



Prevalence of Dyslipidemia in Adults: An Epidemiological Study in Kavaratti Island, Lakshadweep.

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Abstract

Background: Dyslipidemia is an important, modifiable chronic heart disease (CHD) risk factor. Previous studies in various parts of the world including India have reported the prevalence of dyslipidemia particularly in urban population. However, its prevalence in Lakshadweep islands has not been well documented.

Methods: A cross-sectional study for the prevalence of dyslipidemia among adult population in Lakshadweep (Kavaratti Island) using the National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATP III) guidelines was conducted.

Result: 300 subjects recruited (160 men; 140 women) averaged 51.91 and 49.41 years of age, respectively (range: 39-85). After 12 hours fasting, serum samples were collected. Total cholesterol, triglycerides, low-density lipoprotein (LDL-C) and high-density lipoprotein (HDL-C) cholesterol levels were measured. The prevalence of hypercholesterolemia (> 200 mg/dL), hypertriglyceridemia (> 150 mg/dL), high LDL-C (> 130 mg/dL) and low HDL-C (< 40 mg/dL) was 96.428, 52.857, 15.714, 78.571, 94.285 % respectively in women. Women had a slightly higher prevalence of hypercholesterolemia 52.857% and high LDL-C 78.571 % than men, 46.25 and 62.5% respectively while the prevalence of hypertriglyceridemia was approximately 2-3 fold less in females (female 15.71% and males 38.125%). The prevalence of dyslipidemia was present in all age groups in almost similar proportion. One striking feature that is of low HDL was observed in 90 to 100 % in different tertile of age.

Conclusion: The present study demonstrated a high prevalence of dyslipidemia in Lakshadweep (Kavaratti Island) adults with specifically low HDL; hence, primary lipid screening should be considered for all age groups in this area.

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Introduction

Today CHD is at a rise globally and dyslipidemia is a well established risk factor of it with proper guidelines for its management.^[1] However, in the past few years, data from several countries reported a high prevalence of dyslipidemia and unsatisfactory results of dyslipidemia management.^[2,3] A multicountry analysis of national health examination survey data from eight countries on various continents reported disappointing findings of low detection and inadequate management of high serum cholesterol, particularly among middle-income countries.^[3]

Studies have suggested that low HDL-C and high triglycerides also confer residual risk for CHD.^[4] However, LDL-C is usually the primary target for lipid management.^[5] Many studies have been conducted to measure the prevalence of dyslipidemia in many countries including India but no study has ever been conducted in the population of Lakshdweep where the environment and life style of the people are very different from the main land, hence the need was felt to analyze the lipid profile of the adult population of this area and this study was undertaken.

The present study aimed to document the distribution of lipid parameters and prevalence of dyslipidemia among Kavaratti island (Lakshadweep) adults according to age and sex. This study could provide useful information for prevention and control of dyslipidemia as well as provide baseline data for monitoring and evaluation at the national level, especially in this area.

Materials and Methods

Setting and subjects: This was a cross-sectional, community, population-based investigation in Lakshadweep (Kavaratti Island). Lakshadweep is the tiniest Union Territory of India and is its only coral island chain. This archipelago consists of 36 islands, 12 atolls, 3 reefs and 5 submerged banks. The islands have a total area of 32 sq.kms and the lagoons enclosed by the atolls cover an area of 4200 sq.kms. Only 10 of these islands namely, Agatti, Amini, Andrott, Bitra, Chetlat, Kadmat, Kalpeni, Kavaratti, Kiltan and Minicoy are inhabited. Kavaratti is the Administrative Headquarters of the Union Territory with the population of 10113 as per 2001 census. This study was conducted in Indira Gandhi Hospital, which is a 50 bedded government hospital, situated in Kavaratti island. The study was spread over a period of three months. All the patients reporting to the pathology laboratory for lipid profile investigations were included in the study. During this period 300 cases were studied. Most of the subjects were either fisherman, house or office workers.

Specimen collection: Serum samples were collected in the morning after the subjects had fasted for 12 hours. Measurements included total cholesterol, triglycerides, HDL-C and LDL-C. The classification of dyslipidemia was based on the NCEP ATP III Guidelines.^[5]

Methodology: Fasting serum samples were collected and biochemical analysis was done on Semi auto analyzer Naxegen using kits supplied by Aggapi. Method used for serum cholesterol was (CHODPAP method), serum triglycerides (GPO-PAP method) and HDL cholesterol (direct method) ratio of total cholesterol to HDL-C was also calculated.

