

Original Article



Mapping Cancer Concepts in Persian Medicine: A Qualitative Content Analysis and Conceptual Comparison with Contemporary Oncology

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Summary

Introduction: Cancer has been described in Persian Medicine (PM) texts for centuries; however, the ways in which cancer was defined, explained, clinically described, and managed across major historical sources have not been comprehensively characterized. This study examined cancer-related concepts in selected classical PM texts and explored potential conceptual parallels between these historical descriptions and selected concepts in contemporary oncology.

Methods: A summative qualitative content analysis was conducted on five selected classical PM texts dating from the 4th to the 13th century AH. The analysis focused on historical descriptions of cancer, including definitions, proposed etiological factors, clinical manifestations, progression, and therapeutic practices. Coding was inductive, and the development of categories and themes involved iterative review and discussion with faculty members and subject-matter experts.

Results: The selected PM texts describe cancer (*saratān*) within a humoral framework as a pathological swelling associated with altered or accumulated melancholic matter (*soda*) and, in some descriptions, its transformation or "burning" (*ihtiraq*). Reported historical etiological factors included dietary practices, impaired digestion and elimination, sleep disturbances, previous disease or injury, altered heat and dryness, and emotional disturbances. Clinical descriptions included progressive pain, enlargement of the lesion, characteristic vascular appearances, weight loss, and other local and systemic findings. Therapeutic practices included dietary modification, medicinal preparations, measures intended to promote elimination, bloodletting, cauterization, and surgical procedures.

Conclusion: The selected PM texts provide historically situated descriptions of cancer and its causes, manifestations, progression, and management. Some observations may be compared conceptually with selected contemporary biomedical concepts; however, substantial differences exist between the humoral framework of PM and the cellular, molecular, pathological, and evidence-based framework of contemporary oncology. The identified parallels should therefore be regarded as interpretive and hypothesis-generating rather than as evidence that PM anticipated modern oncological mechanisms.

Keywords: Cancer, Persian medicine, Qualitative content analysis, Oncology, Etiology, Oxidative stress, Inflammation

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Introduction

Cancer remains a major global health problem. In 2022, approximately 20 million new cancer cases and 9.7 million cancer-related deaths were estimated worldwide, and the annual number of new cases is projected to exceed 35 million by 2050.^{1,2} Despite substantial advances in contemporary oncology, challenges including treatment resistance, treatment-related toxicity, unequal access to care, and the continuing global burden of cancer remain important areas of research.³ Persian Medicine (PM) refers in this study to the historical medical tradition developed and transmitted through a substantial body of Persian and Arabic medical scholarship over several centuries. Major physicians, including Avicenna (980–1037 CE) and Rhazes (865–925 CE), contributed extensively to this

tradition.⁴ Within this historical framework, diseases were interpreted through concepts including humoral balance, temperament, bodily qualities, environmental influences, diet, lifestyle, and patterns of bodily function.

Historical PM texts contain detailed descriptions of conditions referred to as *saratān* (cancer). These descriptions include pathological swellings, characteristic local changes, proposed etiological factors, systemic manifestations, and therapeutic practices.^{5–9} The historical terminology and explanatory models, however, were developed within a theoretical framework fundamentally different from contemporary pathology and oncology. Previous scholarship has examined cancer and its treatment in historical PM sources, including descriptions of terminology, etiological explanations, and therapeutic



approaches.¹⁰⁻¹² Nevertheless, there remains a need for a more focused qualitative analysis of how cancer was described across selected major historical sources, particularly with respect to definitions, etiological concepts, clinical manifestations, and progression.

A further issue concerns the interpretation of historical observations in relation to contemporary biomedical knowledge. Some historical descriptions may appear conceptually similar to modern discussions of inflammation, altered metabolism, cellular stress, vascular changes, psychological stress, or cancer-associated systemic manifestations. However, such similarities should not be assumed to represent historical knowledge of modern biological mechanisms. Historical concepts must first be interpreted within their original theoretical and textual context and only subsequently considered in relation to contemporary biomedical concepts. Accordingly, the present study aimed to characterize cancer-related concepts in five selected classical PM texts and to examine, in a separate interpretive step, potential conceptual convergences and divergences between these historical descriptions and selected contemporary oncology concepts. The study specifically examined the historical definitions and etiological explanations of cancer, its clinical manifestations and progression, and the therapeutic practices described in the selected texts. Contemporary biomedical literature was used only to contextualize selected findings and to identify potential areas for future hypothesis-driven research.

