OPEN ACCESS

Saudi Journal of Pathology and Microbiology

Abbreviated Key Title: Saudi J Pathol Microbiol
ISSN 2518-3362 (Print) | ISSN 2518-3370 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article

Anatomy and Pathology of the Nasal Cavity: Unani Perspectives in Light of Modern Understanding

Shakera[1]*, Abdul Malik[2], Sayama Bano[3], Shahid Ali[3], Samrin Ansari[3], Hafsa[3], Ahtasham Khatoon[3]

[1]Medical Officer (Unani), Government Ayurvedic Hospital, Gangapur City, Rajasthan, India
[2]Associate Professor, Department of Tashreehul Badan (Human Anatomy), State Takmil ut Tib College & Hospital, Lucknow, U.P., India
[3]PG Scholar, Department of Tashreehul Badan (Human Anatomy), State Takmil ut Tib College & Hospital, Lucknow, U.P., India

DOI: https://doi.org/10.36348/sjpm.2026.v11i02.005 | **Received:** 16.01.2026 | **Accepted:** 10.03.2026 | **Published:** 19.03.2026

***Corresponding author:** Shakera
Medical Officer (Unani), Government Ayurvedic Hospital, Gangapur City, Rajasthan, India

Abstract

The nasal cavity is the principal pathway for respiration and olfaction, combining protective and sensory functions. The anterior portion filters and shields against external particles, while the posterior region refines inspired air and mediates smell perception. In Unani medicine nasal health is associated with the balance of humors and temperament. This paper interlaces together Unani concepts with modern anatomic pathology to present a very useful and pedagogical resource. We present in detail the structure and function of the nasal cavity which also includes the complex issues of its relationship to and vulnerabilities in various pathologic conditions. Unani disease classification and pathophysiologic theories are put under the microscope to present that in fact they do in many cases parallel modern bio-medical understanding of inflammatory, infectious, and neoplastic diseases. We look at acute catarrhal rhinitis, allergic rhinitis, chronic rhinosinusitis, epistaxis, and malignant tumors through the Unani medicine lens which also shows the very relevant role of humor-based etiologies for what are very common illnesses. This integrated approach we put forth adds to academic discussion, also has practical value for the clinician and educator and in turn helps to bridge the gap between traditional and modern systems of care.

Keywords: Nasal cavity, Unani medicine, Epistaxis, Polyps, Kiesselbach's plexus.

1. INTRODUCTION

The nasal cavity forms the anterior segment of the upper airway, conditioning inspired air, hosting the olfactory neuroepithelium, and providing immunologic interface via nasal-associated lymphoid tissue [1, 2]. In Unani medicine, nasal health reflects equilibrium of *Mizāj* (temperament) and balance of *Akhlāṭ* (humors) [3]. Disorders of the nose are widely discussed under *nazla/zukʿām* (catarrhal syndromes), *warm al-anf* (inflammation), *laḥm ghayr ṭabīʿī* (polyps), and *ruʿāf* (epistaxis) [4, 5]. This paper integrates modern anatomical pathology with Unani doctrine to create an actionable, teaching-ready reference.

The nasal cavity represents an essential structural and physiological element of the upper respiratory system. [6]. Structurally, it extends from the anterior nares to the choanae, providing passage for airflow while conditioning inspired air through warming, humidification, and filtration [1]. Functionally, it houses the olfactory neuroepithelium responsible for smell and plays a central role in immune surveillance via nasal-associated lymphoid tissue, which forms part of the body's first line of defence against inhaled pathogens [2]. Given these diverse physiological functions, disturbances in nasal anatomy and pathology often have systemic implications, ranging from impaired respiration to loss of olfaction and recurrent infections.

From the perspective of Unani medicine, the nasal cavity is conceptualised not merely as a passage for air, but as an organ intricately linked with the equilibrium of Mizāj (temperament) and the balance of *Akhlāṭ* (humours). Avicenna, in *Al-Qānūn fī al-Ṭibb*, elaborated on how derangements in humoral balance manifest in nasal conditions, emphasising that excess *balġam* (phlegm) predisposes individuals to catarrhal syndromes [3]. The nasal cavity is vulnerable to a wide spectrum of pathological conditions. The paranasal

sinuses, comprising paired frontal, maxillary, ethmoidal, and sphenoidal sinuses, are particularly prone to disease. S Among these, sinusitis represents the most prevalent disorder, frequently arising from infection or impaired drainage [7,8] In addition, the nasal cavity and its associated sinuses may be affected by traumatic injuries, benign and malignant neoplasms of the paranasal sinuses, as well as primary tumours originating within the nasal cavity itself [9]. Classical Unani scholars described a range of nasal disorders, including *nazla and zukām* (acute and chronic catarrhal syndromes), *warm al-anf* (nasal inflammation), *laḥm ghayr ṭabīʿī* (abnormal flesh or polyps), and *ruʿāf* (epistaxis) [4, 5]. These descriptions reveal a nuanced understanding that parallels, in many respects, contemporary classifications of rhinitis, sinusitis, polyposis, and epistaxis.

