Scientific Bases of Al-Hijamah or Cupping Therapy in Unani Medicine with Modern Techniques for the Treatment of Diseases Related to Uric Acid, Creatinine, Liver Enzymes and Lipid Profile

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Abstract

The present study, describes the effect of cupping therapy on variations observed and assessed in the biochemical parameters such as total cholesterol, triglycerides (TG), low density lipoprotein (LDL), glutamate pyruvate transaminase (GPT), alkaline phosphatase (ALP), total bilirubin, direct bilirubin, urea, creatinine and uric acid before and after cupping therapy.

Wet cupping therapy was undertaken in patients having 4 hrs fasting and after taking consent. The first session of wet cupping therapy was performed on both genders (n=69) aged between 20-65 years for 20-25 minutes on their first visit to the clinic followed by the second session after 1 week and all the biochemical parameters were recorded.

Different symptoms were assessed considering biochemical parameters.

Results of blood samples before and after 10 days of wet cupping treatment was statistically analyzed by applying paired t-test in this study. The values of serum total cholesterol and triglycerides were significantly lower except that of LDL. Thus, the results indicate that cupping therapy of 2 sessions is effective against high cholesterol and triglycerides levels but not for LDL indicating that probably more sessions are required.

Regarding tamperament the cupping therapy was most effective in patients having temperament sanguineous *harr* (hot) and *ratb* (moist) temperament and phlegmatic temperament i.e. *barid* (cold) and *ratb* (moist) whilst moderate improvement in bilious temperament *harr* (hot) and *yabis* (dry) and least in melancholic temperament that is *barid* (cold) and *yabis* (dry) was evident.

Keywords:

Wet Cupping, Blood Samples, Diagnostic Parameters, Evidenced Based Scientific Approach.

1. INTRODUCTION

According to WHO, Traditional Medicine (TM) is a comprehensive term used to refer to TM systems such as Traditional Chinese Medicine (TCM), Indian Ayurveda and Greco-Arab medicine and to various forms of

indigenous medicine. Traditional system of medicine include medication therapies if they involve use of herbal medicines, animal parts and/or minerals and non-medication therapies if they are carried out primarily without the use of medication, as in the case of acupuncture, manual and spiritual therapies (WHO, 2002).

According to Unani system of medicine management can be broadly classified into following therapies:

1. *Illaj Bil Ghiza* (Dietotherapy)
2. *Illaj Bil Dawa* (Pharmacotherapy)
3. *Illaj Bil Tadbeer* (Regimental Therapy)

1.1. *Illaj Bil Ghiza (Dietotherapy)*

Unani physician usually is a believer of particular diet plan for specific ailments. As for the preventive medicine in Unani system of medicine, it encompasses the famous *Asbab-e-Sitta Zaruria* (six essential factors) comprising of *Hawa-e-Muhit* (atmospheric air), *Makool-wa-Mashroob* (foods and drinks), *Harkat-wa-Sakoon-e-Jismani* (rest and physical activity), *Harkat-wa-Sakoon-e-Nafsani* (psychological activity and response), *Naum-wa-Yaqzah* (sleep and wakefulness), *Ist ifragh- wa- Ihtibas* (elimination and retention) for healthy lifestyle. One of the factor in it is *Makool wa Mashroob* (food and drink), Unani physicians use to recommend diet according to the temperament of the person, temperament of the disease, innate power, health and diseased state of the individual. Dietotherapy in Unani System operates in accordance with the rule of *Ilaj bil Zid* to relieve the ailment. Physicians recommend the diet of temperament opposing the existing ailment. *Ilaj bil Ghiza* (Dietotherapy) is recommended by alteration in the quantity and/or its quality depending on the nature of the disease (Look and Look, 1997).

1.2. *Illaj Bil Dawa (Pharmacotherapy)*

Unani System of Medicine emphasizes to maintain health through natural ways by changing lifestyle. In conditions where the other procedures are insufficient *Illaj Bil Dawa* (Pharmacotherapy) is adopted based on drug therapy in which active principle is not isolated instead whole plant is consumed counteracting the side effects.

Selection of drug therapy is determined by quality of drugs in relation to temperament, degree, quantity of drug indicating its weight/ efficacy and time of drug administration.

