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IMPACT OF CLINICAL PHARMACIST EDUCATION ON EVALUATION OF PREVALENCE, MONITORING AND LIPID CONTROL IN DYSLIPIDEMIC PATIENTS

Pharma

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ABSTRACT

Background: The importance of treating dyslipidemias based on cardiovascular risk factors is highlighted by the National Cholesterol Education Program guidelines. Dyslipidemia is defined as a disorder of lipoprotein metabolism. In India ,the prevalence of dyslipidemia was found to be higher in males 38.7% than in females which is 23.3%. The hypercholesterolemia and hyper triglyceridemia are more prominent in the age group 31-40 years in both the age groups. **objective:** The main objective of the study is to assess clinical pharmacist education on evaluation of prevalence, monitoring and lipid control in dyslipidemic patients in a tertiary care hospital.**method:** The present study is a prospective observational study. Participants were randomly assigned to the experimental group and non-experimental group. Data were collected by using proforma and questionnaire after admission to the hospital and at the time of follow up in out-patient department. **result:** A total of 150 patients were recruited and 147 patients completed the study. Three patients in the non-experimental group dropped out of the study because they moved to another hospital. In the present study, we have analyzed 147 dyslipidemic patients. Among them in the experimental group, there were 75 participants. The patients aged above 18 years were included in the study. Prevalence of dyslipidemia was found to be highest in the patients aged above 61 years (56%) and least in the patients aged between 20-30 years (1%). All the P values ($p<0.05$) considered statistically significant. Results were analyzed by Graphpad prism.

KEYWORDS

Dyslipidemia, Patient counseling, Framingham score, Clinical pharmacist, Hyperlipidemia.

INTRODUCTION

Dyslipidemia is defined as a disorder of lipoprotein metabolism, characterized by elevated serum levels of Total Cholesterol (TC), Low Density Lipoprotein (LDL), Very Low Density Lipoprotein (VLDL) and Triglycerides along with the decrease in High Density Lipoprotein (HDL).In simple terms, it is described as an increase in bad cholesterol and decrease in good cholesterol levels in the serum.[1] Cholesterol is a macromolecule (class: lipid), waxy in nature which is present in every cell of the body in higher amounts mainly in the cell membrane. Lipids constitute about 15-20% of the body weight in humans. Triglycerides (TG):They are the most abundant lipids comprising 85-90% of body lipids. They are also called as neutral fat or depot fat. Low density lipoprotein (LDL): They make 60-70% of total serum cholesterol. They vary in size (18-25 nm in diameter) and contents. They carry cholesterol in the blood and around the body for use by the cells.[4] In hyperlipidemia there is lack of LDL-receptor, so the uptake of cholesterol by the cells is reduced and causes the LDL to remain in the circulation thereby raising blood levels of cholesterol. It is an important marker for the risk of developing heart disease. The NCEP identified LDL as the target for cholesterol lowering therapy[2] Very low density lipoprotein (VLDL):They are precursors of LDL. They constitute for 10-15% of the total cholesterol. They are produced in liver and intestine and are responsible for the transport of endogenously synthesized triacylglycerols.[3] In India ,the prevalence of dyslipidemia was found to be higher in males i.e., 38.7% than in females which is 23.3%. The hypercholesterolemia and hyper triglyceridemia are more prominent in the age group 31-40 years in both the age groups.[5] The present study was designed to assess the impact of clinical pharmacist education and evaluation of prevalence, monitoring and lipid control in dyslipidemic patients.

AIM AND OBJECTIVES OF THE STUDY

Primary objective:

- To evaluate the prevalence and the role of pharmacist in monitoring the management of dyslipidemia in a tertiary care hospital.

Secondary objective:

- To improve the patients knowledge regarding the life style modifications.
- To study the impact of clinical pharmacist education on knowledge of the patients.
- To contribute clinical pharmacy service in the better management of dyslipidemia.
- To calculate the 10 year cardiovascular risk based on current clinical condition.

