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REVIEW ARTICLE

# The Effects of the Six Principles of Hygiene in Maintaining Health and Preventing Eye Diseases from the Perspective of Medieval Persian Medicine

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**Abstract:**

***Background:***

The term “Hefz al-Sehheh” (Maintaining Health) in traditional Persian medicine has roots in six core principles and is based on the concept that maintaining health is prioritized over treatment. In this day and age of significant advancements in medical technology and therapeutics, less emphasis is being placed on maintaining health and preventing illness. This manuscript presents the viewpoints of prominent figures of medieval Persian medicine on maintaining eye health and preventing diseases.

***Methods:***

We reviewed the content of six medieval medical reference books written by six most prominent medieval Persian (Iranian) physicians and polymaths, *i.e.*, Rhazes, Haly Abbas, Avicenna, Jorjani, Aghili Shirazi, and Al-Kahhal. Also, related articles were extracted from valid databases using keywords based on entry and exit criteria without time limits.

***Results:***

According to these prominent medieval Persian physicians and polymaths, exposure to extremely hot or cold weather or dusty air; chronic oversleeping or sleep deprivation; sleeping prone on a full stomach; excessive consumption of salty, spicy, sweet, or steamy food; and drinking cold, salted, carbonated water are harmful to eye health. They recommended purging the bowel with laxatives, eating easy-to-digest foods, practicing well-balanced exercise, and avoiding strenuous physical activity and rapid eye movements. Furthermore, they believed that the accumulation of waste products in the body is detrimental to eye health and that therapeutic bloodletting, leeching, rheuming, kohl, and catharsis with laxative drugs are highly effective for maintaining eye health. Moreover, they believed that a person's mental state, *i.e.*, anger, sorrow, grief, joy, and happiness, would influence one's eye health.

***Conclusion:***

The emphasis of medieval, traditional Persian medicine on maintaining eye health deserves our attention, realization, and appreciation of the environmental and lifestyle factors that can affect our eyes and other organs' health and well-being.

**Keywords:** Medieval medicine, Persian medicine, Traditional medicine, History of medicine, Hefz al-Sehheh, Eye Health.

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## 1. INTRODUCTION

Eye care and eye diseases were among the essential disciplines in ancient medicine. A recent archaeological finding of an artificial eye in Shahr-I Sokhta (the burnt city) dates back to around 2900 to 2800 BC (the world's oldest artificial eye). It contains many anatomical details and is an example of ancient interest in this subject (Fig. **1**) [1].

Moreover, in Babylonian civilization, a large portion of the Code of Hammurabi was created concerning ophthalmology to punish offending ophthalmologists [2]. Furthermore, in ancient Egypt, eight columns of Ebers Papyrus (1550 BC) were

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concerned with eye diseases and their respective treatments [3, 4]. A surgeon named Sushrat (800 BC) in Indian traditional medicine is famous for describing 76 different eye diseases and developing several devices and techniques used in ophthalmology [5, 6]. Other significant ophthalmic discoveries include various necropsies performed by Aristotle (384-322 BC), which resulted in finding the three layers of the eye and the anatomical description of the cornea, lens, and optic nerve by Galen (129-200 AD) [7 - 9]

The available information from ancient civilizations indicates that the issues of maintaining eye health, preventing eye diseases, and treating related disorders have been quite intriguing and challenging. However, despite the wealth of information available, the limited, incomplete, and sometimes repetitive investigations conducted in this regard do not reflect such valuable information in history. Most historical studies focus on the above issues from the standpoint of a particular school of thought, such as Greece, without comparative studies of cross-cultural influences on other civilizations and schools, such as Persian (Iranian) medicine. Also, a majority of the existing studies in this field have focused on presenting the treatment modalities mentioned in the ancient medical books, while the maintenance of eye health and prevention of its disorders have received little attention. The report by Trompoukis and Kourkoutas in 2007 entitled "Greek Mythology: The Eye, Ophthalmology, Eye Disease, and Blindness" focused only on the methods of treatment of eye diseases in the ancient Greek civilization, while the issues of eye care and hygiene remained unnoticed. Moreover, the contribution of other civilizations and schools in the field of maintaining eye health, preventing and/or treating diseases, and their cross-cultural influences on the ancient Greek school were not discussed [10]. As it is evident, there have not been many in-depth studies on health maintenance and prevention of eye diseases in the past centuries. The present study examines in detail the methods proposed by medieval Persian medicine to maintain eye health and prevent eye diseases.

