

A preliminary study on the safety and effectiveness of the Unani compound drug *Habb-e-Hindi-Zeeqi* in cases of bronchial asthma (*Zeeq-un-Nafas*)

Parvez Khan^{a,*}, Radhey Shyam Verma^a, Smita Kumari^a, Sadia Ayub^a, Md. Zahid Ansari^a & Usama Akram^b

^aRegional Research Institute of Unani Medicine (CCRUM), Post Box No# 70, Aligarh 202 001, U.P, India

^bCentral Council for Research in Unani Medicine, Jawaharlal Nehru Anusandhan Bhavan, 61-65, Institutional Area, Opp. D-Block, Janakpuri, New Delhi 110 058

*E-mail: waytoparvez@gmail.com

Received 21 March 2025; revised 25 September 2025; accepted 14 November 2025

According to the 2019 Global Burden of Disease report, 34.3 million people in India suffer from asthma, making up 13.09% of the worldwide burden. A proper solution to this problem is still elusive in modern medicine. As a result, the world is anticipating certain traditional treatments in this area. For bronchial asthma, Unani doctors administer both single medications and several Unani formulations. One such frequently recommended Unani medicine is *Habb-e-Hindi-Zeeqi*. In the current study, the Regional Research Institute of Unani Medicine (RRIUM), Aligarh, conducted a clinical, biochemical, and haematological evaluation of the therapeutic efficacy and safety of the Unani compound medicine *Habb-e-Hindi-Zeeqi* during the years 2021-2022. Out of the patients who visited the outpatient department (OPD), a total of 26 patients were chosen. For four weeks, the patients received one tablet (125 mg) of the Unani compound medicine *Habb-e-Hindi-Zeeqi* orally twice a day after meals. The results were statistically assessed using Dennett's test one-way analysis of variance (ANOVA). According to the current study, the Unani compound medicine is safe, non-toxic, and highly successful in treating bronchial asthma. More research in a large population is advised.

Keywords: Disability-adjusted life years (DALYs), Outpatient department (OPD), Unani compound drug (*Habb-e-Hindi-Zeeqi*), *Zeeq-un-Nafas* (bronchial asthma)

IPC Code: Int CI²⁵: A61K 36/00

Patients with bronchial asthma suffer from a chronic illness that affects their social, physical, and mental health. Asthma affects about 339 million individuals worldwide. In terms of disability-adjusted life years (DALYs), asthma ranked 23rd globally among the top 20 illnesses that cause disability, according to the Global Burden of Diseases, Injuries, and Risk Factors Study 2015¹. Asthma prevalence has steadily risen in both industrialized and developing nations^{2,3}. Approximately 300 million people worldwide suffer from asthma, and by 2025, an additional 100 million are predicted to be impacted^{4,6}.

Clinical signs of asthma include coughing, wheezing, chest tightness, and dyspnea. Asthma is a chronic respiratory disease marked by reversible airflow restriction linked to bronchial hyper responsiveness and ongoing inflammation^{7,8}. This clinical condition is generally regarded as one of the

primary non-communicable diseases that can impact both adults and children, significantly impairing their quality of life and increasing the risk of death⁹.

In the Unani medical system, *Zeeq-un-Nafas* (bronchial asthma) has been treated with a variety of single and compound medications¹⁰.

Depending on the drug class, dosage, and administration method, the currently given medications in the allopathic medicine system might have a variety of adverse effects. Cough, headache, vomiting, fever, nausea, sweating, dyspepsia, and increased anxiety¹¹⁻¹³. As a result, focus has now switched to herbal and traditional systems of medicines including Unani medicines since they are cost-effective and versatile in the treatment of bronchial asthma with little to no adverse effects. In light of the aforementioned, the safety and therapeutic effectiveness of Unani compound medications *Habb-e-Hindi-zeeqi* in cases of *Zeeq-un-Nafas* (bronchial asthma) have been assessed using scientific criteria, with the findings reported.

*Corresponding author

Methodology

Study design

A multicentric, open-label clinical research was conducted. *Habb-e-Hindi-zeeqi*, a Unani medicine, was supplied by the Central Council for Research in Unani Medicine, New Delhi. The study was conducted in Aligarh at the Regional Research Institute of Unani Medicine (RRIUM). A total of 26 people, regardless of gender, aged 18 to 65, were selected from the outpatient department (OPD) using pre-established inclusive and exclusive criteria. The total number of cases that were registered was 32, of which 26 were finished and 6 were dropped. The safety and effectiveness of *Habb-e-Hindi-zeeqi*, were evaluated using biochemical and haematological markers as well as the alleviation of symptoms.

Drug, dose and mode of administration

The patients received one tablet (125 mg) of the Unani medicine *Habb-e-Hindi Zeeqi* twice a day, after meals, for four weeks¹⁴ (Table 1).

