

Clinical Study of
Polyherbal Unani Formulations in
Waram Tajāwīf al-Anf Muzmin
(Chronic Sinusitis)



CENTRAL COUNCIL FOR RESEARCH IN UNANI MEDICINE
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**Clinical Study of Polyherbal Unani Formulations in
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Preface

Symptoms and signs of *Nazla Bārid Muzmin* have been described in details in treatises of Unani physicians which closely resemble the symptoms of chronic sinusitis, although *Iltihāb Tajāwif al-Anf* or *Waram Tajāwif al-Anf* (Sinusitis) has not been mentioned as a disease in literature of Unani Medicine. Therefore, *Nazla Bārid Muzmin* has been considered as *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) in conducting the present study. *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) is the chronic inflammation of paranasal sinuses which affects all types of population.

Modern system of medicine offers antibiotics, antihistaminics, and decongestants for the treatment of sinusitis. When medicines fail to provide permanent relief to the patient, antral puncture is attempted to clear blocked sinuses, but that too is not a satisfactory solution in many cases. Also, frequent use of antibiotics is harmful to haemopoietic system of the body. In such a situation, it becomes essential to explore drugs of natural origin, which have least side-effects, for effective management of the disease. Keeping this in view, the Central Council for Research in Unani Medicine (CCRUM) designed a clinical study to evaluate the efficacy of two combinations of coded Unani formulations, UNIM-051 (for oral intake) + UNIM-053 (for inhalation), and UNIM-052 (for oral intake) + UNIM-053 (for inhalation) in the management of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis). The ingredients of these formulations have been selected in accordance with the principles of treatment mentioned in classical literature of Unani system of medicine and suggestions of Unani physicians of the Council's Scientific Advisory Committee (SAC) based on their personal experiences. The present compilation entitled *Clinical Study of Polyherbal Unani Formulations in Waram Tajāwif al-Anf Muzmin (Chronic Sinusitis)* is based on the results of the clinical

study conducted at the Council's Central Research Institute of Unani Medicine (CRIUM), Hyderabad on 3,675 clinically confirmed cases of *Waram Tajāwīf al-Anf Muzmin* (chronic sinusitis). In the first study, 2,322 cases were treated with the coded Unani formulations – UNIM-051 + UNIM-053. Of them, 1,841 (79.3%) showed complete subsidence in all the clinical signs and symptoms. In the second study, out of the 1,353 cases treated with the coded Unani formulations – UNIM-052 + UNIM-053, 963 (71.2%) cases showed complete subsidence in all the clinical signs and symptoms. Safety assessment conducted in both the studies revealed no adverse effects. Results of the clinical study are suggestive of undertaking future study for developing effective Unani treatment of sinusitis.

I am grateful to all the scientists who have been involved in this study at various levels, and also to the members of the Council's Scientific Advisory Committee for their guidance and encouragement. We are also indebted to some of the stalwarts of Unani Medicine like Hakim Yousuf Hussain Khan, Hakim S.M. Shibli, Hakim M.A. Wahab Zuhoori, Hakim Mohammed Iqbal Ali, Hakim M.M. Ali Khan, and Hakim Mastan Ali who were deeply involved in the development of research protocol for the study.

Prof. Rais-ur-Rahman

Director General

Central Council for Research in Unani Medicine

INTRODUCTION

This is a known fact that in the treatises of eminent Unani physicians, *Iltihāb Tajāwif al-Anf* or *Waram Tajāwif al-Anf* has not been mentioned as a disease. However, specific terms have been used for the symptoms, site and cause of *Nazla*, for example, in the description of *Nazla Hārr*, occurrence of *Iltihāb* in the face and eyes; and in *Nazla Bārid Muzmin*, impairment of *Quwwat Shāmma* (power of olfaction) due to *Sudda* (obstruction) in *Khayāshīm* (air cells). In addition, when we go through treatises of ancient Unani physicians regarding the present concept of Sinusitis, we find that symptoms and signs of sinusitis have been described under the disease – *Nazla*.²⁷

Ancient eminent Unani scholars Rabban Tabarī (810-895 A.D.), Zakariyya Rāzī (850-925 A.D.) and Ibn Sīnā (980-1037 A.D.) have regarded Buqrāt (Hippocrates -377-460 B.C.) as the first physician to describe *Nazla Muzmin* in their treatises – *Firdaws al-Hikma fi'l Tibb*, *Kitāb al-Hāwi* and *Al-Qānūn fi'l Tibb* respectively.^{1,3} Thus, in the ancient Unani literature, clinical features resembling sinusitis have been broadly described in the context of *Nazla* in three ways: *Nazla Hārr*, *Nazla Bārid*, and *Nazla Muzmin*.^{21,22,23,24,27} The clinical features of *Nazla Hārr* resembling sinusitis include *Sudā'* (headache), *Nakhs* (pricking pain), *Iltihāb al-Ra's*, *Iltihāb* (inflammation) and redness in face and eyes and watery and irritant nasal discharge.^{21,22,23,27} The clinical findings of *Nazla Bārid* resembling sinusitis include facial pressure and fullness, white and viscous nasal discharge, nasal blockage, and nasal speech.^{22, 23,27} When *Nazla Bārid* is produced by *Burūdat-i Khāriji* (external cold) and *Sudda* (obstruction) or '*Ufūnat* (infection) then it is known as *Nazla Muzmin*.²⁵ Therefore, *Nazla Bārid Muzmin* has been considered as *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) in conducting the present study.²⁶

In Unani System of Medicine, there are some principles for nomenclature of disease. The disease is not named as “*Itihāb*”, instead it is named as “*Waram*”. Therefore, *Itihāb* meaning *Sozish wa Lapat* (burning and flame) has been described as a symptom of *Nazla Hārr* not as a disease. Thus, the term *Waram Tajāwif al-Anf* is more appropriate for sinusitis.²⁶

In Unani classics, the term *Nazla* is derived from ‘*Nuzūl*’, in which *Balgham* (phlegm) produced in response to any stimulus in anterior part of the brain drops on the lower part (nose). *Nazla* is vast and comprehensive term used for common cold, rhinitis and rhinosinusitis on the basis of aetio-pathogenesis and clinical features.¹¹ Renowned Unani physicians have discussed the role of extrinsic and intrinsic factors in the causation of the disease. They have mentioned that exposure to excessive cold conditions affects the body’s homoeostatic system and triggers the production of *Balgham* (phlegm).^{3,5}

Waram Tajāwif al-Anf Muzmin is called chronic sinusitis in modern medicine, which is a chronic inflammatory condition of upper respiratory tract involving the paranasal sinuses. It is usually followed by coryza and cold or sometime resultant of dental infection, deeply seated in upper jaw. Most of the times, the maxillary sinuses are involved. However, it may also affect other sinuses on one or both sides.^{6,7}

CONCEPT OF SINUSITIS IN UNANI SYSTEM OF MEDICINE

‘Ali ibn ‘Abbās Majūsī has discussed about *Sū’-i Mizāj Bārid* of brain, which is responsible for the liquefaction and increase in the brain secretions. These secretions come towards the nasal passage and

nostrils. Sour and saline *Balgham* (phlegm) is produced in head and migrates towards other organs, which initiate the secretions.⁵

Due to exposure of excessive cold and hot conditions, the body heats up leading to the liquefaction of brain secretions. The heat inside the brain allows other body secretions to attract towards the brain. When these secretions accumulate in excess, they flow in the direction of nose. Similarly, excessive cold leads to liquefy the brain secretions and makes them flow towards nostrils.¹

Ibn Sīnā has stated in *Al-Qānūn fi'l Tibb* about the abnormal heat and cold inside and outside the brain, which causes *Nazla Hārr wa Bārid*, while describing *Amraz-i Anf* (diseases of nose). Muhammad bin Zakariyya Rāzī has mentioned in *Kitāb al-Hāwi fi'l Tibb* (Volume III) about the symptomatology and complications of *Nazla Bārid Muzmin*.^{2,3}

When secretions from the anterior ventricles of brain flow through the nasal passage and drain into throat, this condition is called *Nazla*. When the secretions drain towards nasal passage and obstruct it, the condition is termed as *Zukām*. In *Zukām*, the secretion is salty in taste and watery in nature, and this secretion affects the eyes, nose, face muscles and sense of smell.³

Asbāb (Causes)

The causative factors of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) are as follows:

- Coldness: Ice, Hail, Cold water, Cold eatables^{1,5}
- Tursh wa Hamiz Balgham (Sour Phlegm)⁵
- *Sudda* (Obstruction)⁸

- Specific coldness of the brain which aggravates abnormally by some exogenic factors, e.g., toxic substances and use of cold temperament drugs, cold waves, sadness and psychological stress.^{3,9}
- Sudden alternate exposure to heat and cold, and weakness of body.⁹
- *Sū’-i Mizāj-i Dimāgh*^{1,9}: There may be four types of *Sū’-i Mizāj* due to congestion of any of the body humours (*Akhlāt*) - *Dam*, *Balgham*, *Safrā’*, and *Sawdā’*. This condition arises in response to congestion due to evaporation of the affected *Khilt* (Humour) towards brain. As a result, liquefaction starts from brain, which affects nasal passage and nostrils.¹¹

‘*Alāmāt* (Symptoms)

The symptoms of *Waram Tajāwīf al-Anf Muzmin* (Chronic Sinusitis) are as follows:

- Whitish, thick and viscid nasal discharge
- Nasal obstruction
- Feeling of pressure and fullness in nose and forehead
- Decreased sense of smell
- Nasal speech
- Irritation in the nose
- Redness in the face.^{3,9}

Tashkhīs (Diagnosis)

Waram Tajāwīf al-Anf Muzmin (Chronic Sinusitis) is diagnosed on the basis of clinical findings, including heaviness and tightness in the forehead, nasal obstruction, congestion and affected voice.^{2,9,11}

Usūl-i 'Ilāj (Principles of Treatment)

The principles of treatment of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) are as follows:

1. Reduction of causative substance (*Mādda*)
2. Neutralization of cause through *'Ilāj bi'l Didd* (heterotherapy)
3. Removal of sinus secretion either by *Ta'dīl-i Qiwām* (normalization of consistency) or by *Imāla* (diversion) towards other channels.³

Tahaffuz (Prevention)

The following measures have been mentioned in Unani classical literature for prevention of the disease:

- Primary prevention of the disease involves protection of throat and lungs from *Nazla*, which is usually achieved through diet.
 - Affected person should not take food full of stomach at night because it may cause production of impure matter, which accumulates in brain.
 - Exposure to cold waves, especially Northern wind (*Hawā' Shimālī*) after the subsidence of Southern wind (*Hawā' Junūbī*) should be avoided.
 - Use of warm clothes or apparels to protect scalp and body from cold wave exposure.
 - Sleep during day time should be avoided.
 - Intake of cold foods and drinks should be avoided.
 - Easily digestible food should be taken.⁹

- Protection of throat and chest (Lungs) from *Nazla Bārid* by topical application of *Rawghan Banafsha* and *Rawghan Bāns*.
- Drinking of lukewarm water is useful in *Nazla*, which acts as a concoctive and expels the harmful secretions and protects the respiratory organs.

The great Unani scholar Jalinūs states, “One who wants to protect himself from *Nazla* should wash the head and then apply the paste of *Adwiya Muhammira* (rubefacient), e.g., *Khardal*. The excess *Burūdat* (coldness) of body that is responsible for the disease may be expelled by *Hammām Shamsī* (Sun Bath) and *Hammām* (Bath) for relieving the symptoms. He has also said that this procedure is better than *Faşd* (venesection) in patients without the symptoms of *Harārat* (hotness).³

CONCEPT OF SINUSITIS IN MODERN SYSTEM OF MEDICINE

Introduction

Sinusitis is defined as an inflammation of the lining membrane of the paranasal sinuses.⁶ The infection of the paranasal sinuses is quite frequent. It may be acute or chronic. The maxillary sinuses are the most frequently affected. The frontal sinuses are affected less frequently. The ethmoidal or sphenoidal sinuses are seldom affected¹⁴.