**Fig. (1).** Artificial eye discovered in Burned City [1].

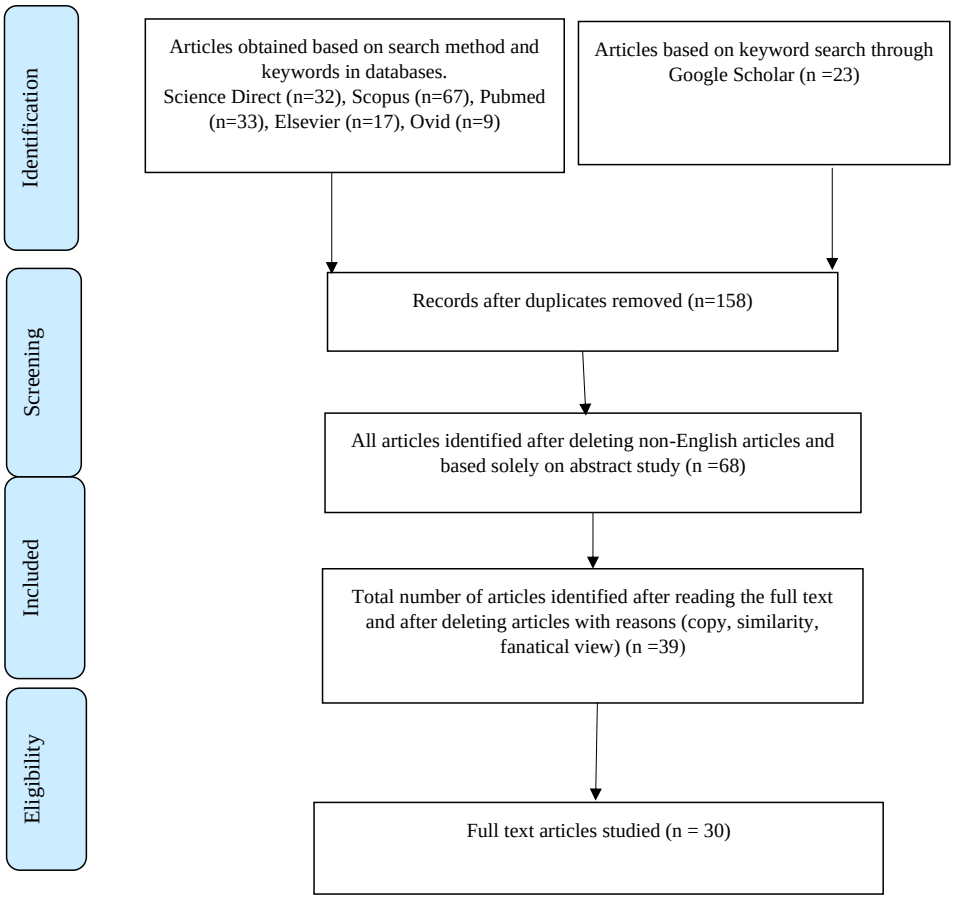


**Fig. (2).** PRISMA flow chart for search and article selection method.

## 2. METHODS

We researched different sources of Persian medicine, including *Al-Hawi fi al-Tebb (Liber Continens)* and *Al-Maonsuri fi al-Tebb (Liber Al-Mansuori)* by Rhazes, *Kamel al-Sana al Tebbia (Liber Regius)* by Haly Abbas, *Al-Qanun fi al-Tebb (The Canon of Medicine)* by Avicenna, *Kholasat al-hakama* by Aghili Shirazi, *Zakhire-ye Kharazmshahi (The Treasure of Kharazmshah)* and *"Al-Aghraz al-Tebbie va al-Mabahes al-Alayieh (Medical Pursuits)* by Ismaeil Jorjani, and *Tazkerat Al kahhalin (Memorandum of the Oculists)* Ali Ibn Isa Al-Kahhal were carefully examined. In addition, other related articles in the literature were extracted using search engines such as Google Scholar and databases such as PubMed, Elsevier, OVID, and Scopus, with keywords like "Hefz al-Sehheh," "Ophthalmology," and "Persian medicine," without time limit. After collecting data and completing notetaking, analysis and research materials were written. In the following, the Prisma chart summarizes the process of searching and collecting materials in databases (Fig. **2**).

## 3. THE SIX PRINCIPLES OF MAINTAINING EYE HEALTH (HEFZ AL-SEHHEH) IN PERSIAN MEDICINE

General healthcare, including the care of the eyes, was based on six basic principles in the ancient medical tradition. Greek physicians, such as Hippocrates, and physicians from other civilizations and schools were involved in its development [11]. These six core principles have been elaborated in medieval Persian medicine under the title of " Hefz al-Sehheh " (Maintenance of Health). Hefz al-Sehheh held a very distinguished place in medieval Persian medicine. It provided the necessary instructions and procedures to maintain total body health and identified the factors affecting our health in general and eye health in particular. These six core principles in Persian medicine included the weather or climate conditions, the states of mobility and rest, sleep and wakefulness, eating and drinking, bodily secretions/excretions and retention, and one's temperaments, which essentially defined our lifestyle and affect our general health and the health of the respective organs, such as the eyes [12].

