ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 9, Issue 2, 2016

Online - 2455-3891
Print - 0974-2441

Research Article

ASSESSMENT OF CORRELATION IN GENDER AND AGE WITH LIPOPROTEIN LEVELS IN HYPERLIPIDEMIA PATIENTS

ANIL BABU A[1]*, RANI S[2], REVIKUMAR KG[3], SHAFEEQUE MATTUMAL[4], UNNIKRISHNAN UG[5]

[1]Department of Pharmacy Practice, KMCT, National College of Pharmacy, Kozhikode, Kerala, India. [2]Department of Pharmacy, Annamalai University, Annamalai Nagar, Chidambaram, Cuddalore, Tamil Nadu, India. [3]Director, Kerala Institute for Drug Studies, Thiruvananthapuram, Kerala, India. [4]Department of Cardiology, KMCT Medical College, Kozhikode, Kerala, India. [5]Biostatistician, Amrita Institute of Medical Sciences, Kochi, Kerala, India. Email: toanilbabu@gmail.com

Received: 17 December 2015, Revised and Accepted: 19 December 2015

ABSTRACT

Objective: The main objective of the study was to monitor and compare the correlation between the age and gender with the serum lipoprotein levels in the hyperlipidemia patients.

Methods: The entire study was performed only after getting approval from the Institutional Ethics Committee. This is a prospective observational study and conducted in Department of Cardiology of a tertiary care teaching hospital. A total of 520 patients were included and the data collected by data entry form, and the results were thoroughly analyzed using various statistical tools for its relevance and significance.

Results: From the total study population (n=520), the majority was males 271 (52.1%) than the female population 249 (47.9%). The minimum age in the study population identified was 40 (years) and the maximum age was 89 (years). The average age of the study population was found to be 60.94±13.062 (years). The mean averages of total cholesterol in males 217.48±39.33 mg/dL compared to females 231.05±55.05 mg/dL, triglycerides in males were 209.01±73.08 mg/dL compared to females 235.71±97.16 mg/dL, low-density lipoproteins in males were 156.42±37.02 mg/dL compared to females 164.19±43.17 mg/dL, and in case of high-density lipoproteins it was 32.61±6.34 mg/dL compared to females 31.48±6.53 mg/dL.

Conclusion: From the entire study, it was concluded that the prevalence rate is a more common in male population. The incidence rate is too high in younger age population. The correlation of age and gender is directly proportional to the incidence of hyperlipidemia.

Keywords: Hyperlipidemia, Cardiology, Gender, Age.

INTRODUCTION

Hyperlipidemia is referred as the most common serious complication in the younger aged populations. The abnormal levels of lipoproteins such as triglycerides (TG), low-density lipoproteins (LDL), total cholesterols (TC), and high-density lipoproteins (HDL) are playing a greater impact in the development of atherogenic attacks in all kinds of populations. Elevation of TG, LDL, and TC or any one of these along with or without decreased levels of HDL can be named as hyperlipidemia. The prevalence rate of hyperlipidemia is increasing most dramatically in younger aged populations. This higher prevalence rate is also provoked the mortality and morbidity rate of cardiovascular diseases (CVD's) to rate at its peak. The hyperlipidemia is generally denoted as hypercholesterolemia, hypertriglyceridemia, and dyslipidemia. It generally classified as primary and secondary hyperlipidemia [1-3]. There are various factors associated with the development of hyperlipidemia. Tha most common metabolic syndrome, diabetes, genetic causes, thyroid dysfunction, and hormonal imbalances. Along with this sedentary lifestyle, poor quality of life, social habits like smoking and alcoholism, high fatty food intake also plays a key role in the development of hyperlipidemia and associated complications like stroke [4-6].

The National Cholesterol Education Programme and the Adult Treatment Plan III (ATP III) guidelines clearly describe the levels of lipoproteins and its relevance in the pathogenesis of diseases [7]. The clinical significance of the lipoproteins like TG, LDL, TC, and HDL has been studied and reported in various clinical studies in the past years [8,9]. There are studies reported with the epidemiological differences between the male and female exposure ratio toward the hyperlipidemia. In many of the studies, the prevalence of hyperlipidemia is decreased in females especially during the premenopausal stages and once they turned into the postmenopausal stage the prevalence is significantly higher in females [10]. The major risk in individuals with higher mortality and morbidity rate are commonly seen with risk ranges in TG, TC, LDL and decreased levels of HDL. The protective effects of the HDL against the cardiovascular pathogenesis are well-known and the same were also reported in the clinical studies conducted in different populations [11]. The development of hyperlipidemia was also studied in association to prove the correlation with various factors. In various epidemiological regions the gender and age of the study population plays a critical role in the hyperlipidemia. In our present study, we mainly aimed to study the gender and age correlation with the hyperlipidemia in the southern part of our country which was not reported in greater extend [12].

