LIPID LOWERING EFFECT OF NATURAL HONEY IN COMPARISON TO ATORVASTATIN ON HYPERLIPIDEMIC RATS

MOON KJ[1], RAHMAN KA[2], RAHMAN H[3], AFROZ R[4], AMIN MR[5], ALIMA F[6], YEASMIN S[7], AHMED KS[8], AHMED F[9]

Abstract:

Aims: *The present study was performed to investigate the hypolipidaemic effect of natural honey in hyperlipidaemic rats. We also compared the hypolipidaemic effects of natural honey with a standard known hypolipidacmic agent, atorvastatin.*

Methods: *At first the rats (n=42), were randomly divided into six groups. Each group composed of seven rats. Group A control group received normal diet, distilled water for 10 days. Group B hyperlipidemic group received normal diet olive oil (1.5inl) with cholesterol daily for 10 days. Group C received normal diet, distilled water. D, E & F. On the 11th day of experiment the final body weight was measured & blood was collected by cardiac puncture for the study of lipid profile.*

Result*: Only cholesterol fed Group B and C rats gained body weights. Natural honey and atorvastatin treated group of rats. Group D, E, F lost body weights. These changes between the initial and final body weight were statistically significant (p<0.05). Regarding the lipid levels, it was observed that (a) there as statistically significant rise of serum TCl., LDL & TG levels in group B compared to that of group A (p <0.001 in each parameter), b the serum TCL is significantly decreased in group B (p<0.05), and group F (p<0.01) in the comparison to groups; the value also decreased in group D but the decrease was slightly significant (C) the serum LDL level significantly reduced in group D, E & F compared to group C; but the maximum effect comparison to group C; the value also decreased in group D but the decreased was slightly significant. (C) the serum LDL level significantly reduced in group D, E & F compared to group C, but maximum effect was observed in group E & F (p <0.001). (d) No significant change of serum HDL was observed in Group D but slightly significantly increased in group E and group F (p <0.05) compared to group C. (e) The serum TG level reduced significantly (p <0.001) in group D. E and F compared to group C. Thus study showed natural honey reduced TCL, LDL & TG and slightly increase HDL and atorvastatin reduce TCL, LDL & TG. But atorvastatin have some side effect on the other hand natural honey have no side effect.*

Conclusion: *The result and observation of the present study provide a rationale for use of natural honey in the development of a new herbal medicine much needed for the reduction of serum lipid levels (TCL, TO, LDL). Atorvastatin also lower TCL, LDL & TO. Thus it could he useful in hyperlipidaemic conditions. But before establishing natural honey as a therapeutically effective hypolipideamic agent, further studies should be carried out to determine the active principles responsible for hypolipidaemic effect and its cellular mechanism of action.*

Key words: *Lipid, Natural honey, Atorvastatin*

J Dhaka Med Coll. 2017; 26(2) : 94-102

Introduction:

Lipoprotein disorder or dyslipidaemias are common metabolic disorder seen in clinical practice. These disorders are important because they may lead to a number of sequelae, including coronary heart disease (CHD), dermatological manifestations (xanthelasmata and xanthomata), pancreatitis and (more rarely) neurological and ocular abnormalities.[1]

1. Dr. Kawsar Jahan Moon, Lecturer, Department of Pharmacology, Dhaka Medical College Hospital, Dhaka
2. Dr. Kazi Afzalur Rahman, Associate Professor, Department of Pharmacology, Dhaka Medical College Hospital, Dhaka.
3. Dr. Hasanur Rahman, Assistant Professor, Department of Pharmacology, Dhaka Medical College Hospital, Dhaka,
4. Dr. Ruman Afroz, Assistant Professor, Department of Pharmacology, Dhaka Medical College Hospital, Dhaka,
5. Dr. Mohammed Ruhul Amin, Medical Officer, Kaligonj Helath Complex, Gazipur
6. Dr. Fauzia Alima, Assistant Professor, Shaheed Munsur Ali Medical College, Uttara, Dhaka
7. Dr. Sabrina Yeasmin, Department of Pharmacology, Dhaka Medical College Hospital, Dhaka
8. Dr. Kazi Shamim Ahamed, Assistant Professor, Medicine, Dhaka National Medical College, Dhaka
9. Dr. Fatema Ahmed, Associate Professor, Departmnt of Critial Care Medicine, BIRDEM, Dhaka