Methodology:

Study design:

Prospective observational study.

Study site:

- The study was carried out in a 250 bedded private multispecialty tertiary care hospital, Adyar, Chennai.
- The study received approval from the hospital ethics committee.

Study duration:

- Study was conducted for a period of 6 months between January 2016 to June 2016.

Study population:

- 150 patients were recruited for the study from the IPD and OPD of General medicine and Cardiology department who had varying levels of high lipid profile.

INCLUSION CRITERIA:

To participate in the study, the patients needed to;

- Have altered lipid profile.
- Male and female above 18 years.
- Have co-morbidities (Cardiovascular and Endocrine disorders).
- Are overweight or obese.
- Who were ready to sign the informed consent and interested in counselling sessions.

EXCLUSION CRITERIA:

Following patients were excluded from the study:

- Psychiatric patients.
- Pregnant and lactating women.

- Patients below 18 years of age.
- Patients with barriers to communication like language.

Data collection:
Participants were randomly assigned to the experimental group and non-experimental group. Data were collected after admission to the hospital and at the time of follow up in out-patient department. Specially designed proforma and questionnaire were used to collect the data. Data were obtained from the patient's case sheets, treatment charts, laboratory investigations, nurse's reports and through direct patient interview. Data were collected on demographic details, BMI, BP, and lipid profile.

Questionnaire:
Questionnaire was prepared as per the NCEP and WHO guidelines. Readability was checked by giving sample questionnaires to lay people and it has been validated by experts.

Structured questionnaires were distributed to all participants to collect the patient's information on; Exercise pattern, Daily intake of water, Consumption of junk foods and soft drinks, Awareness about body weight, BMI, blood cholesterol levels, complications of elevated cholesterol levels, risk factors, current medications for lipid control and patient's medication adherence. Signed informed consent was obtained from all the study participants.

Study Procedure:
A total number of 150 dyslipidemic patients were identified and included in the study. Participants were randomly stratified to two different groups, the experimental group and non-experimental group. The experimental group received pharmacological treatment without clinical pharmacist's counselling and the non-experimental group received both pharmacological treatment and clinical pharmacist's counselling. No significant difference was found between the demographic characteristics of the two study groups.

Clinical pharmacists visited all the participants and collected the information about the patient's medical condition from the case sheets, laboratory investigations, nurse's reports and through direct patient interview. Signed informed consent was obtained from the participants. All the participants were asked to fill the Questionnaires given.

BMI was calculated by dividing weight (kg) by height (m2) of the participants.[10]

$$BMI = (Weight\ in\ kilograms) / (Height\ in\ m^2)$$

All subjects of experimental group were followed-up and provided patient counselling regarding their dietary habits, lifestyle modifications including eating more green leafy vegetables, fresh fruits, nuts, cereals, fiber rich food (peas and cauliflower) and reduce the intake of fatty foods, sugar, junk food, smoking cessation, avoiding alcohol consumption, managing weight, exercising and medication adherence. The clinical pharmacists educated the care takers of the patients about the disease condition, importance of life style changes, adherence and also provided them with the pictorial presentations of the pamphlets for better understanding. The clinical pharmacists also provided information on possible side effects, ADR and drug interactions of the medications.

Before the patients were discharged, Clinical pharmacists reviewed the patient's drug regimen, advised patients on how to take the medications and also stressed the importance of life style modifications for the better management of dyslipidemia.

According to WHO standard guidelines -2016, participants were classified into :[6]
1. Obese (BMI ≥ 30).
2. Overweight (BMI ≥ 25).
3. Normal (BMI between 18.50 and 24.99).
4. Underweight (BMI < 18.50).