1.3. *Illaj Bil Tadbeer (Regimental Therapy)*

Ilaj bil Tadbeer (Regimental Therapy) is one of the most popular methods of treatment practiced by ancient Unani physicians since olden times comprising of special techniques or physical methods to improve the bodily constitution by removing waste materials hence stimulating the immune system of the body. As described by Unani physicians it can be classified into 9 groups: a) Cupping (*Hijamah*), b) Massage (*Dalak*), c) Exercise (*Riyazat*), d) Turkish bath (*Hammam*), e) Venesection (*Fasd*), f) Leeching (*Taleeque*), and g) Cauterization (*Aml-e-Kai*). In the Unani classical literature among all these regimental therapies, cupping is a widely discussed therapeutic regimen. According to the Unani System of Medicine, diseases occur due to the disproportionate distribution of humours or *Akhlat* (blood or dam, phlegm or balgham, bile or *safra*, black bile or *sauda*) inside the body. These humours, which are out of proportion (imbalanced), accumulate in various parts of the body producing inflammation and if persists may lead to various diseases (Ibn Sina, 1927).

As it has been proposed that cupping therapy enhances blood circulation, relieves

congestion and prevents the inflammatory extravasations (evasion of some body fluids e.g. blood) from the tissues (Chirali, 1999 and Yoo *et al.,* 2004, Qureshi and Hannan, 2016). In case of wet cupping therapy its outcome depends on various parameters such as: pressure applied, duration, number of cups used, frequency of cupping therapy and size of capillary fenestrae and pores. Skin capillary pores diameters (12 nm) and fenestrae (60-80 nm) are similar to that of glomerular capillary pores diameter (15 nm) and fenestrae (65 nm). Thus only particles in nanometer less than the range can be filtered through skin capillaries (percutaneous route) and excreted including damaged cells or their debris. However, normal red blood cells (RBCs), white blood cells (WBCs) and platelets in micrometer range cannot leak through capillary pores (Sarin, 2010; Them *et al.,* 2002).

Human skin is composed of epidermis and dermis. The epidermis is the outermost, cellular and non-vascular layer of the skin with thickness ranging from 0.07 mm to 0.12 mm (0.8 to 1.4 mm in the palms and soles). The epidermis is impermeable to water and has protecting barrier functions against physical, ultraviolet injury, chemicals and microbial penetration. The second layer of the skin dermis is the vascular connective tissue matrix that interacts with the epidermis. Dermis is strong, elastic, thin (1 mm to 3 mm) and can store water. The depth of human skin is relatively thin (average 2 mm) and is richly supplied by a network of capillaries. During cupping therapy it can tolerate mechanical stress through migration of the cells originating at the basement membrane to the above layers. Thus wet cupping therapy facilitates blood clearance through filtration of circulating blood via rich capillary network. (Fawcett 1986; Sanders *et al.,* 1995).

2. MATERIAL AND METHODS

2.1. *Study Design*

The present study was conducted during November 2012 to December 2014 at Shifa-ul-Mulk Memorial Hospital, Madinat-al Hikmah, and Eastern Specialist Clinic (PECHS), Karachi, Pakistan in collaboration with Brookes Health and Education Foundation.

It has been described previously in detail (Qureshi and Hannan, 2016). Additionally, in this study the blood samples from the subjects were collected for biochemical analysis and other parameters such as age, fasting state and disease conditions were also considered.

2.2. *Requirements and Equipments*

Self-designed cupping chair, bell shaped small (30 ml) or larger (60 ml) vacuum cupping cups of circumference from 25 mm-75 mm, vacuum pump with pistol grip (U.S. Global, Karachi), sterilized and disposal items included: gloves, surgical blade, cotton and medical gauze and micro-pore surgical tape (Medics shop at medicine market, Karachi), pyodine (Brookes Pharma, Pakistan) and honey (Al-shifa) were purchased from the local market.

2.3. *Inclusion Criteria*

The patients (n=69) having disturbed cholesterol (n=8), triglycerides (n=8), LDL (n=7), total bilirubin (n=5), direct bilirubin (n=6), SGPT (n=10), ALP(n=3), uric acid (n=8), urea (n=9) and creatinine (n=5) both genders aged between 20-65 years were enrolled in the trial after obtaining their informed consent.

Temperamental Evaluation:

The temperament of their patients was assessed as described early with slight modifications.