Correspondence : Dr. Kawsar Jahan Moon, Lecturer, Department of Pharmacology, Dhaka Medical College Hospital, Dhaka, Mobile no. 01818649071

Received: *21 January 2017* ***Revision:*** *01 August 2017* ***Accepted:*** *01 September 2017*
DOI: http://dx.doi.org/10.3329/jdmc.v26i2.38809

Plasma lipids are transported in complexes called lipoproteins. Lipoproteins have hydrophobic core regions containing cholesterol esters and triglyceride surrounded by unesterified cholesterol, phospholipids and apoproteins. Lipoproteins that contain apolipoprotein (apo) B-100 convey lipid into the artery wall. These are low density lipoprotein (LDL), very low density lipoprotein (VLDL), intermediate density lipoprotein (IDL). The risk of coronary disease is strongly related to the concentration of lipoproteins.[2]

Disorder of lipid metabolism are manifested by elevation of the plasma concentration of the various lipid and lipoprotein fraction (total and low density lipoprotein-cholesterol, very low density lipoprotein, triglycerides), and they result predominantly to cardiovascular diseases.[3]

Cellular component in atherosclerotic plaques include foam cells, which are transformed macrophages and smooth muscle cells filled with cholesterol esters. These cellular alterations result from endocytosis of modified lipoproteins via at least four species of scavenger receptors. Chemical modifications of lipoproteins by free radicles create ligands for these receptors. The atheroma grows with the accumulation of foam cells, collagen, fibrin, and frequently calcium. Whereas such lesions can slowly occlude coronary vessels. Clinical symptoms are more frequently precipitated by rupture of unstable atheromatous plaques, leading to activation of platelet and formation of occlusive thrombi.[2]

Although treatment of hyperlipidemia can cause slow physical regression of plaques, but reduction of the lipoprotein concentration is more beneficial. High density lipoprotein (HDL) exerts several antiatherogenic effects. They participate in retrieval of cholesterol from the artery wall and inhibit the oxidation of atherogenic lipoproteins. Low levels of HDL are an independent risk factor for atherosclerotic disease and thus a target for intervention.[2]

Coronary heart disease is the commonest form of heart disease and the single most important cause of premature death in the developed world. The death rates from CHD in the United Kingdom are among the highest in the world. Unfortunately the incidence of the condition is increasing rapidly in Eastern Europe and many developing countries.[4]

Hypertriglyceridemia is associated with increased risk of coronarydisease. VLDL and LDL have been found in atherosclerotic plaques. These patients tend to have cholesterol rich VLDL of small particle diameter and small dense LDL.[2]

Patients with familial hyperlipidemia have a high incidence of premature coronary disease and many epidemiological studies have demonstrated a positive between mean population plasma cholesterol concentration and morbidity and death from coronary disease. The excess risk is closely related to the plasma concentration of low density lipoprotein “cholesterol (LDL-c) and inversely related to plasma high density lipoprotein “cholesterol (HDL-C) concentration and the incidence of CHD.[4]

As the incidence of CHD is increasing rapidly all over the world, the management of CHD now-a-days is more targeted to prevention rather than treatment and this prevention depends on the modification of the risk factors of CHD. Hyperlipidemia is one of those major risk factors. Modification and treatment of the hyperlipidemia is one of the key factors of the prevention of CHD. Besides the conventional lipid lowering agents, the use of a herbal extract to the lipid level will open a new era in the field of management of hyperlipidemia.

Natural Honey is a by-product of flower nectar and the upper areo-digestive tract of the honey bee which is concentrated through a dehydration process inside the bee hive. Honey has a very complex chemical composition that varies depending on the botanical solace. It has been used both as food & medicine since ancient times. Honey is natural product that has been widely used for its therapeutic effects. Honey is composed primarily of fructose and glucose but also contain fructo-oligosaccharide.[5]

Natural honey contain about 200 substance including amino acid, vitamins, minerals and

enzymes but it primarily contain sugar & water.[6]

Almost all honey contains flavonoides (such as api genin, pinocembrin, kaepferol, quercetin, galangin chrysin and heoperetin), phanolic acid (such as ellagie, caffieic, P-coumaric & ferulic acids) ascorbic acid, tocopherols, catalase, superoxide dismutase (SOD), reduced glutathione (GSH). Millard reaction products and peptide[6].