Participants with a mean blood pressure ≥ 140/90 mmHg or who were under anti-hypertensive drugs were classified as hypertensive. Dyslipidemia was defined as elevated serum levels of one or more of the lipid profiles TC, LDL, VLDL, Triglycerides and a reduced HDL. Hypercholesterolemia was defined as TC > 240 mg/dL, LDL > 160 mg/dL, TG > 200 mg/dL and HDL < 40 mg/dL. Participants were also classified based on their co-morbidities. Dyslipidemic drugs were classified based on their dose.[12]

10 year cardiovascular risk of every participant was estimated using "**Framingham Risk Score (FRS)"** separately for men and women, which uses patient's age, total cholesterol, smoking habit, HDL, Systolic BP and whether receiving any anti-hypertensive medication or not.[11]

All the participants were followed up during the subsequent outpatient department (OPD) visits and were asked to fill up the questionnaires again to assess the knowledge about their condition and drugs after the counselling. After three months, lipid profiles of both study groups were collected.

Parameters in the proforma and questionnaires of both the groups were compared, analyzed by using Chi Square, paired t-test and significance was noted by using P-value and results were produced. The software used to analyze the results was Graphpad prism.

RESULTS:
A total of 150 patients were recruited and 147 patients completed the study. Three patients in the non-experimental group dropped out of the study because they moved to another hospital.

In the present study, we have analyzed 147 dyslipidemic patients. Among them in the experimental group, there were 75 participants. The patients aged above 18 years were included in the study. Prevalence of dyslipidemia was found to be highest in the patients aged above 61 years (56%) and least in the patients aged between 20-30 years (1%).

In the experimental group out of 75 participants, 70 % (n=52) were male patients and 31% (n=23) were female patients. In non-experimental group, out of 72 patients, 77% (n=55) were male patients and 22 % (n=16) were female patients.

Table showing the gender wise distribution:
Table: 1

GENDER	EXPERIMENTAL GROUP (n=75)		NON-EXPERIMENTAL GROUP (n=72)	
	Number of patients	Percentage	Number of patients	Percentage
MALE	52	69%	55	76%
FEMALE	23	31%	17	24%

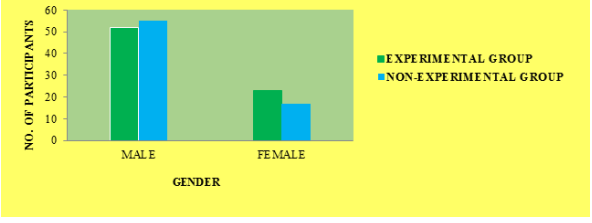


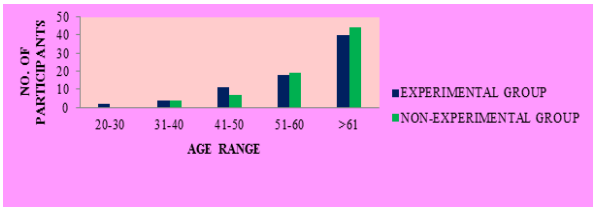
Figure: 1

Table showing the age wise distribution:
(Table: 2)

AGE RANGE (YEARS)	EXPERIMENTAL GROUP (n=75)		NON-EXPERIMENTAL GROUP (n=75)	
	Number of patients	Percentage	Number of patients	Percentage
20-30	2	3%	0	0%
31-40	4	5%	4	5%
41-50	11	15%	7	10%
51-60	18	24%	19	26%
>61	40	53%	44	58%

In the experimental group out of 75 participants, 53% (n=40) of the patients were aged above 61 years, 24% (n=18) were aged between 51-60 years, 15% (n= 11) were aged between 41-50 years, 5% (n= 4) were aged between 31-40 years and 3% (n= 2) were aged between 20-30 years. In the non-experimental group out of 72 participants, 58% (n= 44) of the patients were aged above 61 years, 27% (n=19) were aged between 51-60 years, 10% (n=7) were aged between 41-50 years, 6%

(n=4) were aged between 31-40 years and no patient was aged between 20-30 years.

