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### Original Article

## Prevalence of dyslipidemia in Patients undergoing general Health Checkup

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#### ABSTRACT

**TITLE:** PREVALENCE OF DYSLIPIDEMIA IN PATIENTS UNDERGOING GENERAL HEALTH CHECKUP, AIMS To find the prevalence of dyslipidemia in patients undergoing general health checkup in the following categories: Non diabetic, Normotensive Diabetic/Prediabetic Hypertensive Diabetic and hypertensive To compare the prevalence of dyslipidemia in sample population and general population. To find the age and sex wise distribution of dyslipidemia. **METHODS:** In this cross sectional study. 338 subjects who attended general health checkup at A.J. Hospital & Research Centre were evaluated by physical checkups, fasting lipid profiles and blood glucose levels. Dyslipidemia risk, impaired blood sugar levels and hypertension were determined as per NCEP- ATP III, ADA and JNC guidelines respectively. **RESULTS** The prevalence of dyslipidemia was 72.7 % in the study population as compared with 28.1 % from WHO India 2008 prevalence statistics. The prevalence was highest in the diabetic and hypertensive group and in the age group of 40-65 and was higher in males. **CONCLUSION** Despite emphasis that has been put on awareness of risk factors of cardiovascular disease in recent years, this survey reveals a further up going trend in prevalence of dyslipidemia and is an indication for change in lifestyle modifications to be adopted by the population.

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### 1. Introduction

Cardiovascular disease (CVD)-number one cause of death and disability globally in both developed as well as developing countries. 17.3 million died from CVDs in 2008, 30% of global deaths. South Asians around the globe have the highest rates of Coronary Artery Disease (CAD).<sup>3</sup> In India, 24% mortality is due to cardiovascular disease.<sup>4</sup> According to National Commission on Macroeconomics and Health (NCMH), a government of India undertaking, there would be around 62 million patients with CAD by 2015 in India and of these, 23 million would be patients younger than 40 years of age.<sup>5</sup> CAD is usually due to atherosclerosis of large and medium sized arteries and dyslipidemia has been found to be an independent risk factor for CVD.<sup>6,7</sup> Treatment of dyslipidemia can reduce the risk of heart disease by 30% over a 5-year period.<sup>8</sup> Effective cholesterol lowering reduces CVD mortality<sup>9</sup> more than reduction of other risk factors<sup>10</sup>. Although the benefits of lipid lowering therapy have been demonstrated most conclusively in persons with cardiovascular disease, lipid-lowering therapy is effective even in persons without

clinically apparent cardiovascular disease.<sup>5</sup> As it has long been known that lipid abnormalities are major risk factors for premature CAD, studies<sup>11,2</sup> on the prevalence of these risk factors are urgently needed. In this cross-sectional study, we report the prevalence of dyslipidemia in patients undergoing general health checkup.

#### AIMS

Aims of this study is to find the prevalence of dyslipidemia in non-diabetic, normotensive, Diabetic/Pre-diabetic, hypertensive, diabetic and hypertensive, to compare the prevalence of dyslipidemia in sample and general population and also to find the age and sex wise distribution.

#### MATERIAL AND METHODS

##### Design and Data Collection

The study population consisted of 338 members for general health check up at A.J Hospital and Research Center. Patients were evaluated by physical checkups, fast lipid profiles, and blood glucose levels. Blood samples were collected by venipuncture after an overnight fast for 12-14 hours.

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### Serum Lipid and Glucose Analysis

The lipid profile was determined with Enzyme Selective protection method and LDL was calculated by using the Friedwald's formula. The blood glucose levels was estimated by the GOD-PAP methodology.

### Definitions and Preferred Cutoff Values

The NCEP ATP 3 criteria was applied for determination of dyslipidemia i.e. total cholesterol >200mg/dl, triglycerides >150mg/dl, HDL <40mg/dl and LDL >130mg/dl.<sup>12,4</sup> According to these standard guidelines, hypercholesterolemia is defined as TC >200mg/dl, LDL-C as >100mg/dl, hypertriglyceridemia as TG >150mg/dl and HDL-C <40mg/dl. Dyslipidemia is defined by presence of one or more than one abnormal serum lipid concentration. For serum Glucose levels, we referred to ADA Guidelines.<sup>13</sup> Persons with fasting blood glucose >126mg/dl or who were on medication for diabetes was considered as having diabetes mellitus.

### Exclusion Criteria

Those on treatment for thyroid disease, nephrotic syndrome, chronic renal failure, liver disease. Those on treatment with corticosteroids, beta blockers, estrogens. Prevalence by prevalence rate formula: number of patients per total number of all subjects at the time of study X 100.

