ORIGINAL ARTICLE

Mineral-based Ophthalmic Treatments for Maintaining Health and Treating Eye Diseases and Disorders in the Persian Medicine School

Azam Khosravi (M.Sc.)[1]
Mehdi Salehi (M.D.)[2]

1- Instructor of history of medical sciences, Department of the History of Medical Sciences, Traditional and Complementary Medicine Research Center (TCMRC), Arak University of Medical Sciences, Arak, Iran
2- Assistant Professor, Traditional and Complementary Medicine Research Center (TCMRC), Arak University of Medical Sciences, Arak, Iran

Correspondence:
Mehdi Salehi
Assistant Professor, Traditional and Complementary Medicine Research Center (TCMRC), Arak University of Medical Sciences, Arak, Iran

e-mail: m.salehi@arakmu.ac.ir

Abstract
From ancient times, humanity has tried different methods to treat diseases. Mineral-based ophthalmic treatments have been among these therapies, yet they have little place in today's research despite numerous sources throughout history. Therefore, this research addresses this issue in the Persian Medicine school, focusing on maintaining health and treating eye diseases and disorders. According to studies, the eminent sages of Persian Medicine (PM) used various gems, such as rubies and pearls, in single or composite drugs to strengthen and treat various diseases and eye disorders, including pterygium and cataracts. The results indicate that mineral-based ophthalmic treatments were a common method among Persian sages for the prevention and treatment of various eye diseases. The experiences and opinions of Persian sages in this field can be used to consider the medicinal function of gems within the historical background of medical knowledge and pharmacy. However, the medicinal use of minerals in traditional ophthalmology warrants further scientific investigation. We hope this study will serve as a foundation for future experimental and clinical research.

Key words: History of Medicine, Persian Medicine, Pterygium, Eye Pain

Received: 8 May 2025; Accepted: 7 May 2026; Online published: 1 Nov 2026
Research on History of Medicine/ 2026 Nov; 15(4): 317-332.

Citation:
Khosravi, A., and Salehi, M., 2026. Mineral-based Ophthalmic Treatments for Maintaining Health and Treating Eye Diseases and Disorders in the Persian Medicine School. *Res Hist Med*, 15(4), pp. 317-332. doi: 10.30476/rhm.2026.107009.1320.

Copyright: © Journal of Research on History of Medicine. This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 Unported License, (http://creativecommons.org/ licenses/by-nc/4.0/) which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited non-commercially.

Introduction

In the history of medicine, although plants have been used in the manufacture of various drugs, other types of drugs such as animal drugs and minerals such as metals and gems have also been used (Farkhondehzadeh and Dehghan, 2019). Treatment using gems is a part of complementary and alternative medicine (CAM) and may be termed mineral-based ophthalmic treatments (Bodeker and Kronenberg, 2002). The use of the healing properties of semi-precious stones and gems, contrary to widespread acceptance among people of the world in recent years, is not new; it is thousands of years old (Farkhondehzadeh and Dehghan, 2019). In the medical school of ancient India (5000 BC to 1500 BC), mineral-based treatments were an integral part of the medical school from the time of Caraka Samhita (1st century BC) to the time of Rasajalanidhi (12th century AD). Details of the treatment of the disease with precious gems, including powdered stones, are also found in ancient Greek medical texts (776 BC to 600 AD) (Murthy, 1991). In the civilizations of ancient China (1600 BC to 220 AD) and Rome (486 AD to 1453 AD), under the influence of Greek teachings, polished stones were used to cure diseases and spells (Farkhondehzadeh and Dehghan, 2019; Asadi et al., 2024). The study of surviving papyri from this field of knowledge in ancient Egypt (3100 BC to 332 BC) shows that stone-origin drugs were present in the writings of this civilization (Naderi and Ghasemlou, 2013). Hermes (Greek sage) was the first to study precious and non-precious stones and metals in his book "*The Benefits of Stones and the Properties of Things*" (Hakim Hermes, 2013; Sezgin, 2000). In the Persian Medicine school, with a history of ten thousand years (10,000 BC to 652 AD), jewelry and stone therapy have always attracted the attention of the Persian people as a special field, and treatments based on gems can be found in numerous writings of the eminent sages of this school, such as Rhazes, Avicenna, and Jorjani. Many studies have been conducted by researchers on stones; however, very little scientific research and practical work have been done regarding the healing properties of stones. Despite our extensive search, no credible information was found on the subject, and a search for the term "*mineral-based treatments*" yielded a large amount of unreliable information on the Internet. Searching for published material in reputable medical journals was not very fruitful, and we found only a handful of articles on the subject of mineral-based treatments. One article was a statistical report on the use of healing gems by people in Pakistan, and the other concerned the effect of gems on the treatment of epilepsy (Farkhondehzadeh and Dehghan, 2019; Ishaque, Saleem and Qidwai, 2009; Murthy and Shenoy, 1990; Mohagheghzadeh, Zargaran and Daneshamuz, 2011). These two articles made no brief reference to the history of mineral-based treatments, which appears to be one of the emerging methods of the contemporary centuries. On the other hand, with many studies in the Persian Medicine School, we found that ophthalmology has long been considered one of the specialized fields in PM by Iranian physicians, so that its history dates back to 6000 years ago and the evidence of this claim is the discovery of the first glasses in the third and fourth millennium BC in the burnt city of Zabol (Sistan). In addition, the existence of a separate branch in the Persian school of medicine called Kahaleh (a branch of medicine that deals with the health and diseases of the eye) indicates the concern of Persian physicians in this regard. The most significant area of progress made by the physicians of this school compared with the Greeks was ophthalmology. These great men applied, corrected, and supplemented the Greek and Roman experiences, which were not infallible, and finally, the first independent work

of this school in ophthalmology was written by Hunain Ibn Ishaq, titled "*Ten Treatises on the Eye*," in the 9th century AD (809-873 AD) (Etezad Razavi et al., 2013; Avicenna, 1989; Sheikh Rezaee, Jokar and Moallemee, 2017; Moein and Shams, 2016; Changizi-Ashtiyani et al., 2023). All these cases led us to trace the process of treating eye diseases through mineral-based ophthalmic treatments. It is noteworthy that no similar research has been observed in the databases that follows the historical course of mineral-based treatments for a single type of disease, and it can be said that this research represents an innovation in this field. In this study, we seek to identify the use of mineral-based treatments by Persian sages, as well as the most common gems used in this field, in addition to determining the place of mineral-based treatments in maintaining health and treating eye diseases and disorders in the Persian Medicine School. In the next step, we will examine whether these treatment processes are still used among people. It should also be noted that we only trace the historical course of this issue at a specific time and do not seek to approve or disapprove the use of mineral-based treatments in this area, because determining their correctness or incorrectness requires further clinical trials and research.