Various recommendations of Persian medicine to maintain general body health and healthy organs, including the eyes, are presented below in an orderly fashion based on the six core principles of Hefz al-Sehheh (Fig. **3**).

### 3.1. The Effects of air Quality and Weather Conditions

Breathing clean air has been highly emphasized by Hefz al-Sehheh. Baha' al-Dawla Razi (15th century) mentioned in his treatise *Kholasat al-Tajarob* (The Summary of Experiences in Medicine) that strengthening one's natural temperaments benefits the person's eye health. That is to say, paying attention to all aspects of body and mental health will improve eye health [13].

Several preventive measures that directly and specifically affect eye health have been presented as follows:

#### *3.1.1. The Effects of Prolonged Exposure to Cold Weather*

Rhazes (865-925 AD) described the adverse effects of cold weather on eyes, such as causing burning/pain and eye redness, and considered it a risk factor for developing keratitis. He proposed that to prevent the adverse effects of cold weather, the eyes should be covered as much as possible in cases where such exposure is unavoidable. Except for the necessary part for vision, the rest of the eyes should be covered with a turban, and exposure to the cold wind should be avoided as much as possible [14, 15].


**Fig. (3).** The six principles of maintaining eye health (Hefz al-Sehheh) in Persian medicine.

Seyyed Mohammad Hossein Alavi Aghili Khorasani (18th century), in his treatise Kholasat al Hekma (the Summary of Medical Science), suggested that applying "kohl" (a powder used as a cosmetic to darken the eyelids and eyebrows) is highly effective in avoiding the adverse effects of cold and snow on eye health [15 - 17].

#### *3.1.2. The Effects of Prolonged Exposure to Hot Weather*

Avicenna (981-1037 AD) considered exposure to and walking under high temperatures as one of the causes of eye diseases. He suggested mixing the "kohl" with "fennel water" and applying it to the eyes to absorb heat from the eyes [18]. Aromatherapy was another recommended practice to protect eyes from the harsh environment. For instance, "musk" and "amber" were inhaled to protect the eye from extreme cold and heat [18 - 20].