METHODS

The entire study was performed only after getting approval from the Institutional Ethics Committee. The current study was a prospective observational study which was carried out in the Department of Cardiology of a 500 bedded tertiary care teaching hospital in Kerala. The lipid profile and other laboratory data's were collected directly from medical case record sheet by using a customized data entry sheet. Moreover, the entire study population was classified according to the serum lipid levels as per the ATP III guideline. Based on the inclusion and exclusion criteria, a total of 520 patients were included in the study after taking their consent through informed consent form. The results were thoroughly analyzed using various statistical tools for its relevance and significance.

RESULTS

Gender categorizations

The total study population with the strength of 520 patients was included in this prospective observational study after collecting the informed consent form. The entire studies were conducted in the

Department of Cardiology of a tertiary care teaching hospital. The total study populations were comprised 271 males and 249 females with a prevalence of 52.1% and 47.9%, respectively. The same was depicted in Table 1.

Gender correlation and classes of lipoprotein levels in study population

As per the ATP guidelines, the entire study population is categorized into various classes. The prevalence of lipoprotein levels in both male and female populations shows considerable change. In case TC, 41% of females showed up the dominance in contrast with the male prevalence rate of 25.1%. In the case of LDL and TG females found with 29.7% and 52.2% in high-risk range when compare with males. The variation in the lipid levels is also shown in Fig. 1.

The study mainly calculated the various serum lipid levels and their correlations. The mean averages of all four classes of lipid levels in the entire study population were found to be as, mean TC level of the patients was lower in males (217.48±39.33 mg/dL) compared to females (231.05±55.05 mg/dL) and it is statistically significant (p=0.001). The mean TG level of the patients was lower in males (209.01±73.08 mg/dL) compared to females (235.71±97.16 mg/dL) and it is statistically significant (p<0.001). The mean LDL level of the patients was lower in males (156.42±37.02 mg/dL) compared to females (164.19±43.17 mg/dL) and it is statistically significant (p=0.028). The mean HDL level of the patients was higher in males (32.61±6.34 mg/dL) compared to females (31.48±6.53 mg/dL) and it is statistically significant (p=0.046). The severities in the elevated serum lipid levels were high in female than the male populations as per the ATP III guidelines. The distribution rate and gender correlation of various lipoproteins were shown in Table 2.

Correlation between various age groups and lipid levels in study population

During the study, the entire study populations were categorized into various age groups and while looking into the various age categories the minimum age identified in the study population was 40 years and the maximum age identified were 89 years. The average age of the study population was found to be 60.94±13.062 years. As the age increases the incidence rate of the hyperlipidemia were also increasing.

While looking into the age categorization, the high-risk prevalence rate in the study population is increasing with the age. As per ATP guidelines in case of high-risk TC category 39.5% of the study population were found be ≥60 years of age while <60 years were found to be with 24.7%. In the case of LDL 27.8% patients found to be in high-risk category with ≥60 years of age in comparison with 20.6% in <60 years of age. The TG concentration also shown in high for ≥60 years in high-risk category with 49.8% while <60 years of age found with 41% in high-risk category. In the case of HDL <60 years of age old patients were found to be in high prevalence with 89.5% with high-risk ratio. The detailed categorization is shown up in Fig. 2.

From the total study population were screened, all the four classes of lipoprotein levels shows a significance in the correlation with the age of study population. From the available data, it was clearly understood that the age is directly proportional to the serum lipid levels. In our study, the mean TC level of the patients was lower in the age group below 60 years (217.45±40.64 mg/dL) compared to age group above 60 years (229.53±52.8 mg/dL) and it is statistically significant (p=0.004). The mean TG level of the patients was lower in age group below 60 years (213.60±81.59 mg/dL) compared to age group above 60 years (228.76±89.88 mg/dL) and it is statistically significant (p=0.046). The mean LDL level of the patients was lower in age group below 60 years (156.33±38.92 mg/dL) compared to age group above 60 years (163.38±41.11 mg/dL) and it is statistically significant (p=0.045). The mean HDL level of the patients was lower in the age group below 60 years (31.43±5.94 mg/dL) compared to age group above 60 years (32.62±6.82 mg/dL) and it is statistically significant (p=0.035). The same were also depicted in Table 3.

