Study of Prevalence of Dyslipidemia in Shimla

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Abstract

Background and Objectives: *Dyslipidemia is a major risk factor for cardiovascular disease. It includes high levels of triglyceride (TG), total cholesterol (T-cholestrol), low density lipoprotein cholesterol (LDL-c) and low level of high density lipoprotein cholesterol (HDL-c). Therefore it is important to know the lipid levels of community for early intervention and prevention of cardiovascular disease. The present study investigated the lipid levels of urban population of Shimla*

Methods: *A descriptive cross sectional study was conducted in a health centre at Shimla. 132 samples were tested in the individuals above 18 years of age. Blood samples following overnight fast was collected for determination of serum TG, T-cholestrol, LDL-c and HDL-c. According to the criteria of the National Cholestrol Education Program- Adult treatment Panel III (NCEP-ATP III), Dyslipidemia was classified into (a) Hyperlipidemia-TC >200mg/dl, TG>150mg/dl, (b)Hypercholestrolemia TC>200mg/dl (c) Hypertriglyceridemia TG>150mg/dl, (d) Atherogenic dyslipidemia TG>150 , LDLC>165*

Results: *A total number of 132 adult individuals were enrolled of which 80 (61%) and 52 (39%) were male and female respectively. Study found 32% hyperlipidemia, 30% atherogenic dyslipidemia,8% hypercholesterolemia and 30% hypertriglyceridemia. 35.60% had low HDL. 7.58% had high LDL. BMI was higher among females as compared to males.(p=<0.01)*

Conclusion: *Prevalence of atherogenic dyslipidemia and hyperlipidemia are common and female dyslipidemic patients are susceptible to develop higher BMI. Which calls for urgent lifestyle intervention strategies to prevent and manage this.*

Keywords: *Dyslipidemia, Hypercholestrolemia, hypertriglyceridemia.*

Introduction

Elevated levels of cholestrol is an important risk factor in cardiovascular disease. Increased consumption of fast food and decrease in physical activity are associated with adverse changes in the lipid profile. Economic prosperity has also led to prevalence of lifestyle related diseases. The atherosclerotic CHD has been reported as a leading cause of death and disability not only in countries with high socioeconomic development but also in developing countries. Pathogenic character of cholesterol is determined not only by its blood levels but also its distribution in lipoproteins. Low density lipoprotein (LDL) carried cholestrol is potentially pathogenic and high density lipoprotein (HDL) carried one is index of a shielding role of lipoproteins against atherosclerosis.[3] The imbalance status of one or more types of lipoproteins in blood is known as dyslipidemia[4] and considered as an established independent major risk factor for CHD. It might even be a prerequisite occurring before other

major risk factors come into play. Low concentration of HDL-C and high concentration of TGs have been implicated as possible independent predictors of CHD[5] and combinations of these two conditions have been defined as atherogenic dyslipidemia (AD)[6].

The atherosclerotic CHD has been reported as a leading cause of death and disability not only in countries with a high socio-economic development but also in developing countries[14]. Because of the largest population group, the Asians are suffering from the major part of the global burden of CHD. In addition, since Asians have many different ethnic groups of population who may have different lipid profiles[15]. The INTERHEART investigators reported a higher prevalence of dyslipidemia among study participants living in five South Asian countries (India, Pakistan, Bangladesh, Sri Lanka and Nepal). Based on this scenario a specific assessment of the pattern of dyslipidemia is important to design and plan for health services need and preventive measures to reduce the mortality and morbidity rates.

Effective control of blood lipid levels reduced cardiovascular morbidity and mortality. In this context the present study was designed to determine lipid levels and prevalence of dyslipidemia in urban community of Shimla.

Objective of study was to determine the fasting lipid profile in the Shimla urban population with selected socio demographic factors such as age, sex, socio-economic status etc.

Material and Methods

The study was designed to assess the lipid levels in urban population of Shimla.