## RESULTS

The study population was comprised of 338 subjects that included 205 males and 133 females. The prevalence of dyslipidemia was found to be more in 40-65 yr old males.

Fig.1

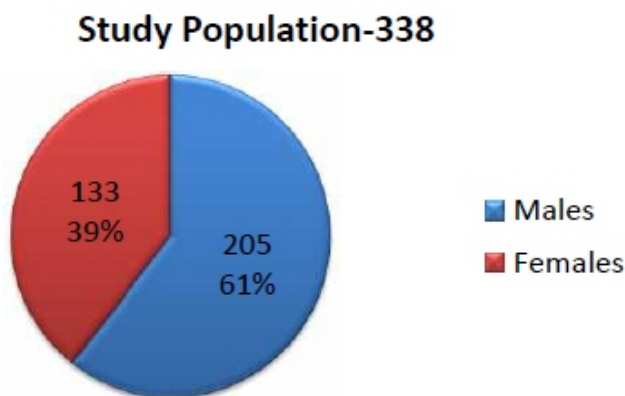


Fig.2

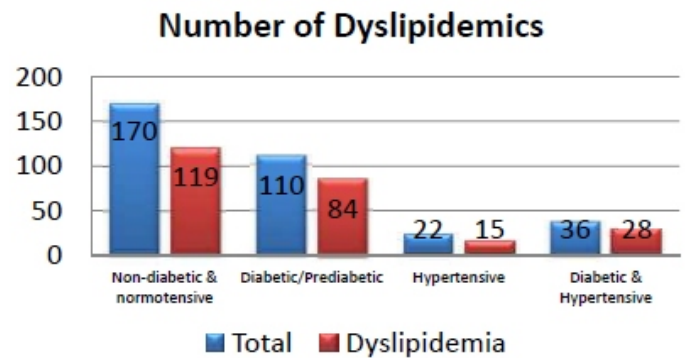


Fig.3

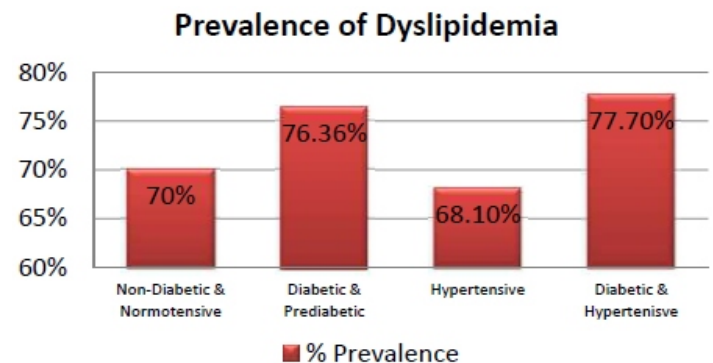


Fig.4

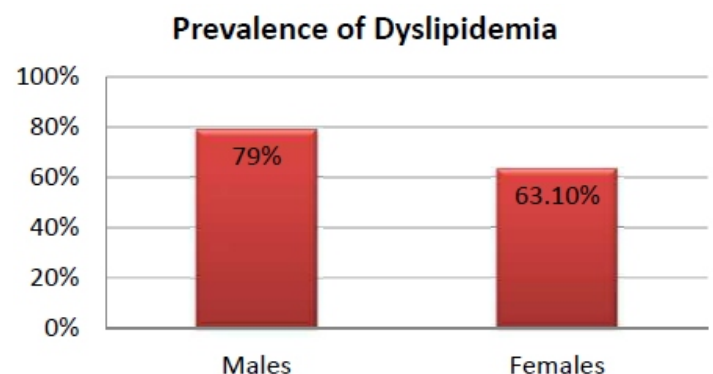
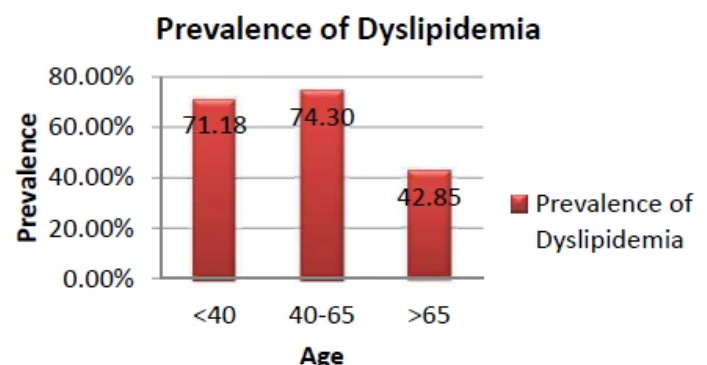


Fig.5



The prevalence of elevated total cholesterol levels was found to be 46.4%, hypertriglyceridemia was 37.86%, high LDL was 30 %, low HDL was 29.28.