Methods

Study design and analytical approach

This study employed a summative qualitative content analysis to examine how cancer was conceptualized, described, and managed in selected classical texts of Persian Medicine (PM). The primary analysis focused exclusively on historical textual evidence concerning the definition, proposed etiology, clinical manifestations, progression, and treatment of cancer. The analysis was conducted inductively so that concepts and patterns could emerge from the historical material rather than being imposed through a predefined modern biomedical framework. Contemporary biomedical literature was consulted only after the historical analysis had been completed. Its purpose was to provide contextual comparison for selected findings and to explore potential conceptual relationships with contemporary oncology. These comparisons were interpretive and hypothesis-generating and were not intended to establish biological, pathological, or mechanistic equivalence between historical and contemporary concepts.

Selection of primary historical sources

Five influential texts of Persian Medicine were selected as the primary historical sources: *Al-Qanun fi al-Tibb* (The Canon of Medicine), *Al-Hawi fi al-Tibb* (The Comprehensive Book of Medicine), *Al-Aghrad al-Tibbiyyah* (Medical Objectives), *Al-Asbab wa al-Alamat* (Causes and Signs) by Samarqandi, and *Eksir A'zam* (The Greatest Elixir). The sources were

selected purposively according to predefined historical and textual criteria. Eligible works were required to: (1) have been authored by recognized physicians or medical scholars with an established position in the history of medicine; (2) reflect authors with documented practical or clinical medical experience in addition to theoretical knowledge; and (3) represent established and influential sources within the PM tradition. In addition, the selected texts were required to contain substantive information relevant to the objectives of the study, particularly concerning disease definitions, etiology, signs and symptoms, progression, and treatment. Studies that did not meet these criteria or lacked sufficient relevant medical content were excluded. All identifiable passages concerning cancer and related clinical descriptions were extracted from the selected primary texts. Historical terms referring to cancer were distinguished, where possible, from metaphorical, figurative, or idiomatic uses in order to focus the analysis on clinically oriented descriptions.

Data collection and textual analysis

The analysis was organized around four major domains commonly used to describe diseases in the selected historical medical texts: definition, etiology, clinical manifestations, and treatment. Relevant passages were identified and coded according to their substantive meaning and clinical content. Passages in Arabic and Classical Persian were translated into modern Persian. The translations were reviewed against the original texts to preserve the intended historical and medical meanings. Importantly, contemporary biomedical terminology was not used to redefine the historical concepts during the initial analysis. Historical terms were first interpreted within their original textual and theoretical context. Contemporary biomedical concepts were introduced only during the subsequent interpretive comparison. Clinical manifestations were categorized into local and systemic findings. Etiological descriptions were grouped according to their underlying meanings within the historical framework. Therapeutic practices were classified into four broad categories: lifestyle modification, nutritional interventions, topical and systemic medicinal preparations, and manual and procedural interventions, including surgery and cauterization. The analysis focused on documenting the concepts expressed in the historical sources rather than evaluating their contemporary diagnostic or therapeutic validity.

Contemporary biomedical literature for conceptual comparison

The contemporary biomedical literature was consulted only after completion of the qualitative analysis of the five selected primary PM texts. This component was not designed as an independent systematic or comprehensive literature review. Its purpose was to provide contemporary biomedical context for selected findings that emerged from the historical analysis and to explore potential conceptual correspondences with contemporary oncology. The modern biomedical literature therefore did not constitute

a second primary dataset and was not used to identify, select, or validate the historical findings. The five selected PM texts constituted the primary data sources of the study. Following the historical analysis, relevant contemporary literature was identified through PubMed, PMC, Scopus, and Google Scholar using concept-specific combinations of terms such as “cancer,” “neoplasm,” “oxidative stress,” “mitochondrial dysfunction,” “inflammation,” “stress biology,” “hemorheology,” “angiogenesis,” and “cancer cachexia.” The selection of contemporary sources was purposeful and concept-driven rather than systematic. Sources were considered relevant when they provided contemporary biomedical evidence concerning a biological or clinical concept that had emerged from the historical analysis. Priority was given to relevant oncology reviews and, where appropriate, primary studies. The contemporary literature was not pooled, quantitatively synthesized, or subjected to an independent systematic review or PRISMA process. Most importantly, contemporary biomedical concepts were not used to redefine historical terminology or to establish direct biological equivalence. Proposed relationships between historical observations and contemporary biomedical concepts were treated as retrospective conceptual comparisons and are presented as such in the Results and Discussion.

Coding and data analysis

The five selected historical texts were imported into ATLAS.ti version 9 (Scientific Software Development GmbH, Berlin, Germany) to facilitate organization, coding, retrieval, and management of textual material. An inductive coding approach was used without a predefined codebook. This approach allowed concepts and patterns to emerge from the historical texts rather than imposing a predetermined contemporary biomedical framework. One researcher conducted the initial coding. The texts were read repeatedly, and meaningful passages relevant to the research questions were identified. Initial codes were assigned to relevant segments and were progressively reviewed and refined throughout the analysis. Codes were merged, differentiated, renamed, or otherwise modified when further examination of the textual material indicated that such changes were appropriate. Conceptually related codes were subsequently grouped into broader categories. The emerging categories and their relationships were examined iteratively, and higher-order themes were developed from the underlying textual evidence.

