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Editorial

The Central Council for Research in Unani Medicine (CCRUM) is the apex government organization established for fostering research and development in Unani Medicine. Since it came into being in 1978, the CCRUM has been busy in creating scientific evidences for this age-old system which has been treating and caring the mankind in a larger part of the world including India. Through its endeavors in the area of clinical research, preclinical research, survey and cultivation of medicinal plants, drug standardization and literary research, the CCRUM has been truly successful in increasing the system's acceptability among the modern and scientific society of the world, promoting its global visibility and developing viable solutions for health problems of the people.

The CCRUM has been publishing various periodical and non-periodical publications to propagate its research outcomes. The Hippocratic Journal of Unani Medicine (HJUM) is one such publication. It is a peer-reviewed scientific quarterly journal which covers papers on clinical research on single and compound Unani drugs, validation of regimen therapy, experimental pharmacological studies, standardization of single and compound drugs, development of standard operating procedures, ethnobotanical studies and development of agro-techniques thereof and literary research on classics of Unani Medicine. The journal is also open for studies on safety evaluation of Unani and other herbo-mineral drugs, nutraceuticals, cosmotherapeutics, aromatics, oral health, lifestyle disorders, sports medicine, etc. and such other newer areas which are the outcome of modern day living.

This issue of HJUM comprises six papers. The first paper presents description, chemical constituents, uses, pharmacological activities and various other aspects of *Khaṭmī* in the light of recent experimental studies. In the second paper, the authors have described morphology, pharmacological actions, ethno-medicinal, traditional and therapeutic uses of *Lupinus albus* L., a potent drug of Unani Medicine for hyperpigmentary skin disorders. The third paper is based on the literature review on *Bawāsīr* (haemorrhoids) elaborating its types, causes and treatment in the perspective of Unani Medicine. In the fourth paper, outcome of a socio-demographic study conducted to analyse the status of the rural scheduled castes of Aligarh, Uttar Pradesh has been presented. The paper contains primary data collected through direct visits to households of scheduled castes under Mobile Healthcare Program of SCSP at Regional Research Institute of Unani Medicine, Aligarh during 2018-19. The fifth paper is based on a preclinical study on nephroprotective, diuretic and steroidal activity of a Unani pharmacopoeial preparation *Tabīkh Kāknaj* in rats, while the last paper is based on a clinical study conducted to prove the efficacy and safety of *Ḥijāma bi'l-Sharṭ* (wet cupping) in the treatment of knee osteoarthritis.

We have been constantly striving to make HJUM a leading journal of Unani Medicine and related sciences. In this context, we thank the authors for their contributions and our learned reviewers for their invaluable inputs in improving the manuscripts. We sincerely hope and trust that the mission can be accomplished with active partnership of quality-conscious individuals and institutions.

Prof. Asim Ali Khan
Editor-in-Chief

Contents

Khaṭmī (*Althaea officinalis* L.) and its Therapeutic Effect in Unani Medicine – A Review

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Abstract

In the present scenario, ethno-botanical and traditional uses of natural compounds, especially of plant origin have received much attention as they are well-tested for their efficacy and generally believed to be safe for human use. *Althaea officinalis* (*Khaṭmī*) is an important drug in Unani Medicine. Root, leaves, flowers and seeds are mainly used in medicine. All the parts contain mucilage. It is extensively used for treatment of several diseases such as *Su'āl Ḥārr* (bronchitis), *Dhāt al-Ri'a* (pneumonia), *Dhāt al-Janb* (pleurisy), *Waram-i-Raḥim* (metritis), *Waram-i-Am'ā'* (enteritis), *Waram al-Thadī* (mastitis) and *Waja' al-Mafāṣil* (arthritis) as mentioned in Unani Medicine. It possesses many pharmacological effects such as antimicrobial, cardiovascular, prevention of urolithiasis, antiestrogenic, cytotoxic and immune-modulatory. Through this paper, an attempt has made to review various aspects of *Khaṭmī* and its Unani pharmacological activities in the light of recent experimental studies.

Keywords: *Althaea officinalis,* Anti-inflammatory, *Khaṭmī*, Mucilages

Introduction

Khaṭmī belongs to the family Malvaceae. It is native to most of the countries of the Europe and distributed in the temperate and subtropical region of Asia (Khory, 1981; Kirtikar and Basu, 1987). *Khaṭmī* has been used for centuries to treat inflammatory disorders like *Su'āl Ḥārr* (bronchitis), *Dhāt al-Ri'a* (pneumonia), *Dhāt al-Janb* (pleurisy), *Waram-i-Raḥim* (metritis), *Waram-i-Am'ā'* (enteritis), *Waram al-Thadī* (mastitis) and *Waja' al-Mafāṣil* (arthritis). It has also been used for other ailments like *Nazla* (catarrh), *Sang-i-Gurda* (renal calculi), *Bahaq* (pityriasis), *Ra'sha* (tremor), *'Usr al-Bawl* (dysuria), *Zaḥīr* (dysentery), *Nafth al-Dam* (haemoptysis) and *Shahīqa* (whooping cough). (Ibn Baitar, 2003; Kabiruddin, 2007; Ghani, 2010). The root of *Althaea officinalis* contains relatively large amount of mucilage, which contains glucose, xylose, uronic acid, methyl pentose and hexose. Studies have reported that the crude mucilage of the root contains glucan, arabinogalactan, and acidic polysaccharide. A neutral fraction is composed of 21% glucose, 52% galactose, and 27% arabinose. Acidic polysaccharide is composed of 58% galacturonic acid, 39% rhamnose, and 3% of galactose and trace amount of glucose (Masashi *et al.,* 1977).

Taxonomical Classification

Kingdom	Plantae
Subkingdom	Tracheobionta

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Superdivision	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Dilleniidae
Order	Malvales
Family	Malvaceae
Genus	*Althaea* L.
Species	*Althaea officinalis* L.
Botanical name	*Althaea officinalis* L.

(Anonymous, 2020; Ibn Baitar, 2003)

Vernacular Names

Unani	Altia, Khairu
Urdu	*Bīkh-i-Khaṭmī*
Arabic	*Bīkh-i-Khaṭmī*
Persian	*Resha-i-Khaṭmī*
English	Marsh Mallow
Hindi	*Khaṭmī*
Tamil	Shemaitute
Marathi	*Khaṭmī*
Telugu	*Khaṭmī*

(Anonymous, 1987; Ibn Baiṭar, 2003; Anonymous, 2007; Kabiruddin, 2007)

Description

Macroscopic: Root – 0.2 to 3 cm in diameter, light brown in colour, strongly longitudinally furrowed, often spirally twisted; fracture – short, texture rough, internally yellowish white; odour – pleasant; taste – sweet and mucilaginous.

Microscopic: T.S. root circular in outline; cork 8 to 12 cells broad, radially arranged flattened cells; cortex broad, loosely arranged, parenchymatous, cells filled with mucilage; small patches of lignified fibres present; large number of schizogenous and lysigenous mucilage canals present; phloem well-developed consisting of sieve tubes, companion cells and phloem parenchyma filled with mucilage; cambium 2 to 3 celled, xylem diffuse porous, made up of vessels, tracheids, fibres and tracheidal fibres, vessels mostly solitary, filled with tyloses at some places, medullary rays 3 to 5 cells deep; rosette crystals of calcium

oxalate present in cortical, phloem and xylem region; cells contain mucilage, stained red with 1% ruthenium red and deep yellow with potassium hydroxide solution; most of the parenchymatous cells contain starch grains, polygonal to rounded, 5 to 20 µm, most grains less than 12 µm in diameter, simple, hilum circular or a 2 to 5 rayed cleft lamellae indistinct (Anonymous, 2007).

Habitat

It is native to British Isles and the temperate regions of India. It is now distributed throughout the Europe and can be found in parts of the Americas (Ross, 2001). Flowers are ornamental. It occurs in Punjab and Kashmir, often cultivated (Anonymous, 1987).

Taste

- Mucilaginous (Anonymous, 1987; Hakim, 2011)

Temperament

- Cold and Moist (Ashraf, 2005; Anonymous, 2007; Hakim, 2011)
- Hot$^{1°}$ and Dry$^{1°}$ (Anonymous, 1987)

Dosage

- 5-7 gm (Anonymous, 2007; Kabiruddin, 2007)
- 6-9 gm (Hakim, 2011)
- 5-10 gm (Anonymous, 1987)

Contraindications

- It causes adverse effects on stomach and stomach diseases (Kabiruddin, 2007; Hakim, 2011)

Correctives

- *'Asal* (honey) (Anonymous, 1987; Ashraf, 2005; Kabiruddin, 2007; Hakim, 2011)
- *Saunf* (*Foeniculum vulgare* Mill.) (Anonymous, 1987; Ashraf, 2005; Kabiruddin, 2007; Hakim, 2011)
- *Zerishk* (*Berberis aristata* DC.) (Anonymous, 1987; Hakim, 2011)

Substitutes

- *Khubāzī* (Seeds and leaves) (Anonymous,1987; Ashraf; Kabiruddin, 2007; Hakim, 2011)

Actions

- *Dāfi‘-i-Surfa* (antitussive) (Hakim, 2011)
- *Rādi‘* (repellent) (Kabiruddin, 2007; Ghani, 2010; Hakim, 2011)
- *Muḥallil* (anti-inflammatory) (Anonymous, 1987; Ashraf, 2005; Baghdadi, 2005; Anonymous, 2007; Kabiruddin, 2007; Ghani, 2010; Hakim, 2011)
- *Mulayyin* (laxative) (Anonymous, 1987; Ashraf, 2005; Baghdadi, 2005; Ghani, 2010; Hakim, 2011)
- *Munḍij* (concoctive) (Anonymous, 1987; Baghdadi, 2005; Kabiruddin, 2007; Ghani, 2010; Hakim, 2011)
- *Murkhī* (relaxant) (Ashraf, 2005; Baghdadi, 2005)
- *Muzliqa-i-Am‘ā’* (intestinal lubricant) (Anonymous, 2007; Kabiruddin, 2007)
- *Musakkin* (sedative) (Anonymous, 2007; Kabiruddin, 2007)
- *Dāfi‘-i-Zaḥīr* (anti-dysentery) (Hakim, 2011)
- *Mudammil* (cicatrizant) (Anonymous, 1987)
- *Kāsir-i-Riyāḥ* (carminative) (Baghdadi, 2005)

Uses

- *Nazla-o-Zukām* (catarrh and coryza) (Ashraf, 2005; Baghdadi, 2005; Hakim, 2011)
- *Su‘āl* (cough) (Ashraf, 2005; Baghdadi, 2005; Hakim, 2011)
- *Su‘āl Ḥārr* (bronchitis) (Anonymous, 1987; Ashraf, 2005)
- *Dhāt al-Janb* (pleurisy) (Anonymous, 1987; Baghdadi, 2005; Kabiruddin, 2007; Hakim, 2011)
- *Dhāt al-Ri’a* (pneumonia) (Anonymous, 1987; Kabiruddin, 2007; Hakim, 2011)
- *Waram-i-Am‘ā’* (enteritis) (Anonymous, 2007; Kabiruddin, 2007)
- *Sudda-i-Am‘ā’* (intestinal obstruction) (Anonymous, 2007; Kabiruddin, 2007; Hakim, 2011)
- *Zaḥīr* (dysentery) (Ashraf, 2005; Anonymous, 2007; Kabiruddin, 2007; Hakim, 2011)
- *Ishāl Ṣafrāwī* (bilious diarrhoea) (Ashraf, 2005; Anonymous, 2007)

- *Waram al-Maq'ad* (proctitis) (Ashraf, 2005; Baghdadi, 2005; Hakim, 2011)
- *Waram al-Thadī* (mastitis) (Baghdadi, 2005; Kabiruddin, 2007; Hakim, 2011)
- *Haṣāh al-Kulya* (kidney stone) (Anonymous,1987; Baghdadi, 2005)
- *Haṣāh al-Mathāna* (cystolithiasis) (Baghdadi, 2005)
- *Sozish-i-Bawl* (burning micturition) (Ashraf, 2005; Baghdadi, 2005; Kabiruddin, 2007)
- *'Usr al-Bawl* (dysuria) (Baghdadi, 2005)
- *Waja' al-Mafāṣil* (arthritis) (Anonymous, 1987; Kabiruddin, 2007)
- *Khanāzīr* (scrofula) (Anonymous, 1987)
- *'Irq al-Nasā* (sciatica) (Kabiruddin, 2007)

Chemical Constituents

Althaea officinalis is found to contain mucilage polysaccharides (6.2-11.6%), galacturonorhamnans, arabinans, glucaris, arabinogalactans, carbohydrates (25-35%), flavonoids, glycosides, sugars (10% sucrose), amines (up to 12% asparagines), fat (1.7%), calcium oxalate, coumarins, phenolic acid and sterols (Gudej, 1991). Purified homogenous mucilage of *Althaea officinalis* is composed of L-rhamsose, D-galactose, galacuonnic acid and D-glucuronic acid in molar ratio of 3:2:3:3 (Tomoda *et al.,* 1987). Scopoletin, quercitin, kaempferol, chlorgenic acid, caffeic acid and p-coumaric acid are also present in the roots. *Althaea officinalis* is found to contain high levels of aluminum, iron, magnesium, selenium, tin, and substantial amounts of calcium. It also contains high level of pectin, which lowers blood glucose concentration. The root contains 25-35% of mucilage, asparagine, sugar, pectin and tannin. The mucilage content of the root, leaves and flowers is highest in the late fall and winter (approximately 11%) and lowest in the spring and summer (5-6%). Xyloses, arabinogalactan, glucan, acidic polysaccharide containing 2-O-alpha-Dgalacturonopyranosyl-l-rhamnose are also present in the hydrolysate of leaf and flower mucilag (Franz, 1966). Extracts from hybrid plants have been found to be more mucilaginous with different sugar composition compared to native plants (Franz & Chladek, 1973).

Compound Formulations

- *La'ūq-i-Sapistān* (Anonymous, 1987; Anonymous, 2007; Kabiruddin, 2007)
- *Sharbat I'jāz* (Anonymous, 2007)
- *La'ūq Nāzlī* (Anonymous, 2007; Kabiruddin, 2007)

- *Dayāqūza* (Kabiruddin, 2007)
- *Labūb Ṣaghīr* (Kabiruddin, 2007)
- *Sharbat-i-Khashkhāsh* (Kabiruddin, 2007)
- *Tiryāq-i-Nazla* (Kabiruddin, 2007)
- *Marham Dākhliyūn* (Kabiruddin, 2007)
- *Matbūkh-i-Nazla* (Anonymous, 2007)
- *Ḥabb-i-Shahīqa* (Kabiruddin, 2007)
- *La'ūq-i-Khashkhāsh* (Kabiruddin, 2007)

Pharmacological Action

- **Antiviral activity:** Water extract of the dried leaf of *Althaea officinalis* was active on herpes virus type 2, influenza virus A2 (Manheim 57), poliovirus 11 and vaccinia virus (May & Willuhn; 1985).
- **Antimicrobial activity:** Ethanol and water extracts of the flower, leaf and root on agar plate were inactive on *Escherichia coli* and *Staphylococcus aureus*. Ethanol, hexane and water extracts of the dried seeds, at a concentration of 10.0 mg/ml, were inactive on *Corynebacterium diphtheriae*, *Diplococcus pneumoniae*, *Staphylococcus aureus*, *Streptococcus pyogenes* and *Streptococcus viridians* (Naovi *et al*., 1991).
- **Anti-inflammatory and immunostimulant activity:** Aqueous extracts of the roots stimulated phagocytosis and release of oxygen radicals and leukotrienes from human neutrophils in vitro (Scheffer *et al*., 1991).
- **Antitussive activity:** A study carried out by Rouhi and Ganji (2007) stated that angiotensin-converting enzyme inhibitor (ACEI) drugs are the leading drugs for the treatment of hypertension, heart failure and some of nephropathy, but cough is one of the most frequent side effects of them. In this study, *Althaea officinalis* was used for the treatment of this cough. On the basis of results of the study, it was concluded that *Althaea officinalis* has an important role in the treatment of the cough caused by ACEI drugs.
- **Antibacterial activity:** Rezaei *et al.* (2015) evaluated antibacterial activity and wound healing potency of the *Althaea officinalis* leaf extract in the rat model of excision wound creation. The results of the study showed that *Althaea officinalis* extract was not effective on gram-negative bacteria but it was efficacious on gram-positive bacteria; on the other hand, the wound healing percent was significantly increased in comparison with controls in the extract-treated wounds.

- **Antifungal activity:** Ethanol (95%), water and hexane extracts of the dried *Althaea officinalis* seeds were found to be effective on *Microsporum canis, Microsporum gypseum, Phialophora jeanselmei, Piedrai ahortae* and *Trichophytonmenta grophytes* (Naovi *et al*., 1991).

Conclusion

Althaea officinalis L., a plant of Malvaceae family, has been mentioned in Unani classical literature as *Khaṭmī*. Many studies have found its strong anti-inflammatory, antibacterial and antimicrobial properties. Further research can be done to know the mode of action and efficacy of *Khaṭmī* which have already been mentioned in Unani classical literature. Also, more clinical trials are needed to validate the therapeutic efficacy of this Unani drug.

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सारांश

ख़तमी (*अल्थिया ऑफिसिनेलिस* एल.) और यूनानी चिकित्सा में इसका चिकित्सीय प्रभाव – एक समीक्षा

***सोफ़िया नौशीन, मुस्तेहसन, ज़ेबा आफ़रीन, नाहीद परवीन, आसिम अली ख़ान**

वर्तमान परिदृश्य में प्राकृतिक यौगिकों विशेषकर पौधों के एथनो–वनस्पति और पारंपरिक उपयोगों पर बहुत ध्यान दिया जा रहा है, क्योंकि इनकी प्रभावकारिता अच्छी तरह से परीक्षित है और ये आमतौर पर मानव उपयोग हेतु सुरक्षित माने जाते हैं। यूनानी चिकित्सा में *अल्थिया ऑफिसिनेलिस* (*ख़तमी*) एक महत्वपूर्ण औषधि है। मुख्य रूप से इसकी जड़, पत्ते, फूल और बीज का उपयोग औषधि में किया जाता है। इसके सभी भागों में लासा होता है। यूनानी चिकित्सा में कई रोगों जैसे *सुआल हार्र* (ब्रोंकाइटिस), *ज़ात अल–रिया* (निमोनिया), *ज़ात अल–जंब* (प्लुरिसी), *वरम–ए–रहिम* (गर्भाशयशोथ), *वरम–ए–अम्आ* (एंटेराइटिस), *वरम अल–सदी* (स्तनशोथ) और *वजा–उल–मफ़ासिल* (गठिया) के लिए इसका व्यापक रूप से उपयोग उल्लिखित है। इसमें कई औषधीय प्रभाव जैसे रोगाणुरोधी, हृदय संबंधी, यूरोलिथियासिस की रोकथाम, एंटीस्ट्रोजेनिक, साइटोटॉक्सिक और इम्यून–मोडूलेटरी प्रभाव होते हैं। इस पत्र के माध्यम से हाल के प्रायोगिक अध्ययनों की रौशनी में *ख़तमी* और इसकी यूनानी औषधीय गतिविधियों के विभिन्न पहलुओं की समीक्षा करने का प्रयास किया गया है।

शब्दकुंजी: *अल्थिया ऑफिसिनेलिस,* एंटीइन्फ्लामेटरी, *ख़तमी,* लासा

A Review on Pharmacological and Therapeutic Profile of *Turmus* (*Lupinus albus* L.)