There was 207 newly diagnosed dyslipidemics in this study.

The mean total cholesterol in the study population was found to be 197.7  $\pm$  41.57. The mean triglycerides under study population was 152.97 and  $\pm$  99.14. The mean HDL was found to be 44.28 and  $\pm$  9.52. Similarly the mean LDL was 112.87 and  $\pm$  32.90. The mean VLDL was found to be 28.56 and  $\pm$  13.22.

Fig.2 and Fig. 3 shows the number & prevalence of dyslipidemics found in non-diabetic & normotensive, diabetic/pre-diabetic, hypertensive and diabetic & hypertensive groups respectively. Fig.4 shows the higher prevalence of dyslipidemia in males than females. Fig.5 shows the prevalence of dyslipidemia under age wise distribution.

Table. 1 shows the values of mean and standard deviation of total cholesterol, triglycerides, HDL, LDL and VLDL according to gender.

**Table.1 Clinical characteristics of study population**

Clinical characteristics	Sex	Mean	S.D
Total cholesterol	Male	197	$\pm$ 44.60
	Female	198.29	$\pm$ 36.57
Triglycerides	Male	174	$\pm$ 114.54
	Female	120.39	$\pm$ 55.27
HDL	Male	41.17	$\pm$ 7.10
	Female	49.09	$\pm$ 10.71
LDL	Male	112	$\pm$ 32.27
	Female	114.18	$\pm$ 33.92
VLDL	Male	31.61	$\pm$ 13.88
	Female	23.81	$\pm$ 10.57

## DISCUSSION

hypertriglyceridemia and abnormally high LDL-C and low HDL-C levels which are well-known risk factors for cardiovascular diseases in all age groups.

This study shows increased prevalence of dyslipidemia was found to be more in males. The overall prevalence rate was 72.7% and the prevalence was high for all groups, in which the highest prevalence was in the diabetic and hypertensive group which was 77.7 %.

Results consistent with previous studies –In a study done by Prabhakaran et al in industrial population, the prevalence rate of dyslipidemia was 62%<sup>14</sup>. And our results are consistent with the previous study. The 2008 WHO statistics found the prevalence of dyslipidemia to be 27.1% in the general population.<sup>15</sup> But our study is in disagreement with this data as our study was not done as a screening study but was done in those individuals who came to the hospital thinking that they had a health problem.

In our study the prevalence of dyslipidemia was found to be high in 40-65 age group, but more importantly a high prevalence was noted in <40 age group. In a study done by A.M Sawant et al<sup>16</sup> the prevalence rate of dyslipidemia was 80% in 31-40 age group. This data is in agreement with our study and signifies the increasingly alarming prevalence of dyslipidemia in younger population, which needs to be tackled by strict implementation of lifestyle modification and pharmacological therapy if necessary.

Our study also found that those on statins was 9.76% and out of this only 2.6% was well controlled. This shows either the inadequate treatment or the non compliance to both lifestyle modification and pharmacological therapy.

Low HDL-C levels are stronger predictor of occurrence and reoccurrence of MI and stroke and are also associated with premature and severe CAD.<sup>17</sup> Oxidative modification of LDL-C is a key process of atherosclerosis and elevated LDL-C has been recognized as primary risk factor for CAD by NCEP – ATP III.<sup>18</sup> In our study increased LDL-C has been found to be contributing majorly to dyslipidemia irrespective of age and gender. Diet with high fat and calorie intake and lack of physical activity would be the major culprits of dyslipidemia in our population. References have shown that our diets are rich in saturated fats. Besides it also involves overcooking of food which results in destruction of nutrients like folate, deep frying and refrying in the same oil leading to trans-fatty acids formation which probably contributes to increase of dyslipidemia in our population.<sup>19</sup>

There was certain limitations to our study. Our study was a cross-sectional study and follow up of patients could not be done. Number of subjects under age group of >65 was less and they could not be adequately evaluated. Those controlled with statins is not included in this study.

## CONCLUSION

This study revealed increased prevalence of dyslipidemia to be more prevalent in 40-65 yr males. Despite emphasis on awareness<sup>20,21</sup> study shows up going trend of dyslipidemia. Combination lifestyle therapies i.e., enhanced physical activity and dietary modification and therapeutic intervention<sup>22</sup> would help us in treatment and management of dyslipidemia.

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