#### *3.1.3. The Effects of Exposure to Smoke, Dust, and Strong Winds*

Iranian sages such as Hally Abbas (931-994 AD) in *Kamel al-Sana al Tebbia (Liber Regius)* and Jorjani (1041-1136 AD) in *Zakhire-ye Kharazmshahi* recommended staying away from dust and smoke as it would help in preventing eye diseases such as "Zafrah" (eye pterygium) [21 - 24].

Hally Abbas has pointed out that the eye is a very sensitive and delicate organ; thus, strong and potent drugs should not be used for treating pterygium. He recommends the best way to prevent and/or treat pterygium is to avoid exposure to dust, smoke, and sunlight. Avicenna also wrote: "*Anyone who seeks good eye health should avoid exposure to dust, smoke, heat, and things that cause dryness of the eyes, such as direct exposure to sunlight and excessive bathing*" [25].

Storms can cause severe eye pain and, thus, must be avoided. According to Avicenna, rubbing fresh oils on the eyes, bathing in freshwater, and inhaling basil can significantly reduce the adverse effects of exposure to strong winds [19]. Interestingly, Rhazes, in his book *Al-Hawi fi al-Tebb,* quotes Oribasius (4th century AD), saying that to maintain eye health, proper measures should be taken to limit exposure to cold, smoke, and dust [26, 27].

In general, exposure to extremes of temperature, loss of eye moisture, and entering of foreign particle(s) into the eye were considered the most significant adverse effects of unhealthy air.

### 3.2. The Effects of Mobility and Rest

In addition to advising to perform various general exercises that strengthen the entire body, they have determined specific activities for each part of the body, such as eyes. Looking at beautiful images, watercourses, and greenery was regarded as eye exercises improving eyesight [13, 22]. Reading small font lines was also considered an eye exercise. However, they indicated that this should only be performed occasionally, and excessive indulgence in this habit was considered distinctly harmful to eye health [22]. As for the procedure, it was recommended to look at small font lines and small items and then slowly turn the gaze to brighter and larger objects [19]. The beneficial effects of looking at distant greenery on eyesight have been recently reported by different investigators [28].

Interestingly, a relatively slow motion has been proposed for most eye movements, and quick eye movements were to be avoided [22]. Muqim Arzani (16th and 17th centuries), in his treatise *Mofarah Al-Gholoob,* proposed that to protect the eye health of infants, loud noises should be minimized in the infant's room since the infant's eyes would be drawn to the source of the loud sound in a sudden and quick motion, which may cause strabismus [29]. From the viewpoint of several famous Persian sages, such as Avicenna, exercise prioritizes other factors, such as nutrition, in maintaining and promoting health and should be carried out in accordance with the individual's physical condition. On the other hand, if this balanced approach is not undertaken, exercising may not be helpful and, on the contrary, could cause serious harm [19].

### 3.3. The Effects of Sleep and Wakefulness

According to the prominent figures of Persian medicine, time of sleep, the quality and quantity of sleep, body position during sleep, and sleeping on a full stomach could all affect eye health. They believed that sleeping immediately after eating and on a full stomach would harm the eyes. In the opinion of Avicenna, getting used to sleeping on a full stomach is highly detrimental to eye health [30]. Furthermore, sleeping hungry may result in losing fat, which is also dangerous to body organs such as the eyes [29]. Due to the accumulation of certain chemicals at a high concentration, it was thought that oversleeping could weaken eyesight result in several eye diseases, and decrease eye moisture.