2.4. *Exclusion Criteria*

Patients suffering from chronic serious

illnesses, dehydration, diarrhea, hypertension, severe vomiting and uncontrolled diabetes, females during menstruation and pregnant women were excluded. Cupping was also avoided in patients experiencing bleeding disorders, inflammation, skin infection, ulcer, or prone to bruising.

2.5. *Instructions for the Patients*

Prior to the cupping treatment regimen all the patients were briefed as described earlier:

i) Briefly, patients were asked to fast and have a bath 4 hrs before cupping therapy.
i) Patient undergo full investigation related to the disease especially diabetes. The requirement of biochemical assays and pathological data was completed before the initiation of therapy.
ii) Physical examination included recording of body temperature, pulse rate, respiratory rate and blood pressure.
iv) Abstain from consuming dairy products, food intake and sleeping at least 1-2 hrs on the day of treatment after therapy.
v) Strenuous exercise, coitus and blood thinning medicines are forbidden prior to cupping therapy.

2.6. *Physical Examination*

Patients were examined to declare capable of bearing the procedure. Site of pain was investigated for inflammation, swelling, sensitivity and vascularity of the area.

2.7. *Blood Specimen Collection and Processing*

From each subject venous blood samples were collected in sterile 1 ml test tube before and after 10 days of wet cupping therapy through venipuncture, by placing the tourniquet 3 to 4 inches above the selected puncture site on the patient, which should not be too tight or not to leave it longer than 1 minute. The sample was centrifuged for 450 rmp/minute, the recommended spin time is 10 minutes and the serum was used for biochemical analyses.

2.8. *Biochemical Parameters Assessment in Serum*

The total cholesterol, triglycerides (TG), low density lipoprotein (LDL), glutamate pyruvate transaminase (GPT), alkaline phosphatase (ALP), total bilirubin, direct bilirubin, urea, creatinine and uric acid were determined using Merck Kits Germany.

In case of LFT's R1 (1 ml/1000 µ) and R2 (1 ml/250 µ) reagents were used making 1:4 dilutions. For bilirubin R1 (50 µl), R2 (200 µl), R3 (1 ml) and R4 (1 ml) reagents were employed, whereas, for lipid profile, urea and creatinine 1 ml reagent is added in 10 µ of serum and incubate for 10 minutes afterwards the results are analyzed using Merck Micro Lab-300.

3. RESULTS AND DISCUSSION

Nowadays, wet-cupping therapy is popularly used worldwide and apparently facilitates the regulation of various systems in the body including neurotransmitters and hormones. In the hematological system, its main effect is regulation of coagulation and anti-coagulation systems, reduction of hematocrit (HCT) thereby increasing the flow of oxygenated blood to various organs. It also effects the immune system inducing local inflammation followed by activation of the complementary system with increase in the levels of interferon and tumor necrosis factor (TNF), affects the thymus thus, regulating and increasing the flow of lymph in lymphatic system (Rozegari, 2000, Ahmadi *et al.*, 2008).

Despite the popularity of wet cupping therapy its mechanism of action is not clear.

However, it has been proposed to act through oxidative balance as the venous blood has higher activity of myeloperoxidase (MPO) and of nitric oxide (NOx) while lower activity of superoxide dismutase (SOD) (Fairoz, 2010). It modulates the immune cellular conditions particularly of innate immune response NK cell % and adaptive cellular immune response SIL-2R (Ahmed, *et al.,* 2005).

The reason that cupping works may be due to its physiological affect by either stimulating or relaxing the body by evacuation through bleeding (Gutteridge, 1992).

The clinical studies published between 1959 and 2008 on cupping therapy including 73 randomized controlled trials (RCTs), 22 clinical controlled trials, 373 case series and 82 case reports supported the progress in various diseases particularly pain conditions and herpes zoster etc. No serious adverse effects were reported in these studies (Cao *et al.,* 2010). According to these results, quality and quantity of RCTs on cupping therapy appeared to be improved during the past 50 years. However, further rigorous designed trials in relevant conditions are required to support their use in practice.

Considering important diagnostic biochemical parameters including blood lipid profile in which cholesterol and triglycerides determines the risk of plaques formation in the arteries that can lead to atherosclerosis by narrowing or blockade of arteries whereas, high cholesterol levels often is considered to be a risk factor for heart disease. Wet cupping therapy has been reported to relieves hyperlipedmic conditions and hence prevent atherosclerosis.