Materials and Methods

The first step was to determine a new topic, and after extensive research, we selected the subject of the study. Then, the study began by searching and examining the writings of famous sages of the Persian school of medicine who had written about mineral-based treatments during the ninth to eighteenth centuries AD. The language of the writings was Persian or Arabic. It is worth mentioning that all the books collected on the subject were written by great sages of Persian Medicine, and the use of Arabic is due to the fact that, at that time, Arabic was the international language. Table 1 shows the names of all Persian medicine books included in the research.

After preparing the books, materials related to the treatment of eye diseases by various gems were collected from these books and notes were taken. Then, we searched databases such as Google Scholar, Ovid, PubMed, and ScienceDirect using keywords such as "*mineral-based treatments*," "*Persian Medicine*," "*ophthalmic*," and "*traditional medicine*." In the next step, the contents of related articles were also added to the notes. During note-taking, for ease of reading, the contents of the medical books were categorized according to types of eye diseases. Finally, the notes from ancient medical texts and database articles were reviewed, classified into relevant sections, and subsequently summarized and analyzed.

Lithology in the Persian Medicine School

In Persian literature, a book that introduces gems and jewelry is called "*Javahernameh*". The main structure of these texts is that the causes of the formation of gems and jewelry, their natural properties and medicinal properties, and their harms have been discussed. In Persian Medicine, some authors of these books entered this field due to their profession and wrote about their experiences and observations (Farkhondehzadeh and Dehghan, 2019; Mohagheghzadeh, Zargaran and Daneshamuz, 2011). In addition, Persian poets such as Khaghani and Molana (Rumi) addressed the healing properties of gems in diseases such as eye diseases in their poetry (Barzegar Khaleghi, 2019; Balkhi, 1995). Topical application, inhalation of gem vapors, and sleeping on rocks were various methods

Table 1: List of all Ancient Persian Medical Books Included in the Research

Category	Language	Author	book	Century
Independent Writings on Lithology	Persian	Mohammad Ibn Abul Barakat Johari Neyshabouri	*Nizami Javahernameh*	12th century AD
	Arabic	Abu Rayhan Muhammad ibn Ahmad al-Biruni (Biruni)	*Al-Jamahir fi Ma'rifat al-Jawahir*	11th century AD
	Persian	Khajeh Nasir al-Din Tusi (Nasir al-Din Tusi)	*Tansukhnameh-ye Ilkhani*	13th century AD
	Persian	Abdullah ibn Ali Kashani	*Arayes al-Jawahir wa Nafayes al-Atyab*	14th century AD
	Arabic	Muhammad ibn Mansour	*Ma'rifat al-Jawahir*	16th century AD
Pharmacological and Pharmaceutical Works	Persian	Abu Mansour Muvaffaq ibn Ali al-Heravi (Al-Heravi)	*Al-Abniyah an Haqayeq al-Adwiyah*	10th century AD
	Arabic	Abu Rayhan al-Biruni (Biruni)	*Al-Sidna fi al-Tib*	11th century AD
	Persian	Seyyed Mohammad Momen Tonekaboni (Hakim Momen)	*Tohfa-ye Momenin*	17th century AD
	Persian	Seyyed Mohammad Hossein Aghili Khorasani (Aghili Khorasani)	*Makhzan al-Adwiyah*	18th century AD
Medical Texts of Persian Medicine	Persian	Seyyed Ismail Jorjani (Jorjani)	*Zakhireye Khwarazmshahi*	12th century AD
	Arabic	Muhammad ibn Zakariya Razi (Rhazes)	*Al-Hawi fi al-Tibb*	10th century AD
	Arabic	Muhammad ibn Zakariya Razi (Rhazes)	*Al-Mansouri fi al-Tibb*	10th century AD
	Arabic	Ibn Sina (Avicenna)	*Al-Qanun fi al-Tibb* (*The Canon of Medicine*)	11th century AD

of their use in Persian Medicine. One of the topical treatments with gems is powdering them and rubbing the powder into the eyes. To treat tuberculosis or to prevent bleeding in the mouth, placing hot stones into goat's milk so that the milk boils from the heat of the stone, as well as inhaling the stone vapor caused by the heat, are other examples of using stone vapors in treating injuries caused by scorpion stings and colds in the sources of Persian medicine. According to the writings of Abu Ali Hussein bin Abdullah bin Hassan bin Ali bin Sina, known as Avicenna (980–1037 AD), in the treatment of seizures, using a dry bath and then lying on a hot stone inside the bath is an example of healing by lying on rocks (Farkhondehzadeh and Dehghan, 2019; Avicenna, 1989; Khosravi et al., 2019). We

have examined the writings of Persian medicine in lithology in three separate sections:

1- Independent Writings on Lithology

The historical background of works written independently by Persian sages in the field of lithology dates back to the 9th century AD. This tradition began with the book "*Gems and Their Properties*," written by Abu Zakaria Yuhanna (Yahya) Ibn Masoyeh Khozavi (780–857 AD), the famous physician of Jundishapur University of Iran, and in the 10th century AD, it reached its peak with the writing of "*Al-Jamahir Fi Al-Ma'rifah Al-Jawahir*" by Abu Rihan Muhammad ibn Ahmad Biruni Khwarazmi (973–1048 AD), known as Biruni. In his book, Ibn Mas'awiyyah mentioned only what all experts in different fields of gemology agree on, and he confined himself to introducing 27 gems and describing their descriptions and properties. In his book, Biruni conducted scientific mineralogy on a scientific basis. He carefully determined the specific gravity of eighteen precious metals and gems (Keramati, 2012; Khosravi et al., 2023). The oldest text in Persian in this science is Nizami *Javahernameh*, written by "*Mohammad Ibn Abul Barakat Johari Neyshabouri*" in the 12th century AD. Much of the book's content reflects his personal knowledge and experiences during his travels (Farkhondehzadeh and Dehghan, 2019). *Tansukhname Ilkhani* by Khajeh Nasir al-Din Tusi (1274-1201 AD) is one of the most important texts for recognizing the importance and benefits of stones, gems, and metals. After introducing and describing the quality and characteristics of stones, he refers to their healing propertie (Farkhondehzadeh and Dehghan, 2019; Tusi, 1884). Among the recent Persian works in this field is "*Arayes al-Jawahir and Nafayes Al-Atyab*" by Abdullah bin Ali Kashani (14th century AD). This work has two parts; the first and second articles are dedicated to the introduction, quality, and identification of precious and semi-precious stones (Kashani, 1967). "*Ma'arefat al-Jawahir*" by Mohammad ibn Mansour (16th century AD) also has two articles, and the first article deals with the identification, introduction, and therapeutic features of stones (Farkhondehzadeh and Dehghan, 2019; Mohammad Ibn Mansour, 1955).

2- Pharmacological and pharmaceutical Works

Since the 9th century AD, books have been written with the aim of expressing the medicinal properties of plants and minerals, some of which are dedicated to the medicinal properties of minerals. Although the inclusion and comprehensiveness of pharmacological and pharmaceutical works on plants is far more than the other two types, the classification, introduction of therapeutic position and medicinal properties of minerals, including precious stones and others are also noteworthy. "*Al-Abniyah a Haqayeq al-Adwiyah*" by Abu Mansour Movafaq Ibn Ali Heravi (10th century AD) and "*Al-Sidna fi Al-Tib*" by Biruni can be introduced as the first texts produced in this field. Heravi, who aimed to mention the nature, benefits, and harms of *al-Adwiyah al-Mufradah* (*medicinal herbs*), mentions gems applicable in medicine in a part of his manuscript (Biruni, 2004; Movafagh-Heravi, 2009). Biruni mentioned precious and non-precious stones in his work and provided information about their therapeutic propertie (Farkhondehzadeh and Dehghan, 2019). Recent books in the field of medicine include *Tohfa Tul Momineen* by Seyyed Mohammad Momen Tonekaboni known as Hakim Momen (17th century AD), and *Makhzan al-Adwiah* (*Drug Treasure*) by Seyyed Mohammad Hossein Aghili Khorasani (18th century). They are considered important works of Persian pharmacy and pharmacology. The authors of

these works, in their texts under the title of stone, have discussed the therapeutic function of stones in medicine after describing the appearance of stones and talking about their hot and cold nature. Aghili also refers to their medical application and the types of precious gems such as rubies, turquoises, and emeralds (Farkhondehzadeh and Dehghan, 2019; Hosseini Tonkaboni, 1959; Aghaili Alavi Shirazi, 2015; Khosravi et al., 2024).

3- Medical Texts of Persian Medicine

In these texts, in addition to describing and identifying gems, their medicinal function in treating various diseases has been mentioned. In the writings of Mohammad ibn Zakaria Razi, known as Rhazes (865-925 AD), gems should be sought in both his knowledge of alchemy and his medical texts. In the field of alchemy and in the list of his works, we can mention "*Rasa'il al-Hijr*", "*Al-Hijr al-Asfar*", "*Khawas al-Hijr*" and "*Shavahid al-Hijr*", which in his field of knowledge are related to stones and minerals. Of course, Rhazes's works are in the field of alchemy and have nothing to do with mineralogy. However, in his medical writings, it should be said that Rhazes used gems in treatments in all his medical texts, including "*Al-Hawi Fi al-Tibb*," "*Al-Mansouri fi al-Tibb*," "*Bari al-Sa'ah*," and "*Man La Yahdharhu al-Tabib*," and in "*Al-Hawi*," as the most comprehensive work of Rhazes, gems have been used in the treatment of physical, eye, skin, neurological, and mental disorders, wound healing, hair growth, and even cancer, and in the pharmacological section of this book, gems have been mentioned in the list of medicinal herbs (Farkhondehzadeh and Dehghan, 2019; Khosravi, Changizi-Ashtiyani, and Amini, 2022; Asadi et al., 2023). In the "*Encyclopedia of Hakim Moyassari*," written by Moyassari Khorasani (10th century AD), which is the oldest poetic medical treatise in Persian, the medical benefits of gems are discussed in some verses.

"*Nice azure is required / which is no less than any other medicine*" (Moein and Shams, 2016).