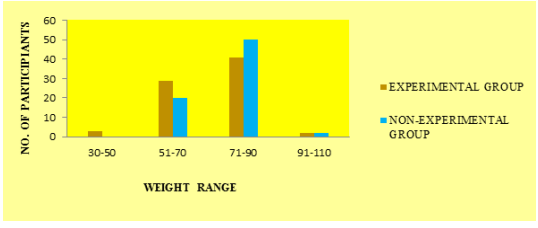


(Figure: 2) Age wise distribution

Table showing the weight distribution:
(Table: 3)

WEIGHT RANGE (kg)	EXPERIMENTAL GROUP (n=75)		NON-EXPERIMENTAL GROUP (n=72)	
	Number of patients	Percentage	Number of patients	Percentage
30-50	3	4%	0	0%
51-70	29	39%	20	27%
71-90	41	55%	50	69%
91-110	2	3%	2	3%

In the experimental group, 55% (n=41) of the patients weighed between 71-90 kg, 39% (n=29) weighed between 51-70 kg, 4% (n= 3) weighed between 30-50 kg, 3% (n= 2) weighed between 91-110 kg. In the non-experimental group, 69% (n=50) of the patients weighed between 71-90 kg, 28% (n=20) weighed between 51-70 kg, 2% (n=2) weighed between 91-110 kg.



(Figure: 3) Weight distribution

Table showing the BMI distribution
(Table: 4)

BMI	CLASSIFICATION BASE ON BMI	EXPERIMENTAL GROUP (n=75)		NON-EXPERIMENTAL GROUP (n=72)	
		Number of patients	Percentage	Number of patients	Percentage
18.5-24.9	NORMAL WEIGHT	12	16%	7	0%
25-29.9	OVERWEIGHT	44	58%	29	10%
>/=30	OBESE	19	25%	36	40%
		p-value	>0.999	p-value	>0.999

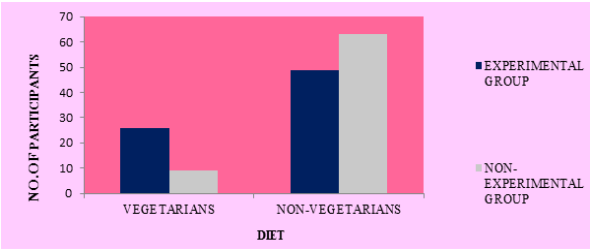
At the beginning in the experimental group, based on BMI 25% (n=19) of the patients were obese, 59% (n=44) were overweight, 16% (n=12) were normal weight. After three months, 12% (n=9) were obese, 55% (n=41) were overweight, 33% (n=25) were normal weight. The difference is non-significant (p > 0.999), which shows that there is no significant change in the BMI of the patients.

At the beginning in the non-experimental group, based on BMI 50% (n=36) of the patients were obese, 40% (n=29) were overweight, 10% (n=7) were normal weight. After three months, 47% (n=34) were obese, 42% (n=30) were overweight, 11% (n=8) were normal weight. The difference is non-significant (p > 0.999), which shows that there is no significant change in the BMI of participants.

Table showing the diet pattern
(Table: 5)

DIET	EXPERIMENTAL GROUP (n=75)		NON EXPERIMENTAL GROUP (n=72)	
	Number of patients	Percentage	Number of patients	Percentage
VEGETARIANS	26	35%	9	12%
NON-VEGETARIANS	49	65%	63	87%

In the experimental group, 65% (n=49) of the patients were non-vegetarians and 35% (n=26) were vegetarians. In the non-experimental group, 88% (n=63) of the patients were non-vegetarians and 13% (n=9) were vegetarians.



(Figure: 4)

Table showing the difference in total cholesterol
(Table: 6)

At the beginning of the study in the experimental group, 92% (n=69) of the patients had a high TC

TOTAL CHOLESTEROL (mg/dL)	EXPERIMENTAL GROUP (n=75)				NON-EXPERIMENTAL GROUP (n=72)			
	BEFORE COUNSELLING		AFTER COUNSELLING		BEFORE COUNSELLING		AFTER COUNSELLING	
	Number of patients	%	Number of patients	%	Number of patients	%	Number of patients	%
BORDERLINE HIGH	6	8	24	32	31	43	46	64
HIGH	69	92	51	68	41	57	26	36
			p-value	<0.0001			p-value	<0.0001

levels, 8% (n=6) had borderline-high TC levels. After three months, 60% (n=45) of the patients had a high TC levels, 39% (n=29) had borderline-high TC levels. Thus there is a significant reduction in TC levels.