Study Design: Descriptive cross sectional study.

Study Area: Health centre at Indian Institute of Advanced Study Shimla.

Study Population: Adults $\geq$ 18 years of age.

Study Tools: Interview schedule, anthropometry, fasting sugar, urea, creatinine, uric acid and lipid profile.

Sample Size: 132 Subjects.

Laboratory, anthropometric and clinical data collection

Face to face interview was conducted by using a pre-tested structured questionnaire to collect the data. Body mass index (BMI) was calculated from height and weight measured by a height weight scale following standard operating procedure (SOP). 5 ml fasting venous blood was collected between 8AM – 9AM.

According to the criteria of National Cholestrol Education Program-Adult Treatment Panel 111(NCEP-ATP111), dyslipidemia was diagnosed and classified into four phenotyped, (a) Hyperlipidemia: TC>200mg/dl, TG>150mg/dl, (b) Hypercholestrolimia: TC>200 mg/dl, (c) Hypertrigyceridemia: TG>150 mg/dl, (d) Atherogenic-dyslipidemia: TG>150mg/dl, LDLC>165 mg/dl.(7.16) Underweight, Normal weight, Overweight and Obesity were determined according to World Health Organization guideline. Fasting blood glucose levels >6.1 mmol/L was referred to diabetic.

Statistical Analysis

t- test was performed to see the gender variation among dyslipidemic subjects. A' p' value =0.05 was considered as statistically significant.

Results

Of 132 participants, 61% (n=80) were male and rest of them were female. The proportion of dyslipidemia was higher among the 46 to 76 years age group 39.4% (n=52) compared to 36 to 45 years 29.5%(n=39) and 18 to 35 years 31.1% (n=41) age groups.The highest proportion of dyslipidemia was reported among the overweight and obese 40.9% (n=54) .

The pattern of dyslipidemia is summarized in Table 2. Out of 132 participants, 38%(n=50) had hyperlipidemia (TC$\geq$200 mg/dl, TG $\geq$150mg/dl) 38% (n=50) had atherogenic dyslipidemia (TG$\geq$150 mg/dl, LDLC $\geq$165 mg/dl),7.6% (n=10) had hypercholesterolemia (TC$\geq$200 mg/dl) and 30% (n=40) had hypertriglyceridemia (TG$\geq$150).

Table 1. Baseline characteristics of the study participants

Characteristics		Frequency (n)	Percentage(%)
Gender	Male	80	61
	Female	52	39
Age Group	18 to 35 years	41	31
	36 to 45 years	39	30
	46 to 76 years	52	39
Education	Under Matric	52	39
	Graduate	30	23
	Post Graduate	50	38
Socioeconomic Status	Low Income	43	33
	Middle Income	44	33
	High Income	45	34
BMI Status	Under Weight	7	5
	Normal Weight	71	53.7
	Over weight and Obese	54	40.9
Glycemic Status	Diabetic	13	9.8
	Non-Diabetic	119	90

Table 2. Pattern of dyslipidemia

Type of Dyslipidemia	Frequency(n)	Percentage
Hyperlipidemia	42	32
Atherogenic	40	30
Hypercholestrolemia	10	8
Hypertriglyceridemia	40	30

For lipid profile and FBS , a significant difference was found among different gender groups. Table 3 shows that among the dyslipidemic subjects, FBS, TC, LDL-C and TG of female were significantly higher than the male patient.

FBS was higher among hyperlipidemia group compared to hyper cholestrolemia group

Table 3. Comparison of different parameters according to gender among dyslipidemic subjects

Parameter	Gender	
	Male	Female
BMI	25.157	25.048
TC	168.71	170
HDL-C	45.82	45.22
LDL-C	96	98.24
TG	140.34	142.58
FBS	86.96	92.86

Table 4. Comparison of FBS among the study subjects with different dyslipidemia types

Dyslipidemia Type	FBS
HL (n=49)	6
HC (n=14)	1
HT (n=35)	6
AD (n=35)	6
Status of BMI	Glycemic Status
UW (n=7)	87.7
NW(n=71)	86.51
OW and OB(n=54)	95.33

Comparison of Glycemic status among the participants with different BMI status shows that the serum mean level of FBS was significantly higher among the overweight and obese group compared to the normal weight as well as underweight group.

