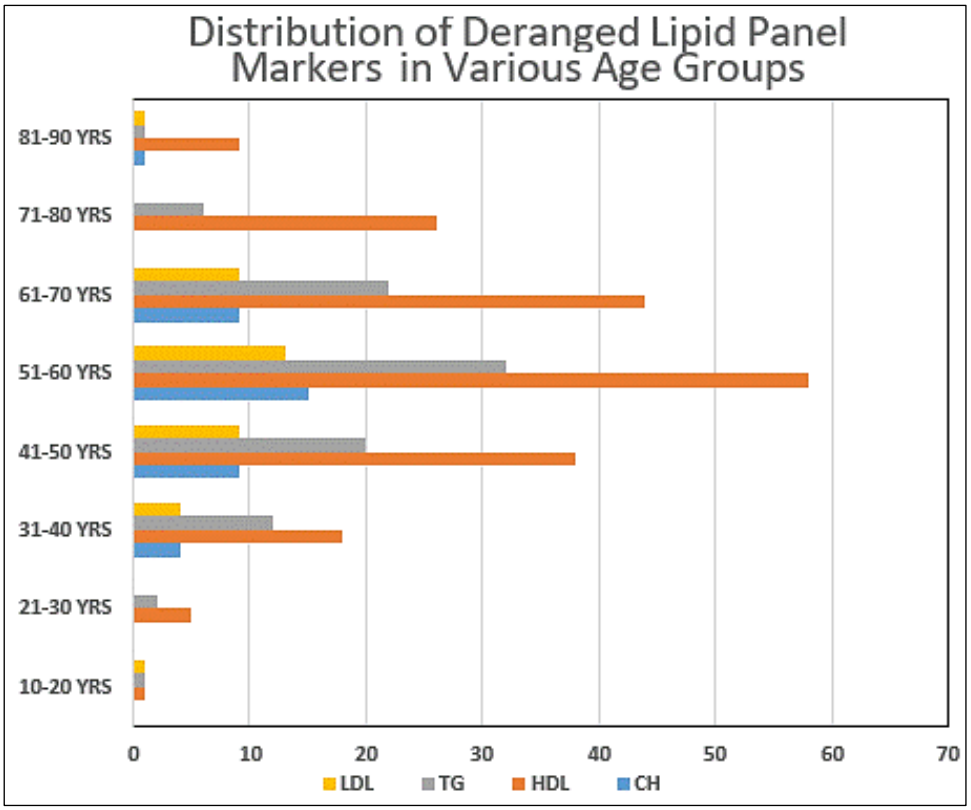

Fig 5: Distribution of cases with deranged lipid panel markers in various age groups

DISCUSSION

The study cohort was classified into positive test and negative test. As defined before following NCEP-ATP III criteria if one or more parameters of the lipid profile showed to have crossed the desirable limit, the cases were considered positive and for patients who were found to have all of the parameters to be within the desirable limit, they were grouped as negative or within normal reference range. Thus, out of 300 patientsincluded in the study 239 patients were having positive test results for one or more parameters of the lipid panel and 61 patients were having negative test for all the parameters.

Taking the advantage of hospital information system in place in our institute, this study attempted to retrieve a representative sample size comprising of 300 investigations carried out for lipid panel markers in our institutional Clinical Biochemistry lab.

Also an enquiry was carried out by analysis of distribution of individual lipid panel markers among the cases who had altered lipid profile so as to consider whether any particular parameter(s) might have the significant determinant role in the diagnostic process from such pattern of alterations of these parameters.

Earlier one study from our group showed significance of cholesterol as an important screening test in the peripheral health care management level (133).

In this study, the account of age specific distribution highlights the impact of this metabolic pathology mostly affected the adult populace (40-70 years), because the percentage more than 70% all positive cases of the total population in the lipid profile investigation cohort was found to be in this combined age group with highest percentage of around 90% of the age specific positive cases was recorded in the sixth decade of life (50-60 years)followed by around 85% of such age specific positive cases in fifth decade of life.

The possible explanation might be obvious involvement of this people in active earning phase of life facing the maximum brunt of the stress which is further accentuated in the later phase of adulthood as a direct proportionate effect on cardio-metabolic impact in relation to advance in age. This is supported by the fact that all the major risk criteria are formulated with age as an important determinant.