On the other hand, prolonged periods of wakefulness could result in dryness of the eyes due to a decline in the level of certain chemicals and less moisture in the eyes [30]. The best sleeping time was considered from 10 pm to dawn, and it was recommended to have dinner at least three hours before sleep. They also believed sleeping after sunrise could result in general sensory weakness, including vision. In their viewpoint, although sleeping prone on the stomach could facilitate the digestion of food, it might also cause various eye diseases. However, if the face were turned entirely to the left or right while sleeping in the prone position, the eyes would not be harmfully affected [29]. Interestingly, such viewpoints on sleep position and eye health have recently been reported in the scientific ophthalmology literature [31]

Furthermore, sleeping on the back (supine position) could also be harmful since it was thought to cause brain wastes to move into the eyes [15, 22, 29]. In "Fi ale al-sham", Galen considered sleeping on the back a risk factor for blindness and excessive periods of wakefulness harmful to eye health [32]. It was recommended that the entire head be more elevated during sleep than the body for maintaining eye health; however, too much elevation of the head relative to the body was discouraged because of its potential adverse effects [13]. They also believed that snorting pure water through the nose and applying "chrism" (a mixture of oil and balsam) to the nostrils and auditory canal using violet oil before bedtime can favorably affect eye health [29]. Prominent figures in Indian

traditional medicine, such as Sushruta, considered poor sleep as one of the reasons for diminishing eyesight [12, 32]. Moreover, according to Persian traditional medicine, the sleep requirement of a person would vary based on the changes in the balance of the four bodily humors (*i.e*., Sanguine humor (Dam), yellow bile (Safra), black bile (Sauda), and phlegm (Balgham)) that influence one's temperaments [33]. Thus, individuals with the dominance of blood humor needed fewer hours of sleep.

### 3.4. The Effects of Eating and Drinking

From the Persian medicine point of view, quantity, quality, type, and time of eating and drinking were all crucial in maintaining eye health.

#### *3.4.1. The Quality and Quantity of Food and Drinks*

In general, due to increased production and accumulation of waste products in tissues, excessive eating was considered detrimental to the entire body's health, including the eyes [30]. Also, due to decreased body moisture level, extreme hunger would cause weakness of eyesight and eye dryness [29].

#### *3.4.2. The Type of Food and Drinks*

Drinking ice-cold water, salty water, sulfuric water, salammoniac water, and alcoholic drinks were considered harmful to the eyes. Sweet, hard to digest, high in iron, salty, spicy, bloating, steamy, and stomach-irritating food were deemed detrimental to the eyes. In contrast, easy-to-digest, light, and laxative food were considered beneficial for the eyes [13, 19, 30]. Ali Ibn Rabban al-Tabari (810–895 AD), One of the famous doctors of the historical city of Merv in the west of Iran, in *Ferdaws al-Hekmah fi al-Tebb " Paradise of Wisdom in Medicine*," states that according to the Indian physicians, salty food is harmful to the eye [5, 34, 35].

#### *3.4.3. The Time of Eating and Drinking*

Eating food before the previous meal is digested, eating before bedtime, particularly in excess, drinking water during or immediately after eating, and eating immediately after sexual intercourse, exercise, or bath were considered harmful to the eyes [15, 30].

Avicenna, in his book *The Canon of Medicine*, indicated that sugar, salty and spicy food, all bloating and steamy beans and legumes, as well as consuming thick and dark wine, dill, chives, raw onions, lentils, cabbage, salty olives, and any other type of food that damages the entrance of stomach (*i.e*., lower esophagus) are harmful to the eyesight [19]. Through years of dedicated observation and experience, ancient Iranian physicians could categorize food items based on various factors, such as taste, ease of digestion, method of preparation, and their effects on the body. They provided much information on these classifications where a class of food items was considered harmful or beneficial instead of pinpointing each food item alone.