Statistical analysis: Statistical analyses were performed using SPSS version 9.0 (SPSS, Inc., Chicago). The results were expressed as means and standard deviations (SD). Descriptive statistics were computed for each sex and the prevalence of dyslipidemia expressed as a percentage.

Result

Out of the 300 patients, 160 were men and remaining 140 were women. The average age was 52.91 and 49.41 years, respectively (range: 39-85). Women had a slightly higher level of total cholesterol and LDL-C than the men but no significant difference was found in the HDL-C levels. Interestingly, the triglyceride level was lower in women than the men (Table 1).

Table 1: Prevalence of dyslipidemia according to the sex.

Dyslipidemia	Male	Female
Hypercholesterolemia (>200 mg/dL)	74 (46.25%)	74 (52.85%)
Hypertriglyceridemia (>150 mg/dL),	61 (38.12%)	22 (15.71%)
High LDL-C (> 130 mg/dL)	100 (62.5%)	110 (78.57%)
Low HDL-C (< 40 mg/dL)	156 (97.5%)	132 (94.28%)
Total	160	140

The prevalence of dyslipidemia in the women was equivalent to men, the slight difference that was present was not statistically significant particularly the high total cholesterol and LDL-C. The prevalence of hypertriglyceridemia was not very high in female (15.71 %) however in men it was 38.12 %. The prevalence of low HDL-C and hypercholesterolemia with hypertriglyceridemia of the entire groups of subjects was 45.625 % in male 12.142 % in female (Table 2). Low HDL-C (< 40 mg/dL) was present in all the age groups and in both male and female ranging from 90 to 100 %.

Discussion

The causal relationship between dyslipidemia and atherosclerosis is well-documented.^[1] Screening and

Table 2A: Prevalence of dyslipidemia by age group (tertile) in females.

Distribution by age in years	<39		40-49		50-59		60-69		<70	
Number of cases (%)	21	%	49	%	39	%	26	%	5	%
Hypercholesterolemia (> 200 mg/dL)	12	57.14	23	46.93	21	53.84	16	61.53	2	40
Hypertriglyceridemia (> 150 mg/dL)	2	9.523	10	20.40	1	2.564	6	23.076	3	60
High LDL-C (> 130 mg/dL)	14	66.66	38	77.55	38	97.43	17	65.38	3	60
Low HDL-C (< 40 mg/dL)	19	90.47	45	91.83	39	100	26	100	3	60
Hypercholesterolemia (>200 mg/dL), and Hypertriglyceridemia (> 150 mg/dL),	1	4.76	6	12.24	5	12.82	5	19.23	1	20
Hypercholesterolemia (> 200 mg/dL),and Low HDL-C (< 40 mg/dL)	12	57.14	20	40.81	19	48.71	16	61.53	1	20
Hypertriglyceridemia (> 150 mg/dL and Low HDL-C (< 40 mg/dL)	1	4.76	6	12.24	4	10.25	5	19.23	3	60
Hypercholesterolemia (>200mg/dL), Hypertriglyceridemia (> 150 mg/dL and Low HDL-C (< 40 mg/dL)	1	4.76	6	12.24	4	10.25	5	19.23	1	20
High LDL-C (> 130 mg/dL) and Hypertriglyceridemia (> 150 mg/dL)	1	4.76	5	10.20	5	12.82	5	19.23	1	20
High LDL-C (> 130 mg/dL) and Low HDL-C (< 40 mg/dL)	12	57.14	23	46.93	18	46.15	15	57.69	2	40
High LDL-C (> 130 mg/dL) Hypertriglyceridemia (> 150 mg/dL) and Low HDL-C (< 40 mg/dL)	1	4.76	5	10.20	4	10.25	5	19.23	1	20

Table 2B : Prevalence of dyslipidemia by age group (tertile) in males.

