Available online through

www.jbsoweb.com

ISSN 2321 - 6328

Research Article

THERAPEUTIC EVALUATION OF UNANI FORMULATION IN DYSLIPIDAEMIA: A RANDOMIZED CONTROLLED STUDY

Danish Mand ^{1*}, Tanzeel Ahmad ², Mohd Khalid ¹, Mohd Jafar ¹, Sabiha Fatima ¹

¹PG Scholar, Department of Moalajat, National Institute of Unani Medicine, Kottigepalya, Magadi Main Road, Bengaluru, India

²Reader, Department of Moalajat, National Institute of Unani Medicine, Kottigepalya, Magadi Main Road Bengaluru, India

*Corresponding Author Email: dr.danish104@gmail.com

Article Received on: 12/09/15 Accepted on: 06/11/15

DOI: 10.7897/2321.6328.03654

ABSTRACT

Dyslipidaemia is a leading medical problem affecting overall health status of an individual. Deranged levels of lipid profile are responsible for atherosclerosis which ultimately leads to development of vascular diseases. If left untreated, it may result in various life threatening complications. Objective was to compare and evaluate the efficacy of test drug Qurs-e-Luk with control drug “Lipotab” in the management of Dyslipidaemia. It was a single blind, randomized, controlled, clinical trial. Thirty subjects of dyslipidaemia were selected and randomly assigned to test (20 patients) and control group (10 patients). Qurs-e-Luk and Lipotab were given to test and control groups in the form of powder (5 gm twice a day) and tablet (2 tablets per day) respectively for 60 days. All the patients of both groups were assessed on subjective and objective parameters at the baseline and after completion of trial, and the study outcome was analyzed using appropriate statistical tests. The test drug showed significant effect on few subjective and objective parameters in comparison to control drug without any significant side effects or toxicity. In test group, improvement in palpitation, fatigue and reduction in S. triglycerides and LDL was statistically significant ($p < 0.05$). The study infers that the comparative analyses of both drugs was not statistically significant; although improvement in subjective parameters was noted in both groups, and the effect on objective parameters was observed only in test group.

Key words: Dyslipidaemia; Siman Mufrit; Qurs-e-Luk; Lipotab.

INTRODUCTION

Dyslipidaemia is characterized by an incongruity in the blood lipids level, which could both go too low or too high¹. It may be of two types: primary dyslipidaemia that refers to a genetic defect in lipid metabolism, and secondary dyslipidaemia which may be due to a variety of aetiologies such as environmental factors (diet rich in saturated fat or sedentary habits), diseases (type 2 diabetes, hypothyroidism etc.) and medications (thiazide diuretics etc.)². If dyslipidaemia left untreated, it may affect the overall health status of an individual leading to arteriosclerosis in later years of life³. Its higher prevalence is reported in the developed countries and is on the surge in developing countries⁴. It is a major risk factor for cardiovascular diseases especially coronary heart diseases¹ and is estimated that by 2020, about 2.6 million Indians will be affected by CVD related disability and death^{5,6}.

There is as such no description of dyslipidaemia in classical Unani literature, but the description of Siman Mufrit does exist since ancient times. The health hazards associated with Siman Mufrit were well known to the Ancient Greek physician Hippocrates, who mentioned that sudden death is more common in obese persons⁷. The etiological factors, clinical features and complications, and line of treatment of Siman Mufrit mentioned by Unani scholars simulate to greater extent with dyslipidaemia. Available hypolipidemic agents such as statins, HMG-CoA reductase inhibitors, niacin and bile acid sequestrants are reported to be moderately effective in dyslipidaemic patients but are also associated with myriad adverse effects including hepato-toxic

effect, cholelithiasis, myopathy and chronic renal failure etc;⁸ hence these agents could not be used for a prolonged period, whereas dyslipidaemia requires long term treatment. Hence, the prevention and proper management of dyslipidaemia is a challenge for public health system in developed as well as developing countries⁹.