In modern clinical practice, anatomical variations such as septal deviation, turbinate hypertrophy, and mucosal pathology are well-recognised risk factors for recurrent sinonasal disease [10]. The convergence between classical Unani doctrines and contemporary anatomical pathology offers a rich interdisciplinary framework for teaching, research, and clinical practice. By contextualising nasal disorders in both traditions, a holistic picture emerges that highlights the continuity of medical thought across centuries.

This paper seeks to provide the anatomical pathology of the nasal cavity within a dual lens: the historical–philosophical framework of Unani medicine and the evidence-based classifications of modern anatomy and pathology. Such an integrative approach not only enriches academic discourse but also offers practical value for clinicians and educators bridging traditional and modern systems of care.

MATERIALS AND METHODS

The present research is grounded in a qualitative framework, utilizing descriptive and comparative methods of analysis. Descriptive methods were applied to extract and synthesize anatomical and pathological details from both Unani and modern medical sources, while comparative methods enabled a systematic evaluation of similarities and differences between the two perspectives. Primary data were obtained through a review of foundational Unani medical texts and its translations, including *Ibn Sīnā's Al-Qānūn fī al-Ṭibb*, *Al-Majūsī*'s *Kāmil al-Ṣināʿa al-Ṭibbiyya*, *Al-Rāzī's Kitāb al-Ḥāwī*, *Al-Zahrāwī's Al-Taṣrīf*, and *Jurjānī*'s *Zakhīra Khwārazmshāhī*. These works provided insights into the anatomical descriptions, pathological classifications, and therapeutic approaches related to the nasal cavity. To complement this, modern anatomical and pathological references such as Gray's Anatomy, Cummings Otolaryngology – Head & Neck Surgery, and peer-reviewed publications in rhinology were consulted to obtain updated biomedical knowledge. A comparative framework was then applied to systematically examine the parallels and distinctions between Unani and modern understandings, with particular attention to structural features, pathological processes, and clinical implications.

Objectives

1. To provide a comprehensive anatomical overview of the nasal cavity, correlating classical Unani descriptions with contemporary biomedical knowledge.
2. To analyze the major pathological conditions of the nasal cavity, such as rhinitis, sinusitis, epistaxis, and structural variations, from both Unani and modern perspectives.
3. To identify areas of convergence and divergence between Unani nosology and modern anatomical-pathological frameworks.

2. LITERATURE REVIEW

Buqrāt (Hippocrates) (460–370 BC) is frequently regarded as the 'father of rhinology,' owing to his early and systematic observations on nasal disorders, including a detailed account of polypoid growths within the nasal passages. In his writings around 400 BC, he further described the nose as a reservoir for the drainage of cerebral mucus, a notion deeply rooted in the humoral theory that dominated ancient medicine [11]. This conceptualization reflects the broader Hippocratic worldview; wherein bodily orifices were interpreted as natural channels for the expulsion of excess humors to preserve health. Such interpretations not only shaped early understandings of nasal physiology and pathology but also laid the groundwork for subsequent elaborations by Greco-Roman physicians such as *Jalinūs* (Galen), and later by Arab-Islamic scholars like *Abū Bakr Moḥammad Ibn Zakriyā Al-Rāzī* (Rhazes) and *Abū ʿAlī al-Ḥusayn ibn ʿAbdallāh ibn Sīnā* (Avicenna), who integrated these ideas into more refined anatomical and clinical frameworks.

Classical Unani texts such as *Al Qanūn fī al-Tibb* by *Ibn Sīnā*, *Kitāb al-Hāwi* and *Kitāb-al-Mansoorī* by *Abū Bakr Moḥammad Ibn Zakriyā Al-Rāzī*, *Kitāb al-tasrīf* by *Abū Al-Qāsim Khalaf Ibn 'Abbās Al-Zahrāwī*, *Kāmil-al-Sanā* by *'Alī Ibn Al-'Abbās Al-Majūsī*, and *Firdaus-al-Hikmat* by *'Alī Ibn Sahl Raban Al-Ṭabarī* extensively document nasal disorders and their relationship to systemic diseases. *Ibn Sīnā* describes inflammation of the nasal mucosa (*Waram al-Anf*), nasal discharge (*ifrāzāt anfiyyah*), ulcers (*qurḥāt*), and growths resembling polyps (*zawā'id laḥmiyyah*) [12]. He emphasizes the importance of nasal symptoms in identifying brain and lung pathologies.