Selection criteria

The following criteria were used to include study participants who were attending the outpatient department of their respective centers and had a clinical diagnosis of *Zeeq-un-Nafas* (bronchial asthma):

Inclusion criteria

1. Men and women ranging in age from eighteen to sixty-five.
2. Objective proof of reversible airway obstruction, either naturally or with therapy ($\geq 12\%$ and ≥ 200 mL decrease in FEV1 and/or a 25% and 60 L/min change in PEFR).
3. At least six months of asthma prior to enrollment.

Exclusion criteria

The following conditions ruled out *Zeeq-un-Nafas* (bronchial asthma) patients from participating in the study:

1. A ratio of FEV1/FVC < 50%.
2. A nursing and pregnant woman.
3. A patient suffering from cancer, tuberculosis, and other respiratory tract infections.

4. A patient with hepatic and renal insufficiency, diabetes mellitus, and co-morbidities.

5. A patient who regularly takes systemic or oral corticosteroids for ailments other than asthma.

Assessment of temperament (mizaj)

At baseline, a temperament (mizāj) assessment was conducted. The patients' temperaments were evaluated using the 10 predetermined factors found in the *Ajnas-e-ashra*.

Evaluation of the follow-up

Clinical evaluations were performed on the following days: baseline (first day), Ist F-up (7th day), IInd F-up (14th day), IIIrd F-up (21st day), and IVth F-up (28th day). Both objective and subjective clinical observations were included in the follow-up sheet.

Assessment of efficacy

1. Pulmonary function test using spirometry: FEV1, FEV1/FVC ratio, and PEFR.

2. Using the asthma control questionnaire (ACQ), the effectiveness outcome was assessed.

3. The number of absolute eosinophils counts (AEC).

Assessment of safety

Based on biochemical analyses, the following findings about the test drug's safety have been made:

Biochemical analysis

Serum glutamate transaminases [SGPT (EC 2.6.1.2) and SGOT (EC 2.6.1.1)]¹⁵ serum alkaline phosphatase enzyme (S-ALP, EC. 3.1.3.1)¹⁶, blood urea¹⁷, serum creatinine¹⁸, total bilirubin¹⁹, uric acid²⁰ were analysed.

Haematological investigation

Haematological variables were carried out²¹. It consist of haemoglobin (Hb), erythrocyte sedimentation rate (ESR), total leucocytes counts (TLC), red blood corpuscles (RBC), differential leucocytes counts (DLC): polymorphs, lymphocyte and eosinophil counts, and absolute eosinophil counts (AEC).

Collection of blood serum

A new vein was punctured to obtain blood samples for every inquiry. One milliliter of blood was combined with ethylene diaminetetraacetic acid (EDTA) for various haematological parameters; and two to three milliliters of blood were allowed to coagulate before the serum was separated by centrifugation for various biochemical parameters.

Table 1 — Constituents of *Habb-e-Hindi-Zeeqi* (NFUM Part-I)¹⁴

S.NO.	Name of ingredient	Scientific name	Quantity
1.	Beesh Mudbbbar	<i>Aconitum ferox</i> Wall. ex. Ser.	15 g.
2.	Post-e-Bekh-e-Madar	<i>Calotropis procera</i> (Ait) R. Br.	30 g.
3.	Aab-e-Adrak	<i>Zingiber officinale</i> Rosc	30 g.

For all necessary scientific parameters, biochemical and hematological analyses were performed.

Statistical evaluation

One-way analysis of variance (ANOVA) by Dennett's test was used for statistical analysis of the data. When the p-value was less than 0.05, the values were regarded as significant.

Results

Demographic study

A total of 26 patients with *Zeeq-un-Nafas* (bronchial asthma) were included in the demographic study. The incidence is higher for male individuals 16 (61.54%) (mean age 44.38 years) than female subjects 10 (38.46%) (mean age 33.1 years). Previous authors have made a similar observation²², but other studies found that women are more likely than men to suffer asthma^{23,24}. The incidence is higher among business 09 subjects (34.62%) than among housewife patients (26.92%), followed by students and vendors. Incidences among non-vegetarian patients were higher at 23 (88.46%) than vegetarian patients at 03 (11.54%) (Table 2) (Fig. 1). The authors had reported similar perspectives²⁵⁻²⁷. Phlegmatic 21 patients (80.77%) had the highest incidence of temperament, followed by sanguine 03 patients (11.54%) and melancholy 02 patients (7.69%) (Table 2) (Fig. 2). Researchers had reported similar findings^{28,29}. The

maximum patients were treated with allopathic medicines (53.85%), followed by Ayurvedic medicine (26.92%) and Unani drugs (19.23%).

