



بسم الله الرحمن الرحيم

Sudan University of Science and Technology
College of Graduate Studies



**The Effect of Wet Blood Cupping on Alanine Aminotransferase
Aspartate Aminotransferase and Albumin in Khartoum State**

تأثير الحجامة الدموية الرطبة على مستويات انزيمي ناقل أمينة الأسبارتيت و ناقل أمينة
الألانين والبروتين الزلالي في البلازما في ولاية الخرطوم

A dissertation submitted in partial fulfillment for the requirements of
M.Sc. degree in medical laboratory science -Clinical Chemistry

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September -2017

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

الآية

بسم الله الرحمن الرحيم

قال تعالى :

يَرْفَعُ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ ﴿١١﴾

صدق الله العظيم

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DeDication

It seems impossible to express my complete gratitude for every single person who has supported me to finish this work but I will try my best.

-To the man who scarified a lot for us, a man despised the luxury of his life for us, a man draw my future for me, I was a headstrong but he was patients, to my father.

-To the moon of my dark nights, my mother

-For a long journey u should chose a very motivate partner, for me I had the best, to my friends, thanks for help and support, without u guys I won't go that far.

Acknowledgment

-To my supervisor he was very patient and helpful.

-To my teachers in Sudan University and coworkers in clinical chemistry Laboratory of Radiation & Isotopes center-Khartoum thanks a lot.

Abstract

Hejamah or Blood cupping or bloodletting is a traditional Islamic treatment and a part of the prophetic medicine recommended by the prophet Mohammed, Peace Be upon Him .Hejamah is a form of cupping therapy (sucking blood out of the body for healing purposes).This study was carried out to evaluate the effect of hijamah on the liver concentrating specifically in the effect on liver enzymes (AST and ALT) and albumin protein levels. This study was accomplished in Khartoum state on randomly selected forty volunteers from different hijamah centers from the period of February to June 2017. Venous blood sample were collected and processed and analyzed by using BS-200 mindray full automated chemistry analyzer. Data was analyzed by using statistical package for social science (SPSS) computer program version (16.0) to obtain the results.

This study showed that ALT plasma level was significantly increased after cupping with p-value=0 .003) (mean± SD =4.310±4.7654 **versus** 5.997±4.7654). And there was an insignificantly difference in AST level with p-value=0.527) (mean± SD 15.265±13.0057 **versus** 16.057±12.0513). Also insignificantly difference in Albumin level with p-value= (0.131) (mean± SD 4.217±.3876 **versus** 4.300±.3876). The study also showed a strong positive significant correlation between AST and ALT pre cupping (r= 0.643^{**}) (P-value=0 .000). And a positive correlation between ALT and AST post cupping (r=0.375^{*}) (p-value=0.017).we can conclude that blood cupping has an effect on ALT level but no effect on AST and Albumin level.

المستخلص

الحجامة هي طريقة علاج تقليدي قديمة و تعتبر احدى اقسام الطب النبوي التي وصى بها النبي محمد (عليه افضل الصلاة واتم التسليم) . الحجامة هي عملية امتصاص الدم من جسد المريض بطريقة معينة بغرض العلاج. اجريت هذه الدراسة لتقييم أثر الحجامة على الكبد عن طريق قياس انزيمات الكبد بالتحديد (انزيمي ناقل امينة الأسبارتيت و ناقل امينة الألنين) وبروتين الزلال في البلازما. اجريت هذه الدراسة بولاية الخرطوم في الفترة من فبراير الى يونيو من العام 2017 باختيار اربعين متطوعا عشوائيا من مراكز حجمة مختلفة داخل الولاية. تم جمع عينات الدم الوريدية ومعالجتها وتحليلها في المختبر باستخدام جهاز (بي اس 200) المحلل الكيميائي الالي بالكامل المنتج من قبل شركة ميندراي الالمانية. البيانات التي تم الحصول عليها عولجت وحلت باستخدام برنامج الحزم الاحصائية للعلوم الاجتماعية النسخة 16.0 للحصول على النتائج.

اظهرت هذه الدراسة ان هناك زيادة ملحوظة في مستوى انزيم ناقل امينة الالنين بعد الحجامة مقارنة بمستواه قبل الحجامة ب احتمال احصائي يساوي 0.003. ووسط حسابي يساوي (قبل 4.310) و (بعد 5.997). اما بالنسبة ل انزيم ناقل امينة الاسبارتيت اظهرت الدراسة انه لا يوجد اختلاف ملاحظ بين مستواه قبل وبعد الحجامة ب احتمال احصائي يساوي (527). ووسط حسابي يساوي (15.2 قبل) (16.0 بعد). وايضا لا يوجد اختلاف ملحوظ بين مستويات بروتين الزلال قبل وبعد الحجامة ب احتمال احصائي يساوي (131). ووسط حسابي (4.21 قبل) (بعد 4.30). ايضا اظهرت هذه الدراسة ان هنالك علاقة ارتباط معنوية موجبة قوية بين مستويي انزيمي ناقل امينة الالنين والاسبارتيت قبل الحجامة باحتمال احصائي يساوي (0.000). ومعامل بيرسون للارتباط يساوي (0.643**). وايضا هنالك علاقة ارتباط قوية موجبة بعد الحجامة باحتمال احصائي يساوي (0.017). و معامل بيرسون للارتباط يساوي (0.375*).

يمكننا ان نخلص من هذه الدراسة ان هنالك زيادة معنوية ملحوظة في مستوى انزيم ناقل امينة الالنين بعد الحجامة مقارنة بمستواه قبل الحجامة . ولا يوجد تغيير ملحوظ بين مستويي انزيم ناقل امينة الاسبارتيت وبروتين الزلال قبل وبعد الحجامة .

CHAPTER ONE

Introduction, Rationale and Objectives

1.1. Introduction

Cupping therapy(CT) is one of the oldest documented medical techniques. The Arabic name for cupping therapy is Hijamah which has been part of middle eastern cultural practice for thousands of years with citations dating back to the time of Hippocrates (400BC) (Zahraa, 2016).The mechanism of cupping is in which a cup is applied to the skin and the pressure in the cup is reduced (by using change in heat or by suctioning out air), so that the skin and superficial muscle layer is drawn into and held in the cup (Reza *et al.*, 2012). According to our Islamic background Al-hijamah considered as a prophetic medicine and among the best remedies according to the hadith (The best among what you use in therapy is Al-hijamah (Mahmoud *et al.*, 2013). It believed that seventy percent of diseases, pains and ailments are due to the blood being unable to reach certain parts of the body. Dry cupping and dry massaging cupping allow the blood to reach these places (Reza *et al.*, 2012).

The liver is a functionally complex organ that plays a critical biochemical role in the metabolism, digestion, detoxification, and elimination of substances from the body, which are essential to life (Bishop, 2010). Because of such functional complicity a multiple marker are needed to evaluate liver status. Alanine aminotransferase (ALT) and aspartate aminotransferase (AST) are transaminases enzymes found inside liver cells it's used to evaluate parenchymal damage of the liver (Nessar, 2011). Albumin is synthesized in the liver and its concentration in the plasma is in part a reflection of the production functional capacity of the organ (Marshall, 2012).

1.2 Rationale

Because the liver can easily become overworked, Hijamah has an effect on the liver it reduces the work required by the liver in detoxifying the body and removing waste products. Therefore, may assist in all liver diseases and also the resulting jaundice that may occur, liver enzymes alanine aminotransferase (ALT) and aspartate aminotransferase (AST) are indicative of liver damage when found in larger than normal concentrations in the blood. These enzymes are lower after the Hijamah procedure and suggest a possibility of improved liver function and health post the Hijamah procedure. Albumin levels also returned to normal in the some study (Latib, 2013). Though cupping therapy has been used for thousands of years ago, there has been no systematic summary of clinical research on it especially in Sudan despite of the increasing practice of it in the last years. So many questions arise from time to time about the exact role of cupping in treating some diseases and understanding the mechanism. Also studies are needed to scientifically prove the prophetic medicine visions the Benefits of hijamah therapy.

1.3 Objectives

General objective

To evaluate the effect of wet blood cupping on alanine aminotransferase, aspartate aminotransferase enzymes and albumin

Specific objectives

- To measure alanine aminotransferase enzyme, aspartate aminotransferase enzyme, and albumin protein pre- and post wet cupping sessions.
- To correlate between ALT and AST pre- and post- hijamah.
- To correlate between ALT and albumin pre- and post- hijamah.
- To correlate between AST and albumin pre- and post- hijamah.

CHAPTER TWO

Literature Review

2.1. Blood Cupping

Blood cupping or bloodletting or hijamah in arabic is the process of applying cups to various points on the body creating a reduced pressure inside the cup (by using change in heat or by suctioning out air), so that the skin and superficial muscle layer is drawn into and held in the cup. (Reza *et al.*, 2012)

Cupping is one of the oldest and most effective methods of releasing toxins from the body's tissues and organs, Cupping therapy is a simple procedure in which negative pressure is applied to the skin through sucking cups. This exerts as an approach for treatment and prevention of diseases. Back in time people mainly used buffalo horn, bamboo, bones or sea shells or glass cups on patients' skin until it developed to plastic cup nowadays creating minus pressure inside the cups (Zahraa, 2016). Such pressure leads to an increased flow of blood to the area. The cupping action draws impurities, toxins, pain and inflammation away from the deeper tissues and organs towards the skin where it can be eliminated. Cupping facilitates the healing process, and assists in restoring balance (homeostasis) to the body.

Cupping is part of the range of eliminative or hands-on therapies practiced in most traditional healing modalities including Chinese Medicine as well as in African Traditional Medicine where it is known as u ku-gcaba. In prophetic medicine it is an important and effective treatment option (Bhikha and Dockrat , 2015).