Discussion

This study was carried out at the outpatient department (OPD) of Health Centre at Shimla to assess the pattern and factors associated with dyslipidemia among adult population. Our results found that the proportion of dyslipidemia was a bit higher among the 46 to 76 years age group in comparison to the other groups.

In terms of income we have found that majority of the dyslipidemic patients were middle or higher income group. It might be due to less physical activity.

In our study most common type of dyslipidemia was hyperlipidemia (32.0%). The level of TC and TG were found higher among female compared to male.

Our study findings show that increase in BMI was significantly associated with the FBS level.

Conclusion

This study concludes that Hyperlipidemia and Atherogenic dyslipidemia are more common types of dyslipidemia among adult population in Shimla. Female dyslipidemic patients are more susceptible to develop higher FBS, TC, LDL-C, and TG. Hyperlipidemic adults have higher chance of increased level of FBS as compared to the hypercholestrolemic group. We would like to

recommend urban women to maintain their FBS and Lipid profile within normal range for preventon of dyslipidemia.

References

1. Rukhsana Rabeya,Mohammad Hayatun Nabi, Ariful Bari Chowdhary. Epidemiology of Dyslipidemia among Adult Population of Bangladesh. Rom. J. Diabetes, Nutr, Metab Dis.26(2)99-106. 2019.

2. World Health Organization. The atlas of heart disease and stroke/Judith Mackay and George Mensah; with Shanthi Mendis and KURT Greenland. Geneva: World Health Organization 2004. http;//www.who.int/iris/handle/10665/43007 (accessed on 12th October 2018).

3. Natarajan P, Ray KK, Cannon CP. High density lipoprotein and coronary heart disease. J AM Coll Cardiol 55(13):1283-1299,2010.

4. Smith S, Lall AM. A study on lipid profile levels of diabetics and non diabetics among Naini region of Allahabad, India. Turkish J Biochem 33(4):138-141.2008.

5. Amarenco P, Labreuche J, Toubol PJ. High density lipoprotein-cholestrol and risk of stroke and carotid atherosclerosis. A systematic review. Atherosclerosis 196(2) 489-496,2008.

6. Fruchart JC, Sacks F, Hermans MP, Assmann G, Brown WV, Ceska R et al. The Residual Risk Reduction Initiative: a call to action to reduce residual vascular risk in patients with dyslipidemia. Am J Cardiol 102(IOS)1K-34K.2008.

7. Bhalodkar NC, Blum S, Rana T, Bhalodkar A, Kiitchappa R, Kim KS, et al. Comparison of levels of large and small high density lipoprotein cholesterol in Asian Indian men compared with Caucasian men in the Framingham offspring study. Am J Cardiol 94:1561-1563, 2004.

8. Neaton JD, Wentworth D. Serum cholesterol, blood pressure, cigarette smoking, and death from coronary heart disease. Overall findings and differences by age for 316,099 white men. Multiple risk factor intervention trial research group. Arch Intern Med 152 (I):56-64, 1992.

9. Yusuf S, Reddy S, ounpuu S, Anand S. Global burden of disease, part 1: general considerations, the epidemiologic transition, risk factors and impact of urbanization. Circulation 104(22):2746-2753,2001.

10. Farzadfar F, Finucane MM, Danaei G. Global Burden of Metabolic Risk Factors for Chronic Diseases Collaborating Group (Cholestrol) National, regional and global trends in serum total cholesterol since 1980: systemic analysis of health examination surveys and epidemiological studies with 321 country –years and 3.0 million participants. Lancet 377(9765):578-586, 2011.