Assessment of efficacy

Clinical assessment

Subjective Parameters

Pulmonary Function Test (PFT)

The spirometer SP10BT model (CONTECH Medical System Co. Ltd., China) was used to perform

Classification of Dietary Habits

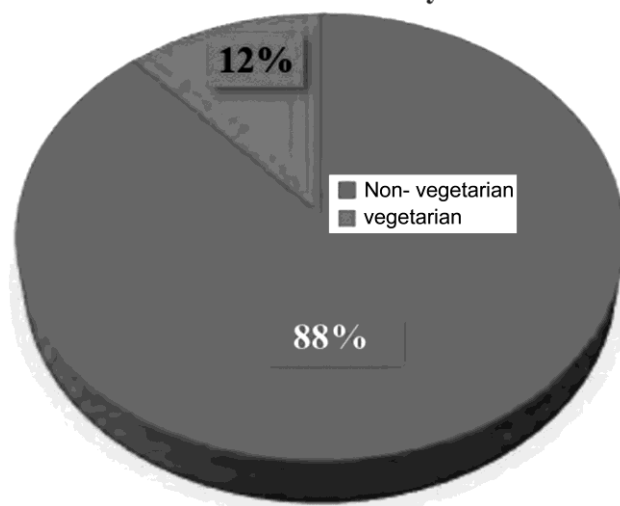


Fig. 1 — Distribution of patients according to dietary habits

Table 2 — Demographic information displaying the distribution of patients with *Zeeq-un-Nafas* (bronchial asthma) by age, sex, marital status, occupation, socioeconomic status, body mass index, dietary habits, length of illness, and temperament

Characteristic	Variables	Number of male, female & %	Mean age (in years) ± SD
1. Sex	Male	16 (61.54%)	44.38±12.90
	Female	10 (38.46%)	33.10±14.46
2. Occupation	i. Business	09 (34.62%)	
	ii. Housewife	07 (26.92%)	
	iii. Student	04 (15.39%)	
	iv. Vendar	06 (23.08%)	
3. Dietary habits	i. Non-vegetarian	23 (88.46%)	
	ii. Vegetarian	03 (11.54%)	
4. Treatment history	i. Allopathic	14 (53.85%)	
	ii. Ayurvedic	07 (26.92%)	
	iii. Unani	05 (19.23%)	
5. Duration of disease	i. 0 month to 12 months	07 (26.92%)	
	ii. 13-24 months	Nil	
	iii. 25-36 months	08 (30.77%)	
	iv. 37-48 months	01 (3.85%)	
	v. 49-60 months	Nil	
	vi. 61-72 months	08 (30.77%)	
	vii. > 73 months	02 (7.69%)	
6. Temperament	i. Phlegmatic	21 (80.77%)	
	ii. Melancholic	02 (7.69%)	
	iii. Sanguine	03 (11.54%)	
	iv. Bilious	Nil	

pulmonary function tests (PFT), which included the FEV1/FVC ratio, forced expiratory volume (FEV1) in the first second, and peak expiratory flow rate (PEFR). When comparing the results of baseline and various treatment follow-up for 28th days, a significant increase in pulmonary function test was noted: PEFR, FEV1, and FEV1/FVC ratio on 21st days (IIIrd F-UP) were 8.63% (p<0.01), 9.05% (p<0.01), and 5.78% (p<0.01), respectively, and on 28th day (IVth-F-UP) post-treatment were 13.38% (p<0.0001), 13.87% (p<0.0001), and 9.36% (p<0.0001), respectively (Table-3) (Fig. 3). The other researchers have likewise observed comparable findings³⁰.

Asthma Control Questionnaire (ACQ)

When compared to baseline values with various treatment follow-up for 28th days, a significant decrease in the ACQ score on 21st days (IIIrd F-UP) was 24.57% (p<0.01) and on 28th days (IVth-F-UP) post-treatment was 53.02% (p<0.0001) (Table 3) (Fig. 4). The other investigators have also observed comparable findings³¹.

Absolute eosinophil counts (AEC)

When compared to baseline readings with various treatment follow-ups on the 28th day, no discernible changes in absolute eosinophil counts (AEC) were

found (Table 3). Similar findings have also been reported by the other studies³².

Assessment of safety

Biochemical Studies

Liver and kidney function tests

There had been no noticeable changes in either the kidney or liver function tests. Thus, it can be

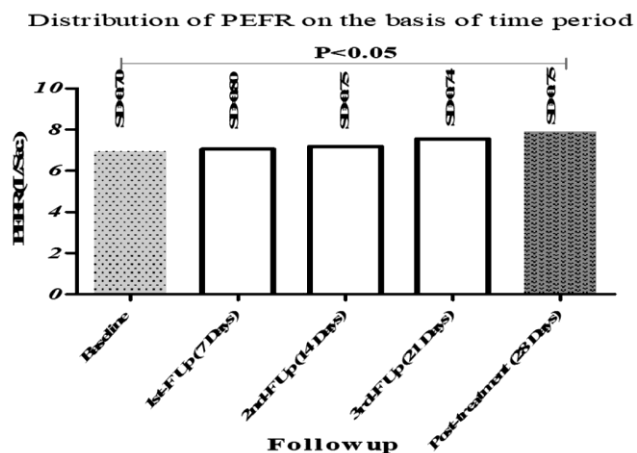


Fig. 3 — Graph showing the distribution of PEFR on the basis of time period in bronchial asthma patients treated with Unani compound drug *Habb-e-Hindi-Zeeqi*