Hijamah is a traditional Islamic treatment and a part of the prophetic medicine recommended by the prophet Mohammed, Peace Be upon Him, and it is used for the treatment of a variety of medical conditions. Hijamah is a form of cupping therapy, also known as wet-cupping, blood leach or blood-letting therapy.

According to the prophetic medicine, hijamah should be performed at specific times during the odd days of full moon (day 17, 19 and 21) in the lunar months (Islamic calendar) and the patients should be fasting. (Refaat *et al.*, 2014)

IbnSina the famous Muslim physician said: ‘Hijamah is not preferred in the beginning or the end of the month. It is preferred in the middle of the month when the substances (of the constitution or the condition) accumulate and become agitate (Latib, 2013).

Cupping therapy believed to treat hypertension, neck pain, headache, chronic hepatitis, ophthalmic diseases, skin diseases and infectious diseases, Blood diseases such as hemophilia, hypertension, rheumatic conditions, pain relief, inflammatory conditions, mental and physical relaxation migraine headache, polycythemia, hemochromatosis menopause syndrome pain of the knee, liver diseases, renal and uretic colic and other diseases.

The main purpose of this therapy is to precipitate the circulation of blood and to remove blood-stasis and waste from the body. Local damage of the skin and capillary vessels may act as a nociceptive stimulus . Cupping is thought to remove noxious materials from skin microcirculation and interstitial compartment. Wet cupping has been claimed to drain excess fluids and toxins, loosen adhesions and lift connective tissue, bring blood flow to skin and muscles, and to stimulate the peripheral nervous system Also, cupping reduces pain and high blood pressure as well as modulate neurohormones and the immune system. Cupping therapy is used to improve subcutaneous blood flow and to stimulate the autonomic nervous system (Zahraa, 2016).

2.2 Historical Background

Way back in time, long before any historical or archeological evidence had been uncovered to support the application of cupping instruments to the body as a therapeutic procedure, prehistoric humans relied in part on their ability to suck and draw to the surface any irritations such as stings and thorns. Early humans also developed conceptualizations concerning their place in nature and the universe and the causes of ill health. In their efforts to explain sickness, they held beliefs about that which could enter the body or mind such as evil spirits and cause pain and suffering. Many researchers including anthropologists have described how healers of these super naturalistic traditions of illness causation applied oral suction to the surface of the body to withdraw the effects of these malevolent influences (Reza *et al.*, 2012).

The exact origin of cupping therapy is a matter of controversy, Chinese scientists report in their literature that cupping therapy is a part of the traditional Chinese medicine dating back to at least two thousand years. (El Sayed *et al.*, 2013).

The earliest discovered record of cupping in China was in the (Wu Shi Er Bing Fang) an ancient book written on silk. This book was discovered in an ancient tomb of the Han Dynasty in 1973. Early written records in China strongly support the use of CT and acupuncture. It stated that “more than half of the illnesses will be cured by acupuncture and cupping. Zhao Xue-min, a Chinese doctor in the Qing Dynasty wrote a book entitled Bencao Gangmu Shiyi (Supplements to Compendium of Materia Medica) about 200 years ago, describing details of the history and origin of different kinds of cupping, cup shapes, their functions and clinical uses in the treatment of diseases.

Cupping has also been known as “Jiao Fa” which means the horn technique. In this method, hollowed horns were used. Many other names were used to describe cupping techniques, including “sucking method,” “fire cupping” and “boiling bamboo cylinder” in early Chinese Practice (Qureshi *et al.*, 2017).

Ancient Egyptians were reported to practice cupping therapy earlier than many old civilizations, where cupping therapy was one of the oldest known medical therapies in ancient Egypt. The first report of using cupping therapy in ancient Egypt dates back to 1550 B.C. (more than 3500 years ago) where drawings on the famous Egyptian papyrus paper (Ebers paper) and ancient Egyptian temples showed that Egyptians were advanced in treatment using cupping therapy. Cupping therapy was also used in ancient Greek medicine (El Sayed *et al.*, 2013).

North American natives are reported to have used buffalo horns for wet cupping. The horns were hollowed with a small hole at the top through which the cupper would suck the air out of, in order to create a vacuum in the horn which would then pull up the blood from the incisions previously made with a blade (Latib, 2013).

Cupping in Europe and the Middle East grew from humoral medicine, a system of health ancient Greeks used to restore balance through the four "humors" in the body: blood, phlegm, yellow bile and black bile (Zahraa, 2016).

Arabic writers report that cupping therapy dates back to 3500 B.C. (5500 years ago), where Assyrians were the first Arab population to use primitive tools as animal horns and bamboo wood for cupping therapy. Arabic civilization termed cupping therapy, Al-hijamah (which means in Arabic: to restore to the original size), where it was used in treating hypertension, polycythemia, headache, migraine and drug intoxication. They diagnosed polycythemia whenever there was an exaggeration of the pink color of the skin (EL Sayed *et al.*, 2013).

As we mentioned above we find that the practice of Hijamah was already present before the arrival of the prophet Mohammad “peace be upon him” he encouraged and used it himself on many occasions. Many arabic companions of the Prophet have reported his hadiths concerning hijamah. In Sahih Bukhari, the messenger said, “Indeed the best of remedies you have is cupping.” also he said: “healing is to be found in three things including use of honey, cupping and cauterly.” Ibn al-Qayyim Jawzia (Islamic intellectual and scientist) believed that cupping was considered as an effective medical practice.

The author of the book entitled Al-Qanoon, Sina (980–1037 B.C.) said: “Cupping is neither preferred in the beginning at the end of the month. It is preferred in the middle of the month when the toxic substances accumulate.” Furthermore, Ibn Sina said that hijamah can treat more than 30 different diseases. A different hadith states that “the Prophet used to have cupping done on the 17th, 19th and 21st day of the lunar month.” Overall, Islamic cupping practitioners (Islamic medicine) have played a significant role in reviving and sustaining cupping therapy across the Islamic countries (Qureshi *et al.*, 2017).

2.3 Prophetic Medicine and Hijamah

Prophetic medicine is a term given to all the sayings (hadith), advices, habits and teachings of Prophet Mohammad peace be upon him as regard health and dealing with diseases. It was reported that in prophetic medicine, cupping therapy is a highly recommended line of treatment in more than one hadith: “The best remedy is Al-hijamah) and: (If there is a benefit in any of your treatment modalities: benefit will be in the blade puncture in cupping therapy, a gulp of honey and cauterizing, but I do not like cauterization). Prophet Mohammad was not a medical practitioner but a great teacher and a guide to his companions and his nation. His advices and teachings were in all aspects of life including health and medical aspects. It was reported that the steps of wet cupping therapy in prophetic era are the same until now (more than 1400 years ago), where prophet Mohammad requested for wet cupping therapy (Al-hijamah) then the physician started by putting horns, The prophet replied: “This is Al-hijamah ”. The man asked: “What is Al-hijamah?” The prophet answered:” It is one of the best remedies used by people”. Prophet Mohammad said: “Al-hijamah before eating is better and gives cure and blessings and increases mental power and memory”. From this hadith, valuable scientific facts can be gained which agree with modern medical knowledge. Performing cupping therapy while the stomach is empty will guarantee that the major portion of circulatory blood will not be shifted to gastrointestinal tract, which guarantees that blood circulation in the skin will not decrease. Therefore, empty stomach will allow enormous blood to come to the skin circulation to be filtered during cupping therapy. In another hadith, Prophet Mohammad said: (If tension of blood increases (manifested by hyperemia), one should get wet cupping therapy because severe increase in blood tension may be fatal). The scientific description mentioned in the hadith agrees with current medical knowledge where hypertension may manifest with hyperemia. The use of

wet cupping therapy in treatment of severe hypertension may be beneficial as cupping therapy may drain excess fluids with their possible contents of solutes, vasoactive substances, toxins and excess blood (in polycythemia) (El sayed *et al.*, 2013).

2.4 Classification of Cupping Therapy

There are a number of different methods and types of blood cupping based on the patient's health, the presenting ailment and general constitution, as well as geographic, seasonal and climatic factors (Latib, 2013).

Cupping therapy can be classified into six main categories; the first is technical category which includes dry, wet, massage and flash cupping therapy. The second is the power of suction related category which includes light, medium, strong and pulsatile cupping therapy. The third is method of suction related category which includes fire, manual vacuum, and electrical vacuum cupping therapy. The fourth is based on materials inside cups, and includes herbal, water, laser, Moxa, needle, electrical stimulation, and magnetic cupping therapy. The fifth is area treated related category. The sixth is other cupping methods category that includes sports, cosmetic and aquatic cupping (Al-Bedah *et al.*, 2016).

2.4.1 Technical types:

This category of cupping is in line with technique used in doing cupping. It includes dry cupping, flash cupping, wet cupping and massage cupping.

Dry cupping

Dry cupping is also given other names such as static cupping or retained cupping.

This method of applying cups over the skin needs negative pressure inside the cups through various methods including fire, manual pump or electrical suction. Negative pressure is the pressure that is less than ambient pressure, and created by exhausting air inside the cup. The practitioners leave the cups on the skin area up to 15 minutes. The pressure inside the cup can be controlled by the number of suction when using manual pump. Increasing number of suction will increase the negative pressure inside the cup. The pressure inside the cup can also be controlled by the fire exposure time when using fire to create negative pressure.

Prolonged exposure of the cup to the fire will increase the negative pressure inside the cup that may cause pain or discomfort and may cause skin burn due to the overheating of the cup. Atmospheric (ambient) pressure is higher than the negative pressure inside the cup allowing the skin to pullout. Cupping is applied to increase the circulation of blood and lymph to the local area and also to relieve painful muscle tension. Cupping effectively treats pain and also enhances a patient's general feeling of wellbeing. Risk of burn, scar formation, and dermatitis are the main disadvantages of this method (Al-Bedah *et al.*, 2016).