Thus, it is needed to search for such a drug which may prove effective as well as safe in management of dyslipidaemia. The test drug “Qurs-e-Luk” was selected to manage dyslipidaemia and associated complications as its ingredients possess Muffatah-e-Sudad (deobstruent), Muqawwi Qalb-wa-Kabid (cardio & liver tonic), Mulattif (demulcent) and Muhallil (resolvent) actions¹⁰. Hence, a hypothesis was generated that Qurs-e-Luk could be effective in treatment of Dyslipidaemia based on the inherent actions of ingredients present in the test drug.

MATERIALS AND METHODS

Composition and preparation of test drug (Qurs-e-Luk)

The ingredients of Qurs-e-Luk were Luk maghsool (*Coccu lacca*) 40 gm; Rewand Chini (*Rheum emodi*) 20 gm; Asaroon (*Valeriana wallichii*) 10 gm; Sunbul-ut-Teeb (*Valirians jatamansi*) 10 gm; Mastagi (*Pistacia lentiscus*) 10 gm; Tukhm-e-karafs (*Apium graveolans*) 10 gm; Anisoon (*Pimpinella anisun*) 10 gm; Nankhwah (*Carum capticum*) 10gm; Izkhar (*Andropogon jwarancus*) 10 gm; Qust (*Saussurea lappa*) 10 gm; Filfil Siyah (*Piper nigrum*) 10 gm, and Zanjabeel (*Zingiber officinalis*) 10

gm.¹⁰ Good quality single drugs were procured by the pharmacy of National Institute of Unani Medicine, Bangalore, and their originality was established by the chief pharmacist of the institute. The ingredients were cleaned, then powdered, and supplied to the patients in powder form in a transparent small bag containing 150 gm. The control drug Lipotab was manufactured by Hamdard Dawa Khana, New Delhi.

Research Design, Subjects and Randomization

A single blind, randomized, controlled, clinical trial was conducted at NIUM Hospital, Bengaluru from December 2013 to December 2014. The study was executed after obtaining approval of the study protocol from the Institutional Ethical Committee, NIUM and IEC no. was NIUM/IEC/2012-13/005/Moal/05. Written informed consents were taken from the patients.

Thirty diagnosed subjects of dyslipidaemia were randomly assigned to test (20 patients) and control group (10 patients). The randomization was done by lottery method (Figure 1). Qurs-e-Luk and Lipotab were given to the test and control groups in the form of powder (5 gm twice a day) and tablets (2 tablets per day) respectively for 60 days. No concomitant drug was allowed to be used during the trial period that was 60 days.

Inclusion criteria were diagnosed patients of dyslipidaemia based on lipid profile (total cholesterol > 200 mg/dL, triglycerides > 150 mg/dL, LDL > 130 mg/dL, HDL < 40 mg/dL) and subjective parameters (palpitation, breathlessness, and fatigue), of both genders in the age group of 20-60 years. Exclusion criteria included patients with severe systemic disorders (like uncontrolled diabetes mellitus, renal failure etc), pregnant and lactating women. Patients fulfilling the above criteria were enrolled in the trial, then subjected to investigations, and assessed clinically by the relevant history, general physical examination, and other required parameters. Withdrawal criteria were failure to follow the protocol, noncompliance with therapy, and any adverse effect.

Efficacy assessment & Follow-up

Primary outcome was reduction in lipid profile (serum cholesterol, serum triglyceride, LDL and HDL cholesterol) levels, whereas secondary outcomes consisted of improvement in palpitation, breathlessness, and fatigue in each group. Safety parameters included Hb%, TLC, DLC, ESR; Urine routine & microscopic; SGOT, SGPT, Alkaline phosphate, Serum Bilirubin, Blood urea & Serum Creatinine; Fasting and Post Prandial Blood sugar at baseline and at the end of trial.