The coding structure, interpretations, categories, and emerging themes were discussed in multiple meetings with participating faculty members and subject-matter experts. Similarities and differences among codes were examined, alternative interpretations were considered, and codes and categories were revised where necessary. The final thematic structure was developed through iterative discussion and consensus among the research team. Because the initial coding was performed by a single researcher, formal inter-coder agreement statistics, such as Cohen’s kappa, were not calculated. Analytical credibility was instead supported

through repeated review of coding decisions, iterative expert discussion, consideration of alternative interpretations, and consensus-based refinement of categories and themes. ATLAS.ti was used as a data-management and analytical support tool. Its use was not considered, in itself, evidence of methodological rigor.

Translation and quality assurance

Original Arabic and Classical Persian passages were translated into Persian. The translations were reviewed against the original texts by the supervisor to assess linguistic accuracy and preservation of the intended historical and medical meaning. Particular attention was given to historical medical terminology for which direct contemporary equivalents may not exist. Where a modern biomedical concept was discussed, it was treated as a subsequent interpretation rather than incorporated into the translation of the historical passage. Translation decisions, coding procedures, revisions to codes and categories, and major analytical decisions were documented to maintain an audit trail.

Distinction between historical findings and contemporary interpretation

The historical texts constituted the primary evidence base of the study. Statements concerning the definitions, proposed etiologies, clinical manifestations, progression, and therapeutic practices of cancer were derived from these primary sources and were interpreted within their historical conceptual framework. Contemporary biomedical literature was considered separately and only after the historical findings had been established. Where a possible relationship with contemporary oncology was identified, the relationship was explicitly characterized as a conceptual comparison, retrospective analogy, or hypothesis-generating interpretation. Such comparisons were not intended to demonstrate that historical physicians described modern molecular, cellular, physiological, or oncological mechanisms.

Statistical analysis

No statistical analysis was performed because this was a qualitative historical content-analysis study. Findings were derived through qualitative coding, categorization, thematic interpretation, and comparison of textual material.

Results

Historical description of cancer in Persian Medicine

The selected PM texts describe cancer (*saratān*) within a historical humoral framework. Across the reviewed sources, cancer is described as a type of pathological swelling (*varam*) associated with the accumulation, alteration, or transformation of melancholic matter (*soda*), with some descriptions referring to “burning” or transformation (*ihтираق*) of this matter.⁵⁻⁹ The lesion is described in several sources as firm or hard, painful, and progressively enlarging, with vessels extending from its margins in a configuration compared with the legs of a

crab.⁵⁻⁹ Changes in the color or appearance of the lesion are also described in some passages. These descriptions are reported as historical observations. They are not interpreted as equivalent to the contemporary pathological definition of malignant neoplasia. Cancer-related descriptions occur in relation to several anatomical sites, including the uterus, eye, nose, breast, brain, stomach, liver, and intestines.⁵⁻⁹ The descriptions varied according to the affected site and were accompanied by different local manifestations and therapeutic recommendations.

Etiological concepts in the historical texts

Several groups of factors were identified as being associated with the development or progression of cancer within the historical framework. These included altered or accumulated bodily matter, dietary factors, impaired digestion, impaired elimination, constipation, sleep disturbance, previous injury or disease, and conditions characterized within PM as increased heat and dryness.⁵⁻⁹

Specific dietary factors included foods considered difficult to digest or capable of producing dense or undesirable bodily matter. These included various meats, selected legumes and vegetables, aged foods, and foods characterized by salty, spicy, very sour, or very sweet tastes.^{5-7,13} These classifications represent the dietary concepts of the historical medical system and should not be interpreted as direct evidence of contemporary dietary cancer causation. The texts also associated impaired elimination with retention of bodily waste and described constipation and, in some passages, amenorrhea in this context.⁵⁻⁷ Poor sleep, previous injury, chronic disease, and impaired function of organs such as the stomach or liver were also mentioned within the historical etiological framework.⁵⁻⁹ Psychological and emotional states, including fear, anger, grief, and other emotional disturbances, were described in some texts in association with changes characterized as increased heat and dryness.⁵⁻⁹ These observations are reported as historical attributions and are not interpreted as equivalent to contemporary concepts of psychological stress, sympathetic activation, neuroendocrine signaling, or cancer development.