In the fifth chapter of the Book of *Healing* written by Avicenna, all kinds of gems and jewels are discussed, and minerals are divided into stones, solutes, Kabariat, and minerals, which is important from a geological point of view. A study by *al-Qānūn fī al-Ṭibb* (*The Canon of Medicine*) shows that he has used stones in many of his treatments for physical, neurological, tongue diseases, treatment of low vision, stomach, eye, tooth cleaning and even heart diseases that have been prescribed as adawiyah al mufradah or graphidion medicine. About 800 drugs of plant, animal, and mineral origin are mentioned in the second volume of the Canon of Medicine. This list also includes the medical benefits of stones such as the Hajrul yahood (Lapis judaicus), honey stone, the Armenian stone, etc (Farkhondehzadeh and Dehghan, 2019; Avicenna, 1984). Stones were used less frequently in the medical text of the book "*Hidayat al-Muta'allimin*," written by Abu Bakr Rabi' Ibn Ahmad Akhwini Bukhari (983–?), the first Persian Muslim physician. In this book, as an example, in one case, "*Hajrul yahood*" has been prescribed as a treatment for kidney stone disease (Akhaweyni, 1992). Seyyed Ismail Hosseini Jorjani (1041-1136 AD) refers to the function of stones in treatments in all his medical works. In the book *Yadegar*, which is of special importance in pharmacology due to its description of more than 1,700 single drugs, compound medicines, ointments, pills, and opium, the benefits of some gems in the field of medicine are mentioned (Khosravi et al., 2025; Jorjani, 2002). "*Zakhireye Khwarazmshahi*" is an important medical book of Jorjani. In this book, various stones have been used to treat various body-related diseases, eye diseases, and to prepare kohl and

prevent eyelash loss (Farkhondehzadeh and Dehghan, 2019; Changizi-Ashtiyani, Zarei and Elahipour, 2009).

Types of Stones Effective in Maintaining Health and Strengthening Eyes from the Perspective of the Persian School of Medicine

In Persian Medicine, maintaining health and strengthening various organs of the body is of primary importance, and the treatment of disease is the second task of the physician (Velayati, 2005). In this regard, we first introduce effective gems in maintaining health and strengthening the eyes, and then we refer to the course of treatment of eye diseases and disorders by gems in Persian Medicine.

1- Maintaining Eye Health

Rhazes, in the book *al-Mansouri fi al-Tibb*, considers a combination of kohl, eqlimā, washed Marghishishai, pearl, and coral stone to be very useful for maintaining eye health, and states that it should be rubbed on the eyelids at noon and in the evening (Razi, 1987). In his book *Bari al-Sa'eh*, he considers the application of kohl from Isfahani stone powder and Indian tutia mixed with fennel or marjoram juice to be effective medicine in strengthening the eyes (Razi, 2012).

2- Strengthening Eye Vision

Khajeh Nasir al-Din Tusi in the book *Tansukh-Nameh-ye Ilkhani* considers ruby, Dohnaj Shirin, Tutia, emerald, pearl; Johari Neyshabouri in the book *Jawaher Nezami* considers pearl, and Lapis lazuli; Heravi in the book *Al-Abniyah an Haqayeq al-Adwiyah*, considers pearl and coral, Abu Reihan Biruni in his book *saydand fil- tibb*, considers emerald and in book *Al-Jamaher fi Al-Ma'rifah Al-Jawaher* considers pearl and Muhammad ibn Mansour in *Ma'aref Al-Jawahir* considers antimony as the most effective stones in strengthening eye (Tusi, 1884; Mohammad Ibn Mansour, 1955; Biruni, 2004; Movafagh-Heravi, 2009; Johari Neyshabouri, 2003; Biruni, 1995).

In addition to medical books, Persian literary books also mention the healing properties of stones and their effects on strengthening eyesight. Khaghani, a Persian poet, in his book *Divan Khaghani* mentions rubies and pearls to strengthen the eyes (Barzegar Khaleghi, 2019).

Another Persian poet, Jalaluddin Balkhi, known as Mulana, also has poems on the benefits of pearls for strengthening the eyes (Balkhi, 1995).

3- Improving Nerve and Eye Muscle Strength

Jorjani, in the *Zakhireye Khwarazmshahi*, considers hematite [effective]; Khajeh Nasir al-Din Tusi, in *Tansukh Name*, considers antimony effective in strengthening the muscles and nerves of the eyes; and Aqili Khorasani, in *Makhzan Al-Adawiyah*, considers the powdered combination of antimony with musk to be effective in this field (Etezad Razavi et al., 2013; Tusi, 1884; Aghaili Alavi Shirazi, 2015).

4- Strengthening Eyelashes

Heravi in his book, *Al-Abniyeh an Haqayeq Al-Adawiyah*, considers lapis lazuli useful in strengthening eyelashes, and Jorjani, in *Al-Aghraz Al-Tebiyya* and *Al-Mabaheth Al-Alaiyya*, talks about strengthening eyelashes: "*Mix and apply burnt dates, lavender, lapis*

lazuli and Frankincense smoke" (Hosseini Tonkaboni, 1959; Jorjani, 2015).

Types of Stones Effective in the Treatment of Eye Diseases and Disorders from the Perspective of the Persian School of Medicine

1- Nyctalopia

Avicenna, in *The Canon of Medicine*, considered a combination of three stones—Basfis, Magnet, and Ahatis (also known as white alum)—along with hematite (*Hajr ul-Damm*), effective for treating nyctalopia. Additionally, Aqili Khorasani, in *Makhzan al-Adwiyah*, regarded Qishour as beneficial for the same condition (Avicenna, 1989; Hosseini Tonkaboni, 1959).

2- Pterygium

In the book *Al-Hawi*, Razhes finds a combination of three yellow arsenic stones, pepper stone, and salt stone along with coriander juice beneficial (Razi, 2002).

3- Moisture in the Eyes

Khajeh Nasir Tusi, in *Tansukh Nameh*, following the property of Tutia stone, mentions it as a modifier of eye moisture and considers it a useful medicine for all kinds of eye disorders (Tusi, 1884). Also, in the book of *Al-Abniyah an Haqayeq al-Adwiyah*, Heravi considers the stones of antimony and coral useful for moistening the eye (Movafagh-Heravi, 2009).

4- Cataracts

Aghili Khorasani in *Makhzan al-Adwiyah* considers the combination of "*Hajar al-Baqr*" with beet juice useful (Aghaili Alavi Shirazi, 2015).

5- Smallpox

Khajeh Nasir al-Din Tusi, in *Tansukh Nameh*, finds sweet Dohnaj useful in smallpox and writes: "*Its property was that what is sweet benefits the eye. It settles the rising veins, removes smallpox from the eye and increases the brightness*." He considers the sour Dohnaj as poison; if someone uses it, "*it is as if he has used poison*" (Tusi, 1884).