Biochemical assessment was done on 0 and 60th day of the treatment. The adverse event or reaction, if any, appearing during the study either in the test or control group was duly recorded. For efficacy assessment, subjective parameters were recorded at every 15th day of follow-up using an arbitrary scale (0= no symptoms; + for mild symptoms but not enough to require remedial therapy; ++ for moderate symptoms which interfere in day to day activities and require remedial therapy; +++ for severe symptoms which do not allow to daily activities). Objective parameters were assessed at 0 and 60th day of the trial.

Statistical Analysis

Paired *t* and unpaired *t* tests were used for within and between group analysis; chi square & chi square for trends and Wilcoxon matched pairs test were also applied to analyze qualitative data using Instat Graph Pad software. Difference in the treatment groups were considered significant at *p*<0.05.

RESULTS

Demographic data for both test and control groups has been depicted in Table 1. Effect of test and control drugs on subjective parameters (palpitation, breathlessness fatigue) was analyzed using Chi Square within group and among groups, whereas Chi Square for trends was used, if any value was less than 5 in any cell (Table 2). Objective parameters were analyzed using paired *t* test, and unpaired *t* test for intra and inter group analysis respectively. Significant effects were seen in reduction of triglycerides and LDL (Table 3). Data on safety parameters is illustrated in Table 4.

Table 1: Demographic Data

Attributes	Test (n= 20)	Control (n= 10)
Age		
30-40	3	3
41-50	12	3
51-60	5	4
Gender		
Male	16	5
Female	4	5
Diet		
Mixed	18	9
Veg	2	1
SES		
Upper (I)	0	0
Upper Middle (II)	7	2
Lower Middle (III)	8	7
Upper Lower (IV)	5	1
Lower (V)	0	0

SES: socio-economic status (kuppaswamy 2007)

Table 2: Effects of drugs on subjective parameters

On Palpitation

Palpitation	0 day	15th day	30th day	45th day	60th day	p value
Test Group (n=20)						
None	6 (30%)	5 (25%)	10 (50%)	11 (55%)	14 (70%)	0.0486
Mild	5 (25%)	6 (30%)	8 (40%)	7 (35%)	4 (20%)	
Moderate	7 (35%)	7 (35%)	2 (10%)	2 (10%)	2 (10%)	
Severe	2 (10%)	2 (10%)	0 (0%)	0 (0%)	0 (0%)	
Control Group(n=10)						
None	5 (50%)	5 (50%)	7 (70%)	7 (70%)	8 (80%)	0.4276
Mild	2 (20%)	2 (20%)	2 (20%)	3 (30%)	2 (20%)	
Moderate	3 (30%)	3 (30%)	1 (10%)	0 (0%)	0 (0%)	
Severe	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
P value	0.2349	0.1773	0.4409	0.2964	0.3865	---

On Breathlessness

Breathlessness	0 day	15th day	30th day	45th day	60th day	p value
Test Group(n=20)						
None	9 (45%)	9 (45%)	11 (55%)	14 (70%)	14 (70%)	0.0584+
Mild	3 (15%)	3 (15%)	6 (30%)	5 (25%)	6 (30%)	
Moderate	6 (30%)	7 (35%)	3 (15%)	1 (5%)	0 (0%)	
Severe	2 (10%)	1 (5%)	0 (0%)	0 (0%)	0 (0%)	
Control Group(n=10)						
None	5 (50%)	5 (50%)	5 (50%)	7 (70%)	7 (70%)	0.5324
Mild	2 (20%)	2 (20%)	3 (30%)	3 (30%)	3 (30%)	
Moderate	3 (30%)	3 (30%)	2 (20%)	0 (0%)	0 (0%)	
Severe	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
p value	0.5252	0.5921	0.7313	0.8102	1.00	---