**Table 1. An overview of the six hygiene principles in Persian medicine [13 - 26, 29, 30, 32 - 40].**

| The Six Principles of Maintaining Eye Health in Persian Medicine | Positive Effects | Negative Effects | Preventive Measures |
|---|---|---|---|
| **Weather** | Inhaling clean air strengthens the eyes | Cold weather causes burning, redness, and keratitis of the eyes<br>Use of perfume | Covering the eyes as much as possible in cold weather |
| | | Hot weather causes loss of moisture in the eyes | Using kohl and fennel water<br>Using perfume |
| | | Dust and storms cause foreign materials to enter the eye | Using fresh oils on the eyes, bathing in freshwater, and inhaling basil |
| **Mobility and rest** | View beautiful scenery, such as green nature (atmosphere, water, green space) and Balanced exercise | Reading small fonts and continuously gazing at an object | Avoiding reading very small texts, looking at small objects, and continuously looking at an object |
| **Sleep and wakefulness** | Sleep between 10 pm and dawn | Sleeping on an empty stomach.<br>Sleeping with a very full stomach.<br>Sleeping prone on the stomach<br>Sleeping a lot on the back | Snorting clean water through the nostrils and applying "chrism" (a mixture of oil and balsam) to the nostrils and auditory canal with violet oil before going to bed.<br>Keeping the head position higher than the body during sleep.<br>Avoiding prolonged or too short sleeping |
| **Eating and drinking** | Eating fast-digesting food | Gluttony<br>Insufficient eating or drinking<br>Alcoholic beverages<br>Eating before going to bed<br>Drinking water after sleep<br>Eating after sexual intercourse<br>Drinking vinegar, cold water,<br>Eating onions, lettuce, salty food | Avoiding thick and difficult-to-digest food<br>Avoiding overeating<br>Avoiding eating garlic, onions, chives, ripe olives, dill, cabbage, and lentils before sleep<br>Avoiding eating too many sweets<br>Avoiding eating food that is sexually stimulating<br>Avoiding eating spicy food, causing melancholia<br>Avoiding eating different foods in a row |
| **Psychological states** | Happiness | Sadness, overthinking, jealousy, crying | Having a balanced and happy state of mind |

*(Table 1) contd.....*

| The Six Principles of Maintaining Eye Health in Persian Medicine | Positive Effects | Negative Effects | Preventive Measures |
|---|---|---|---|
| **Evacuation & retention** | Appropriate elimination of bodily wastes:<br>Urine, sweat, menstruation, breast milk, and vaginal secretions | Excessive crying, excessive sexual intercourse, excessive leeching and phlebotomy, excessive bathing | Avoiding constipation, vomiting<br>Avoiding too much crying, sexual intercourse, or bathing<br>Avoiding too much leeching and bloodletting |

### 3.5. The Effects of the Psychological State of Mind

The mental and psychological states are most significant in maintaining overall health and in treating diseases. This is because they rapidly and considerably influence the patient's capabilities and activities. Jorjani, a physician from Gorgan, Iran, in his treatise *Al-Aghraz al-Tebbie va al-Mabahes al-Alayieh (Medical Pursuits),* stated that one's state of temperaments such as happiness, sadness, anger, pleasure, and feeling of safety, fear, shame, and obsession in perfection could all directly affect the well-being of the body, more significantly and rapidly than the effects of eating and drinking [24, 36]. Galen believed that ethics and temperaments are mutually influential and interactive. For instance, yellow bile (Safra) temperament can cause anger, and, in turn, irritation and anxiety can also cause yellow bile temperament [32]. Therefore, each state of mind can affect eye health due to its effect on the body. For example, Jorjani indicated in *Zakhire-ye Kharazmshahi* that crying adversely affects eye dryness and causes eyesight weakness if done excessively. Moreover, he suggested that sadness can cause brain dryness and coldness, which would shrink the brain and stretch the nerves to the eyes, irritating and stimulating the nerve causing crying and excess secretion from the eyes [22]. Ali Ibn Isa Al-Kahhal (11th century) is Jesse in Europe Jesu Occulist, *Tazkerat Al Kahhalin (Memorandum of the Oculists)* proposed that anger, sadness, thoughtfulness, envy, and crying change the natural temperament of the body and lowers body temperature, resulting in weakening in eyesight. In contrast, happiness improves natural body temperature and enhances all primary senses, particularly eyesight [37, 38]. Furthermore, they believed that in addition to the mental states mentioned above, the body is affected by one's imagination. In this regard, Avicenna expressed that imagining black objects (considered cold-tempered) results in the contraction of eye muscles, while visualizing white objects would relax eye muscles. Finally, imagining a red object would cause the blood to appear and move around the eye socket [19].