6- Swelling of the eyes and Eyelids

Avicenna, in his book *the Canon of Medicine*, considers an equal mix of two stones, white and yellow alum, and placing it on the eyelid, useful in the treatment of eyelid inflammation, and also considers the combination of Armenian stone and azure, useful in eye inflammation (Avicenna, 1984). Also, according to the notes of Khajeh Nasir in *Tansukh Nameh*, white alum is beneficial in eliminating eye inflammation (Tusi, 1884).

7- Thick Eyelid

Aghili Khorasani, in *Makhzan al-Adawiyah*, considers the mesmen stone—with which knives and swords are sharpened and which is called hone and knife stone in Persian—to be effective in repelling the thickness of the eyelid (Aghaili Alavi Shirazi, 2015).

8- Eye Sores

Heravi, in the book *Al-Abniyeh an Haqayeq al-Adwiyah*, considers coral and antimony

useful in the treatment of eye wounds (Movafagh-Heravi, 2009).

Jorjani, in his *Zakhireye Khwarazmshahi*, considers hematite, which he describes as Shazanj, to be one of the treatments for corneal ulcers. The source of this drug is stone, and it is hot and dry. He also introduces this drug as effective in stopping eye bleeding (Etezad Razavi et al., 2013). Aghili Khorasani also considers the combination of antimony, camphor, and coriander to be effective in preventing and treating ulcers and wounds caused by blister and typhoid (Aghaili Alavi Shirazi, 2015).

9- Eye Hot Inflammation

In *Al-Abniyah 'an Haqa'eq al-Adwiyah*, Heravi states that antimony is effective in the treatment of ocular inflammation (Movafagh-Heravi, 2009).

10- Leukocoria

Aghili Khorasani in *Makhzan Al-Adwiyeh* considers the combination of antimony with pearl and white candy as useful for leukocoria. He also considers kidney and bladder stones excreted from the kidneys and bladder to be effective in the treatment of this disease (Aghaili Alavi Shirazi, 2015). Muhammad ibn Mansour in *Ma'refah al-Jawahir* considers Roman agate, and the sage Muhammad Tonekaboni, in the book *Tuhfa tul-Momenin*, also considers turquoise very beneficial in removing leukocoria (Mohammad Ibn Mansour, 1955; Hosseini Tonkaboni, 1959).

11- Itchy Eyes

Jorjani, in his book *Zakhireye Khwarazmshahi*, considers hematite effective for eye ulcers; in addition, he regards hematite as one of the treatments for eye itching (Etezad Razavi et al., 2013). Aghili Khorasani, in the book *Makhzan Al-Adwiyah*, has also considered white stone (*Hajr al-Bani*) useful in treating itchy eyes (Aghaili Alavi Shirazi, 2015).

12- Bleeding Eyes

Jorjani in his book *Zakhireye Khwarazmshahi* considers Shadanj or hematite, a useful medicine to eliminate eye bleeding (Etezad Razavi et al., 2013).

13- Eye Pain

Khwaja Nasir al-Din Tusi writes in *Tansukh Nameye Ilkhani*: "*As you purify antimony and cover the eyes with it, it will repel the pain*" (Tusi, 1884). Kashani, in his book *Arayes Al-Jawahir and Nafayes Al-Atayeb*, considers pearl effective for eye pain (Kashani, 1967).

Discussion

In this study, thirteen ancient medical books from the ninth to eighteenth centuries in Persian Medicine were explored. In this discussion, an attempt was made to study the course of mineral-based ophthalmic treatments in Persian medicine over eight hundred years. In this study, it was observed that in single-knowledge textbooks on mineral-based treatments, only one type of stone has been used as a single drug—for example, the use of sweet dohnaj in the treatment of smallpox by Khajeh Nasir al-Din Tusi in *Tansukh Nameh* (Tusi, 1884). In these single-knowledge books, there was no compound medicine based on the use of gems in the treatment of eye diseases, with one exception: the book *Makhzan Al-Adwiyah*, written by Aghili Khorasani, which—despite being a single-knowledge book

in the field of pharmacology—has used various stones either alone or in combination with other drugs (Hosseini Tonkaboni, 1959). However, in multi-knowledge books such as *Al-Hawi*, most gem therapies were in combination with other herbal, animal, or mineral medicines—as in the treatment of ocular pterygium by Rhazes in *Al-Hawi*, where, in addition to the use of three stones with therapeutic properties, the simultaneous use of coriander is also mentioned (Razi, 2002).

Among the gems used to maintain and strengthen eye health, a total of 14 gems were mentioned in the studied books, among which pearl and then antimony were the most frequently used, with 5 and 4 sages mentioning their use, respectively. Among the Persian sages, Tusi had the greatest variety in prescribing the type of stone—namely, six types of stones—followed by Heravi, with three types of stones for strengthening the eyes. Perhaps it can be said that because *Tansukh Nameh* was written later than the other books, it drew on more sources in its compilation and, as a result, offered more treatments. All the stones used were in the form of a single drug, except in two cases in which Rhazes used ten different stones along with herbal medicines in combination to make two medicines (Razi, 2002).

In the field of treating eye diseases with stones, the study of the selected books mentioned the healing properties of 22 stones. Among these stones, "*antimony*" and "*hematite*" had the most application in treatment, and among the sages who prescribed stones for various eye diseases, Aghili Khorasani, followed by Heravi and Khajeh Nasir al-Din Tusi, used the most diverse stones for various diseases. This diversity was probably due to the fact that these two scientists were later and had more resources available than the other authors.

From our studies, it was observed that the authors who have authored in the field of mineral-based treatments, in addition to providing new information in this regard, have benefited from the material of their predecessors in this field. For example, Mohammad Ibn Mansour, under the property of sweet dohnaj, mentions some of Tusi's words in the book "*Tansukh Nameh*" in the description of this stone: "*Dissolve sweet dohnaj in water and drop it in the eye so that the rising veins settle and increase the light of the eye*." Or in another part of his book, Mohammad Ibn Mansour in Goharnameh, like Heravi and Khajavi Neyshabouri, considers "*pearl*" effective in strengthening the eye, which he probably took from reading the book *Al-Abniyeh an Haqayeq al-Adwiyah* or *Jawahirnameh Nezami* (Movafagh-Heravi, 2009).