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Abstract

Botanicals have been main components of prescriptions of Unani physicians in the treatment of diseases since time immemorial. *Turmus* (*Lupinus albus* L.) has been used for various therapeutic purposes since ancient time. It has been used as a potent drug in hyperpigmentary skin disorders such as *Kalaf* (melasma), *Baraṣ* (freckles), *Til* (moles), etc. Unani classical literature describes its actions as *Jālī* (cleanser/detergent), *Qātil-i-Dīdān-i-Am'ā'* (antihelmintic), *Mudirr-i-Bawl* (diuretic), *Mudirr-i-Ḥayḍ* (emmenagogue), *Muḥallil-i-Awrām* (anti-inflammatory), *Musakkin-i-Alam* (analgesic), *Mufattit-i-Ḥaṣāh* (lithotriptic), *Muqawwi-i-Baṣar* (eye tonic), *Mugharrī* (nutritive) and *Mukhrij-i-Janīn* (abortifacient). Through this review paper, an attempt has been made to describe morphology, pharmacological actions, ethno-medicinal, traditional and therapeutic uses of *Lupinus albus* L. and finally provide an ample scope for further researches to explore its therapeutic potential to develop a better medicine for diabetes mellitus type 2, worm infestations, melasma and hyperlipidaemia.

Keywords: Antihelmintic, Anti-diabetic, Anticonvulsant, *Lupinous albus*, Melasma, *Turmus*

Introduction

Unani Medicine is a science that deals with health and disease conditions. It provides preventive, curative, promotive and rehabilitative healthcare adopting holistic approach. Unani Medicine offers treatment for diseases related to almost all systems of human body. The strength areas of this system of medicine are treatments for chronic skin diseases as well as hepatobiliary, musculoskeletal and reproductive disorders. Botanicals have been main components of prescriptions of Unani physicians in the treatment of diseases since ancient time. *Turmus* (*Lupinus albus* L.) has been used for various therapeutic purposes in Unani Medicine. Unani classical literature described its actions as *Jālī* (cleanser/detergent), *Qātil-i-Dīdān-i-Am'ā'* (antihelmintic), *Mudirr-i-Bawl* (diuretic), *Mudirr-i-Ḥayḍ* (emmenagogue), *Muḥalil-i-Awrām* (anti-inflammatory), *Musakkin-i-Alam* (analgesic), *Mufattit-i-Ḥasāh* (lithotriptic), *Muqawwi-i-Baṣar* (eye tonic), *Mugharrī* (nutritive) and *Mukhrij-i-Janīn* (abortifacient) (Tarique, 2010; Hakeem, 2002; Kabiruddin, 2000; Ghani, 1998; Khan, 2013).

Turmus (*Lupinus albus* L.), commonly known as white lupin or lupine, is a leguminous plant (Anonymous, 2009; Pastor-Cavada *et al.,* 2009; Uzun *et al.,* 2007). There are more than 400 species in the genus Lupinus. Out of them, only 4 are of agronomic importance (Reinhard *et al.,* 2006): (1) *Lupinus albus*

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L: white lupine, (2) *Lupinus angustifolius* L: blue lupine, (3) *Lupinus luteus* L: yellow lupine and (4) *Lupinus mutabilis* L.: pearl or tarrwi lupin (Uzun *et al.,* 2007; Reinhard *et al.,* 2006; Mulayim *et al.,* 2002). In Unani Medicine, seeds and roots of *Turmus* are used as therapeutic agents. There are two varieties of *Lupinus albus* L., wild as well as garden. Wild varieties have more medicinal values in comparison to garden varieties (Ghani, 1998; Khan, 2013). *Turmus* is found in different habitats throughout the world (Anonymous, 2009). It is cultivated as a traditional pulse in the Mediterranean region from where it spreads to many countries (Prusinski, 2015). Chile, the world's largest producer of lupines, produces ~40,000 tons annually (Von Baer *et al.,* 2009).

Turmus (*Lupinus albus* L.) is an economically and agriculturally valuable plant (Gulewicz *et al.,* 2008; Sujak *et al.,* 2006). It is traditionally used in Arabian regions for consumption, cosmetic and pesticide (Swan, 1997). Seeds of the plant are rich in proteins, dietary fibers and carbohydrates (Rochfort and Panozzo, 2007). Hence, it is used for nutrition in animals as well as human beings all over the world (De Cortes-Sanchez *et al.,* 2005). In recent past, several preclinical studies demonstrated that seeds of *Turmus* (*Lupinus albus* L.) have antimicrobial, antioxidant, antihelmintic, hypolipidemic, hypoglycemic, anticonvulsant and anti-atherosclerotic activities (Romeo *et al.,* 2018; Mohamed *et al.,* 2017; Dubois *et al.,* 2019; Bouchoucha *et al.,* 2016; Villalpando-Vargas and Medina-Ceja, 2016; Bahr *et al.,* 2013). Its seeds provide numerous health benefits counteracting the problems associated with high blood pressure, insulin resistant diabetes mellitus type 2, hypercholesterolaemia and obesity (Martins and Bento, 2007). Literature survey of Unani classics further explored that it has been used externally in the dosage form of liniment for various hyperpigmentary disorders such as *Kalaf* (melasma), *Baraṣ* (freckles), and *Til* (moles) (Ghani, 1998; Khan, 2013). Biological active constituents present in the seeds of *Turmus* such as phytic acid, lupanine, 13- hydroxylupanine, multiflorine, albine, angastifoline and didehydromultiflorine might be responsible for its reported actions in the treatment of various disorders (Kroc *et al.,* 2017).

There are many limitations in conventional medicine which lead to search for alternative medicines for successful management and treatment of metabolic, cardiovascular, autoimmune and infective disorders. After thorough literature search, it has been found that *Turmus* (*Lupinus albus* L.) has been in use therapeutically in traditional and alternative medicines since ages. This plant medicine has potential to treat inflammations, worm infestation, diabetes mellitus type 2 and vesical calculi (Tarique, 2010; Hakim, 2002; Kabiruddin, 2000; Ghani, 1998; Khan, 2013; Ibn Baitar, YNM). This review can provide insights for its medicinal potential and draw the attention of researchers, health care providers and academia to further explore its potential through rigorous experimental studies to develop a better medicine for various metabolic and infective disorders.

Common Vernacular Names

English - White lupine (Tarique, 2010; Hakim, 2002; Kabiruddin, 2000; CSIR, 1982); Hindi -*Turmas* (CSIR, 1982), *Jhalar* (Tarique, 2010; Ibn Baitar, YNM); Persian - *Bāqilla-i-Miṣrī* (Tarique, 2010; Hakim, 2002; Kabiruddin, 2000; Ibn Baitar, YNM); Unani - *Turmus*, Amaras, Galaloutie, Foal, Teafouwa, Keatanol (Khan, 2013; Anonymous, 2009); Bengali - Turmuz (CSIR, 1982); Punjabi - Turmuz, Zurmish (CSIR, 1982); Arabic - *Turmus* (Tarique, 2010; Hakim, 2002; Kabiruddin, 2000; Ibn Baitar, YNM; Nadkarni, 1989).

Morphological Characteristics

Turmus (*Lupinus albus* L.) is a perennial or annual herb grown in garden in India. It belongs to the family Fabaceae and reaches up to 45-120 cm in height (Villalpando-Vargas and Medina-Ceja, 2016; CSIR, 1982). Leaves are alternate, digitate and compound with five to seven elongated ovoid leaflets (Sujak *et al.,* 2006; CSIR, 1982; Kohajdova *et al.,* 2011). Its leaves are similar to the leaves of *Bāqlā (Vicia faba)* in appearance (Ghani, 1998). Flowers are terminal racemes, pea like, often blue, characterized by irregular five petals with central "keel". White lupine flowers in May-June every year. Flowers are most often blue and occasionally white, red or yellow in color (Sujak *et al.,* 2006; Kohajdova *et al.,* 2011). White lupine seeds are generally classified as sweet or bitter in taste depending on the alkaloid content, which ranges from 0.01 to 4%. Seeds are orbicular, flattened and white in color externally and internally yellowish orange in color. Seeds of wild variety with strong fragrance are smaller than that of garden variety (Ghani, 1998; CSIR, 1982).

Temperament

In Unani Medicine, physicians have attributed the particular characteristic known as temperament to every single drug used as therapeutic agent. This parameter is considered while prescribing medicine to the patient. Temperament of *Turmus* (*Lupinus albus* L.) is described as "*Ḥārr*^{2} *Yābis*^{3} (*Har*^{1}*Yabis*^{2}). This is a unique feature of therapeutics in Unani Medicine. Temperament of a drug signifies that this medicine may not have same effectiveness in the patient having the same temperament but may be effective in patient having just opposite temperament. This consideration of temperaments of the medicine and the patient for prescription indicates that Unani Medicine has unique approach of personalized medicine (Ghani, 1998; Khan, 2013).

Dosage and Substitute

In Unani Medicine, physicians have identified substitute of every single drug so that the substitute can be used in place of unavailable drug. In this case, *Afsantīn* (*Artemisia absinthium* L.) is considered as the best substitute to *Turmus* (*Lupinus*

albus L.), because it has similar medicinal properties (Ghani, 1998; Khan, 2013). Oral dosage of seeds of *Turmus* (*Lupinus albus* L.) is recommended in the range of 10-25 gm per day. When it is used as a single drug, the recommended oral dose should be 25 gm per day but in combination with other synergistic drugs the dose should be 10 gm per day (Ghani, 1998).

Traditional Medicinal Uses

Turmus (*Lupinus albus* L.) has been used widely as therapeutic agent in Unani Medicine. *Mudabbar* (detoxified) seeds of *Turmus* are used therapeutically in different dosage forms. It is applied externally in paste form for thin hairs. Infusion of seeds prepared in sodium water is used for bathing hairs for consecutive 5 days to change the colour of hair from black to golden. Decoction of the seeds with honey is recommended for splenomegaly (Ghani, 1998). Decoction is also indicated as an emmenagogue. The paste of cooked seeds of *Turmus* (*Lupinus albus* L.) is used externally over the lesion in lymphadenitis and lymphadenopathy (Anonymous, 2001). It is also considered as a good therapeutic agent for pruritus. It is recommended that patients suffering from pruritus take bath with decoction of the seeds (Ghani, 1998). This decoction is also effective in skin disorders in animals. Paste of the seeds is considered as a good therapeutic agent for melasma and *Pityriasis versicolor* (Ghani, 1998). It is also used as liniment or face pack for the purpose of fairness. It becomes more effective when the seeds are boiled in rain water. Decoction of seeds of *Turmus* (*Lupinus albus* L.) is also recommended for external application in vitiligo. Seeds in the paste form are also useful in acne vulgaris and bruises. Paste of the seeds prepared after cooking the seeds in vinegar is very useful in edema and joint pain (arthralgia) (Ghani, 1998). The paste prepared from flour of the seeds by adding sea water is more effective in edema and joint pains (Anonymous, 2001). Warm decoction of the seeds is more effective in treating wounds of syphilis, scabies, pityriasis varsicolor, alopecia areata, non-healing ulcer and wound. Its external application as paste is also recommended in gangrene (Ghani, 1998). These indications imply that seeds of *Turmus* (*Lupinus albus* L.) possess antibiotic medicinal properties. Sometimes, the paste is used in dressing to be applied on lymphadenitis, vitiligo, alopecia areata, scrofula (lymphadenopathy of neck) and hepatomegaly. For the treatment of freckles, it is applied on face in the paste form. Seeds in the powder form are recommended to take orally at the dosage of 10 gm per day in the treatment of chronic headache and chronic sinusitis (Ghani, 1998). Powder of the seeds by adding little quantity of salt and sugar is considered as a good eye tonic for improvement in vision. Powder of the seeds along with honey is used as linctus for chronic cough and ascites (Ghani, 1998). Flour of the seeds of *Turmus* (*Lupinus albus* L.) and *Murmakkī* (*Commiphora myrrh* Engl.) are mixed together to form a paste which is applied on the back in sciatica (Ghani, 1998). The paste prepared with vinegar is very

useful in arthritis, sciatica and lower backache. Paste prepared from powder of *Turmus* (*Lupinus albus* L.) and vinegar adding oil of *Katha* (*Acacia catechu* L.) and *Fulfuniya* in a small quantity is applied around the anus in the treatment of hemorrhoids, prolapse of rectum and anal fissure (Khan, 2013). It is one of the recommended drugs for worm infestation. It is generally used in combination with other antihelmintic drugs. There are a few compound pharmacopoeial formulations containing *Turmus* (*Lupinus albus* L.) as one of the ingredients indicated for worm infestation such as *Iṭrīfal Dīdān* and *Safūf Dīdān* (Tarique, 2010; Kabiruddin, 2000).

The powder form of the drug is also recommended as a tonic for spleen and urinary bladder. It is also recommended in vesicular calculi. Decoction of the root part of *Turmus* (*Lupinus albus* L.) is described as diuretic. It is a good emmenagogue when decoction is prepared in combination with *Sudāb* (*Ruta graveolens*) and *Filfil Siyāh* (*Piper nigrum* L.). The paste of these three previously mentioned medicines is used as a pessary to act as emmenagogue and abortifacient.

Conventional Therapeutic Uses

The seed of *Turmus* (*Lupinus albus* L.) is a suitable diet for vegans due to its higher content of proteins. It is highly recommended for people with the celiac disease and on gluten-free diet (Razi, 1991). It possesses favorable effect on lowering the total cholesterol level as well as reducing susceptibility to the ischaemic heart disease (Prusinski, 2017). Presence of phenolic compounds in seed coats showed antibacterial, antioxidative and antifungal properties (Prusinski, 2017). It can be used in the prevention of cardiovascular diseases due to higher fatty acids content (Simopoulos, 2003). Glycemic indexes of seeds of *Turmus* (*Lupinus albus* L.) are low because of abundance in non-starch carbohydrates in it which is slowly digested and thus gradually releases glucose into the blood. Hence, it can prevent diseases related to insulin resistance (Petterson *et al.,* 1998; Gullion and Champ, YNM; Mohamed and Rayas-Duarte, 1995). Isoflavones have been recognized as useful substances in preventing the occurrence of breast cancer, osteoporosis, and hot flushes during menopause. They demonstrated hypercholesterolemia properties (Khan *et al.,* 2015). In several clinical studies, the ethanolic extract of the seeds of *Turmus* (*Lupinus albus* L) demonstrated efficacy in the treatment of chronic hands and foot eczema (Antoun *et al.,* 1977; Antoun and Taha, 1981; Santiago-Quiles *et al.,* 2010).

Toxicity of *Turmus* (*Lupinus albus* L.)

In Unani Medicine, detoxified (*Mudabbar*) seeds of *Turmus* (*Lupinus albus* L.) are used therapeutically for oral use. The procedure of the detoxification is very simple. The seeds are soaked in water whole night. Soaking may help in

Table-1 Indications of *Turmus* (*Lupinous albus* L.)

S. No.	Pharmacological Action	Indications	Mode of Administration	References
1.	*Muḥallil-i-Awrām* (anti-inflammatory)	Inflammation of lymph nodes, arthritis, sciatica, acne, *Bawāsīr* (piles)	local application	1-5, 26
2.	*Mudirr-i-Bawl* (diuretic)	Hypertension, oliguria, anurea	oral intake	1-5, 26, 30
3.	*Musakkin-i-Alam* (analgesic)	Arthritis, sciatica, backache, anal fissure	local application	2, 4, 5, 26
4.	*Mudirr-i-Ḥayḍ* (emmenagogue)	Oligomenorrhea (*Qillat-i-Ṭamth*), amenorrhea	oral intake	1-5, 26, 30
5.	*Qātil-i-Dīdān-i-Am'ā'* (vermifuge) anti-helmintic	Worm infestations (nematodes)	local application	1-5, 26
6.	*Muqawwi-i-Baṣar* (eye tonic)	Cataract, improve vision	oral intake	2, 4, 5, 26
7.	*Mugharrī* (nutritive)	Debilitating health	oral intake	5
8.	*Jālī* (detergent)	Melasma (*Kalaf*), fairness of skin, *Baraṣ* (mole), *Tha'ālīl* (warts), hyperpigmentation, post inflammatory hyperpigmentation, *Nār Fārsī* (eczema), acne	local application	1-5, 26, 30
9.	*Mukhrij-i-Janīn* (abortifacient)	Abortion	local application	1, 2, 4, 5, 26, 30
10.	*Mufattit-i-Ḥaṣat-i-Mathāna* (lithotriptic)	Bladder stone, urinary stone	oral intake	1, 4, 5
11.	*Dāfi'-i-Su'āl* (antitussive)	Chronic cough, asthma	oral intake	1, 2, 4, 5
12.	*Dāfi'-i-Ātshak* (antisyphilitic)	Syphilis	local application	4
13.	*Mushtahī (appetizer), Dāfi'-i-Warm-i-Jigar* (hepatoprotective)	Loss of appetite, hepatomegaly	oral intake	2, 4, 5
14.	*Muqawwi-i-Ṭiḥāl*[5]	Spleenomegaly	local application	2, 4, 5

1- (Tarique, 2010), 2- (Hakim, 2002), 3- (Kabiruddin, 2000), 4- (Ghani, 1998), 5- (Khan, 2013), 26- (Ibn Baitar, YNM), 30- (Razi, 1991).

dissolving the water soluble toxic substances. This process lessens bitterness of the seeds. Debittered seeds are recommended for oral use as therapeutic agent (Ghani, 1998; CSIR, 1982).

Turmus (*Lupinus albus* L.) are considered to be toxic when ingested at 1% or more of the body weight (Anonymus, 2001). Sweet lupine containing low level of potentially toxic alkaloids (0.003%) causes low risk of toxicity in animal and human (Wasche *et al.,* 2001; Martinez-Villaluenga *et al.,* 2006). In a study in reverse mutation assay, the mouse lymphoma assay and the mouse nuclear assay, ethanolic extract of *Lupinus termis* were found to be non-genotoxic (Sujak *et al.,* 2006). Higher contents of alkaloids in the seeds of *Turmus* (*Lupinus albus* L.) may cause cramps, vomiting and even death as a result of paralysis of respiratory system. In humans, very high dosage may also cause trembling and convulsions (Arnoldi and Greco, 2011; McKnickiene and Asakaviciute, 2008).

Chemical Constituents

Chemistry of the seeds of *Turmus* (*Lupinus albus* L.) has shown that they are rich in protein, fat, carbohydrates and minerals, such as K, Ca, Mg, Na, P and Fe (CSIR, 1982; Rastogi, 1993). Six major alkaloids from the seeds of this plant have been isolated such as Lupanine, 13- hydroxylupanine, Multiflorine, Albine, Angastifoline and Didehydromultiflorine (Kroc *et al.,* 2017). The seeds contain storage proteins - 85% globulins and 15% albumins - and essential amino acids such as arginine, lysine, leucine, and phenylalanine in comparatively higher concentration than soyabean (Prusinski, 2017; Petterson *et al.,* 1998). The seeds of this plant also contain about 8% to 11.5% fats (Uzun *et al.,* 2007; Sujak *et al.,* 2006; Straková *et al.,* 2006; Vecerek *et al.,* 2008). The important fatty acids are oleic acid, linoleic acid, palmitic acid, linolenic acid, gadoleic acid, erucic acid, stearic acid, arachidic acids, SFA (saturated fatty acids), MUFA (monosaturated fatty acids), PUFA (polyunsaturated fatty acids) (Prusinski, 2017). The carbohydrates present in the seeds are mainly non-starch carbohydrates oligosaccharides including stachiosis, sucrose, raffinose and verbascose (Prusinski, 2017). Phytic acid is also present in the seeds of *Turmus* in the range of 0.03% to 1.89–2.27%. It may reduce the bioavailability of mineral components in monogastric animals through cation chelation to non-absorbable phytynians (Petterson *et al.,* 1998; Petterson and Fairbrother, 1996; Saastamoinen *et al.,* 2013). It also contains phenolic compounds mainly in seed coats up to 8 mg/100 g (Prusinski, 2017).