Abū Al-Qāsim Khalaf Ibn 'Abbās Al-Zahrāwī, in *Kitāb al-Tasrīf li-man 'ajiza 'an al-ta'lif fī al-tibb*, discussed surgical interventions for *zawā'id anfiyyah* (nasal polyps) and *nazif al'anf* (nasal bleeding),

indicating early understanding of pathological growths and vascular abnormalities [13].

Contemporary anatomical pathology, as detailed in Gray's Anatomy and Robbins' Pathologic Basis of Disease, explores microscopic and macroscopic alterations in the nasal epithelium resulting from infections, immunological responses, and malignancies [14,15]. While Unani medicine lacks histological insights, the functional correlation between humoural imbalance and observable pathology reveals a parallel understanding of disease mechanisms.

The nasal cavity is a complex anatomical structure consisting of bony and cartilaginous frameworks lined by mucosa, divided medially by the nasal septum, and bounded laterally by the turbinates [1]. It serves multiple physiological roles, including humidification and filtration of air, olfaction, and resonation of speech. The mucosa of the nasal cavity is highly vascularised and contains goblet cells, serous glands, and immune components, making it both a frontline defense and a potential site for pathological changes [15].

2.1 Anatomical Overview (Clinically Oriented)

The nasal cavity is a central anatomical structure within the craniofacial skeleton, playing key roles in respiration, olfaction, humidification, filtration, and resonance of the voice. Anatomically, the nasal cavity is a hollow space situated between the cranial base and the palate. Superiorly, it is bounded by the ethmoid bone, while its lateral walls are formed by the ethmoid, maxilla, and the inferior nasal conchae [16]. The nasal septum divides the cavity into two nearly symmetrical sections, stretching from the anterior nares to the posterior choanae. Anatomically, the cavity is structured into three main areas: the vestibule, the olfactory zone, and the respiratory zone [17]. Physiologically, the nasal cavity serves two primary functions: respiration and olfaction. In the adult human, it has an estimated surface area of approximately 150 cm^2 and an average volume of around 15 mL, providing an extensive mucosal interface for the filtration, humidification, and warming of inspired air, as well as for the detection of olfactory stimuli [18-23]. These physiological features are clinically significant, as alterations in nasal surface area or airflow dynamics—such as those observed in deviated nasal septum, turbinate hypertrophy, or chronic rhinosinusitis—may compromise both respiratory efficiency and olfactory acuity [17].

The nasal cavity is divided into distinct regions with specialized structural features. The vestibule, the anterior most part situated just within the external nares, covers an area of approximately 0.6 cm^2 and functions as the initial entry point for inspired air [18]. Posterior to it lies the atrium, a transitional zone between the vestibule and the respiratory region, where the anterior portion is lined by stratified squamous epithelium, while the posterior portion is covered by pseudo-stratified columnar cells bearing microvilli [24,25]. The respiratory region forms the largest part of the nasal cavity and contains the three turbinates—superior, middle, and inferior—which enhance surface area and airflow regulation [26]. This region is lined with respiratory epithelium composed of pseudostratified columnar epithelial cells, goblet cells, basal cells, and underlying mucous and serous glands, which collectively contribute to air filtration, humidification, and mucociliary clearance [27]. A clinically oriented understanding of its anatomy is essential, as its complex relationships make it vulnerable to numerous pathological conditions and surgical risks.

2.1.1 Roof of the Nasal Cavity

The roof of the nasal cavity is narrow and segmented, composed anteriorly by the nasal bones, centrally by the cribriform plate of the ethmoid, and posteriorly by the body of the sphenoid. The cribriform plate transmits olfactory nerve filaments, making it vital for the sense of smell [28]. However, this delicate structure also constitutes a weak point in the skull base, predisposing it to cerebrospinal fluid (CSF) rhinorrhoea when disrupted by trauma or surgical intervention [29]. The fovea ethmoidalis, another roof component, demarcates the superior limit of the ethmoid labyrinth, and its proximity to the anterior cranial fossa highlights the potential for intracranial complications during sinus or nasal surgery [1].

2.1.2 Floor of the Nasal Cavity

The floor is broader and formed by the palatine processes of the maxillae and the horizontal plates of the palatine bones. This structure also constitutes the roof of the oral cavity. From a clinical perspective, the nasal floor plays a critical role in cleft palate conditions, where defective fusion creates a passage between the oral and nasal cavities, giving rise to challenges in feeding and speech [29].

2.1.3 Nasal Septum

Dividing the nasal cavity into two halves, the septum is formed by the quadrangular cartilage at the front, the ethmoid's perpendicular plate above, and the vomer below [1]. Beyond its structural role, it significantly contributes to the control of airflow. Deviations of the septum are common anatomical variations, often asymptomatic, but when severe they contribute to obstruction, impaired sinus drainage, and recurrent rhinosinusitis [30]. Septal perforations may result from trauma, cocaine use, or iatrogenic causes, leading to crusting, bleeding, and whistling sounds during respiration [28].

