

Lipid levels in Nepalese population

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Abstract

Objective: To study the lipid pattern of Nepalese population **Design:** Retrospective study **Setting:** Patients attending Temple of Healing for consultation **Methods:** Fasting lipid profile of 2218 blood samples was analyzed.

Results: Abnormal total cholesterol(TC) was found in 7.7%. High LDL cholesterol(LDL-C) was found in 5% of cases. 70% of subjects had triglyceride(TG) level more than the upper level of normal. All abnormal lipid level was found in the age group 49-60years. 23% of the study group had low level of HDL cholesterol. **Conclusions:** abnormal triglyceride level is the commonest lipid abnormality in our population. High total cholesterol and LDL cholesterol is not very common except in the age group 40-49 where it is significantly high in comparison to other age groups. HDL cholesterol level did not decrease significantly with increasing age.

Keywords: Lipids, Nepalese population

It is an accepted fact that dyslipidaemias predispose to coronary artery disease. Boas et al recognized as early as 1948 that hypercholesterolaemic xanthomatosis can cause coronary arteriosclerosis and coronary heart disease¹. Ancel Keys also identified the relation of cholesterol and saturated fat with coronary artery disease in 1952².

At the present time, it is firmly believed that dyslipidaemia is both atherogenic and thrombogenic. Plaques growth and rupture is associated with dyslipidaemia. If total cholesterol level is below 150 mg %, no new plaques will be formed³. Acute coronary event is expected when the plaques with thin fibrous cap ruptures. It is not the degree of narrowing of the coronary artery but the nature of the plaque determines the onset of acute coronary event. Dyslipidaemia is known to increase platelets aggregation, fibrinogen levels and (Platelets activation inhibitor) PAI⁴

In the Asian population, triglycerides, lipoprotein (a) and small dense LDL cholesterol are found to be high⁵. Total cholesterol may be normal or slightly increased. HDL cholesterol level is usually on lower side. Various reports suggest that triglyceride level is an independent risk factor for myocardial infarction in men and for coronary heart disease in women^{6,7}.

The Executive Summary of the third report of the National Cholesterol Education program (NCEP) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults(ATPIII) was published in May 2001⁸. The full report of NCEP (ATPIII) was published in December

2002⁹. It provides evidence-based recommendations on management of high blood cholesterol and relates disorders and also given the values for lipid levels. It has graded total cholesterol as desirable, borderline high, and high. The LDL cholesterol level has been graded as optimal, above optimal, borderline high, high, and very high. Similarly the triglyceride has been divided into five categories with <149mg:optimal, 150-199: above optimal, 200-249: borderline high, 250-499: high, and >500mg very high. NCEP (ATPIII) recommends treatment for triglyceride level > 200mg/dL as it increases cardiovascular risk^{9, 10}. Borderline hypertriglyceridaemia is usually due to obesity excessive alcohol intake, poorly controlled diabetes mellitus, chronic renal failure, nephrotic syndrome or use of drugs like beta-blockers, estrogens and corticosteroids. Familial hypertriglyceridaemia has low risk for coronary heart disease than those with familial combined hyperlipidaemia¹¹. Lipoprotein (a) has also been identified as an independent risk factor for the development of coronary heart disease¹².

This study tries to find the prevalence of various lipid abnormalities in a private clinic going population irrespective of age and preexisting diseases. This is a preliminary study. Further study is ongoing with the aim of finding the prevalence of dyslipidaemia in specified group like diabetes, hypertensive, obese, alcoholic and patients taking antipsychotic medications.

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Methods

It is a retrospective study. Fasting lipid profile of 2218 blood samples taken from patients attending a private clinic in Kathmandu from 10.4.2055 to 23.6.2061 was reviewed irrespective of age and sex. All had total cholesterol, triglyceride, LDL cholesterol, HDL cholesterol and the ratio of

LDL/HDL done. Lipid assay was done with Enzymatic Colorimetric Test for Cholesterol and Triglyceride with lipid Clearing Factor. LDL-C was determined by direct method and HDL-C by precipitation method. The results were analyzed and tabulated.

Results

Table 1. Total cholesterol distribution

Total Cholesterol ⁽⁸⁾	Female n=(%)	Male n=(%)	Total n=(%)	Chi square value	P value
<200 mg% Desirable	603 (38.97)	944 (61.03)	1547 (69.75)	=154	= .003
200 –239 mg% Borderline High.	216 (43.2)	284 (56.8)	500 (22.55)		
>240 mg % High.	68 (39.76)	103 (60.24)	171 (7.7)		

In all the total cholesterol ranges the total male patients were significantly more than the females $p=.008$. Further 60.24% of male subjects had high total cholesterol as compared to only 39.76% in female. In

both sexes cholesterol level was desirable in 1547 cases (69.75%). Only 171 cases (7.7%) had high cholesterol level.