In the present study result of blood samples before and after 10 days of wet cupping treatment was statistically analyzed by applying paired t-test. The values of serum total cholesterol ($p=0.016$) and triglycerides ($p=0.028$) were significantly lower except that of LDL ($p=0.069$). Thus, the results indicate that cupping therapy of 2 sessions is effective against high cholesterol and triglycerides levels but not for LDL levels indicating more sessions of cupping therapy are required for prolonged duration to achieve the normal ranges in order to relieve disease symptoms.

In Table 1 the lipid profile including serum total cholesterol, triglycerides (TG), low density lipoprotein (LDL) before and after cupping is presented. The magnitude of decline in the levels of above parameters were compared with the standard ranges and represented as normal (N), borderline (B) and high (H). A general decline in cholesterol levels in patients was observed with H, B and N levels i.e. in 2 cases high cholesterol levels were reduced by 35 and 24 points from 243 mg/dl to 208 mg/dl and 289 mg/dl to 265 mg/dl respectively however, it remained in high cholesterol level category. 3 cases of normal cholesterol decline from 128 to 115, 139 to 130 and 173 to 106 with the decline of 13, 9 and 67 points which was highest decline (67 points) in individuals with normal levels of cholesterol.1 case of borderline cholesterol 194 decline to still borderline 190. 1 case of borderline cholesterol 200 decline to 185.

For TG levels a dramatic decline of 102 points was noted in patients with high (H) points but it still remained higher. 2 cases of high (H) TGs was declined from 303 to 201 and 255 to 239 by 102 and 16 points. 5 cases of normal TGs declined from 122 to 103, 120 to 101, 127 to 122, 113 to 80 LDL showed reduction by 70 points with a shift from higher (HR) to borderline (B) after cupping therapy.

In some cases the level before cupping therapy whether it is high (H), borderline (B) or normal (N) declined with improvement in the overall symptoms (fatigue, in digestion and

numbness) indicating improvement towards better and healthy lifestyle conditions.

In previous research studies, relationship between some blood parameters and wet cupping therapy, showed that cupping can only regulate some blood parameters such as Cholesterol, HDL, LDL, and FBS in young healthy male (20-27 years old) after five sessions of cupping (one time per month) (Ranaei-siadat *et al.,* 2004).

In another study results showed that subjects treated with one session of cupping therapy declared significant increase ($P< 0.0000$) in LDL cholesterol concluding that cupping will increase the level of LDL cholesterol an hour after treatment (Gugun & Alfian, 2010).

Another biochemical parameter evaluated for determining efficacy of cupping therapy was Liver Function Tests (LFTs). LFTs are not specific to specific systems or disease processes, yet abnormalities may indicate significant or serious diseases. Abnormal LFTs are used to diagnose any underlying liver disease, however, single abnormalities in LFTs are difficult to localize and diagnose. Bilirubin blood levels may become elevated with impaired bile flow. This can occur in severe liver disease, gallbladder disease, or other bile system conditions. Usually either alanine aminotransferase (ALT) or aspartate aminotransferase (AST) is measured. These proteins both indicate leakage from damaged cells due to inflammation or cell death. Liver disease is more likely to occur when the values of AST and ALT are higher, ALT rises more than AST in acute liver damage. Raised GGT in patients with chronic liver disease is associated with bile duct damage and fibrosis. If the GGT concentration is normal, a high ALP result suggests bone disease. ALP is physiologically increased when there is increased bone development (e.g. adolescence) and is elevated in the third trimester of pregnancy (produced by the placenta) (Giannini *et al.,* 2005; Rochling 2001; Limdi *et al.,* 2003; Sherwood *et al.,* 2001 and Walsh *et al.,* 2000).

