



## Changes in Lifestyle after Dyslipidemia Diagnosis in Tertiary Care Teaching Hospital.

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### Research Article

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### Abstract

**Aim & Objective:** The present study was aimed to determine the extent to which people recently diagnosed with high lipid profile modify their lifestyles after the life style modification counseling.

**Methods:** The prospective interventional study was conducted in a tertiary care teaching hospital, Tamilnadu and involved 57 newly diagnosed dyslipidemia patients in all age groups. The Subjects were assigned to receive life style modification counselling after diagnosis and their results during reviews were compared between baseline values. By using questionnaire, patients assigned with the life style modification counseling were interviewed for their response.

**Results:** The statistically significant improvements were seen in the smoking cessation, diet, physical activity and moderate alcohol intake in the overall and both age groups (<40years,≥40years) and a smaller change was seen in decreasing BMI. Life style modification counseling improves patient's lifestyle. No significant improvement in BMI on those patients is needed to find effective methods and behavioral treatment for providing wide scale intervention.

**Conclusion:** Pharmacists need to be able to provide more patient counseling about risk factors, therapeutic lifestyle modifications to the patients and to achieve lasting lifestyle changes, it is likely that system changes are needed, such as the creation of multidisciplinary teams with expertise in counseling and the remuneration of time spent in lifestyle counseling.

**Keywords:** Dyslipidemia, life style modification, Questionnaire, Patient counseling

### Introduction

Dyslipidemia is an important, traditional, modifiable risk factor leading to cardio vascular diseases (CVD) which is major cause of morbidity and mortality in worldwide. South Asians around the globe have the highest rates of coronary artery disease (CAD).<sup>1</sup> According to World Health Organization (WHO), dyslipidemia is associated with more than half of global cases of ischemic heart disease and more than 4 million deaths per year.<sup>2</sup> Abnormalities in plasma lipoprotein play a central role in the pathogenesis of atherosclerosis and CAD is a clinical manifestation of atherosclerosis.<sup>3,20</sup> Ever since the connection between cholesterol levels and risk for CAD was established, the management of dyslipidemia became a very important health issue.<sup>4</sup>

Observational cohort studies have clearly demonstrated that 'lifestyle' risk factors like cholesterol rich diet, cigarette smoking, physical inactivity, and increased body mass index (BMI) are associated with increased risks of premature CVD and death.<sup>5</sup> NCEP ATP III (National cholesterol education programme Adult treatment panel III) recommends lifestyle therapies in place of drug therapies for patients who fall into an intermediate range of CHD (Coronary heart disease) risk.<sup>6</sup> A group at low risk of CVD based on normal BMI, never smoking status, medium to high levels of physical activity, light alcohol consumption and a reduced saturated fat intake.<sup>7</sup>

Previous researches have reported that, nearly three quarters of patients received information about lowering their serum lipids through lifestyle modifications when they were first diagnosed with elevated serum cholesterol concentrations and other than in smoking cessation there is little improvement in the lifestyles of newly diagnosed patients.

People developing the diseases are already more likely to have more risk factors, and reducing such risk factors by lifestyle changes, while often difficult, is effective in reducing diseases. Despite the beneficial effects of preventing dyslipidemia, designing and implementing effective strategies that lead to sustained lifestyle



modification is difficult. To optimize existing strategies, we need to evaluate whether people alter existing risk factors after they first learn of their dyslipidemia.<sup>8,9</sup> Thus, the objective of the present study was to determine the extent to which people recently diagnosed with high lipid profile modify their lifestyles after life style modification counseling.

## Methodology

### Type of study

A prospective interventional study, carried out from June to December 2010. The study populations were monitored for every three months in the study duration.

### Population and sampling

Newly diagnosed patients with elevated lipid profile were included in this study. Exclusion criteria: Patients, who had been taken already treatment for dyslipidemia.