During our research in medical books after the 18th century AD, it was found that mineral-based ophthalmic treatments as part of the health and treatment of eye diseases are still continued in Persian Medicine. Mir Mohammad Akbar bin Mohammad Shah Arzani (19th century AD), author of the book "*Akbari tibb*", and Mohammad Karim bin Ebrahim Kermani (19th century AD), author of the book "*Daqaeq Al-Alaj*", were sages who referred to mineral-based treatments in the field of ophthalmology in their books (Arzani, 2012; Kermani, 2008). Shah Arzani, a sage of the 19th century AD, in his book *Akbari tibb*, for removing the bruise on the eyelid, writes: "*Mix litharge with rose water and apply it on eyelid to remove the wound and then use sanga pelpel*" (Arzani, 2012). About the usefulness of stones in maintaining health and treating eye diseases, we should mention that in one case, the stone caused disease in the eye. In the book *Maarefa al-Jamahir*, Muhammad ibn Mansour declared that watching rubies in the sun caused eye damage and pain (Mohammad Ibn Mansour, 1955). But in an interesting case, we saw that Aghili

Khorasani, in the book *Zakhireye Khwarazmshahi*, used stones created in the human body, such as kidney and bladder stones, in the treatment of eye diseases. Although this book has nothing to do with mineral-based treatments, it offered the most diverse treatments by gems in eye diseases (Aghaili Alavi Shirazi, 2015). In recent centuries, with the development and expansion of modern medicine, although studies related to mineral-based treatments have been very few and far between, this chain has not yet been broken, and several studies have occasionally been conducted in this regard. In 1990, Vijayanagar, in a study entitled mineral-based treatments and epilepsy, found a positive effect of ruby, emerald, and turquoise in the treatment of this disease (Murthy and Shenoy, 1990).

In 2009, Ishaque et al., based on statistics gathered in Pakistan, concluded that the majority of people in the country had heard about mineral-based treatments by word of mouth and that a large number of people used mineral-based treatments. In another study for the evaluation of the effects of hasonite on human breast cancer cells MDA MB 231, the inhibitory effect of hasonite on these cancer cells was suggested (Ishaque, Saleem and Qidwai, 2009). Although traditional medicine and the use of various drugs have become more popular among people today, no studies have been conducted in the field of historical courses or clinical trials on the effect of mineral-based treatments on ophthalmology (Salehi et al., 2017). However, despite the lack of clinical and reliable research, some people in different parts of Iran use mineral-based treatments for the treatment of eye diseases, which they have learned orally. In Hamedan, according to oral teachings, for the treatment of eye cocoons, magnetic stones and Egyptian candy are rubbed together and poured into the eyes. In Bajgiran city of Khorasan Razavi province, they use antimony to treat eye inflammation and infections (Janeb Elahi, 2011). In the previous parts, it was mentioned that Hakim Heravi, in his book *Al-Abniyeh a Haqayeq Al-Adawiyah*, also prescribed antimony for the treatment of eye inflammation. From this case, it can be inferred that this learning probably came from Heravi to the people of Bajgiran in Khorasan Razavi. Because Bajgiran in Khorasan Razavi was close to Herat, the birthplace of Heravi, which was considered part of Iran at that time, an interest in using gems in the treatment of diseases can still be seen, and people continue to use them. It is hoped that clinical trials will determine whether or not gems should be used in the treatment of diseases, including eye diseases.

Conclusion

The authors of medical texts in Persian Medicine have tested the therapeutic function of gems for various eye diseases and have reflected the amount and method of treatment with these medicinal substances in their works. Over time, traditional physicians have used the findings of previous traditional physicians in new treatments, have added to the findings of their predecessors, and have gradually improved this type of treatment. According to Tables 2 and 3, during our research on the subject, we concluded that our current knowledge of the effects of gemstones in the treatment of various diseases is very limited, and this type of treatment is almost unexplored in traditional medicine. This research cannot correct all aspects of mineral-based ophthalmic treatments, including their accuracy or inaccuracy in the treatment of various diseases, and other independent research is required. Therefore, more studies, including clinical trials, are needed to gather more valid information in this area.

Table 2: The Use of Effective Gems in Maintaining Health and Strengthening the Eyes from the Perspective of the Persian School of Medicine

Gems														
Impact on	**Antimony**	**Eglimā**	**Marghishishai**	**Pearl**	**Coral**	**Isfahani stone**	**Indian tutia**	**Emerald**	**Pearl**	**Tutia**	**Dohnaj Shirin**	**Ruby**	**Lazuli**	**Hematite**
Maintaining eye health	Rhazes	Rhazes	Rhazes	Rhazes	Rhazes	Rhazes	Rhazes	Rhazes	Rhazes	Rhazes				
Strengthening eye vision	Muhammad ibn Mansour				Heravi			Biruni / Tusi	Biruni / Heravi / Johari Neyshabour Tusi	Tusi	Tusi	Tusi	Johari Neyshabouri	
Improving nerve and eye muscle strength	Tusi ، Aqili Khorasani													Jorjani
Strengthening eyelashes													Heravi	
Number gems used	4	1	1	1	1	1	1	3	5	2	1	1	2	1

Table 3: The Use of Effective Gems in the Treatment of Eye Diseases and Disorders from the Perspective of the Persian School of Medicine

Gems			
Illness	**Nyctalopia**	**Pterygium**	
Yellow arsenic		Rhazes	
Pepper stone		Rhazes	
Salt stone		Rhazes	
Tutia			
Antimony			
Coral			
Dohnaj Shirin			
Basfis	Avicenna		
Magnet	Avicenna		
Alum (white alum)	Avicenna		
Hematite			
Hajar al-Baqr			
Hajr Qishour	Aqili		
Mesmen			
Yellow alum			
Roman agate			
Kidney stones			
Bladder stones			
Turquoise			
Azure			
Armenian stone			
Pearl			