Natural honey has been applied for medicinal purpose since ancient times. However in the case of cardiovascular disease, effect of honey against cardiovascular risk factor such as hyperlipidemia and production of free radicals anti-oxidant present in honey include vitamin C, monophenolios, flavonoids and polyphenolies. Regular flavonoids intake is associated with a reduced risk of cardiovascular diseases a wide range of phenolic compound is present in honey which has promising effect in the treatment of cardiovascular disease.[7]

In coronary heart disease the protective effect of phenolic compounds include mainly antithrornbotie anti-ischemic, anti-oxidant and vasorelaxant. It is suggested that flavonoids decrease the risk of CHD by three major action[8];

Natural honey reduced cholesterol, LDL-C and TO and slightly elevated HDL-C. In patient with hypertriglyceridemia artificial honey increase TO while natural honey decreased TG. In patient with hyperlipidemia, artificial honey increased LDL-C while natural honey decreased LDL-C. Natural honey can contain nitric oxide (NO) metabolite and increased level of NO in natural honey might have a protecting function of cardiovascular disease. Natural honey also decreases venous blood pressure. Natural honey has antioxidant activity, anti inflammatory effect, antidiabetic effect, antiviral effect, antibacterial effect, effect on gastro-intestinal tract diseases, hepato-protective effect and anti-carcinogenic effect[8].

Objective:

General Objective:

To compare blood lipid lowering effect of natural honey and atorvastatin.

Specific objectives:

a) To estimate the serum levels of total cholesterol LDL, HDL and Triglyceride in normal & fat fed rats.

b) To estimate the effect of fatty diet (olive oil plus Cholesterol) on serum lipid profile in normal rats.

c) To estimate the effect of natural honey on serum lipid profile of fat fed rats in different doses.

d) To compare the effect of natural honey on serum lipid profile of fat fed rats with that of atorvastatin.

Methods:

It was a prospective experimental study carried out in the Department of Pharmacology, Dhaka Medical College from July 2014 to June 2015. A total number of 42 Albino rats of both sex and weighing 150-200g were selected for the study & collected from ICDDR.B Dhaka. They were kept in animal house of the Department of Pharmacology, Dhaka Medical College. Rats of different batches of different groups were kept in different metallic cages and were allowed to feed on standard laboratory diet and to drink ad libitum. 'These rats were acclimatized 10 days at temperature and humidity. Natural honey were obtained from national institute of Apiculture, Bangladesh. The dose of honey were calculated 200mg/kg & 300mg/kg and the calculated amounts were diluted in distilled water and were administered orally in a volume of 0.5m1/100g body weight. 5ml olive oil plus 1% cholesterol. 10gm cholesterol were dissolved in 100ml olive oil. So 1.5m1 olive oil per rat (average weight 150g) contained 0.15g cholesterol, i.e. equivalent to 1% cholesterol diet[9,10] Atorvastatin were used standard hypolipidemic agent and were collected from the Beximco Pharmaceuticals.

Procedure: A total number of 42 Norweigian rats of both saxes were collected for the current experiment the animal were housed in a standard room and with 12-hour light & dark cycle. The rats were divided into six groups (A, B, C, D, E & F) with each group comprising of 7 rats. Each group were treated for l0days & sacrificed on 1 l days.

The experiments were designed to demonstrate the comparative lipid lowering effect of natural honey with Atorvastatin on hyperlipidemic rats. For convenience, the experiments were divided into two parts, experiment-I and experiment-II.

To hyperlipidemic effect of blood of Rats fat diet (1.5ml olive oil + 1% cholesterol) were used. Natural honey in a dose of 200mg/kg and 300mg/kg and Atorvastatin 0.14mg/kg were used to see the hypolipidemic effect in hyperlipidemic Rats. Comparative lipid 1owering effect of natural honey with Atorvastatin on hyperlipidemic Rats.

Natural honey 200mg/kg and 300mg/kg were used. The experimental animals were divided into four groups. (1) Hyperlipidemic group (distilled water + olive oil I .5m1 with I % cholesterol). (2) Low dose natural honey group (200mg/kg). (3) High dose natural honey group (300mg/kg) and (4) Atorvastatin (0.14 mg/kg) group, each group were composed of 7 rats.