### Materials

The diagnosis of dyslipidemia was supported in every patient by lipid profile reports. Necessary findings like demographics, anthropometric measurements, social habits and family history data were collected by direct patient interview. Medication profile, co morbid diseases were collected through patient's case reports. The study was explained to the patients and their relatives and their consent were taken. Excessive alcohol intake was defined by more than two drinks to men and more than one drink to women as per the WHO guidelines.<sup>10</sup>

The MEDFICTS questionnaire (MF), a rapid and accurate brief dietary assessment instrument to assess dietary fat intake would be a clinically useful screening tool. It contains 8 food categories: Meats, Eggs, Dairy, Fried foods, fat In baked goods, Convenience foods, fats added at the Table, and Snacks. The first column of the questionnaire addresses each of these food categories. Within each category, food items are assigned to either group 1 (desirable) or group 2 (undesirable) based upon total fat content. The questionnaire is scored using totaling the quality-adjusted intake quantity yielding a possible range of scores from 0 to 216 points.<sup>11,12</sup>

The short version of international physical activity questionnaire (IPAQ) is a dimension-based instrument. The questionnaire is structured to capture physical activity in 4 generic dimensions of physical activity, namely vigorous, moderate, walking and sitting. Depending upon the score categorized in to three groups (Less, Moderate, Vigorous).<sup>13</sup> BMI, social habits, physical activity, dietary pattern, medication and lipid profile data were collected among the study group during their first (after 3 months) and second visit (after 6 months) also.

During each review life style modification counseling was given to the patients. Changes in proportion of lifestyle risk factors baseline and follow up of dyslipidemia were summarized by absolute risk reduction (ARR) and relative risk reduction (RRR). ARR is the absolute risk difference between before and after percentages, while the RRR consists of the ARR as a percentage of the risk factor before hypertension diagnosis.<sup>8</sup>

### Definition and preferred cutoff Values

According to NCEP - ATP III Guidelines for serum lipids, hypercholesterolemia is defined as total cholesterol (TC) >200mg/dl, low density lipoprotein cholesterol (LDL-C) as >100mg/dl, hypertriglyceridemia as triglycerides (TG) >150mg/dl and high density lipoprotein cholesterol (HDL-C) <40mg/dl. Dyslipidemia is defined by presence of one or more than one abnormal serum lipid concentration.

### Interventions

Subjects were assigned to receive life style modification counseling after diagnosis. Depending upon their previous life style histories, the counseling was given to the patients. The counseling was mainly focused about their social habits, diet and physical activity. By using questionnaire, life style risk factors noted and assessed during baseline and reviews.

### Statistical Analysis

The statistical analysis was performed using the SPSS (version 12.0). The significant changes of life style modifications in Baseline, Review I, Review II among the study population was assessed by Mc Nemer test<sup>8</sup>. Lipid profile mean values and anthropometric were compared using one way ANOVA. P-value less than 0.05 was considered as significant.

## Results

A total of 57 newly diagnosed dyslipidemic patients were included in our study. In overall patients, proportion of study population with life style risk factors in baseline vs first review was showed statistically significant changes in lifestyle risk factors with the greatest improvements in the diet (RRR 46.3%) (p =0.0001), physical activity (RRR 41.86%) (p= 0.0001), and moderate alcohol intake (RRR 45.4%) (p = 0.0002), some improvements in the smoking cessation (RRR 24.58%) (p= 0.0233) and no significant changes in the BMI $\geq$ 25 (RRR 1.7%) (p =1.000).

The baseline vs. review II was also showed statistically significant improvements in the diet (RRR 66.7%) (p = 0.0001), physical activity (RRR 38.9%) (p = 0.0001), moderate alcohol intake (RRR 54.3%) (p = 0.0005) and smoking cessation (RRR 51.9%) (p = 0.0009) but there was no significance changes in the BMI $\geq$ 25 (RRR 8.6%) (p = 1.000). The improvement of life style modification was greater in review



w II when compare to review I except physical activity. (Table-1).