Anatomy of Paranasal Sinuses

Paranasal sinuses are the spaces filled up with air in certain skull bones in relation to nose. They develop as out-pouching of the mucus membrane of nasal fossae. They start developing at about the third or

fourth month of the foetal life and the development is completed by 20-25 years of age. They may be divided into two groups:

1. Anterior group
 - a. Maxillary sinuses (Antrum of highmore)
 - b. Frontal sinuses
 - c. Anterior group of ethmoidal sinuses
2. Posterior group
 - a. Posterior group of ethmoidal sinuses
 - b. Sphenoidal sinuses

All the sinuses are lined with respiratory epithelium, i.e. pseudo-stratified ciliated columnar epithelium. The movement of the cilia in the paranasal sinuses is directed towards the nasal cavity.

a. Maxillary Sinus

It is pyramidal in shape, and occupies the body of maxilla. The base of the pyramid lies medially, and the apex lies in the zygomatic portion of the maxilla. It is the largest of all the paranasal sinuses. The average capacity of this in adult is 15 ml. It has five walls.

b. Frontal Sinus

Both the right and left frontal sinuses are upward extension of the anterior ethmoidal sinuses. They occupy the frontal bone. The capacity of the sinus is about 7 cc in adults. It has three walls and a partition in between the two sinuses.

c. Ethmoidal Sinus (Labyrinth)

There are two groups of cells, and there are about 7 to 15 thin-walled cells in each ethmoidal labyrinth. The anterior ethmoidal

air cells open into the upper part of the hiatus semilunaris, and sometimes on to or above the bulla ethmoidalis. These are usually small and numerous. The posterior ethmoidal air cells open into the superior meatus, and the cells are large and few.

d. Sphenoidal Sinus

They occupy the body of the sphenoid bone. The capacity of each sinus is about 7 cc in adults. The two sinuses are separated by a thin plate of a bony partition. The opening of the sinuses is situated in the upper part of the anterior wall. It drains into the superior meatus through the sphenoidal recess.¹⁴

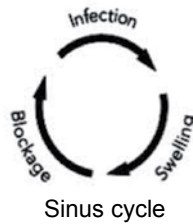
Functions of Paranasal Sinuses

The paranasal sinuses are thought to serve the following functions:

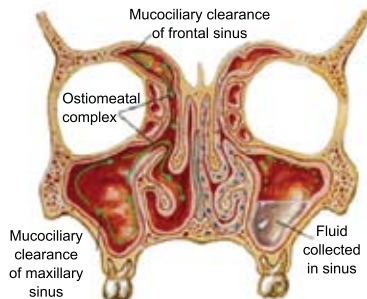
1. Warming and moistening of inspired air may be partly done by the large mucosal surface of these adjacent sinuses.
2. The air filled sinus cavities probably add resonance to the laryngeal voice.
3. They act as temperature buffers. It is regarded that these chambers probably protect the contents of orbits and cranial fossae from the intranasal temperature variations.
4. Probably, sinus formation in the cranial bones helps in reducing the weight of the facial bones.
5. The sinus mucosa may act as a donor site for reconstructive procedures, e.g., for subglottic stenosis and implantation of maxillary sinus mucosa into the nasal cavity in atrophic rhinitis.
6. They act as shock buffers.¹⁶

Pathophysiology of Sinusitis

Acute sinusitis is most commonly preceded by acute or chronic rhinitis, but maxillary sinusitis occasionally arises by extension of periapical infection through the bony floor of the sinus. The offending agents are usually inhabitants of the oral cavity, and the inflammatory reaction is entirely non-specific. Impairment of drainage of the sinus by inflammatory oedema of the mucosa is an important contributor to the process, and when complete, may impound the suppurative exudate, producing *empyema* of the sinus. Obstruction of the outflow, most often of the frontal and next most often of the anterior ethmoid sinuses, occasionally leads to an accumulation of mucus secretion in the absence of direct bacterial invasion, producing a so-called *mucocele*. Acute sinusitis may, in time, give rise to *chronic sinusitis*, particularly when there is interference with drainage. There is usually a



Nasal cycle



Cilia drain sinuses by propelling mucus toward natural ostia (mucociliary clearance)

mixed microbial flora, largely of normal inhabitants of the oral cavity. Particularly severe forms of chronic sinusitis are caused by fungi (e.g., mucormycosis), especially in diabetics.¹⁷

Aetiology

Sinusitis is usually associated with nasal infection. It is due to any condition within the nose hampering the drainage and aeration of sinus which is liable to get infected. If the infection persists, the blockage of the natural drainage channels occurs. Such type of narrowing and obstruction of the nasal passage predisposes to the development of sinusitis. The excessive vasomotor changes take place with the variation of temperature or improper air conditioning resulting in excessive humidity and drainage, which also predisposes to sinus infection. Dental infection may also predispose to sinusitis.⁶ Chronic sinusitis is most commonly associated with either bacteria or fungi.²⁸

Classification of Sinusitis

i) Acute Sinusitis

Acute sinusitis is defined as sinusitis of less than 4 weeks' duration.²⁸ The maxillary sinus, owing to its size, gives acute symptoms less often than the other sinuses. When infected, however neuralgic pains in the upper teeth may be the first sign. There is a beating sensation in the cheek and feeling of fullness below the eye on the affected side, while frequently a spot of tenderness can be indicated just lateral to the alae nasi. Tenderness may be found on pressure behind the maxilla on the edge of the pterygoid fossa. Examination of the nose may reveal the presence of pus in the middle meatus. In the early stages, probably there will be some drainage from the nose. This may

completely dry up as the mucus membrane in the sinus swells and occludes the ostium. Now the tension rises inside the sinus, and a certain amount of purulent fluid is forced out through the ostium. At this stage, there is extremely severe pain, and after a little discharge the pain may subside. This condition may continue for some days until the infection begins to recover, when drainage is re-established from the ostium and there is a copious flow of pus from the infected sinus. Complete resolution takes place within 2-3 weeks.⁶

ii) Chronic Sinusitis

Chronic sinusitis is characterized by symptoms of sinus inflammation lasting more than 12 weeks. This illness is most commonly associated with either bacteria or fungi, and clinical cure in most cases is very difficult.²⁸ In this stage, the damage to the mucus membrane occurs which leads to the impairment of the ciliary activity and thickening of mucus membrane. This condition may progress until the sinus is filled with polypi and pus, which is discharged at frequent intervals into the nose. Symptoms are varied and complaint may be of frequent colds, or an unpleasant taste or a bad smell in the nose. The discharge is frequently foul. As the condition settles into the chronic stage, pain and tenderness disappear.⁶

Clinical Features

The symptoms of sinusitis can be divided into two broad groups.

General Symptoms

The symptoms of sinusitis may be slight or not sufficient to prevent ordinary work.⁷ Radiological changes in the sinuses after cold

do not necessarily produce the clinical picture of sinusitis. The general symptoms associated with sinusitis are malaise, headache and fever. Fever is common in acute cases and presenting with general toxæmia accompanying acute infection in the sinuses. The fever is not usually high and when it is, suggests a closed infection or a complication. It is usually remittent but may be intermittent if the sinus is blocked and contains pus. The malaise is the most frequent feature, particularly in the early stage and before the formation and discharge of mucoid and mucopurulent secretion that usually appears in 48 hours. With the onset of free discharge, the malaise may be rapidly improved.⁷

Local Symptoms

Early stage may consist of feeling of discomfort in the post-nasal space and clearness of the nasal passages, but this quickly gives place to obstruction on the side of the sinusitis with loss of vocal resonance. This is particularly noticeable with ethmoiditis, producing the typical 'flat voice' and may be associated with loss of smell and there may be cacosmia.⁷

The classical diagnostic symptom is the nasal or post-nasal discharge, usually nasal in the early stage or after an exacerbation, which gradually becomes post-nasal as the amount of discharge decreases and the cilia deals with the discharge by conveying it into the post-nasal space.⁷ Pain over the sinus concerned may be localized or referred to the branches of the nerves involved in the inflammation.⁷

Ethmoidal pain is localized over the bridge of the nose and inner canthus behind the eye and is aggravated with the movement of eyes. Sometimes pain is referred to the parietal eminence and is often localized to a small area.⁷

Frontal pain is mainly localized to the forehead and is always associated with generalized headache. Infection in the frontal sinus gives rise to the characteristic periodicity of pain more than in any other sinus. It often persists for an hour or two after getting up in the morning and clears during the afternoon.⁷

Sphenoidal pain: Acute sphenoiditis is commonly associated with pan-sinusitis and particularly associated with infection of the posterior ethmoidal cells. It may give rise to occipital or vertical headache and sometimes referred to mastoid process.⁷

Diagnosis

Diagnosis of sinusitis is made on the basis of clinical and radiological findings. Radiograph of the paranasal sinuses (water's view) shows haziness initially due to mucosal oedema. Later, as the exudates collect, the radiograph shows opacity with a free fluid level, if radiography is performed in an upright position. As the exudates increase, the entire sinus becomes opaque.¹⁴

Differential Diagnosis

1. Alveolar abscess is characterized by a painful tooth and swelling of the alveolar margin. Swelling of the face is often present, which is unusual with acute maxillary sinusitis.
2. Cellulitis of the cheek is usually secondary to the cellulitis of the nose caused by a furuncle in the vestibule. Sinusitis does not cause swelling of the face, though it may swell because of cellulitis.
3. Furuncle on the face can be easily identified.
4. Insect bite may cause redness and oedema of the face.
5. Angioneurotic oedema of the face presents with a swelling without inflammation.

6. Infra-orbital or trigeminal neuralgia, a severe pain in the infra-orbital region.
7. Malignancy of the maxillary sinus may present as a painful lesion, and may occur in elderly patients who may have blood-stained discharge from the nose. Radiological investigations, exfoliative cytology of the antral puncture washings and biopsy settle the diagnosis.
8. Temporal arteritis may resemble sinusitis, but the pain is in the temporal region.¹⁴

Complications

The complications of sinusitis are common during an acute exacerbation of chronic suppurative sinusitis.

The infection may spread through the following routes:

- Through the bony wall directly
- Venous spread
- Lymphatic spread
- Through the perineural spaces of the olfactory nerves to the subarachnoid space.

The complications are as follows:

- Osteomyelitis
- Orbital cellulitis
- Cavernous sinus thrombosis
- Meningitis
- Brain abscess
- Extradural abscess
- Subdural abscess.¹⁵

Management

General Treatment

1. The condition may respond to antibiotics. If does not respond changing to the next generation antibiotics may help in relieving the symptoms.
2. Decongestants reduce the congestion and swelling of the mucosa of the nose and sinus, and improve the drainage of the sinus.
3. Analgesics make the patient comfortable.
4. Antihistamines are useful in patients with allergic manifestations.¹⁴

Local Treatment

1. Nasal decongestant drops reduce the congestion of the nasal mucosa and accelerate the drainage of the sinus through its ostium.
2. Steam inhalation provides fomentation and thins the secretions which may flow out easily. Various additives, eucalyptus oil or menthol act mainly as flavoring agents.
3. Fomentation or short-wave diathermy on the sinus provides soothing.¹⁴

STUDY RATIONALE

In classical Unani Literature, *Nazla Bārid Muzmin* has been described in detail, and its clinical features closely resemble the features of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis). The ancient Unani physicians Zakariyya Rāzī, ‘Ali ibn ‘Abbās Majūsi, Ibn Sīnā, and

Ibn Rushd have mentioned the role of extrinsic and intrinsic factors in the causation of the disease.^{2,4,5}

Waram Tajāwif al-Anf Muzmin is characterized by symptoms of sinus inflammation lasting more than 12 weeks. This illness is most commonly associated with either bacteria or fungi, and clinical cure in most cases is very difficult. Many patients have undergone treatment with repeated course of antibacterial agents and multiple sinus surgery, increasing their risk of colonization with antibiotic-resistant pathogens and of surgical complications. These patients often have high rates of morbidity, sometimes over many years.

There are several single as well as compound Unani drugs which are in use for centuries for effectively treating *Nazla Bārid Muzmin* and presently for *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis). But many of them have not been evaluated clinically on scientific parameters. Further, the limitations of management of *Waram Tajāwif al-Anf Muzmin* (chronic sinusitis) available in modern medicine necessitate a scientific search for safe, effective and convenient medications for the disease.

Keeping this in view, the present study was designed to evaluate the safety and efficacy of the coded Unani formulations in two combinations – UNIM-051 (oral) + UNIM-053 (inhaler) and UNIM-052 (oral) + UNIM-053 (inhaler) in cases of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis).

OBJECTIVE OF THE STUDY

- To evaluate the safety and efficacy of the coded Unani formulations in the treatment of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis).

STUDY DESIGN

An open-label clinical study was conducted.

SELECTION CRITERIA

Inclusion Criteria

1. Patients of either sex in the age group of 15-65 years.
2. Clinical diagnosis of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) based on the following signs and symptoms of more than 12 weeks' duration:
 - Nasal discharge
 - Nasal obstruction
 - Headache
 - Hyposmia
 - Malaise

Exclusion Criteria

1. Patients with pan sinusitis and diabetes mellitus
2. Hepatic, renal, cardiac and pulmonary disorders
3. Patients on regular treatment from other systems of medicine
4. Pregnant and lactating women
5. Women on oral contraceptives

Subject Selection

- Clinical diagnosis of *Waram Tajāwif al-Anf Muzmin* (Chronic

Sinusitis) based on the following signs and symptoms of more than 12 weeks' duration:

- Nasal discharge
- Nasal obstruction
- Headache
- Hyposmia
- Malaise

MATERIALS & METHODS

Patients of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) fulfilling the inclusion criteria and willing to participate in the study were selected from the OPD of CRIUM Hyderabad. They were subjected to clinical examination and pathological, biochemical and radiological investigations including complete blood count (CBC), erythrocyte sedimentation rate (ESR), nasal smear cytology (NSC), urine examination (R/M), stool examination (R/M), fasting blood glucose, liver function tests (LFTs), renal function tests (RFTs). LFTs and RFTs were conducted to assess the safety of the study drugs and X-ray PNS was performed to rule out pan sinusitis. Investigations were conducted at baseline and at the end of treatment, whereas the fasting blood glucose and X-ray PNS were performed at baseline only to rule out diabetes mellitus and pan sinusitis respectively. The duration of therapy was 60 days with clinical follow-ups conducted fortnightly. Cured and relieved patients were advised to report in case of recurrence/ relapse of any of the clinical features of the disease during post-treatment period of one year. The present study was conducted on 3675 clinically diagnosed cases of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) including 2322 cases in study-I and 1353 cases in study-II during the period from April, 1980 to March, 2001.

