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A clinical study on the effectiveness of homoeopathic medicine *Crataegus oxyacantha* in different potencies in the management of hyperlipidemia

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Abstract
Haw thorn is widely used Chinese herb for treatment of gastrointestinal ailments and heart problems. Hyperlipidemia is a life threatening condition which leads to coronary artery disease if treatment is not started earlier. In allopathic system statins are the most important drug used in case of hyperlipidemia and there are known side effects for the drug. There are only few studies available in the past about the success of homoeopathic medicines in treating patients suffering from hyperlipidemia. Therefore an observational study was conducted with an objective to ascertain the effectiveness of homoeopathic medicine *Crataegus oxyacantha* in the management of hyperlipidaemia.

Methods: An observational study was conducted at OP and IP departments of Govt Homoeopathic medical college, Thiruvananthapuram. Thirty cases suffering from hyperlipidemia that followed up for 1 year were assessed using lipid profile values.

Results and Discussion: The highest number of cases were in the age group 51-55, with maximum incidence in females. Out of 30 cases studies 23 patients shows significant improvement in total cholesterol values, 26 patients shows significant improvement in triglycerides values, 22 patients shows significant improvement in LDL value, 26 patients shows significant improvement in HDL value. In the present study bad cholesterol levels were found to be decreased along with that there is improvement in good cholesterol values. The wellbeing level of the patient is good after treatment with medicine Crataegus. By using the paired t test, the calculated t value of total cholesterol, triglycerides, HD Land LDL were found to be greater than the table value ie, $p<0.01$.Potencies used for this study is 30,3X and mother tincture and mother tincture is effective in43.33%.

Conclusion: Result obtained from the study are encouraging and majority of patient shows significant improvement.

Keywords: Fasting lipid profile, hyperlipidemia, *crataegus oxyacantha*

Introduction

Crataegus oxyacantha is a part of a genus of spiny shrubs and trees native to temperate regions in Northern Hemisphere in Europe, Asia and North America. It belongs to Rosacea family and consists of bright green leaves, flowers and bright red berries. It is popularly known for its cardio protective action. Extracts may be prepared using methanol or ethanol or water based extractions and are derived from various parts of plants most commonly berries, leaves and flowers. Oxidation of low density lipoprotein plays an important role in atherosclerosis. This accumulation causes an inflammatory reaction and it leads to the formation of atherosclerotic plaque and it leads to myocardial infarction [6]

Hyperlipidemia is a major risk factor for coronary heart disease [1]. The Prevalence of hyperlipidemia is very high in India and needs urgent life style modification3. Increasing prevalence of hyperlipidemia has become a worldwide public health problem and it varies according to socioeconomic and cultural characteristics. The age standard prevalence of hyperlipidemia was35.5% according to National cholesterol education programme adult treatment panel 111 criteria 3. In hyperlipidemia cardiovascular disease is the main cause of morbidity and mortality in our society [4].

Studies in population repeatedly demonstrated strong association between LDL cholesterol and total Cholesterol levels. In case of hyperlipidemia the exact cause is genetic and environmental factors such as obesity, high saturated fat diet and smoking [1]. Hyperlipidemia may lead to coronary artery disease, peripheral arterial disease and stroke. It can also presented with exceptional dyspnoea, paraesthesia's and confusion.

Alteration in levels of triglycerides, very low density lipoproteins, low density lipoproteins and intermediate density lipoproteins results in complications such as acute pancreatitis, occlusion of blood vessels etc. [5].
Statins are the first line of treatment for hyperlipidemia and prolonged use of this drug cause side effects such as type 2 diabetes mellitus and liver damage. 6So my study aims to reduce the lipid levels without any adverse side effects. Homoeopathic medicines are highly individualized to the patient and will help to lower bad cholesterol levels and raises the good cholesterol level, detoxify the body and also enhanced the immune system.
According to Boer Ickes Material Medica, the medicine *Crataegus oxyacantha* is having a solvent power upon the crustaceous and calcareous deposits in arteries [15]. This made me to do a study on the effectiveness of homoeopathic medicine Crataegus in hyperlipidemia.