Flash cupping

Flash cupping also referred to as empty cupping is the name given when several medium to light pressure cupping are preformed several times in quick succession along the area being considered for treatment that requires stimulation. It only takes less than 30 seconds from the time when cup is applied and then removed because it entails stimulation process. It is done by using one cup, or some practitioners use four medium sized cups. They apply the four cups quickly then reapply them on the skin of next area before 30 seconds and used to stimulate Para spinal lines on the back. This method is used when dry cupping is not indicated especially in young people and ladies (Al-Bedah *et al.*, 2016).

Wet cupping

Wet cupping has been given several other names: full cupping, bloodletting cupping and bleeding cupping. This method is used most frequently in traditional medicine. A surgical instrument is used to scrape the skin and the cup is then applied to suck blood. Laceration of the skin and capillary vessels takes place in wet cupping, and it may act as a nociceptive stimulus, that triggers diffuse noxious inhibitory control (DNIC). It may help in treatment of chronic musculoskeletal pain. Skin disinfection, wearing personal protective equipment, following infection control program that includes safe medical waste disposal are advisable for all

cupping therapy practitioners. The risk of infection, vasovagal attacks and scars are the main disadvantages of this method (Al-Bedah *et al.*, 2016).

Massage cupping

Massage cupping also known as moving cupping, dynamic cupping and gliding cupping is a method of massage and done by applying oil to the skin and moving the cup, by a weak suction, on the area that needs massage. Various types of oils may be used such as olive oil, peppermint oil and lavender oil. It is suitable for all people, even young and elderly people. The cost may be the disadvantages of this method (Al-Bedah *et al.*, 2016).

2.4.2 The power of suction related types

This category of cupping types is classified according to the level of negative pressure inside the cups used in doing cupping. It includes light cupping, medium cupping and strong cupping and pulsatile cupping therapy.

Light cupping

Practitioners produce a weak suction in the cup to do light cupping. It is suitable for children and elderly people. The pressure inside the cup is between 100 and less than 300 millibar which is a unit of atmospheric pressure. Practitioners do one to two full manual pump suction to perform light cupping. It is a light method of cupping that can be used for elderly people and in sensitive body parts like the face. Light cupping pressure used in massage, dry and flash cupping techniques and may be used to treat pain disorders for elderly people and facial massage. The advantage of light cupping is that it does not leave cupping marks on most of cases. Conversely, fall of cup is the most frequently reported disadvantage of light cupping (Al-Bedah *et al.*, 2016).

Medium cupping

Medium cupping is a medium strength, and general purpose cupping. The pressure inside the cup remains between 300 and less than 500 millibar. Practitioners do three to four full manual pump suction to perform medium cupping. It is a general purpose cupping method and the negative pressure is suitable for all other types.

Medium cupping pressure may be used to treat musculoskeletal pain conditions, headaches and to increase blood circulation. Frequently observed cupping marks is one of its disadvantages so, it is advisable to not use this method on face (Al-Bedah *et al.*, 2016).

Strong cupping

Strong cupping is done by creating high negative pressure inside the cups Suction is intense and, therefore, it is not suitable for children and elderly people. The negative pressure inside the cup is above 500 millibar. Practitioners do five or more full manual pump suction to perform strong cupping. The practitioners should take special care while performing strong type of cupping because they produce a high negative pressure on the skin associated with the risk of inflammation, pain and discomfort. The risks of dermatitis and skin burn are the two main disadvantages of this method (Al-Bedah *et al.*, 2016).

Pulsatile cupping therapy

Pulsatile cupping is special type of cupping therapy. The pressure inside the cups is not constant but variable. It is used in randomized clinical trials evaluating the efficacy of cupping therapy in the treatment of osteoarthritis. Pulsatile cupping is administered by a mechanical cupping device with flexible silicone and plastic cups according to the treatment area. The device generates a pulsatile (changeable) negative pressure inside cup. Negative pressure varies between 100 and 200 millibar, at the interval of 2 seconds. This method is found to relieve symptoms of osteoarthritis of the knee compared to no intervention (Al-Bedah *et al.*, 2016).

2.4.3 Method of suction related types:

This category of cupping types is classified according to how the practitioners create negative pressure inside the cup. It includes fire cupping, manual vacuum cupping and electrical vacuum cupping

Fire cupping therapy

Fire cupping is a type of cupping done by creating negative pressure inside the cups by using fire. There is a risk of skin burn in this cupping type because of using fire (Al-Bedah *et al.*, 2016).

Manual vacuum cupping therapy

Manual cupping has also other names: vacuum cupping and opening cupping. It is done by creating negative pressure inside the cups by using manual suction pump. The main advantages of this method are: experimental studies showed that the increase in blood flow is more evident by using this type of cupping than the traditional fire one. In addition, this cupping instrument is also a new technique in the modernization of cupping. Reusing the manual pump without sterilization by some practitioners is the main disadvantage of this method (Al-Bedah *et al.*, 2016).

Electrical vacuum cupping therapy

Electrical vacuum cupping is a type of cupping in which negative pressure is created inside the cup by using electrical suction pump or apparatus. The advantages of this type are that the therapists can adjust the negative pressure freely, can produce a negative pressure pulse, and connect several cups. (Al-Bedah *et al.*, 2016).

2.4.4 Materials inside cups related types:

This category of cupping types is classified according to the material inside the cups. Some new cupping devices contain magnets, laser probe, and electrical stimulant. They used also more than one therapy in the same session by

complementing the value of cupping therapy to other traditional therapies. It includes needle cupping, hot cupping, herbal cupping, magnetic cupping, laser cupping, electrical stimulation cupping and water cupping (Al-Bedah *et al.*, 2016).

Needle cupping

Needle cupping is done by applying the acupuncture needle first, and then the cup is applied over it (Al-Bedah *et al.*, 2016).

Hot cupping

Dried herb, called Moxa is used to do hot cupping or Moxa cupping. Therapists use a needle, warmed by Moxa, and then the cup is applied over it. Usually, they use special technique to protect skin from burning by using a thin aluminum layer under the hot Moxa. Moxa is a dried Mugwort leaves used in Chinese medicine in a procedure called Moxibustion, a form of acupuncture (Al-Bedah *et al.*, 2016).

Herbal cupping

Herbal cupping or medicinal cupping is done by boiling cups in a suitable herbal tincture, and then applied to the skin. The herbs are placed into a deep pan and boiled in water for 30 minutes. Then bamboo cups are placed in the herbal tincture for 5 minutes to soak. Each cup is removed from the pan, allowed to cool briefly (about 1 minute) and then applied to a pain area (Al-Bedah *et al.*, 2016).

Magnetic cupping therapy

Magnetic cupping therapy is done by using magnetic cupping sets that contains magnets inside the cups. Electromagnetic stimulation increases the therapeutic effectiveness of cupping, especially when applied to joints, including the knees and elbows. It is used in the treatment of diseases related to joints. The main advantage of this therapy is the dual effect on patients. The development of skin ulcers on prolonged application is the main disadvantage (Al-Bedah *et al.*, 2016).

Laser cupping therapy

This method uses new cupping devices that contain acupuncture laser probe inside the cups. It stimulates acupuncture points by laser stimulation in addition to cupping. The advantage of this method is the dual effect of laser acupuncture and cupping therapy. The cost of this device may be the main disadvantage (Al-Bedah *et al.*, 2016).

Electric stimulation cupping therapy

Electrical stimulation cupping is a method of providing electric stimulation simultaneously with cupping therapy. The electrical stimulation during treatment is similar to transcutaneous electrical nerve stimulation (TENS) stimulation. Thus the combined two therapies enhance the overall effect and used for stimulating points and muscles by electric and vacuum stimulation. The advantage of this method is the dual effect of electrical stimulation and cupping therapy (Al-Bedah *et al.*, 2016).

Water cupping

Water cupping is done by using warm water inside the cup during cupping session. It involves filling a third of the cup with warm water. Water cupping is especially beneficial for treating asthma and related conditions including dry cough .But certainly not in the acute stages of these diseases (Al-Bedah *et al.*, 2016).

2.4.5 Area treated related types

Pedi cupping

Pedi Cupping is a combination of reflexology, massage cupping and plantar facial release of the leg and foot. This method could be used to treat musculoskeletal pain in the legs and lower compartment. This method may be used to treat plantar fasciitis as other leg ailments (Al-Bedah *et al.*, 2016).

Abdominal cupping

It begins with flash cupping and continues with massage cupping on abdomen. It stretches the walls of the organs, increase blood circulation and promote the digestive system. This method could be used to treat digestive problems and in the management of obesity. Stimulation of blood circulation and acupuncture points which control mood and appetite are the main suggested mechanisms of action (Al-Bedah *et al.*, 2016).

Facial cupping

It is used mainly for beauty reasons. Small silicon cups are used for facial cupping. The practitioners often use special massage cupping techniques. The benefits of facial cupping are multiple including oxygen-rich blood is forced to the face, fluid circulation is encouraged, and the lymphatic system is activated, and all this resulting in healthier and livelier looking skin (Al-Bedah *et al.*, 2016).

Female cupping

Female cupping is also called Breast cupping therapy can be done by the use of special cup sizes and sets to stimulate and support female breasts (Al-Bedah *et al.*, 2016).

Male cupping

Male cupping is the use of vacuum erection device to stimulate and support erection function (Al-Bedah *et al.*, 2016).

2.4.6 Other types

This category includes cupping types that are not classified in other categories. It includes sports cupping, cosmetic cupping and aquatic cupping.

Sports cupping

Cupping is used for the treatment of sports and athletic injuries and for rehabilitation purposes. Myofascial decompression is an alternative term used describing this method of cupping therapy. Myofascial decompression is specific

techniques have developed for cupping therapy to aid in healing of musculoskeletal pathologies. Movement patterns and functional exercise with the cups attached to specific sites. One of the best examples of it is the treatment of hamstrings conditions by cupping. Myofascial decompression is used as an intervention for soft tissue injuries like hamstrings strain (Al-Bedah *et al.*, 2016).