Pharmacological Activities

Antimicrobial Activity

Traditionally, *Lupinus albus* L. seeds have been used as an antimicrobial drug. An *in-vitro* study conducted by Flora Valeria Romeo, *et al*. demonstrated that

seed extract had significant antimicrobial activity on *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* (Romeo *et al.,* 2018). The clinical findings of this study suggested that *Lupinus albus* L. seeds may be used as antimicrobial agent to control various antimicrobial related disorders.

Anthelmintic Activity

In Unani classical literature, seeds of *Lupinus albus* L. are considered as a good anthelmintic drug. It has been prescribed widely to control worm infestation. In an *in-vivo* trial, it was demonstrated that the antihelmintic potential of *Lupinus albus* L. seeds extracts moderately inhibited larval migration. The secondary metabolites present in this plant showed more potential against nematodes species (Dubois *et al.,* 2019). Thus, it can be said that the alkaloids isolated from its seeds could be used as a source material for development of new antihelmintic drug.

Antioxidant Activity

There are several studies which demonstrated that seeds of *Lupinus albus* L. have remarkable antioxidant and free radical scavenging activity. In an *in-vitro* study conducted by Abdallah, *et. al*, it was found that seeds of *Lupinus albus* L. had potential antioxidant activity and radical scavenging activity compared to pure ascorbic acid. In another study, Tsaliki, *et al.* (1999) found that methanolic extract of *Lupinus albus* L. seeds showed a remarkable antioxidant activity higher than that of soybean. Aniess, *et al.* (2015) mentioned that seeds of *Lupinus albus* L. exhibited higher antioxidant activity than that of wheat seeds. Moreover, seeds of white *Lupinus albus* L. contain tocopherols (vit E) in higher quantity. It implies that *Lupinus albus* L. protects against free radical through inhibition of the oxidation of body lipids and fats (Mohamed *et al.,* 2017).

Anti-hyperglycemic Activity

In classical literature, seeds of *Turmus* (*Lupinus albus* L.) have been used in the treatment of diabetes mellitus type 2. In recent studies, it has been proved that the dry extract of *Turmus* (*Lupinus albus* L.) seeds induced significant reduction in fasting and post-prandial plasma glucose concentration. In a clinical study conducted on 47 adult patients of diabetes mellitus type 2, daily dose of 400mg of dry extract of *Turmus* (*Lupinus albus* L.) decreased fasting and post-prandial plasma glucose level at 2 and 12 weeks compared to baseline values. This study showed that *Turmus* (*Lupinus albus* L.) had hypoglycemic effect and controlled serum glucose level within normal range. The findings of the study suggest that *Turmus* (*Lupinus albus* L.) has insulin mimetic actions. In an investigation for insulin releasing action of an aqueous *Turmus* (*Lupinus albus* L.) extract on isolated rodent pancreatic islets demonstrated that *Turmus* (*Lupinus*

albus L.) seeds had capacity to potentiate glucose induced insulin release. This study concluded that *Turmus* (*Lupinus albus* L.) may be potentially useful in the treatment of diabetes mellitus type 2. In a double blinded placebo controlled randomized trial conducted on 97 patients of diabetes mellitus type 2, dry extract of *Turmus* (*Lupinus albus* L.) at a dose of 400mg showed a significant difference in the reduction of serum glucose levels at 2 and 12 weeks comparing to baseline values. The study concluded that *Turmus* (*Lupinus albus* L.) might be effective as adjuvant drug to oral hypoglycemic agents in diabetes mellitus type 2 (Bouchoucha *et al.,* 2016).

Anti-hyperlipidemic Activity

Lipids are important risk factors for cardiovascular diseases. Altered lipid metabolism is responsible for the development of atherosclerosis which has been identified as major risk factor in myocardial infarction (MI). In a randomized controlled clinical trial, extract of *Turmus* (*Lupinus albus* L.) showed a significant reduction in serum lipid profile (Triglyceride and total cholesterol level) (Bahr *et al.,* 2013). In another study, the authors observed the interference of *Turmus* (*Lupinus albus* L.) with cholesterol enterohepatic circulation and decreased the accumulation of fat in the liver. Marches, *et al*. also established the role of *Turmus* (*Lupinus albus* L.) as hypolipidemic and antisclerotic agent (Bouchoucha *et al.,* 2016; Bahr *et al.,* 2013).

Anticonvulsant Activity

Seeds of *Turmus* (*Lupinus albus* L.) have been used as an anticonvulsant drug in epilepsy and seizures. The bitter seeds of *Turmus* (*Lupinus albus* L.) contain sparteine, a quinolizidine alkaloid which has role in central nervous system. Sparteine reduces locomotors activities and acts as analgesic. Sparteine has demonstrated numerous pharmacological activities in animal models as well as in humans. In a study, sparteine exhibited anticonvulsant effect on seizures (Villalpando-Vargas and Medina-Ceja, 2016).

Conclusion

Unani Medicine presents avenues in the search of new and alternative drugs. There are thousands of plants in Unani Medicine used as therapeutics for various ailments. These medicinal plants have promising future because most of them have not been investigated for pharmacological activities. The present review concludes that *Lupinus albus* L. demonstrated anti-diabetic, anti-convulsant, antioxidant, antimicrobial and antihyperlipidemic activities in several preclinical studies. In clinical studies, *Lupinus albus* L. showed efficacy to control serum glucose and dyslipidaemia. Insulinotropic mechanism of action to control serum glucose has also been established. These pharmacological activities of *Lupinus*

albus L. attribute to the alkaloids present in the seeds of *Lupinus albus* L. such as sparteine, lupanine and so on. Moreover, the seeds of *Lupinus albus* L. contain tocopherol (vit E) in large quantity. So, it can be used as a *Jālī* (detergent) to treat hyperpigmented skin disorders. This review suggests that seeds of *Turmus* (*Lupinus albus* L.) have immense potential to treat a wide variety of diseases. Its therapeutic uses as an abortifacient, diuretic, lithotriptic and anti-inflammatory have not been studied scientifically despite empirical evidences available in classical literature. In the light of this review, it can be said that seeds of *Lupinus albus* L. and its derivatives may emerge as a potential drug for diabetes mellitus type 2, dyslipidaemia, vesical calculus, worm infestations, fairness of skin, melasma, vitiligo, lymphadenopathy, ischaemic heart diseases, cancer and seizure. Further rigorous studies are required to establish the efficacy of *Lupinus albus* L. as a potent drug for metabolic disorders, skin diseases and epilepsy.

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सारांश

तुरमुस (*ल्यूपिनस अल्बस* एल.) की औषधीय एवं चिकित्सीय प्रोफ़ाइल पर समीक्षा

इफ़रा अब्दुल क़य्यूम, मोहम्मद नवाब

वनस्पति प्राचीन काल से ही रोगों के उपचार में यूनानी चिकित्सकों के नुस्ख़े की मुख्य घटक रही है। तुरमुस (*ल्यूपिनस अल्बस* एल.) का उपयोग प्राचीन समय से विभिन्न चिकित्सीय उद्देश्यों के लिए किया जाता रहा है। इसका उपयोग हाइपरपिगमेंटरी त्वचा रोगों जैसे कलफ़ (मेलाज़्मा), बरस (फ़्रेकल्स), तिल (मोल्स) इत्यादि में एक गुणकारी औषधि के रूप में किया जाता है। यूनानी क्लासिकल साहित्य में इसकी क्रियाओं का वर्णन जालि (क्लींजर/डिर्जेंट), क़ातिल–ए–दीदान–ए–अमआ (एंटीहेल्मिंटिक), मुदिर्र–ए–बौल (मूत्रवर्धक), मुदिर–ए–हैज़ (आर्तवजनक), मुहल्लिल–ए–औराम (सूजनरोधी), मुसक्किन–ए–अलम (एनाल्जेसिक), मुफ़्तित–ए–हसात (लिथोट्रिप्टिक), मुक़व्वी–ए–बसर (नेत्र स्वास्थ्यवर्धक), मुग़र्री (पोषक) और मुख़ारीज–ए–जनीन (गर्भस्रावक) के रूप में किया गया है। इस समीक्षा पत्र के माध्यम से *ल्यूपिनस अल्बस* एल. के आकारिकी, भेषजगुण, मानवजाति चिकित्सीय, पारंपरिक और चिकित्सीय उपयोगों का वर्णन करने का प्रयास किया गया है।

शब्दकुंजी: एंटीहेल्मिंटिक, मधुमेहरोधी, आक्षेपरोधी, *ल्यूपिनस अल्बस* एल., तुरमुस

Bawāsīr (Haemorrhoids): An Overview

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Abstract

Bawāsīr (haemorrhoids) is a disease in which there is accumulation of black bile in the venules of rectum to form a polyp like growth. The word 'haemorrhoid' is derived from the Greek words 'haema' meaning blood, and 'rhoos' meaning flowing. Hippocrates defines haemorrhoids as vascular tumours (*Sal'a 'Urūqī*) of mucous membrane (*Ghishā' Mukhāṭī*) in the lower part of rectum. Generally, it is known as piles and the word 'pile' is derived from Latin, meaning a ball or a mass. It has been found that 50% of the population over 50 years of age experiences at least one episode of symptomatic haemorrhoid disease. Its peak prevalence usually occurs between 45–65 years of age. In general, it has not been possible to identify a particular cause that triggers the condition but some predisposing factors may aid the disease. According to Unani classical literature, there are comprehensive principles of treatment for *Bawāsīr* (haemorrhoids), viz. *Iṣlāḥ-i-Ghidhā'* (Dietary regulation), *Talyīn* (laxation), *Tanqiya-i-Dam Fāsid wa Khilṭ Sawdāwī* (Evacuation of impure sanguine & black bile), *Taskīn-i-Dard* (analgesia), *Ḥābis-i-Dam* (haemostasis) in case of excessive bleeding and *Indimāl* (healing). In this review paper, *Bawāsīr* is elaborated with its types, causes and treatment in Unani perspective.

Keywords: *Bawāsīr*, Haemorrhoids, Piles, Unani Medicine

Introduction

Bawāsīr (haemorrhoids) is a disease in which there is accumulation of black bile in the venules of rectum to form a polyp like growth in it. The word '*haemorrhoid*' is derived from the Greek, with '*haema*' meaning blood and '*rhoos*' meaning flowing and was originally used by Hippocrates (460-377 BC) to describe the flow of blood from the veins of the anus (Leff, 1987).

'*Bawāsīr*' (singular: *Bāsūr*) is an Arabic word meaning *Thūlūl / Massah* (wart) which is used to describe the haemorrhoidal disease in Unani Medicine (Kabiruddin, 2003; Khayat, 1983). Generally, it is known as piles and the word 'pile' is derived from Latin, meaning a ball or a mass (Gheewala *et al.*, 1971). According to the presence of bleeding, *Bawāsīr* (haemorrhoids) is known as *Bawāsīr Dāmiya* (bleeding haemorrhoids) and in its absence it is known as *Bawāsīr Ummiyya / Bawāsīr Aṣam* (non-bleeding haemorrhoids) (Kabiruddin, 2003).

It has been found that 50% of the population over 50 years of age experiences at least one episode of symptomatic haemorrhoid disease. Its peak prevalence usually occurs between 45–65 years of age and affects both the genders

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(Lohsiriwat, 2012). It has been found to be the most common cause of lower gastrointestinal bleeding. It affects 75% population in India and 50-80% globally (Kumar, 2019).

According to Hippocrates, *Bawāsīr* is the varicosities of the internal mucous membrane in the lower part of rectum similar to the varicosities of the veins of lower limb. According to Samarqandi, haemorrhoids is a type of extra growth on the terminals of haemorrhoidal veins produced by accumulation of thick melancholic (*Ghalīz Sawdāwī*) blood, which resembles flesh (Kabiruddin, 1916). *Nafīs ibn 'Iwaḍ ibn al-Kirmānī* defines haemorrhoids as extra growths located on the haemorrhoidal veins, which look like flesh or cartilage (Kirmani, 1908). '*Bawāsīr*' or 'Piles' (haemorrhoids) is mentioned in medical writings of every culture including Babylonian, Egyptian and Greek. According to *Kabiruddin,* haemorrhoids are the vascular tumours of mucous membrane of the lower rectum. The veins of lower part of rectum and anal canal are as swollen as in varicosity of veins. According to *Majusi*, *Bawāsīr* is an excessive growth at mouth of vessels present in anus (Majusi, 2010).

In general, it has not been possible to identify a particular cause that triggers the condition but the most consistent of them is constipation owing to greater effort made during evacuation with constant straining. This causes haemorrhoidal prolapse below the anorectal junction and outside the anal canal. However, it is important to note that not all patients with haemorrhoidal disease are constipated. Therefore, alcohol, spicy foods, constipation, diarrhea, pregnancy, occupation, sedentary lifestyle and possibly other factors should also be considered as predisposing, not as aetiologic factors (Guindic and Frank, 2014).

Aetiology of *Bawāsīr Dāmiya* (Bleeding Haemorrhoids)

In his famous book *Kitāb al-Ḥāwī fi'l Ṭībb,* Muhammad ibn Zakariyya Razi mentioned that the basic cause of haemorrhoids is the accumulation of melancholic (*Sawdāwī*) blood in the varicosed veins around the anus (Razi, 1962). Muhammad Akbar Arzani in his book *Ṭibb-i-Akbar* mentioned that *Bawāsīr Khūnī* is caused by thick melancholic (*Ghalīz Sawdāwī*) blood (Arzani, 1924). Tabari in his book *Mu'ālajāt al-Buqrāṭiyya* mentioned that *Bawāsīr* is a melancholic disease (*Sawdāwī Maraḍ*) which is caused by accumulation of abnormal thick blood in the terminal part of anal blood vessels. This blood becomes altered within the liver due to excessive heat, dryness or due to intake of such foods which produce melancholic (*Sawdāwī*) blood (Tabari, 1997). Ibn Sina mentioned in his famous book *Al-Qānūn fi'l-Ṭibb* that haemorrhoids are caused by accumulation of black bile (*Sawdā'*) or melancholic (*Sawdāwī*) blood. Less commonly they may be developed due to accumulation of phlegm (*Balgham*) (Kantoori, 1906).

Ajmal Khan in his book *Ḥadhīq* described the causes of haemorrhoids such as excessive heat, eexcessive use of hot foods, e.g. red chilies and meat and hot climatic conditions of India leading to burning of blood causing production of thick (*Ghalīz*) blood (Khan, 1987).

Kabiruddin has mentioned various causes of haemorrhoids like repeated pressure on the veins of anus, passage of dried hard stool, chronic constipation, pressure of uterus during pregnancy (pregnancy piles), repeated use of potent purgatives, sedentary lifestyle, and excessive use of meat, fish, red chilies, spices, brinjal, cabbage and lentil pulse as well as excessive alcohol intake (Kabiruddin, 1916).

Types of *Bawāsīr* (Haemorrhoids)

According to Unani classical literature, following are the types of haemorrhoids:

i. ***Bawāsīr Thūlūlī* (wart-like pile masses)**: Polyps in the shape of '*Adasiya* (lentil) or *Ḥimmaṣiyya* (gram). These are lentil or gram like pile masses which resemble small hard warts and are produced by black bile (*Sawdā'*).

ii. ***Bawāsīr 'Inabiyya***: Shape of the polyps resembles grapes. These are round shaped pile masses which resemble grapes and are produced by such matter that falls between melancholic (*Sawdāwī*) and sanguineous (*Damwī*).

iii. ***Bawāsīr Tūtī***: These pile masses or polyps are loose which resemble mulberry and are produced by sanguineous (*Damwī*) matter (Kabiruddin, 1916).

iv. ***Bawāsīr Naffakhī***: The polyps resemble with the shape of small bubble.

v. ***Bawāsīr Nakhlī***: Vessels of the polyps are spread like the branches and roots of date tree.

vi. ***Bawāsīr Tīnī***: Shape of the polyps is flat and round similar to that of *Anjīr* (fig).

vii. ***Bawāsīr Tamrī***: Shape of the polyps is similar to the shape of date, i.e. long and oval.

Clinical Features of *Bawāsīr* (Haemorrhoids)

Clinical features of haemorrhoids according to Unani Medicine are bleeding per rectum in *Bawāsīr Khūnī* (*Jarayān al-Dam fī'l-Maq'ad*) which occurs due to perforation of rectal veins (Razi, 2004), the patient may feel burning pain (*Waja' al-Maq'ad*) during defecation (which may be due to *Ṣafrāwī Mādda*) and sometimes may feel itching (*Ḥikka al-Maq'ad*) (Jurjani, 2010). In *Bawāsīr Rīḥī*, the patient may experience joint pain, indigestion, acidity. When bleeding is continuous, the patient may become anaemic (Razi, 2004).

Diagnosis

The diagnosis of *Bawāsīr* (haemorrhoids) is made on the basis of clinical symptoms and signs especially rectal bleeding, rectal pain and pruritus ani around the anus (Razi, 2004).

Treatment of *Bawāsīr* (Haemorrhoids)

According Unani Medicine, the treatment of *Bawāsīr* starts with the principle of *Izāla-i-Sabab* (elimination of cause). After that, *Tanqiya* (expelling) of morbid matter from the body with the help of different procedures should be done and its formation in the body should also be avoided as its main cause is *Sawdāwī* or *Ghalīz Khūn* (morbid matter). For *Tanqiya* (expelling) of morbid matter from the body, following regimen therapies may be adopted:

- ***Faṣd* (Venesection)**: *Faṣd* of *Warīd-i-Basalīq* (basilic vein) is done to expel the *Sawdāwī/Ghalīz Dam*.
- ***Ḥijāmah* (Cupping)**: Cups are applied on the hips to expel the causative *Sawdāwī* matter.
- ***Ta'līq* (Leeching)**: Leeches are directly applied over the haemorrhoidal mass or swelling or adjacent area to expel out the morbid matter.
- ***Ishāl* (Purgation)**: It is done by using the *Mushilāt-i-Suwdā'* medicines (*Aftīmūn* (*Cuscuta reflexa*), *Kharbaq Siyāh (Helleborus niger), Halela Siyāh* (*Terminalia chebula*), etc.) to expel out the *Sawdāwī* and *Ghalīz* matter (Khan *et al.,* 2014).

For the treatment of *Bawāsīr Dāmiya* (bleeding haemorrhoids), the combination of following drugs is used as per Unani Medicine: 1 gram of *Gerū* (Red chalk), *Kahrubā Shāmī* (*Vaterica indica*) and powder of *Marajān* (*Corallium rubrum*) with 20 ml of *Sharbat-i-Anār* (Kirmani, YNM).

Marham (ointment) made up of *Safeda* (Lead carbonate), *Qala'ī* (*Tīn*), *Mom Safed* (Bees Wax) and *Rawghan-i-Gul* (oil of *Rosa damascene*) is applied for local soothing effect (Kirmani, YNM).

There are some surgical procedures mentioned in Unani classical literature used for the treatment of *Bawāsīr* (Haemorrhoids):

1. ***'Amal-i-Khazm***: In this classical procedure, needle attached with silk thread is inserted at the base of pile mass and then the silk thread is tied two to three times circumferentially to the pile mass, then knot is made with the thread. The mass dries as well as sheds off along with the thread after few days.

2. '*Amal-i-Shadd:* In this classical procedure, the pile mass is dragged out with the help of forceps for the visualization of its base which is tied with thread. The base of pile mass is tied again on second day till the mass sheds off.