During the experiment, distilled water, low dose natural honey and high dose natural honey and Atorvastatin were administrated orally to the experimental animals in each group once a day for 10 consecutive days on the 10^{th} & 11^{th} day in the all pretreated groups. Fat (olive oil 1.5ml + 1% cholesterol) were orally administrated.

Following the initial infusion of hypolipidemic agent & prior to the infusion of the final agent, the experimental animals were allowed free access to the standard diet (diet ad libitum) and 300mg/kg the calculated amount were diluted/ suspended in distilled water and administrated orally in a volume of 0.5rnl/l00g body weight. All the drugs were administrated via oral route.

Experimental design-I

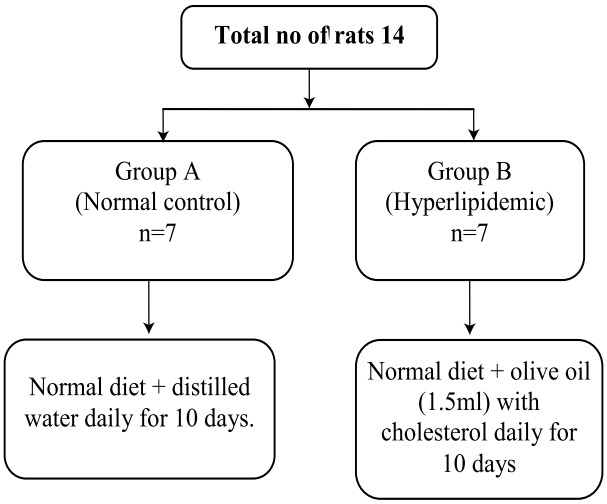
Fat fed hyperlipidemic grouping of the animals.

The part of the experiment were designed to demonstrate the effect of fat and high fatty diet on Serum lipid profile on normal rats. Body weight were estimated at the beginning and on 11^{th} day of experiment. Rats were sacrificed and blood were collected by cardiac puncture for estimation of serum lipid profile.

Fourteen rats are equally divided into following two groups.

Group A: Normal control group will receive normal diet (diet ad libitum) and (distilled water per day for 10^{th} day.

Group B: Hyperlipidemic experimental group receive normal diet and I.5m1 olive oil with cholesterol per day for 10^{th} day.



Experiment II

In this part of the experiment. 28 rats were divided into group C, D, E & F. Group C Served as fat fed control group and group D. E & F served as fat fed experimental groups. Body weight were estimated at the beginning and on the 11^{th} day of experiment. Also on 11^{th} day of experiment blood were collected by cardiac puncture for estimation of serum lipid profile. The doses were adjusted according to previous work[11].

Group C " Hyperlipidcmic fat fed control group received nonnal diet distilled water and 1.5ml olive oil with cholesterol per day.

Group D " Fat fed experimental group received normal diet, distilled water, 1.5ml olive oil with cholesterol & 200mg/kg natural hone) per day.

Group E " Fat fed experimental group received normal diet, distilled water, I.5m1 olive oil with cholesterol & 300mg/kg natural honey per thy.

Group F " Fat fed experimental group received normal diet, distilled water, I.5m1 olive oil with cholesterol & 0.14mg/kg Atorvastatin per day[12].