Study	Study drugs	Number of patients studied
I	UNIM-051 + UNIM-053	2322
II	UNIM-052 + UNIM-053	1353
	Total	3675

STUDY DRUG DETAILS

The coded Unani formulations – UNIM-051, UNIM-052 and UNIM-053 were prepared at GMP certified Pharmacy of CRIUM, Hyderabad.

STUDY-I

Study Drugs: UNIM-051 + UNIM-053

UNIM-051(Oral)

The coded Unani formulation – UNIM-051 is a combination of Irsā (*Iris ensata* Thunb.) and Filfil Siyāh (*Piper nigrum* Linn.) mixed in a definite proportion and prepared in the form of powder filled in capsules.

Composition of UNIM-051		
S. No.	Ingredient	Botanical Name
1	Irsā ^{13, 20}	<i>Iris ensata</i> Thunb.
2	Filfil Siyāh ^{19, 20}	<i>Piper nigrum</i> Linn.

UNIM-053 (Inhaler)

The coded Unani formulation – UNIM-053 is a combination of Satt-i Ajwāin (*Ptychotis ajowan* DC.), Satt-i Pudinā (*Mentha arvensis*

Linn.) and Kāfūr (*Cinnamomum camphora* Nees & Eberm.) mixed in definite proportion in liquid form for steam inhalation.

Composition of UNIM-053		
S. No.	Ingredient	Botanical Name
1	Satt-i Ajwāin ^{12, 18, 19}	<i>Ptychotis ajowan</i> DC. (Thymol)
2	Satt-i Pudīnā ^{12, 18, 19}	<i>Mentha arvensis</i> Linn. (Menthol)
3	Kāfūr ^{12, 18, 19}	<i>Cinnamomum camphora</i> Nees & Eberm.

STUDY-II

Study Drugs: UNIM-052 + UNIM-053

UNIM-052 (Oral)

The coded Unani formulation – UNIM-052 is a combination of Ustūkhūdūs (*Lavandula stoechas* Linn.) and Filfil Siyāh (*Piper nigrum* Linn.) mixed in a definite proportion and prepared in the form of powder filled in capsules.

Composition of UNIM-052		
S. No.	Ingredient	Botanical Name
1	Ustūkhūdūs ¹³	<i>Lavandula stoechas</i> Linn.
2	Filfil Siyāh ^{13, 18}	<i>Piper nigrum</i> Linn.

UNIM-053 (Inhaler)

The coded Unani formulation – UNIM-053 is a combination of Satt-i Ajwāin (*Ptychotis ajowan* DC.), Satt-i Pudīnā (*Mentha arvensis* Linn.)

and Kāfūr (*Cinnamomum camphora* Nees & Eberm.) mixed in definite proportion in liquid form for steam inhalation.

Composition of UNIM-053		
S. No.	Ingredient	Botanical Name
1	Satt-i Ajwāin ^{12, 18, 19}	<i>Ptychotis ajowan</i> DC. (Thymol)
2	Satt-i Pudīnā ^{12, 18, 19}	<i>Mentha arvensis</i> Linn. (Menthol)
3	Kāfūr ^{12, 18, 19}	<i>Cinnamomum camphora</i> Nees & Eberm. (Camphor)

PHOTOGRAPHS OF SOME INGREDIENTS OF THE CODED UNANI FORMULATIONS – UNIM-051 & UNIM-052



Irsā (*Iris ensata* Thunb)



Filfil Siyāh (*Piper nigrum* Linn.)



Ustūkhūdūs (*Lavandula stoechas* Linn.)

Dosage and Mode of administration

Study-I

The coded Unani formulation – UNIM-051 was given in the dose of two capsules of 500 mg each orally twice daily before meals along

with UNIM-053 as inhaler in the dose of 1-2 drops at bedtime. The duration of therapy was 60 days.

Study-II

The coded Unani formulation – UNIM-052 was given in the dose of two capsules of 500 mg each orally twice daily before meals along with UNIM-053 as inhaler in the dose of 1-2 drops at bedtime. The duration of therapy was 60 days.

DIETARY RESTRICTIONS

According to Unani theory of management of disease, the diet is supposed to play an important role both in aggravation as well as in relieving of symptoms. Since the *Mizāj* (temperament) of the *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) is regarded as phlegmatic and cold, all the patients were advised not to take food items with phlegmatic and cold temperament during the trial as detailed in the table.

Restricted Food Items			
S. No.	Item	S. No.	Item
1.	Curd	10.	Guava
2.	Butter milk	11.	Musk melon
3.	Tamarind	12.	Water melon
4.	Lime	13.	Cucumber
5.	Orange	14.	Indian sorrel
6.	Pineapple	15.	Red sorrel
7.	Pomegranate	16.	Pumpkin
8.	Banana	17.	Ice cream
9.	Custard apple	18.	Chilled water

CRITERIA FOR ASSESSMENT OF SAFETY

Safety of the study drug was assessed on the basis of liver function tests and renal function tests at baseline and after completion of treatment.

CRITERIA FOR ASSESSMENT OF EFFICACY

The efficacy of the study drugs was assessed on the basis of improvement in the subsidence of signs and symptoms of *Waram Tajāwif al-Anf Muzmin* (Chronic Sinusitis) and results were graded as under:

Result	Response to Treatment
Cured	100% Relief in Signs and Symptoms
Relieved	50-99% Relief in Signs and Symptoms
Not relieved	<50% Relief in Signs and Symptoms

OBSERVATIONS AND RESULTS OF STUDY-I

Total number of 2,322 patients were included in this study and treated with UNIM-051 + UNIM-053. Their age ranged between 15 and 65 years with mean age 34.67 ± 13.26 (S.D.) years. The chronicity of disease ranged between 6 months and 31 years with mean chronicity 6.79 ± 6.31 years (Table 1, Fig. 1).

Age, sex, dietary habits, socio-economic status and *Mizāj* (temperament) of the patients are shown in Tables 2 to 5. Male patients (56.8%) dominated female patients and maximum 30% patients were in the age group 35-45 years (Table 2, Fig. 2). According to dietary habits, 91.0% patients were non-vegetarian indicating that they had a greater risk of the disease than the vegetarians (Table 3, Fig. 3). Most

Table 1: Gender, age and chronicity (mean \pm SD, range) of the patients treated with UNIM-051 + 053

S. No.	Characteristics	Number of cases
1.	Male	1318 (56.8%)
	Female	1004 (43.2%)
	Total cases	2322
2.	Age (Mean \pm S.D.)	34.67 \pm 13.26 years
	Age (Range)	15-65 years
3.	Chronicity (Mean \pm S.D.)	6.79 \pm 6.31 years
	Chronicity (Range)	6 months-31 years

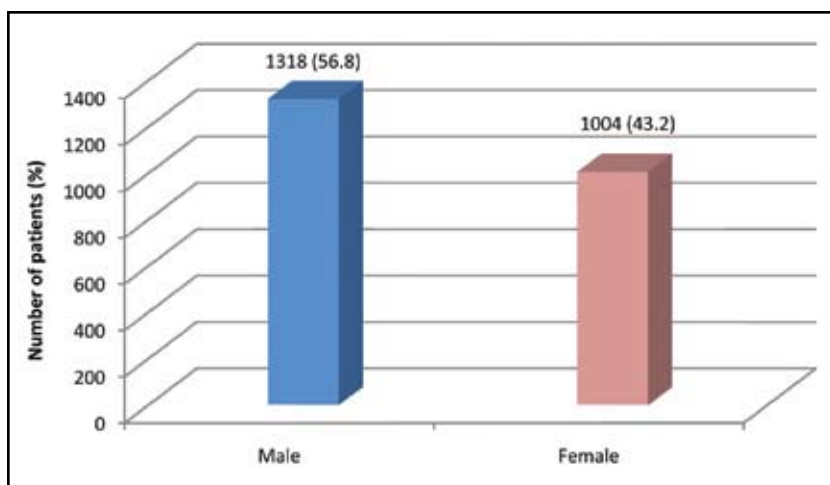


Fig. 1: Gender of the patients

of the patients (53.0%) belonged to average socio-economic status whereas 42% and 5% of the patients had good and poor socio-economic status, respectively (Table 4, Fig. 4). All the patients were assessed for

Table 2: Distribution of patients according to age and sex

Age (in years)	Sex		Total	Percentage
	Male	Female		
15 – 25	298	247	545	23.5
25 – 35	367	272	639	27.5
35 – 45	410	286	696	30.0
50 – 55	105	94	199	8.5
55 – 65	138	105	243	10.5
Total	1318	1004	2322	100.0

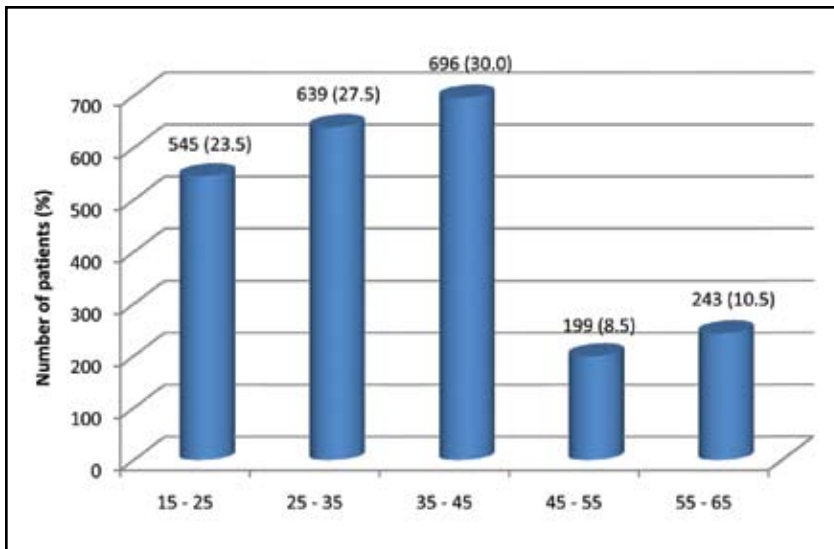


Fig. 2: Patients in different age groups

their *Mizāj* (temperament) according to classical Unani parameters and it was observed that 75.3% patients had *Balghami* temperament followed by 22.8% having *Damwi*, 1.5% *Safrāwi* and 0.4% *Sawdāwi*

Table 3: Distribution of patients according to dietary habits

Dietary Habits	Sex		Total	Percentage
	Male	Female		
Vegetarian	149	61	210	9.0
Non-vegetarian	1169	943	2112	91.0
Total	1318	1004	2322	100.0

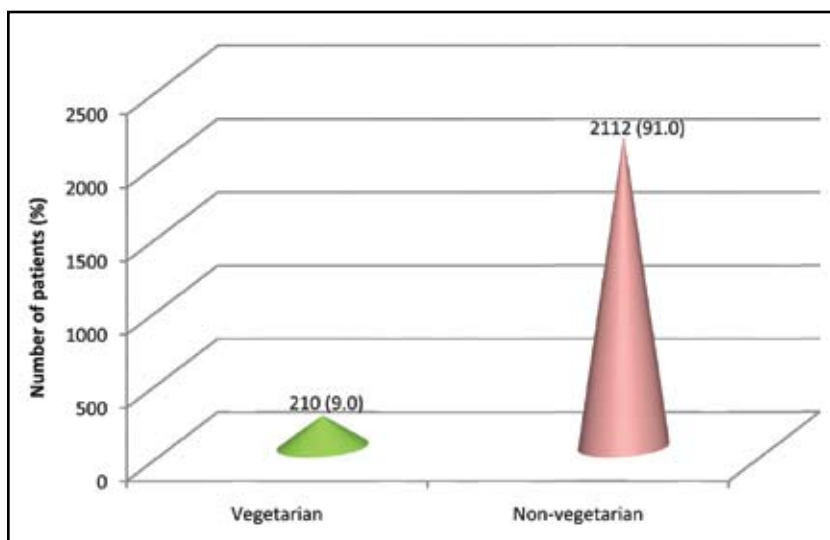


Fig. 3: Dietary habits of the patients

temperaments (Table 5, Fig. 5). Urine and stool examinations were normal in all the cases.

Role of season in the onset and aggravation of symptoms was assessed and it was observed that the prevalence was more in winter season (50.4%) followed by summer (33.0%) and rainy seasons (16.6%) (Table 6, Fig.6).

Table 4: Socio-economic status of patients

Socio-economic status	Sex		Total	Percentage
	Male	Female		
Poor	97	19	116	5.0
Average	652	579	1231	53.0
Good	569	406	975	42.0
Total	1318	1004	2322	100.0

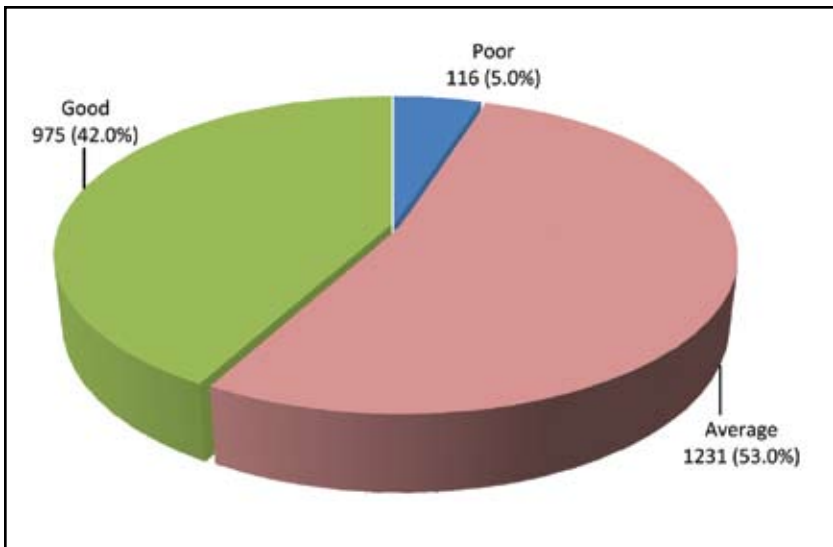


Fig. 4: Socio-economic status of patients

According to chronicity of the symptoms, highest number of patients had chronicity of 4-10 years (29.6%) followed by 1-2 years (19.0%) (Table 7, Fig.7).