Lipids
Lipids are fats that are present in our bloodstream [14]. They are substances that are insoluble in water and soluble in alcohol, ether and chloroform. They are the main constituent of plant and animal cell. Lipids include cholesterol and triglycerides. It plays an important role in storage of energy and cell membrane formation [11].

Lipoproteins
They are molecular complexes consists of lipids and protein help in the transport of lipids in blood. It also transport lipids to various tissues of body for the utilization of energy. Lipids are classified as chylomicrons,
Low density lipoproteins, high density lipoproteins, very low density lipoproteins, free fatty acids [11].

Chylomicrons
They are synthesized in the intestine. They consists of 99% lipids and 1% of proteins. Chylomicrons are largest in size among lipoproteins [11]. They transport dietary lipids to various tissues [12].

Low density lipoproteins
They are the main carries of cholesterol. It passes to liver and peripheral cells. Lipids particles deposit lipids into walls of peripheral vasculature. Not all the cholesterol cannot be transported into lipoprotein particles some of them can be converted to bile salts [12]

Very low density lipoprotein
They are produced in liver and intestine. They are the main source of energy to the body during prolonged fasting. Apo protein B -100 is an essential component of VLDL [12].

High density lipoprotein
They are produced both in liver and intestine. HDL particles transport cholesterol away from periphery and transport cholesterol directly to liver and other tissues such as ovaries, testes and adrenal cortex [12].

Free fatty acids
They are in bound form with albumin in circulation. Each molecule of albumin can hold 20 to 30molecules of free fatty acids [11].

Triglycerides
Major component of very low density lipoproteins and chylomicrons.
It plays an important role in metabolism and transport of dietary fat. In the intestine triglycerides splits into glycerol and fatty acids with the help of enzyme lipoprotein lipase. They are synthesized by fat and liver cells [13].

Materials and Methods

Study design
Prospective study was conducted at OP and IP departments of Govt Homoeopathic Medical College Trivandrum. To assess the status of progression of disease lipid profile values are used.

Study population
Thirty cases with following criteria were included

Diagnostic criteria
Fasting lipid profile
Total cholesterol more than 200 mg/dl
Low density lipoprotein more than 130 mg/dl
Triglyceride-morethan1 50 mg/dl.
High density lipoprotein-less than 40 mg/dl.

Inclusion criteria
1. Age group from30-60years.
2. Cases of both sexes.
3. Cases without complications.

Exclusion criteria
1. Cases above 60 years of age.
2. Cases under long term medication for other systemic illness and for hormonal imbalance.

Sample and sampling technique.
Total 30 cases were selected satisfying the exclusion and inclusion criteria.

Data collection process
Case was taken and record homoeopathically. Detailed physical examination was done in each case. Details are recorded in standard case taking proforma and investigation reports are recorded. Minimum period of study is one year and each case will be reviewed at 1 months and follow upto a period of 6 months.

Methods used
The methods used for this study is a clinical trial. Each case was recorded in detail, physical examination was done. Status of patient was assessed with lipid profile values. Remedy given was *Crataegus oxyacantha*. Potencies usedwere3X, 30 and mother incture. Follow up was done every I month for a period of 6months.

Plan for data analysis
Data will be analysed using paired test. Data will be presented in the form of mean, standard deviation, frequency table, graphs and diagrams [51].

Statistical analysis
The study is conducted to determine the effectiveness of homoeopathic medicine *crataegus oxyacantha* in the management of hyperlipidemia, initial and final values of lipid profile during study periods are used as variables for

statistical analysis. Since the study involved the assessment of same variable at two points of time paired t test is used. The cases where all together 30 (n-30).