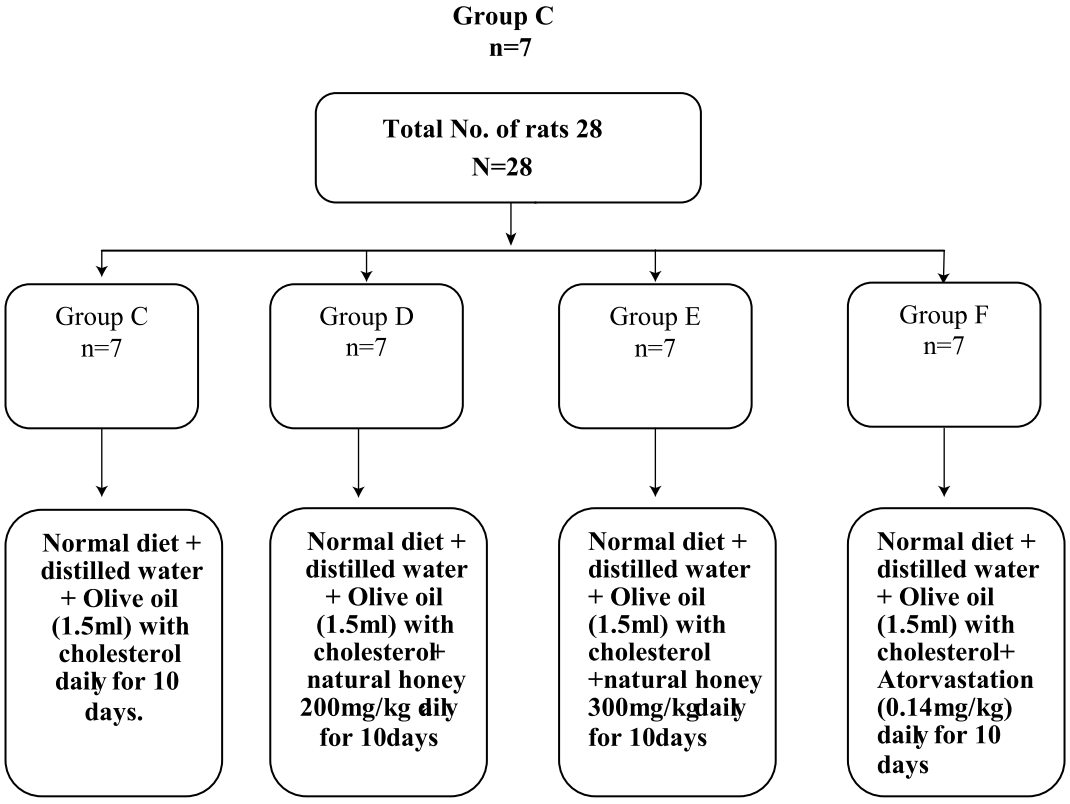


Figure 4.2: *experimental design of experiment II.* ±

Measurements: Body weight of the rats were recorded before & after treatment on the 11th day blood were collected by cardiac puncture from all rats and sera are obtained. Subsequently, serum total cholesterol, HDL, LDL and triglyceride level measured by enzymatic colorimetric method in the Department of Pharmacology & Therapeutics, Dhaka Medical College, using lipid profile kits.

Data analysis and results: All relevant information for each rat were recorded in a predesigned data collection sheet. Collected data were screened, complied and appropriate statistical analysis, such as unpaired Student's 't' test, were applied using computer based software. Statistical significance ware considered at p <0.05, p<0.0l and p <0.001.

Results

Effect of fatty diet on body weight (experiment 1)

The gain or loss in body weight during experimental procedure were calculated by subtracting the initial body weights (at the beginnings of the experiment) from the final body weights (on the day of sacrifice). The body weights were expressed in grams. There were statistically significant changes in final body weight from the initial body weight of the rats except group A. The mean initial and final body weight of group B rats were 164.3 ± 2.7 and 170.4 2.86 (table-I). Therefore it was observed that the fat fed group (B) gained body weight significantly at final measurement.

Table-I

Mean initial and final body weight of different groups of rats in experiment-I

Study groups	Initial body weight (g) (mean SD)	Final body weight (g) (mean SD)
Group-A	161.6 2.21	158 3.6
Group B	164.3 2.7	170.4 2.86

Data expressed as mean ±SD *P<0.05 is significant ***P<0.001 taken as highly significant

Group A: received normal diet and distilled water

Group B: received normal diet and olive oil (1.5rn1) plus cholesterol

Effect of Natural honey and atorvasfatin on body weight (experiment II)

The mean initial and final body weights in group C were 164.3 ± 2.7 and 1 70.42.86 in group D were 161.152.23 and 152.142.16 in group E were 161.15 2.23 and 149.742.74 in group F were 160.701.56 and 150.82.67 (table II, Fig. 5.1). Therefore it was observed that the rat treated with extract of Natural honey and atorvastatin (i.e group D, E, F and showed significant loss. Among the Natural honey treated group maximum weight loss was observed with the high dose of extract, i.e group E.

Table-II

Mean initial and final body weight of different groups of rat in Experiment II.