3. '*Amal-i-Qaṭ*': In this procedure, pile mass is dragged out with forceps. When the pile mass prolapses completely, then it is tied at the base and excised. Thereafter, haemostatic drugs are sprinkled over the raw area (Ibn al-Quff, YNM).

Dietary Restrictions

Restricted food articles include meat, fish, egg, red chilies, spices, dried dates, brinjal, cabbage, fenugreek, onion, garlic, pickle, cheese, lentil pulse, tea and alcohol (Khan, 1987; Kabiruddin, 1916).

Dietary Recommendations

Recommended food items which may be helpful include:

- Milk, rice, moong dal
- Vegetables: bottle gourd, pumpkin, red pumpkin, gourd / sweet pumpkin, Luffa (*Turai*), Luffa gourd (*Chikni Turai*), snake gourd (*Chichinda*), spinach, common Indian purslane / garden purslane (*Khurfa*), *Tinda*, etc.
- Salad: Cucumber
- Fruits: Papaya
- In case of generalized weakness: Chicken gravy, half-boiled egg, sweet almond oil (Khan, 1987; Kabiruddin, 1916)

Prevention

Following methods and precautions may be taken to avoid haemorrhoids:

- Eat high-fiber rich foods: Fruits, vegetables and whole grains should be taken on regular basis. High fiber diet softens and increases bulk of stool and removes constipation.
- Drink plenty of fluids: Drink 6-8 glasses of water and other liquids daily. Alcohol should be avoided.
- Don't strain: Straining during defecation creates pressure in the veins in the lower rectum, so it should be avoided.

- Exercise: It is helpful in preventing constipation and reducing pressure on veins. Exercise can also be helpful to reduce weight that may be a precursor for development of haemorrhoids.
- Avoid long periods of sitting especially in toilet as it can increase pressure on the veins of the anus.

Conclusion

Bawāsīr (haemorrhoids) is a common anorectal disorder in India. It is difficult to identify a particular cause leading to the condition. However, some predisposing factors may be considered responsible for the disease. Most of the patients can be effectively cured by simple modification of their lifestyle along with diet. It has been observed that the most common cause of *Bawāsīr* is constipation, therefore, it can be treated by avoiding constipation. In Unani Medicine, there are different modes of treatment, such as pharmacotherapy, surgical and regimenal therapies (non-surgical techniques). Regimenal therapies including *Faṣd* (venesection), *Ḥijāmah* (cupping) and *Taʿlīq* (leeching) which are helpful in treating *Bawāsīr* (haemorrhoids). These therapies are beneficial to humankind as they are holistic and cost effective than conventional surgical techniques.

Conflict of Interest

There is no conflict of interest.

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सारांश

बवासीर (हेमोरॉइड) : एक समीक्षा

***अन्जु, रासिख़ जावेद, ग़ज़ाला जावेद**

बवासीर (हेमोरॉइड) एक ऐसा रोग है जिसमें मलाशय के शिराओं में काले पित्त का संचय होता है जिससे उसमें एक पॉलीप जैसी वृद्धि होती है। 'हेमोरॉइड' यूनानी शब्द 'हेमा' अर्थात् रक्त और 'रहूस' अर्थात् बहना से लिया गया है। हिप्पोक्रेट्स ने मलाशय के निचले हिस्से में श्लेष्म झिल्ली (*गिशा मुखाती*) के संवहनी ट्यूमर (*सला उरूक़ी*) को हेमोरॉइड परिभाषित किया है। आमतौर पर इसे पाइल्स (*बवासीर*) के रूप में जाना जाता है और 'पाइल' शब्द लातीनी भाषा से लिया गया है जिसका अर्थ गेंद या ढेला होता है। यह पाया गया है कि 50 वर्ष से अधिक आयु की 50% जनसंख्या अपनी ज़िन्दगी में कम से कम एक बार हेमोरॉइड रोग के लक्षणों का अनुभव करती है। इसका चरम प्रसार प्रायः 45–65 वर्ष की आयु के बीच होता है। सामान्य तौर पर रोग को सक्रिय करने वाले किसी विशेष कारण का पता लगाना संभव नहीं है, परन्तु कई संभावित कारण हैं जो रोग की सहायता कर सकते हैं। यूनानी क्लासिकल साहित्य के अनुसार *बवासीर* (हेमोरॉइड) के लिए व्यापक उपचार सिद्धांत अर्थात् *इस्लाह–ए–ग़िज़ा* (आहार नियमन), *तलयीन* (शिथिलीकरण), *तनक़िया–ए–दम फ़ासिद व ख़िल्त सौदवी* (अशुद्ध रक्त एवं काले पित्त का निष्कासन), *तस्कीन–ए–दर्द* (एनाल्जेसिया), अत्यधिक रक्तस्राव की स्थिति में *हाबिस–ए–दम* (हेमोस्टेसिस) और *इन्दिमाल* (विरोहण) हैं। इस समीक्षा पत्र में बवासीर को यूनानी परिप्रेक्ष्य में इसके प्रकारों, कारणों और उपचार के साथ विस्तृत किया गया है।

शब्दकुंजीः बवासीर, हेमोरॉइड, पित्त, यूनानी चिकित्सा

A Socio-Demographic Study of Rural Scheduled Castes of Aligarh, Uttar Pradesh, India

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Abstract

Background: The main objective of the paper is to analyze the status of the rural scheduled castes of Aligarh, Uttar Pradesh with respect to size of the population, sex ratio, literacy level, marital status, occupation and income. This paper is based on the primary data collected through direct visits to households of scheduled castes under Mobile Healthcare Program of SCSP at Regional Research Institute of Unani Medicine, Aligarh during 2018-19.

Method: A pre-tested questionnaire containing information about demographic particulars like caste, age, gender, educational qualification, occupation and monthly income was administered by paying house to house visits.

Results: 83.58% of the families are nuclear. Average number of person per household is 6. The sex ratio is 910 females for 1000 males. The literacy rate is 75.31%. Majority of the population earns their livelihood by farming. Majority (32.46%) of the households earns less than Rs.5000 per month and major part of the population has mixed type of food habit.

Conclusion: Socio-demographic profile of rural scheduled castes of Aligarh, Uttar Pradesh is similar to other scheduled castes of rural areas of Uttar Pradesh. There is progress in the development but at quite low rate.

Keywords: Socio-Demographic, Scheduled Castes, Rural, Aligarh

Introduction

The scheduled caste (SC) population constituted 16.2 per cent of the total population in Census 2001 and increased marginally to around 16.6 per cent in Census 2011. People belonging to SC communities, by and large, are spread all over the country, with about 80 per cent of them living in rural areas. Around half of the SC population is concentrated in five States – Uttar Pradesh, West Bengal, Tamil Nadu, Andhra Pradesh and Bihar (Anonymous, 2011).

The scheduled caste population of Uttar Pradesh is 41,357,608 as per the 2011 Census, constituting 20.6 percent of the total state population of 199,812,341. Uttar Pradesh holds 1st rank and 4th rank in terms of absolute number of SC population and its proportion to total population respectively among all the States and Union Territories (UTs) of the country. The State has a total of sixty six (66) SCs; all of them have been enumerated in 2011 Census. According to 2011 Census of India, the Jatav community constitutes 54% of the total SC population of the State (Anonymous, 2013).

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SC people also known as *Dalits* are socially excluded in India and face discrimination on the basis of their position at the very bottom of the Indian caste system. As a result, *Dalits* find themselves deprived on many aspects of common wellbeing and face cultural, health, economic and educational discriminations in the society.

The Scheduled Castes Sub-Plan (SCSP) of 1979 mandated a planning process for the social, economic and educational development of SCs and improvement in their working and living condition. It entailed a targeted flow of funds and associated benefits from the annual plan of States and UTs in appropriate proportion to the national SC population. As much as 27 States and UTs with sizable SC population are implementing the plan (Anonymous, 2006).

The strategy of SCSP envisages channelizing the flow of outlays and benefits from all the sectors of development in the Annual Plans of States/UTs and Central Ministries at least in proportion to their population both in physical and financial terms. For the benefit of SC population, the Ministry of AYUSH initiated Mobile Healthcare Program under SCSP through Central Council for Research in Unani Medicine (CCRUM) in Aligarh and several other locations. The CCRUM is an apex autonomous research organization functioning under the Ministry of AYUSH, Government of India. The objectives of the program are to screen/examine the SC population for their health status in the OPD as well as in the health camps and to provide Unani treatment to the patients suffering from different diseases. Also, it aims to create awareness among the masses on preventive, promotive and curative health aspects through lectures, group meetings, health camps and distribution of literature among SC population.

Present data is a compilation of demographic details collected through household survey in the Mobile Healthcare Program under SCSP in Aligarh.

Objectives

The main objective of the paper is to enumerate and analyze the status of the scheduled castes in rural areas of Aligarh, Uttar Pradesh with respect to size of the population, family type, sex ratio, marital status, literacy, occupation and income level.

Methodology

This study was carried out in five SC dominated villages of Aligarh district of Uttar Pradesh, namely Shahpur-Qutub, Ilyaspur, Haridaspur, Amarpur Nehra and Ibrahimpur by the CCRUM's Regional Research Institute of Unani Medicine (RRIUM), Aligarh. Primarily, contact was established with the Pradhans of all the villages who extended a good rapport in reaching out to the target population.

The importance of the study was explained and a well-informed consent was taken from all the subjects included in this study. A questionnaire containing demographic information like caste, age, gender, educational qualification, occupation and monthly income was administered by paying house to house visits.

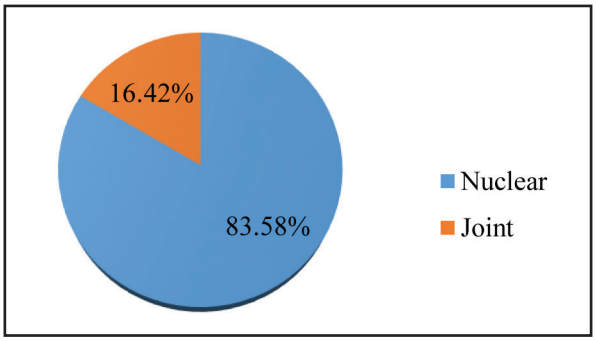
Observations and Discussion

A total of 268 households of five SC dominated villages of Aligarh district of Uttar Pradesh, namely Shahpur-Qutub, Ilyaspur, Haridaspur, Amarpur-Nehra and Ibrahimpur were surveyed and 1608 people were included in the study. Average number of people per household was 6. Out of 66 castes of SCs, only five castes, namely *Jatav*, *Balmiki, Dhangar, Khateek* and *Dhobi* were found in the areas adopted for the study. *Jatav* was the major caste group while *Balmiki, Dhangar, Khateek* and *Dhobi* were in negligible proportion. According to the 2011 Census of India, the Jatav community of Uttar Pradesh comprised 54% of the State's total SC population (Anonymous, 2011).

Table 1: Family Type

Family Type	Frequency	Percentage
Nuclear	224	83.58
Joint	44	16.42
Total	268	100

Graph 1: Family Type



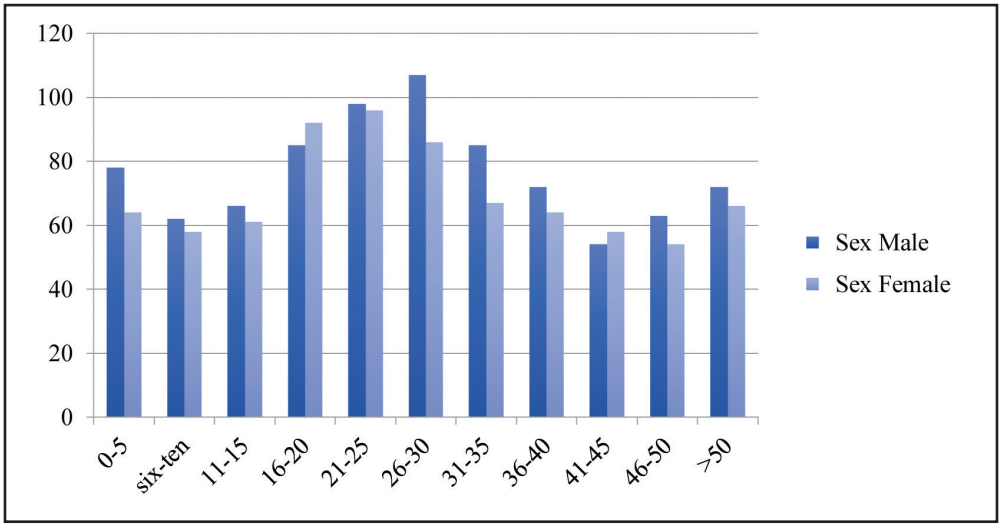
Majority of total families (83.58%) were nuclear and only 16.42% families were joint (Table 1; Graph 1). The family functions on the basis of certain ideology that includes rules of marriage, residence, property ownership, roles and functions determined according to age and gender (Kolenda, 1987).

Out of 1608 people, 842 were males and 766 females. Maximum population was of the age group of 21-25 years consisting of 12.06% of total population while

Table 2: Age and Sex Distribution

Age Group	Sex		Total
	Male	Female	
0-5	78	64	142 (8.83%)
6-10	62	58	120 (7.46%)
11-15	66	61	127 (7.89%)
16-20	85	92	177 (11%)
21-25	98	96	194 (12.06%)
26-30	107	86	193 (12%)
31-35	85	67	152 (9.4%)
36-40	72	64	136 (8.4%)
41-45	54	58	112 (6.9%)
46-50	63	54	117 (7.2%)
>50	72	66	138 (8.5%)
Total	842	766	1608

Graph 2: Age and Sex Distribution



minimum population was of the age group of 6-10 years constituting 7.46% of total population. Maximum population of males was of the age group of 26-30 consisting of 12.71% of male population and 6.65% of total population while maximum population of females was of the age group of 21-25 years consisting of 12.53% of female population and 5.97% of total population. Minimum population of males was of the age group of 41-45 years consisting of 6.41% of male population and 3.36% of total population. Sex ratio is 910 females for 1000 males (Table 2; Graph 2).

As per the Census 2011, Aligarh district of Uttar Pradesh has total population of 3,673,889, out of which 33.1% people live in urban areas while 66.9% lives rural areas. SC's constitute 20.6% of total population in Aligarh district including 53.29% males and 46.71% females. Sex ratio of SC's in Aligarh was 876 females for every 1000 males. Also, there were 574,509 children of 0-6 years in Aligarh district. Out of them, 306,019 were male, while 268,490 were female (Anonymous, 2011; Anonymous 2015).

Table 3: Literacy Level among Various Age Groups

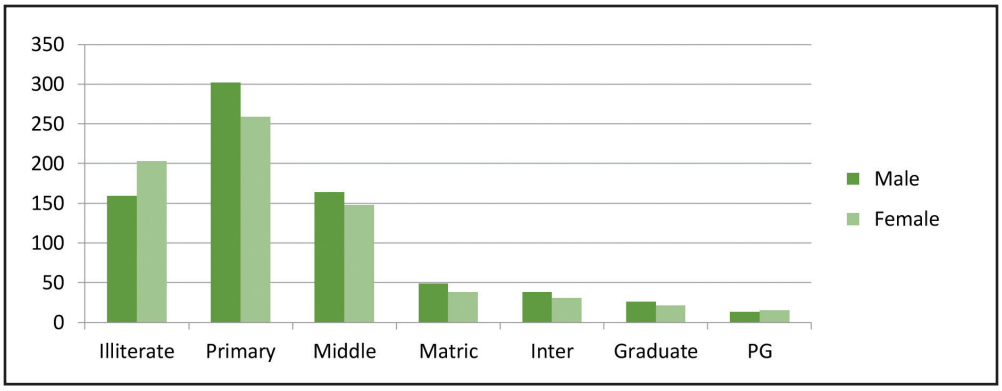
Age Group (in Years)	Literacy Level								Total
	Illiterate	Literate	Primary	Middle	Secondary	Intermediate	Graduate	Post Graduate	
<10	118	144	144	0	0	0	0	0	262
11-20	39	265	128	91	20	24	2	0	304
21-30	48	339	138	116	33	10	22	20	387
31-40	76	212	99	58	17	19	14	5	288
41-50	89	140	74	33	8	13	9	3	229
>50	92	46	20	14	9	3	0	0	138
Total	462	1146	561	312	87	69	47	28	1608

In the present study, the level of education was classified as primary, middle, secondary, graduate and post graduate. Among the children less than 10 years of age, 144 are enrolled in primary education comprising 54.96%. Majority of the population, i.e., 34.89% had primary education. Next to primary educated population is the illiterate group population which constitute 28.73% of the population. Among the literate population, 30.60% lies under the age group of 21-30 years (Table 3), which is very significant and more than the total literacy rate of Aligarh district (67.52%) (Anonymous, 2011). However, literacy rate among elder age group i.e. above 50 years is very poor (only 33.33%).

Table 4: Gender Difference in Literacy Level

Literacy Status	Sex		Total
	Male	Female	
Illiterate	159	203	362
Primary	302	259	561
Middle	164	148	312
Matric	49	38	87
Inter	38	31	69
Graduate	26	21	47
PG	13	15	28

Graph 3: Gender Difference in Literacy Level



Literacy rate among males was higher (78.83%) than females (71.61%), but number of post graduates was more in females than males (Table 4; Graph 3). As per 2011 Census, literacy rate among males of Aligarh district was 77.97% against 55.68% among females.

Table 5: Marital Status

Age	Unmarried		Married		Widowed		Total
	Male	Female	Male	Female	Male	Female	
<20	283	248	8	27	0	0	566
21-25	73	56	22	38	3	2	194
26-30	76	39	30	43	1	4	193
31-35	17	6	38	60	0	1	152
36-40	7	3	59	57	6	4	136
41-45	1	0	52	55	1	3	112
46-50	0	0	60	53	3	1	117
>50	2	0	63	58	7	8	138
Total	459	352	332	391	21	23	1608

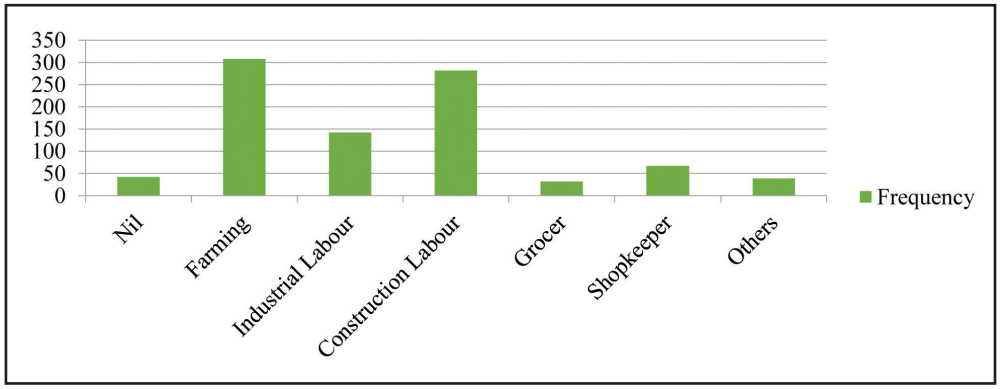
Unmarried people were 50.43%, married people were 44.96% and widowed were 2.74%. Also, unmarried males were 28.54%, married males 20.65% and widowed males were 1.31%, whereas unmarried females were 21.89%, married females 24.31% and widowed females were 1.43% of total population (Table 5).

According to Census 2011, more than half (53.3%) of the SC population is 'never married'. 'Married' persons constitute 42.7%. 'Widowed' persons form 3.9% while negligible percent (0.2%) is of 'divorced and separated' persons.