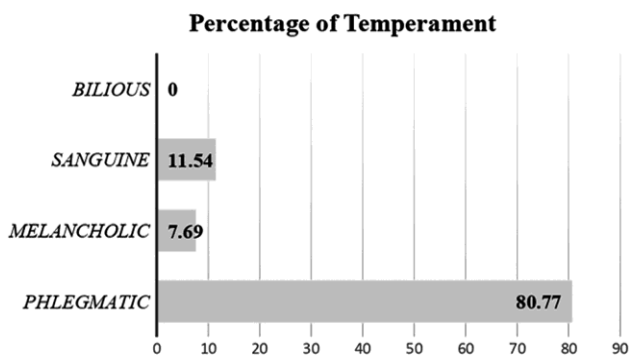


Fig. 2 — Distribution of patients according to temperament

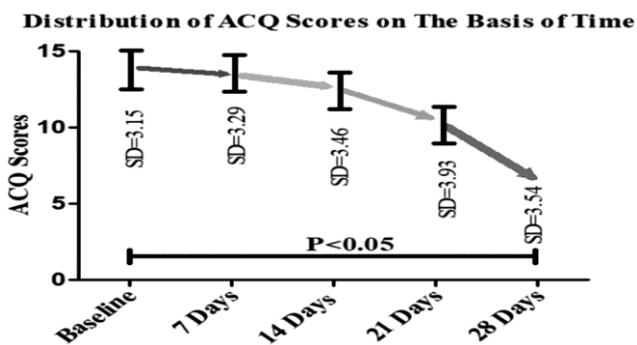


Fig. 4 — Graph showing the distribution of Asthma Control Questionnaire (ACQ) score on the basis of time period in bronchial asthma patients treated with Unani compound drug *Habb-e-Hindi-Zeeqi*

Table 3 — Effect of Unani compound drug *Habb-e-Hindi Zeeqi* on PFTR (L/Sec), FEV1 (%) FEV1/FVC (%), Asthma Control Questionnaire (ACQ) and absolute eosinophil counts (AEC) in *Zeequn Nafas* (Bronchial Asthma) patients. [*p<0.05 & **p<0.01 are significant, ***p<0.001 is highly significant]

Group	Baseline (0 st -day)	1 st F-up (7 th -day)	(2 nd F-up) (14 th -day)	(3 rd F-up) (21 th -day)	Post-treatment (IV th F-up) (28 th -day)
PEFR (L/Sec.)	6.95±0.70	7.05±0.80	7.18±0.75	7.55±0.74**	7.88±0.75***
FEV1 (%)	78.23±8.19	79.58±9.38	81.15±8.27	85.31±7.70**	89.08±8.48***
FEV1/FVC (%)	79.27±7.73	79.81±7.38	81.19±6.72	83.85±5.86**	86.69±6.59***
ACQ Scores	13.92±3.15	13.46±3.29	12.65±3.46	10.50±3.93**	6.54±3.54***
Absolute eosinophil counts (AEC)	212.56±85.02	219.94±177.66	--	--	208.40±146.91

ACQ: Asthma Control Questionnaire, AEC: Absolute eosinophil counts

concluded that there was no adverse or negative reaction brought on by the test medication. As a result, the drug's safety is conformed (Table 4). Similar inferences had been made by other authors³³.

Haematological studies

There had been no noticeable changes in the levels of haemoglobin, red blood cells (RBCs), total leucocyte counts (TLC), erythrocyte sedimentation rate (ESR), and differential leucocyte counts (DLC) (Table 5). Other authors had undertaken a similar intervention^{34,35}.

Discussion

This study, which was conducted in 2021-2022, aims to investigate the efficacy of Unani compound drug *Habb-e-Hindi-Zeeqi* and validate its efficacy and safety in treating patients of bronchial asthma. The findings are based on clinical, biochemical, and haematological parameters of 32 registered bronchial asthma patients, which were assessed; 26 of whom had completed the investigations successfully. *Habb-e-Hindi-Zeeqi*, the test drug, has been found to be non-toxic, safe, and effective for human use.