### 3.6. The Effects of Retention of Body Waste Products, Body Secretions, and Excretions

Body secretion and excretion mechanisms act as a form of a body purifying and waste disposal system. This is performed *via* various means, such as fecal excretion, urination, perspiration, menstruation, rheum discharges, breast milk, and vaginal secretions. Retention is the opposite force, wherein the balance between these forces maintains body homeostasis and health. Out of natural bodily secretions and excretions, excessive crying and sexual intercourse (particularly on an empty stomach) were considered detrimental to the eyes, causing eye dryness and sagging (dark circles under the eyes). Also, excessive bodily secretion and excretion through leeching, inducing rheum discharges, phlebotomy, and diarrhea were considered harmful to the entire body and the eyes [29, 37]. The effects on the body of taking a bath were summarized as experiencing a sense of warmth and wetness; however, due to excessive perspiration, bathing for a long time on an empty stomach, as well as having a sauna to lose fat was considered to be detrimental to the eyes [19, 30].

Conversely, rinsing and opening their eyes in clean and clear cold water was recommended for young people. In contrast, warm water was suggested to older people to maintain their eyesight health [19]. Leeching of a shank, cephalic vein phlebotomy, and inducing rheum discharges, when done in moderation and according to their respective safety procedures, were among the bodily secretions and excretions performed by a physician to improve and maintain eye health [22]. Avicenna quoted Hippocrates (355-460 BC) in "The Canon of Medicine" that the appropriate number of inducing rheum discharges is twice a month, enhancing eyesight—however, inducing more rheum discharge results in decreased vision [19]. Relief of constipation using laxative drugs was considered beneficial for maintaining eye health, although severe diarrhea led to visual impairment.

Moreover, performing eye purgation, *i.e*., washing eyes in cold water while slowly moving limbs and massaging the soles of feet with oil, would cleanse the eyes from waste material and promote eye health. Avicenna considered physical activity, exercise, and massage, particularly the legs, highly effective in cleansing the whole body and the eyes from waste products. Furthermore, gentle and slow walking would purge eyes from waste products and was recommended for maintaining eye health. Finally, applying chrism to the legs using goat fat facilitates the purgation of eyes from waste products [39].

In ancient Persian medicine, "kohl" was used to protect the eyes from toxins and various underlying diseases and to treat eye diseases. For example, Rhazes prescribed a weekly application of kohl prepared from an extract of common sea-buckthorn (Hippophae rhamnoides) for maintaining eye health. He also considered applying kohl designed from a combination of "antimony" and "aloe vera" to be highly effective in protecting eyes from diseases such as smallpox and measles [26].

Although leeching, inducing rheum discharges, and phlebotomy were recommended in several cases to enhance vision, the consensus was that excessive use of these measures was detrimental to health. Thus, the patient's condition and proper safety measures were considered before performing these procedures alongside the prescribed recommendation. In the table below, a summary of the six factors affecting eye health is mentioned (Table **1**).