Table 6: Occupation

Occupation	Frequency	Percentage
Nil	42	4.61%
Farming	308	33.81
Industrial Labour	142	15.59
Construction Labour	282	30.95
Grocer	32	3.51
Shopkeeper	67	7.35
Others	38	4.17
Total	911	100

Graph 4: Occupation



Out of the population of 1608, working group population was only 911. Children below 14 years of age were not considered in working population. Among the working population, majority (33.81%) of the population earn their livelihood by doing faming. Other major occupational group is construction labour (30.95%) followed by industrial labour. Few people are involved in other occupations like tailoring, teaching, barbering and other jobs (Table 6; Graph 4).

As per the Census 2011, agricultural labour constitutes the highest proportion (42.5%) among the total SC workers. This is lower than the national average of 45.6% recorded by all SCs in this category. 'Cultivators' constitute 30.9% which is significantly higher than the national average (20%). 'Other Workers' account for 22.2%, against the national average of 30.5%. Workers engaged in 'household industry' (HHI) constitute 4.3%, which is slightly higher than the national average (3.9%) (Agarwal, 2013).

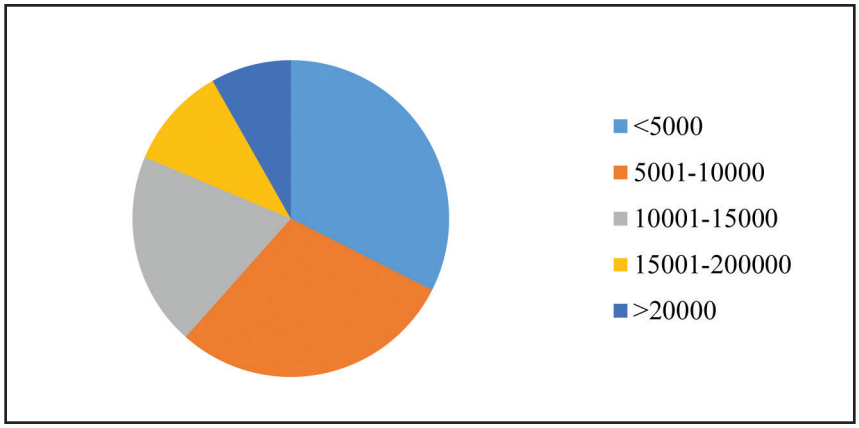
At the level of individual caste, '*Harijan*' have the highest proportion of 'agricultural labour. *Pasi* have the highest proportion of 'cultivators' whereas *Dhobi* have registered the highest percentage of 'household industry' workers among the five

major SCs. *Balmiki* have more than half of the total workers as 'Other Workers', constituting the highest proportion in this category (Anonymous, 2013).

Table 7: Family Income Status

Income (in Rs per month)	Frequency	Percentage
<5000	87	32.46
5001-10000	78	29.10
10001-15000	53	19.78
15001-200000	28	10.45
>20000	22	8.21
Total	268	100

Graph 5: Family Income



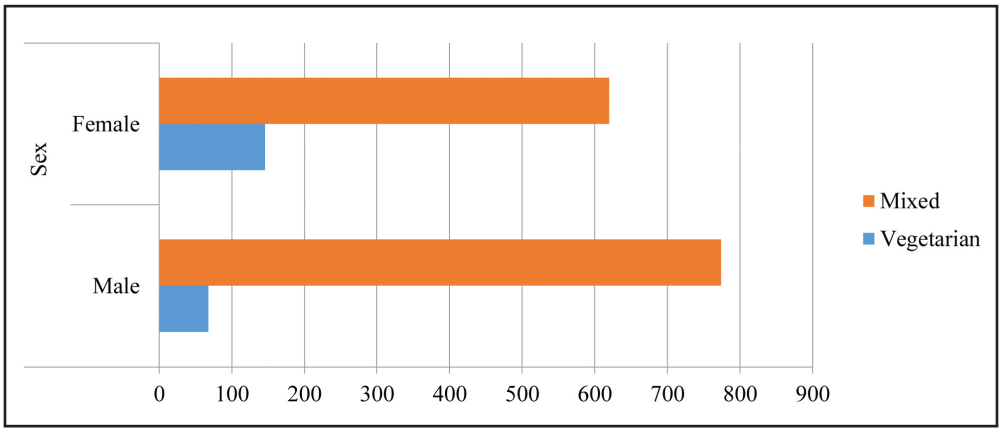
Majority (32.46%) of the households earns less than Rs.5000 per month followed by 29.10% population earning Rs.5001-10000 per month. Only 8.21% households earn more than Rs.20000 per month (Table 7; Graph 5). Family income status shows that the population in general is poor.

Maximum number of population (86.69%) had mixed type of food habit. Only 13.31% population had vegetarian food habit. Out of 86.69% mixed food habit population, males are 48.13% and rest (38.56%) are females (Table 8; Graph 5).

Table 8: Food Habits

Food Habit	Sex		Total
	Male	Female	
Vegetarian	68	146	214
Mixed	774	620	1394
Total	842	766	1608

Graph 6: Food Habits



Conclusion

It can be concluded that majority of SCs is living in rural areas with unique physical, socio-economic and cultural environment. Most of the families are nuclear with average size of 6 persons per household. Maximum population is of 21-30 years and is primary educated. People know the importance of literacy and they are educating their young generation. SC people are aware about the right age of marriage. Only a small number of people get married below 20 years of age. The main occupation of the SC people is farming. They have also adopted other available occupations for improving their status. Majority of the population earns less than Rs.5000 per month and there is very small proportion of population with good monthly income. Food habit of the population is of mixed type. The study revealed that most of the indicators of level of living and household assets are found low in SC areas of Aligarh district. Development in SC areas of Aligarh District is continued but at quite low rate. More emphasis is needed to be given for the upliftment and better living standard of SCs through various outreach programs.

Acknowledgement

Authors are greatly indebted to the Ministry of AYUSH, Government of India and Director General of CCRUM, New Delhi for undertaking SCSP. Authors are also thankful to all the local Pradhans and Scheduled Caste people for their support as well as entire staff of SCSP at RRIUM, Aligarh.

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सारांश

अलीगढ़, उत्तर प्रदेश, भारत के ग्रामीण अनुसूचित जातियों का सामाजिक–जनसांख्यिकीय अध्ययन

***सरताज अहमद, रिफ़ाक़त, परवेज़ ख़ान, सरफ़राज़ अहमद, ज़ोहा क़य्यूम, अब्दुल रहीम, शगुफ़्ता परवीन**

पृष्ठभूमि: इस पेपर का मुख्य उद्देश्य अलीगढ़, उत्तर प्रदेश की ग्रामीण अनुसूचित जातियों की जनसंख्या के आकार, लिंग अनुपात, साक्षरता स्तर, वैवाहिक स्थिति, व्यवसाय और आय के संबंध में विश्लेषण करना है। यह पेपर क्षेत्रीय यूनानी चिकित्सा अनुसंधान संस्थान, अलीगढ़ में एस.सी.एस.पी. के अंतर्गत चल स्वास्थ्य सेवा कार्यक्रम द्वारा अनुसूचित जातियों के परिवारों का प्रत्यक्ष दौरे के माध्यम से एकत्र किए गए प्राथमिक आंकड़ों पर आधारित है।

विधि: जाति, आयु, लिंग, शैक्षणिक योग्यता, व्यवसाय और मासिक आय जैसे जनसांख्यिकीय विवरणों पर आधारित एक पूर्व–परीक्षित प्रश्नावली को घर–घर जाकर भरा गया।

परिणाम: 83.58% परिवार न्युक्लीयर हैं। प्रत्येक परिवार में औसतन छः सदस्य हैं। लिंगानुपात 1000 पुरुषों पर 910 महिलाएं हैं। साक्षरता 75.31% है। अधिकांश जनसंख्या अपनी आजीविका के लिए खेती पर निर्भर है। अधिकांश (32.46%) परिवारों की आय 5000/– रुपये प्रति माह से कम है। आबादी के बड़े हिस्से में मिश्रित प्रकार की खाद्य आदतें हैं।

निष्कर्ष: अलीगढ़, उत्तर प्रदेश की ग्रामीण अनुसूचित जातियों की सामाजिक–जनसांख्यिकीय रूपरेखा उत्तर प्रदेश की अन्य अनुसूचित जातियों के समान है।

शब्दकुंजी: जनसांख्यिकीय, अनुसूचित जातियां, ग्रामीण, अलीगढ़

A Study of Nephro-protective, Diuretic and Steroidal Activity of a Unani Pharmacopoeial Preparation *Tabīkh Kāknaj* in Rats

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Abstract

The nephroprotective activity of aqueous and 50% hydroalcoholic extracts of powder of a Unani preparation *Tabīkh Kāknaj* was studied in albino rats of either sex divided into four groups of six animals each. Cisplatin (5 mg/kg i.p.) was administered on 1st day in group II and on 11th day in groups III and IV to induce nephrotoxicity. The test drug was given in the dosage of 260 mg/kg (aqueous extract) and 300 mg/kg (hydroalcoholic extract) in group III and IV from 1st to 10th day of the study whereas group I served as plain control. The animals were sacrificed by administration of thiopental sodium (20 mg/kg, i.p.) on 6th day from group II and on 16th day from group I, III, IV and blood sample was collected for the estimation of serum creatinine and blood urea. Kidneys were isolated for histopathological studies. A significant nephroprotective effect was observed in aqueous and hydroalcoholic groups when compared with plain control as well as the negative control groups ($P<0.001$). The diuretic effect of the test drug *Tabīkh Kāknaj* was also conducted on albino rats which were kept on fasting for 8 hours. The animals of group I were administered normal saline (30 ml/kg), while groups II, III and IV were treated with furosemide (25 mg/kg), aqueous and 50% hydroalcoholic extracts respectively. The urine passed by the animals during 6 hours was collected. The total urine output was measured and the concentration of sodium and potassium was estimated by flame photometer. The study showed that the treated groups of the test drug possess moderate diuretic, natriuretic and kaliuretic activity. To evaluate the steroidal effect of *Tabīkh Kāknaj*, the rats of group I were treated with normal saline while groups II, III and IV were treated with hydrocortisone (33.3 µgm), aqueous and 50% hydroalcoholic extracts twice a day for 3 days respectively. On 4th day, all the animals were sacrificed and thymus glands were dissected out and their weights were measured. The test drug reduced the weight of thymus gland significantly in aqueous and 50% hydroalcoholic extracts as compared to control group. The results obtained as mean ± S.E.M significance were determined by using ANOVA one way with Tukey Kramer multiple comparison test. *p*- value equal to or less than 0.05 showed significance.

Keywords: Cisplatin, Diuretic and Steroidal Effect, Nephroprotective Activity, *Tabīkh Kāknaj*

Introduction

Unani Medicine claims to possess many safe and effective drugs for the management of different diseases. Both single and compound preparations are described to have nephroprotective effects and successfully used in various renal disorders, but most of them despite being extensively used in therapy, have

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not been scientifically studied so far, therefore it is substantial to subject this clinically very important group of drugs for scientific validation. A compound Unani pharmacopoeial preparation *Tabīkh Kāknaj* (TK) which is mentioned in an authentic pharmacopoeia *'Ilāj al-Amrāḍ* authored by Hakim Sharif Khan (2005) as effective in different renal problems was selected for the present study. *Tabīkh Kāknaj* is a Unani decoction which includes *Ḥabb-i-Kāknaj* (fruits of *Physalis alkekengi*) 7 gm, *Tukhm-i-Khubbāzī* (seeds of *Malva sylvestris*) 7 gm, *Zīrā Safed* (fruits of *Cuminum cyminum*) 14 gm, *Afsantīn* (whole herb of *Artemisia absinthium*) 14 gm, *Mulethī* (rhizome of *Glycyrrhiza glabra*) 14 gm and *Tukhm-i-Kharbūza* (seeds of *Cucumis melo*) 14 gm in its composition (Khan, 2005). Most of the ingredients of TK have been described to possess diuretic (Husain, 1885; Aziz, 1948; Lubhaya, 1977; Ibn Baitar, 2003; Nabi, 2007; Khan, 2013; Dymock *et al.,* 1891; Ibn Baitar, 1985; Kirtikar and Basu, 1987; Khory and Katrak, 1985; Ghani, 2010), nephroprotective (Marouane *et al.,* 2011) and anti-inflammatory (Ahmad *et al.,* 1992; Gupta and Tandon, 2013; Prudente *et al.*, 2013) effects and useful in the treatment of dysuria (Nadkarni, 2000; Chopra *et al.,* 2006), weakness of kidney and urinary bladder (Husain, 1885; Hakim, 1922; Aziz, 1948; Ibn Baitar, 1985; Kabiruddin, 2000; Nabi, 2007; Khan, 2013), urinary tract ulcer (Husain, 1885; Ayub, 1907; Hakim, 1922; Qarshi, 1974; Ibn Baitar, 2000; Khan, 2013), diseases of kidney and urinary bladder (Husain, 1885; Hakim, 1922; Lubhaya, 1977; Nadkarni, 2000; Nabi, 2007; Ghani, 2010; Khan, 2018), renal colic (Ibn Baitar, 1999), proteinuria and burning micturition (Husain, 1885; Lubhaya, 1977; Ibn Baitar, 1999; Ghani, 2010; Khan, 2012), etc.

Cisplatin (*cis*-diammine dichloro platinum [II], CDDP) is a chemotherapeutic drug used for the treatment of many solid tumours, including those of the breast, head, neck, lung, testis, and ovary. While cisplatin induces various toxicities including gastrotoxicity, myelosuppression, ototoxicity and allergic reactions, the major dose-limiting side effect is nephrotoxicity (Sastry and Kellie, 2005). The nephrotoxicity of cisplatin has been recognized since its approval for clinical use over 35 years ago. Cisplatin nephrotoxicity can present with various types of symptoms such as acute kidney injury (AKI), hypomagnesemia, fanconi-like syndrome, distal renal tubular acidosis, hypocalcemia, renal salt wasting, and hyperuricemia. However, the most serious and one of the most common side effects is AKI, which occurs in 20-30% of patients (Miller *et al.*, 2010).

In view of the described effect of the above mentioned drugs and their frequent use by Unani physicians since long period of time in the management of different kidney diseases, the selection of this compound preparation to study its potential of protecting kidney from the adverse effect of other drugs and chemicals appears to be quite rational. Since this compound preparation has not been studied yet scientifically for its effect in kidney ailment or associated disorders, therefore a comprehensive study schedule was designed to evaluate different effects related to kidney diseases and associated pathological conditions. Present study included

nephroprotective, diuretic and steroidal activities of *Tabīkh Kāknaj* using albino rats.

As reported by some of the recent studies (Anwar *et al.,* 1999; Wasim, 2005) that the most important use of some of the ingredients of TK i.e. *Physalis alkekengi*, *Cucumis melo* and *Glycyrrhiza glabra* is in nephrotic syndrome like conditions and since most of the existing drugs for nephrotic syndrome are effective because of their steroidal activity, therefore, this formulation was studied for steroidal activity by thymus regression test (Stephenson, 1954) and the effect produced by it was compared with the effect of hydrocortisone.

Materials and Methods

Collection and Authentication of Plant Materials

The ingredients of the test drug were procured from Dawakhana Tibbiya College, Aligarh Muslim University, Aligarh, properly identified as per the literature available and confirmed in Pharmacognosy Section of Department of Ilmul Advia, Aligarh Muslim University, Aligarh. A herbarium sample was prepared and submitted to the Mawalid Salasa Museum of the Department of Ilmul Advia, AMU, Aligarh with following details for future reference.

Ḥabb-i-Kāknaj (*Physalis alkekengi*) - Voucher No. SC- 0240/18,

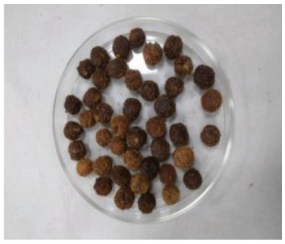
Tukhm-i-Khubbāzī (*Malva sylvestris*) - Voucher No. SC- 0243/18,

Zīrā Safed (*Cuminum cyminum*) - Voucher No. SC- 0242/18,

Afsantīn (*Artemisia absinthium*) - Voucher No. SC- 0239/18,

Mulethī (*Glycyrrhiza glabra*) - Voucher No. SC- 0241/18,

Tukhm-i-Kharbūza (*Cucumis melo*) - Voucher No. SC- 0244/18



Physalis alkekengi

Malva sylvestris

Cuminum cyminum

Artemisia absinthium

Glycyrrhiza glabra

Cucumis melo

Preparation of Extract

The dried ingredients of *Tabīkh Kāknaj* were coarsely powdered with the help of an electric grinder and extracted in aqueous and 50% hydroalcoholic solvent with the help of Soxhlet's apparatus for 6 hours. The extracts were filtered and dried on water bath. The yield percentage was calculated with reference to the air dried drug and was found to be 18.6% and 21.6% for aqueous and hydroalcoholic extract of *Tabīkh Kāknaj*, respectively.

Dosage of the Test Drug

The dose of crude drug was mentioned as 12 gm per day in Unani literature, when the dose was calculated for albino rats with the formula suggested by Freirich, *et al*., (1966), it was fixed as 1400 mg/kg. However, since the extract of crude drug was taken in the study, therefore the yield percentage of extract was taken into account while calculating the dose of the extract. Secondly an extract facilitates easy administration to the animals and accurate dose can be given to them. The dose of Wistar rats was calculated by multiplying the human clinical dose by appropriate conversion factor (by 7 in case of rats). Thus the dose was finally calculated for animals as 260 mg/kg and 300 mg/kg respectively.

Animals and Diet

Wistar albino rats of either sex were used in the study. Animals were kept in animal house of the Department of Ilmul Advia, in polypropylene cages, under standard laboratory condition with 12 hour day-night cycles. A temperature of 35±2 °C and humidity of 45-64% were maintained during the study. Throughout the experimental period, animals were fed a balanced commercial pellet diet (Ashirvad Pvt Ltd., Chandigarh) and water *ad libitum* and were acclimatized for 7 days before the experiment. All animal care and experiments were conducted in accordance with the guidelines made by the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) and ethical clearance was taken from the Institutional Animal Ethics Committee (IAEC), Department of Ilmul Advia, Ajmal Khan Tibbiya College, Aligarh Muslim University, Aligarh, vide registration number 1979/GO/Re/S/17/CPCSEA/3, dated 23/10/2017.

Study for Nephroprotective Activity

Wistar albino rats of either sex, weighing 150-200 gm were divided into 4 groups of 6 animals each. Group I was administered 3.0 ml of normal saline, by oral route, twice a day for 15 days and served as plain control. The animals in group II were treated with a single i.p. dose of cisplatin 5 mg/kg body weight on first day and served as negative control. Animals of group III and IV were

treated orally with 260 mg/kg and 300 mg/kg body weight of the aqueous and 50% hydroalcoholic extracts of *Tabīkh Kāknaj* respectively, in a divided dose twice a day for 10 days, and on the 11th day a single i.p. dose of cisplatin was also administered. Blood sample was collected on the 6th day from animals of group II and on the 16th day from group I, III and IV by heart puncture for the estimation of serum creatinine and blood urea. The animals were sacrificed by administration of anaesthetic thiopental sodium (20 mg/kg, i.p.). Kidneys were isolated after blood withdrawal. Tissue samples were immersed in 10% formalin for histopathological studies. Samples were embedded in paraffin, sectioned and stained with haematoxylin and eosin (Shirwaikar *et al.*, 2004). The details are given in Table 1.