While validating *Habb-e-Hindi-Zeeqi*' efficacy with previous research on several other Unani medicines in the treatment of bronchial asthma, including Shati churna³⁶, Sharbat-E-Sadar³⁷, Trial drug³⁸ Kalongi (*Nigella sativa* L.), Darchini (*Cinnamomum zeylanicum* Blume), and Shehad (pure honey). Test Group II³⁹ consisted of the decoction of Irsa (*Iris ensata* Thunb), Mulethi

(*Glycyrrhiza glabra* Linn.), Kakrassenghi (*Pistacia integerrima* Stewart ex Brandis), Zangibeel (*Zingiber officinale* Rosc.), and Gul-e-zoofa (*Hyssopus officinalis* Linn.), Berg-e-Arosa (*Adhatoda vasica* Nees), and Aslus-Soos (*Glycyrrhiza glabra* Linn.). Test Group III consisted of a powdered mixture of Maghz-e-Amaltas (*Cassia fistula* Linn.), Zangibeel (*Zingiber officinale* Rosc.), Irsa (*Iris ensata* Thunb), and Qaranfal (*Eugenia caryophylla* Thunb). It revealed that the safety parameters SGOT, SGPT, alkaline phosphatase, urea, and creatinine are missing from these earlier investigations.

However, the studies on one Unani coded drug UNIM-352⁴⁰ and two other Unani formulations⁴¹ that contain Aslussoos (*Glycyrrhiza glabra* Linn.), Parsiyaoshan (*Adiantum capillus veresis*), Zufa yabis (*Hyssopus officinalis*), and Sapistan (*Cordia dichotoma* Forst) also lack the majority of the crucial subjective measures for assessing drug efficacy, such as the asthma control questionnaire (ACQ) and absolute eosinophil counts (AEC). As a result, these investigations lack some crucial scientific parameters (Table 6). Our test medication, *Habb-e-Hindi-Zeeqi*, has shown preliminary promising results in treating bronchial asthma and conform to all necessary safety, toxicity, and efficacy parameters. Our research also supports the findings of previous studies on the above-discussed Unani medicines. Regardless, before this test drug is used in broader medical use, we recommend additional research on a bigger population to better understand its safety and efficacy.

Table 4 — Impact of Unani medicine *Habb-e-Hindi Zeeqi* in the level of SGPT, SGOT, alkaline phosphatase, bilirubin, blood urea, serum creatinine and uric acid, in *Zeeq-un-Nafas* (Bronchial Asthma) patients

Parameter → Group ↓	SGOT (IU/L)	SGPT (IU/L)	Alkaline Phosphatase (IU/L)	Bilirubin (mg %)	Blood Urea (mg %)	Creatinine (mg %)	Uric Acid (mg %)
Baseline (0 st -day)	8.84±3.68	10.89± 7.50	71.01±30.69	0.70±0.26	21.67±5.49	1.00±0.18	4.48±1.13
1 st F-up (7 th days)	9.40±4.14	9.95±5.65	68.73±27.53	0.68±0.20	20.69±6.04	0.89±0.14	4.77±1.35
Post-treatment (28 th -days)	9.05±4.09	9.83±4.30	64.02±27.27	0.65±0.19	21.63±7.26	0.87±0.12	4.62±1.48

Table 5 — Effect of Unani compound drug *Habb-e-Hindi Zeeqi* in the level of haemoglobin, R.B.C. count, total leucocyte counts (TLC), erythrocyte sedimentation rate (ESR), polymorphs, lymphocytes and eosinophils count in *Zeeq-un-Nafas* (Bronchial Asthma) patients

Parameter → Group ↓	Haemoglobin (g %)	RBC (10 ⁶ /mm ³)	TLC (10 ³ /mm ³)	E.S.R. (mm /hr)		Differential leucocyte counts (DLC)		
				1 H	2 H	Polymorphs (%)	Lymphocytes (%)	Eosinophils (%)
Baseline (0 st -day)	13.73±1.73	4.53±0.63	7.97±2.68	31.0±13.91	41.0±11.73	67.00±9.97	27.00±9.64	6.00±1.77
1 st F-up (7 th days)	13.75±1.55	4.59±0.55	7.57±2.32	30.0±12.74	42.0±9.62	66.0±8.75	30.00±7.85	4.00±1.78
Post-treatment (28 th -days)	13.66±1.66	4.55±0.58	7.93±2.63	27.0±12.61	39.0±10.47	65.00±9.35	29.00±8.70	6.00±2.81

Table 6 — Showing Unani medicines previously studied in the treatment of bronchial asthma, providing abstract information on safety, toxicity, adverse side-effects and efficacy etc. on scientific lines (2011-2022)