The signs and symptoms of the patients showed that nasal discharge was present in 99.5% patients, nasal obstruction in 96.5%

Table 5: Distribution of patients according to Mizāj (temperament)

Mizāj	Sex		Total	Percentage
	Male	Female		
<i>Damwī</i>	236	293	529	22.8
<i>Balghamī</i>	1054	694	1748	75.3
<i>Safrāwī</i>	22	14	36	1.5
<i>Sawdāwī</i>	6	3	9	0.4
Total	1318	1004	2322	100.0

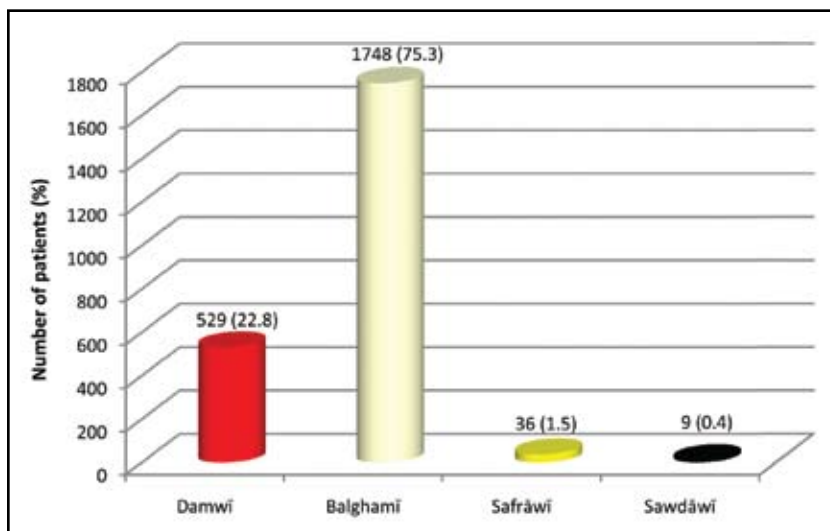


Fig. 5: Distribution of patients according to Mizāj

patients, headache in 98.5% patients, hyposmia in 94.5% patients whereas 92.1% patients had malaise (Table 8 and Fig. 8).

The outcome of the treatment is depicted in Tables 9 to 20 and figures 9 to 15. Out of 2,322 patients, 2181 (93.93%) responded in

Table 6: Seasonal onset/ aggravation of symptoms

Seasons	Sex		Total	Percentage
	Male	Female		
Summer	359	407	766	33.0
Rainy	231	155	386	16.6
Winter	728	442	1170	50.4
Total	1318	1004	2322	100.0

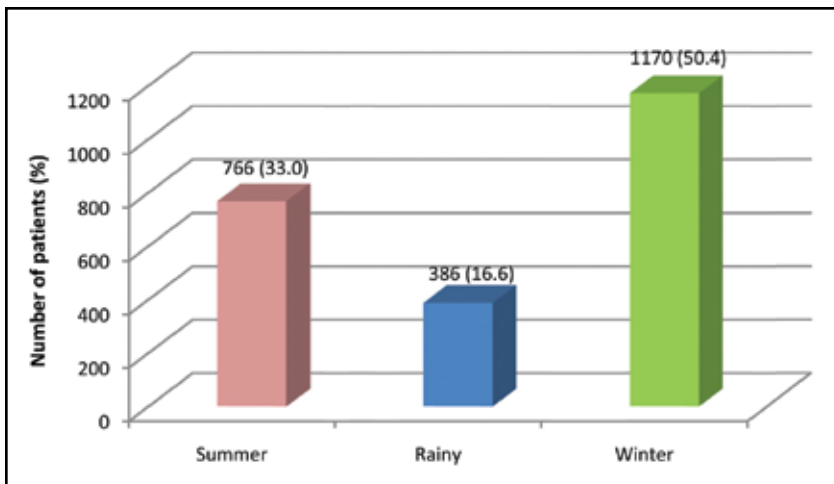


Fig. 6: Seasonal onset/aggravation of symptoms

varying degrees, whereas 141 (6.07%) patients did not respond to the treatment (Table 9, Fig. 9). Total mean response with the treatment was 83.5 percent (S.D. 24.9) (Table 12, Fig. 12). Out of 2322 patients, 1841 (79.3%) patients were cured, 340 (14.6%) relieved and 141 (6.1%) patients did not relieve (Table 15, Fig. 15).

According to assessment, influence of age and chronicity indicated that the drug was almost equally effective in all age groups

Table 7: Distribution of patients according to chronicity of disease

Chronicity	Sex		Total	Percentage
	Male	Female		
06-12 months	98	123	221	9.5
01-02 years	244	197	441	19.0
02-03 years	197	175	372	16.0
03-04 years	211	192	403	17.4
04-10 years	404	284	688	29.6
10 years & above	164	33	197	8.5
Total	1318	1004	2322	100.0

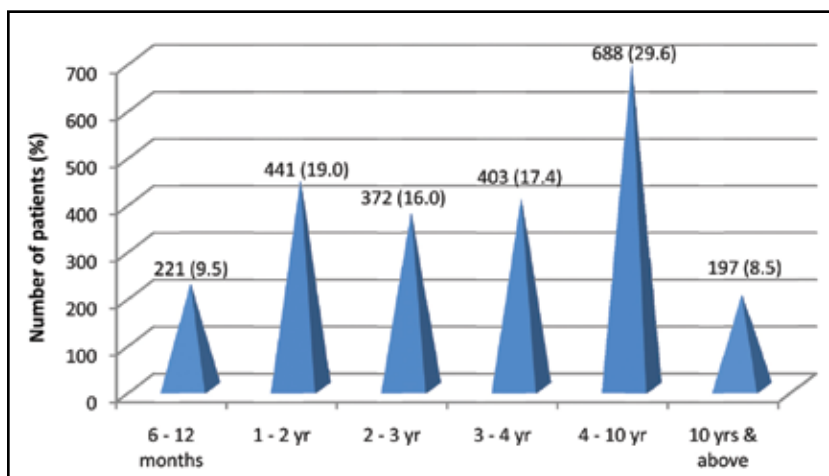


Fig. 7: Patients in different chronicities

and chronicity (Table 10, 11, 12, 13, 16 and 17, Fig. 10, 11, 12 and 13). The difference in percentage response in different age groups and chronicity was not statistically significant (Table 12 and 13).

Table 8: Signs and symptoms at baseline

Signs & Symptoms	Sex		Total	Percentage
	Male	Female		
Nasal discharge	1308	1002	2310	99.5
Nasal obstruction	1270	971	2241	96.5
Headache	1295	993	2288	98.5
Hyposmia	1220	974	2194	94.5
Malaise	1208	930	2138	92.1

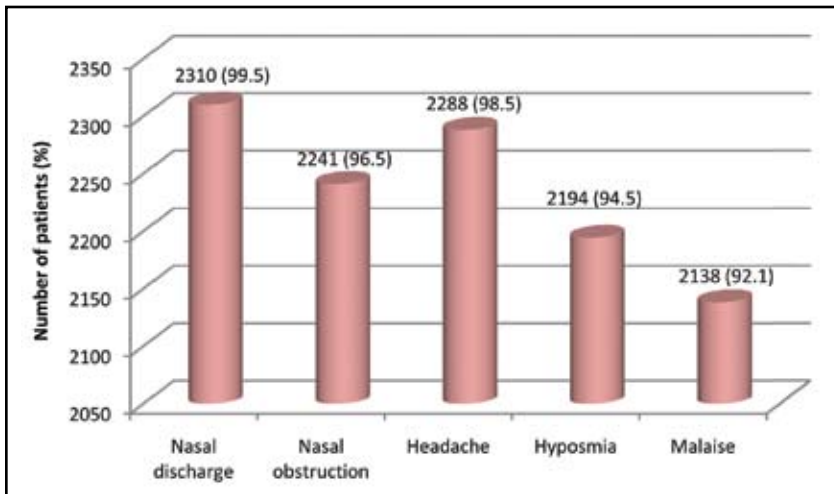


Fig. 8: Clinical picture at baseline

Relief in signs and symptoms at various stages of the treatment suggested that the response was directly proportional to the duration of treatment as the percentage of patients relieved of their signs and symptoms increased with increase in duration of treatment. This further indicated that the effect of the drug was faster during first 15 days of treatment (Table 14, Fig. 14).

Table 9: Responders and Non-responders

Total number of patients treated	Responders	Non-responders
2322	2181	141
100%	93.9%	6.1%

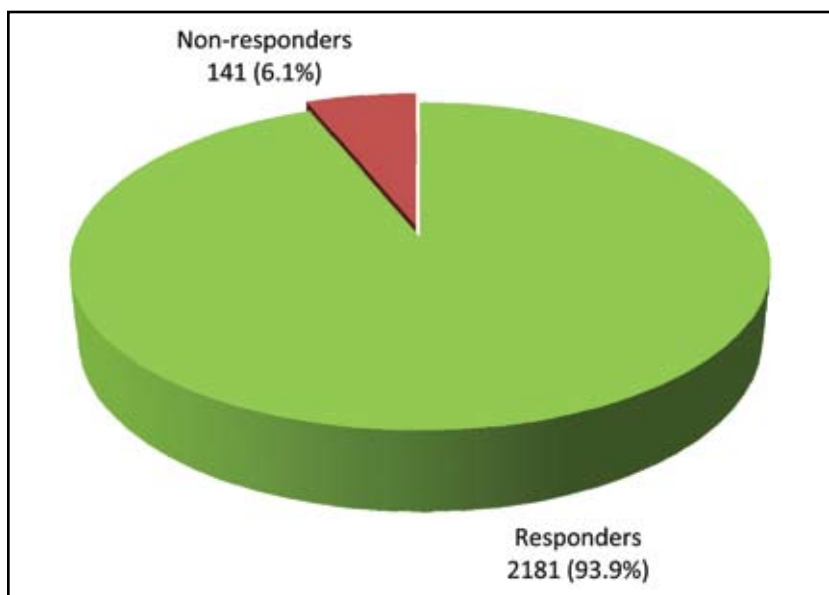


Fig. 9: Responders and Non-responders

Pathological and biochemical laboratory findings before and after treatment are shown in Tables 18 to 20. The results indicated that the drug had no effect on haemoglobin level and erythrocyte count. However, the differential leucocyte count showed that there was significant reduction in eosinophil count of the patients at the end of the treatment. The drug showed reduction in ESR, though it was not statistically significant (Table 18).

Table 10: Responders and Non-responders in different age groups

Age (in years)	Total number of patients	Number (%) of Responders	Number (%) of Non-responders
15 – 25	545	513 (94.1)	32 (5.9)
25 – 35	639	607 (95.0)	32 (5.0)
35 – 45	696	644 (92.5)	52 (7.5)
45 – 55	199	187 (94.0)	12 (6.0)
55 – 65	243	230 (94.7)	13 (5.3)
Total	2322	2181 (93.9)	141 (6.1)

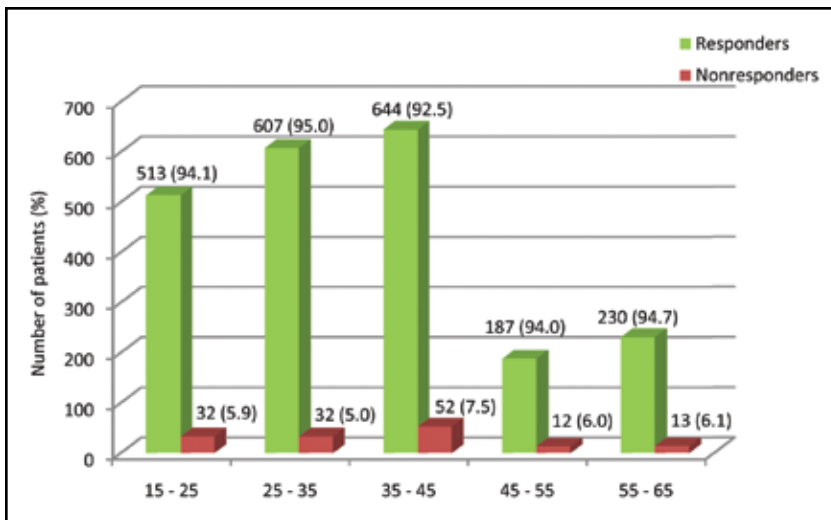


Fig. 10: Responders and non-responders in different age groups

The findings of nasal smear cytology are shown in Table 19. It is evident from the findings that different cells - eosinophils, lymphocytes, epithelial cells, pus cells and neutrophils were present