Separation of historical evidence from contemporary interpretation

The historical evidence was first extracted and categorized according to the terminology and explanatory framework used by the historical authors. Contemporary biomedical concepts were considered only during the subsequent interpretive stage. Terms such as *soda*, *ihтираq*, *gharizi* heat, *gharib* heat, accumulation of bodily matter, and impaired elimination are therefore retained as historical concepts. Their possible relationships with contemporary concepts such as inflammation, cellular stress, altered metabolism, or other biomedical mechanisms are considered conceptual comparisons rather than direct equivalences. The detailed mapping of the principal historical etiological findings and their subsequent interpretations is presented in Table 1.

Clinical manifestations described in the historical texts

The selected PM texts describe a range of local and systemic findings in association with conditions identified as *saratān* or cancer. These include progressive pain, enlargement of the lesion, changes in tissue appearance or consistency, vascular changes, adhesion, and ulceration.⁵⁻⁹ Several systemic findings are also reported, including weight loss, nausea and vomiting, fever, insomnia, ocular hollowing, liver-related changes, splenic enlargement, and dark or blackish blood.⁵⁻⁷ Importantly, these findings are reported as historical textual observations. The present analysis does not assume that every finding corresponds to a manifestation of a contemporary malignant neoplasm. In particular, findings such as liver atrophy, splenomegaly, dark-colored blood, ocular changes, and vascular discoloration may have had broader diagnostic meanings within the historical medical system. Because historical disease categories and diagnostic criteria differ substantially from contemporary oncology, their modern diagnostic interpretation remains uncertain. Accordingly, Table 2 separates the historical observation from any possible contemporary interpretation.

Historical therapeutic practices described in Persian Medicine

The selected PM texts describe several therapeutic approaches for conditions identified as cancer, including dietary modification, medicinal preparations, measures intended to promote elimination, bloodletting (*fasd*), cauterization, and surgical intervention.^{5-9,11} Surgical removal was described in selected circumstances, particularly when the lesion was considered sufficiently localized for removal. Some texts also expressed concern regarding manipulation of lesions considered susceptible to progression or worsening.^{5,6,11} These descriptions are reported strictly as historical therapeutic concepts and do not constitute contemporary surgical recommendations. Dietary modification was also described within the historical management of cancer, including recommendations regarding foods considered appropriate or inappropriate according to their presumed effects on heat, dryness, or the production of undesirable bodily matter.^{5-8,13} The texts further describe measures intended to promote elimination or “cleansing,” including specific traditional preparations such as *Aftimoon* (*Cuscuta epithymum*) and *Ma al-jobn*, as well as bloodletting (*fasd*).^{5,6,9} These practices are reported solely for their historical significance.

Important qualification regarding historical treatments

The therapeutic practices described in the selected texts should be understood strictly within their historical medical context. Their inclusion in this study does not constitute evidence of clinical efficacy, safety, contemporary therapeutic relevance, or a recommendation for their use in cancer management. In particular, historical descriptions of “detoxification,” bloodletting, cauterization, traditional medicinal preparations, and historical surgical procedures

Table 1. Historical etiological concepts associated with cancer in selected Persian Medicine texts and their contemporary interpretation

Historical concept/term	Historical statement or finding	Historical interpretation	Possible contemporary interpretation	Evidence level for proposed association	Ref
Accumulation of <i>soda</i> / melancholic matter	Cancer is described as a swelling associated with accumulated or altered melancholic matter.	Explanation within the humoral framework.	Broad conceptual analogy with pathological accumulation; no direct modern biological equivalent.	Conceptual only	5-9
<i>Ihtiraq</i> (burning/combustion)	Some descriptions refer to “burned” or transformed matter.	Pathological transformation within PM physiology.	May be compared broadly with cellular stress or injury.	Conceptual only	5-9
Difficult-to-digest/dense foods	Certain foods were considered capable of producing dense or undesirable matter.	Dietary quality was considered relevant to disease development.	Some dietary categories may be compared with contemporary dietary cancer-risk research.	Indirect/limited	5-7,13
Meat and processed/cured foods	Certain meats and preserved foods were included among unfavorable dietary factors.	Foods were classified according to their presumed effects within PM.	Contemporary evidence concerning red/processed meat applies only to specific exposures and cancers.	Indirect and exposure-specific	13
Retention of bodily waste	Impaired elimination and retention were described as disturbances of bodily balance.	Failure of normal elimination within humoral physiology.	Broad conceptual analogy with physiological accumulation; not equivalent to metabolic waste or pro-oxidant intermediates.	Conceptual only	5-7
Constipation/amenorrhea	These were associated in some passages with disturbed elimination.	Manifestations within the historical framework of impaired elimination.	Contemporary causal relationships cannot be inferred from the historical descriptions.	Insufficient for equivalence	5-7
Sleep disturbance	Poor sleep and insomnia were described among relevant factors.	Disturbed sleep was considered harmful to bodily balance.	Broadly comparable with contemporary interest in sleep and health.	Indirect	5-7
Previous injury/chronic disease	Previous injury, wounds, pain, or prolonged disease were described as contributing factors in some passages.	Local vulnerability or chronic disturbance.	May be compared broadly with chronic tissue injury/inflammation.	Conceptual/indirect	5-7
Heat and dryness	Increased heat and dryness were associated with disease development.	Disturbance of temperament and bodily equilibrium.	Not equivalent to fever, hypermetabolism, or oxidative stress.	Conceptual only	5-7
Fear, anger, and emotional disturbance	Emotional states were associated with altered heat and dryness.	Psychological states incorporated into the humoral explanation of disease.	Contemporary research on stress and cancer provides a broad conceptual comparison.	Indirect	5-7
Salty/spicy foods	Certain tastes were considered unfavorable when consumed persistently or excessively.	Dietary taste was incorporated into PM assessment.	Modern associations are cancer- and exposure-specific.	Limited/indirect	5-7,13