S. no	Name of Unani drugs investigated	Parameters
1.	Shati churna ³⁶	Safety Biochemical & Haematological Significant decrease in AEC, ESR & Serum IgE \leq
2.	Sharbat-E-Sadar ³⁷	The drug was found safe on haematological and biochemical parameters.
3.	Trial drug ³⁸ Kalongi (<i>Nigella sativa</i>), Darchini (<i>Cinnamomum zeylanicum</i>) and Shehad (pure honey).	No significant alterations in Hb, TLC, Neutrophil, Lymphocytes, Basophils and Monocytes had been observed. *No safety parameters <i>i.e.</i> , SGOT, SGPT, ALP were carried out.
4.	Unani compound formulations ³⁹ has divided into Three test groups: Group I Gul-e-zoofa (<i>Hyssopus officinalis</i> Linn.), Berg-e-Arosa (<i>Adhatoda vasica</i> Nees) and Aslus-Soos (<i>Glycyrrhiza glabra</i> Linn.); test group II was decoction of Irsa (<i>Iris ensata</i> Thunb), Mulethi (<i>Glycyrrhiza glabra</i> Linn.), Kakrassenghi (<i>Pistacia integerrima</i> Stewart ex Brandis), Zangibeel (<i>Zingiber officinale</i> Rosc) and test group III was powdered combination of Qaranfal (<i>Eugenia caryophylla</i> Thunb), Irsa (<i>Iris ensata</i> Thunb) Zangibeel (<i>Zingiber officinale</i> Rosc) and Maghz-e-Amaltas (<i>Cassia fistula</i> Linn.).	Significant reduction in eosinophil count and absolute eosinophil count had been observed. *No safety parameters <i>i.e.</i> , SGOT, SGPT, ALP were carried out.
5.	Unani coded drug UNIM-352 Unani coded drug ⁴⁰	Markedly reduced the eosinophil and neutrophil counts in blood and bronchoalveolar lavage (BAL). No safety parameters <i>i.e.</i> SGOT, SGPT, ALP were carried out. UNIM-352 also attenuated the levels of TNF- α , IL-4, GM-CSF and NF- κ B whereas histone deacetylase (HDAC) levels were elevated in both blood and BAL fluid.
6.	Unani formulation ⁴¹ composed of Aslussoos (<i>Glycyrrhiza glabra</i> Linn.), Parsiyaoshan (<i>Adiantum capillus veresis</i>), Zufa yabis (<i>Hyssopus officinalis</i>) and Sapistan (<i>Cordia dichotoma</i>).	Both safety parameters of biochemical and haematological were carried out. No clinically significant side effects were observed.

*Parameters not studied

Conclusion

Results and discussions suggest that *Habb-e-Hindi Zeeqi*, a Unani formulation, is a safe and effective treatment for *Zeeq-un-Nafas* (bronchial asthma).

Acknowledgements

We are grateful to Mr. Javed Akhtar and Mr. Tariq Ali Beg, Lab Technicians, for carrying out standard laboratory tests and Mr. Shish Mohammad, Lab Attendant of the Biochemistry and Pathology Laboratory, RRIUM, Aligarh.

Funding

The Central Council for Research in Unani Medicine, New Delhi, provided financial assistance to the authors.

Conflict of Interest

One of authors is affiliated with the funding agency, the research work including study design, data collection, analysis, and interpretation was carried out independently to ensure impartiality and avoid any potential bias.

Author Contributions

All the authors contributed equally.

Informed Consent

Patients who completed the study's eligibility requirements received comprehensive information on the study's purpose, the medications to be used, the treatment plan, etc. Enough time was given to patients to complete the informed consent process. Participation was voluntary, and confidentiality and anonymity were strictly maintained throughout the research process.

Ethics Statement

Has been approved by the institutional ethics committee (IEC) on September 11, 2018, vide no. F. No. 5-11/2011-12/RRI-ALG/Tech./63.

Data Availability

Data will be made available on request.