2.1.4 Lateral Wall and Turbinates

The lateral wall of the nasal cavity is anatomically complex, hosting the turbinates (inferior,

middle, and superior conchae), which project medially to increase the surface area for humidification and filtration. Beneath each turbinate lies a corresponding meatus, providing drainage pathways for the paranasal sinuses [1]. The inferior meatus receives the nasolacrimal duct, the middle meatus is the drainage site for the maxillary, frontal, and anterior ethmoidal sinuses, while the superior meatus drains the posterior ethmoidal cells. Situated above the superior turbinate, the sphenoethmoidal recess serves as the sphenoid sinus's drainage channel [28].

From a clinical perspective, obstruction at these drainage sites due to mucosal swelling, polyps, or anatomical variants such as concha bullosa (pneumatisation of the middle turbinate) predisposes to sinusitis [30]. Enlargement of the inferior turbinate, a common cause of nasal obstruction, may necessitate surgical reduction. The close anatomical relationship of the lateral wall with the orbit and cranial cavity also explains the risk of orbital cellulitis or intracranial spread of sinus infections [29].

2.1.5 Vascular Supply

The nasal cavity's rich vasculature, which is supplied by branches of the internal and external carotid arteries, not only supports its functions but also frequently causes nosebleeds. Anteriorly, Kiesselbach's plexus (also known as Little's area) is formed by the anastomosis of the anterior ethmoidal, sphenopalatine, greater palatine, and superior labial arteries [1]. This region is the most common site of epistaxis, particularly anterior nosebleeds, which are frequent but usually self-limiting. Posteriorly, the sphenopalatine artery provides the dominant supply and is implicated in more severe posterior epistaxis, which often requires surgical or endovascular management [29]. The venous drainage communicates with the cavernous sinus via the ophthalmic veins, posing a potential route for intracranial spread of infection, classically described in cavernous sinus thrombosis [28].

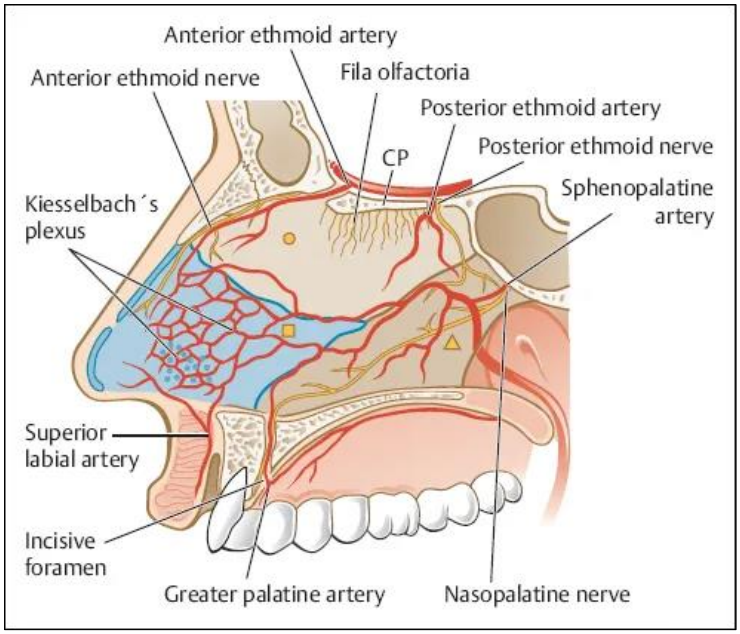

Figure 1: Arterial supply of nasal septum

2.1.6 Innervation

The nasal cavity receives its innervation predominantly from branches of the trigeminal nerve, a distribution that holds clinical importance in rhinological pain and anesthesia. The ophthalmic division (V1), via the anterior ethmoidal nerve, supplies the anterosuperior region, while the maxillary division (V2) innervates the posteroinferior part through the nasopalatine and posterior nasal branches [1]. Autonomic secretomotor innervation originates in the pterygopalatine ganglion, with parasympathetic fibres promoting glandular secretions and sympathetic fibres modulating vascular tone. Olfactory sensation is mediated by the olfactory nerve filaments traversing the cribriform plate. Clinical implications include trigeminal neuralgia affecting nasal branches and anosmia resulting from olfactory nerve damage due to head trauma or viral infections [30].