should not be interpreted as evidence-based contemporary cancer treatments. The present study did not evaluate treatment response, cancer incidence, survival, adverse effects, quality of life, or other clinical outcomes. Therefore, no conclusion regarding the efficacy or safety of these historical interventions can be drawn (Table 3).

Historical cancer-related concepts and contemporary conceptual comparison

To enhance transparency, Table 4 distinguishes the historical observation, the conceptual similarity identified retrospectively, the potential contemporary biomedical interpretation, and the evidence against direct equivalence.

Discussion

The present analysis identified recurring concepts in five selected classical PM texts concerning the definition, proposed causes, clinical manifestations, progression, and treatment of conditions described as cancer. These descriptions were embedded within a humoral and theoretical framework involving melancholic matter, bodily qualities, heat and dryness, digestion and elimination, diet, lifestyle, and emotional states.⁵⁻⁹ The historical framework should be distinguished from contemporary oncology. Modern cancer biology defines cancer as a heterogeneous group of diseases involving abnormal cellular proliferation, genetic and epigenetic alterations, interactions with the tissue microenvironment, and evolutionary processes.^{14,15}

The historical description of cancer as a pathological swelling therefore cannot be considered equivalent to the modern biological definition of malignant neoplasia. Nevertheless, some historical observations can be examined retrospectively for broad conceptual similarities with contemporary biomedical concepts. Such comparisons are useful only when the historical meaning is preserved, and the substantial differences between the two frameworks are explicitly acknowledged.

One recurring historical concept is *ihтираq*, generally translated as “burning” or “combustion.” In the selected texts, the term occurs within the humoral explanation of the transformation or alteration of bodily matter.^{5,7-9} Contemporary oncology recognizes oxidative stress and reactive oxygen species (ROS) as important components of cancer biology, including their roles in cellular signaling, DNA damage, tumor progression, and treatment response.^{16,17} A retrospective comparison can therefore be made between the broad notion of pathological “burning” and contemporary concepts of cellular stress. However, this comparison is limited. The historical concept of *ihтираq* was embedded in a humoral physiological model and does not provide evidence that historical physicians understood ROS, oxidative stress, mitochondrial dysfunction, or molecular redox signaling. Thus, *ihтираq* should be described as a conceptual analogy rather than a historical anticipation of oxidative stress. Similarly, the concepts of innate or acquired heat should not be equated

Table 2. Clinical signs and symptoms described in association with cancer in selected Persian Medicine texts