11. Labreuche J, Touboul PJ, Amarenco P. Plasma triglyceride levels and risk of stroke and carotid atherosclerosis: A systemic review of the epidemiological studies. Atherosclerosis 203(2): 331-345,2009.

12. Karthikeyan G, Teo KK, Islam S, McQueen MJ, Pais P, Wang X et al. Lipid profile, plasma apolipoproteins, and risk of a first myocardial infarction among Asians: An analysis from the INTERHEART study.J Am Coll Cardiol53(3):244-253.2009.

13. Bakesiima R, Byakika-Kibwika P, Tumwine JK et al. Dyslipidemias in women using hormonal contraceptives: a cross sectional study in Mulago Hospital Family Planning Clinic , Kampala, Uganda. BMJ Open 8 (10):eo22338,2018.

14. World Health Organization. Global status report on non communicable diseases 2010, Geneva. Accessed at:

https://www.who.int/nmh/publications/ncd_report-full-en.pdf

15. Heng DM. Lee J. Chew SK. Tan BY. Hughes K. Chia KS. Incidence of Isschemic Heart Disease and Stroke in Chinese, Malays, and Indians in Singapore: Singapore Cardiovascular Cohort Study. Ann Accad Med Singapore29(2): 231-236,2000.

16. Reddy KS. Cardiovascular disease in non Western countries. N Engl J Med 350(24):2438-2440.2004

17. Li Qi, Xianbin D, Wenge T, Qin Li, Deqiang, M.Yulin W. Prevalence and Risk Factors Associated with Dyslipidemia in Chongqing. China. Int. J.Environ. Res. Public Health 12(10): 13455-13465,2015.

18. Bener A, Mohammad AG, Ismail AN, Zirie M, Abdullatef WK, AI-Hamaq AQ. Gender and age- related differences in patients with the metabolic syndrome in a highly endogenous population. Bosn J Basic Med Sci 10(3):210-217,2010.

19. Li Y,ZhaoL, Yu D, Ding G. The prevalence and risk factors of dyslipidemia in different diabetic progression stages among middle aged and elderly populations in China. PLoS One 13(10):e0205709, 2011.

20. Cai L, Zhang L, Liu A, Li S, Wang P, Prevalence, awareness, treatment, and control of dyslipidemia among adults in Beijing, China. J Atheroscler Thromb19(2):159-168,2011.

21. Wang S, Xn L, Jonas JB, You QS, Wang YX, Yang H. Prevalence and associated factors of dyslipidemia in the adult Chinese population. PLoS One 6(3),2011.

22. Sharma U, Kishore J. Garg A, Anand T, Chakraborty M, Lali P, Dyslipidemia and associated risk factors in a resettlement colony of Delhi. J Clin Lipidol 7(6):653-660, 2013.

23. Gupta R, Ravinder S. Rao, Misra A, Samin K. Sharma. Recent trends in epidemiology of dyslipidemias in India. Indian Heart Journal 69(3):382-392,2017.

24. Bayram F, Kocer D, Gundogan K, Kaya A, Demir O, Coskun R et al. Prevalence of dyslipidemia and associated risk factors in Turkish adults. J Clin Lipidol 8(2):206-216,2014.

25. O'Brien T. Nguyen TT, Zimmerman BR, Hyperlipidemia and diabetes mellitus. Mayo Clin Proc 73(10):969-976,1998.

26. Misra A and Shrivastava U. Obesity and Dyslipidemia in South Asians. Nutrients 5(7):2708-2733, 2013.

27. Gebel Erika. A matter of the sexes:the differences between men and women with diabetes. Diabetes Forecast 64(10):46-49, 2011.

28. Hillier TA, Pedula KL. Characteristics of an Adult Population with Newly Diagnosed Type 2 Diabetes. The relation of obesity and age of onset. Diabetes care 24(9): 1522-1527, 2001.