Number gems used	Eye pain	Bleeding eyes	Itchy eyes	Leukocoria	Eye hot inflammation	Eye sores	Thick eyelid	Swelling of the eyes and eyelids	Smallpox	Cataracts	Moisture in the eyes
1											
1											
1											
1											
6	Tusi										
2											
1											
1											
1											
3			Aqili								
4		Jorjani	Jorjani								
1				Aqili	Heravi	Heravi, Aqili Khorasani					
1						Heravi					
1									Tusi		
1											
1											
1						Jorjani					
1								Avicenna			Tusi
1								Avicenna			Heravi
							Aqili				
1				Muhammad ibn Mansour				Avicenna		Aqili	Heravi
1				Aqili							
1				Aqili							
1				Tonekaboni							
1											
1								Avicenna			
1								Avicenna			
2	Kashani			Aqili							

Acknowledgements

The authors would like to thank the Deputy of Research and Technology of Arak University of Medical Sciences for funding this study as a research project, and the library staff

of Arak University of Medical Sciences for their assistance. This study was conducted in accordance with all relevant ethical guidelines. The study protocol was approved by the Arak University of Medical Sciences Ethics Committee, approval number IR.ARAKMU.REC.1403.167.

Authors' Contribution

Both authors contributed in the study concept, design, acquisition and interpretation of data, drafting of the manuscript, writing the critical revision of the manuscript for important intellectual content and administrative, technical, or material support. The study supervision is done by Mehdi Salehi. Both authors read and approved the final manuscript.

Funding

This work was supported by the deputy of Research and Technology of Arak University of Medical Sciences.

Conflict of Interest

None.

References

Akhaweyni, R., 1992. *Hedayat al-Motaalemin fi al-Tibb*. Mashhad: Daneshgah-e Ferdowsi. [in Persian]

Aqili Khorasani, M.H., 2015. *Makhzan al-Adwiyah*. Ardehal: Safir Ardehal. [in Persian]

Arzani, M.A., 2012. *Teb Akbari*. Vol. 1. Tehran: Almaei. [in Persian]

Asadi, M.H., et al., 2023. The historical course of varicose vein surgery in Persian medicine. *Acta Chirurgica Belgica*, 123(6), pp. 589–600.

Asadi, M.H., et al., 2024. The history of medieval bladder stone surgery in Persia. *Acta Chirurgica Belgica*, 124(6), pp. 444–454. https://doi.org/10.1080/00015458.2024.2395136 [Accessed 14 February 2026]

Avicenna, 1984. *Shefa* [*Tabieyat*]. Vol. 2. Edited by S. Zaed. Qom: Ketabkhaneh Marashi. [in Persian]

Avicenna, 1989. *Al-Qanun fi al-Tibb* (*The Canon of Medicine*). Tehran: Soroush Publisher. [in Persian]

Balkhi, J., 1995. *Masnavi*. Tehran: Sokhan. [in Persian]

Barzegar Khaleghi, M.R., 2019. *Sharh-e Divan-e Khaqani* (*Description of Khaghani's Diwan*). Tehran: Zavvar. [in Persian]

Biruni, A., 1995. *Al-jamahir fi marifat al-jawahir*. Tehran: Miras Maktob. [in Persian]

Biruni, A., 2004. *Al Seydaneh al Teb*. Translated by B. Mozafarzadeh. Tehran: Academy of Persian Literature. [in Persian]

Bodeker, G., and Kronenberg, F., 2002. A public health agenda for traditional, complementary, and alternative medicine. *American J Public Health*, 92(10), pp. 1582–1591. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3221447 [Accessed 14 February 2026]

Changizi-Ashtiyani, S., Zarei, A. and Elahipour, M., 2009. Innovations and discoveries of Jorjani in medicine. *J Medical Ethics and History of Medicine*, 2, p. 16. Available at: https://pubmed.ncbi.nlm.nih.gov/23908730/ [Accessed 14 February 2026]

Changizi-Ashtiyani, S., et al., 2023. The effects of the six principles of hygiene in maintaining

health and preventing eye diseases from the perspective of medieval Persian medicine. *The Open Public Health J,* 16(1), pp. 1–12.

Dashtaki, M.I.M., 1955. *Goharnameh*. Tehran: Farhang Iran Zamin. [in Persian]

Etezad Razavi, M., et al., 2013. Diagnosis and management of ocular disorders in Iranian and Islamic traditional medicine of middle ages. *Bina*, 19(1), pp. 63–71. Available at: https://www.sid.ir/en/journal/ViewPaper.aspx?id=350607 [Accessed 14 February 2026] [in Persian]

Farkhondehzadeh, M., and Dehghan, M., 2019. Mineral healing in Iranian-Islamic medicine: A review study. *J Islamic and Iranian Traditional Medicine*, 9(4), pp. 347–360. Available at: http://jiitm.ir/article-1-1057-en.html [Accessed 14 February 2026] [in Persian]

Hakim Hermes, 2013. *Khavas al-Ahjar va Noughosheha*. Tehran: Entesharat Manshour Samir. [in Persian]

Hosseini Tonkaboni, M.M., 1959. *Touhfeh Hakim Moumen*. Edited by M. Najmabadi. Tehran: Ketabforoushi Mostafavi. [in Persian]

Ishaque, S., Saleem, T., and Qidwai, W., 2009. Knowledge, attitudes and practices regarding gemstone therapeutics in a selected adult population in Pakistan. *BMC Complementary and Alternative Medicine*, 9(32), pp. 1-17. Available at: https://bmccomplementmedtherapies.biomedcentral.com/articles/10.1186/1472-6882-9-32 [Accessed 14 February 2026]