Historical sign/symptom	Historical evidence	Historical interpretation	Possible contemporary interpretation	Evidence for correspondence	Ref
Progressive pain	Pain is described as accompanying the cancerous swelling and may become severe.	Local manifestation of the pathological swelling.	Pain is common in symptomatic and advanced cancers but is nonspecific.	Broad clinical similarity	5-9
Progressive enlargement	The swelling is described as enlarging progressively or rapidly.	Progressive behavior of the lesion.	May resemble tumor growth.	Conceptual/clinical similarity	5-9
Crab-like vessels	Vessels extending from the lesion are compared with crab legs.	Characteristic local appearance.	May resemble abnormal vascularity; does not establish angiogenesis.	Conceptual only	5-9
Firm/hard lesion	The lesion is described as firm or hard.	Physical characteristic of the swelling.	May occur in some neoplastic lesions but is nonspecific.	Nonspecific similarity	5-9
Pulsation	Pulsation is described in relation to the lesion in some passages.	Local physical finding.	No specific contemporary cancer equivalent can be established.	Insufficient	8,9
Burning sensation	Burning or painful sensation is described in some passages.	Local symptom within the historical disease description.	Nonspecific symptom that may occur in multiple conditions.	Nonspecific	5-7
Weight loss	Marked or progressive weight loss is described among systemic findings.	Systemic manifestation of severe disease.	May resemble cancer-associated weight loss/cachexia.	Broad similarity; not specific	5-7
Nausea/vomiting	Nausea and vomiting are described.	Systemic or organ-related manifestation.	Occurs in cancer but is nonspecific.	Broad similarity	5,6
Fever	Fever is described among systemic manifestations.	Systemic manifestation within the historical framework.	May accompany malignancy but has many causes.	Nonspecific	7,9
Ocular hollowing	Hollowing of the eyes is described.	Historical physical sign.	Could reflect weight loss, dehydration, or severe illness, but cannot specifically be attributed to cancer.	Uncertain	5,7
Liver atrophy	Liver atrophy is reported among certain findings.	Historical organ-related description.	No direct correspondence with a specific modern cancer manifestation can be established.	Uncertain	5,6
Splenomegaly	Enlargement of the spleen is described.	Historical systemic/organ finding.	Can occur in multiple diseases, including some malignancies, but is nonspecific.	Indirect/nonspecific	8,9
Dark/blackish blood	Dark or blackish blood is described.	Historical description within the humoral framework.	Cannot be equated with a contemporary hematological or hemorheological abnormality.	Insufficient for equivalence	5-7
Vascular discoloration	Altered color of vessels surrounding the lesion is described.	Local characteristic of the lesion.	Does not establish tumor angiogenesis.	Conceptual only	7-9
Adhesion	Adhesion of the lesion to surrounding structures is described.	Local behavior of the lesion.	May be compared broadly with invasive behavior, but no histopathological equivalence can be established.	Conceptual only	5
Ulceration	Cancer is described according to the presence or absence of ulceration.	Historical classification of the lesion.	Ulceration may occur in some advanced or surface-involving cancers.	Clinical similarity; nonspecific	7

Table 3. Therapeutic practices described in selected Persian Medicine texts and their contemporary evidence status

Historical practice	Historical description	Historical interpretation	Contemporary evidence status	Primary source
Surgical removal	Surgical removal was described for selected lesions considered removable.	Removal of the pathological mass under specified historical conditions.	Historical description only; contemporary efficacy was not evaluated.	5-7
Avoidance of excessive manipulation	Manipulation of some lesions was discouraged.	Intended to prevent worsening or ulceration within the PM framework.	Historical therapeutic principle; not evidence for or against modern surgery.	5-7
Dietary modification	Specific foods were recommended or avoided according to their perceived effects on humoral balance.	Dietary regulation within PM disease management.	May generate research questions but does not establish therapeutic efficacy.	5-7,13
Prevention of ulceration	Dietary and other measures were described to prevent ulceration.	Intended to control progression within the historical framework.	Historical practice; contemporary efficacy not established.	5-7
"Cleansing"/"detoxification"	Measures and preparations were described to promote elimination.	Part of the PM concept of eliminating undesirable bodily matter.	No evidence from this study that such practices prevent or treat cancer.	5-7
<i>Aftmoon</i> (<i>Cuscuta epithymum</i>)	Described as a medicinal substance within the historical therapeutic framework.	Historical medicinal intervention.	Contemporary anticancer efficacy was not evaluated.	5-7
<i>Ma al-jobn</i>	Described among measures intended to support elimination/cleansing.	Historical therapeutic preparation.	Contemporary anticancer efficacy was not evaluated.	5-7
Bloodletting (<i>fasd</i>)	Bloodletting was described as a therapeutic measure.	Historical intervention within humoral medicine.	Not established as an effective contemporary cancer treatment.	5,6,9
Cauterization	Cauterization was described in relation to selected lesions or procedures.	Historical procedural intervention.	Contemporary clinical relevance cannot be inferred.	5,6
Management of ulcerated lesions	Local management and, in selected descriptions, surgery were used for ulcerated lesions.	Management according to ulceration status.	Historical classification and treatment; no clinical outcome evidence.	5-9

Note: All practices are reported as historical observations. Their inclusion does not constitute a recommendation for contemporary cancer prevention or treatment

Table 4. Historical cancer-related concepts: historical evidence, conceptual similarity, and divergence

Historical evidence	Conceptual similarity	Potential biomedical interpretation	Divergence/evidence against equivalence
<i>Ihtiraq</i> ("burning"/transformation)	Pathological transformation	May be compared broadly with cellular stress or metabolic disturbance.	Not equivalent to oxidative stress, ROS, or mitochondrial dysfunction.
Historical descriptions of progressive extension of disease	Recognition of progression	May be compared retrospectively with progression or dissemination.	Does not establish knowledge of metastasis or circulating tumor cells.
Pathological heat	Altered bodily state	May be compared broadly with physiological disturbance.	Not equivalent to hypermetabolism, fever, or oxidative stress.
Altered/viscous humoral matter	Disturbance in movement of bodily matter	May be compared broadly with altered circulation.	Not equivalent to modern hemorheological abnormalities.
Psychological/emotional disturbance	Mind–body relationship	May be compared with contemporary stress research.	No evidence of knowledge of sympathetic activation, neuroendocrine pathways, or ROS signaling.
Abnormal swelling and local vascular appearance	Recognition of local pathological change	May be compared broadly with tumor growth and vascular alteration.	Does not establish a modern diagnosis of malignancy or angiogenesis.
Historical distinction between localized and more advanced disease	Recognition of disease progression	May be compared retrospectively with the concept of disease extent.	Not equivalent to TNM staging or modern pathological classification.