Cosmetic cupping

Cosmetic cupping is one of the new concepts of cupping therapy that was introduced in spas and beauty salons. In cosmetic cupping, devices are used to enhance body functions and health (Al-Bedah *et al.*, 2016).

Aquatic cupping

Aquatic cupping is doing cupping underwater. Muscles tend to stretch much underwater and doing cupping may help in this situation. This method combines cupping therapy with aquatic therapy. Aquatic cupping is water-based treatments of therapeutic value. It is used for rehabilitation, and musculoskeletal diseases (Al-Bedah *et al.*, 2016).

2.5 The liver

The liver is a large and complex organ weighing approximately 1.2–1.5 kg in the healthy adult. It is located beneath and is attached to the diaphragm, is protected by the lower rib cage, and is held in place by ligamentous attachments.

Despite the functional complexity of the liver, it is relatively simple in structure. It is divided unequally into two lobes by the falciform ligament, with the right lobe being approximately six times larger than the left lobe. There is no known functional difference between the lobes, and communication flows freely between all areas of the liver (Bishop, 2010).

The liver is a vital organ that has a wide range of functions in the human body. Residing at the crossroads between the digestive tract and the rest of the body, the liver has the enormous task of maintaining the body's metabolic homeostasis. This task includes the processing of dietary amino acids, carbohydrates, lipids, and vitamins; synthesis of serum proteins; and detoxification and excretion into bile of endogenous waste products and xenobiotic. Thus, it is not surprising that the liver is vulnerable to a wide variety of metabolic, toxic, microbial, and circulatory insults. In some instances the disease process is primary to the liver. In others the hepatic involvement is secondary, often to some of the most common diseases in humans, such as heart failure, diabetes, and extra hepatic infections (Robbins, 2013)

Liver Function Tests (LFTs):

Frank liver failure is incompatible with life and the functions of the liver are too complex and diverse to be sub served by a mechanical pump; dialysis membrane; or concoction of infused hormones, proteins, and growth factors. The clinical laboratory offers several tests for the assessment of liver function; the enzymes alkaline phosphatase, ALT, AST, and 5'-nucleotidase are helpful in the assessment of the proper functioning and inflammatory status of the liver. Because the liver is

the site for metabolism of carbohydrate, protein and lipids, as well as for the synthesis of many proteins, the conjugation of bilirubin and detoxification of drugs and other substances, the liver may be assessed by measurement of total and direct bilirubin, total protein and albumin, cholesterol and triglycerides, and urea and ammonia. Correlation of laboratory results across time is an indication of accuracy (Zahraa, 2016).

Liver enzymes

Enzyme analysis is used to aid in diagnosis and treatment of disease. In particular, enzymes that are synthesized within cellular organelles carry out their functions within cells and are released into body fluids when those cells become diseased.

Thus, an increase in enzyme activity when compared to the reference range can indicate pathological changes in certain types of cells and tissues. Enzyme activity levels in body fluids can reflect leakage from cells due to cellular injury, or changes in enzyme production rate or actual enzyme induction due to metabolic or genetic states or proliferation of neoplasms. The clinical utility of enzyme activity in relationship to specific tissue pathology and clinical signs is enhanced when the enzyme activity quickly rises following the onset of the disorder and remains elevated for an adequate time frame, particularly when other clinical signs and symptoms are not sufficient to provide a diagnosis. (windy and jean, 2007)

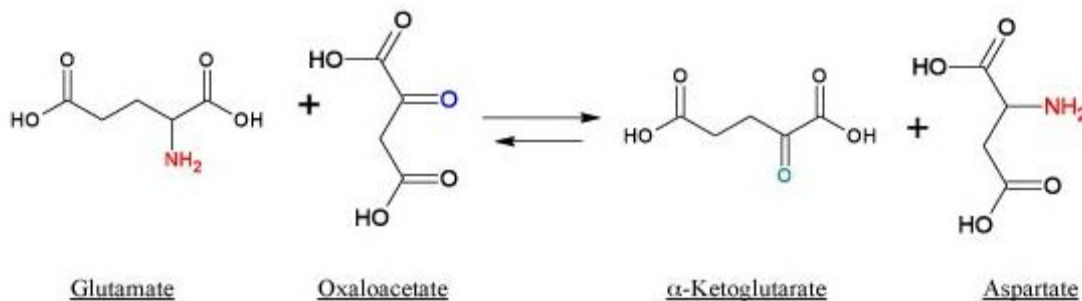
Liver enzymes play an important role in the assessment of liver function because injury to the liver resulting cytolysis or necrosis will cause the release of enzymes into circulation. Enzymes also play an important role in differentiating hepatocellular (functional) from obstructive (mechanical) liver disease, which is an important clinical distinction because failure to identify an obstruction will result in liver failure if the obstruction is not rapidly treated. Although many enzymes have been identified as useful in the assessment of liver function, the most clinically useful include the aminotransferases (alanine aminotransferase [ALT]

and aspartate aminotransferase [AST]), the phosphatases (alkaline phosphatase [ALP] and 5- nucleotidase), gamma -glutamyltransferase (GGT), and lactate dehydrogenase (Bishop, 2010).

Aspartate Aminotransferase

Aspartate aminotransferase (AST) is an enzyme belonging to the class transferases. It is commonly referred to as a transaminase and is involved in the transfer of an amino group between aspartate and alpha-keto acids. The older terminology, serum glutamic oxaloacetic transaminase (SGOT, or GOT), may also be used. Pyridoxal phosphate functions as a coenzyme.

The transamination reaction is important in intermediary metabolism because of its function in the synthesis and degradation of amino acids. The ketoacids formed by the reaction are ultimately oxidized by the tricarboxylic acid cycle to provide a source of energy.



Tissue Source

AST is widely distributed in human tissue. The highest concentrations are found in cardiac tissue, liver, and skeletal muscle, with smaller amounts found in the kidney, pancreas, and erythrocytes.

Diagnostic Significance

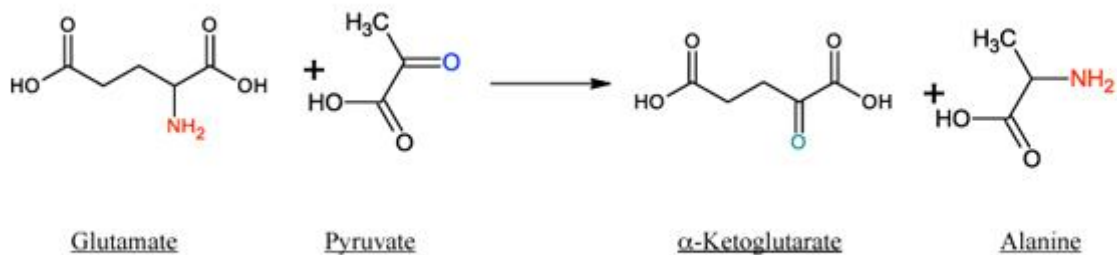
The clinical use of AST is limited mainly to the evaluation of hepatocellular disorders and skeletal muscle involvement. In AMI, AST levels begin to rise within 6 to 8 hours, peak at 24 hours, and generally return to normal within 5 days. However, because of the wide tissue distribution, AST levels are not useful in the diagnosis of AMI. AST elevations are frequently seen in pulmonary embolism. Following congestive heart failure, AST levels also may be increased, probably reflecting liver involvement as a result of inadequate blood supply to that organ. AST levels are highest in acute hepatocellular disorders. In viral hepatitis, levels may reach 100 times ULN. In cirrhosis, only moderate levels approximately four times ULN are detected. Skeletal muscle disorders, such as the muscular dystrophies, and inflammatory conditions also cause increases in AST levels (4–8 ULN).

AST exists as two isoenzyme fractions located in the cell cytoplasm and mitochondria. The intracellular concentration of AST may be 7,000 times higher than the extracellular concentration. The cytoplasmic isoenzyme is the predominant form occurring in serum. In disorders producing cellular necrosis, the mitochondrial form may be significantly increased. Isoenzyme analysis of AST is not routinely performed in the clinical laboratory.

Alanine Aminotransferase

Alanine aminotransferase (ALT) is a transferase with enzymatic activity similar to that of AST. Specifically, it catalyzes the transfer of an amino group from alanine to alpha ketoglutarate with the formation of glutamate and pyruvate.

The older terminology was serum glutamic-pyruvic transaminase (SGPT, or GPT).



Tissue Source

ALT is distributed in many tissues, with comparatively high concentrations in the liver. It is considered the more liver-specific enzyme of the transferases.

Diagnostic Significance

Clinical applications of ALT assays are confined mainly to evaluation of hepatic disorders. Higher elevations are found in hepatocellular disorders than in extra hepatic or intrahepatic obstructive disorders. In acute inflammatory conditions of the liver, ALT elevations are frequently higher than those of AST and tend to remain elevated longer as a result of the longer half-life of ALT in serum (16 and 24 hours, respectfully). Cardiac tissue contains a small amount of ALT activity, but the serum level usually remains normal in AMI unless subsequent liver damage has occurred. ALT levels have historically been compared with levels of AST to help determine the source of an elevated AST level and to detect liver involvement concurrent with myocardial injury (Bishop, 2010).

Albumin (Alb):

Serum albumin is a highly soluble multidomain protein, without prosthetic groups or bulky appending carbohydrates, that is very stable and available at high purity and low cost, albumin synthesized by the liver after loss of a 24-residue propeptide and immediately secreted into the bloodstream without being stored . Consisting of 585 amino acids with molecular weight of approximately 66, 2 Dalton. It is the most abundant protein in human plasma. Usually, it constitutes about 55–60% of all plasma proteins and has a serum half-life of about 20 days. Albumin may have significant antioxidant potential additionally to its property as a carrier protein for copper ion. It is involved in the scavenging of oxygen free radicals, which have been implicated in the pathogenesis of inflammatory diseases this may be related to the abundance of sulfhydryl (-SH) groups on the albumin molecule (Zahraa, 2016).