Group n=7	Initial body weight	Final body weight
Group-C	164.3 2.7	170.4 2.86
Group-D	161.15 2.23	152.14 2.16
Group-E	161.15 2.23	149.74 2.74
Group-F	160.70 1.56	150.8 2.67

Data expressed as mean ±SD, *p<0.05 is significant ***P<0.001 taken as highly significant

Group C: received normal diet and olive oil (1.5m1) plus cholesterol

Group D: received normal diet, distilled water, olive oil (1.5ml) plus cholesterol plus natural honey 200mg/kg

Group E: received normal diet, distilled water, olive oil (1.5m) plus cholesterol plus natural honey 300mg/kg

Group F: received normal diet, distilled water, olive oil (1.5ml) plus cholesterol plus Atorvastatin (0.14mg/kg)

Experiment- I

Hare a comparative study of different lipid parameters between group A and group B were observed.

Serum total cholesterol (TCL): The mean TCI. levels in group A and group B were 74.51 ± 2.35 and 142.5±2.05 mg/dl. respectively. The increase in the mean serum TCL in group B compared to control group was highly significant (P<0.001) (Table-III, Fig. 5.2)

Serum high-density lipoprotein (HDL): The mean HDL levels in group A and group B were 36.27±2.14 and 32.78±1.64 mg/dl respectively. The decrease in the mean serum HDL level in group B compared to group B compared to group A was significant. (p<0.001) (Table- III, Fig. 5.2)

Serum low-density lipoprotein (LDL): The mean LDL level in group A and group B were 23.08 ± 1.76 and 82.82±2.28 mg/dl respectively. The increase in the mean serum level of LDL level in group B compared to group A was highly significant (p<0.00l) (Table-III. Fig. 5.2)

Serum triglyceride (TG): The mean TG level in group A and group B were 71.5±2.14 and 115.12 ± 4.04 mg/dl respectively. The increase in mean serum TG level in group B compared to group A was highly significant (p<0.001) (Table- III, Fig. 5.2).

Table III

Effect of IICD ott Serum lipid level of adult rats

Group n=7	TLC	HDL	LDL	TG
Group A	74.51± 2.35	36.27± 2.14	23.08± 1.76	71.5± 2.14
Group B:	142.5± 2.05	32.78± 1.64	82.82± 2.28***	115.12± 4.04

Data expressed as mean ±SD, *p<0.05 is significant ***P<0.001 taken as highly significant

Group A: received normal diet and distilled water

Group B: received normal diet and olive oil (1.5m1) plus cholesterol

Experiment II

Here the effects of extract of natural honey at different doses in group D & E on lipid levels of fat-fed rats were observed, which were compared with the hyperlipidemic control group. The observed lipid lowering effects of natural honey were compared with that of the atorvastatin.

Serum total cholesterol (TCL)- The mean TCL in group C, D, E, F were 141.50±2.66, 122.27±3.44, 73.32±3.20 & 72.61±3.19 respectively. It was observed that the serum TCL decreased in all the natural honey and atorvastatin treated groups compared to hyperlipideamic control group (group C). But the changes were significant in group D, E, F (p<0.05, p<0.001, p < 0.001) (table IV, Fig 5.3)

Table IV

Mean lipid profile of different groups of rats in experiment II.

Group n=7	TCL	LDL	HDL	TG
Group-C	141.50±2.66	82.81±2.28	30.87±1.53	112.28±.06
Group-D	122.24±3.44***	60.68±3.28***	31.17±2.99^{ns}	102.47±3.62*
Group-E	73.32±3.20***	32.6±3.12***	35.17±2.55*	89.55±4.22***
Group-F	72.61±3.93***	30.88±3.93	37.45±3.47*	86.58±4.26***

Data expressed as mean -SD, *<0.05 is significant ***P<0.001 taken as highly significant
Group C: received normal diet and olive oil (1 .5m1) plus cholesterol
Group D: received normal diet, distilled water, olive oil (1.5m1) plus cholesterol plus natural honey 200mg/kg
Group E: received normal diet, distilled water, olive oil (l.5m1) plus cholesterol plus natural honey 300mg/kg
Group F: received normal diet, distilled water, olive oil (1 .5m1) plus cholesterol plus Atorvastatin (0.14mg/kg

Serum low density lipoprotein (LDL): The mean LDL in group C, D, E & F were 82.81±2.28, 60.68±3.28, 32.6±3.12 and 30.88±3.93 mg/ dl respectively. It was observed that serum LDL decreased in all groups compared with group C. The changes were highly significant in group E and F. (p<0.001, P <0.001) (Table IV, Fig 5.4).