The most sensitive and widely used LFTs liver enzymes are the aminotransferases including aspartate aminotransferase (AST or SGOT) and alanine aminotransferase (ALT or SGPT). AST (SGOT) is normally found in multiple tissues including liver, heart, muscle, kidney, and brain. It is released into serum when any one of these tissues is damaged (Niasari, *et al.,* 2007). One of the research study showed that blood sampling 2 weeks after cupping therapy did not cause any change in SGOT level but there was significant increase of SGPT after 2 weeks. The effect of cupping therapy improving blood/lymph circulation and strengthening organic (liver) function was introduced in the study of Jun-Ru (Jun-ru *et al.,* 2007). Such finding is not in accordance that liver damage causes SGPT increase (Wong *et al.,* 2000) i.e. it seems the augmentation of SGPT after cupping therapy is not as a result of liver impairment but more probably other factors like skin injury after cupping are related to this increase.

Table 2 indicates that the bilirubin, serum glutamyl phosphate transaminase (SGPT) and alkaline phosphatase level declined considerably as seen in case of total bilirubin 4 cases of borderline (B) were decrease to 0.1 points that is from 0.9 to 0.8 (3 cases), 1.0 to 0.9 (1 case) but still remained at borderline levels. In case of direct bilirubin 1 case of high (H) level declined by 0.01 points from 0.16 to 0.15 levels but still remained high. 1 case of high (H) level was declined to normal (N) from 0.15(H) to 0.06 (N) by 0.09 points. 4 cases of normal still declined by 0.02 points from 0.06 to 0.04, 0.06 to 0.05, 0.06 to 0.04, 0.04 to 0.02.

TABLE 1: Effect of Cupping Therapy on Lipid Profile in Patients

S.No.	Cholesterol			Triglycerides (TG)			Lower Density Lipoprotein (LDL)			Comments by the patients
	Before	After	Comments after treatment	Before	After	Comments after treatment	Before	After	Comments after treatment	
1.	243 (H)	208 (H)	Level declined by 35 points	303 (H)	201 (H)	Level declined by 102 points	179 (H)	109 (B)	Level declined by 70 points	Improvement in symptoms of fatigue and digestion.
2.	202 (H)	188 (N)	Level declined by 14 points	255 (H)	239 (H)	Level declined by 16 points	142 (H)	140 (H)	Level declined by 2 points	Improvement in symptoms of fatigue, numbness and digestion
3.	194 (B)	190 (B)	Level declined by 4 points	122 (N)	103 (N)	Level declined by 19 points	129 (H)	106 (B)	Level declined by 23 points	Improvement in symptoms of fatigue and digestion.
4.	128 (N)	115 (N)	Level declined by 13 points	120 (N)	101 (N)	Level declined by 19 points	130 (H)	119 (B)	Level declined by 11 points	Improvement in symptoms of fatigue and digestion.
5.	139 (N)	130 (N)	Level declined by 9 points	127 (N)	122 (N)	Level declined by 5 points	51 (N)	45 (N)	Level declined by 6 points	Improvement in symptoms of fatigue and digestion
6.	289 (H)	265 (H)	Level declined by 24 points	113 (N)	80 (N)	Level declined by 33 points	66 (N)	57 (N)	Level declined by 9 points	Improvement in symptoms of fatigue, exhaustion and digestion
7.	173 (N)	106 (N)	Level declined by 67 points	63 (N)	57 (N)	Level declined by 6 points	220 (H)	205 (H)	Level declined by 15 points	Improvement in symptoms of fatigue and digestion
8.	200 (B)	185 (N)	Level declined by 15 points	166 (B)	108 (N)	Level declined by 58 points				Improvement in symptoms of fatigue, exhaustion and digestion
Mean± SEM	196	173		158	126		131	111		
n	**8**			**8**			**7**			
P-value	.016			.028			.069			

Diagnostic range for triglycerides (TG), cholesterol, and low density lipoprotein (LDL).
Cholesterol: Normal (N) = below 200 mg/dl, Borderline (B) = 200-239 mg/dl and High (H) = 240 and above mg/dl.
Triglycerides: Optimal = Less than 100 mg/dl, Normal = 101-150 mg/dl, Borderline = 150-199 mg/dl and High = 200-499 mg/dl.
Lower Density Lipoprotein (LDL): Normal (N) = Below 100 mg/dl, Borderline (B) = 130-159 mg/dl and High (H) = 160-189 mg/dl.
(Friedewald *et al.,* 1972; Tanno *at al.,* 2010 and Mora *et al.,* 2009).