Albumin is responsible for nearly 80% of the colloid osmotic pressure of the intravascular fluid, which maintains the appropriate fluid balance in the tissue. Albumin also buffers pH and is a negative acute-phase reactant protein. Another prime function of albumin is its capacity to bind various substances in the blood. There are four binding sites on albumin, and these have varying specificity for different substances. Albumin transports thyroid hormones; other hormones, particularly fat-soluble ones; iron; and fatty acids. For example, albumin binds unconjugated bilirubin, salicylic acid (aspirin), fatty acids, calcium (Ca²⁺) and magnesium (Mg²⁺) ions, and many drugs and serum albumin levels can affect the half-life of drugs. This binding characteristic is also exhibited with certain dyes, providing a method for the quantitation of albumin (Bishop, 2010).

CHAPTER THREE

Materials and Methods

3.1 Materials

3.1.1 Study design

This is an experimental study.

3.1.2 Study area

This study was constructed in Sudan, Khartoum State. The practical part of this study was carried out in clinical chemistry Laboratory of Radiation and Isotopes Center- Khartoum.

3.1.3 Study duration

During the period from February to June 2017.

3.1.4 Sample size

Forty samples were collected (pre and post hijamah sessions).

3.1.5 Data collection

Data was collected by using a structural questionnaire including all valuable information concerning each participant examined. (Appendix 1)

3.1.6 Ethical considerations:

Oral formed consent was obtained from all participants; in addition to that all participants were informed about the purpose of the research. For more assurance they were asked before specimen collection.

3.7 Collection of blood specimens

Five ml of venous blood samples were collected in lithium heparin containers and centrifuged for 5 minutes at 3000 rpm to obtain plasma and were transported to the laboratory as soon as possible.

3.1.8 Biochemical testing;

The biochemical analysis were carried out in the Clinical Chemistry Laboratory of Radiation and Isotopes center- Khartoum by using BS-200 chemistry analyzer (a full automated chemical analyzer by mindray company- Germany).

3.2 Methods

3.2.1 Estimation of Alanine Aminotransferase (ALT/GPT) IFCC

3.2.1.1 Principle of the method

Alanine aminotransferase (ALT or GPT) catalyzes the transfer of the amino group from alanine to 2-oxoglutarate, forming pyruvate and glutamate. The catalytic concentration is determined from the rate of decrease of NADH, measured at 340 nm; by means of the lactate dehydrogenase (LDH) coupled reaction.

3.2.1.2 Procedure

1. Working Reagents and the instrument were brought to reaction temperature.
2. The following procedure was used:

Reaction temperature	37°C	30°C
Working Reagent added	1.0 mL	1.0 mL
Sample added	50 BL	100 BL

3. Sample mixed well and the cuvette inserted into the photometer.
4. after 1 minute, initial absorbance recorded and at 1 minute intervals thereafter for 3 minutes.
5. The difference between consecutive absorbances Calculated, and the average absorbance difference per minute obtained (DA/min).

3.2.2 Estimation of ASPARTATE AMINOTRANSFERASE (AST/GOT)

IFCC

3.2.2.1 Principle of the method

Aspartate aminotransferase (AST or GOT) catalyzes the transfer of the amino group from aspartate to 2-oxoglutarate, forming oxaloacetate and glutamate. The catalytic concentration is determined from the rate of decrease of NADH, measured at 340 nm; by means of the malate dehydrogenase (MDH) coupled reaction.

3.2.2.2 Procedure

1. Working Reagent and the instrument were brought to reaction temperature.
2. The following procedure was used:

Reaction temperature	37°C	30°C
Working Reagent added	1.0 mL	1.0 mL
Sample added	50 AL	100 AL

3. Sample mixed well and the cuvette inserted into the photometer.
4. after 1 minute, initial absorbance recorded and at 1 minute intervals thereafter for 3 minutes.
5. The difference between consecutive absorbances calculated, and the average absorbance difference per minute obtained (DA/min).

3.2.3 Estimation of ALBUMIN (BROMOCRESOL GREEN)

3.2.3.1 Principle of the method

Albumin in the sample reacts with bromocresol green in acid medium forming a coloured complex that can be measured by spectrophotometry.

3.2.3.2 Procedure of the method

	blank	standard	Sample
Albumin standard added		10 μ l	
Sample added			10 μ l
Reagent A added	I ml	I ml	I ml

2. Sample mixed thoroughly and let stand the tubes for 1 minute at room temperature.

3. The absorbance (A) recorded of the Standard and the Sample at 630 nm against the Blank.

3.2.4 Quality control

The precision and accuracy of all methods used in this study were checked by commercially prepared control sample before the application of the tests measurement

3.2.5 Statistical analysis

Data was analyzed to obtain means, standard deviation and correlation of the samples using statistical package for social science (SPSS) computer programed version (16.0) .paired sample T tests and person correlation were used for comparison and correlations.

CHAPTER FOUR

Results

The clinical and biochemical characteristics of this study subjects were a comparison between the baseline (before cupping) and 10-14 days after blood cupping. The results are given in tables and figures below.

Table (4-1)

Shows descriptive statistics of population subjected to hijamah, 14 male and 26 female participated in this research. Age group (1-30) years old were 13 and those of age groups of (30-70) years old were 27 person. People with arthritis complaint were 15, those with headaches were 5, those with other diseases 10 and the apparently healthy individuals were 10.

Table (4-2):

Illustrate the mean concentration of ALT, AST and albumin pre and post blood cupping. The ALT plasma levels were significantly increased after cupping (p-value= .003) (mean± SD =4.310±4.7654 **versus** 5.997±4.7654), AST levels were insignificantly changed (p-value=.527) (mean± SD 15.265±13.0057 **versus** 16.057±12.0513). Albumin level were insignificantly changed (p-value=.131) (mean± SD 4.217±.3876 **versus** 4.300±.3876).

Table (4-3): Illustrate the person correlation (P-value, r) of ALT, AST and Albumin pre- and post- cupping.

Figure (4-1) There was a positive significant correlation between AST and ALT pre cupping (P-value= .000) (r= .643^{**}).

Figure (4-2) There was a positive correlation between ALT and AST post cupping (p-value=.017) (r=.375^{*}).

Figure (4-3) There was no correlation between ALT and Albumin pre cupping (P-value==.065) (r=.294)

Figure (4-4) There was no correlation between ALT and Albumin post cupping (p-value=.069) (r=.291).

Figure (4-5) There was a positive correlation between AST and Albumin pre cupping (p-value=.023) (r=.358).

Figure (4-6) There was no correlation between AST and Albumin post cupping (p-value=.489) (r=.113).

Table4-1: descriptive statistics of population

	sex		Age group (years)		disease			
	male	female	(1-30)	(30-70)	arthritis	headache	other	healthy
NO.	14	26	13	27	15	5	10	10

Table (4-2): Illustrate the mean concentration of ALT, AST and albumin in pre and post cupping.

Variable	Pre- Mean±SD	Post- Mean±SD	P. value
ALT	4.310±4.7654	5.997±4.7654	0.003
AST	15.265±13.0057	16.057±12.0513	0.527
ALBUMIN	4.217±.3876	4.300±.3876	0.131

*Result given in mean ± SD, *P-Value* ≤ 0.05 considered significant.

* Paired sample T test was used for comparison.

Table (4-3): Illustrate the person correlation (P-value, r) of ALT, AST and ALBUMIN pre and post cupping.

Variable	Person correlation(r)	p.value
Correlation B/w ALT,AST pre cupping	0.643**	0.000
Correlation B/w ALT,AST post cupping	0.375*	0.017
Correlation b/w ALT,ALB pre cupping	0.294	0.065
Correlation b/w ALT,ALB post cupping	0.291	0.069
Correlate b/w AST,ALB pre cupping	0.358*	0.023
Correlation b\w AST,ALB post cupping	0.113	0.489

*Result given as p-value and r=person correlation.

*P-Value ≤ 0.05 considered significant.