with fever, basal metabolic rate, hypermetabolism, or oxidative stress. Contemporary cancer biology recognizes altered metabolism and redox processes as components of tumor biology,^{16,17} but the historical descriptions do not provide evidence that the PM concepts represented these mechanisms.

The selected texts associated cancer with several dietary, lifestyle, digestive, eliminative, and emotional factors.⁵⁻⁹ These observations demonstrate that historical PM authors considered cancer within a multifactorial framework rather than attributing it to a single cause. Some of these observations can be compared broadly with contemporary cancer-prevention research. Modern evidence supports associations between certain dietary exposures, physical inactivity, tobacco use, obesity, infections, and cancer risk.¹⁸⁻²¹ However, contemporary causal relationships are based on epidemiological, experimental, and clinical evidence that was not available to the historical authors. For example, the historical discussion of meat and other foods may be compared with contemporary evidence concerning red and processed meat and selected cancer outcomes.²² Such a comparison should not be interpreted as evidence that historical dietary classifications anticipated modern nutritional epidemiology. Similarly, the historical emphasis on physical activity and lifestyle can be compared broadly with contemporary evidence concerning physical activity and cancer prevention.^{18,19} The similarity is therefore at the level of recognizing modifiable aspects of health rather than at the level of shared biological mechanisms.

The concept of retained or inadequately eliminated bodily matter is an important component of the historical etiological framework.⁵⁻⁷ It may be tempting to interpret this concept as corresponding to modern metabolic waste, microbiome-derived compounds, oxidative products, or other biochemical intermediates. However, such interpretations would exceed the historical evidence. Contemporary cancer biology recognizes complex interactions among metabolism, inflammation, immune responses, and the tissue microenvironment. Nevertheless, the historical concept of retained bodily waste cannot be considered equivalent to any specific modern biochemical pathway. The most appropriate interpretation is therefore

a broad conceptual similarity concerning physiological accumulation or disturbance, rather than a mechanistic correspondence.

Fear, anger, grief, and other emotional states were incorporated into some historical explanations of disease through their presumed effects on bodily qualities, including heat and dryness.⁵⁻⁹ Contemporary research has investigated relationships between chronic psychological stress and cancer-related biological processes, including effects on the tumor microenvironment and neuroendocrine and immune pathways.²³ This provides a potentially relevant conceptual comparison concerning the recognition that psychological states may interact with physical health. However, there is no basis for interpreting the historical descriptions as evidence of knowledge of sympathetic activation, hypothalamic–pituitary–adrenal signaling, neuroendocrine pathways, or ROS-mediated mechanisms. The convergence is therefore limited to the broad recognition of a relationship between psychological and physical states.

Some historical descriptions refer to changes in blood quality, color, or movement. These observations may be compared cautiously with contemporary research concerning hemorheological changes in cancer.²⁴ However, dark or altered blood described in historical texts cannot be equated with increased blood viscosity, altered red-cell deformability, hypercoagulability, or other modern hemorheological variables. The comparison therefore remains conceptual and cannot be used to infer historical knowledge of modern hemorheology.

The selected texts describe pain, enlargement, firmness, vascular changes, ulceration, weight loss, and other systemic findings.⁵⁻⁹ Some of these observations resemble clinical manifestations encountered in contemporary oncology. For example, progressive weight loss may resemble cancer-associated wasting, while abnormal vascular appearances may superficially resemble tumor-associated vascular changes. However, these similarities are nonspecific. Historical disease categories were not based on histopathological, molecular, or imaging-based diagnostic criteria. Consequently, the presence of an individual symptom cannot establish that a historical author was

describing the same disease entity recognized by modern oncology. This distinction is particularly important for findings such as liver atrophy, splenomegaly, dark blood, ocular changes, and vascular discoloration. These findings should remain primarily historical observations unless the original text explicitly establishes a cancer-specific association.

The historical texts contain descriptions suggesting progression or extension of some pathological lesions. These observations can be compared retrospectively with the modern recognition that cancer may progress from a localized lesion to more extensive disease. However, this does not establish historical knowledge of metastasis as a cellular or molecular process. Likewise, the historical distinction between localized and advanced disease should not be described as an early form of TNM staging. TNM is a modern standardized classification based on primary tumor extent, regional lymph-node involvement, and distant metastasis.²⁵ The appropriate description is therefore retrospective conceptual similarity, not historical anticipation. Similarly, historical descriptions of disease spread cannot be interpreted as descriptions of circulating tumor cells. CTCs represent a modern cellular and technological concept concerning tumor dissemination and metastatic processes.²⁶ No evidence from the present textual analysis establishes knowledge of this mechanism.