On Fatigue

Fatigue	0 day	15 th day	30 th day	45 th day	60 th day	p value
Test Group(n=20)						
None	6 (30%)	5 (25%)	7 (35%)	9 (45%)	12 (60%)	0.0014
Mild	4 (20%)	7 (35%)	8 (40%)	11 (55%)	8 (40%)	
Moderate	10 (50%)	8 (40%)	5 (25%)	0 (0%)	0 (0%)	
Severe	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Control Group(n=10)						
None	4 (40%)	4 (40%)	5 (50%)	6 (60%)	6 (60%)	0.0087
Mild	1 (10%)	1 (10%)	5 (50%)	4 (40%)	4 (40%)	
Moderate	5 (50%)	5 (50%)	0 (0%)	0 (0%)	0 (0%)	
Severe	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
p value	0.7736	0.8787	0.1490	0.4386	1.00	

Test used was Chi Square for analyzing data within group and among groups in all the subjective parameters. Chi Square for trends was used, when any value was less than 5 in the cell.

Table 3: Effects of drugs on objective parameters in dyslipidaemic patients

Groups	Cholesterol		p value	Triglyceride		p value	HDL-C		p value	LDL-C		p value
	BT	AT		BT	AT		BT	AT		BT	AT	
Test (n=20)	195 ± 8.469	205.95 ± 9.148	0.1197	246.3 ± 16.613	203.1 ± 16.084	0.0241	41.35 ± 1.754	42 ± 1.874	0.3745	104.45 ± 8.550	124.95 ± 9.974	0.0477
Control (n=10)	198.8 ± 14.374	209.1 ± 12.759	0.1018	231.9 ± 24.250	209.5 ± 30.009	0.2309	38.7 ± 1.967	40.7 ± 3.246	0.3626	113.5 ± 15.123	126.5 ± 15.180	0.1158
P value	0.4051	0.4216		0.2754	0.4822		0.1987	0.3091		0.2892	0.4654	

Paired *t* test and Unpaired *t* were used for intra and inter group analysis respectively

Table 4: Safety parameters at baseline and after treatment

Parameters		Test (n=20)		p value	Control (n=10)		p value
		B.T.	A.T.		B.T.	A.T.	
Hb %		14.67±0.31	14.76±0.36	0.5821	12.7±0.56	12.44±0.51	0.2292
TLC		8272±399.8	7915±441.01	0.2336	7390±603.2	7350±595.4	0.8803
DLC	Poly	58±1.371	57.65±1.179	0.8459	60.6±1.765	60.9±2.084	0.8249
	Lymph	34.4±1.375	34.15±1.074	0.8842	33.6±1.551	31.7±2.124	0.2754
	Mono	3.2 ± 0.2772	3.75 ± 0.2702	0.1353	2.1 ± 0.3145	3.2 ± 0.4163	0.0469
	Eosino	4.1 ± 0.2395	4.45 ± 0.2458	0.3013	3.7 ± 0.3958	4.2 ± 0.4163	0.3125
	Baso	0.25±0.160		0.1351			

ESR	23.6 ±3.653	21.65 ±3.675	0.8308	84.7±7.143	40.2 ±6.826	0.2421
B. Urea	34.7 ±1.726	34.95 ±1.669	0.9564	33.3±2.848	37 ±3.393	0.3554
S. Creatinine	1 ± 0.03244	0.98±0.0257	0.4548	0.95±0.045	1±0.06498	0.2500
T. Bilirubin	0.731±0.06	0.664±0.059	0.1550	0.509±0.04	0.451±0.02	0.1602
SGOT	23.25±2.01	19.95 ±1.072	0.022+	21.4 ±2.242	19.7 ±1.758	0.3828
SGPT	30.45±2.91	25.75±2.185	0.038*	25.3±3.795	23.3±2.883	0.5836
Alk Phos.	113.7±5.37	112.9±6.167	0.8182	130.4±11.9	112.4±6.949	0.1680
FBS	105.4±7.71	100.7±5.188	0.4090	119.4±22.4	112.3±18.7	0.3750
PPBS	148.3±13.3	150.5±12.85	0.8984	164.8±27.9	155±23.382	0.3222

Tests Used: Paired *t* test and Wilcoxon Matched Pairs test were applied when the data did not pass normality test, even after transformation.