Table 1: Study for Nephroprotective Activity

Group No. (n=6)	Drug Treatment	Route and Dose (in mg/kg body weight)	Duration	Days of withdrawal of blood and kidney	Purpose
1	Normal saline	3 ml p.o.	1st – 15th	16th	Plain Control
2	Cisplatin	5 mg/kg i.p. (single dose)	1st	6th	To induce kidney damage (Negative control)
3	Aqueous extract + cisplatin	260 mg/kg p.o. 5 mg/ kg i.p. (single dose)	1st – 10th 11th	16th	Protective effect
4	50% hydroalcoholic extract + cisplatin	300 mg/kg p.o. 5 mg/ kg i.p. (single dose)	1st – 10th 11th	16th	Protective effect

Study for Diuretic Activity

18 hours fasted albino rats of either sex, weighing 150-200 gm were divided into 4 groups of 6 animals each. The animals in group I served as plain control were given 3.0 ml normal saline by oral route. The animals in group II were administered 25 mg/kg of Furosemide dissolved in normal saline, by oral route and served as standard control. The animals of group III and IV were treated orally with 260 mg/kg and 300 mg/kg body weight of the aqueous and 50% hydroalcoholic extracts of *Tabīkh Kāknaj*, respectively.

All the animals were immediately placed individually in metabolic cages. The mineral oil (Paraffin oil) was applied on the upper surface of the bottom of

the metabolic cage. A glass funnel kept under the cage was also lubricated with mineral oil. The mineral oil was applied to prevent the loss of urine through evaporation. Urine passed over 6 hours was calculated in measuring cylinders. The total urine output was measured and the concentration of sodium and potassium was estimated by Flame photometer (Lipschitz *et al.*, 1943; Taylor and Toplis, 1962).

Thymus Regression Test for Steroidal Activity

Albino rats of either sex weighing 40-60 gm were divided into 4 groups of 6 animals each, having equal distribution of sex and such that the total weight of animals in various groups were approximately the same. The animals in group I served as plain control were treated with 3.0 ml of normal saline by oral route twice a day for 3 days. The animals in group II were treated with 200 microgram of hydrocortisone divided into 6 doses, twice a day, for 3 days by subcutaneous injection. The animals of group III and IV were treated orally with 260 mg/kg and 300 mg/kg body weight of the aqueous and 50% hydroalcoholic extracts of *Tabīkh Kāknaj*, respectively, in a divided dose twice a day, for 3 days. On 4^{th}day, all the animals were sacrificed by administration of anaesthetic thiopental sodium (20 mg/kg, i.p.) and the thymus gland was dissected out. The body weight and weight of thymus gland was calculated. The result was expressed as mg of gland/100gm of body weight (Stephenson, 1954; Amin and Khan, 1994). The details are given in Table 2.

Table 2: Study for Steroidal Activity

Group No. (n=6)	Drug Treatment	Route and Dose	Duration	Day of dissection of thymus gland
1	Normal saline	3 ml p.o.	1^{st} -3^{rd}	4^{th}
2	Hydrocortisone	33.3 micro gm/100 subcutaneous	1^{st} -3^{rd}	4^{th}
3	Aqueous extract	260 mg/kg p.o.	1^{st} – 3^{rd}	4^{th}
4	50% hydroalcohalic extract	300 mg/kg p.o.	1^{st} – 3^{rd}	4^{th}

Statistical Analysis

The results obtained as mean ± S.E.M significance were determined by using ANOVA one way with Tukey Kramer multiple comparison test. *p*- value equal to or less than 0.05 showed significance.

Observation and Results

Effect of Test Drug on Nephroprotective Activity

Effect on Blood Urea

Blood urea was found to be 37.9±3.464 mg/dl in the plain control group, while it increased to 88.4±4.016 mg/dl ($p<0.001$) in negative control group treated with single dose of cisplatin 5 mg/kg (i.p.). In the animals of group III and IV treated with aqueous and 50% hydroalcoholic extracts of TK for 10 days followed by single dose of cisplatin 5 mg/kg (i.p.) on 11th day, blood urea was found to be 54.4±1.865 mg/dl ($p<0.001$) and 48.9±1.464 mg/dl ($p<0.001$), respectively (Table 3).

Effect on Serum Creatinine

Serum creatinine was found to be 0.99±0.073 mg/dl in the plain control group, while it increased to 2.85±0.209 mg/dl ($p<0.001$) in negative control group treated with single dose of cisplatin 5 mg/kg (i.p.). In the animals of group III and IV treated with aqueous and 50% hydroalcoholic extracts of TK for 10 days followed by single dose of cisplatin 5 mg/kg (i.p.) on 11th day, serum creatinine was found to be 1.89±0.031 mg/dl ($p<0.001$) and 1.58±0.139 mg/dl ($p<0.001$), respectively (Table 3).

Table 3: Effect of *Tabīkh Kāknaj* on Renal Function

Group No. (n=6)	Drug Treatment	Blood Urea mg/dl, Mean±S.E.	Serum Creatinine mg/dl, Mean±S.E.
1	Plain control (Normal saline 3ml)	37.9±3.464	0.99±0.073
2	Negative control (Cisplatin 5mg/kg)	88.4±4.016***	2.85±0.209***
3	Aqueous extract of TK (260 mg/kg) + Cisplatin	54.4±1.865***	1.89±0.031***
4	50% Hydroalcoholic extract of TK (300 mg/kg) + Cisplatin	48.9±1.464***	1.58±0.139***

***P<0.001

Histopathological Analysis

In the animals of group I (plain control) treated with normal saline, the microscopic examination of their kidney showed a good number of glomeruli,

numerous blood vessels were also seen. No histopathological abnormalities were observed.

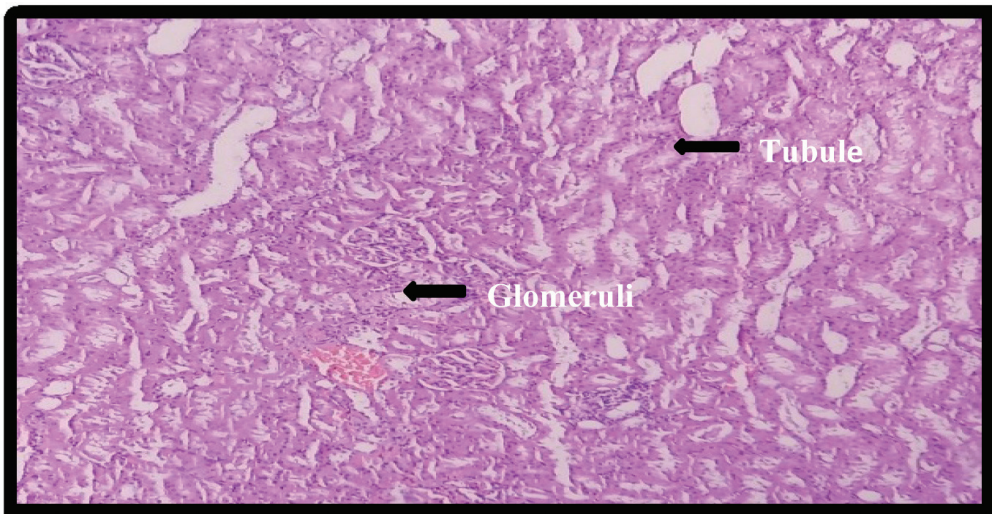
In the animals of group II (negative control) treated with cisplatin, the microscopic examination of their kidney showed definite sign of nephrotoxicity as compared to the plain control. Kidney structures were distorted by glomerular congestion, peritubular congestion, tubular casts, epithelial desquamation and inflammatory cells.

In animals of groups III and IV (protective groups) treated with aqueous and 50% hydroalcohalic extracts of TK, the microscopic examination showed mild glomerular congestion, peritubular congestion, and inflammatory cells. Tubular cast was not observed in group IV (Table 4; Fig. 3-6)

Table 4: Histopathological Features Seen in the Kidney

S.No.	Histological Features	Group I	Group II	Group III	Group IV
1	Glomerular congestion	Nil	+++	+	+
2	Tubular casts	Nil	+++	+	–
3	Peritubular congestion	Nil	+++	+	+
4	Epithelial desqamation	Nil	+++	–	–
5	Inflammatory cells	Nil	+++	+	+

Fig. 3



Photograph of group I (plain control) showing normal glomeruli and tubules

Fig. 4(a)

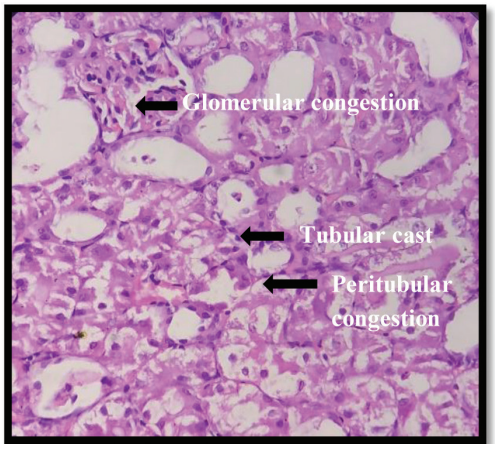
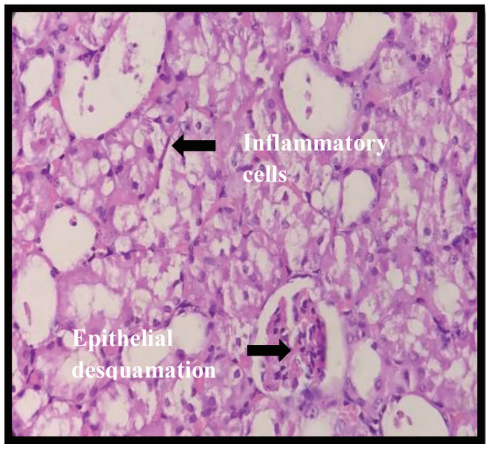


Fig. 4(b)



Photographs of group II (negative control) showing glomerular congestion, peritubular congestion, tubular casts, epithelial desquamation and inflammatory cells

Fig. 5

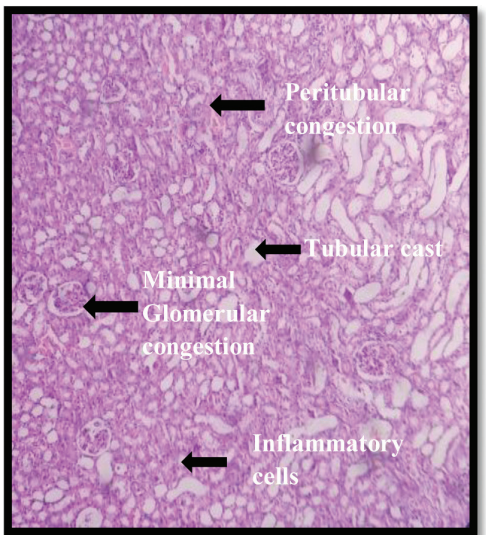
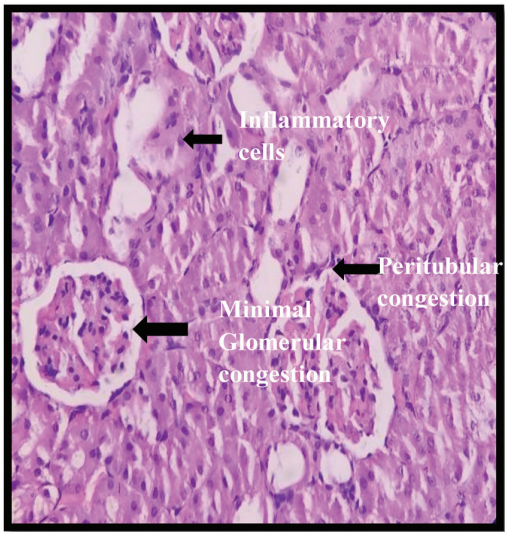


Fig. 6



Photograph of group III (protective) showing minimal glomerular congestion, peritubular congestion, tubular casts, and inflammatory cells

Photograph of group IV (protective) showing minimal glomerular congestion, peritubular congestion and inflammatory cells

Effect of Test Drug on Diuretic Activity

Urine Analysis

In plain control group, the mean volume of urine was found to be 1.6 ± 2.633 ml, whereas in standard group (treated with furosemide) it increased

significantly to 4.83 ± 0.240 ml (p<0.001). The mean urine volume in the groups treated with aqueous and hydroalcohalic extracts of TK was found to be 3.56 ± 0.374 (p<0.001) and 2.68 ± 0.140 ml (p<0.05), respectively. The mean potassium and sodium concentrations in the plain control were found to be 55.1 ± 2.710 mmol/l and 74.6 ± 2.615 mmol/l respectively whereas in standard, aqueous and hydroalcoholic groups, the potassium and sodium levels were found to be 93.8 ± 1.693 mmol/l (p<0.001), 67.2 ± 1.605 mmol/l (p<0.01), 64.2 ± 1.431 mmol/l (p<0.05) and 116.4 ± 1.790 mmol/l (p<0.001), 86.51 ± 1.560 mmol/l (p<0.01)and 83.6 ± 1.723 mmol/l (p<0.05) respectively (Table 5).

Table 5: Effect of Test Drug on Urine Out-put and Sodium & Potassium Excretion

Group No. (n=6)	Drug Treatment	Urine Volume (ml)	Potassium (mmol/l)	Sodium (mmol/l)
1	Plain control (Normal Saline 3ml)	1.6 ± 2.633	55.1 ± 2.710	74.6 ± 2.615
2	Standard (Furosemide 25mg/kg)	4.83 ± 0.240***	93.8 ± 1.693***	116.4 ± 1.790***
3	Aqueous extract of TK (260 mg/kg)	3.56 ± 0.374***	67.2 ± 1.605**	86.51 ± 1.560**
4	50% Hydroalcoholic extract of TK (300 mg/kg)	2.68 ± 0.140*	64.2 ± 1.431*	83.6 ± 1.723*

*p<0.05, **p<0.01, ***p<0.001

Effect of Test Drug on Steroidal Activity

In the control group, the mean thymus weight /100gm of body weight was found to be 367.05±16.923 mg/100 gm of body weight, while in the standard group it was reduced to 256.93±12.385 mg/100gm of body weight (p<0.001). The decrease in thymus weight was found statistically significant. The thymus weight was found to 276.28±13.461 mg/100gm (p<0.001) and 290.72±7.826 mg/100gm (p<0.01) in animals treated with aqueous and 50% hydroalcoholic extracts of TK respectively which were also found statistically significant (Table 6).

Table 6: Effect of Test Drug on Thymus Weight

Group No. (n=6)	Drug Treatment	Mean Thymus Weight (mg/100 gm of Body Weight)	P Value
1	Plain control (Normal Saline 3ml)	367.05±16.923	_
2	Standard (Hydrocortisone 33.3 µgm/100gm)	256.93±12.385***	<0.001
3	Aqueous extract of TK (260 mg/kg)	276.28±13.461***	<0.001
4	50% Hydroalcoholic extract of TK (300 mg/kg)	290.72±7.826**	<0.01

Discussion

The findings demonstrated that *Tabīkh Kāknaj* possesses significant nephroprotective effect against cisplatin induced nephrotoxicity in a dose dependent manner. Aqueous and 50% hydroalcoholic extracts of TK when administered followed by cisplatin, protected from renal damage, suggesting that they have nephroprotective activity. TK was found to produce significant effect on the parameters of renal functions. A significant effect was recorded both in comparison of plain control as well as the negative control (P<0.001) while in the group comparison no significant difference was found between aqueous and hydroalcoholic extracts showing that both have same degree of response. TK is commonly used in the form of decoction as a therapeutic agent, the findings suggested that the dosage form as used in Unani Medicine is sufficient to produce nephroprotective effect and that the constituents extracted in water are equally efficacious as that of hydroalcoholic extract. Cisplatin has been reported to induce nephrotoxicity mainly by causing injury to proximal tubules. It involves a number of mechanisms including tubular injury, oxidative stress, inflammation and vascular injury, etc., therefore, it appears that the test drug was able to produce a counter effect by the different constituents contained in it. In Unani Medicine, pharmacopoeial and other compound formulations are commonly prescribed for the management of complex diseases. Since the nephrotoxicity represented mostly by acute or chronic renal failure, involves a number of mechanisms and different pathophysiological attributes, it appears intelligible to use a combination of drugs which can address the diverse therapeutic requirement in the process of amelioration of the disease. TK contains six single drugs which have diverse pharmacological effects such as antiulcer, antioxidant, healing, diuretic, nephroprotective, anti-inflammatory, antitumor, etc. (Ahmad *et al.* 1992; Shafi *et al.* 2004; Adel *et al.,* 2005; Wright *et al.,* 2007; Li *et al.*, 2008; Allahghadri *et al.,* 2010; Barros *et al.,* 2010; Marouane *et al.,* 2011; Gill *et al.,* 2011; Ali *et al.,* 2013; Gupta and Tandon, 2013; Prudenle *et al.,* 2013; Afshar

et al., 2015; Bhat *et al.,* 2014). These effects may have collectively produced a response that was able to negate the toxicity induced by cisplatin.

In the test for diuretic effect, the study showed that standard, aqueous and 50% hydroalcoholic groups significantly increased the urine out-put, Na^+ and K+ excretion as compared to plain control group. The study clearly showed that the aqueous and 50% hydroalcoholic extracts of TK possess moderate diuretic, natriuretic and kaliuretic activity. The test drug TK by increasing the urine volume, natriuretic and kaliuretic effect indicated that it has a wide therapeutic potential and can be used in various acute and chronic renal diseases and its complications that arise because of retention of fluid such as ascites, portal hypertension, congestive heart failure, nephrotic syndrome and other volume overload conditions. While comparing the aqueous group with hydroalcoholic group, it was seen that quantum of effect is almost similar, however the effect produced by group III and IV is less than that produced by standard drug furosemide.

Since most of the ingredients of TK have been described to be effective in nephrotic syndrome like conditions, it was thought that beneficial effect may be due to its steroidal activity. In the present study, the test drug reduced the weight of thymus gland significantly in aqueous and 50% hydroalcoholic extract as compared to control, and since the weight of thymus gland is inversely proportional to the level of corticosteroid in the body (Turner and Hebborn, 1965), therefore, the study clearly indicated that TK possesses striking steroidal activity. The findings also suggested that the magnitude of the effect produced by aqueous extract is greater than that produced by 50% hydroalcoholic extract. Therefore, the study reveals that the test drug TK attributes significant steroidal activity, which is probably the basis of its therapeutic application in nephrotic syndrome like condition.

Conclusion

The present study demonstrated that the TK possesses significant nephroprotective, diuretic and steroidal effect, thus, it scientifically substantiated the use of *Tabīkh Kāknaj* in different renal diseases such as burning micturition, dysuria, oliguria, proteinuria, renal failure and nephrotic syndrome like conditions and also confirmed its use as a diuretic and nephroprotective agent and corroborated Unani claim that it is useful in renal toxicity.

Tabīkh Kāknaj possesses strong steroidal activity, which is probably the basis of its therapeutic application in nephrotic syndrome like conditions. The claim of Unani Medicine regarding the efficacy of TK in kidney diseases was scientifically validated by the study and found in consonance as described by Unani physicians.