At the beginning of the study in the non-experimental group, 57% (n=41) of the patients had a high TC levels, 43% (n=31) had borderline-high TC levels. After three months, 36% (n=26) of the patients had a high TC levels, 64% (n=46) had borderline-high TC levels.

Table showing the difference in LDL cholesterol
(Table: 7)

LDL CHOLESTEROL (mg/dL)	EXPERIMENTAL GROUP (n=75)				NON-EXPERIMENTAL GROUP (n=72)			
	BEFORE COUNSELLING		AFTER COUNSELLING		BEFORE COUNSELLING		AFTER COUNSELLING	
	Number of patients	%	Number of patients	%	Number of patients	%	Number of patients	%
Near Optimal	2	3	24	32	0	0	4	6
Borderline High	36	48	33	44	23	32	31	43
High	28	37	15	20	20	28	20	28
Very High	9	12	3	4	28	81	18	25
			p-value	<0.0001			p-value	<0.0001

At the beginning of the study in the experimental group, 12% (n= 9) of the patients had very high LDL levels, 37% (n=28) had high LDL levels, 48% (n=36) had borderline-high LDL levels, 3% (n=2) had near optimal LDL levels. After three months, 4% (n=3) of the patients had very high LDL levels, 20% (n=15) had high LDL levels, 44% (n=33) had borderline-high LDL levels, 32% (n=24) had near optimal LDL levels, Thus there is a significant reduction in the LDL levels after counselling.

At the beginning of the study in the non-experimental group, 81% (n=28) of the patients had very high LDL levels, 28% (n=20) had high LDL levels, 32% (n=23) had borderline-high LDL levels. After three months, 25% (n=18) of the patients had very high LDL levels, 28% (n=20) had high LDL levels, 43% (n=31) had borderline-high LDL levels, 6% (n=4) had near optimal LDL levels.

Table showing the difference in triglyceride
(Table: 8)

TRIGLYCERIDES (mg/dL)	EXPERIMENTAL GROUP (n=75)				NON-EXPERIMENTAL GROUP (n=72)			
	BEFORE COUNSELLING		AFTER COUNSELLING		BEFORE COUNSELLING		AFTER COUNSELLING	
	Number of patients	%	Number of patients	%	Nu Number of patients	%	Nu Number of patients	%
NORMAL	23	31	32	43	4	6	6	8
BORDER LINE HIGH	43	57	36	48	40	56	43	60
HIGH	7	9	5	7	27	38	23	32
VERY HIGH	2	3	2	3	0	0	0	0
			p-value	0.0008			p-value	0.0008

At the beginning of the study in the experimental group, 3% (n=2) of the patients had very high TG levels, 9% (n=7) had high TG levels, 57% (n= 43) had borderline-high, and 31% (n= 23) had normal TG levels. After three months, 3% (n=2) had high TG levels, 24% (n=18) had borderline-high, and 73% (n= 55) had normal TG levels. Thus there is a significant reduction in the TG levels.

At the beginning of the study in the non-experimental group, 56% (n=40) had borderline-high, and 6% (n= 4) had normal TG levels. After three months, 32% (n=23) had high TG levels, 60% (n=43) had borderline-high, and 8% (n=6) had normal TG levels.