Figure 1: Subject Flow Chart

DISCUSSION

The present conducted study was the first study, to compare and evaluate the efficacy of Qurs-e-Luk in dyslipidaemia. In this trial, 24 (80 %) were in the age group of 41-60 years and 6 (20%) in age group of 30-40 years. This data shows a higher prevalence of dyslipidaemia in age group of 41-60 years, which coincides with the study conducted by M Estari *et al*¹¹. The prevalence of disease is reported more in males (21) than females (9) which is in conformity with the study conducted by Huang Y *et al* highlighting the increased prevalence in male^{11,12}.

In dietary habits, 27 (90 %) patients had mixed dietary habits and only 3(10%) patients were vegetarian, and present data is in agreement with the study conducted by Rasheed A *et al* inferring that fatty diet is highly responsible for dyslipidaemia¹³. (Table 1).

Significant result was observed in improvement of the subjective parameters like palpitation and fatigue except breathlessness (Table 2). This improvement may be attributed to Mufarreh and Muqawwi Qalb (exhilarant and cardio tonic) properties of Sumbul-ut-Teeb, Qust and Mastagi, present in test formulation. This finding is in accordance with the description of the drugs mentioned in Taj-ul-Mufradat, Aljame-ul-mufradat al-Advia wa al-Aghziya, Kitab-al-Fath Fi-al-Tadawi and Unani Pharmacopoeia of India^{14,15,16,17}.

Regarding the fatigue, the improvement may be attributed to Muqawwi Kabit (liver tonic) and Muqawwi Qalb (cardio tonic) activity of Luk, Rewand chini, Qust, Mastagi, Sumbul-Ut-Tib and

Izkhair present in test formulation. This finding is in accordance with the properties of the drugs suggested by description of the drugs mentioned by Najmul Ghani, Ibn Baitar and HNA Tariq^{14,15,18}. Further, Asaroon, Mastagi, Anisoon, Izkhair and Zanjabeel have anti oxidant property that may be responsible for abating the fatigue^{19,20,21,22,23}.

Both test and control drugs showed no significant effect on cholesterol level in either group, ($p>0.05$) and it infers that test and control drugs are equally ineffective in reducing S. Cholesterol level in the patient of dyslipidaemia. The difference of Mean $\pm$ SEM of Triglyceride in test group at 60th day from baseline, was found statistically significant ($p<0.05$); in control group, there was no significant reduction in Serum Triglycerides ($p>0.05$). Similarly, both test and control drugs showed no effect on HDL-C level neither within same group nor between both groups ($p>0.05$). So far LDL-C is concerned, the observed result was found suggestive of significant efficacy with the Mean $\pm$ SEM in test group at 60th day from baseline, ($p=0.0477$), whereas in control group comparison the difference was statistically insignificant at 60th day from baseline, ($p>0.05$).

The observed response may be attributed to Har Yabis Mizaj (hot dry temperament) of all the ingredients present in the test formulation. By virtue of Har Yabis temperament, these drugs are bestowed with Mulattif (demulcent), Muhallil (resolvent) and Musakhkhin (calorific) properties and excess production of Hararat and Yuboosat in liver which might have rectified its metabolism and led to decrease of lipids (Triglycerides and LDL) at the end of treatment. The observed results are in congruence of

the classical Unani literature that excessive Burudat and Rutubat in body especially in liver, deranges Istihala (metabolism) of lipids leading to increased production of Shaham (fat) in the body, whereas its contrary temperaments i.e. Hararat and Yaboosat metabolizes the Shaham and serves as the source of energy for the body. Hence, the observations validate our hypothesis. Thus, the observed result establishes that the Qurs-e-Luk is effective in reduction of triglycerides and LDL and subjective parameters.