DISCUSSION

Present study was conducted with the objectives to monitor and compare the correlation with the Age and Gender with the serum lipoprotein levels of hyperlipidemia patients. From the current study, it was clearly indicated that the prevalence of hyperlipidemia is higher in male population when compared with the female prevalence rate. This high prevalence rate in male population is mainly as the numbers of patients with hyperlipidemia were more in male when compared to the female population. The higher prevalence rate in males is because of the metabolic changes and the sedentary lifestyles in the male populations which were greatly notified to be get increased as age increases. These results show that the metabolic defects are too

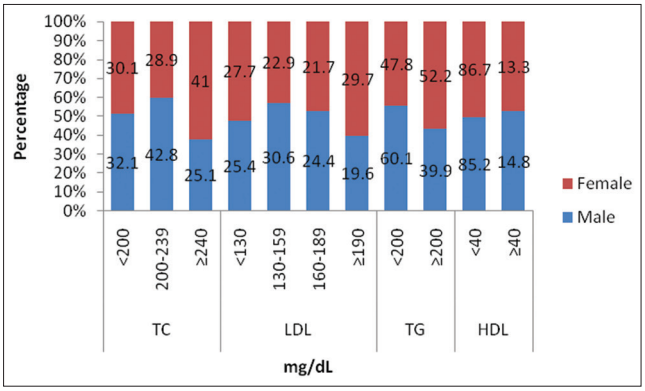

Fig. 1: Lipoprotein levels in study population

Table 1: Gender categorizations (N=520)

Male (%)	Female (%)
271 (52.1)	249 (47.9)

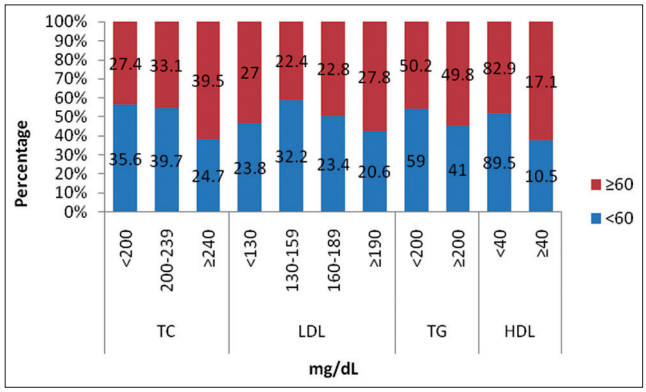

Fig. 2: Age categorizations in relation to lipoprotein levels

Table 2: Gender correlations with lipoprotein levels (N=520)

Variables	Gender	N	Mean±SD	p value
TC	Male	271	217.48±39.33	0.001*
	Female	249	231.05±55.05	
TG	Male	271	209.01±73.08	<0.001*
	Female	249	235.71±97.16	
LDL	Male	271	156.42±37.02	0.028*
	Female	249	164.19±43.17	
HDL	Male	271	32.61±6.34	0.046*
	Female	249	31.48±6.53	

TC: Total cholesterol, TG: Triglycerides, LDL: Low-density lipoprotein, HDL: High-density lipoproteins, SD: Standard deviation, *Clinically significant

Table 3: Correlations of age with lipoprotein levels (N=520)

Variables	Age	N	Mean	SD	p value
TC	<60	239	217.45	40.64	0.004*
	>60	281	229.53	52.82	
TG	<60	239	213.60	81.59	0.046*
	>60	281	228.76	89.88	
LDL	<60	239	156.33	38.92	0.045*
	>60	281	163.38	41.11	
HDL	<60	239	31.43	5.94	0.035*
	>60	281	32.62	6.82	

TC: Total cholesterol, TG: Triglycerides, LDL: Low-density lipoprotein, HDL: High-density lipoproteins, SD: Standard deviation, *Clinically significant

common in the male populations and which are generally associated with the poor quality of life. The correlation between the genders with the serum lipoprotein levels shows positive significance rate with TC, TG, LDL, and HDL levels. The lower prevalence rates in females were reported with various studies and this is because of their extra protective mechanism in the premenopausal age. While as age increases the prevalence rate were also increase, and the incidence rate of hyperlipidemia as well as the associated complications were identified with almost same percentage [13]. As per the ATP III guideline, from the study populations the females were more prone to be in high-risk categories of all lipoprotein classes, and this is because of the postmenopausal women's showed up almost equal or even more prevalence in comparison with their premenopausal state. Similarly, the female populations admitted in the study were also identified with older age. The similar incidence of prevalence rate is also reported in study conducted in the south Indian populations [14,15].

As per the age categorization, the number of hyperlipidemia patients was found to be increased with increasing age. That means age is directly proportional to the hyperlipidemia associated complications. Moreover, the higher prevalence rate of hyperlipidemia in younger adults clearly indicates the high-risk ratio of CVD's in younger age groups. Age normally concluded as a nonmodifiable risk factor in the development of hyperlipidemia with CVD's, and it was reported highly significant in the present study. As age increases the properties of coronary arteries and myocardial contractility reduces and in relation to this the deposition of the serum lipid levels in the coronary arteries will cause atherosclerosis to the myocardium and followed by ischemia. The abnormal serum concentrations of LDL, TC, TG, and HDL were considered to be as the major threat in the study population in relation with their age. This clearly indicates that as the age increases the complication associated with the hyperlipidemia were also increases or otherwise it can also hypothecated like as age increases the control over the serum cholesterol levels were also decreases. Hence that brings out a high percentage of mortality and morbidity ratio in the community. This was highly correlated with various studies conducted in same kinds of populations [16-19].