Table showing the difference in HDL cholesterol
(Table: 9)

HDL CHOLESTEROL (mg/dL)	EXPERIMENTAL GROUP (n=75)				NON-EXPERIMENTAL GROUP (n=72)			
	BEFORE COUNSELLING		AFTER COUNSELLING		BEFORE COUNSELLING		AFTER COUNSELLING	
	Number of patients	%	Number of patients	%	Nu Number of patients	%	Nu Number of patients	%
LOW	61	81%	54	72%	45	63%	40	56%
OPTIMAL	14	19%	21	28%	26	36%	33	44%
			p-value	=0.0114			p-value	0.0114

At the beginning of the study in the experimental group, 81% (n= 61) of the patient had low HDL levels, 19% (n=14) had optimal HDL levels. After three months, 72% (n=54) of the patients had a low HDL levels, 28% (n=21) had optimal HDL levels. Thus there is significant improvement in the HDL levels.

At the beginning of the study in the non-experimental group, 63% (n=45) of the patient had low HDL levels, 36% (n=26) had optimal HDL levels. After three months, 56% (n=40) of the patients had a low HDL levels, 44% (n=33) had optimal HDL levels.

Table showing the difference in FRAMINGHAM RISK SCORE (FRS)
(Table: 10)

FRS	EXPERIMENTAL GROUP (n=75)				NON-EXPERIMENTAL GROUP (n=72)			
	BEFORE COUNSELLING		AFTER COUNSELLING		BEFORE COUNSELLING		AFTER COUNSELLING	
	Number of patients	%	Number of patients	%	Number of patients	%	Nu Number of patients	%
<1%	4	5	9	12	0	0	3	4
1-10%	23	31	21	28	11	15	10	14
11-20%	22	29	22	29	12	17	16	22
21-30%	14	19	22	29	27	38	42	53
>30%	12	16	0	0	22	31	1	1

Table showing the distribution of anti-hyperlipidemic drugs prescribed
(Table: 11)

DRUGS	EXPERIMENTAL GROUP (n=75)		NON-EXPERIMENTAL GROUP (n=72)	
	Number of patients	Percentage	Number of patients	Percentage
ATORVASTATIN	60	80%	52	72%
ROSUVASTATIN	10	13%	20	28%
FENOFIBRATE	5	7%	3	4%

In the experimental group, 80% (n=60) of the patients were prescribed with atorvastatin, 13% (n=10) were prescribed with rosuvastatin, and 7% (n=5) were prescribed with fenofibrate. In the non-experimental group, 72% (n=52) of the patients were prescribed with atorvastatin, 28% (n=20) were prescribed with rosuvastatin, and 4% (n=3) were prescribed with fenofibrate.

Table showing the distribution co-morbidities
(Table: 12)

COMORBIDITIES	EXPERIMENTAL GROUP (n=75)		NON-EXPERIMENTAL GROUP (n=72)	
	Number of patients	Percentage	Number of patients	Percentage
CHD	43	57%	42	58%
Respiratory Disease	7	9%	6	8%
Neurological Disease	4	3%	11	15%
Endocrinal Disorders	7	9%	5	7%
Renal Disease	2	1%	1	1%

In the experimental group, 57% (n=43) had CHD, 9% (n=7) had respiratory disease, 9% (n=7) had metabolic disease, 3% (n=4) had neurologic disease, 1% (n=2) had renal disease, and 8% (n=12) had other co-morbidities. In the no-experimental group, 58% (n=42) had CHD, 8% (n=6) had respiratory disease, 7% (n=5) had metabolic disease, 15% (n=11) had neurologic disease, 1% (n=1) had renal disease, and 10% (n=7) had other co-morbidities.