Routine investigations were within the normal limits in both groups before and after the treatment. This indicates that the oral administration of drug formulation is safe for therapeutic use. (Table 4)

Pharmacologically, the reduction in lipid profile may be related to various properties inherent in the ingredients of the test drug. Luk was found to have anti-inflammatory and diuretic effects by Siddiqui SA²⁴. Rewand Chini has anti-inflammatory and hepatoprotective actions which help improve the metabolism of lipids in liver^{25,26}. Asaroon possesses anti-oxidant action which abates the oxidative stress markers for dyslipidaemia¹⁹. Sumbul-ut-Teeb has lipid lowering property as concluded by Shadke AS²⁷. Mastagi has been reported for anti-dyslipidaemic²⁸, anti-atherogenic²⁹, hepatoprotective³⁰, and antioxidant activities²⁰. Tukhm-e-Karafs exerts hypolipidemic action,³¹ and Anisoon is known for antioxidant activity²¹. Javed I et al reported that Nankhwah has anti-hyperlipidaemic effect³². Izkhir also has antioxidant action²². Akhtar MS et al reported that Qust has cardiotonic activity³³. Zanjabeel is reported to have hypolipidemic^{28,34,35}, antioxidant²³, and hepatoprotective effects³⁶.

Thus, based on the above pharmacologic properties inherent in the ingredients of the test drug, the efficacy has been acquired due to a complex mechanism of actions including anti-oxidant, anti-dyslipidaemic, cardio tonic, liver tonic and anti-atherogenic properties of test formulation.

CONCLUSION

Present study concluded that Qurs-e-Luk is effective on subjective and objective parameters; the test formulation has shown significant anti-triglyceridaemic, LDL lowering and anti-atherogenic effects without demonstrating any sign of toxicity or side effect. Limitations of the study are small sample size and shorter duration of clinical trial. As diverse mechanisms are involved in development of dyslipidaemia, elaborate studies are recommended to ascertain pharmacological actions of test formulation for longer duration in future studies.

ACKNOWLEDGEMENT

Authors are thankful to the director, National Institute of Unani Medicine, Bengaluru, Karnataka for providing facilities during the clinical trial.