Table 11: Responders and Non-responders in various chronicities

Chronicity	Total number of patients	Number (%) of responders	Number (%) of non-responders
06 – 12 months	221	211 (95.5)	10 (4.5)
01 – 02 years	441	418 (94.8)	23 (5.2)
02 – 03 years	372	355 (95.4)	17 (4.6)
03 – 04 years	403	382 (94.8)	21 (5.2)
04 – 10 years	688	632 (91.9)	56 (8.1)
10 years & above	197	183 (92.9)	14 (7.1)
Total	2322	2181 (93.9)	141 (6.1)

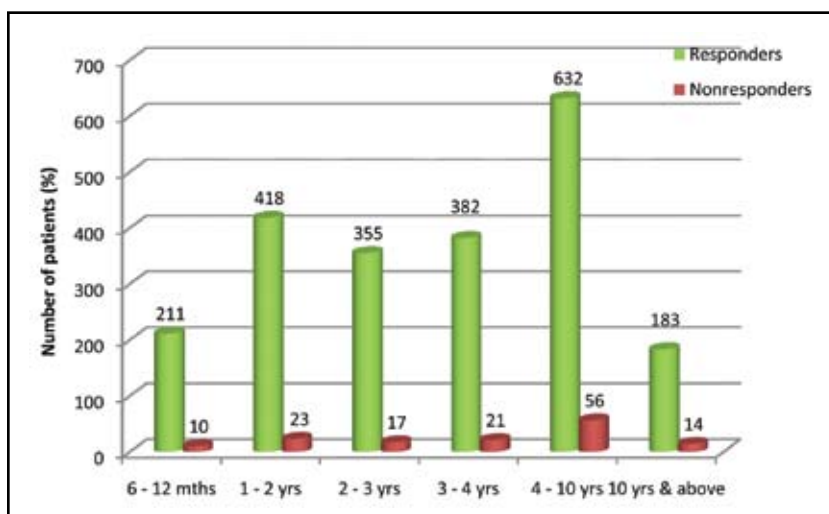
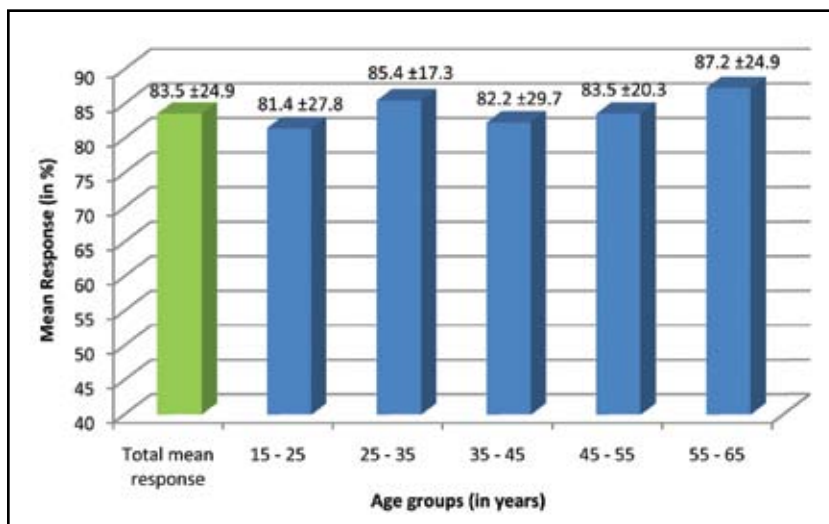


Fig. 11: Responders and non-responders in different chronicities

at the baseline. Their disappearance was observed after treatment in 86.5%, 31.7%, 28.7%, 27.2%, and 22% of the patients, respectively (Table 19).

Table 12: Age and Response (Mean \pm S.D.)

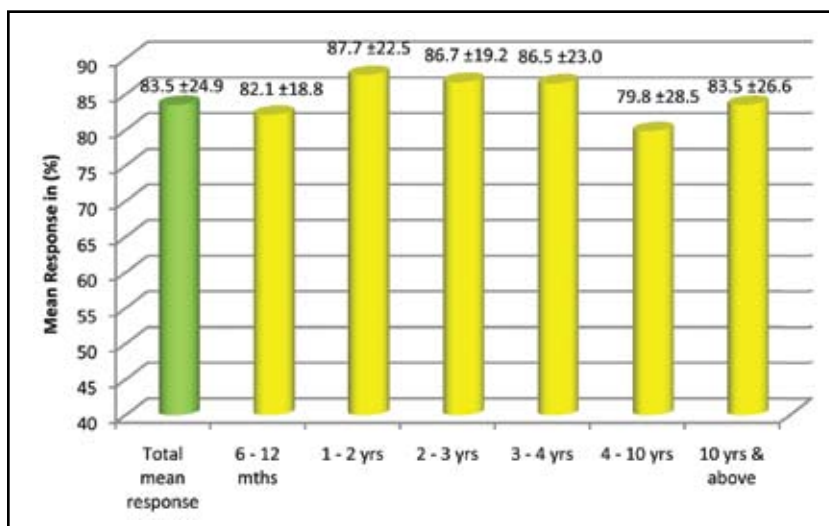
Age (in years)	Number of patients	Response (%)
15 – 25	545	81.4 \pm 27.8
25 – 35	639	85.4 \pm 17.3
35 – 45	696	82.2 \pm 29.7
45 – 55	199	83.5 \pm 20.3
55 – 65	243	87.2 \pm 21.9
Total	2322	83.5 \pm 24.9

Fig. 12: Mean (\pm S.D.) response in different age groups

No statistically significant changes were observed in the values of biochemical parameters at the end of treatment, which suggests that the study drug has no adverse effects on hepato-renal functions (Table 20).

Table 13: Chronicity and Response (Mean \pm S.D.)

Chronicity	Number of patients	Response (%)
06 – 12 months	221	82.1 \pm 18.8
01 – 02 years	441	84.7 \pm 25.5
02 – 03 years	372	86.7 \pm 19.2
03 – 04 years	403	86.5 \pm 23.0
04 – 10 years	688	79.8 \pm 28.5
10 years & above	197	83.5 \pm 26.6
Total	2322	83.5 \pm 24.9

Fig. 13: Mean (\pm S.D.) response in different chronicities

During post treatment period of one year, less than 10% of the patients who were either cured or relieved with the treatment reported with mild symptomatic relapse which was fully controlled by the drug in one or two weeks.

Table 14: Relief in Signs and Symptoms at various stages of treatment

S. No.	Signs & Symptoms	No. of patients	Number (%) of patients relieved				
			Base-line	15 days	30 days	45 days	60 days
1.	Nasal discharge	2310	00 (0.0)	1196 (51.8)	1404 (60.8)	1811 (78.4)	2019 (87.4)
2.	Nasal obstruction	2241	00 (0.0)	883 (39.4)	1347 (60.1)	1777 (79.3)	1916 (85.5)
3.	Headache	2288	00 (0.0)	848 (37.1)	1289 (56.3)	1741 (76.1)	1834 (80.2)
4.	Hyposmia	2194	00 (0.0)	847 (38.6)	1044 (47.6)	1661 (75.7)	1778 (81.0)
5.	Malaise	2138	00 (0.0)	1022 (47.8)	1464 (68.5)	1731 (81.0)	1993 (93.2)

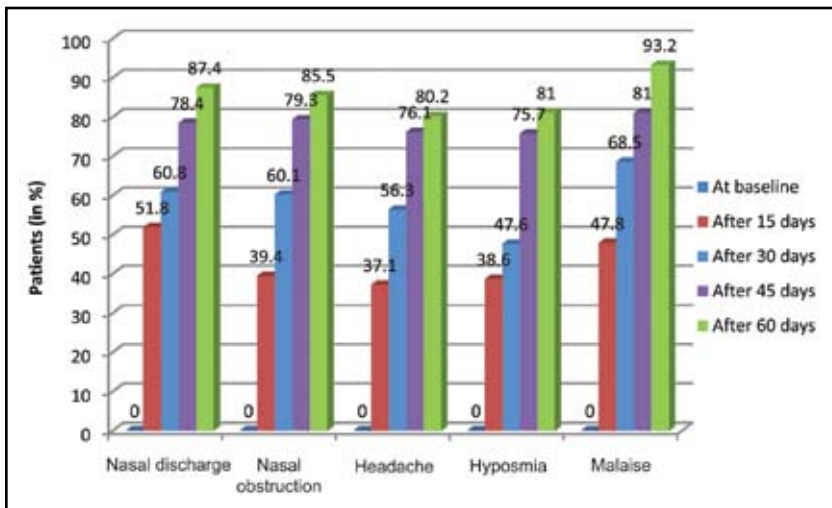


Fig. 14: Patients relieved of various symptoms and signs at different follow-ups

Table 15: Therapeutic Response at a glance

Response	Number of cases	Percentage
Cured	1841	79.3
Relieved	340	14.6
Not relieved	141	6.1
Total	2322	100.0

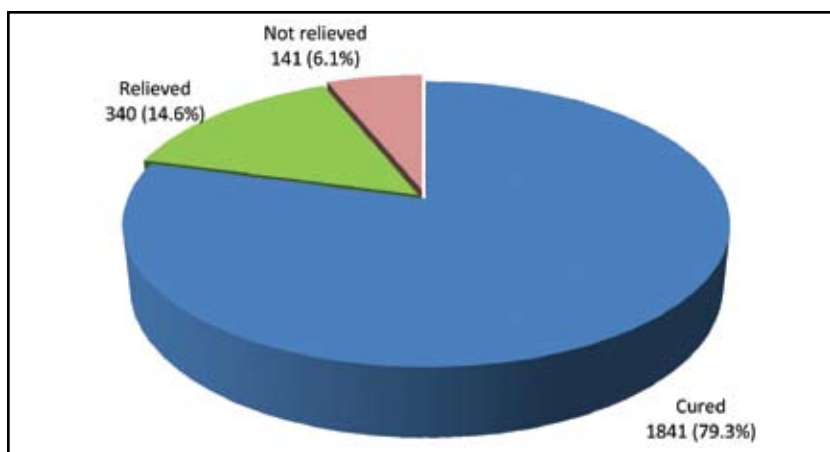


Fig. 15: Therapeutic response at a glance

Table 16: Therapeutic Response in different age groups

Age (in years)	Number of patients	RESPONSE (%)		
		Cured	Relieved	Not relieved
15 – 25	545	424 (77.8)	89 (16.3)	32 (5.9)
25 – 35	639	508 (79.5)	99 (15.5)	32 (5.0)
35 – 45	696	556 (79.9)	88 (12.6)	52 (7.5)
45 – 55	199	153 (76.9)	34 (17.1)	12 (6.0)
55 – 65	243	200 (79.1)	40 (15.8)	13 (5.1)
Total	2322	1841 (79.3)	340 (14.6)	141 (6.1)

Table 17: Therapeutic Response in different chronicities

Chronicity	Number of patients	RESPONSE (%)		
		Cured	Relieved	Not relieved
06 – 12 months	221	161 (72.8)	51 (23.1)	9 (4.1)
01 – 02 years	441	367 (83.2)	51 (11.6)	23 (5.2)
02 – 03 years	372	291 (78.2)	64 (17.2)	17 (4.6)
03 – 04 years	403	321 (79.7)	61 (15.1)	21 (5.2)
04 – 10 years	688	544 (79.1)	88 (12.8)	56 (8.1)
10 years & above	197	157 (79.7)	25 (12.7)	15 (7.6)
Total	2322	1841 (79.3)	340 (14.6)	141 (6.1)

Table 18: Pathological Assessment before and after treatment (Mean \pm S.D.)

S. No.	Parameter	Before treatment	After treatment	Significance P <0.05	
1	Haemoglobin (gm%)	13.2 \pm 1.53	13.6 \pm 1.45	NS	
2	Erythrocyte Count/cmm	5.2 \pm 0.65	5.0 \pm 0.54	NS	
3	Total Leucocyte Count/cmm	6900 \pm 1100	7100 \pm 1350	NS	
4	**DLC	Neutrophil (%)	54.6 \pm 10.2	56.2 \pm 9.7	NS
		Lymphocyte (%)	36.8 \pm 9.7	38.2 \pm 8.9	NS
		Eosinophil (%)	6.8 \pm 4.1	3.51 \pm 2.7	P < 0.01
		Monocyte (%)	1.8 \pm 1.1	2.1 \pm 1.4	NS
		Basophil (%)	0.0 \pm 0.0	0.0 \pm 0.0	NS
5	*ESR (mm/hour) (I hour)	18.2 \pm 16.3	12.2 \pm 12.1	NS	
6	*ESR (mm/hour) (II hour)	32.6 \pm 26.3	29.5 \pm 24.2	NS	

*ESR = Erythrocyte Sedimentation Rate

**DLC = Differential Leucocyte Count

Table 19: Nasal Smear findings

S. No.	Findings	No. of positive cases before treatment	No. of cases turned negative after treatment	Percentage of disappearance
1	Epithelial cells	2830	811	28.7
2	Neutrophils	501	110	22.0
3	Lymphocytes	2211	701	31.7
4	Pus cells	1282	349	27.2
5	Bacteria	-	-	-
6	Mucus	1665	361	21.7
7	Eosinophils	281	243	86.5

Table 20: Biochemical Assessment before and after treatment (Mean \pm SD)

S. No.	Parameter	Before treatment	After treatment	Significance P <0.05
1	Fasting Blood Glucose (mg/dL)	84.56 \pm 21.72	82.96 \pm 20.09	***ns
2	Blood Urea (mg/dL)	23.12 \pm 8.23	21.3 \pm 9.05	NS
3	Serum Creatinine (mg/dL)	0.85 \pm 0.31	0.81 \pm 0.23	NS
4	*SGPT (Unit/ml)	14.31 \pm 6.92	12.56 \pm 5.72	NS
5	**SGOT (Unit/ml)	11.56 \pm 7.12	10.86 \pm 6.91	NS

* SGPT = Serum Glutamic Pyruvic Transaminase

** SGOT = Serum Glutamic Oxaloacetic Transaminase

***NS = Not Significant

OBSERVATIONS AND RESULTS OF STUDY-II

A total of 1,353 patients were treated with the combination of UNIM-052 + UNIM-053. Out of them, male patients 801 (59.2%) were predominantly affected with *Waram Tajāwif al-Anf Muzmin* (Chronic sinusitis), whereas females were 552 (40.8%). The age was ranging from 15 to 64 years with mean of 32.85 ± 11.86 (S.D.) years and the chronicity ranged from 6 months to 29 years with mean of 6.16 ± 6.06 (S.D.) years (Table 21, Fig. 16).

