

# Ripples in the tranquil sea of lipids



## Medical Science

**KEYWORDS :** non-high density lipoprotein cholesterol (non-HDL-C), low density lipoprotein cholesterol (LDL-C), intermediate low-density lipoprotein (ILD), apo lipoprotein B (Apo-B), discordant group.

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### ABSTRACT

*Today's therapy of dyslipidemia is centred on low density lipoprotein (LDL) and high density lipoprotein (HDL) -cholesterol. By looking at these targets we are missing a small proportion of people with high non-HDL cholesterol who are at a risk of cardiovascular event. It is time that we give non-HDL cholesterol its due respect and include it in our investigatory panel. In my study if we go by normal LDL-C we will be missing out 30 patients i.e. 12.93 % who had a high non-HDL -C level. If we go only by non-HDL-C we will be missing 49 patients i.e. 19.52 % who had high LDL-C. In the best interest of patients we should include both LDL-C and non-HDL cholesterol.*

### INTRODUCTION

Lipid therapy is centred on the low density lipoprotein cholesterol (LDL-C), we are all targeting the LDL-C. Prove -It Timi trial<sup>7</sup> have proven that in spite of reaching the LDL target, 22% of patient have residual risk of having a cardiovascular event within 2 years.

In order to cover these 22% of population biochemists have introduced non-HDL- cholesterol as an important parameter which biochemically correlates with apo-B levels. Non HDL-cholesterol is a better marker of atherogenicity than LDL-C<sup>3, 8</sup> non HDL-C includes LDL, ILD, very low density lipoprotein and APO -B.

The advantages of non- HDL-C include - there is no need to be in fasting state for blood collection, no additional cost to the patient, easy to calculate from simple formula, non-HDL-C levels = Total cholesterol levels - LDL levels<sup>9,10</sup>.

We have a group of patients with normal LDL and high non-HDL-C, another group has high LDL and normal non-HDL-C<sup>1,11,5</sup> which would be the discordant group.

### MATERIALS AND METHODS

Lipid profile of people undergoing master health check up in a private clinic located in Chennai was collected over a period of 6 months. A written informed consent was obtained from the subjects included in the study. 417 subjects were included in the study. The data so obtained was analysed using relevant statistical methods. National cholesterol education programme (NCEP) guide line for lipids was used for defining normal values<sup>2</sup>

### RESULTS OF THE STUDY

The sample study population included 417 subjects. 232 patients i.e. 55.63% had high non-HDL-C, 251 subjects out of 414 (three having been excluded for high Triglyceride levels), (60.62%) had high LDL-C.

Among those with high non-HDL-C 30 patients out of 232 (12.93 %) had normal LDL-C (figure 1).

Among the high LDL-C group 49 patients out of 251 i.e. 19.52 % had normal non- HDL-C (figure 2). TGL >400 was seen in 8 patients out of 417(1.91 %). All the 8 in this group had high non-HDL-C.

### DISCUSSION

Many people with normal LDL-C still have high non-HDL-C, therefore treatment is recommended. People having high TGL >400mg. LDL can't be used, therefore it has to be informed to the lab to give non- HDL-C values in all patients who are having

a TGL above 200mg and higher. The above points show a limitation in the use of LDL alone in screening.<sup>4</sup> People with high non-HDL-C and normal LDL-C are likely to have impaired fasting glucose (figure 3), Diabetes Mellitus, Metabolic Syndrome, Insulin resistance and dyslipidemia. There is increased risk of coronary heart disease (CHD) with person having high non- HDL-C<sup>6</sup>. Sniderman et al showed LDL-C is a less potent marker of cardiovascular risk compared with non -HDL-C. If we focus on non-HDL-C we will miss a group of people with high LDL-C and normal non-HDL-C. Other advantage in using non-HDL-C as a screening procedure is easy calculation, no need of fasting state, less variation than calculated LDL.

### CONCLUSION

A substantial section of general population is there with normal LDL-C and high non- HDL-C. These people are at risk of CHD and Diabetes<sup>4</sup> and may be left out if we go by LDL-C targets alone. So one has to include non-HDL-C also in the screening of dyslipidemia along with LDL<sup>1</sup>. So the governing bodies and health authorities should take into account about this discordance in lipid values, and make it mandatory of laboratories to report non- HDL-C along with the lipid panel.