2.1.7 Anatomical Variations and Clinical Correlations

The nasal cavity exhibits several anatomical variations with important clinical implications. One such variation, concha bullosa, involves the pneumatization of the middle turbinate, potentially narrowing the middle meatus and contributing to repeated sinus infections. Another common anomaly, septal deviation, may lead to unilateral obstruction, recurrent episodes of epistaxis, and heightened risk of sinusitis due to compromised mucociliary clearance. Additionally, paradoxical curvature of the middle turbinate, Haller cells, and Onodi

cells are important considerations in endoscopic sinus surgery, as they increase the risk of orbital or skull base injury if unrecognised pre-operatively [28].

2.2 Major Disease Categories (Modern Framework)

2.2.1 Inflammatory & Infectious

Acute viral rhinitis presents with mucosal oedema, epithelial desquamation, and congestion [2]. Allergic rhinitis is IgE-mediated, showing eosinophilia and goblet cell hyperplasia [31]. Chronic rhinosinusitis (CRS), with or without nasal polyps, reflects biofilm formation and type 2 inflammation. Fungal rhinosinusitis manifests as allergic (AFRS), invasive, or chronic invasive forms, with invasive types being life-threatening in immunocompromised patients [32]. Granulomatous conditions such as granulomatosis with polyangiitis and sarcoidosis also affect the nose [33].

2.2.2 Structural & Vascular

Structural variations such as deviated nasal septum, hypertrophied turbinates, and concha bullosa represent key etiological factors in nasal airway obstruction, with significant impact on airflow and sinonasal function [28]. Epistaxis constitutes another frequent disorder, most commonly anterior in origin from Kiesselbach's plexus, though posterior bleeding, often more severe, typically arises from the sphenopalatine artery. In addition, septal perforation may develop secondary to mechanical trauma, autoimmune conditions including granulomatosis with polyangiitis formerly known as Wegener's granulomatosis, or chronic intranasal substance abuse such as cocaine, each of which contributes to disruption of septal tissue integrity [2].

2.2.3 Benign & Borderline Tumours

The spectrum of benign neoplasms within the nasal cavity includes several entities of considerable clinical importance. Nasal polyps, commonly linked with chronic inflammatory states, may obstruct airflow and predispose to recurrent infections. Antrochoanal polyps represent a distinct subtype arising from the maxillary sinus and extending into the choanae, frequently observed in younger populations. Inverted papillomas, despite their benign histological profile, are clinically significant due to their locally invasive behaviour and potential for malignant transformation. Equally notable are vascular tumours such as juvenile nasopharyngeal angiofibroma, a rare but highly vascular lesion typically affecting adolescent males, which poses unique diagnostic and therapeutic challenges. [34,35].

2.2.4 Malignant Neoplasms

Sinonasal squamous cell carcinoma is most common, followed by adenocarcinoma linked to wood-dust exposure. Esthesio-neuroblastoma arises from the olfactory mucosa, and sinonasal undifferentiated carcinoma is highly aggressive [36,37]. Extra-nodal NK/T-cell lymphoma and mucosal melanoma also occur [29,38].

2.3 Unani Nosology and Pathophysiology

In the Unani system of medicine, health is defined as the harmonious balance of the *Mizāj* (temperament) and the four *Akhlāṭ* (humours: blood, phlegm, yellow bile, black bile) [3,39]. Disease arises when this balance is disturbed, resulting in either quantitative or qualitative derangements of the humours and their interaction with organs [40]. This theoretical framework, inherited from Galenic medicine and refined by eminent Unani physicians, continues to underpin the understanding of nasal diseases in the Unani tradition [41].

According to Unani medicine, acute catarrhal rhinitis (*nazla ḥādda*) arises from dominance of the phlegmatic humor (*balġam*), leading to cold and moist changes in the nasal passages that manifest as congestion and profuse discharge. This concept aligns with the modern understanding of viral rhinitis, which is characterized by acute mucosal inflammation and hyper secretion. In contrast, allergic rhinitis is explained in Unani theory through S*ūʾ-e-Mizāj ḥārr* (hot dystemperament), denoting a heightened and imbalanced state of reactivity. Modern clinical science equates this to IgE-mediated hypersensitivity, wherein allergens initiate an exaggerated immune response, releasing mediators such as histamine and leukotrienes, which produce symptoms including nasal obstruction, sneezing, and watery discharge [5].

2.3.1 Unani Perspective on Nasal Pathologies

The Unani system, rooted in Greco-Arabic traditions, conceptualises disease through the lens of the four humours—blood (*dam*), phlegm (*balġam*), yellow bile (*ṣafrā*), and black bile (*sawdāʾ*)—and their associated temperaments (*Mizāj*). Disease is viewed as a result of humoral imbalance and derangement of the temperamental equilibrium of organs [42]. The nose, in Unani terminology, is considered part of the *Aʾza-e-Raeesa* (vital organs), and its pathologies are frequently attributed to deranged phlegmatic humour (*balġami* sūʾ-*e-mizāj*), particularly in chronic conditions like *nazla* and *zukām*.