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सारांश

चूहों में एक यूनानी मिश्रण *तबीख़ काकनज* की नेफ्रोप्रोटेक्टिव, मूत्रवर्धक और स्टेरॉयडल गतिविधि का अध्ययन

नदीम अहमद, *अब्दुर रऊफ़, गुफ़रान अहमद, मोहम्मद नसीरुद्दीन

यूनानी मिश्रण *तबीख़ काकनज* के पाउडर के जलीय और 50% हाइड्रोक्लोरिक सत्त की नेफ्रोप्रोटेक्टिव गतिविधि का अध्ययन दोनों लिंग के छः श्वेत चूहों के चार समूह में किया गया। पहले दिन द्वितीय समूह और 11वें दिन तृतीय और चतुर्थ समूह में नेफ्रोटोक्सिसिटी उत्पन्न करने के लिए सिप्लैटिन (5 मि.ग्रा./कि.ग्रा. आई.पी.) दी गई। परीक्षण औषधि तृतीय और चतुर्थ समूह को 260 मि.ग्रा./कि.ग्रा. (जलीय सत्त) और 300 मि.ग्रा./कि.ग्रा. (हाइड्रोक्लोरिक सत्त) की खुराक में अध्ययन के 1 से 10वें दिन तक दी गई जबकि प्रथम समूह को साधारण नियंत्रण के रूप में रखा गया। द्वितीय समूह जीवों को छठें दिन और प्रथम, तृतीय तथा चतुर्थ समूह के जीवों को 16वें दिन थियोपेंटल सोडियम (20 मि.ग्रा./कि.ग्रा., आई.पी.) देकर बलिदान कर दिया गया और सीरम क्रिएटिनिन और रक्त यूरिया के अनुमान के लिए रक्त का नमूना एकत्र किया गया। हिस्टोपैथोलॉजिकल अध्ययन के लिए किडनी को अलग किया गया। सामान्य नियंत्रण के साथ–साथ नकारात्मक नियंत्रण समूहों ($P<0.001$) की तुलना में जलीय और हाइड्रोलिसिसिक समूहों में एक महत्वपूर्ण नेफ्रोपैट्रक्टिव प्रभाव देखा गया। श्वेत चूहों पर जांच औषधि *तबीख़ काकनज* के मूत्रवर्धक प्रभाव को भी जांचा गया और जीवों को 8 घंटे तक उपवास पर रखा गया। प्रथम समूह के जीवों को सामान्य सेलाइन (30 मि.ग्रा./कि.ग्रा.) दिया गया जबकि द्वितीय, तृतीय और चतुर्थ समूह का उपचार क्रमशः फ़्यूरोसेमाइड (25 मि.ग्रा./कि.ग्रा.), जलीय और 50% हाइड्रोक्लोरिक सत्त से किया गया। जीवों का 6 घंटे के दौरान का मूत्र एकत्र किया गया। कुल मूत्र को मापा गया और सोडियम और पोटेशियम की सांद्रता का अनुमान फ़्लेम फोटोमीटर द्वारा लगाया गया। अध्ययन से पता चला कि परीक्षण औषधि के उपचारित समूहों में मध्यम मूत्रवर्धक, नैट्रियूरेटिक और कलियुरेटिक गतिविधि होती है। *तबीख़ काकनज* के स्टेरॉयड प्रभाव का मूल्यांकन करने के लिए प्रथम समूह के चूहों का उपचार सामान्य सेलाइन से किया गया जबकि द्वितीय, तृतीय और चतुर्थ समूह का उपचार 3 दिनों तक दिन में दो बार क्रमशः हाइड्रोकार्टिसोन (33.3 माइक्रोग्राम), जलीय और 50% हाइड्रोक्लोरिक सत्त से किया गया। चौथे दिन सभी जानवरों को बलि किया गया और थाइमस ग्रंथियों को काटकर बाहर निकाला गया और उनका वज़न किया गया। परीक्षण औषधि ने नियंत्रण समूह की तुलना में थाइमस ग्रंथि का वजन जलीय और 50% हाइड्रोक्लोरिक सत्त में कम कर दिया। ± S.E.M. महत्व के रूप में प्राप्त परिणामों को टुकी क्रेमर बहु तुलनात्मक परीक्षण के साथ एक प्रकार के एएनओवीए का उपयोग करते हुए निर्धारित किया गया। पी–मान 0.05 के बराबर या उससे कम महत्व रहा।

शब्दकुंजी: सिस्प्लैटिन, मूत्रवर्धक और स्टेरॉयड प्रभाव, नेफ्रोप्रोटेक्टिव गतिविधि, *तबीख़ ककनज*

Efficacy & Safety of *Ḥijāma bi'l-Sharṭ* (Wet Cupping) in the Treatment of Knee Osteoarthritis

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Abstract

Objective: To prove the efficacy and safety of *Ḥijāma bi'l-Sharṭ* (wet cupping) in the treatment of knee osteoarthritis by the elimination of morbid humors.

Method: Patients with pain in knee joints were obtained from the attached hospital after meeting inclusion and exclusion criteria. A total of 60 patients suffering from knee osteoarthritis were selected for the study. To validate the efficacy of wet cupping in knee osteoarthritis, five parameters were selected – Joint pain, morning stiffness, local swelling, restriction of movements of joints, and muscular weakness. For measuring the severity of joint pain VAS was used and for other parameters grading system was used to assess the effect. Each patient was subjected to 5 sittings of cupping therapy. Before and after values were obtained and compared statistically.

Results: It was found that after wet cupping therapy, pain in the knee joint was reduced completely or partially in 73.33% of the subjects of knee osteoarthritis ($p = >0.001$). Morning stiffness, restriction of joint movement, local swelling, and muscular weakness also improved in statistically significant manner ($p = >0.001$).

Conclusion: In the present study, the efficacy of wet cupping in the patients of knee osteoarthritis is established. It not only reduces the pain, improves the movement of patients, and reduces dependency of patients on medicines but at the same time the patients may be safe from the side effects of medication as well.

Keywords: *Ḥijāma bi'l-Sharṭ,* Knee, *Waja' al-Mafāṣil*, *Waja' al-Rukba,* Wet Cupping

Introduction

Unani Medicine is one of the oldest systems of medicine. It is based on the theory of humour and temperament. In Unani Medicine, health and disease depend upon the balance of body fluid known as *Akhlāṭ* (humours). Due to alteration in *Akhlāṭ*, either qualitatively or quantitatively, disease condition develops. Unani physicians believe in the elimination of these morbid *Akhlāṭ* (humours) from the body to regain health. Many methods are employed by Unani physicians for the evacuation of *Akhlāṭ* (humours). *'Ilāj bi'l-Tadbīr* (Regimenal therapy) is one of the methods used for evacuation of morbid *Akhlāṭ* from the body.

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Ḥijāma (cupping) is one of the important methods in *'Ilāj bi'l-Tadbīr* used by physicians for the treatment of chronic diseases. Sometimes, it is used as independent therapy and sometimes with *'Ilaj bi'l-Dawā'* (pharmacotherapy). It depends on the condition of patients, signs & symptoms of the disease and judgment of the physician.

Ḥijāma is *Tafarruq-i-Ittiṣāl Irādī* to evacuate waste products from the body especially from upper surface, e.g. skin and muscles. There are two types of *Ḥijāma:*

(i) *Ḥijāma bi'l-Sharṭ* (cupping with scarification): A type of *Ḥijāma* in which skin of that part is cut superficially and deeply by scalpel before applying the instrument. This is done for local evacuation.

(ii) *Ḥijāma bilā Sharṭ* (cupping without scarification): A type of *Ḥijāma* wherein skin is not incised. It is done only for diversion of morbid humours from the affected site (Anonymous, 2012; Al-Bedah *et al.,* 2018).

Cupping therapy is a holistic, preventive and curative treatment which is beneficial for the management of *Waja' al-Mafāṣil*.

The Ebers Papyrus, one of the oldest medical textbooks in the world, describes the systemic use of cupping by the early Egyptians, as far back as 1550 B.C. (Kalimullah *et al.,* 2007). Joints pain is described in Unani literature under the heading of *Waja' al-Mafāṣil* occurring in joints (Majusi, 1889; Ali, 1896; Jurjani, 1903).

Waja' al-Mafāṣil has been described as a disease in the classics of Unani Medicine exhaustively. *'Waja'* means pain and *'Mafāṣil'* means joints in Arabic, hence *Waja' al-Mafāṣil* is literally known as pain in joints (Baig *et Al.,* 2014; Khan, 2018).

In the classical Unani texts, *Waja' al-Mafāṣil* is broadly explained and its clinical findings closely resemble the findings of arthritis mentioned in the modern system of medicine. Buqrat, Jalinus, Razi, Ibn Sina and other Unani physicians described the painful joints of hands and feet under the term *Waja' al-Mafāṣil* (Razi, 2004). The involvement of other joints like hip, heel, back, and toes are called *Waja' al-Khāṣira*, *Waja' al-'Aqib*, *Waja' al-Qaṭan* and *Niqris* (Khan, 2018).

Waja' al-Mafāṣil is a painful condition of joints due to the accumulation of morbid humours around the joints. As per the involvement of humours, it is of four types – *Damwī, Balghamī, Ṣafrāwī*, and *Sawdāwī* (Nafees, 1904).

According to Unani Medicine, pain in any part is due to stagnation of bad humour. This stagnation can be a result of injury, stress, lack of blood supply, or invasion of cold in the body and joints.

It is a very common problem in old age but may start at an earlier stage of life, especially if there is a predominance of *Balgham* (phlegm) along with obesity, indigestion, prolonged breast-feeding, poverty, getting wet, exposure to cold and humid climates (Kabiruddin, 2007).

Ḥijāma or cupping is a method of clearing local congestion. A partial vacuum is created in cups and then placed on the skin either employing heat or suction. This draws up the underlying tissues. When the cup is left in place on the skin for a few minutes, blood stasis is formed, and localized healing takes place. Cupping therapy on the specific points provides warmth and helps to release the stagnation of blood and body fluids and ultimately results in the reduction of pain occurring due to any reason (Bano, 2018).

Waja' al-Mafāṣil or joints pain is a vast term that includes several types of painful conditions of joints such as osteoarthritis, osteoporosis, and rheumatoid arthritis. It is prevalent in communities across the globe and widely spreading (Woolf and Pfleger, 2003).

Knee osteoarthritis is a degenerative and chronic disease of the knee joint resulting from damage to hyaline cartilage. It is the most common type of arthritis and the most common musculoskeletal disease among individuals older than 65 years. The knee osteoarthritis affects the ability for sitting on chair, standing, walking and climbing stairs (2-3) and influences almost one-third of this age group. Knee osteoarthritis is highly accompanied by morbidity in the community (Nejati *et al.,* 2015).

Knee pain is the most common joints pain complaint followed by shoulder and hip pain (Richard *et al.*, 2010). This is the most common cause of severe long-term pain and disability and currently reported to be affecting hundreds of millions of people around the world (Woolf and Pfleger, 2003). Among the chronic rheumatic diseases, hip and knee osteoarthritis is the most prevalent and a leading cause of pain and disability in most countries worldwide. Its prevalence increases with age and generally affects women more frequently than men (Pal *et al.,* 2016).

Osteoarthritis is the second most common rheumatologic problem and the most frequent joint disease with a prevalence of 22% to 39% in India. It is more common in women than men, but the prevalence increases dramatically with age (Davis *et al.,* 1988). Nearly 45% of women over the age of 65 years have symptoms while radiological evidence is found in 70% of those over 65 years. Osteoarthritis of knee is a major cause of mobility impairment, particularly among females. It was estimated to be the 10th leading cause of nonfatal burden (Pal *et al.,* 2016).

To date, international guidelines recommended that the use of oral non-steroidal anti-inflammatory drugs (NSAIDs) can be highly beneficial for the management

of knee osteoarthritis. However, according to recent research, these agents only help to slightly reduce short-term pain and do not modify the natural history or progression of knee osteoarthritis. Moreover, these drugs are frequently associated with some undesired side effects and increase the risk of serious adverse events involving gastrointestinal, cardiovascular and renal systems. Therefore, as with most chronic musculoskeletal diseases, knee osteoarthritis patients usually tend to seek alternative treatment and therapies for help in managing their pain and discomfort.

Methodology

Study Design: It was a single-centered, open-labeled, interventional study conducted at Ajmal Khan Tibbiya College (AKTC), Aligarh Muslim University, Aligarh.

Selection of Volunteers: Patients of knee osteoarthritis were selected from OPD of AKTC based on inclusion and exclusion criteria. The procedure of therapy was explained to the participants along with the possible outcomes. Written informed consent was obtained from all the patients before the initiation of the procedure. A detailed general examination, systemic examination, and local examination were done, and systemic examinations of patients were carried out to rule out any other disease. *Mizāj* (temperament) of the patients was recorded. *Mizāj* was determined with the help of questionnaire prepared in the light of Unani classical books (Ibn Sina, 1993).

Five parameters were used to test the efficacy of *Ḥijāma* in knee osteoarthritis: 1. Joint pain, 2. Morning stiffness, 3. Local swelling, 4. Restriction of movements of joints, 5. Muscular weakness.

After meeting inclusion and exclusion criteria and obtaining written and informed consent, a total of sixty (60) patients were enrolled for the study.

Inclusion Criteria: Patients of either sex of more than 35 years of age having musculoskeletal pain condition *Waja' al-Rukba* (knee pain) were included in the study.

Exclusion Criteria: Patients below the age of 35 years, patients using any therapy for pain in the previous 2 weeks, using NSAIDs since a week, underwent cupping therapy in the last 3 months, using anticoagulant, known cases of coagulopathy, anaemia (Hemoglobin < 10gmdl) and other systemic diseases were excluded from the study. Similarly, pregnant and lactating women and subjects with gross deformity were also excluded from the study.

Duration of the Study: The duration of the study was 3 years.

Investigations: All the cases were subjected to haematological test (CBC- Hb%, TLC, DLC, ESR), biochemical test (LFT - S. bilirubin, SGOT, SGPT, S. alkaline phosphatase, and KFT - urea, creatinine, RA factor) and urine (routine & microscopic) investigations before and after the therapy while X-Ray of knee joint AP & lateral view was done at the time of screening only.

The safety of the therapy was evaluated clinically by monitoring adverse effects on every visit. The safety was also evaluated based on the laboratory investigations like CBC, LFT, KFT, and Urine R/M done at the time of inclusion and end of the study.

Assessment Scale: VAS was used for measuring joint pain and for other parameters grading system was used to assess the effect. Each patient was asked to grade pain intensity on a 0-5 visual analogue scale (VAS) before and after the procedure and other parameters scored on the following grading from 0 to 3.

Morning Stiffness: (Grade 0 = No morning stiffness; Grade 1 = Mild, up to 5 minutes; Grade 2 = Moderate, morning stiffness between 5 to 10 minutes; Grade 3 = Severe, morning stiffness is more than 10 minutes).

Local Swelling: (Grade 0 = No swelling/no pitting; Grade 1 = Mild, pitting is present but rebounds immediately; Grade 2 = Moderate, pitting is present but rebounds after 5 seconds; and Grade 3 = Severe, pressure leaves an indentation and takes more than 5 seconds to rebound)

Restriction of Movement: (Grade 0 = Normal movement; Grade 1 = Mild, partially restricted movement; Grade 2 = Moderate, partial movement, when the joint moved by the examiner; and Grade 3 = Completely restricted movement)

Muscular Weakness: (Grade 0 = Strength against gravity and added resistance; Grade 1 = Mild, strength only against gravity, not added resistance; Grade 2 = Moderate, muscular contraction occurs but not sufficient to overcome gravity; and Grade 3 = Severe, muscular contraction with little or no movement)

Wet Cupping Procedure: Wet cupping (*Ḥijāma bi'l-Sharṭ*) was performed in five sittings at the baseline, 1st follow-up (after 14 days), 2nd follow-up (after 29 days), 3rd follow-up (after 44 days) and 4th follow-up (after 59 days). Two disposable plastic vacuum cups of medium size and 1-2 small cups were applied on the affected joints for skin demarcation. The cups on each selected site were applied and suction was created for 3-5 minutes or till the appearance of erythema and congestion on the surface of the skin. Then the cups were depressurized and removed. 10-15 minor superficial scarifications of 1-2mm of depth and 3-5mm length were made evenly on the skin by using surgical blade (No. 11) and the cups were re-applied for 5 minutes on the skin in the same manner as described above. Blood started oozing from the scarified site at the skin surface. Cups were removed after

5 minutes or till blood was coagulated and the scarified area was cleaned by antiseptic solution and dressing was done to prevent any infection.

Response of the Therapy: For assessment of efficacy of the wet cupping (*Ḥijāma bi'l- Sharṭ*) therapy, the results were interpreted in terms of percentage efficacy. The percentage efficacy was calculated by the reduction in VAS score from baseline findings which was calculated by the following formula:

$$\text{Percentage efficacy} = \frac{\text{Maximum score - Minimum score x 100}}{\text{Maximum score}}$$

Assessment was done in the following manner:

Complete Response = **60-100%** improvement in the signs and symptoms of disease i.e. joints pain, tenderness, joints swelling and restriction of movement

Partial Response **= 30-59%** improvement in the signs and symptoms of disease, i.e. joints pain, tenderness, joints swelling and restriction of movement

No Response **= <30%** improvement in the signs and symptoms of disease, i.e. joints pain, tenderness, joints swelling and restriction of movement

Data obtained from hematological and biochemical parameters were analyzed statistically by using paired 't' test. The values were considered significant when the p values were found less than 0.05 ($p<0.05$).

Results

In this study, a total of 60 patients of knee osteoarthritis were registered for *Ḥijāma bi'l-Sharṭ* (wet cupping), out of which 24 were male and 36 females (Table 1). The mean and standard deviation of subjective parameters at the baseline and after 2 months of wet cupping therapy were calculated. It was revealed after this study that the mean and standard deviation of pain intensity score were dropped from 4.8 ± 1.3 at baseline to 3 ± 1.7 after 2 months of therapy. This reduction in pain score was found highly significant ($p<0.001$) when the two mean scores were analyzed using paired 't' test as shown in Table 5, Graph 6.

Among 60 patients of knee osteoarthritis, 09 patients had reported swelling. As much as 52 patients complained of restriction of joint movement, 59 complained of morning stiffness, and 27 patients reported muscular weakness.

On the basis of response of the therapy, about 73% of patients (N=44, F=27, M=17) responded well to the therapy and pain was subjectively relieved, swelling was relieved in 73% of patients (N=7, F=6, M=1) and morning stiffness was relieved in 72.88% of patients (N=43, F=30, M=13), while 46% of patients (N=24, F=16, M=8) reported positive response in restriction of

joint movement and 44.4% of patients (N=12, F=10, M=2) reported positive response in muscular weakness as shown in Table 4.

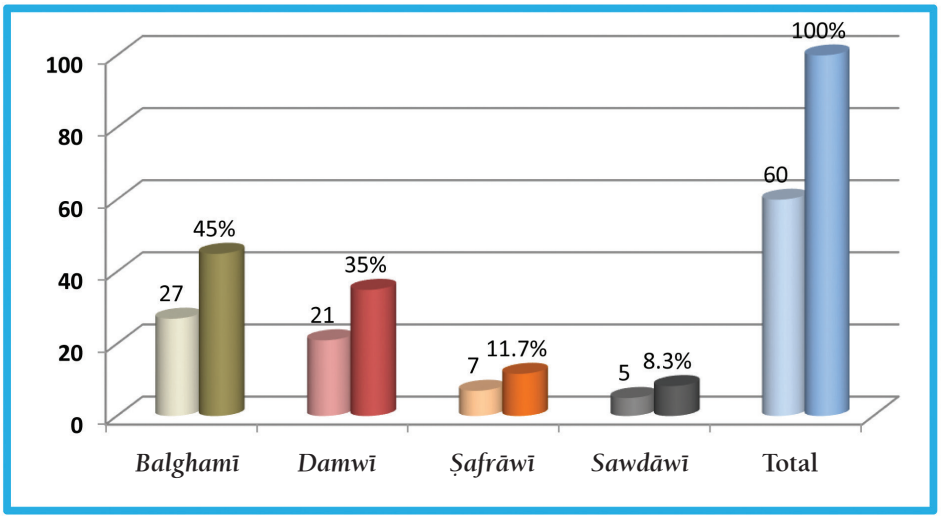
A total of 53 (88.3%) patients of knee osteoarthritis reported no side effects, 3 (5%) reported itching in the cupping area for 2 days, 4 (6.67%) complained of irritation and pain in the cupping area, which was of a mild degree and relieved itself in the next 24 hours. Nobody responded that the therapy was poor. No other adverse events were reported by the patients.