REFERENCES

- Mahmood ZA, Ahmad SW, Sualah M, Mehmood SBZ. Hyperlipidemia Development and Consequences. Medical Channel 2009; 15(3): 14-15.
- Danish Mand, Mohd Khalid, Sabiha Fatima, Tanzeel Ahmad, Mohd Jafar, Ziaul Haque. Dyslipidaemia: A correlational approach with Siman mufrat in Unani medicine. J Biol Sci Opin 2015;3(5):212-215 <http://dx.doi.org/10.7897/2321-6328.03546>
- Dyslipidemia - Symptoms, Causes, Diagnosis and Treatment.26. <http://medicalcontent.hubpages.com/hub/Dyslipidemia>. (accessed on18/9/2014)
- Paccaud F, Fasmeyer VS, Witlisbach V, Bovet P. Dyslipidemia and Abdominal Obesity: an Assessment in Three General Populations. Journal of Clinical Epidemiology 2000; 53: 399-400
- S. Goenka, D. Prabhakaran, V. S. Ajay, and K. S. Reddy, "Preventing cardiovascular disease in India— Translating evidence to action," Current Science. 2009; 97(3): 367–377.
- K. S. Reddy, D. Prabhakaran, V. Chaturvedi et al., "Methods for establishing a surveillance system for cardiovascular diseases in Indian industrial populations," Bulletin of the World Health Organization, 2006; 84(6): 461–469.
- Williams G, Fruhbeck G. Obesity Science to Practice. USA: John Wiley & Sons Ltd; 2009: 3.
- Joel G, Hardman, Lee EL. Goodman & Gilman's the pharmacological basis of therapeutics. 10th ed. USA: Mc Graw Hill Publication; 2001: 984-94.
- Anonymous. Ecological analysis of the association between mortality and major risk factors of cardiovascular diseases. The World Health Organization MONICA Project. Int J Epidemiol 1994; 23: 505-16.
- Anonymous. National Formulary of Unani Medicine; Govt. of India Ministry of Health & Family Welfare Dept. of AYUSH, New Delhi, (2007), Part. 2. Vol.1, 2007: 32.
- Estari M, Reddy AS, Bhikshapati T, Satyanarayan J, Venkanna L, Reddy MK. The Investigation of serum lipids and prevalence of dyslipidemia in urban adult population of Warangal district, Andhra Pradesh, India. Biology and Medicine. 2009; Vol 1 (2): 61-65.
- Huang Y, Gao L, Xie X, Tan SC. Epidemiology of Dyslipidemia in Chinese Adults: Meta- Analysis of Prevalence, Awareness, Treatment, and Control. Population Health Metrics 2014; 12:28:1-7.
- Rasheed A, Siddiqui MA, Khan JA. Therapeutic Evaluation of Kalonji (*Nigella sativa*) in Dyslipidemia - A Randomized Control Trial. Medical Journal of Islamic World Academy of Sciences 2014; 22(3): 111-116.
- Tariq HNA. Taj-ul-Mufradat. New Delhi: Idara Kitab-us-Shifa; 2010: 33-37, 39-43, 100-101, 121-22, 401-403, 578-80, 643-44, 676-77, 686-87.
- Ibne Baitar ZA, Aljame-ul-mufradat al-advia wa al-aghziya, Urdu translation, CCRUM, New Delhi, India, (2000) part 1-4: 29-31, 51-54, 144-45, 253-54, 275-82, 349-51, 377-80.
- Magribi ASBI. Kitab-al-Fath Fi-al-Tadawi. 1st ed. New Delhi: Jamia Hamdard; 2007: 46-49, 102-103, 128-29, 138-39, 146-47, 160-161, 164-65, 182-83, 190-91, 202-203.
- Anonymous. The Unani Pharmacopoeia of India; Govt. of India Ministry of Health & Family Welfare Dept. of AYUSH, New Delhi, (2007), 1 (I & II): 9-10, 74-75, 84-85, 88-89, 91-94.
- Ghani HN. *Khazianul Advia* (Musawwar Edition). New Delhi: Idara Kitab-us-Shifa, (YNM): 202, 752-753, 1175.
- Kalim MD, Bhattacharya D, Banerjee A, Chattopadhyay S. Oxidative DNA damage preventive activity and antioxidant potential of plants used in Unani system of medicine. BMC Complementary and alternative medicine, 2010; 10: 77.
- Mezni F, Maaroufi A, Msallem M, Boussaid M, Khouja ML, Khaldi A. Fatty acid Composition, Antioxidant and Antibacterial Activities of *Pistacia lentiscus* L. Fruit Oils. A Journal of Medicinal Plants Research. 2012; 6(39): 5266-5271.
- Kucukkurt I, Avci G, Eryavuz a, Bayram I, Cetingulis AB et al. Effect of Spplimentation of Anise Seed (P.A.L) at Various Amounts to Diets on Lipid Peroxidation , Antioxidant Activity and Some Biochemical Parameters in laying Quails (*Coturnix Coturnix Japonica*). Kocatepe Vet J (2009); 2(1):1-5.
- Prasad C, Singh D, Shukla O. Antioxidant Activity and Trace Elements Profile of Extracts of *Cymbopogon jwarancusa* (Jones.) Leaves. Journal of Pharmacognosy and Phytochemistry 2013; 2(3):33-57.
- Bhaskar N, Sachindra NM, Modi VK, Sakhare PZ, Mahendraker NS, Preparation of proteolytic Activity Rich Ginger Powder and Evaluation of its Tenderizing Effect on Spent –Hen Muscles. Journal of Mussle foods.2006; (17):174-184.
- Siddiqui SA. Lac- The Versatile Natural Resin. Natural Product Radiance 2004; 3(5):335.
- Malik S, Sharma N, Sharma UK, Singh NP, Bhushan S, Sharma M et al. Quantitative and Qualitative analysis of Anthroquinone Derivatives in Rhizomes of Tissue Culture Raised *Rheum emodi* Wall Plant. Journal of plant physiology 2010; 167 (9): 749-756.
- Akhtar MS, Amin M, Ahmad M, Alamgeer A. Hepatoprotective Effect of *Rheum emodi* Roots (Rewand chini) and Akseer-e-Jigar