Unani medicine commonly emphasizes *zukām* (cold) and *nazla* (catarrh) as primary afflictions of the nasal cavity. Clinical manifestations include sneezing, congestion, rhinorrhea, and constitutional symptoms like fever and general discomfort. Classical Unani literature, particularly *Ibn Sīnā*'s *Al-Qānūn fī al-Ṭibb*, explains these disorders as arising from a predominance of cold and humid temperament, resulting in excessive mucus formation and its retention in the sinuses and nasal cavity [43]. Contemporary scholars have correlated *nazla ḥārra* (hot catarrh) and *nazla barida* (cold catarrh) with allergic and infectious rhinitis, respectively [42].

2.3.2 Acute Catarrhal Rhinitis (*Nazla ḥādda*)

Unani physicians described acute catarrhal rhinitis as *nazla ḥādda*, resulting from the predominance of *balġam* (phlegm). According to *Ibn Sīnā*, the accumulation of excessive moist humour leads to discharge and congestion, manifesting clinically as rhinorrhoea, sneezing, and nasal obstruction. *Abū Bakr Moḥammad Ibn Zakriyā Al-Rāzī* emphasised that external cold exposure or consumption of cold-tempered diets could precipitate this condition, reflecting a disruption in the equilibrium of humours. In contemporary biomedical terms, this correlates with viral upper respiratory tract infections, highlighting the enduring relevance of humoral explanations for common illnesses [44].

2.3.3 Allergic Rhinitis

Allergic rhinitis in the Unani framework is understood as a manifestation of *sūʾ-e-Mizāj ḥārr* (hot dystemperament) affecting the nasal mucosa. The heightened reactivity and burning sensations are attributed to excessive heat in the local temperament [5]. Avicenna described hypersensitivity reactions in terms of inappropriate humoural responses, where otherwise innocuous stimuli trigger excessive nasal discharge. This description parallels modern immunological mechanisms of allergy [3]. It has been noted that these insights demonstrate how classical Unani medicine recognised the individuality of bodily responses, anticipating later biomedical notions of hypersensitivity.

2.3.4 Chronic Rhinosinusitis (CRS) and Nasal Polyps

Chronic rhinosinusitis, particularly when associated with nasal polyps, was explained by Unani physicians under the category of *laḥm ghayr ṭabīʿī* (abnormal fleshy growth) [45,46]. *Al-Zahrāwī* attributed these to chronic retention of humoural moisture, impaired drainage, and weakened nasal tissues. *Ibn Sīnā* further suggested that chronicity arises from incomplete resolution of acute catarrh, leading to thickened secretions and mucosal hypertrophy. This concept aligns with current biomedical understanding of chronic rhinosinusitis as a multifactorial condition involving inflammation, impaired clearance, and structural abnormalities. The persistence of moisture (*ruṭūbat*) in the Unani model reflects the chronic inflammatory state described in modern pathology [47].

2.3.5 Epistaxis (*Ruʿāf*)

Epistaxis, or *ruʿāf*, is viewed in the Unani system as the result of an overabundance of the sanguine humour (*dam*) combined with excessive heat within the blood vessels [47,48]. *Al-Rāzī* classified epistaxis as both a symptom and a disease entity, recognising that it may serve as a compensatory evacuation of excess blood or an indicator of underlying pathology. *Al-Zahrāwī* provided detailed surgical guidance on managing severe epistaxis, including cauterisation and tamponade, which foreshadow modern otorhinolaryngological practice. It is highlighted, how these approaches reveal the empirical sophistication of medieval Unani physicians in managing haemorrhagic disorders [41].

2.3.6 Malignant Tumours (*Awrām sāwdāʾī*)

Nasal malignancies in Unani medicine were described under *awrām sāwdāʾī* (melancholic tumours), attributed to the predominance of black bile (*sawdāʾ*). Avicenna characterised these tumours as hard, irregular, and progressively destructive, features that correlate closely with malignant pathology. *Al-Rāzī* suggested that dietary and environmental factors could contribute to melancholic humoral derangements, predisposing individuals to such growths. *Al-Zahrāwī* recommended surgical excision when feasible, acknowledging the guarded prognosis. Modern historians stress that Unani conceptualisations of malignancy, though rooted in humoral theory, provided a rational framework that guided clinical intervention and prognosis long before the advent of histopathology [39,40].

3. Integrative Insights

The Unani nosological and pathophysiological explanations of nasal diseases demonstrate a consistent reliance on the principles of humoural imbalance, temperament derangements, and abnormal growths. While the language and framework differ from modern biomedical terminology, parallels can be drawn between *balġam* excess and infectious/inflammatory catarrh, *sūʾ-e-Mizāj ḥārr* and allergic hyper reactivity, *ruṭūbat* retention and chronic inflammatory sinus disease, dam predominance and vascular bleeding disorders, and *sawdāʾ* predominance and malignant neoplasia.