Table 2. LDL Cholesterol distribution

LDL Cholesterol	Female N=(%)	Male N=(%)	Total	Chi square value	p value
<100 mg% Optimal	493(39)	776(61)	1269(57)	= 145.2	= .003
100 – <130 mg% abo. Opt	241(41)	348(59)	589(27)		
130-<160 mg% Borderline	116(45)	139(55)	255(11)		
160-<190 mg% High-	29(37)	50(63)	79(4)		
≥190 mg% Very High-	8(31)	18(69)	26(1)		

The LDL cholesterol significantly high ($p=.003$) in males .

High LDL cholesterol was found in only 105(5%) cases. Moreover the mean LDL level has increased significantly ($p=.008$) with increasing age.

Table3. HDL Cholesterol distribution

HDL cholesterol	Female N=(%)	Male N=(%)	Total N=(%)	Chi-square value	P value
≥40 mg%	744(43.73)	957(56.26)	1701(76.69)	13.5	.009
<40 mg%	142(27.46)	375(72.53)	517(23.30)	45.7	.003

The HDL cholesterol level was >40mg in statistically significant number of males ($p=.009$) . HDL level

<40mg was also significantly high in males ($p=.003$).

Table4: Triglyceride Level

Triglyceride	Female	%	Male	%	Total	(%)
<149 mg%	313	46.50	360	53.49	673	30.34
150 – 199 mg%	339	40.02	508	59.97	847	38.18
200 –249 mg%	135	35.34	247	64.65	382	17.24
250 – 499 mg%	95	32.20	200	67.79	295	13.30
>500 mg%	5	23.80	16	76.19	21	0.94
Total					2218	100%
Chi-Square for male and female =138 and p= .007						

Table 5: Age wise lipid distribution

AGE (years)	No (%)	TC Mean±SD	LDL-C Mean±SD	HDL-C Mean ±SD	TG Mean±SD	P=
<20	5	158.75±21.8	82.92±19.46	46.34±4	143.40±40	<.05
Male	4	158±25.24	85±21.25	45.6±4.2	137.5±43.3	
Female	1	157±0	74.6±0	49.00	167	
20-39	474	178.1±35.8	77.84±22.69	49.14±15	186.55±76.9	>.05
M	312	180.6±37.9	77.53±23.29	48.31±15.22	197.42±75.3	
F	162	173.13±30.8	78.41±21.61	50.72±14.3	165.5±75.7	
40-59	1175	187.30±39	79.92±22.13	50.14±13.8	197.5±85.8	>.05
M	667	187.2±40.4	95.28±10.3	48.24±13.2	207.71±94.7	
F	508	187.4±36.9	58.87±15.78	52.64±14.3	184.09±70.3	
>60	564	185.12±38.17	99.18±35.47	50.70±14.37	176.98±60.89	>.05
M	348	182.34±35.8	97.30±35.03	49.81±14.8	175.82±59.19	
F	216	189.61±41.4	102.19±36.04	52.12±13.5	178.84±63.62	
Sample mean		177.32±33.7	84.97±25	49.08±11.5	176.12±65.8	

Discussion

A population study of dyslipidaemia is lacking in our country. Our aim in undergoing this study was to take a first step towards finding the lipid pattern in our population. One can argue that the population studied does not represent the whole country as it is done in urban setting in a highly biased sample. But we think that our sample is fairly representative as the patients coming to this clinic come from all over the country. Our study has shown mean total cholesterol to be 177.34mg/dl. The total cholesterol was found to be to be high and borderline high in 30.25% cases in which males were significantly more (p=.003) than females.

A recent Indian population study¹³ shows high total cholesterol in around 37.4% of population. Another study from India¹⁴ has shown mean total cholesterol to be 170.5mg/dl; less than our population. As far as LDL cholesterol is concerned our study has shown high and very high LDL -C level in 5% of the population vs. 37% in the Indian study¹³. However the mean LDL-C level in our population was 84.97mg/dl significantly low than the Indian study (LDL-C=102.1mg/dl¹⁴). Regarding TG 31.5% of our study population had level >200mg/dl vs. 30.6% in the Indian study and only >.94% of our study

population had TG level >500mg/dl . Mean TG level in our study was 176.12mg/dl vs. 124mg/dl in the Indian study¹³. Further TC, LDL-C and TG showed significant positive correlation with age (p=<.5) as also shown in other studies. In our study 23.30% population had HDL –C level <40mg/dl vs. 54.9% in the Indian study. Mean HDL-C in our population was 49.08 mg/dl vs. 43.6 mg/dl¹⁴. Curiously the HDL-C level also shows significant (p=.04) increase with increase in age. But none have level >60mg/dl vs. 11.7% in an Indian Study. Another interesting observation is that in both categories of HCL-C(40mg/dl and<40mg/dl) male population was significantly (p=<.05) more than female population.