References

- GBD 2015 Chronic Respiratory Disease Collaborators, Global, regional, and national deaths, prevalence, disability-adjusted life years, and years lived with disability for chronic obstructive pulmonary disease and asthma, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015, *Lancet Respir Med*, Sep; 5 (9) (2017) 691-706. doi: 10.1016/S2213-2600(17)30293-X. Epub 2017 Aug 16. Erratum in: *Lancet Respir Med*, 5 (10) (2017) e30. doi: 10.1016/S2213-2600(17)30336-3
- Liu H, Zhang J, Liu L, Lian G, Shi R, *et. al.*, Global disease burden and attributable risk factor analysis of Asthma in 204 countries and territories from 1990 to 2019, *Allergy Asthma Immunol Res*, 15 (4) (2023) 473-495. DOI: 10.4168/aa.2023.15.4.473
- Yuan L, Tao J, Wang J, She W, Zou Y, *et. al.*, Global, regional, national burden of asthma from 1990 to 2021, with projections of incidence to 2050: a systematic analysis of the global burden of disease study 2021, *eClin Med*, 80 (2025) 1-11. doi: 10.1016/j.eclinm.2024.103051.
- Shinde S S, Mandade R J, Masirkar V J & Deshmukh R G, A review on anti-asthmatic potential of various medicinal plants, *Int J Pharm Res Appl*, 8 (2) (2023) 147-152. DOI: 10.35629/7781-0802147152
- Bezerra J J L, Pinheiro A A V & de Oliveira Barreto, Medicinal plants used in the treatment of asthma in different regions of Brazil: a comprehensive review of ethnomedicinal evidence, preclinical pharmacology and clinical trials, *Phytomed Plus*, 2 (4) (2022). DOI: 10.1016/j.phyplu.2022.100376
- Barnig C, Frossard N & Levy B D, Towards targeting resolution pathways of airway inflammation in asthma, *Pharmacol Ther*, 186 (2018) 98-113. DOI: 10.1016/j.pharmthera.2018.01.004
- Lambrech B N, Hammad H & Fahy J V, The cytokines of asthma, *Immunity*, 50 (4) (2019) 975-991. DOI: 10.1016/j.immuni.2019.03.018
- Chaddha V & Gupta R, Potential applications of medicinal plants in symptomatic treatment of asthma: a review, *Biomedicine*, 43 (1) (2023) 259-264. DOI: https://doi.org/10.512248/.v43i01.2649
- Dharmage S C, Perret J L & Custovic A, Epidemiology of asthma in children and adults, *Front Pediatr*, 7 (2019) 246. DOI: 10.3389/fped.2019.00246
- Imtiyaz S, Mohammed Zubair & Minhaj S, Unani perspective of *Zeequn Nafas* (Bronchial Asthma) and its management in Unani system of Medicine: a systemic review, *Int J Creat Res Thoughts*, 11 (12) (2023) h899-h908.
- Rajzadeh M A, Najafipour H & Bejeshk M A, "An updated comprehensive review of plants and herbal compounds with antiasthmatic effects", *Evid-Based Complement Altern Med*, (2024). DOI: 10.1155/2024/5373117
- Tompson C A, Eslick S R, Berthon B S & Wood L G, "Asthma medication use in obese and healthy weight asthma: systematic review/meta-analysis," *Eur Respir J*, 57 (3) (2021). DOI: 10.1183/13993003.00612-2020
- Newnham D M, "Asthma medications and their potential adverse effects in the elderly: recommendations for prescribing," *Drug Saf* 24 (14) (2001) 1065-1080. doi:10.2165/00002018-200124140-00005
- Anonymous national formulary of unani medicine, part-I (Ministry of health and family welfare, Department of AYSUH, New Delhi), (2006) 18.
- Bradley D W, Maynard J E, Emery G & Webster H, Transaminases activities in serum of long term hemodialysis patients, *Clin Chem*, 18 (11) (1972) 1442.
- Wilkinson J H, Boutwell J H & Winsten S, Evaluation of a new system for the kinetic measurement of serum alkaline phosphatase, *Clin Chem*, 15 (6) (1969) 487-495.
- Tiffany T O, Jansen J M, Burtis C A, Overton J B & Scott C D, Enzymatic kinetic rate and end-point analyses of substrate by use of a GeMSAEC fast analyzer, *Clin Chem*, 18 (8) (1972) 829-840.
- Bowers L D, Kinetic serum creatinine assays I, the role of various factors in determining specificity, *Clin Chem*, 26 (5) (1980) 551-4.
- Pearlman F C & Lee R T, Detection and measurement of total bilirubin in serum, with use of surfactants as solubilizing agents, *Clin Chem*, 20 (4) (1974) 447-453.
- Trinder P, Quantitative determination of uric acid in human serum, *J Clin Pathol*, 22 (1949) 246-250. 20.
- Mukherjee K L, Medical Laboratory Technology, 3rd Edition, (Tata Mc Graw-Hill Publishing Company Limited, New Delhi), (1990) p. 228.
- de Assis E V, Santana M D R, Feitosa A N A, de Sousa M N A, Isidório U A, *et.al.*, Prevalence of asthma symptoms and risk factors in adolescents, *J Hum Growth Dev*, 29 (1) (2019) 110-116.
- Chowdhury N U, Guntur V P, Newcomb D C & Wechsler M E, Sex and gender in asthma, *Eur Respir Rev*, 30 (162) (2021) 210067. DOI: 10.1183/16000617.0067-2021
- Boulet L P, Lavoie K L, Raheison-Semjen C, Kaplan A, Singh D, *et.al.*, Addressing sex and gender to improve