Discussion

The study was conducted to find out the effectiveness of homoeopathic medicine *Crataegus oxyacantha* in different potencies in the management of hyperlipidemia. By using the paired t test, the calculated t value of total cholesterol, triglycerides, HDL and LDL were found to be greater than the table value ie, $p<0.01$. So the test was statistically significant. In addition to changes in values of total cholesterol, triglycerides HDL and LDL, VLDL values are also found to be lowered in many cases. Peak incidence were found in age group51to 55.Majority of cases were females 60%. Family history of hyperlipidemia is noted in 10 cases. Those who engaged in house hold works 46.66%, sedentary works 10%, manual labourers 3% and others 3%. Majority of patients are from middle class families 60%. According to dietary habits majority of patients are non-vegetarians 73.33%. Potency used for this study was Crataegus 30,3X and Mother tincture. Among these potencies used mother tincture is effective in majority of cases 43.33%. Crataegus 30 was given in 23.33%, 3X was given in 33.33% of cases. Out of 30 cases studies 23 patients shows significant improvement in total cholesterol values, 26 patients shows significant improvement triglycerides values, 22 patients shows significant improvement in LDL value, 26 patients shows significant improvement in HDL value. Clinical symptoms were not specifically found in hyperlipidemia cases. Wellbeing level of the patient is good after treatment with medicine Crataegus.

Table 1: Distribution of patients according to sex

Out of 30 patients studied 12 male and 18 female Sex Number Percentage		
Male	12	40%
Female	18	60%

Table 2: Show that age and no of patients

Age	No of patients
30-35	2
36-40	4
41-45	6
46-50	5
51-55	8
56-60	5

Table 3: Distribution of patients according to Occupation

Occupation	Number of patients	Percentage
Housewife	14	46.66%
Manual	3	10%
Sedentary	10	33.33%
Others	3	10%

Table 4: Distribution of patients according to family history of hyperlipidemia or coronary artery disease

Family history	Number of patients	Percentage
Present	10	33.33%
Absent	20	66.66%

Table 5: Distribution of patients according to dietary habits

Dietary habits	Number of patients	Percentage
Vegetarians	4	13.33%
Non-vegetarian	22	73.33%
Egg vegetarian	4	13.33%

Table 6: Distribution of medicine with potency used

Medicine with potency	Number of patients	Percentage
Crataegus30	7	23.33%
Crataegus3X	10	33.33%
Crataegus tincture	13	43.33%

Table 7: Total cholesterol

Case no	X	Y	X-Y=d	d2
1.	285	175	110	12100
2.	244	175	69	4761
3.	270	206	64	4096
4.	272	190	82	6724
5.	261	170	91	8281
6.	268	186	82	6724
7.	310	220	90	8100
8.	284	175	109	11881
9.	229	180	49	2401
10.	236	168	68	4624
11.	236	188	48	2304
12.	262	185	77	5929
13.	273	220	53	2809
14.	262	180	82	6724
15.	290	336	-46	2116
16.	301	280	21	441
17.	260	196	64	4096
18.	256	190	66	4356
19.	256	185	71	5041
20.	302	210	92	8464
21.	218	196	22	484
22.	231	186	45	2025
23.	248	188	60	3600
24.	256	190	66	4356
25.	280	195	85	7225
26.	252	169	83	6889
27.	240	180	60	3600
28.	230	202	28	784
29.	287	200	87	7569
30.	275	173	102	104

Compare with t table value

The t value follows a distribution with (n-1); (30-1) degree of freedom. The table value for 29 degree of freedom at 5%, 1% and 0.1% levels are 2.045, 2.462 and 2.756 respectively. The calculated value 11.57 is greater than 5%, 1% and 0.1% levels, with $p<.001$. Inference-Treatment is effective to reduce total cholesterol level

Table 8: Triglycerides

Case no	X	Y	X-Y=d	d2
1.	160	110	50	2500
2.	153	140	13	169
3.	160	137	23	529
4.	90	110	-20	400
5.	160	104	56	3136
6.	163	138	25	625
7.	65	83	-18	324
8.	168	140	28	784
9.	141	90	51	2601
10.	166	168	-2	4
11.	159	140	19	361
12.	160	130	30	900
13.	186	145	41	1681
14.	162	128	34	1156
15.	165	170	-5	25
16.	178	208	-30	900
17.	170	138	32	1024
18.	142	138	4	16
19.	158	140	18	3564
20.	210	160	50	2500
21.	157	148	9	81
22.	80	74	6	36
23.	149	136	13	169
24.	180	115	65	4225
25.	160	125	35	1225
26.	235	110	125	15625
27.	205	126	79	6241
28.	190	150	40	1600
29.	240	151	89	7921
30.	85	75	10	100