Janeb Elahi, M., 2011. *Pezeshki-ye Sonnati va Amiyaneh-ye Mardom-e Iran ba Negah-e Mardomshenakhti* (*Traditional and folk medicine of the Iranian people from an anthropological point of view*). Tehran: Amir Kabir. [in Persian]

Johari Neyshabouri, M.I.A.B., 2003. *Javaher Name Nezami*. Tehran: Miras Maktob. [in Persian]

Jorjani, S.I., 2002. *Yadegar*. Edited by M. Mohaghegh. Tehran: University of Tehran. [in Persian]

Jorjani, S.I., 2015. *Zakhireye Khwarazmshahi*. Tehran: Safir Ardehal Publications. [in Persian]

Kashani, A., 1967. *Arayes al-Javaher va Nafaies al-Atyab*. Edited by I. Afshar. Tehran: Anjoman Asar Melli. [in Persian]

Keramati, Y., 2012. *Ma'dan-shenasi va gohar-shenasi* (*Mineralogy and gemology*). In: Mousavi Bojnordi, K. ed. Tarikh-e Jame-e Iran (The comprehensive history of Iran). Vol. 13. Tehran: Centre for the Great Islamic Encyclopaedia, pp. 749-785. [in Persian]

Kermani, M., 2008. *Daghegh-Al-Alaj*. Translated by E.Z. Ebrahimi. Kerman: Saadat Publication. [in Persian]

Khosravi, A., Changizi-Ashtiyani, S., and Amini, S., 2022. The Interaction between Hellenic and Persian Pharmacology: What's the output? *The Open Public Health J*, 15(1), pp. 1–5. https://doi.org/10.2174/18749445-v15-e2208190 [Accessed 14 February 2026]

Khosravi, A., et al., 2019. The innovations of Rhazes (854–925 AD) in the diagnosis and treatment of kidney diseases. *Medical History*, 11(38), pp. 111–120. Available at: https://journals.sbmu.ac.ir/mh/article/view/30392 [Accessed 14 February 2026] [in Persian]

Khosravi, A., et al., 2023. Cauterization's history in the Persian medicine school. *Acta Chirurgica Belgica*, 123(1), pp. 1–11. https://doi.org/10.1080/00015458.2022.2135256 [Accessed 14 February 2026]

Khosravi, A., et al., 2024. An approach to the milestones of spine surgery in Persian traditional medicine. *Acta Chirurgica Belgica*, 124(3), pp. 161–169. https://doi.org/10.1080/00015458.2024.2325798 [Accessed 14 February 2026]

Khosravi, A., et al., 2025. Etiology of Hematuria from Point of View of Rhazes (865–925 AD). *Translational Research in Urology*, 7(2), pp. 53–60. https://doi.org/10.22034/tru.2025.500501.1223 [Accessed 14 February 2026]

Moein, H.R., and Shams, H., 2016. History of ophthalmology in Iran. *Bina*, 16(1), pp. 3–8. Avail-

able at: https://www.sid.ir/en/Journal/ViewPaper.aspx?ID=188031 [Accessed 14 February 2026] [in Persian]

Mohagheghzadeh, A., Zargaran, A., and Daneshamuz, S., 2011. Cosmetic sciences from ancient Persia. *Pharmaceutical Historian*, 41(2), pp. 18–23.

Movafagh-Heravi, A., 2009. *Al-Abniyeh An-Haqaeqe al-adawiye*. Tehran: Tehran University of Medical Sciences. [in Persian]

Murthy, S., 1991. Role of gems in Indian medicine. *Ancient Science of Life*, 10(3), p. 156. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3331284 [Accessed 14 February 2026]

Murthy, S.R.N., and Shenoy, R., 1990. Gem therapy treatments and epilepsy. *Ancient Science of Life*, 9(4), pp. 185–190. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3331331 [Accessed 14 February 2026]

Naderi, N., and Ghasemlou, F., 2013. *Darousazi va Daroshenasi*. Tehran: Ketabkhaneh Daneshnameh Jahan Islam. Available at: https://rch.ac.ir/book/Details/60 [Accessed 14 February 2026] [in Persian]

Razi, M.I.Z., 1987. *Al-Mansouri fi al-Tibb*. Kuwait: Arab Organization for Education, Culture and Science. [in Arabic]

Razi, M.I.Z., 2002. *Al-Hawi fi al-Tibb*. Beirut: Dar Ihya al-Turath al-Arabi. [in Arabic]

Razi, M.I.Z., 2012. *Resaleh-ye Darman-e Fouri* (*Treatise on immediate cure; translation of Bar' al-Sa'a*). Translated from Arabic by E. Moghaddas. Tehran: Niloberg. [in Persian]

Salehi, M., et al., 2017. The effect of Myrtus communis L. syrup in reducing the recurrence of gastroesophageal reflux disease: A double-blind randomized controlled trial. *Iranian Red Crescent Medical J*, 19(7), pp. 1–8. Available at: https://www.sid.ir/en/journal/ViewPaper.aspx?id=560793 [Accessed 14 February 2026]

Sezgin, F., 2000. *Tarikh Negareshhay Arabi*. Vol. 4. Tehran: Vezarat Farhang va Ershad. [in Persian]

Sheikh Rezaee, M.R., Jokar, A., and Moallemee, M., 2017. Moruri bar Ab-e Morvarid dar Ketabha-ye Qanun fi al-Tebb (Ebn-e Sina) va Nur-ol-oyun (Jorjani). *J Mazandaran University of Medical Sciences*, 27(150), pp. 223–231. Available at: http://jmums.mazums.ac.ir/article-1-9416-en.html [Accessed 14 February 2026] [in Persian]

Tusi, Kh.N., 1884. *Tansukh Nameh Ilkhani*. Tehran: Etela'at. [in Persian]

Velayati, A.A., 2005. *Puyayi-ye Farhang va Tamaddon-e Eslam va Iran* (*Dynamic culture and civilization of Islam and Iran*). Tehran: Ministry.