Discussion

In this study, 95 patients with knee osteoarthritis were evaluated, 74 of whom were eligible for inclusion in the study. Out of 74 participants, 8 refused to participate in the study as they were afraid of wet cupping (*Ḥijāma bi'l- Sharṭ*) therapy and 6 patients dropped out during the study. The demographic characteristics of each patient are presented in Table 1–3. A total of 60 patients of knee osteoarthritis were registered for *Ḥijāma bi'l-Sharṭ* (wet cupping), out of which 24 were male and 36 females as shown in Table 1. Out of the 60 patients of knee osteoarthritis, 27 (45%) were *Balghamī*, 21 (35%) *Damwī*, 07 (11.7%) *Ṣafrāwī*, and 05 (8.3%) *Sawdāwī* (Graph 1).

Table 1: Distribution of Patients According to Sex

Sex	No.	Percentage
Male	24	40%
Female	36	60%
Total	60	100%



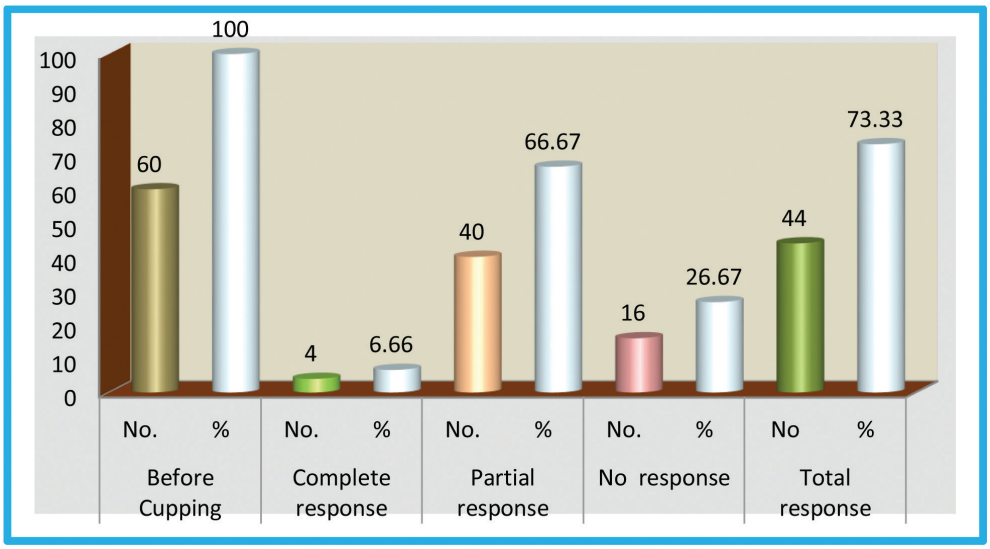
Graph 1: Distribution of Patients According to *Mizāj*

In the present study, volunteers aged above 35 years were included and sub-divided into four age groups of 35-45 years, 45-55 years, 55-65 years and more than 65 years respectively.

It was observed that the maximum number of knee osteoarthritis patients were aged above 65 years and the minimum number of patients in the age group of 35-45 years as shown in Table 2. It was also observed that the majority of patients were found in the group of more than 70 kg and the minimum number of patients were found in the group of 40-50 kg body weight as shown in Table 3.

Table 2: Distribution of Patients According to Age

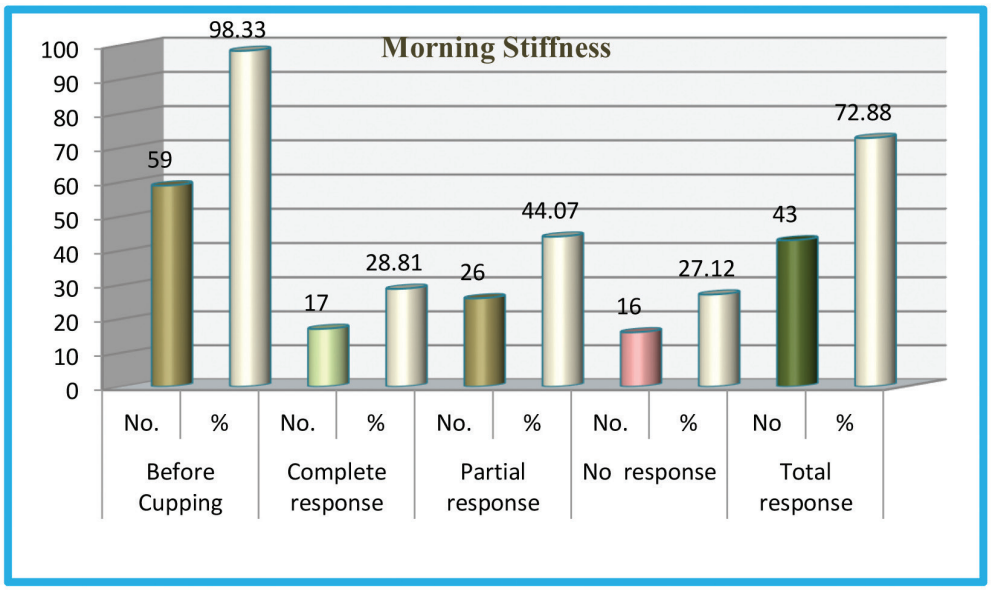
Age Group	No. of Patients	Percentage
35-45	11	18.34%
45-55	15	25%
55-65	16	26.66%
> 65	18	30%
Total	60	100%



Graph 2: Assessment of Pain

Table 3: Distribution of Patients According to Weight (in kg)

Weight in Kg	Number of Patients	Percentage
40-50	10	16.67
50-60	12	20.00
60-70	17	28.33
70 and above	21	35.00
Total	60	100.00

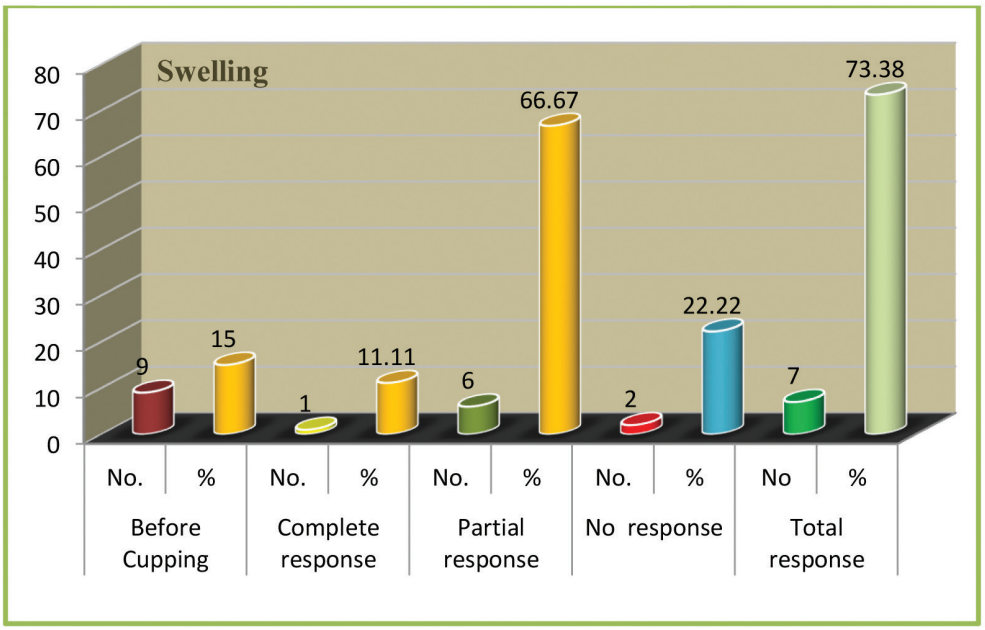


Graph 3: Assessment of Morning Stiffness

The mean and standard deviation of subjective parameters at the baseline and after 2 months of wet cupping therapy were calculated. It was revealed after this study that the mean and standard deviation of pain intensity score were dropped from 4.8 ± 1.3 at the baseline to 3 ± 1.7 after 2 months of therapy. This reduction in pain score was found highly significant ($p<0.001$)

Table 4: Outcome of Wet Cupping in Knee Osteoarthritis

Before Cupping			After Cupping							
			Complete response		Partial response		No response		Total response	
Parameter	No.	%	No.	%	No.	%	No.	%	No	%
Pain	60	100	4 F=3 M=1	6.66	40 F=24 M=16	66.67	16 F=9 M=7	26.67	44 F=27 M=17	73.33
Swelling	9	15	1 F=1 M=0	11.11	6 F=5 M=1	66.67	2 F=2 M=0	22.22	7 F=6 M=1	73.38
Morning stiffness	59	98.33	17 F=11 M=6	28.81	26 F=19 M=07	44.07	16 F=11 M=5	27.12	43 F=30 M=13	72.88
Restriction of joint movement	52	86.66	17 F=11 M=6	32.70	7 F=5 M=2	13.46	28 F=17 M=11	53.84	24 F=16 M=8	46.16
Muscular weakness	27	45	5 F=5 M=0	18.52	7 F=5 M=2	25.92	15 F=9 M=6	55.56	12 F=10 M=2	44.44



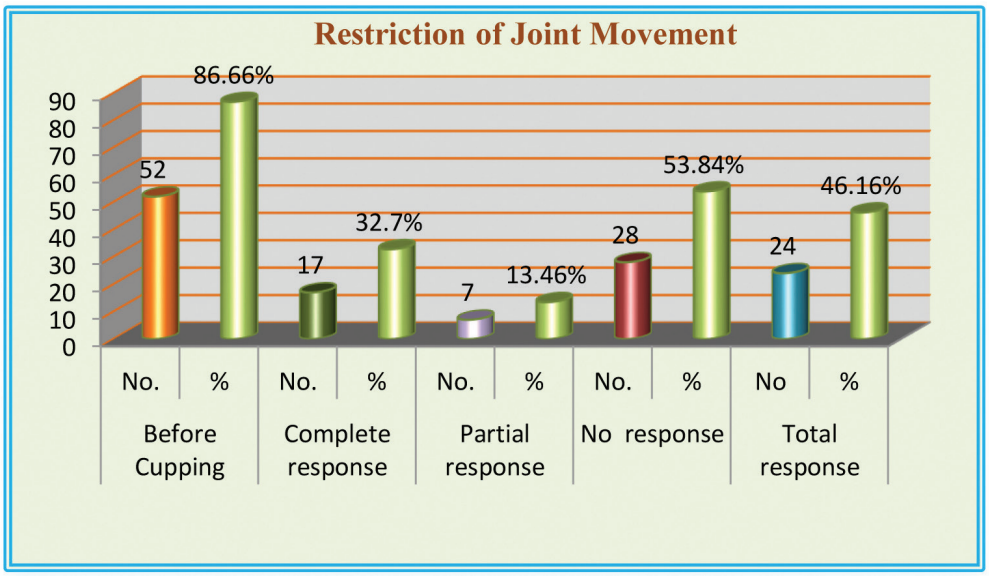
Graph 4: Assessment of Swelling

when the two mean scores were analyzed using paired 't' test as shown in Table 5, Graph 6.

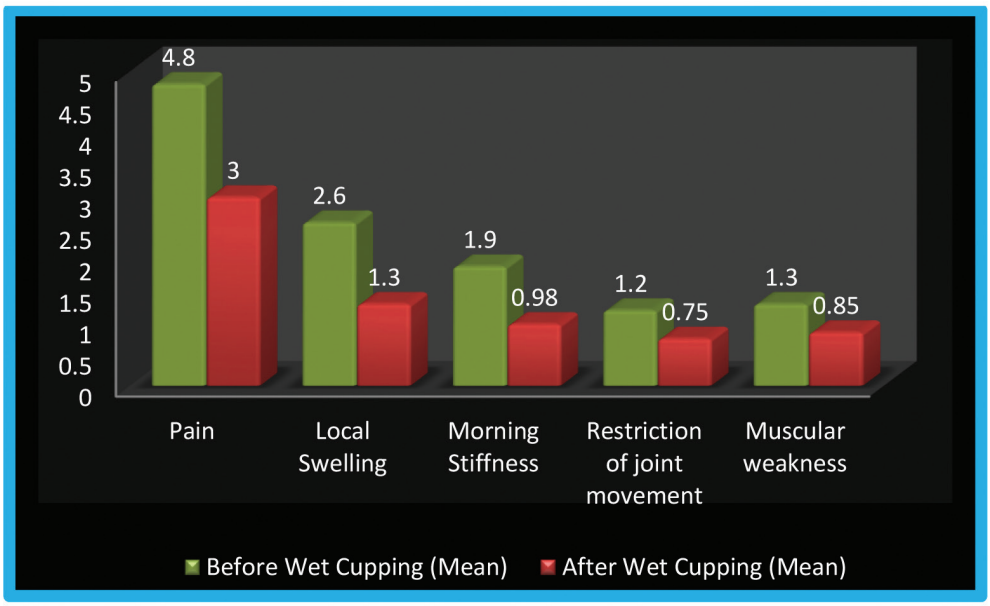
The other subjective parameters were analyzed statistically, and it was found that before wet cupping therapy the mean of local swelling score was 2.6 with a standard deviation of 0.5 and after wet cupping therapy it was reduced to 1.3 with a standard deviation of 0.82. The 't' test was applied to test significance of the results and it was found that the effect of wet cupping on local swelling was found highly significant ($p<0.001$) as shown in Table 5, Graph 6.

Table 5: Statistical Assessment of Subjective Parameters

S. No.	Parameters	Before Wet Cupping Mean ± S.D.	After Wet Cupping Mean ± S.D.	Significance	
1	Pain	4.8 ± 1.3	3 ± 1.7	t = 9.9	p= <0.001
2	Local Swelling	2.6 ± 0.5	1.3 ± 0.82	t = 4.5	p= <0.001
3	Morning Stiffness	1.9 ± 0.6	0.98 ± 0.8	t = 10.4	p= <0.001
4	Restriction of Joint Movement	1.2 ± 0.4	0.75 ± 0.58	t = 6.6	p= <0.001
5	Muscular Weakness	1.3 ± 0.45	0.85 ± 0.45	t = 4.6	p= <0.001



Graph 5: Assessment of Restriction of Joint Movement



Graph 6: Statistical Assessment of Subjective Parameters

Before wet cupping, it was found that the mean and standard deviation of morning stiffness score was dropped from 1.9 ± 0.6 at the baseline to 0.98 ± 0.8 after 2 months of therapy. This reduction in score was found highly significant ($p<0.001$) when the two mean scores were analyzed using paired 't' test (Table 5, Graph 6).

Before wet cupping therapy, it was found that the mean restriction of joint movement score was 1.2 with a standard deviation of 0.4 and after therapy it was reduced to 0.75 with a standard deviation of 0.58. This reduction

in score was found highly significant ($p<0.001$) when the two mean scores were analyzed using paired 't' test (Table 5, Graph 6).

It was revealed after this study that the mean and standard deviation of the muscular weakness score were dropped from 1.3 ± 0.45 at the baseline to 0.85 ± 0.45 after 2 months of therapy. This reduction in pain score was found highly significant ($p<0.001$) as shown in Table 5, Graph 6.

Among 60 patients of knee osteoarthritis, 09 patients had reported swelling. Fifty-two patients complained of restriction of joint movement, fifty-nine complained of morning stiffness and 27 patients reported muscular weakness.

On the basis of response of the therapy, about 73% of patients (N=44, F=27, M=17) reported to have responded well to the therapy and pain was subjectively relieved, swelling was relieved in 73% of patients (N=7, F=6, M=1) and morning stiffness was relieved in 72.88% of patients (N=43, F=30, M=13), while 46% of patients (N=24, F=16, M=8) reported positive response in restriction of joint movement and 44.4% of patients (N=12, F=10, M=2) reported positive response in muscular weakness as shown in Table 4.

Conclusion

We found that wet cupping (*Ḥijāma bi'l- Sharṭ*) therapy was effective in the treatment of knee osteoarthritis with significant relief in pain and improvement in knee joint mobility. It was effective in terms of analgesia, anti-inflammation and resolution of edema. Cupping therapy caused minimal and temporary side effects like ecchymosis, mild pain and blister formation. Thus, it can be concluded that wet cupping therapy is safe and effective in the management of knee osteoarthritis. Our outcomes of this study are a good example of successful intervention that can contribute to the debate about methodological standardization of cupping therapy in the management of knee osteoarthritis. Furthermore, wet cupping requires rigorous education and training on hygiene and precautions, as it entails a blood-letting process. Therefore, further well-designed, large-scale studies employing standardized procedures are recommended to thoroughly establish the efficacy of wet cupping and to examine potential adverse effects associated with it.

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Conflicts of Interest: The authors declare no conflict of interest.

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सारांश

घुटने के अस्थिसंधिशोथ के उपचार में *हिजामा बिल–शर्त* (वेट कपिंग) की प्रभावकारिता और सुरक्षा

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उद्देश्य: रुग्ण भाव के निष्कासन द्वारा घुटने के अस्थिसंधिशोथ के उपचार में वेट कपिंग की प्रभावकारिता और सुरक्षा को सिद्ध करना।

विधि: अंतर्वेशन और अपवर्जन मानदंडों को पूरा करने के बाद घुटनें के जोड़ों में दर्द से पीड़ित रोगियों को संकाय से जुड़े अस्पताल से लिया गया। अध्ययन के लिए घुटने के अस्थिसंधिशोथ से पीड़ित कुल 60 रोगियों का चयन किया गया। घुटने के अस्थिसंधिशोथ में वेट कपिंग की प्रभावकारिता का वैधीकरण करने के लिए पांच मापदंडों – जोड़ों का दर्द, सुबह में अकड़न, बाहरी सूजन, जो़ड़ों की गतिविधियों में रुकावट और मांसपेशियों की कमजोरी का चयन किया गया। जोड़ो के दर्द की गंभीरता को मापने के लिए वीएएस का उपयोग किया गया और अन्य मापदंडों के लिए ग्रेडिंग प्रणाली का उपयोग प्रभाव का आकलन करने के लिए किया गया। प्रत्येक रोगी को 5 बार कपिंग थेरेपी दी गईं।

परिणाम: यह पाया गया कि वेट कपिंग थेरेपी के बाद 73.33% घुटने के अस्थिसंधिशोथ ($p = >0.001$) में घुटने के जोड़ के दर्द में पूरी तरह या आंशिक रूप से कमी आई। जबकि सुबह में अकड़न, बाहरी सूजन, जो़ड़ों की गतिविधियों में रुकावट और मांसपेशियों की कमजोरी में भी सांख्यिकीय रूप से महत्वपूर्ण ($p= > 0.001$) सुधार हुआ।

निष्कर्ष: वर्तमान अध्ययन में, घुटने के अस्थिसंधिशोथ के रोगियों में वेट कपिंग की प्रभावकारिता सिद्ध की गई। यह न केवल दर्द कम करता है, रोगियों की गतिविधियों में सुधार और औषधियों पर रोगियों की निर्भरता को कम करता है, बल्कि साथ ही साथ रोगी को औषधियों के दुष्प्रभावों से भी सुरक्षित रख सकता है।

शब्दकुंजी: *हिजामा बिल–शर्त,* घुटना, वजा उल–मफ़ासिल, वजा उल–रुक्बा

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