Contemporary Unani scholars argue that this rich theoretical heritage provides not only a historical understanding but also a holistic clinical framework for modern practice [44]. By linking classical principles with contemporary insights, the Unani approach to nasal pathology reflects an enduring medical tradition that continues to inform integrative healthcare.

Table 1: Anatomical Regions of the Nasal Cavity: Unani vs Modern Perspectives

Region	Description in Unani Medicine	Description in Modern Anatomy
Khayshūm (Nasal Cavity)	Primary channel for respiration and olfaction; its membranes protect and sense; anterior–posterior parts emphasized [46, 49-51].	Divided into vestibule, atrium, respiratory and olfactory regions; mucosa warms, humidifies and filters inspired air [1, 39].
Al-Hajiz Al-Anfi / Nasal Septum	Partition ensuring smooth airflow; deviations/ulcers linked to dystemperament and local lesions [46, 49-51].	Formed by quadrangular cartilage, vomer, and perpendicular plate of ethmoid; common site of deviation and perforation [1, 34].
Al-minṭaqatu ash-shammiyyatu (Olfactory region)	Seat of smell tied to *quwwat shammiya*; proximity to brain emphasizes its neurological influence [46, 49-51].	Olfactory epithelium at superior nasal concha and roof; olfactory nerve filaments traverse cribriform plate [1, 34].
Al-Maharat al-Anfiyyah (Turbinates)	Mucosal projections modulating airflow, heat and moisture; hypertrophy linked to *ruṭūbat* excess [46, 49-51]	Inferior, middle, superior conchae increase surface area, create laminar/turbulent flow; erectile tissue regulates resistance [1, 34].
Masarat e Manfuzāt (Drainage pathways)	Natural outlets for excess waste-humors from cranial region; patency prevents *imtilā'* (congestion) [46, 49-51].	Ostiomeatal complex drains maxillary, frontal and anterior ethmoid sinuses via middle meatus; sphenoethmoidal recess drains sphenoid [1, 34].

Table 2: Pathological Conditions of the Nasal Cavity: Unani vs Modern Views

Condition	Unani Perspective (Classical Texts)	Modern Medical Perspective
Nazla (Catarrh)	Descent of morbid humors from brain into nasal cavity; predominance of *balġam*; features: rhinorrhea, heaviness, cough [46, 49, 51].	Acute viral rhinitis (rhinovirus/coronavirus); mucosal inflammation and edema with watery rhinorrhea [1, 34].
Zukām (Rhinitis)	Nasal disorders may arise from exposure to cold or from disturbances in temperament. They are classified into *ḥārra* (hot), characterized by burning sensations, and *bārida* (cold), which presents with thick nasal discharge [46, 49, 51].	Clinically, rhinitis is distinguished as allergic, mediated by IgE hypersensitivity, or non-allergic, arising from non-immune mechanisms. Provoking factors range from allergens to chemical or physical irritants, while characteristic symptoms comprise nasal blockage and paroxysmal sneezing [1, 34].
Polypus anfi (Nasal Polyp)	Fleshy, often soft growth from moist dystemperament (*sū'-e-Mizāj ratab*) and *balġam ghalīz* [46, 49, 51].	Chronic inflammatory polyps associated with chronic rhinosinusitis; eosinophilia; recurrence common [1, 34].
Insidād al-anf (Nasal Obstruction)	Nasal obstruction may arise from the accumulation of excessive humors, the formation of crusts, or the presence of abnormal growths. Management within the Unani framework typically involves *tadbīr* (regimens) such as steam inhalation and *'ilāj al-anf* (nasal therapy), while in resistant cases, *kai* (cauterization) or surgical intervention may be employed [46, 49, 51].	Among the common underlying causes of nasal blockage are deviation of the nasal septum, enlargement of the turbinates, and the presence of polyps. Treatment approaches are tailored to the condition and may involve pharmacological management or operative correction [1, 34].
Rū'āf (Epistaxis)	Due to *hiddat al-dam* (heat of blood), fragile vessels, trauma; sometimes protective by relieving intracranial fullness [46, 49, 51].	Anterior epistaxis from Kiesselbach's plexus; causes include trauma, hypertension, coagulopathy; managed with compression, cautery, packing [34, 52].
Warm al-juyūb (Sinusitis)	Inflammation of nasal/paranasal structures due to *ghalaba safrā* (bile) or *balġam*; features: heaviness, obstruction, fetor [46, 49, 51].	Acute vs chronic rhinosinusitis; EPOS criteria (≥12 weeks for CRS), role of OMC obstruction and biofilms [1, 30, 34].