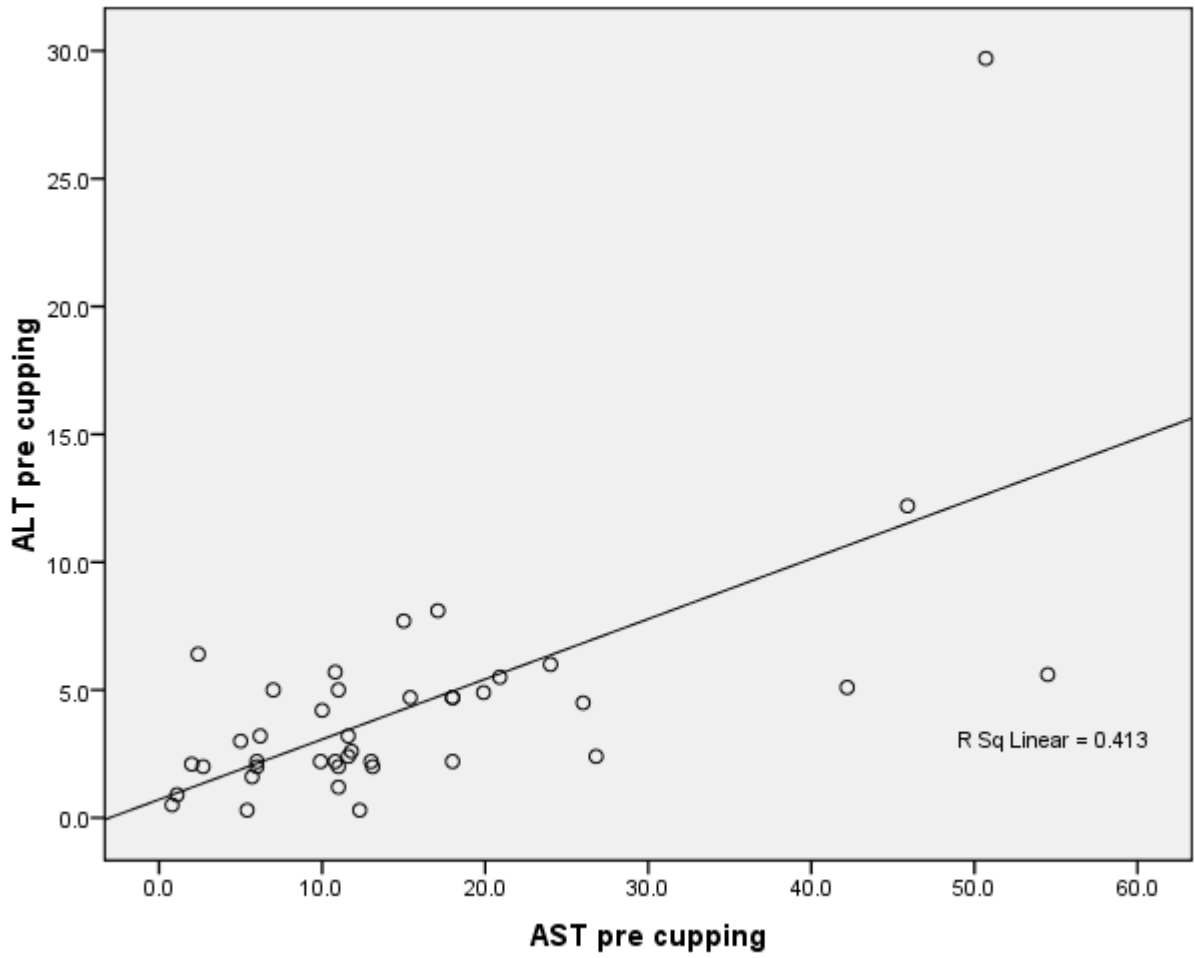


Figure (4-1): correlation between ALT and AST pre cupping (P -Value =.000) ($r=.643^{**}$).

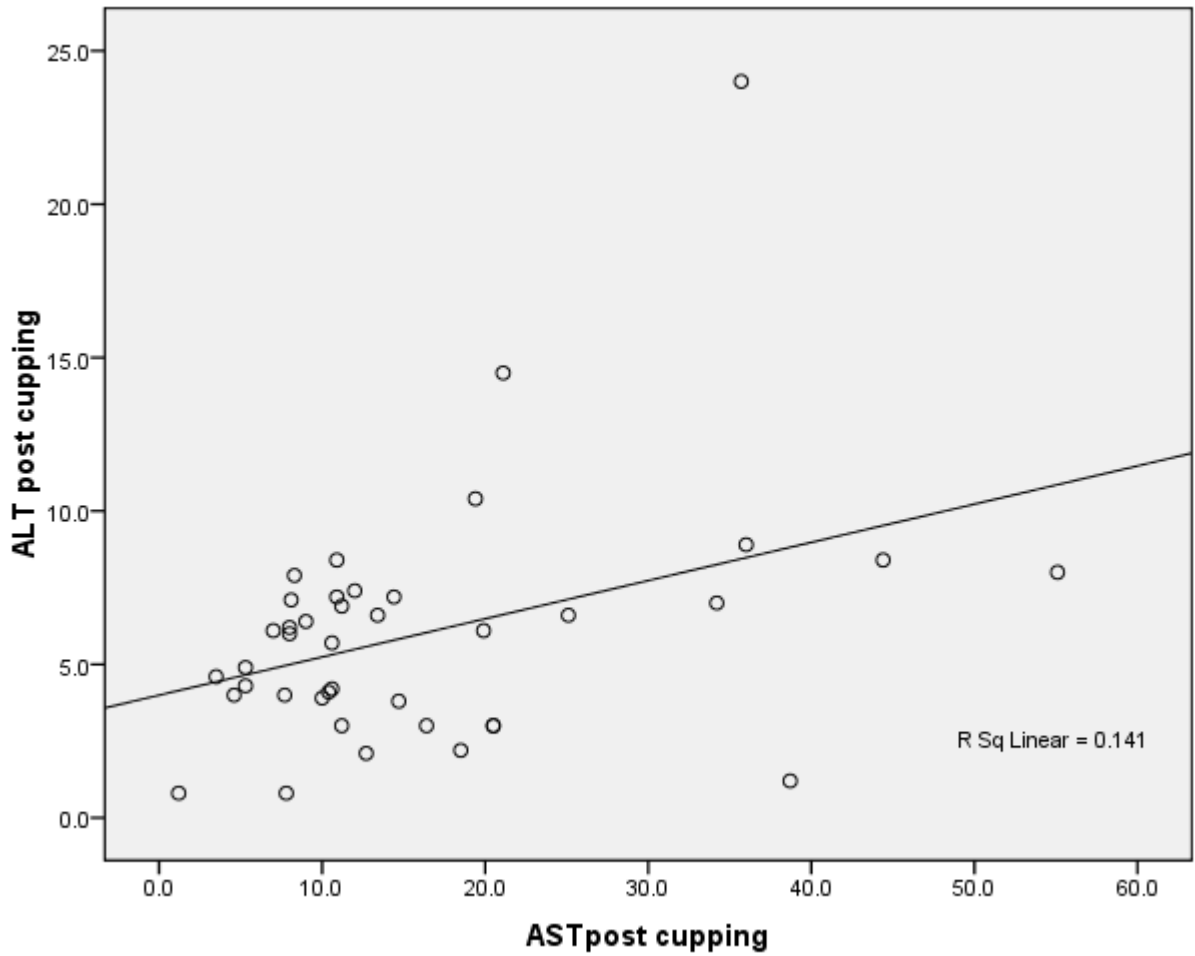


Figure (4-2): Show correlation between ALT and AST post cupping (P -Value =.017). ($r=.375^*$).

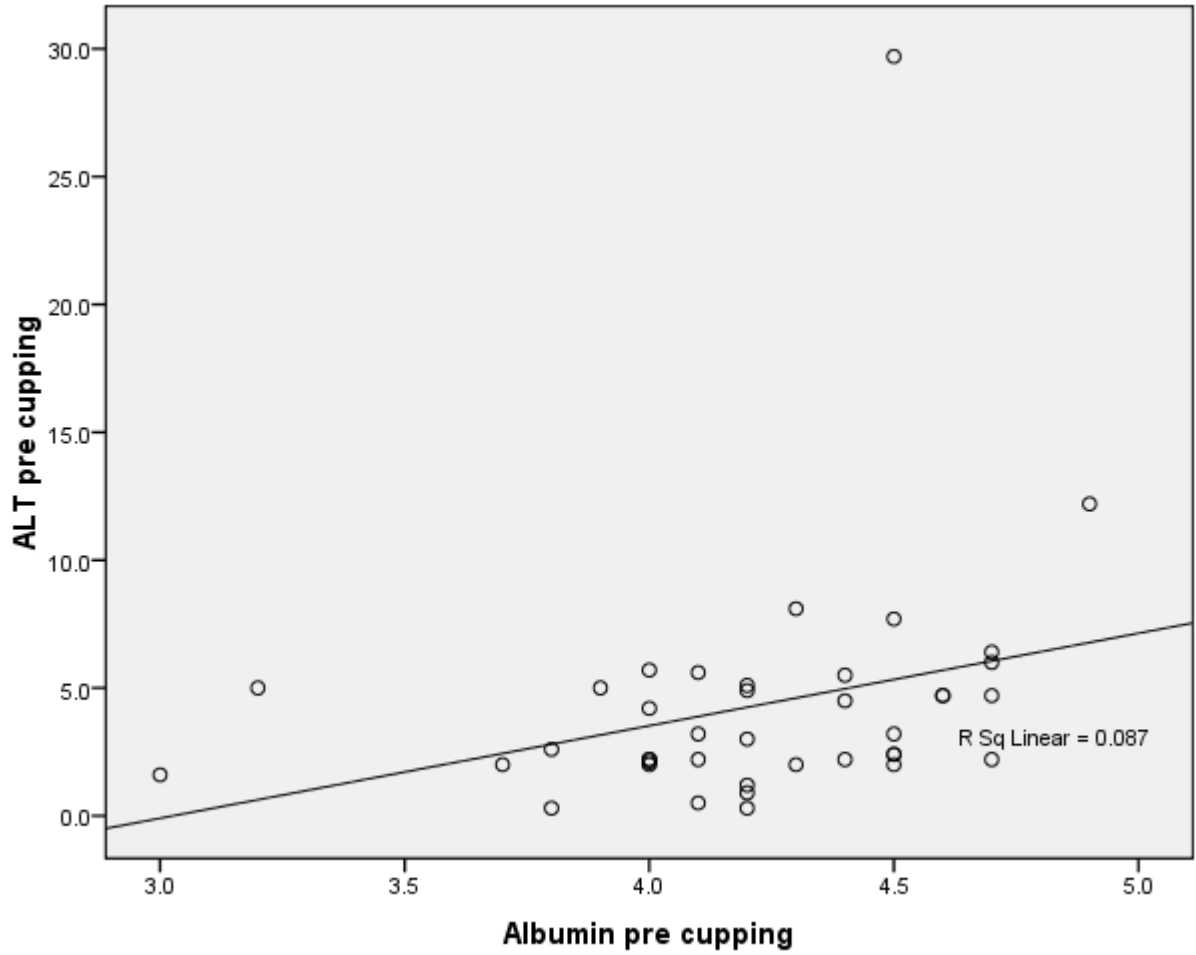


Figure (4-3): correlation between ALT and Albumin pre cupping (*P-Value* =.065) ($r=.249$).