CONCLUSION

The study concludes that the prevalence of the hyperlipidemia is more severely seen in male populations than female population. The prevalence rate is increasing with the age of study population, more commonly a greater part of the population affected is identified as the younger adults. This is clearly emphasize the importance of the earlier detection, therapeutic as well as nonpharmacological management of hyperlipidemia by improving the quality of life in the community.

REFERENCES

1. Stone NJ, Robinson J, Lichtenstein AH, Merz NB, Lloyd-Jones DM, Blum CB, *et al*. ACC/AHA Blood cholesterol guideline. J Am Coll Cardiol 2013;:1-85.
2. Joshi SR, Anjana RM, Deepa M, Pradeepa R, Bhansali A, Dhandania VK, *et al.* Prevalence of dyslipidemia in urban and rural India: The ICMR-INDIAB study. PLoS One 2014;9(5):e96808.
3. Nelson RH. Hyperlipidemia as a risk factor for cardiovascular disease. Prim Care 2013;40(1):195-211.
4. Estari M, Reddy AS, Bikshapathi T, Satyanarayana J, Venkanna L, Reddy MK. The investigation of serum lipids and prevalence of dyslipidemia in urban adult population of Warangal District, Andhra Pradesh, India. Biol Med 2009;1:61-5.
5. Monaliza MA, Aggarwal M, Srivastava A. Awareness of risk factors and warning symptoms of stroke in general population. Nurs Midwifery Res J 2012;8:149-61.
6. Chou P, Hsiao KJ, Lin JW, Chen ST. Community-based survey on blood pressure, blood biochemistry and dietary habits in Pu-Li, Taiwan. Zhonghua Yi Xue Za Zhi (Taipei) 1992;50(4):279-87.
7. ATP III Guidelines At-A-Glance Quick Desk Reference, NIH Publication No. 01-3305, May 2001.
8. Maheshwari P, Sharma M, Sharma KK, Goyal NK, Roy MN, Mishra BS, *et al*. Equivalence of cholesterol levels at hospital-based health-check program with population-based studies: A comparative study. J Clin Prev Cardiol 2013;:1-7.
9. Dawalji S, Venkateshwarlu K, Thota S, Venisetty PK, Venisetty RK. Prescribing pattern in coronary artery disease: A prospective study. Int J Pharm Res Rev 2014;3:24-33.
10. Guetta V, Cannon RO 3rd. Cardiovascular effects of estrogen and lipid-lowering therapies in postmenopausal women. Circulation 1996;93(10):1928-37.
11. Gordon T, Castelli WP, Hjortland MC, Kannel WB, Dawber TR. High density lipoprotein as a protective factor against coronary heart disease. The Framingham study. Am J Med 1977;62(5):707-14.
12. 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;45:275-9.
13. Jayarama N, Reddy M, Lakshmaiah V. Prevalence and pattern of dyslipidemia in Type 2 diabetes mellitus patients in a rural tertiary care centre, southern India. Glob J Med Public Health 2012;1:24-7.
14. World Heart Federation, Cardiovascular Risk Factors: 1-4.
15. Björkelund C, Andersson-Hange D, Andersson K, Bengtsson C, Blomstrand A, Bondyr-Carlsson D, *et al.* Secular trends in cardiovascular risk factors with a 36-year perspective: Observations from 38- and 50-year-olds in the population study of women in Gothenburg. Scand J Prim Health Care 2008;26(3):140-6.
16. Lin CH, Lai SW, Liu CS. Prevalence of hypercholesterolemia and its related factors in middle-aged Taiwanese adults a hospital-based study. Mid Taiwan J Med 2003;8:85-90.
17. Mendis S, Puska P, Norrving B. World Health Organization. Global Atlas on Cardiovascular Diseases Prevention and Control. Geneva: World Health Organization in collaboration with the World Heart Federation and the World Stroke Organization; 2011. p. 1-28.
18. Mithal A, Majhi D, Shunmugavelu M, Talwarkar PG, Vasnawala H, Raza AS. Prevalence of dyslipidemia in adult Indian diabetic patients: A cross sectional study (SOLID). Indian J Endocrinol Metab 2014;18(5):642-7.
19. Karki DB, Neopane A, Pradhan B, Magar A. Lipid levels in Nepalese population. Kathmandu Univ Med J (KUMJ) 2004;2(4):349-53.