Table 2: Representing the Variations in LFT's Before and After Cupping Therapy

S.No.	(TBL)*			(DBL)**			(SGPT)***			(ALP)****		
	Before	After	Comments	Before	After	Comments	Before	After	Comments	Before	After	Comments
1.	0.9 (B)	0.8 (B)	Level declined by 0.1 points	0.16 (H)	0.15 (H)	Level declined by 0.01 points	58 (H)	46 (N)	Level declined by 12 points	182 (HR)	143 (H)	Level declined by 39 points
2.	1.0 (B)	0.9 (B)	Level declined by 0.1 points	0.06 (N)	0.04(N)	Level declined by 0.02 points	31 (N)	30 (N)	Level declined by 1 point	198 (HR)	129 (H)	Level declined by 69 points
3.	0.9 (B)	0.8 (B)	Level declined by 0.1 points	0.15 (H)	0.06 (N)	Level declined by 0.09 points	32 (N)	25 (N)	Level declined by 7 points	240 (HR)	190 (HR)	Level declined by 50 points
4.	0.8 (B)	0.7 (N)	Level declined by 0.1 points	0.06 (N)	0.05 (N)	Level declined by 0.01 points	42 (N)	37 (N)	Level declined by 5 points			
5.	0.98 (B)	0.82 (B)	Level declined by 0.16 points	0.06 (N)	0.04(N)	Level declined by 0.02 points	15 (N)	12 (N)	Level declined by 3 points			
6.				0.04(N)	0.02 (N)	Level declined by 0.02 points	55 (B)	51 (N)	Level declined by 4 points			
7.							70 (HR)	60 (H)	Level declined by 10 points			
8.							27 (N)	21 (N)	Level declined by 6 points			
9							90 (HR)	55 (B)	Level declined by 35 points			
10							72 (HR)	44(N)	Level declined by 22 points			
Mean± SEM	0.916	0.804		0.08	0.06		49.2	38.1		206	154	
n	**5**			**6**			**10**			**3**		
P-value	.001			.073			.013			.027		

Normal blood test results for typical liver function tests include:

ALP : 45 to 115 U/L, Total Bilirubin:. 0.3 to 1.0 mg/dl, Direct bilirubin: 0 to 0.4 mg, Glutamic -pyruvic transa minase SGPT: Normal = 7 to 55 units per liter (U/L), Borderline 2-3 time s higher than normal range and High = 1000 and above

Alkaline phosphatase ALP. Normal 45 to 115 U/L.

ALT (or SGPT serum glutamic-pyruvic transaminase) is found partic ularly in large amounts in the liver and plays an important role in metabolism that converts food into energy. The ALT test may be recommended if child is experie ncing symptoms of liver disease, including jaundice (yellowish skin or eyes), dark urine, nausea, vomiting, or abdominal pain. It also be recommended to diagnose infections of the liver such as viral hepatitis (ALT levels are high with acute hepatitis) or to monitor patients using medications that cause liver-related side e ffects, or to evaluate an injury to the liver.

The damaged liver cells release excessive ALP in the blood. This test is often used to detect blocked bile ducts because ALP is especially high in the edges of cells that join to form bile ducts.

Usually, a chemical test is used to first measure the total bilirubin level (unconjugated plus conjugated bilirubin). If the total bilirubin level is increased, a second chemical test is used to detect water-soluble forms of bilirubin, called direct bilirubin. The direct bilirubin test provides an estimate of the amount of conjugated bilirubin pre sent. Subtracting direct bilirubin level from the total bilirubin level estimate the indirect level of unconjugated bilirubin. In adults and older children, bilirubin is measured to:

a) Diagnose and/or monitor diseases of the liver and bile duct (e.g., cirrhosis, hepatitis, or gallstones).
b) Evaluate sickle cell disease or other causes of hemolytic anemia; in case of excessive RBC destruction.