The selected texts emphasized diet, lifestyle, physical activity, and other aspects of maintaining health.^{5,7} Contemporary cancer prevention similarly addresses modifiable behavioral and environmental risk factors.¹⁸⁻²¹ These similarities may be useful for historical comparison, but they do not establish continuity between PM and modern cancer-prevention guidelines. The historical therapeutic practices identified in the texts included dietary modification, medicinal preparations, elimination or cleansing measures, bloodletting, cauterization, and surgery.⁵⁻⁹ These interventions must be distinguished from contemporary evidence-based oncology. The present study did not assess their efficacy, safety, or clinical outcomes. Historical descriptions of symptom-oriented treatment or avoidance of aggressive manipulation should likewise not be described as anticipation of contemporary palliative care. Contemporary palliative care is a defined multidisciplinary approach focused on improving quality of life and relieving suffering among people with serious illness.²⁷ Historical practices may show a broad concern with symptom management or treatment burden, but this does not establish equivalence with modern palliative care.

The comparison reveals several areas of broad conceptual convergence. These include recognition of cancer as a progressive pathological condition, attention to dietary and lifestyle factors, recognition of systemic manifestations, consideration of psychological and physical states, and the importance of modifying factors that may influence health and disease.⁵⁻⁹ However, the divergences are equally important. PM explanations were grounded in humoral theory, temperament, innate and acquired heat, and the transformation and movement of bodily

matter. Contemporary oncology is based on cellular and molecular biology, genetics, pathology, immunology, epidemiology, and clinical evidence.^{14,15} Consequently, similarity at the level of an observation does not imply similarity at the level of mechanism. This distinction is particularly important for *ihтираq*, pathological heat, retained bodily matter, blood-related observations, psychological influences, disease progression, and local vascular changes. These concepts may provide starting points for historical or interdisciplinary comparison, but they should not be considered equivalent to oxidative stress, mitochondrial dysfunction, hypermetabolism, hemorheological disturbance, TNM staging, metastatic biology, angiogenesis, or neuroendocrine stress pathways. The principal value of these comparisons therefore lies in documenting the evolution of medical reasoning and identifying questions for future interdisciplinary research rather than demonstrating continuity between historical and modern biomedical knowledge.

Several limitations should be considered when interpreting the findings. The analysis was restricted to five influential classical PM texts and therefore cannot represent the full diversity of Persian medical literature. Source-selection, translation, and interpretive biases may have influenced the findings, particularly because historical medical terminology and disease classifications do not always correspond directly to contemporary concepts. Although historical descriptions were separated from contemporary biomedical interpretations, retrospective comparisons remain conceptual and hypothesis-generating rather than evidence of biological equivalence. Coding was conducted by a single researcher, although findings were discussed with faculty members and subject-matter experts. Furthermore, contemporary concepts were used only for contextual comparison, without empirical validation or experimental evidence. Finally, the study included no clinical outcome data; therefore, historical diagnostic, preventive, or therapeutic approaches cannot be considered evidence of modern clinical effectiveness or safety.

Conclusion

The present analysis documents how selected classical PM texts conceptualized cancer, including its proposed causes, clinical manifestations, progression, and therapeutic practices.

Several historical observations may be compared conceptually with selected contemporary themes in oncology, including lifestyle-related risk factors, disease progression, psychological influences, cellular stress, vascular changes, and systemic manifestations. However, these similarities should not be interpreted as evidence that PM anticipated or discovered modern concepts such as oxidative stress, mitochondrial dysfunction, TNM staging, circulating tumor cells, metastatic biology, or contemporary palliative care. The historical concepts examined in this study emerged within a distinct humoral and theoretical framework and differ substantially from the cellular, molecular, pathological, epidemiological, and

evidence-based foundations of contemporary oncology. The present analysis therefore contributes primarily to the documentation and interpretation of historical medical knowledge and to the identification of potentially informative conceptual parallels. These parallels may generate hypotheses for future interdisciplinary research, but proposed biomedical correspondences require independent empirical investigation before any mechanistic or clinical conclusions can be drawn.

Artificial Intelligence Use Disclosure

ChatGPT (OpenAI) was used solely to assist with language editing. The authors critically reviewed and revised all AI-generated outputs and took full responsibility for the final content.

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Competing Interests

The authors declare that they have no competing interests.

Ethical Approval

Ethical approval was not applicable because this study involved analysis of published historical medical texts and did not involve human participants, patient data, identifiable personal information, or any intervention involving individuals.

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