Serum high density lipoprotein (HDL): The mean HDI in group C, D, E & F were 30.87±1.53, 31.17±2.99, 35.17±2.55 and 37.45±13.47 mg/ dl, respectively. It was observed that serum HDL increased significantly (p<0.05) in group in group E and F the change was not significant in Group D. (table IV, Fig 5.5)

Serum triglyceride (TG): The mean TG levels in group C, D, E & F 112.28±3.06. 102.47±3.62, 89.55±4.22 and 86.58 ±4.26 mg/dl, respectively. It was observed that serum TG level decreased significantly (p<0.05) in group D and highly significantly (p<0.001) in group E & F. (table IV, Fig 5.6).

Discussion

The present study was carried out to evaluate the effect of natural honey on serum lipid level and compare with atorvastatin. Its hypolipidemic effect were tested on albino rats. The daily food intake during the experimental period did not differ between the groups and weight gain was also unaffecte by the diet. No side effect such as diarrhea occurred in rats feed the experimental diet and no rats normal diet.

In the present work, hyperlipidemia was induced in rats by administration of 1.5 nil olive oil with 1% cholesterol for 10 days. The hyperlipidemia was evidenced by a significanct increase in serum TCL, LDL and TG levels. The serum HDL level significantly decreased.

An important risk factor for coronary heart disease in dyslipidemia and lipid lowering agent atorvastatin reduce this risk. The present study showed the natural honey containing flavonoids & phenolic compound lowered the cholesterol, LDL-c, TG & slightly elevatel HDLC. Thus natural honey improve lipid abnormality and reduced the atherogcnic index. In coronary heart disease the protective effect of phenolic compounds include mainly antithrombotic anti-ischemic, anti-oxidant and asorelaxant. It is suggested that flavonoids decrease the risk of CHD by three major action:

1. Improving coronary vasodilatation,

2. Decreasing the ability of platelets in the blood to clot

3. Preventing LDLs from oxidizing.

Atorvastatin in predominantly cholesterol lowering agent. Which inhibit HMG Co-A reductase enzyme and block the rate limiting step of cholesterol synthesis and decrease cholesterol synthesis. On the other hand atorvastatin increase in LDL receptor. Depletion of intracellular cholesterol. increase cell surface receptor and binding with its receptor. Increase internalization occurs, increase catabolism of LDL and decrease cholesterol synthesis.

Similar observation was made by a number of workers. Farhana Adnan[13], M. Sadia. Adnan

Jehangir Department of Biochemistry Ripha International University, Islamabad, Pakistan. Anti hyperlipidemic effect of accacia honey (Deshi kikar) in cholesterol-diet inducduct hyperlipidemia in rats. Initially all four groups (B to E) were given cholesterol diet (2%) 2 gms cholesterol in 98 gms diet for 2 months to induce hyperlipidae-mia except Group A, which served as (control). Group B received no therapy after establishing hyperlipidaemia. Groups C received 20 mg/kg of body weight acacia honey and group D received 10 mg/kg body weight of simvastatin oraly for 8 weeks after establishing hyperlipidaemia. while group E received combination of 20 mg/kg body weight of acacia honey and simvastatin respectively orally for 8 weeks. Rats having normal lipid profile were included in this study. Blood samples were taken on 60th day after giving antihyperlipidaemic therapy. Group B showed increase in serum LDL, TGs. cholesterol but decrease HDL levels. The level of these parameters decreased in group C which was given acacia honey reached near towards normal level. On the other hand with simvastatin in group D, these levels reached near normal level. In group E given combination of acacia honey and simvastatin the levels reached towards normalcy. In conclusion, acacia honey has an antihyperlidaemic effect against cholesterol diet induced hypcrlipidaemia in rats.

Another study by Zinat Rehana Sharmin[12], Department of Phamacology, Dhaka Medical College. Dhaka, Bangladesh. Study on the effect of Momordica Charantia (karla) on serum lipid profile in fat feed rats. Where Momordica Charnatia compared with atorvastatin this experiment was done for 10 clays and result vas Momordica Charantia was lowered TC, LDL , TG than atorvastatin.

In this study concomitant administration of natural honey, atorvastatin and hyperlipidernic diet (olive oil plus cholesterol) dailly orally for 10 days reduced serum TCL, LDL and TG levels. The reduction was highly significant in comparison to hyperlipidaemic control group, which was best level of HDL- cholesterol did not alter by any of the doses studied, in atorvastatin treated group serum TCL, LDL and TG reduced significantly and serum lHDL increased significantly.