- asthma management, *NPJ Prim Care Respir Med*, 32 (1) (2022). DOI: 10.1038/s41533-022-00306-7
- 25 Ait-Hadad W, Bedard A, Chanoine S, Dumas O, Laouali N, *et al.*, Healthy diet associated with better asthma outcomes in elderly women of the French Asthma-E3N study, *Eur J Nutr*, 61 (5) (2022) 2555-2569. DOI: 10.1007/s00394-022-02815-0
- 26 Ait-Hadad W, Bédard A, Delvert R, Orsi L, Chanoine S, *et al.*, Plant-based diets and the incidence of Asthma symptoms among elderly women, and the mediating role of body mass index, *Nutrients*, 15 (2022) 52. DOI: 10.3390/nu15010052
- 27 26. Muraleetharan G & Anuradha G, Dietary risk factors for childhood asthma in a semi-urban area of South India: a cross-sectional study, *Indian J Child Health*, 6 (6) (2019) 273-277. DOI: <https://doi.org/10.32677/IJCH.2019.v06.i06.004>
- 28 Ahmad J, Alam M A, Khalid M, Khan J A & Siddiqui M A, Efficacy of *Joshanda Zeequnnafas* and *Habbe Hindi Zeeqi* in Zeequnnafas (Bronchial Asthma) – An observational open clinical trial, *Int J Pharm Sci Res*, 5 (12) (2014) 974-979.
- 29 Anjum A, Concept of DIQ-AL-NAFAS (bronchial asthma) and management in Unani medicine, *Word J Pharm Med Res*, 7 (2) (2021) 75-78. DOI: <https://doi.org/10.17605/OSF.IO/K93QM>
- 30 Singhal K C, Jabin F, Ahmad S, Rahman S Z, Bhargava R, *et al.*, Scientific validation of Unani compound formulation for its efficacy in bronchial asthma, *Indian J Tradit Know*, 8 (3) (2009) 421-424.
- 31 Suryawanshi M, Kumavat V B, Dua P, Yadav B, Khanduri S, *et al.*, A multi-centre study to evaluate the effect and safety of a classical Ayurveda medicine Vyaghri Haritaki in bronchial asthma, *Indian J Tradit Know*, 23 (2) (2024) 109-118. DOI: 10.56042/ijtk.v23i2.6532
- 32 Khan M T, Ahmad F, Parveen S & Mohd N, Clinical validation to evaluate the safety and efficacy of Unani Pharmacopeial formulation Habb-e-Banafsha in the Management of Diq al- Nafas (Bronchial Asthma), *Afr J Bio Sci*, 6 (4) (2024) 1354-1362. doi: 10.48047/AFJBS.6.4.2024.1354-1362
- 33 Ahmad J, Alam M, Danish M, Shaikh M, Shaikh A M, *et al.*, An exploratory study of efficacy of *Joshanda Zeequnnafas* and *Habb-e- Hindi Zeeqi* in treatment of Zeequnnafas (Bronchial Asthma), *Word J Pharm Med Res*, 10 (9) (2024) 151-160.
- 34 Abd El-Salam M, Ammar N M, Yassin N, Ezzeldin N, Zikri E N, *et. al*, Clinico- Pharmacological assessment of a herbal preparation for the treatment of Bronchial Asthma, *World J Med Sci*, 12 (2) (2015) 115-124. DOI: 10.5829/idosi.wjms.2015.12.2.9363
- 35 Naqvi M, Reshi M R, Hasan N, Anees S, Gulati K, *et. al*, Preclinical toxicity assessment of UNIM-352, a polyherbal Unani preparation, and its optimized formulations: a potential therapeutic modality for Bronchial Asthma, *EC Pharmacol Toxicol*, 11 (5) (2023) 01-09.
- 36 Kumar S, Yadav S & Dipti, Clinical efficacy of *Simhyadi Kwath* along with *Shati Churna* in Tamaka Shwasa (Bronchial Asthma), *World J Pharm Sci*, 10 (02) (2022) 159-167. DOI: 10.54037/WJPS.2022.100201
- 37 Sultana N, Siddiqui M Y, Hakim M H & Mohd. M, A clinical study to assess the efficacy of anti asthmatic effect of *Sharbat-E-Sadar*, *Acta Tradit Med*, 01 (01) (2022) 41-60.
- 38 Ahmad N, Dar P A, Rashid N & Yousuf R, Clinical efficacy of Unani herbal formulation in *Zeeq-Un-Nafas Shoabi* (Bronchial asthma), *J Pharmacogn Phytochem*, 9 (4) (2020)1921-1928. DOI: <https://doi.org/10.22271/phyto.2020.v9.i4z.14344>
- 39 Naseer M & Siddiqui Mohd. Y, Comparative study of Unani formulations in the management of *Zeeq-Un-Nafas Shoabi* (Bronchial asthma), *Hippocratic J Unani Med*, 10 (2) (2015) 43-51.
- 40 Rai N, Ray A, Jamil S S & Gulati K, Cellular and molecular mechanisms of action of polyherbal preparation UNIM-352 in experimental models of bronchial asthma, *Indian J Exp Biol*, 53 (10) (2015) 625-31.
- 41 Shah A H, Haji A, Siddiqui M A, Ansari A N & Sofi G, Study of *Warne Shoab Muzmin* (Chronic Bronchitis) with therapeutic evaluation of a Unani formulation, *Indian J Tradit Know*, 10 (4) (2011) 706-710.