Distribution	<39		40-49		50-59		60-69		<70	
Number of cases	23	%	40	%	53	%	29	%	15	%
Hypercholesterolemia (> 200 mg/dL)	9	39.13	22	55	27	50.94	12	41.37	4	26.66
Hypertriglyceridemia (> 150 mg/dL),	11	47.82	13	32.5	18	33.96	5	17.24	14	93.33
High LDL-C (> 130 mg/dL)	11	47.82	31	77.5	34	64.15	17	58.62	7	46.66
Low HDL-C (< 40 mg/dL)	22	95.65	39	97.5	52	98.11	28	96.55	15	100
Hypercholesterolemia (> 200 mg/dL),and Hypertriglyceridemia (> 150 mg/dL),	4	17.39	10	25	14	26.41	4	13.79	1	6.66
Hypercholesterolemia (> 200 mg/dL),and Low HDL-C (< 40 mg/dL)	9	39.13	21	52.5	27	50.94	12	41.37	4	26.66
Hypertriglyceridemia (> 150 mg/dL and Low HDL-C (< 40 mg/dL)	4	17.39	10	25	14	26.41	4	13.79	1	6.66
Hypercholesterolemia (> 200 mg/dL), Hypertriglyceridemia (> 150 mg/dL and Low HDL-C (< 40 mg/dL)	9	39.13	22	55	27	50.94	12	41.37	3	20
High LDL-C (> 130 mg/dL) and Hypertriglyceridemia (> 150 mg/dL)	4	17.39	10	25	13	24.52	4	13.79	1	6.66
High LDL-C (> 130 mg/dL) and Low HDL-C (< 40 mg/dL)	12	52.17	23	57.5	18	33.96	15	51.72	2	13.33
High LDL-C (> 130 mg/dL) Hypertriglyceridemia (> 150 mg/dL and Low HDL-C (< 40 mg/dL)	1	4.34	5	12.5	4	7.54	5	17.24	1	6.66

appropriate management of dyslipidemia by health care providers is imperative for both primary and secondary prevention of coronary artery disease, peripheral vascular disease and stroke. It is seen that the total cholesterol levels in Asian Indians is similar or lower as compared to Caucasians,^[6] but the atherogenic dyslipidemia is more common, which may contribute to CHD. Various researchers have found that the prevalence of dyslipidemia ranged from 10-73%. Specifically, prevalence of hypercholesterolemia was 28% in urban subjects as compared to 22% in the rural subjects.^[7] In urban New Delhi, the prevalence rate of hypertriglyceridemia was 61% in non-obese subjects as compared to ~73% in obese subjects.^[7,8,9] Subjects belonging to low socio-economic stratum and residing in the urban slums also showed substantial prevalence of hypercholesterolemia (~27%) and hypertriglyceridemia (~12-17%).^[7,10,11]

Using the NCEP (ATP III) Guidelines, the present study shows that the prevalence of dyslipidemia was high, particularly among the women who had a 1 to 2 fold higher prevalence of hypercholesterolemia and a higher LDL-C than the men in the study, while the prevalence of hypertriglyceridemia was less by 2.5 fold in females. The prevalence of dyslipidemia was not associated with age in the present population. Since in lakshdweep population no well documented studies have been conducted so it is difficult to compare the prevalence of dyslipidemia as the geographical location and life style is unique to this place.

In the present study, age was grouped in tertiles. The prevalence of dyslipidemia was found to be relatively high even in the youngest tertile (mean, 32.9 + 7.4 years of age), in both the men and women, perhaps because of the changes in nutrition, health accompanying socio-economic development and westernization of food consumption patterns.

The increased prevalence in hypertriglyceridemia may be partially explained by the high consumption of carbohydrates, as from glutinous rice and fat consumption from coconut while protein was modest.^[11] The drastically low high density lipoproteinemia is due to the sedentary life style. While interpreting these findings, the geographical conditions should also be considered like in the island availability of food is totally dependent on the main land as farming and local production of food items is bare minimum. Since the supply from main land is by sea route and is many times restricted because of weather conditions and hence the local population have the tendency to consume the food which can be stored over longer period like rice.

Further the local customs like marriage within the community and in maximum cases among the residents of island also increase the genetic predisposition to the hereditary based diseases like dyslipidemia.

Even though the risk of dyslipidemia in the elderly tends to be higher than in the younger

tertiles, the difference was modest in the present study. This finding was not consistent with other studies conducted at various locations which demonstrated that the prevalence of dyslipidemia in the elderly as very high (i.e. 70 % for hypercholesterolemia).^[12]

The present findings must be interpreted within the context of number of in built potential strengths and weaknesses. Although the subjects in the present study were well characterized, they were all Lakshdweep inhabitants, whose body size, lifestyles, cultural backgrounds and environmental living conditions are different from other populations. Thus, care should be taken when extrapolating these results to other populations.

Conclusion

Our study demonstrated the high prevalence of dyslipidemia among adults of Lakshdweep inhabitants, particularly low HDL-C, hypertriglyceridemia and hypercholesterolemia.

Recommendations:

- Primary screening for cholesterol and triglycerides in the adult population of Lakshdweep island should be routinely done.
- Dietary modification like consuming food which is rich in HDL-C.
- Extensive physical activity.
- Counselling and awareness.

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Competing Interests

None declared.

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