In the case of  $\geq 40$  yrs (n=36), also reported the more reduction in low physical activity 20 (55.5%), high fat diet 19 (52.7%) and some reduction in smoking 12 (33.3%), excessive alcohol intake 8 (22.2%), BMI  $\geq 25$  26 (72.2%). In the case of  $< 40$  years, we found statistically significant

**Table 1.** Proportion of study population with lifestyle risk factors in baseline, Review 1 and Review 2.

Risk factors	Presence of life style risk factors					Presence of life style risk factors				
	Baseline n (%)	Review 1 n (%)	ARR	RRR	P value	Baseline n (%)	Review 2 n (%)	ARR	RRR	P value
<b>Overall (n=57)</b>						<b>Overall (n=38)</b>				
<b>Smoking</b>	29(50.9)	22 (38.6)	12.3	24.2	0.0233*	23(60.1)	11(28.9)	31.2	51.2	0.0009**
<b>Excessive alcohol intake</b>	33(57.8)	18 (31.6)	26.3	45.4	0.0002**	24(63.2)	11(28.9)	34.3	54.3	0.0005**
<b>Less physical activity</b>	55(96.5)	32 (56.1)	40.4	41.9	0.0001**	36(94.7)	22(57.9)	36.8	38.9	0.0001**
<b>BMI <math>\geq 25\text{kg/m}^2</math></b>	41(71.9)	40 (70.1)	1.2	1.7	1.0000	27(71.1)	25(65.8)	5.3	7.5	1.000
<b>High fat diet</b>	54 (94.7)	29 (50.9)	43.8	46.5	0.0001**	36(94.7)	12(31.5)	63.2	66.7	0.0001**

We also assess proportion of study population with life style risk factors of  $< 40$  years (n=21) and  $\geq 40$  years (n=36). The percentage risk factors reduction of  $< 40$  years patients (n=21) were showed, more reduction in high fat diet 11 (52.3%), low physical activity 10 (47.6%) and some reduction in smoking 10 (47.6%), excessive alcohol intake 11 (52.3%), BMI  $\geq 25$  13 (61.9%).

improvements in diet (RRR 42.1 %) (p=0.0077), physical activity (RRR 47.6 %) (p=0.041) and no significant improvements in moderate alcohol intake (RRR 20.8%) (p=0.2482), smoking cessation (RRR 16.6 %) (p=0.4795), BMI (RRR 7.1%) (p =1.000).

**Table 2.** Proportion of study population with lifestyle risk factors before and after diagnosis of dyslipidemia in age groups

In  $\geq 40$  year patients, also we found statistically significance improvements in diet (RRR 44.17 %) (p=0.0003), physical activity (RRR 42.9%) (p=0.0005),

Risk factors	Presence of life style risk factors					Presence of life style risk factors				
	Before n (%)	After n (%)	ARR	RRR	P	Before n (%)	After n (%)	ARR	RRR	P value
<b>By age groups</b>	<b><math>&lt; 40\text{yrs}(n=21)</math></b>					<b><math>\geq 40\text{yrs}(n=36)</math></b>				
<b>Smoking</b>	12 (57.1)	10(47.6)	9.5	16.6	0.4795	18(50)	12 (33.3)	16.7	33.4	0.0412 *
<b>Excessive alcohol intake</b>	14(66)	11(52.3)	13.7	20.8	0.2482	20(55.5)	8 (22.2)	33.3	60	0.0015 **
<b>Less physical activity</b>	20 (95.2)	10(47.6)	47.6	50	0.0412*	35(97.2)	20 (55.5)	41.7	42.9	0.0005 **
<b>BMI <math>\geq 25\text{kg/m}^2</math></b>	14 (66.6)	13 (61.9)	4.7	7.1	1.0000	27(75)	26(72.2)	2.8	3.7	1.000
<b>High fat diet</b>	19(90.4)	11(52.3)	38.1	42.1	0.0077*	34(94.4)	19(52.7)	41.7	44.17	0.0003 **



moderate alcohol intake (RRR 60%) (p=0.0015), smoking cessation (RRR 33.4 %) (p=0.0412) and no significant improvement in BMI (RRR 3.7%). (p=1.000) (Table-2).

The Mean Lipid profile, Weight and BMI values in baseline, Review I and Review II were showed in Table-3. The values of the above parameters were gradually decreased. There was statistically significant difference in total cholesterol, LDL-C (p<0.01) and triglycerides, VLDL-C (P<0.05).