*Total Bilirubin, **Direct Bilirubin, ***Serum Glutamyl Phosphate Tansaminase, ****Alkaline Phosphatase

TABLE 3: Representing the Variations in Renal Function Before and After Cupping Therapy

S.No.	Uric Acid (UA)			Urea (UR)			Creatinine (CR)		
	Before	After	Comments	Before	After	Comments	Before	After	Comments
1.	4.9 (N)	4.2 (N)	Level declined by 0.7 points	26 (N)	22 (N)	Level declined by 4 points	0.6 (N)	0.5 (N)	Level declined by 0.1 points
2.	6.0 (N)	5.0 (N)	Level declined by 0.1 points	30 (N)	27 (N)	Level declined by 3 points	0.9 (N)	0.8 (N)	Level declined by 0.1 points
3.	7.1 (N)	6.2 (N)	Level declined by 0.9 points	21 (N)	18 (N)	Level declined by 3 points	1.1 (B)	0.7 (N)	Level declined by 0.4 points
4.	4.8 (N)	4.7 (N)	Level declined by 0.1 points	24 (N)	20 (N)	Level declined by 4 points	1.5 (H)	1.3 (N)	Level declined by 0.2 points
5.	6.5 (N)	6.3 (N)	Level declined by 0.2 points	44 (H)	35 (N)	Level declined by 9 points	0.8 (N)	0.6 (N)	Level declined by 0.2 points
6.	4.3 (N)	4.1 (N)	Level declined by 0.2 points	37 (N)	30 (N)	Level declined by 7 points			
7.	4.2 (N)	3.9 (N)	Level declined by 0.3 points	30 (N)	21 (N)	Level declined by 9 points			
8.	3.8 (N)	3.7 (N)	Level declined by 0.1 points	24 (N)	18 (N)	Level declined by 6 points			
9.				38 (B)	25 (N)	Level declined by 13 points			
Mean± SEM	5.2	4.7		30.4	24		0.98	0.78	
n	**8**			**9**			**5**		
P-value	.012			.000			.022		

Creatinine-Low levels are sometimes seen in kidney damage, protein starvation, liver disease or pregnancy. Elevated levels are sometimes seen in kidney diseases involved in impairment of kidney function as excreting excessive creatinine, muscle degeneration and some drugs.

Creatinine, serum = 0.6-1.2 mg/dl, Creatinine, Urine (male) = 0.8-2.4 g/24 hrs, Creatinine, Urine (female) = 0.6-1.8 g/24 hrs, Creatinine clearance (male) = 97-137 mL/min, Creatinine clearance (female) = 88-128 mL/min.

Uric acid-High levels are noted in gout, kidney disease, alcoholism, high protein diets and toxemia in pregnancy. Low levels may be indicative of kidney diseases as malabsorption, poor diet, liver damage or an acidic kidney.

Uric Acid, serum = 3.0-8.2 mg/dL, urine = varies with diet

Urea is an end product of protein metabolism and its normal range in blood is 20-40 mg/dl.

In SGPT 1 case of high (H) declined to normal (N) from 58 to 46 by 12 points. 1 case of borderline (B) declined to normal (N) from 55 to 51 by 4 points. 1 case of higher level (HR) was declined to high (H) from 70 to 60 by 10 points. 1 case of higher level (HR) was declined to borderline (B) from 90 to 55 by 35 points. 1 case of higher (HR) level was declined to normal (N) from 72 to 44 by 22 points. 5 cases of normal (N) SGPT were further declined from 31 to 30, 32 to 25, 42 to 37, 15 to 12 and 27 to 21 by 1-7 points.

Whereas, for 2 cases of alkaline phosphatase higher (HR) level were declined to high (H) level from 182 to 143 and 198 to 129 by 39 and 69 points. 1 case of alkaline phosphatase with higher (HR) level remained still at higher (HR) level but delined from 240 to 190 by 50 points.

For the parameters total bilirubin, direct bilirubin, SGPT and alkaline phosphatase before and after cupping therapy were also analyzed by applying statistical tool paired t test and found that the *p*-value showed significant difference except for direct bilirubin (0.073). All showed highly significant *p*-value in order of: total bilirubin (0.001), SGPT (0.013) and ALP (0.027).

One of the biochemical indicators that were used to assess efficacy of cupping therapy was uric acid. Uric acid is an end product of the metabolism of purine produced by the action of xanthine dehydrogenase or xanthine oxidase. It is present in blood and excreted in the urine. It has been found that the high level of serum uric acid is associated with various illnesses including hypertension, atherosclerosis, vascular anomalies, hyperinsulinemia and renal insufficiency. Uric acid is a factor involved in different pathogenic courses and may have potential value for the assessment of variations in clinical settings and prognosis of illness. Serum creatinine is the most commonly used diagnostic indicator of renal function. Urea also reflects the renal function and increases when renal function declines. Studies from the general population suggest that obesity may also produce renal insufficiency in individuals without hypertension, diabetes, or preexisting renal disease (Nakagawa *et al.*, 2008).