- Against Paracetamol Induced Hepatotoxicity in Rats Ethnobotanical leaflets. An International Journal of Ethnobotanical Research
27. Shadke AS. A Review on Lipid Lowering Activities of Ayurvedic and Others Herbs. Natural Product Radiance. 2007; 6(1): 81-89.
 28. Tahmasebi F, Johari H, Jahromi VH, Rahmanian E, Baghtiari A, Farzam M. Effect of *Zingiber officinale* and *Pistacia vera* Extract on Changes in Blood factors HDL, LDL, Triglycerides and Total Cholesterol in Hypercholesterolemic Rabbits. Advance in Environmental Biology 2012; 6 (10): 2802-2808.
 29. Dedoussis GV, Kaliora AC, Psarras S, Chiou A, Mylona A and Nikolaos Papadopolos G et al. Antiatherogenic effect of *Pistacia Lentiscus* via GSH Restoration and Downregulation of CD36 mRNA Capression. Atherosclerosis 2004;174: 293-303.
 30. Sana Janakat, Hela Al-Merie. Evaluation of Hepatoprotective Effect of *Pistacia lentiscus*, *Phillyrea latifolia* and *Nicotiana glauca*. Journal of Ethnopharmacology 2003; 83: 135-138.
 31. Ahmed QS, Sayeda K. Effect of Celery (*Apium Graveolens*) Seeds Extract on Protease Inhibitor (Ritonavir) Induced Dyslipidemia. NJIRM 2012; 3(1): 52-56.
 32. Javed I, Iqbal Z, Rahman ZU, Khan FH, Muhammad F, Aslam B, Ali L. Comparative antihyperlipidaemic efficacy of *Trachyspermum ammi* extracts in albino rabbits. Pakistan Vet J. 2006; 26(1): 23-29.
 33. Akhtar MS, Bashir S, Malik MNH. Cardiotonic activity of Methanolic Extract of *Saussurea lappa* Linn Roots. Pak. J. Pharm. Sci. 2013;26(6):1197-1201
 34. Navaei RA, Roozber F, Sarari M, Pouramiz M, Jalali F, Moghadammia AA. Investigation of the Effect of Ginger on the Lipid Level A Double Blind Controlled Clinical Trial.Saudi Med J 2008; 29(9):1280-1284.
 35. Kamal R, Aleem S. Clinical Evaluation of the Efficacy of a Combination of Zanjabeel (*Zingiber officinalis*) and Amla (*Emblica officinalis*) in Hyperlipidimia. Indian Journal of Traditional knowledge 2009; 8(3): 413-416.
 36. Kashaw V, Nema AK, Agarwal A. Hepatoprotective Prospective of Herbal Drugs and Their Vascular Carriers –A Review. International Journal of Research in Pharmaceutical and Biomedical Sciences 2011; 2(2):360-374.

Cite this article as:

Danish Mand, Tanzeel Ahmad, Mohd Khalid, Mohd Jafar, Sabiha Fatima. Therapeutic evaluation of Unani formulation in dyslipidaemia: A randomized controlled study. J Biol Sci Opin 2015;3(6):253-258 <http://dx.doi.org/10.7897/2321-6328.03654>

Source of support: National Institute of Unani Medicine, Bengaluru, Karnataka; Conflict of interest: None Declared

Disclaimer: JBSO is solely owned by Moksha Publishing House - A non-profit publishing house, dedicated to publish quality research, while every effort has been taken to verify the accuracy of the contents published in our Journal. JBSO cannot accept any responsibility or liability for the site content and articles published. The views expressed in articles by our contributing authors are not necessarily those of JBSO editor or editorial board members.