Table 21: Gender, age and chronicity (mean \pm SD, range) of the patients treated with UNIM-052+053

S.No.	Characteristics	Number of cases
1.	Male	801 (59.2%)
	Female	552 (40.8%)
	Total cases	1353
2.	Age (Mean \pm S.D.)	32.85 ± 11.86 years
	Age (Range)	15 – 64 years
3.	Chronicity (Mean \pm S.D.)	6.16 ± 6.06 years
	Chronicity (Range)	6 m – 29 years

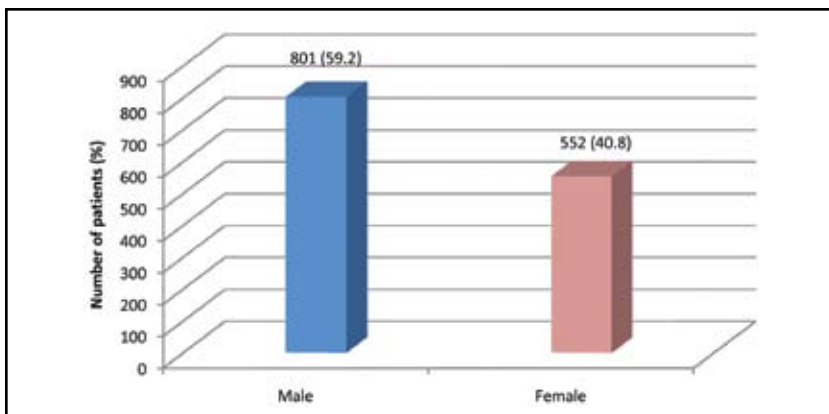


Fig. 16: Gender of the patients

Age, sex, dietary habits, socio-economic status and *Mizāj* (temperament) of the patients are shown in Tables 22 to 25. Male patients (28.5%) were present in the age group 35-45 years (Table 22, Fig. 17). According to dietary habits, non-vegetarians were 90.4%

Table 22: Age and sex-wise classification of patients

Age (in years)	Sex		Total	Percentage
	Male	Female		
15 – 25	197	155	352	26.0
25 – 35	220	152	372	27.5
35 – 45	254	131	385	28.5
45 – 55	80	96	176	13.0
55 – 65	50	18	68	5.0
Total	801	552	1353	100.0

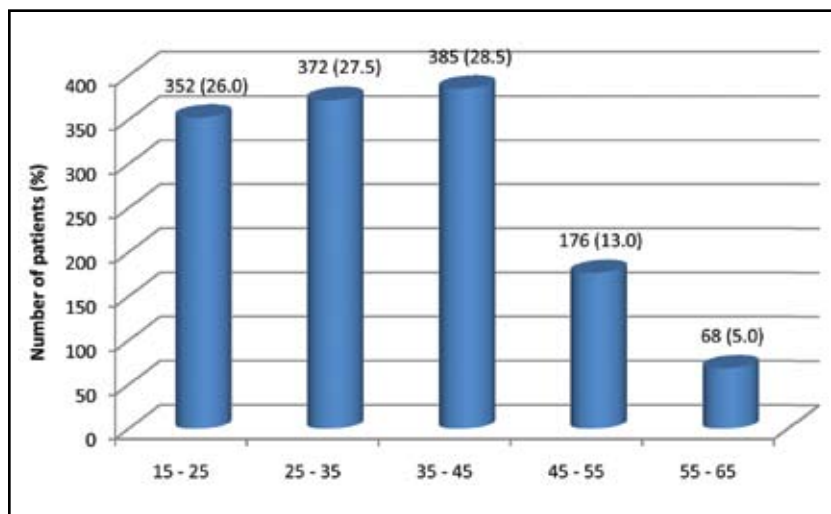


Fig. 17: Patients in different age groups

whereas vegetarians were less prone (Table 23, Fig. 18). Most of the patients (53.2%) belonged to average socio-economic group, followed

Table 23: Dietary Habits of the patients

Dietary Habits	Sex		Total	Percentage
	Male	Female		
Vegetarian	101	29	130	9.6
Non-vegetarian	700	523	1223	90.4
Total	801	552	1353	100.0

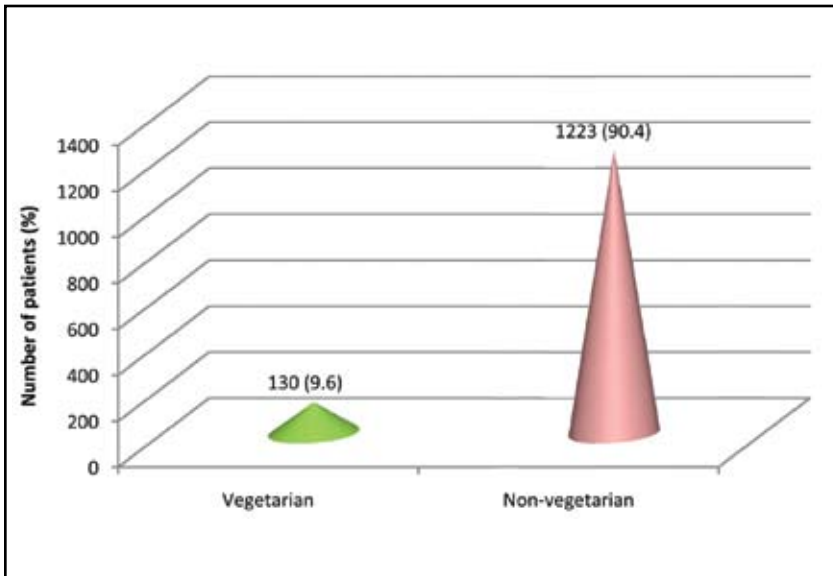


Fig. 18: Dietary habits of the patients

by 41.9% in good and 4.9% in poor socio-economical group (Table 24, Fig. 19). All patients were assessed for their *Mizāj* (temperament),

Table 24: Socio-economic status of patients

Socio-economic status	Sex		Total	Percentage
	Male	Female		
Poor	58	8	66	4.9
Average	402	318	720	53.2
Good	341	226	567	41.9
Total	801	552	1353	100.0

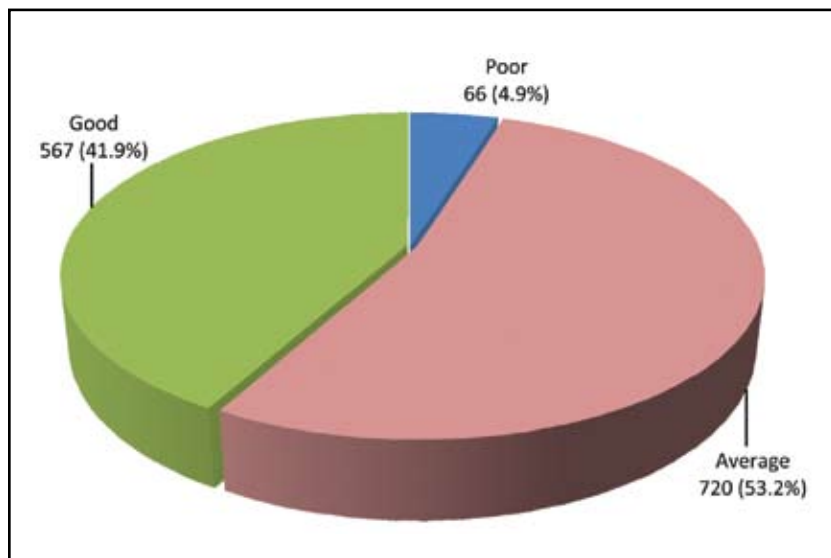


Fig. 19: Socio-economic status of patients

according to classical Unani parameters, 75.3% were having *Balghami* temperament followed by 22.8% *Damwi*, 1.6% *Safrāwi* and 0.3% *Sawdāwi* temperament (Table 25, Fig. 20).

Table 25: Distribution of patients according to *Mizāj* (Temperament)

<i>Mizāj</i>	Sex		Total	Percentage
	Male	Female		
<i>Damwī</i>	149	160	309	22.8
<i>Balghamī</i>	635	383	1018	75.3
<i>Safrāwī</i>	14	8	22	1.6
<i>Sawdāwī</i>	3	1	4	0.3
Total	801	552	1353	100.0

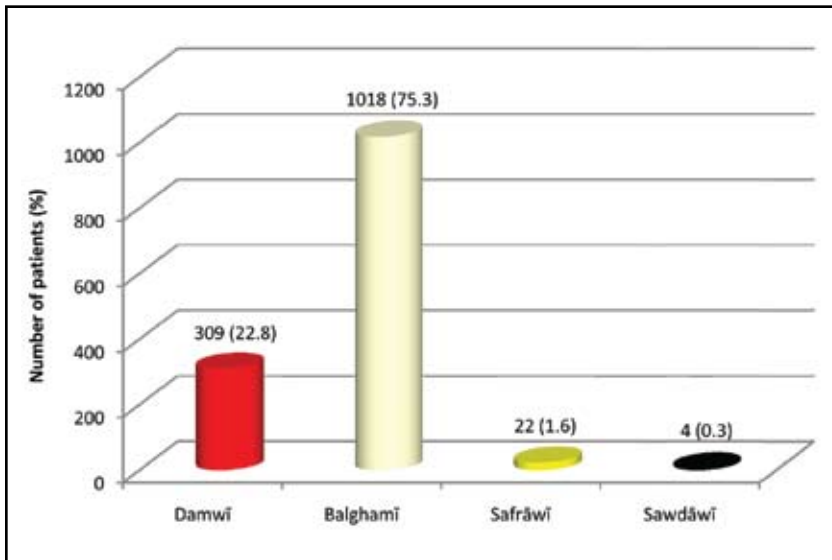


Fig. 20: Distribution of patients according to *Mizāj*

According to seasonal onset and aggravation of symptoms, it was observed that the prevalence was more in winter (49.9%) followed by summer (33.3%) and rainy season (16.8%) (Table 26, Fig. 21).

Table 26: Seasonal onset/ Aggravation of symptoms

Seasons	Sex		Total	Percentage
	Male	Female		
Summer	220	231	451	33.3
Rainy	143	84	227	16.8
Winter	438	237	675	49.9
Total	801	552	1353	100.0

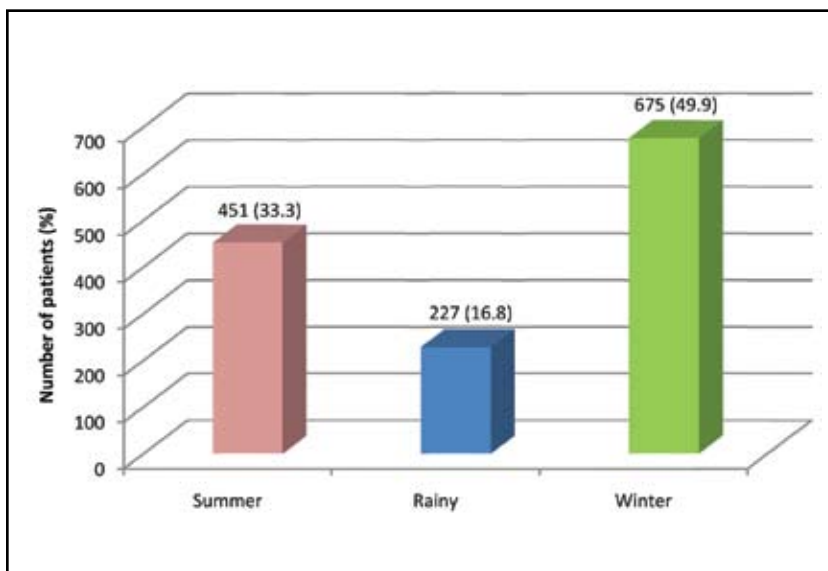


Fig. 21: Onset/Aggravation of disease in different seasons

The chronicity of the symptoms was 1-2 years in 378 (27.9%) cases, 4-10 years in 284 (21.0%) and 6-12 months in 149 (11.0%) cases (Table 27, Fig. 22).