Figure 1

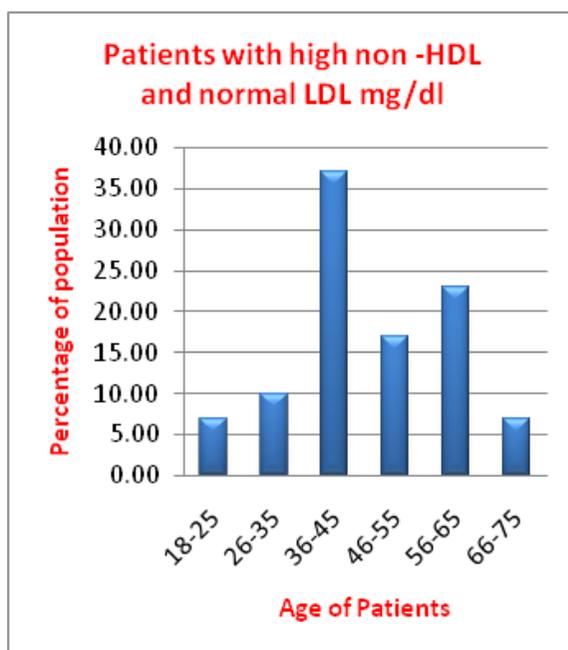


Figure 2

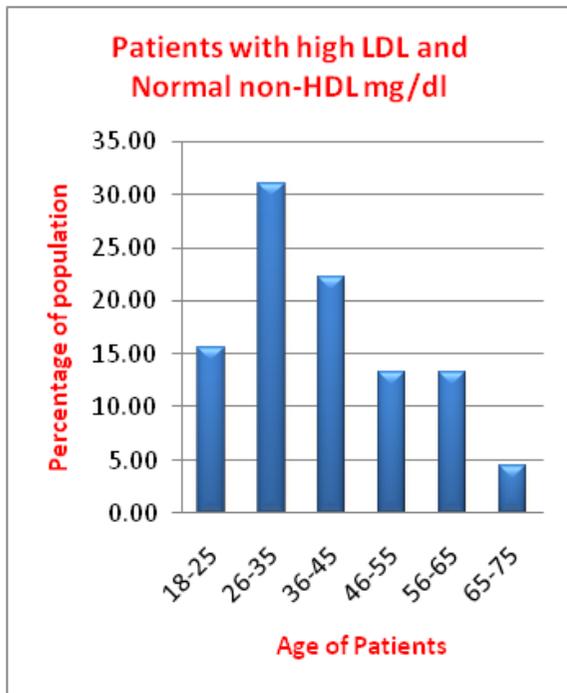


Figure 4

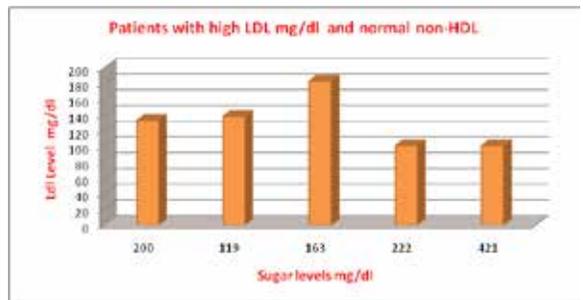
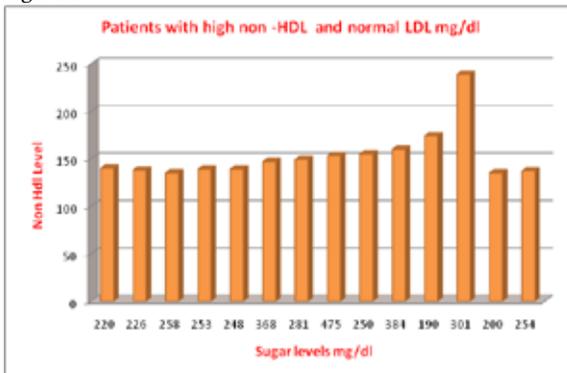


Figure 3



**REFERENCE**

1. Discordance between high non-HDL cholesterol and high LDL-cholesterol among US adults. Meredith Kilgore et al Journal of clinical lipidology <http://dx.doi.org/10.1016/j.jacl.2013.11.001> | 2. Expert panel on detection, evaluation, and treatment of high blood cholesterol in adults executive summary of the third report of the national cholesterol education programme (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adult (adult treatment panel iii) *Jama*.2001;285:2486-2497. | 3. Curi, Y., Blumenthal,R.S., Flaws, J.A.et al. Non high density lipoprotein cholesterol level as a predictor of cardiovascular disease mortality. *Arch Intern Med*.2001; 161: 1413-1419 | 4. Baruch, L., Chiong, VJ., Agarwal , S, and Gupta, B. discordance of non-HDL and directly measured LDL cholesterol: which lipid measure is preferred when calculated LDL is inaccurate, cholesterol. *2013;2013; 502948* | 5. Degoma , E.M , Davis , M.D , Dunkar , R.L., Mohler .E.R.III , Greenland , P ., and French .B , Discordance between non-HDL -cholesterol and LDL - particle measurements : results from the multi - ethnic study of atherosclerosis. *Atherosclerosis*. 2013 ; 229 : 517-523. | 6. Sniderman , A.D., Williams , K., Contois , J.H. et al . A meta analysis of low -density lipoprotein cholesterol , non- high density lipoprotein cholesterol, and apolipoprotein B as marker of cardiovascular risk . *circ . Cardiovasc qual outcomes . 2011 ; 4 : 337 -345 .* | 7.Reduction in recurrent cardiovascular events with intensive lipid - lowering statin therapy after acute coronary syndromes from the Prove it - Timi 22 trial.Murphy SA,Cannon CP ,Wiviott SD, Mc Cake CH, Braunwald E. *J Am Coll Cardiol*. 2009 Dec 15; 54 (25) : 2358 -62 . doi : 10.1016 /j.jacc.2009.10.005 | 8.Pischon,T, Girman,C.J,Sacks, F.M.,Rifai,N., Stampfer,M.J, and Rimm.E.B. non-high -density lipoprotein cholesterol and Apolipoprotein B in the prediction of coronary heart disease in men. *Circulation* 2005;112:3375-3383. | 9. Sniderman,A.D., Blank,D., Zakarian,R., Bergeron,J., and FrohlichJ. triglycerides and small dense LDL : the twin Achilles heels of the friedewald formula . *Clin Biochem* .2003;36:499-504. | 10. Hsia,S.H. Non-HDL cholesterol into the spotlight.*Diabetes Care*. 2003;26:240-242. | 11. Boekholdt,S.M., Arsenault,B.J., Mora,S. etal Association of LDL -cholesterol , non-HDL cholesterol , and apo-lipoprotein B levels with risk of cardiovascular events among patient treated with statins: a meta analysis .*JAMA* 2012;307: 1302-1309. |