Because, among the total of around 150 cases who had previous disorder 124 people showed alteration in lipid panel marker and only 26 people showed no abnormality in lipid parameters. On the other hand, among the other half of the population under this study who did not have any such previous records of disease, 127 cases were found to have altered lipid markers and 23 people showed no dyslipidemia.

Almost equal number of cases with dyslipidemic results in single or multiple parameters were observed among the patients with earlier disease history as compared to such cases found in the population without any earlier record of these pathological conditions.

In this context, it is worth mentioning that although there is record of their earlier disease history but the record of their earlier lipid profile values were not

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available. Hence actual comparative assessment is not totally possible.

Across all the cases with previous history of such related disorders HDL and triglyceride appeared to be the most significant lipid parameters to be affected. Smoking and alcoholism also showed alteration in these two parameters. Although it is considered that alcohol intake has some positiveinfluence on increase in HDL cholesterol level (144), however in this population in alcoholics, the HDL is found to be lowered.

Results were further dissected in depth to find out the involvement of these lipid panel parameters in the study population. It was observed that HDL cholesterol component was mostly affected followed by triglyceride level but total Cholesterol and LDL cholesterol fraction is the least affected parameters.

Considering only two altered parameters in combination we got 83 patients and out of them HDL and TG as mentioned already recorded to have highest number of cases of 58. Quite expectedly males showed higher representation than females.

While in NCEP ATP-III guidelines the importance was given on total and LDL cholesterol and less on TG and HDL for CVD risk, our result did not record any significant number of patients to have altered levels of cholesterol or LDL fraction. In this context, it is very interesting to note that a recurrently similar pattern of alteration in two specific parameters in lipid panel namely HDL and TG were found in all forms of categorization of cases.

CONCLUSION

Because very few cases were found to have derangement of multiple parameters of the lipid panel, hence it seems that screening with most frequently affected marker like HDL-c and TG only for screening may be considered in this population. This might have vital impact on rational use of lab resources and also able to detect more cases in the community.

In essence, this study explored the possibility of extending the scope of the lab medicine to integrate it with various clinical and demographicdeterminants.

REFERENCES

1. Ramachandran A, Snehalatha C. Rising Burden of Obesity in Asia. J Obes. 2010; 2010: 1-8.
2. Nanditha A, Ronald M, Ambady Ramachandran A, Snehalatha C, JulianaC. *et al*. Diabetes in Asia and the Pacific: Implications for the Global Epidemic. Diabetes Care 2016; 39(3): 472-485.
3. Pan WH, Wen-Ting Yeh W, Weng LC. Epidemiology of metabolic syndrome in Asia. Asia Pac J Clin Nutr. 2008;17(S1):37-42.
4. Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C. *et al*. 2016 European Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts) Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR). *European Heart Journal*. 2016; 37 (29): 2315–2381.
5. Agnoli C, Berrino F, Abagnato CA, Muti P, Panico S, Crosignani P, *et al*.Metabolic syndrome and postmenopausal breast cancer in the ORDET cohort: a nested case-control study. Nutr Metab Cardiovasc Dis 2010 ; 20(1): 41.
6. Laguardia HA, Hamm LL, Chen J. The metabolic syndrome and risk of chronic kidney disease: pathophysiology and intervention strategies. J Nutr Metab. 2012; 2012: 1-9.
7. Ginsberg HN, MacCallum PR. The obesity, metabolic syndrome, and type 2 diabetes mellitus pandemic: Part I. Increased cardiovascular disease risk and the importance of atherogenic dyslipidemia in persons with the metabolic syndrome and type 2 diabetes mellitus. J Cardiometab Syndr J Cardiometab Syndr. 2009; 4(2): 113–119.
8. George P LB. George P, Ludvik B. Lipids and diabetes. J Clin Basic Cardiol. 2000; 3:159–162.
9. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Circulation. 2002;106:3143.
10. Rao S, Gandhe M, Indira S, Srilakshmi P, Goswami K. The role of the total cholesterol level in the assessment of the severity of myocardial infarction. J. Clin Diag Res. 2013; 7(5): 972-973.
11. Ajani U, Gaziano J, Lotufo P, Liu S, Hennekens C. *et al*. Alcohol Consumption and Risk of Coronary Heart Disease by Diabetes Status. Circulation. 2000;102:500-505.