Table showing the impact of clinical pharmacist education in improving patient knowledge
(Table: 13)

NO	QUESTIONS	BEFORE COUNSELLING		AFTER COUNSELLING		P value
		YES	NO	YES	NO	
1	Do you exercise regularly?	35	40	60	15	< 0.0001
2	Do you drink 10 glasses of water daily?	50	25	70	5	< 0.0001

3	Do you check your weight regularly?	23	52	72	3	<0.0001
4	Do you know your BMI?	14	61	73	2	< 0.0001
5	Do you check your blood cholesterol levels regularly?	67	8	71	4	<0.0001
6	Do you know the complications of elevated cholesterol levels?	30	45	73	2	< 0.0001
7	Do you have any family history of elevated cholesterol levels?	48	27	48	27	<0.0001
8	Do you know what medication you take for your high cholesterol?	60	15	68	7	<0.009
9	Do you take your medications as directed by your physician?	62	13	75	0	< 0.0002
10	Have you missed any doses of your medication?	15	60	2	73	< 0.0001
11	Do you prefer junk foods?	54	21	30	45	< 0.0349
12	Do you prefer soft drinks?	52	23	15	30	< 0.0001

Comparison between experimental and non-experimental group (Table: 13)

PARAMETERS	EXPERIMENTAL GROUP (n=75)	NON-EXPERIMENTAL GROUP (n=72)
GENDER		
1)MALE	69%	76%
2)FEMALE	39%	22%
AGE		
20-30	3%	0%
31-40	5%	5%
41-50	15%	10%
51-60	24%	26%
>61	53%	58%
HEIGHT		
130-140	0%	0%
141-150	53%	4%
151-160	49%	54%
161-170	39%	39%
171-180	67%	3%
>180	0%	0%
WEIGHT		
30-50	4%	0%
51-70	39%	28%
71-90	55%	70%
91-110	3%	3%
>110	0%	0%
OCCUPATION		
IT sector		
Govt. sector	19%	6%
Bank sector	20%	18%
Daily wage	24%	21%
workers	15%	11%
Others	23%	44%
DIET		
Vegetarians	35%	13%
Non vegetarians	65%	88%
SOCIAL HISTORY		
Alcoholic	83%	70%
Smokers	88%	71%
Both alcoholic and smoker	21%	61%

	Before counselling	After counselling	Before counselling	After counselling
TOTAL CHOLESTEROL				
Borderline	8%	32%	43%	64%
High	92%	68%	57%	36%
LDL CHOLESTEROL				
Near optimal	3%	32%	0%	6%
Borderline high	48%	44%	32%	43%
High	37%	20%	28%	8%
Very high	12%	4%	41%	25%
TRIGLYCERIDES				
Normal	31%	73%	6%	8%
Borderline high	57%	24%	56%	60%
High	9%	3%	38%	32%
Very high	3%	0%	0%	0%
HDL CHOLESTEROL				
Low	81%	72%	63%	56%
Optimal	19%	28%	36%	44%
FRS				
<1%	5%	1%	0%	45
1-10%	31%	61%	15%	145
11-20%	29%	32%	17%	22%
21-30%	19%	7%	38%	59%
>30%	16%	0%	1%	1%
COMOBIDITIES				
CHD	57%		58%	
Respiratory disease	9%		8%	
Neurological disease	3%		15%	
Metabolic disease	9%		7%	
Renal disease	1%		1%	
Others	8%		10%	

DISCUSSION:

Dyslipidemia is defined as a disorder of lipoprotein metabolism, characterized by elevated serum levels of Total Cholesterol (TC), Low Density Lipoprotein (LDL), Very Low Density Lipoprotein (VLDL) and Triglycerides along with the decrease in High Density Lipoprotein (HDL).[7] It is caused either due to genetic predisposition or some secondary risk factors such as Diabetes Mellitus, obesity, obstructive liver disease, chronic renal failure.[13,15] Our goal was to achieve a better lipid control by improving patient's knowledge by providing Clinical pharmacist intervention along with conventional pharmacologic therapy.[8]

Some studies evaluated the impact of involvement of Clinical pharmacist in the counselling of patients and found that pharmacist's intervention improved their medication adherence, knowledge regarding disease, drug use and health related life style modifications.[9] Sathiyanarayana et al., have reported in their prospective observational study that the impact of patient education by clinical pharmacist towards lipid control.[14]

In our study, the experimental group (n=75) which had direct access with Clinical pharmacist, had significantly higher quality of life than the non-experimental group. There is a significant improvement in lipid profile of the experimental group receiving Clinical pharmacist. By active counselling and subsequent life style modifications we could notice that the 10 year cardiovascular risk has been reduced significantly (P value<0.0001).