**Table 3.** Mean Lipid profile, Weight and BMI values in baseline, Review I and Review II.

Parameters	Baseline (mg/dl) (Mean±SD) (n=57)	Review I (mg/dl) (Mean±SD) (n=57)	Review II(mg/dl) (Mean±SD) (n=38)	p value
Total cholesterol	216.26 ±33.73	162.84±41.61	165.1±41.2	0.000**
Triglycerides	186.36 ±94.59	162.68 ±88.43	142.28 ±62.39	0.046*
LDL-C	150.07 ±25.87	98.73± 38.77	97.65± 37.05	0.000**
HDL-C	40.86 ±10.28	41.23 ±9.22	41.84± 8.3	0.884
VLDL-C	33.52 ±11.73	29.73 ±12.95	26.31± 10.21	0.015*
Weight	72.39 ±8.22	71.55 ±8.14	71.28± 7.96	0.775
BMI	27.09±2.97	26.88±2.98	26.58±3.38	0.732

**Discussion**

In India almost 2.6 million individuals are predicted to die due to CHD, constituting nearly 54% of all CVD deaths by 2020. Some Indian studies showed that, the percentage of patients below the age of 45 years suffering from acute myocardial infarction (AMI) is reported as high as 25-40% and coronary risk factors accounted for 89% of the cases of AMI in Indians.<sup>14-16</sup> While changes in the lifestyle risk factors should be a first-line treatment<sup>6</sup> for the cholesterol management, and this was not seen fully in the results of the present study. As a consequence to urbanization and modernization, consuming food that is prepared outside the home was increasing among the population. In this present study most of the patients have consumed high fat diet like baked items, fried items, and snacks, especially in the younger patients were more consumed the fast food items.

In overall patients nearly half of the improvements in moderate alcohol intake, physical activity, dietary pattern, one third improvement in smoking cessation and there is no improvement in BMI on review I. In review II, improvement was seen only in dietary habits, smoking cessation. Though the patients change their life style, there was only a very less improvement in BMI. It is clear

that more work needs to be done about promoting lifestyle changes.

To achieve lasting lifestyle changes, it is likely that system changes are needed, such as the creation of multidisciplinary teams with expertise in counseling and the remuneration of time spent in lifestyle counseling. The mean lipid profile, weight and BMI were gradually decreased in the study population from the baseline.

Indians are prone as a community to CAD at a much younger age. Indian population study was revealed that the increased prevalence of dyslipidemia to be more in younger adults and also have an increased risk of

developing CAD.<sup>1, 14</sup> NCEP ATP III recommends therapeutic life style changes for the management of dyslipidemia in place of drug therapies for patients who fall into an intermediate range of CHD risk and younger adults.<sup>17</sup> But in our study ≥ 40 years patients, we were seen more improvements in moderate alcohol intake, smoking cessation and diet compare than <40 years patients.

The improvement of physical activity and BMI was higher in <40 years patients compare than ≥ 40 years of patients who have knee and leg pain. These results showed that, after life style modification counseling we have seen more significant improvements in diet, physical activity, moderate alcohol intake, smoking cessation in both groups. But there was no significant improvement in BMI, because life style modifications for weight reduction face several challenges. BMI is an independent risk factor for dyslipidemia and 1 kg/m<sup>2</sup> increase in BMI was also associated with a 6% increase in risk of CHD.<sup>5, 18, 19</sup>

**Conclusion**

In our study population, the improvements in the smoking cessation, diet, physical activity and moderate alcohol intake in the overall and both age groups (<40years, ≥40years) reveals that, life style counselling improves the



lifestyle modifications. However further studies are multicenter trials/studies are warranted to confirm the effect. No significant improvement in BMI on those patients is needed to find effective methods and behavioral treatment for providing wide scale intervention.

#### Practice implications

Pharmacists need to be able to provide more patient counseling and education about risk factors, therapeutic lifestyle modifications to the patients compared with physicians and nurses and recommend psychological therapy to the addictive patients, if necessary. To achieve lasting lifestyle changes, it is likely that system changes are needed, such as the creation of multidisciplinary teams with expertise in counselling and the remuneration of time spent in lifestyle counselling.

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#### **AUTHORS' CONTRIBUTIONS**

Authors contributed equally to all aspects of the study.

#### **PEER REVIEW**

Not commissioned; externally peer reviewed

#### **CONFLICTS OF INTEREST**

The authors declare that they have no competing interests