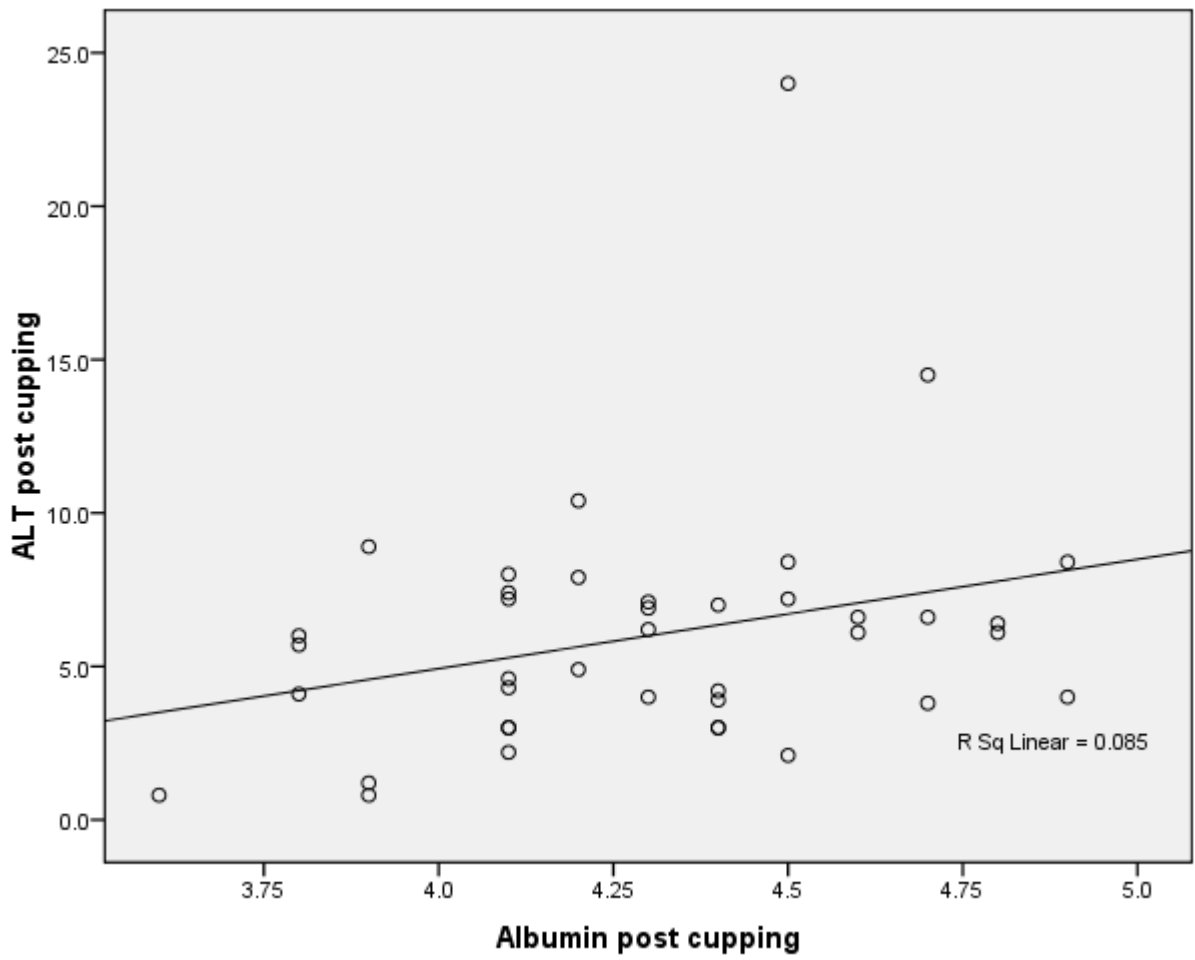


Figure (4-4): correlation between ALT and Albumin post cupping (P -Value =.069) ($r=.291$).

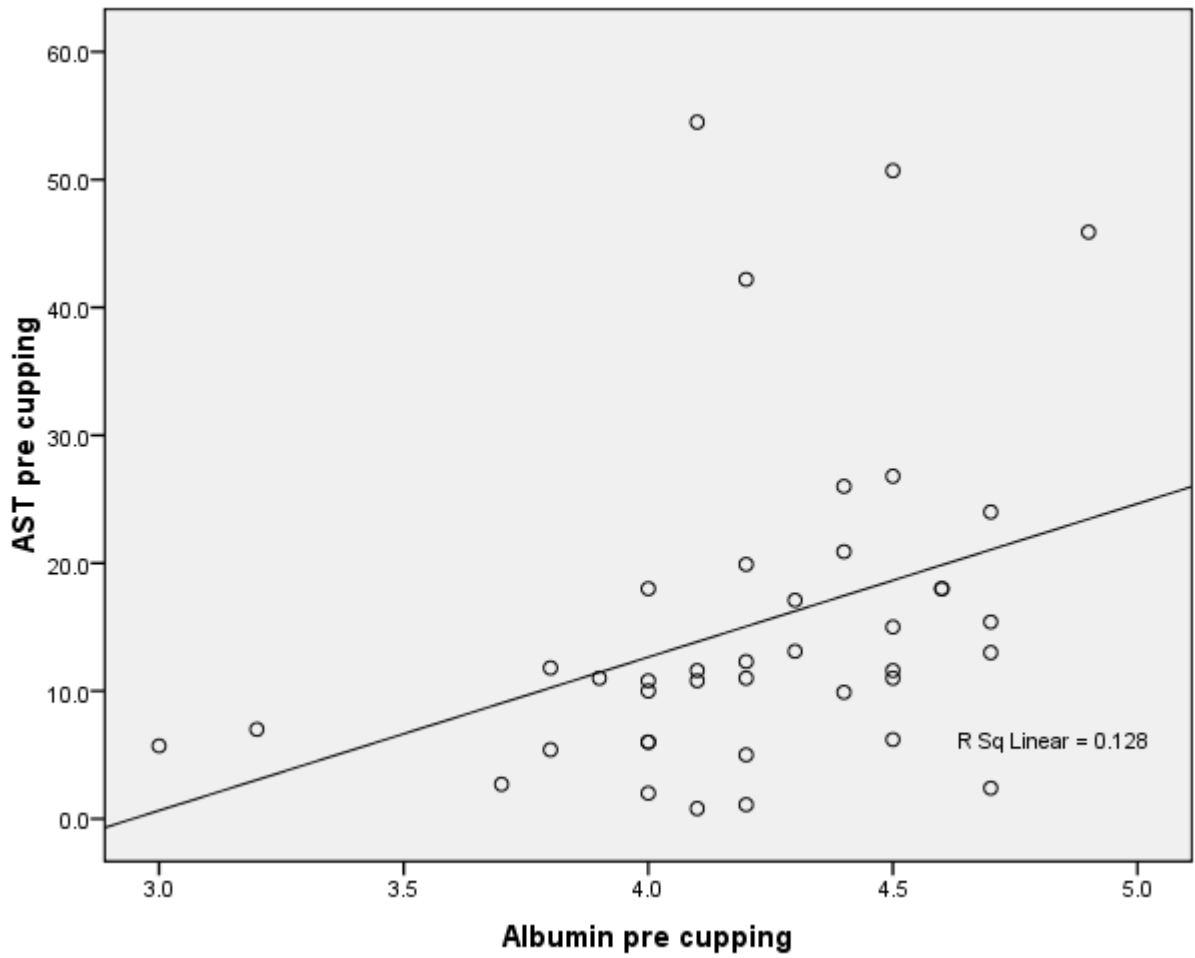


Figure (4-5): correlation between AST and Albumin pre cupping (*P-Value* =.023) ($r=.358^*$).

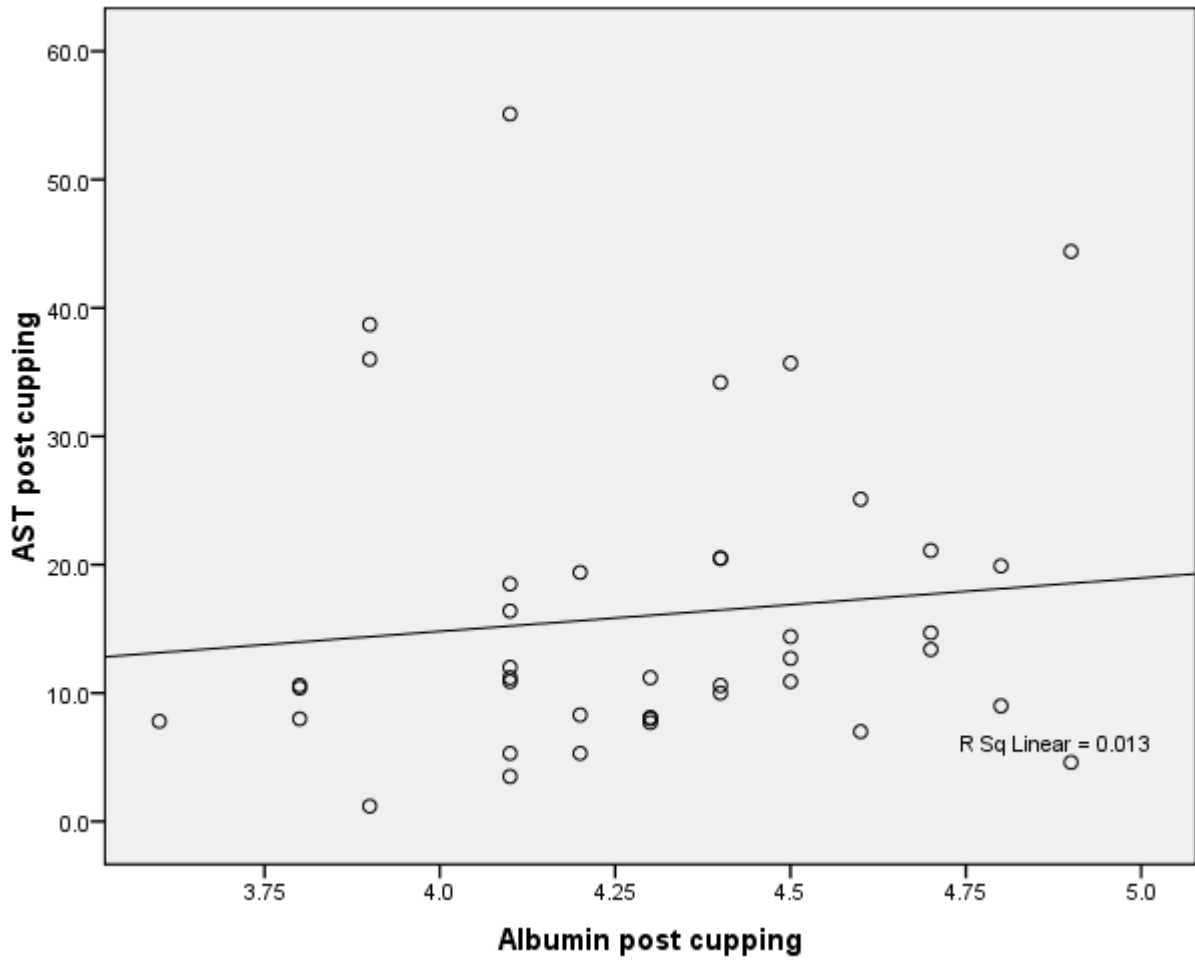


Figure (4-6): correlation between AST and Albumin post cupping (*P-Value* =.489) ($r=.113$).