In our study, we noticed that dyslipidemia is one of the major risk factors for congestive heart failure. We also noticed that by proper

management of dyslipidemia can prevent coronary problems to a great extent. The study has following limitations; It was a single department study as most of the participants were from cardiology department.The study was conducted for a short duration of time. Sample size was small.

CONCLUSION

The current study revealed that Clinical pharmacists can make substantial contribution to the better management of dyslipidemia, by providing patient counselling on their disease condition, drugs and life style modifications. Clinical pharmacist support improved self-care ability, quality of life, drug therapy compliance, and treatment success rate in the study participants.

REFERENCES:

1. Joseph T Dipiro, Robert L Talbert, Gary C Yee, Barbara G Wells, L Michael Posey. PHARMACOTHERAPY-A Pathophysiologic Approach. 7th Edition. U.S.A: Mc Graw Hill Medical; 2008. 386.
2. Alberts et.al. Mol Biol Cell. 4thedition. New York: Garland Science; 2002.588.
3. Dr.Satyanarayana U, Dr. Chakrapani U. Biochemistry. 3rdedition. Ltd.published; 2011. 285,309,317.
4. U.S.DEPARTMENT OF HEALTH AND HUMAN SERVICES;Public Health Service;National Institutes of Health-National Heart,Lung and Blood Institute;NIH Publications No.01-3305;May 2011.
5. Executive Summary of the Third report of the National Cholesterol Education Program (NCEP) Expert panel on Detection ,Evaluation ,and treatment of High Blood cholesterol in Adults (Adult Treatment Panel III) [Special Communication] JAMA 2001; 285: 2486-2947.
6. Roger Walker and Cate Whittlesea. Clinical Pharmacy and Therapeutics. 5thedition. Edinburgh: Churchil Livingstone/Elsevier; 2012. 392-396.
7. Schaefer E J. Diagnosis and Management of Lipoprotein Disorders..Drug treatment of hyperlipidemia. In Rifikind BM ed. 1991; 17-52.
8. Roger Walker and Cate Whittlesea. Clinical Pharmacy and Therapeutics. 5thedition. Edinburgh: Churchil Livingstone/Elsevier; 2012. 39.
9. Fredrickson D S, Levy R I, Lees R S. Fat transport in lipoproteins - an integrated approach to mechanisms and disorders. N Engl J Med. 1967; 276: 34-42.
10. Joseph T Dipiro, Robert L Talbert, Gary C Yee, Barbara G Wells, L Michael Posey. PHARMACOTHERAPY-A Pathophysiologic Approach. 7thedition. U.S.A: Mc Graw Hill Medical; 2008. 391.
11. National Cholesterol Education Program;Second report of the Expert Panel on Detection ,Evaluation and Treatment of High Blood Cholesterol in Adults (adult treatment panel II), Bethesda, Md:National Cholesterol Education Program, National Institutes of Health-National Heart,Lung and Blood Institute. DHSS publication no. 1993; 5: 3093-3095.
12. Harris W S, Von Schacky C. The Omega-3 index: A new risk actor for death from coronary heart disease. Prevent Med. 2004; 39: 212-220.
13. Joseph T Dipiro, Robert L Talbert, Gary C Yee, Barbara G Wells, L Michael Posey. PHARMACOTHERAPY-A Pathophysiologic Approach. 7thedition. U.S.A: Mc Graw Hill Medical; 2008. 393.
14. Blake G H, Triplett L C. Management of Hypercholesterolemia Am Fam Physician. 1995; 51: 1157-1166.
15. Roger Walker and Cate Whittlesea. Clinical Pharmacy and Therapeutics. 5thedition. Edinburgh: Churchil Livingstone/Elsevier; 2012. 400.