Table 27: Chronicity of the disease

Chronicity	Sex		Total	Percentage
	Male	Female		
06-12 months	71	78	149	11.0
01-02 years	207	171	378	27.9
02-03 years	113	90	203	15.0
03-04 years	93	70	163	12.1
04-10 years	184	100	284	21.0
10 years & above	133	43	176	13.0
Total	801	552	1353	100.0

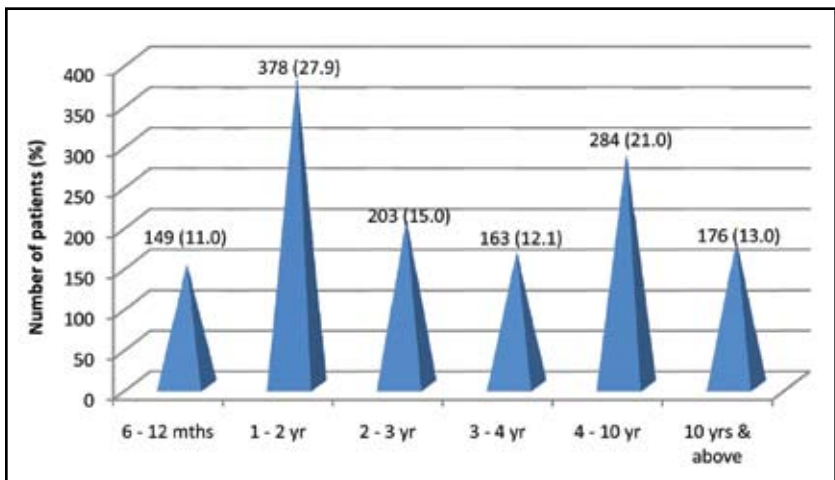


Fig. 22: Patients in different chronicities

The Table 28 and Fig. 23 represent the dominance of signs and symptoms. The nasal obstruction was present in 1331 (98.4%) patients followed by hyposmia in 1295 (95.7%) patients, headache in 1292 (95.5%) patients, whereas nasal discharge in 1271 (93.9%), and malaise in 1198 (88.5%) patients.

Table 28: Signs and symptoms at baseline

Signs & Symptoms	Sex		Total	Percentage
	Male	Female		
Nasal discharge	745	526	1271	93.9
Nasal obstruction	794	537	1331	98.4
Headache	757	535	1292	95.5
Hyposmia	794	501	1295	95.7
Malaise	706	492	1198	88.5

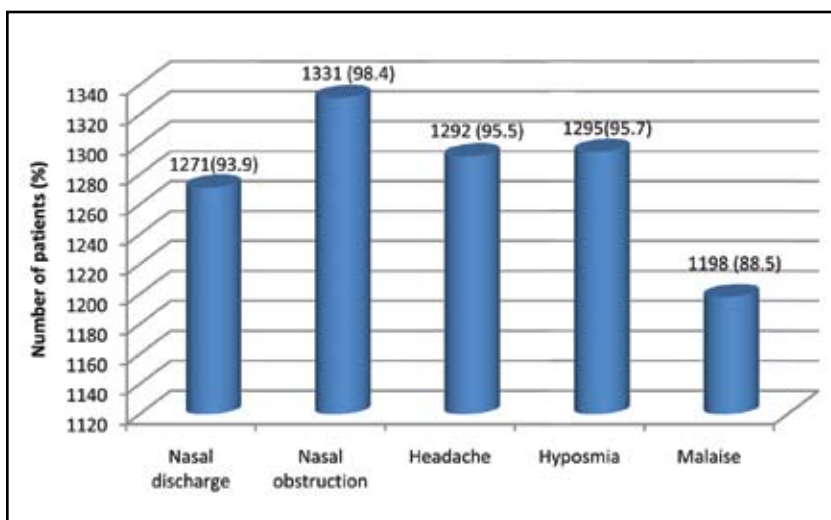


Fig. 23: Clinical picture at baseline

The results are depicted in Tables 29 to 40 and Figs. 24 to 30. Out of 1353 patients, 1209 (89.36%) responded in varying degrees and 144 (10.64%) cases did not respond (Table 29, Fig.24). The mean response to treatment was $68.6\% \pm 31.8\%$ (S.D.) (Table 32, Fig.27). Out of 1353 patients, 963 (71.2%) were cured, 246 (18.2%) relieved and 144 (10.6%) patients did not respond to treatment (Table 35, Fig. 30).

Table 29: Showing responders and non-responders

Total no. of patients treated	Responders	Non-responders
1353	1209	144
100%	89.36%	10.64%

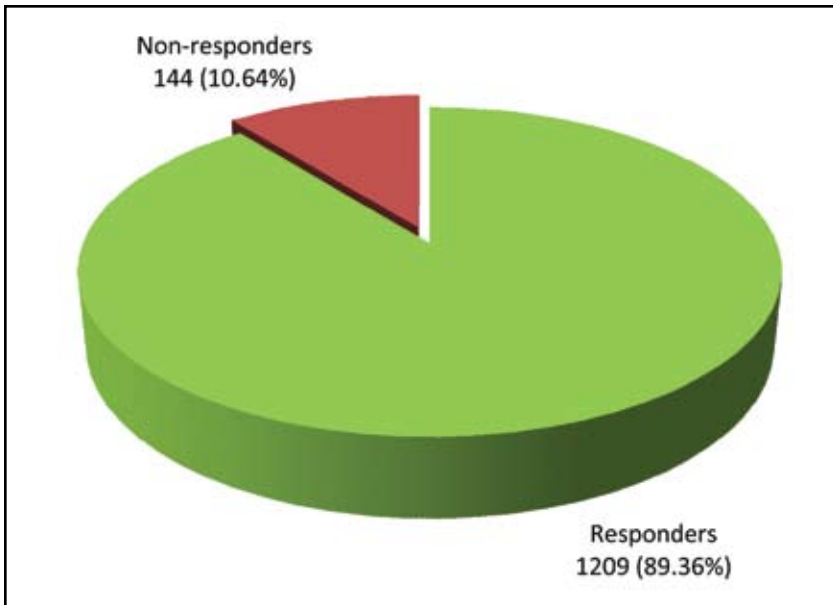


Fig. 24: Responders and non-responders

The evaluation of the effect of drug on age and chronicity revealed that the drug was almost equally effective in all age groups and chronicity (Tables 30, 31, 32, 33, 36 and 37, Fig. 25, 26, 27, and

Table 30: Responders and non-responders in different age groups

Age (in years)	Total number of patients treated	Number (%) of responders	Number (%) of non-responders
15 – 25	352	306 (86.9)	46 (13.1)
25 – 35	372	339 (91.1)	33 (8.9)
35 – 45	385	343 (89.1)	42 (10.9)
45 – 55	176	161 (91.5)	15 (8.5)
55 – 65	68	60 (88.2)	8 (11.8)
Total	1353	1209 (89.4)	141 (10.6)

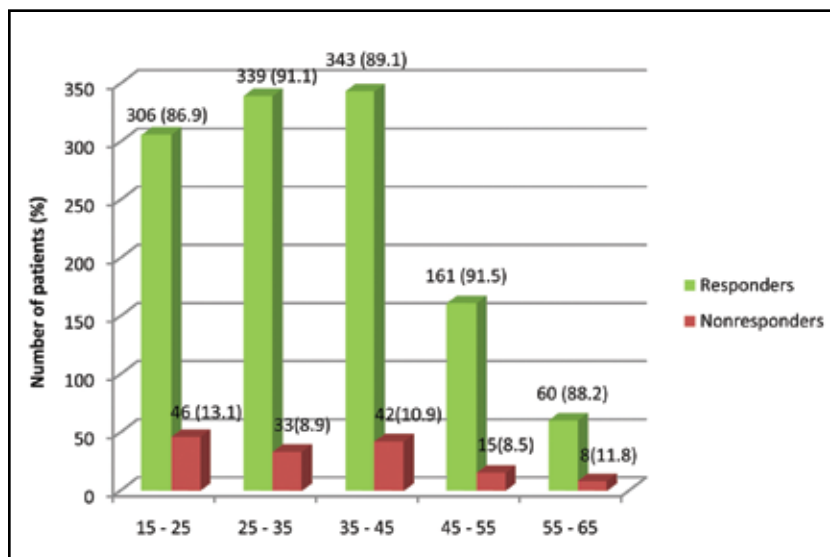


Fig. 25: Responders and non-responders in different age groups

28). The difference in mean percentage response between different age groups and chronicity was not statistically significant.

Relief in signs and symptoms at various stages suggested that the response was directly proportional to the duration of treatment as the

Table 31: Responders and non-responders in various chronicities

Chronicity	Total number of patients treated	Number (%) of responders	Number (%) of non-responders
06 – 12 months	149	137 (91.4)	12 (8.1)
01 – 02 years	378	341 (90.2)	37 (9.8)
02 – 03 years	203	185 (91.1)	18 (8.9)
03 – 04 years	163	149 (91.4)	14 (8.6)
04 – 10 years	284	248 (87.3)	36 (12.7)
10 years & above	176	149 (84.7)	27 (15.3)
Total	1353	1209 (89.4)	144 (10.6)

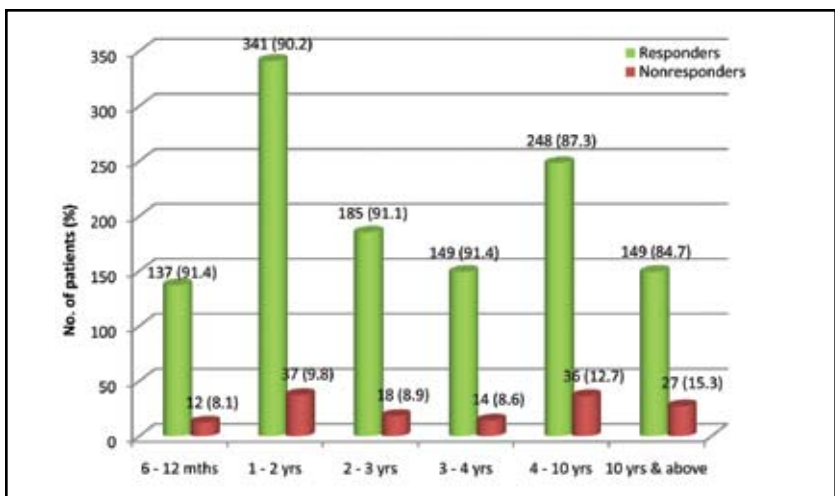


Fig. 26: Responders and non-responders in different chronicities

percentage of patients relieved of their symptoms and signs increased with increase in duration of treatment. It further suggested that the effect of the drug was faster during first 15 days of treatment. (Table 34, Fig.29).

Table 32: Age and Response (Mean \pm SD)

Age (in years)	Number of patients	Response (%)
15 – 25	352	57.3 \pm 38.4
25 – 35	372	82.5 \pm 22.1
35 – 45	385	70.7 \pm 23.4
45 – 55	176	61.5 \pm 37.1
55 – 65	68	56.0 \pm 33.8
Total	1353	68.6 \pm 31.8

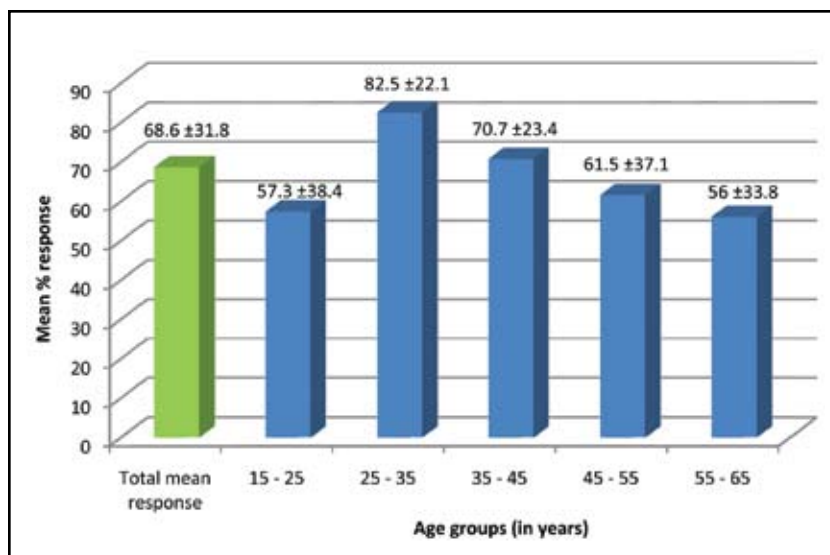


Fig. 27: Mean (\pm SD) response in different age groups

Pre-and post-treatment pathological and biochemical laboratory findings are tabulated in Tables 38 to 40. It was observed that the drug had no effect on haemoglobin level and erythrocyte count. The differential leucocyte count showed significant reduction in

Table 33: Chronicity and Response (Mean \pm SD)

S.No.	Chronicity	Number of patients	Response (%)
1.	06 – 12 months	149	77.3 \pm 18.6
2.	01 – 02 years	378	64.0 \pm 36.9
3.	02 – 03 years	203	62.0 \pm 34.9
4.	03 – 04 years	163	65.0 \pm 25.3
5.	04 – 10 years	284	81.4 \pm 19.6
6.	10 years & above	176	61.5 \pm 31.3
	Total	1353	68.6 \pm 31.8