4. DISCUSSION

Unani scholars view the nasal cavity as a reflective organ of balance, contrasting with modern anatomy's focus on the upper airway. The cavity accommodates the olfactory neuroepithelium and acts as a sentinel for immunological defense. This divergence in epistemological framing highlights how clinical realities have been integrated across traditions, highlighting the importance of understanding the nasal cavity in respiratory and olfactory physiology. According to the principles of Unani medicine, the genesis of pathology lies in the imbalance of *Mizāj* (temperament) and the disequilibrium of the *Akhlāṭ* (humours). The system posits that the harmonious proportion of the four

humours is essential for maintaining health, whereas their excess, deficiency, or qualitative change disrupts the natural temperament. Such humoral derangements are regarded as the underlying cause of both localized and systemic disorders, reflecting the centrality of humoural theory in Unani nosology. Avicenna's description of catarrhal conditions, such as *Nazla/Zukām*, is attributed to the predominance of *balġam* (phlegm), leading to excessive nasal discharge and congestion. This metaphor mirrors modern understanding of mucosal inflammation and hyper secretion in acute rhinitis and anterior bleeds at Kiesselbach's plexus.

The continuity between the two systems is also apparent in descriptions of structural lesions. Unani authors such as *Al-Zahrāwī* referred to *laḥm ghayr ṭabīʿī* (abnormal flesh), which modern clinicians recognise as nasal polyps. The explanation of these as products of retained moisture and poor drainage may be seen as a humoral analogue of chronic inflammation, mucosal oedema, and impaired mucociliary clearance in chronic rhinosinusitis with polyposis. Similarly, *awrām sāwdāʾī* (melancholic tumours) denote early endeavors to describe malignant lesions, utilizing the lexicon of black bile and deterioration. Modern oncology, with its cellular and genetic foundations, departs from humoral metaphors yet retains the same phenomenological concern with abnormal proliferation, obstruction, and invasion.

Concha bullosa, turbinate hypertrophy, and nasal septum deviation are anatomical details of unani medicine that predispose to obstruction, stagnation, and recurrent disease. The shift from temperament to tissue, humours to histology, represents a translation of explanatory language, attempting to map the relationship between form and function, imbalance, and disease. Modern medicine and Unani philosophy share a common anatomical site, the nose, which is considered a gateway organ between the external world and the internal body. Disorders in the nose symbolize imbalance in an individual's relationship to their environment. Modern medicine, while less inclined to metaphysical symbolism, recognizes the nose as a critical interface between host and environment, critical in respiratory immunity, allergen response, and microbial colonisation. Integrating Unani and modern frameworks offers more than historical curiosity, providing a heuristic model for teaching and practice, while enriching our understanding of the plurality of medical thought.

Ultimately, the discussion demonstrates that the anatomical pathology of the nasal cavity is not confined to the present-day clinic. It is embedded in a long continuum of medical reflection—where Galen, Avicenna, *Al-Rāzī*, and *Al-Zahrāwī* once sought to explain its mysteries, and where contemporary otolaryngology continues to refine its understanding. The dialogue between humoral imbalance and histopathology, between temperament and tissue, represents more than historical comparison; it offers a framework for integrating tradition with modern science, cultivating a medicine that is both clinically precise and philosophically reflective.

5. CONCLUSION

Anatomical pathology of the nasal cavity, a highly structured organ, is a subject of ongoing clinical curiosity and philosophical reflection. Modern pathology explains vulnerabilities through precise vascular, neural, and cellular mechanisms, while Greco-Arabic physicians offer holistic interpretations of nasal disorders through their frameworks of *Mizāj* and *Akhlāṭ*. Avicenna, *Al-Rāzī*, and *Al-Zahrāwī*, Unani scholars, viewed the nasal cavity as a site for humoral imbalances, causing conditions like *nazla* and *ruʿāf*. Lesions like polyps and *sāwdāʾī* reveal early nosological categorization, reflecting humoral theory and empirical observation. Unani doctrine and modern pathology are interconnected, providing preventive insights and precision in diagnosis and intervention, bridging past and present, practice and philosophy, enhancing medical understanding. Future research should map immunological endotypes to *Mizāj* types to personalise therapy.

The nasal cavity is a significant historical and intellectual passage in medicine, connecting past findings to contemporary understandings. It is an evolving explanation reflecting our growing body of knowledge. Medical advancements should be seen as part of a broader narrative, encompassing challenges, triumphs, and changing paradigms that have shaped our understanding of human anatomy and pathology over time.

Conflict of Interest: The authors declare that there are no conflicts of interest to disclose in relation to the publication of this manuscript.

Funding: No funding source is reported for this study.

Ethical Statement: The authors indicated that ethical approval was not necessary for this study, given its nature as a review. Nonetheless, we have taken care to ensure that all data sources employed are duly acknowledged and cited in compliance with established academic standards.

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