Conclusion

Dyslipidaemia is quite prevalent in our population and the lipid pattern is significantly different from that seen in other Asian studies^(15, 16, 17,18). Both hypercholesterolaemia and hypertriglyceridaemia were present in around 31% of our sample population. LDL cholesterol was very high in 5% of our population but mean total cholesterol was high compared to other study groups. HDL cholesterol was above 40mg/dl in almost 77% of the population but none of our population had HDL-C level above 60mg/dl.

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References

1. Carlson IA Bottiger I E: Risk factors for ischaemic heart disease in men and women. Results of the 19 years follow up of the Stockholm prospective study. *Acta Med scand* 1985; 218:207-211.
2. Aberg H, Lithell H, Selims I, Hedstrand H: Serum triglycerides are a risk factor for myocardial; infarction but not for angina pectoris. Result from a 10 year follow up of Uppsal primary preventive study. *Atherosclerosis* 1985;54:89-9.
3. Cambien F, Jacqueson A, Richard JL, Warmer JM, Ducimetiere P, Claude JR: is the level of serum triglyceride a significant predictor of coronary death in “normocholesterolemic” subject? The Paris prospective Study *AMJ, Epidemic* 1986;124:624-632.
4. Eugene Braunwald: *Cardiology, The past the present and the future.* American College of Cardiology. South Asian Edition, March-April 2004 Volume 2, Number

5. Manotosh Panja: *Postgraduate medicine* Vol. 17,2003.
6. Rubins HB,Robins SJ, Collins D,et al, Department of Veterans Affairs HDL Intervention Trial Study Group. Distribution of lipids in 8,500 men with coronary arteru disease. *Am J Cardiology.*1995;75:1196-1201.
7. Goel PK, Bharti BB, Pandey CM et al. A tertiary care hospital based study of conventional risk factors including lipid profile in proven coronary artery disease. *Indian Heart J.*2003 May-Jun.; 55(3):234-40
8. Expert Panel on Detection, Evaluation, and Treatment of High cholesterol in adults. Executive Summary of the third report of the National Cholesterol Education program(NCEP) Expert Panel on Detection, Evaluation ,and Treatment of High Blood Cholesterol in Adults(ATPIII). *Jama.*2001;285:2486-2497
9. Expert Panel on Detection, Evaluation, and Treatment of High cholesterol in adults. Third report of the National Cholesterol Education program(NCEP) Expert Panel on Detection, Evaluation ,and Treatment of High Blood Cholesterol in Adults (ATPIII) final report. *Circulation.*2002; 106:3143-3421
10. Rubins HB,Robins SJ, Collins D, et al, Department of Veterans Affairs HDL Intervention Trial Study Group. Gemfibrozil for secondary prevention of coronary heart disease in men with low levels of HDL cholesterol. *NEJM.* 1999; 341:410-418.
11. Triglycerides and coronary heart disease: implications of recent trials. *J Cardiovascular Risk.* 2000; 7: 339-345.
12. Danesh J,Collins R,Peto R. Lipoprotein(a) and coronary heart disease: metaanalysis of prospective studies. *Circulation.*2000;102:1082-1085.
13. Gupta R,Gupta VP,Serena M et al. Serial epidemiological surveys in an urban Indian population demonstrates coronary risk factors among the lower socioeconomic strata.*J Asso Physician India* 2003;mar51:470-7
14. Gupta R, Prakash H, Kaul V. Cholesterol lipoproteins, triglycerides, rural-urban differences and prevalence of dyslipidaemia among males in Rajasthan .*J Assoc Physicians India.* 1997 Apr; 45(4):275-9.
15. Haddad FH, Omari AA, Shamailah QM, Malkawi OM, Shehab AI, Mudabber HK, Shubaki MK. Lipid profile in patients with

- coronary artery disease. *Saudi Med J*. 2002 Sep; 23(9):1054-8.
16. Li Z, Yang R, Xu G, Xia T. Serum lipid concentrations and prevalence of dyslipidemia in a large professional population in Beijing. *Clin Chem*. 2005 Jan; 51(1):144-50. Epub 2004 Nov 11
17. Szapary PO, Rader DJ. The triglyceride-high-density lipoprotein axis: an important target of therapy? *Am Heart J*. 2004 Aug;148(2):211-21.
18. Azizi F, Raiszadeh F, Salehi P, Rahmani M, Emami H, Ghanbarian A, Hajipour R. Determinants of serum HDL-C level in a Tehran urban population: the Tehran Lipid and Glucose Study. *Nutr Metab Cardiovasc Dis*. 2002 Apr;12(2):80-9.