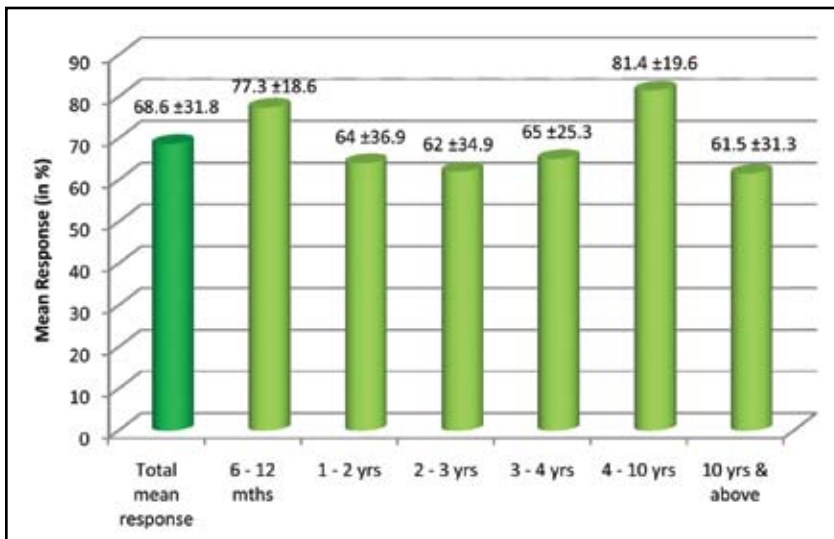


Fig. 28: Mean (\pm SD) response in different chronicities

Table 34: Relief in Signs and Symptoms at various stages of treatment

S. No.	Signs & Symptoms	No. of patients affected	Number (%) of patients relieved				
			Baseline	15 days	30 days	45 days	60 days
1.	Nasal discharge	1271	00 (0.0)	109 (8.6)	437 (34.4)	547 (43.0)	779 (61.3)
2.	Nasal obstruction	1331	00 (0.0)	229 (17.2)	377 (28.3)	646 (48.5)	941 (70.7)
3.	Headache	1292	00 (0.0)	177 (13.7)	300 (23.2)	571 (44.2)	844 (65.3)
4.	Hyposmia	1295	00 (0.0)	80 (6.2)	122 (9.4)	540 (41.7)	809 (62.5)
5.	Malaise	1198	00 (0.0)	218 (18.2)	381 (31.8)	627 (52.3)	803 (67.0)

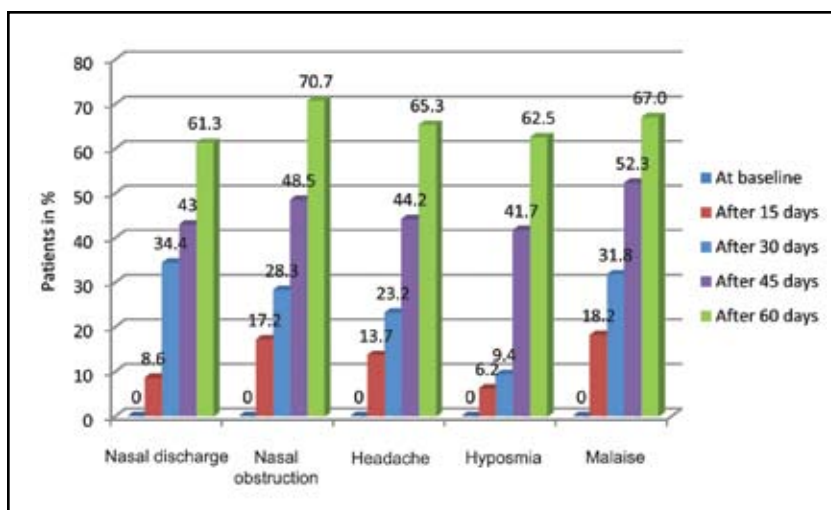


Fig. 29: Patients relieved of various symptoms and signs at different follow-ups

eosinophil count of the patients at the end of treatment. The drug showed reduction in ESR, albeit, it was not statistically significant (Table 38).

The findings of nasal smear cytology showed presence of epithelial cells, neutrophils, lymphocytes, pus cells and eosinophils at the baseline and their disappearance was observed in 21.4%, 17.5%, 15.4%, 24.3% and 66.7% of the patients respectively (Table 39).

Table 35: Therapeutic Response at a glance

Response	Number of cases	Percentage
Cured	963	71.2
Relieved	246	18.2
Not relieved	144	10.6
Total	1353	100.0

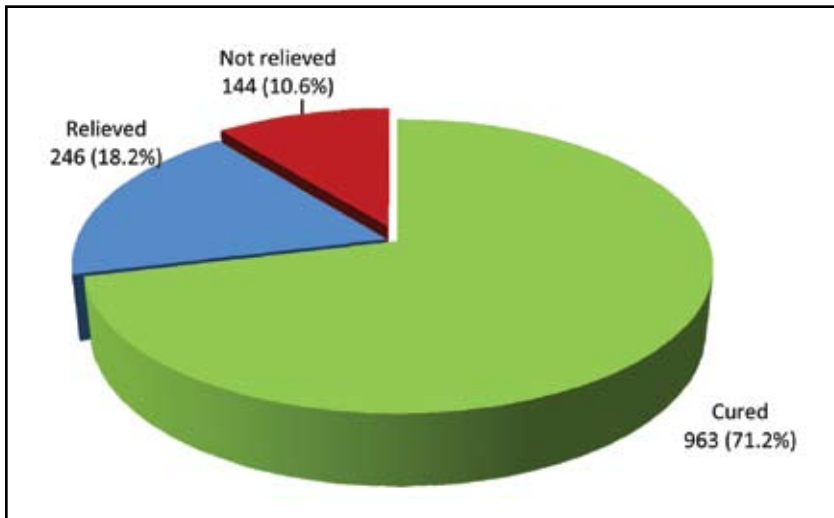


Fig. 30: Therapeutic response at a glance

No statistically significant change was observed in the values of biochemical parameters at the end of treatment, which suggested that the study drug had no adverse effects on hepato-renal functions (Table 40).

Table 36: Therapeutic Response in different age groups

Age (in years)	Number of patients	RESPONSE (%)		
		Cured	Relieved	Not relieved
15 – 25	352	260 (73.8)	46 (13.1)	46 (13.1)
25 – 35	372	281 (75.5)	58 (15.6)	33 (8.9)
35 – 45	385	269 (69.9)	73 (18.9)	43 (11.2)
45 – 55	176	110 (62.5)	51 (29.0)	15 (8.5)
55 – 65	68	43 (63.2)	18 (26.5)	7 (10.3)
Total	1353	963 (71.2)	246 (18.2)	144 (10.6)

Table 37: Therapeutic Response in different chronicities

Chronicity	Number of patients	RESPONSE (%)		
		Cured	Relieved	Not relieved
06 – 12 month	149	111 (74.5)	26 (17.4)	12 (8.1)
01 – 02 years	378	262 (69.3)	79 (20.9)	37 (9.8)
02 – 03 years	203	150 (73.9)	35 (17.2)	18 (8.2)
03 – 04 years	163	113 (69.3)	36 (22.1)	14 (8.6)
04 – 10 years	284	194 (68.3)	54 (19.0)	36 (12.7)
10 years & above	176	133 (75.6)	16 (9.1)	27 (15.3)
Total	1353	963 (71.2)	246 (18.2)	144 (10.6)

Table 38: Pathological Assessment before and after treatment (Mean \pm SD)

S. No.	Parameter	Before treatment	After treatment	Significance P <0.05
1	Haemoglobingm%	13.5 \pm 1.23	13.7 \pm 1.42	NS
2	Erythrocyte Count/cmm	5.31 \pm 0.52	5.22 \pm 0.57	NS
3	Total Leucocyte Count/cmm	7350 \pm 1200	7275 \pm 1165	NS
4	**DLC			
	Neutrophil %	52.7 \pm 11.2	53.5 \pm 10.5	NS
	Lymphocyte %	38.3 \pm 9.8	39.9 \pm 9.2	NS
	Eosinophil %	6.7 \pm 4.5	4.61 \pm 3.5	P < 0.01
	Monocyte %	2.3 \pm 1.7	2.0 \pm 1.3	NS
	Basophil %	0.0 \pm 0.0	0.0 \pm 0.0	NS
5	*ESR (mm/hour) (I hour)	15.6 \pm 14.8	13.1 \pm 12.8	NS
6	*ESR (mm/hour) (II hour)	28.5 \pm 26.4	25.3 \pm 25.1	NS

*ESR = Erythrocyte Sedimentation Rate

** DLC = Differential Leucocyte Count

Table 39: Nasal Smear findings and their disappearance after treatment

S. No.	Findings	No. of positive cases before treatment	No. of cases turned negative after treatment	Percentage of disappearance
1	Epithelial cells	1926	412	21.4
2	Neutrophils	891	156	17.5
3	Lymphocytes	1207	186	15.4
4	Pus cells	1148	279	24.3
5	Bacteria	-	-	-
6	Mucus	1069	78	7.3
7	Eosinophils	84	56	66.7

Table 40: Biochemical Assessment before and after treatment (Mean \pm SD)

S. No.	Parameter	Before treatment	After treatment	Significance P <0.05
1	Fasting Blood Glucose (mg/dL)	85.62 \pm 19.12	83.12 \pm 18.23	***NS
2	Blood Urea (mg/dL)	24.45 \pm 7.23	23.67 \pm 8.21	NS
3	Serum Creatinine (mg/dL)	0.87 \pm 0.27	0.83 \pm 0.22	NS
4	*SGPT (Unit/mL)	15.58 \pm 11.23	13.61 \pm 9.15	NS
5	**SGOT (Unit/mL)	12.67 \pm 10.12	12.12 \pm 9.83	NS

*SGPT = Serum Glutamic Pyruvic Transaminase

**SGOT = Serum Glutamic Oxaloacetic Transaminase

***NS = Not Significant.

During post-treatment period of one year, 5% of the patients who were either cured or relieved with the treatment reported with mild symptomatic relapse which was fully controlled by retreatment with the drug in one or two weeks.

SUMMARY

Waram Tajāwif al-Anf Muzmin (Chronic sinusitis) is a debilitating disease affecting significant proportion of the population. All the paranasal sinuses are prone to inflammation and one or more than one sinus may be involved in a patient. The principle of treatment is to control inflammation and help the sinuses drain. Treatment of *Waram Tajāwif al-Anf Muzmin* (chronic sinusitis) is challenging, and affected individuals seek different treatments for effective control of

their symptoms, but the condition remains unresolved in majority of the cases. These patients often have high rates of morbidity, sometimes over many years.

In these separate studies, 3675 clinically diagnosed patients of *Waram Tajāwīf al-Anf Muzmin* (chronic sinusitis) with different age groups, either sex, different chronicity and single or multiple sinus involvements were treated with two combinations of coded Unani formulations – UNIM-051 + UNIM-053 in study-I and UNIM-052 + UNIM-053 in study-II, and their clinical and laboratory findings were analysed. It has been observed that the highest percentage of the patients of *Waram Tajāwīf al-Anf Muzmin* (chronic sinusitis) were of *Balghami* temperament (75.3%) followed by *Damwi* (22.8%), *Safrāwi* (1.6%) and *Sawdāwi* (0.3%) temperament. Majority of the patients had the history of multiple medical treatments prior to their entry in these studies.

The results of both the studies suggest high clinical efficacy of the study drugs in all age groups and chronicities. Laboratory findings confirm that the study drugs have no side effect on haemoglobin level and erythrocyte counts. However, a significant reduction in elevated eosinophil counts was noted.

Nasal smear cytology is a useful study in sinusitis as the type of cells present in nasal secretion often gives definite clue for diagnosis. In *Waram Tajāwīf al-Anf Muzmin* (chronic sinusitis), the smear showed clumps of purely pus cells whereas during allergic episodes, nasal secretion showed high percentage of eosinophils often in clumps.

Our findings suggest that the drugs are effective in *Waram Tajāwīf al-Anf Muzmin* (chronic sinusitis) and allergic episodes as disappearance of neutrophils, pus cells and eosinophils in the nasal smear has been demonstrated in significant number of cases.

No statistically significant changes were observed in the values of biochemical parameters at the end of treatment, which revealed that the study drugs do not have any adverse effects on hepato-renal functions.

Therapeutic response and safety of the study drugs revealed that these drugs are safe and effective in cases of *Waram Tajāwif al-Anf Muzmin* (chronic sinusitis). It was also observed that the results of combination UNIM-051 + UNIM-053 used in study-I were better than the results of combination UNIM-052 + UNIM-053 used in study-II.

CONCLUSION

Findings of the study are in consonance with the claims of Unani physicians about the therapeutic actions of these drugs. The constituents of both the study drugs, i.e. UNIM-051 and UNIM-052 are reported to be hot and dry in *Mizāj* (temperament), which is opposite to the *Mizāj* of *Waram Tajāwif al-Anf Muzmin* (chronic sinusitis). This is a basic principle (*‘Ilāj bi’l Ḍidd* – heterotherapy) used in the treatment of *Waram Tajāwif al-Anf Muzmin* (chronic sinusitis) in Unani System of Medicine. Further, the study drugs have classically been reported having *Muḥallil* (resolvent) and *Māni’-i Iltihāb* (anti-inflammatory) actions. Besides, *Ustūkhūdūs* – the main ingredient of the coded Unani formulation – UNIM-052 is also classically reported to have affinity with central nervous system in general and brain in particular with regard to its therapeutic value to mention in chronic cold, headache and nervous disorders.

The results of the combination of coded Unani formulations – UNIM-051 + UNIM-053 used in study-I were better than the results of the combination of coded Unani formulations – UNIM-052 + UNIM-053 used in study-II.

Our results are in conformity with claims of ancient Unani physicians who used these drugs to treat *Nazla Bārid Muzmin* (chronic sinusitis) with favourable therapeutic effects. In addition, no untoward effects of the study drugs were observed in both the studies.

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