The reduction of serum TCL, LDL and TG by heigher doses of natural honey 300mg were almost similar to that of atorvastatin. As far as our knowledge goes, no other work had been carried out on this aspect of natural honey in our country. Therefore the result could not correlated further with those of others. Further investigation are warranted to reconfirm and identify the hypolipidaemic active principles and elucidate their mechanism of action. Toxicological studies should also be undertaken before any chemical use.

The present study provide an initial step in demonstrating the hypolipidaemic effect of natural honey in hyperlipidaemic statues. Thus it could be a new agent in reducing morbdity and mortality resulting from dyslipidaemia. However, the promising hypolipidaemic effect of natural honey must be weighted along with easy availability.

The current study was basically a pharmacological one and both the modem drugs and herbal products were used to influence the biological system. It was evident that biological systems have certain limitations, like individual variation, interference in the response with the system, variablity in methods and other factors, which might have interfered with the primary finding. Despite all these limitations, interpertation of the results obtained in this study was made carefully and causiously.

Conclusion:

The result and observation of the present study provide a rationale for use of natural honey in the development of a new herbal medicine much needed for the reduction of serum lipid levels (TCL, TO, LDL). Atorvastatin also lower TCL, LDL & TO. Thus it could he useful in hyperlipidaemic conditions. But before establishing natural honey as a therapeutically effective hypolipideamic agent, further studies should be carried out to determine the active principles responsible for hypolipidaemic effect and its cellular mechanism of action.

References

1. Fdward CRW. Endocrine and Metabolic Disease. in: Edwards CRW Bouchier I, Haslet C, Chilver F editors, Davidson's principles and practice of medicine 19th ed. Edinburgh: Churchill Livingstone 2002, 670-774.
2. Mary J. Malloy, John P. Kane Agents used in Dyslipidemias, In: Basic and clinical pharmacology, 11th ed. Tata. McGRAW HILL, 2010: 650-609.
3. Bennet PN. Brown MJ. Hilyperlipidemias In: clinical pharmacology, 9th ed. Edinburgh Churchill Livingstone 2003: 521-8.
4. Boon NA. Fox KAA. Disease of the cardiovascular system In: Edwards CRW, Bouchier I, Haslet C. Chilvers. E, Editors: Davidsons Principles and practice of medicine, 19th ed. Edinburgh Churchill Livingstone, 2002: 358-479.
5. Eteraf-Oskouei T, Najafi M. Traditional and modern uses of natural honey in human disease. A review-Basic Med Sci Jun 2013 16(6): (731-742)
6. Bogdanov S, Jurendic T, Sieber R, Gallmann P, Honey for Nutrition and health review. American Journal of the College of Nutrition, 2008, 27: 677-689.
7. Najafi M, Shaseb E, Ghaffary S, Fakhrju A, Oskouei TE, Effect of Chronic oral administration of natural honey on lchemia/Reperfusion induced of arrithromia in Isolated rats. Iranian Journal of basic medical science Mar-8-2010.
8. Banda SDT, Shankar KR, Prakash TJ, Ali F. Anti-Diabetic "Anti-Hyperlipidemic and anti-oxidant activities of ATH-2143" in streptozocin induced Diabetic rats. Journal of Advanced Pharmacy Education & Research Oct-Dec 2013f Vol-3 Issue 4-487.
9. Sabina J. A study on the effect of Catharanthus Roseus Linn on serum lipid profile in fat fed rats. M. Phill thesis, Dhaka University of Dhaka, 2004.
10. Akhter A. Study of the effect of neem oil on serum lipid profile in normal and fat fed rats. (B.Sc honors thesis) Dhaka; University of Dhaka, 1991.
11. Anita BS. Okokon JE. Effect of lea f juice of catharanthus roseus Linn on cholesterd, triglyceride and lipoprolein levels in normal rats. md J Pharmaeol 2005; 37 401-2.
12. Sharmin ZR, Study on the effect of Momordica charantia on serum lipid profile in fat fed rats. Department of Pharmacology, Dhaka Medical College, Dhaka 2012 - page -45.
13. Adnan F, Sadiq M, .Jehangir A, Anti-Hyperlipidemic effect of Acacia honey (Dcsi Kikar) in cholesterol-Diet induced Hyperlipidemia in rats 2011; vol. 27 P. 62-67.