CHAPTER FIVE

Discussion, conclusion, recommendation

5.1 Discussions

Despite the revolutionary improvement in medicine and medicines techniques in this decade, a great number of people still conservative to the idea of traditional medicine is much better and safer than modern medicine. Religion and spiritual believes play a major role in backing such concepts. So blood cupping or hijamah is the core of this dilemma of contradictory views. Increasing turnout of hijamah using in Sudan and recent studies that claim its efficiency in treating some incurable ailments led us to start such a research.

In this study we wanted to evaluate the effect of blood cupping on liver, and does hijamah can help in treating some liver diseases? To evaluate the effect in case of liver damage, we estimated the change of certain liver enzymes in the blood. Alanine and Aspartate aminotransferases represents the must used hepatic enzymes. Also assessment of the liver productivity functions by measuring albumin protein. We choose these three parameters because they represent liver status. The study is unique in selection and performing such research in this analyte comparing to other studies. We wanted to make it a backbone study for more specialized research in Sudan. This study estimated ALT, AST and Albumin plasma level from venous blood of randomly selected participant subjected to hijamah sessions.

AST levels were insignificantly changed with $p\text{-value}=0.527$) so there is no difference between AST levels before and after hijamah. This result agree with (Fairouz, 2010) and disagree with (zahraa, 2016) in which there was a significant decrease in its level. In result of (Bilal *et al.*, 2011), (Muhammad *et al.*, 2015) and

(Fatin *et al.*, 2014) there was a decrease in its level but the main difference in their studies that they estimated the levels in cupping blood compare to venous blood.

AST is normally found in many tissues other than liver such as, heart, muscle, kidney, and brain. It leaks out into serum when damage occurs to any of these tissues. Therefore, it's not a highly specific indicator of liver injury.

Albumin level showed no change (p-value=0.131). So there was no difference between its level before and after hijamah. This result disagrees with the result of (zahraa, 2016) in which there was a significant decrease in its level. Also disagree with (Fatin *et al.*, 2014) which there was a decrease in its level but the main difference in their study that they estimated its levels in cupping blood instead of venous blood.

This study showed that ALT plasma levels were significantly increased after cupping (p-value=0.003) .This totally disagree with the result of (zahraa, 2016) which there was a significant decrease in its level. The result also disagree with (Fairouz, 2010) which there was no significant difference.

In results of (Bilal *et al.*, 2011), (Muhammad *et al.*, 2015) and (Fatin *et al.*, 2014) there was a decrease in its level but the main difference in their study that they estimated cupping blood instead of venous blood.

ALT is normally present in various tissues but its comparatively higher concentrations are found in liver and kidney. ALT concentration can be elevated in skeletal or cardiac muscle disease, its reported that alcohol consumption, overweight, iron over load, impaired glucose metabolism , age, ethnicity and gender play key role in elevating ALT concentrations. We understand that the elevating of ALT levels only is not an exclusive liver damage indicator. Therefore the random selection of participant in this research may be the major explanation in yielding such results. Concluding, it seems the augmentation of ALT after cupping is not an indicator of liver impairment.

The study showed a strong positive significant correlation between AST and ALT pre cupping (P-value= 0.000) ($r=0.643^{**}$). And a positive correlation between ALT and AST post cupping (p-value=0.017) ($r=0.375^*$).

5.2 Conclusion

The findings of this study indicate that blood cupping has an effect on ALT level, while there is no effect on AST and Albumin levels.

5.3 Recommendations

- Evaluation the effect in the same days of Sunnah during the odd days of full moon (day 17, 19 and 21) in the lunar months (Islamic calendar) is recommended to try to coincide the Islamic view of cupping therapy.
- Specific group of liver diseases patients can be subjected for better monitoring of the effect.
- Evaluate other liver damage marker such as ALP, GGT and Alpha feto protein and others.
- Estimation of such markers in close time intervals (24 hours, two days, etc.) to detect any minimum effect that may appear.
- Use larger sample size of subjects for better representation of the population.
- Application of this research in specific population sharing the same factors (age, weight, sex, drug usage..etc.) To observe the exact change in any parameters affected by such factors.

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Appendix I

Sudan University of Science and Technology

College of Graduate Studies

The Effect of Wet Blood Cupping on Alanine Aminotransferase Aspartate Aminotransferase and Albumin in Khartoum State Questionnaire

Name.....

Patient Number () Phone Number ()

Age ()

Reason of hijamah:.....

Presence of chronic diseases: Yes () No ()

If yes: type of disease.....

Duration ()

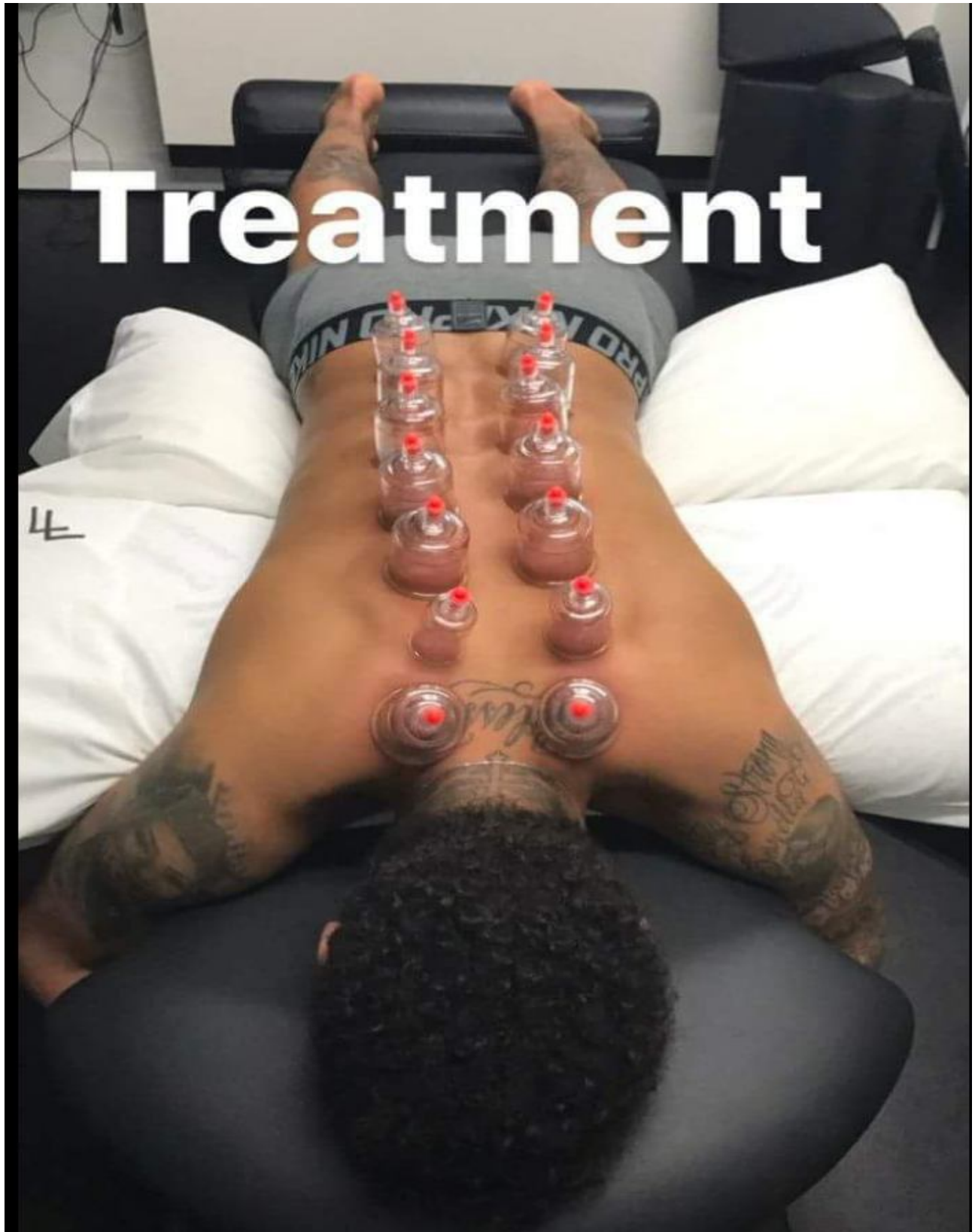
Treatment.....

Laboratory investigations:-

Test name	Concentration
ALT	U/L
AST	U\L
Albumin	g/dl



Appendix 5



Appendix 6



Appendix 7