In case of uric acid, 8 cases of normal (N) uric acid was still declined from 4.9 to 4.2, 6.0 to 5.0, 7.1 to 6.2, 4.8 to 4.7, 6.5 to 6.3, 4.3 to 4.1, 4.2 to 3.9 and 3.8 to 3.7 by 0.1 to 0.7 points. 7 cases of normal (N) urea still declined from 26 to 22, 30 to 27, 21 to 18, 24 to 20, 37 to 30, 30 to 21 and 24 to 18 by 3 to 9 points. 1 case of high (H) urea was declined to normal (N) from 44 to 35 by 9 points. 1 case of borderline (B) urea was declined to normal (N) from 38 to 25 by 13 points. 3 cases of normal (N) creatinine was still declined from 0.6 to 0.5, 0.9 to 0.8, and 0.8 to 0.6 by 0.1 to 0.2 points. 1 case of borderline (B) creatinine was declined to normal (N) level from 1.1 to 0.7 by 0.4 points. 1 case of high (H) level was declined to normal (N) level from 1.5 to 1.3 by 0.2 points. In this study reduced blood levels of urea (0.000), uric acid (0.012) and creatinine (0.022) showing highly significant difference regarding urea (Table 3).

It can be concluded that biochemical parameters (lipid profile, renal parameters, liver enzymes) as shown in Tables 1, 2 and 3 showed significant decrease in cholesterol, triglycerides, total bilirubin, SGPT, alkaline phosphatase, uric acid, urea, creatinine levels before and after cupping therapy except LDL and direct bilirubin levels.

It is noteworthy that marked improvement was linked with the temperament of patients such as sanguineous, phlegmatic, bilious, melancholic and the disease conditions were improved as > sanguineous temperament *harr* (hot) and *ratb* (moist) > phlegmatic

temperament *barid* (cold) and *ratb* (moist) > bilious temperament *harr* (hot) and *yabis* (dry) > melancholic temperament , *barid* (cold) and *yabis* (dry). The therapeutic effect of wet cupping therapy followed a sequence of improvement in biochemical parameters as: Cholesterol > tr iglycerides > alkaline phosphatase > SGPT > bilirubin > urea > uric acid > creatinine.

It has been noticed that temperamental imbalance of cold and dry qualities, results in increased stiffness aggravating cold and dry qualities of the connective tissues. Other associated factors like increased weight, hormonal variations, excessive intake of cold and dry foods can also take part in aggravating the disease. Additionally, six essential factors of Unani medicine play an important role in progression towards temperamental imbalance. In the present study, patients having sanguineous and phlegmatic temperament a marked improvement was observed in their ill-health conditions, improved sleeping pattern as well as their emotional status.

One of the studies showed that there might be some imbalance or impurities present in the blood which is evacuated or discarded through cupping therapy resulting in a favorable balance environment including various vital parameters (Bilal Alam Khan *et al.*, 2011).

The above mentioned facts obtained as a result of wet cupping therapy indicated that it is very effective and promising technique against cardiovascular disease, liver diseases, obesity and also improved kidney function as reflected by the reduction in the serum cholesterol, creatinine, triglyceride, urea, uric acid levels and liver function tests. The patients having sanguineous *harr* (hot) and *ratb* (moist) and phlegmatic temperament *barid* (cold) and *ratb* (moist) showed marked improvement whilst moderate improvement in bilious temperament *harr* (hot) and *yabis* (dry) and least in melancholic temperament that is *barid* (cold) and *yabis* (dry) is seen. These results led us to conclude that it is a simple, safe and effective way of treatment to be used against afore-mentioned diseases. However, it is a preliminary report on comparatively small scale and needs to be extended in future to a larger sample size before definite conclusion could be reached.

However, patients showing no response to cupping therapy were either affected by the prolonged medication or severity of the disease indicating marked disability or any other organic disorder.

Conflict of Interest

The authors declare that there is no conflict of interest.

Authors Contribution

Tasneem Qureshi: Conducted the therapy.

Hakim Zahoor: Conducted the therapy.

Prof. Dr. Hakim Abdul Hannan: supervised the research study.

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