## 4. DISCUSSION

The attitude of traditional medicine to medical science is primarily preventive and therapeutic. Traditional medicine, by dividing practical medicine into two branches of "sanitary hygiene" and "healing science," considers health to be the priority over treatment, and according to this attitude, with great care and attention, every issue related to health and disease is treated. He placed it under his microscope and explained each one. In the meantime, preserving eye health has always been the focus of sages in different civilizations. The presence of Greek, Syriac, and Persian terms and titles in the book *Daghal al-Ayn* (Disorder of the Eye) by Ibn Masawaih (known later as Mesue, 777-857 AD) shows that maintaining eye health is of great importance in different civilizations and ophthalmology has been widely used for centuries. It used to be done [41, 42]. Persian medical scholars have often referred to the scholars before them in different civilizations regarding eye hygiene. In the discussion of the effect of vomiting on eye health, in the book of *Zakhire-ye Kharazmshahi*, Jorjani refers to the words of Hippocrates and writes: " *Hippocrates says: I like vomiting in the form of vomit because it makes the eyes clear*." Also, in another place, "*And if the winter was northern and dry, and in the spring, it rained a lot and weather was hot, in the summer many will have a high fever, eye pain, and diarrhea*" [22]. Although Persian medicine scholars benefited from other scholars in their writings, they also added their innovative and new ideas. For example, Rhazes in Al-Mansouri's Book of Medicine, in the extreme cold and frost, to avoid blindness, he points out that "*A person who is afraid of snow blindness, should choose black clothing and cover his cheeks with a black cloth so that his gaze falls on that black cloth. He should also take a black cloth in his hand and look at it continuously. He should also make everything around him black. One of the very beneficial things is to close the eyes with it is a black cloth woven from the tail hair of black cattle*" [15]. The sages after him also used this secret point of view (the use of cloth and black paint to avoid blindness in freezing) in their writings. Avicenna, Jorjani, and Aghili Khorasani have mentioned this issue in books [15, 17, 19, 20, 22, 36].

Today, after thousands of years, some of the contents related to maintaining eye health are sometimes consistent with modern medical knowledge. As mentioned earlier, Persian medicine sages considered sleeping on the stomach to be harmful to the eyes' health, and for the eyes' health, the head should be placed higher than the body when sleeping. In this regard, a research conducted by Sedgewick *et al*. in 2018 entitled "*Effects of different sleeping positions on intraocular pressure in secondary open-angle glaucoma and glaucoma suspect patients*" concluded that lateral sleeping positions, including lying on the stomach, lead to a significant increase in IOP in PD patients. To prevent such a situation, they advised these patients to sleep in a bed that allows the head to be raised 30 degrees [31]. Also, in a study by Bringman *et al*. entitled "*Intake of dietary salt and drinking water: Implications for the development of age-related macular degeneration,*" conducted in 2016, they stated that increased plasma osmolality might exacerbate age-related retinal diseases by stimulating local inflammation and angiogenic factor production in the RPE. Also, consuming large amounts of salt can increase the risk of glaucoma and diabetic retinopathy by increasing blood pressure [43]. As evident, some of the cases raised by Persian sages about maintaining eye health are consistent with the knowledge of modern medicine. However, there are many uncertainties in this regard that require separate research. In this research, despite the scattering of materials, the unavailability of all linear sources, the limited time, and the large volume of sources, comprehensive information was to be presented in one place regarding the preservation of eye health in Persian medicine. However, to determine whether or not the knowledge of the sages of Persian medicine is correct, it is suggested that each of the mentioned items that are effective in eye health and health should be tested separately in clinical form and standard research. The results will be informative to the experts and the public.

## CONCLUSION

The great doctors of the Persian school of medicine and the examples of harmful and beneficial factors in maintaining the eyes' health have been explicitly mentioned, which have attracted the attention of doctors for many centuries after them. Familiarity with their beliefs and opinions in this field, especially for researchers and specialists in ophthalmology, shows the evolution of human knowledge for preventing and controlling eye diseases. Today, with the tremendous human progress in the field of ophthalmology, many of these beliefs may never be considered and used. Still, they can indicate the path of tireless efforts of different schools of medicine to solve the mystery of eye diseases.

## LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| **A.D** | = | Anno Domini |
| **B.C** | = | Before Christ |

## CONSENT FOR PUBLICATION

Not applicable.

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