Compare with t table value

The t value follows a distribution with (n-1); (30-1) degree of freedom. The table value for 29 degree of freedom at 5%, 1% and 0.1% levels are 2.045, 2.462 and 2.756 respectively. The calculated Value 3.518 is greater than 5%, 1%and 0.1%levels, $p<.001$. Inference- Treatment is effective to reduce triglyceride level

Table 9: LDL Cholesterol

Case no	X	Y	X-Y=d	d2
1.	170	124	46	2116
2.	171	109	62	3844
3.	148	131	17	289
4.	214	126	88	7744
5.	176	109	67	4489
6.	169	128	41	1681
7.	248	216	32	1024
8.	146	122	24	576
9.	142	124	18	324
10.	146	180	34	1156
11.	146	1 28	18	324
12.	140	124	16	256
13.	160	136	24	576
14.	148	122	26	676
15.	196	203	-7	49
16.	196	250	-54	2916
17.	150	126	24	576
18.	146	128	18	324
19.	138	124	14	196
20.	190	130	60	3600
21.	151	128	23	529
22.	172	132	40	1600
23.	191	150	41	1681
24.	220	133	87	7569
25.	160	130	30	900
26.	180	104	76	5776
27.	200	115	85	7225
28.	175	131	44	1936
29.	170	167	3	9
30.	214	140	74	5476

Compare with t table value

The t value follows a distribution with (n-1); (30-1) degree of freedom. The table value for 29 degree of freedom at 5%, 1% and 0.1% level sare 2.045, 2.462 and 2.756 respectively. The calculated value 5.51 is greater than 5%, 1% and 0.1% levels with $p<.001$.

Inference- Treatment is effective to reduce LDL level.

Table 10: HDL cholesterol

Case no	X	Y	X-Y=d	d2
1.	58	68	-10	100
2.	46	58	-12	144
3.	36	68	-32	1024
4.	40	63	-23	529
5.	50	60	-10	100
6.	40	56	-16	256
7.	47	66	-19	361
8.	50	60	-10	100
9.	59	60	-1	1
10.	43	62	-19	361
11.	30	53	-23	529
12.	36	60	-24	576
13.	54	60	-6	36
14.	45	60	-15	225
15.	30	25	5	25
16.	45	58	-13	169
17.	32	48	-16	256
18.	42	50	-8	64
19.	35	54	-19	361
20.	63	60	3	9
21.	37	56	-19	361
22.	43	60	-17	289
23.	28	57	-29	841
24.	44	60	-16	169
25.	48	50	-2	4
26.	38	46	-8	64
27.	46	50	-4	16
28.	54	55	-1	1
29.	65	60	5	25
30.	47	48	-1	1

Compare with t table value

The t value follows a distribution with (n-1); (30-1) degree of freedom. The table value for 29 degree of freedom at 5%, 1% and 0.1% level sare 2.045, 2.462 and 2.756 respectively. The calculated value 6.83 I greater than 5%, 1% and 0.1% levels with, $p<.001$.

Inference: Treatment is effective to improve HDL level

Conclusion

The study showed that homoeopathic medicine *Crataegus Oxyacantha* is effective in cases of hyperlipidemia. The outcome of the study is encouraging and this kind of treatment should avoid unnecessary complications. The lipid profile values were changed to normal within 6 to 12 months after the treatment. Homoeopathic treatment is found to be very effective in chronic diseases like hyperlipidemia. Peak incidence were found in age group 51 to 55. Majority of cases were females. Family history of hyperlipidemia is noted in 10 cases. Majority of patients are from middle class families. According to dietary habits majority of patients are non-vegetarians. Potency used for this study was Crataegus 30, 3X and mother tincture.

Among these potencies used mother tincture is effective in majority of cases. This study was done only in 30 cases for a period of one year and there is only limited reliability for this. To get a better reliable result long term study and also comparative study with other Systems of medicine should be carried out.

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Conflict of Interest
Not available

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