



# UNANI PERSPECTIVE OF CATARACT (*NUZUL AL MAA*): A LITERARY REVIEW

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**Abstract:** *Nuzul al Maa* is an obstructive disorder caused by *Rutubat e ghareeba* (diseases producing humour) infiltrate in the pupil, which is situated in between the *Rutubat Baiziyyah* (aqueous humour) and *safaq qarniya* (cornea). Thus prevents the penetration of images towards the retina. It develops due to some internal and/ or external factors causes abnormal heat, which affects all *rutubat* (humour) of the body including the *rutubat* that present in the lens. By this abnormal heat, denature the lens protein gradually and then the lens becomes hydrated causes visual impairment or blurriness. In the modern medicine, *Nuzul al Maa* can be correlated with cataract which is defined by the World Health Organization (WHO) as a visual acuity (VA) of less than 3/60 in the better eye. This is the leading cause of blindness in the world. It affects approximately 18 million people, 90% of them in low- and middle-income countries. This review aims at highlighting the concept of cataract with special reference of *Nuzul al Maa* and its management in Unani system of medicine. Information were gathered from the Unani classical texts, published journals, PubMed, google scholar, research gate by using words like *Nuzul al Maa*, cataract, blindness, visual impairment and quality of life. Then the data were analyzed and summarized.

**Key words:** *Nuzul al Maa*, cataract, lens, visual acuity, quality of life, visual impairment.

## 1. INTRODUCTION

*Nuzul al Maa* (cataract) is a medical condition in which the *rutubat e jaleediyah* (lens) of the eye becomes progressively opaque or clouding, resulting in blurred vision. Early Persian physicians mentioned the term *nazul-i-ah* or “descent of the water” diffused into waterfall disease or cataract and they believing such visual impairment to be caused by an outpouring of corrupt humour (*ghair Tab'ee khilt*) into the eye (<https://en.wikipedia.org/wiki/Cataract>, 2021). In the modern medicine *Nuzul al maa* can be correlated with cataract, which is defined by the World Health Organization (WHO) as a visual acuity (VA) of less than 3/60 in the better eye. This is the leading cause of blindness in the world. It affects approximately 18 million people, 90% of them in low- and middle-income countries (Shah et al, 2021).

The lens is a transparent, biconvex avascular structure suspended between the iris and vitreous body by the suspensory ligaments which connects the ciliary body. The nutrition to the lens is supplied up to 8 months of foetal life by hyaloid artery and afterwards by aqueous humour. The lens is a relatively dehydrate structure composed of water approximately 66%, protein 34% (soluble 85% & insoluble 15%) and traces of minerals, glutathione and ascorbic acids both in oxidized and deoxidized forms. The glutathione plays an important role in healthy function of the lens and the level is reduced with age as well as in the formation of cataract (Nema and Nema, 2008).

## 2 METHODOLOGY

Details and facts on *Nuzul al Maa* were gathered from the Unani classical texts, published journals, PubMed, google scholar, research gate by using words like *Nuzul al Maa*, cataract, blindness, visual impairment, lenticular changes and quality of life. Then the data were analyzed and summarized.

## 3 LITERARY REVIEW

### 3.1 Historical Background

In 9<sup>th</sup> century, Ali Ibn Sahl Rabban al Ṭabri, in his treatise '*Firdaws al-Hikmat*', mentioned cataract (maa), but not its surgical cure. Most authors in Arabic who discussed cataract surgery, such as Hunain Ibn Ishaq (809–877 CE) and Ali Ibn Isa el-Kahhal (c. 940–1010 CE), both of Bagdad, and `Ammar ibn `Ali al Mawsili of Cairo (fl. c. 1000 CE) (Leffler et al, 2020).

The concept of cataract held by Celsus and his predecessors persisted until the latter half of the seventeenth century. The first to conceive the idea that cataract is an opaque lens is said to have been Francois Quarre, a physician and surgeon in Paris, about 1643. Eight years later, in 1651, Remy Lasnier, an oculist and lithotomist, proposed the same idea in a thesis before the College of Surgeons of Paris. Werner Rolfinck in 1656n was able to confirm the speculation that a cataract is an opaque lens (Rucker, 1965).

Royal Academy of Sciences in 1705, demonstrating that the lens is the site of cataract, and Antoine Maitre-Jan in 1707 showed that cataract is clouding of the lens. Actually, then, not until the 1700's was the true nature of cataract generally recognized (Rucker, 1965).

The procedure of cataract lens removal by suction through a hollow instrument was described by the 10th-century Persian physician Muhammad Ibn Zakariya Al-Razi, who attributed it to Antyllus, a 2nd-century Greek physician. The same procedure was also described by the Iraqi ophthalmologist Ammar Al-Mawsili, in his *Choice of Eye Diseases*, written in the 10th century. A later variant of the cataract needle in 14th-century by the oculist Al-Shadhili, used a screw to produce suction which was claimed ineffective by the renowned surgeon Abu al-Qasim al-Zahrawi, who developed surgical devices for cataract surgeries. In 1748, Jacques Daviel was the first modern European physician to successfully extract cataracts from the eye ([https://en.wikipedia.org/wiki/Cataract\\_surgery](https://en.wikipedia.org/wiki/Cataract_surgery), 2021).

### 3.2. Concept of *Nuzul ul Maa*

According to Davood Anthaqi, it is a rutubat infiltrates in between *Rutubat Baiziyah* (aqueous humour) and *safaq qarniya* (cornea), which obstruct the *saqbah inabiyyah* (pupil) and prevent vision (Anthaqi).

According to Ibn Sina, it is an obstructive disorder caused by *rutubat e ghareeba* (diseases producing humour) which infiltrate in the pupil in between the *Rutubat Baiziyah* and *safaq qarniya*. Thus prevents the penetration of images towards the retina. It will vary in *kammiyat* (quantity) and *kaiifeat* (quality) (Sina, 2010).

In quantity, the pupil could be obstructed completely with total loss of vision or could be obstructed partially with partial loss of vision of particular part affection. Hence, images of the things could be seen as half or part of that. In quality, if the *qivam* (consistency) of the *maaddah* is *raqeeq* (thin), light and sunlight can enter in to the eye and reach the retina, but, if the *qivam* is *ghaleez* (thick), it prevents light and sunlight enter in to the eye (Sina, 2010).

If we consider the colour (*Laun*) of the *maaddah*, it may be colourless (colour of air), or some of them are colour of lime (*jassi*) or pearl (*lu'lu*) or bluish white or Turquoise (*fairoosaj*), gold (*zahabij*), yellowish or dust colour (Sina, 2010).

According to National Eye Institute (NEI), cataract is a condition in which the lens of the eye becomes clouded preventing clear vision (<https://nei.nih.gov/health/ataract>, 2019).

Any opacity in the lens is called cataract which may be either developmental or acquired (Nema and Nema, 2008).

When vision  $< 20/200$  in the better eye on presentation is defined as blindness (Jain et al, 2019). Another researcher says that the condition cataract is an opacification of the crystalline lens, leading to visual impairment (Davis, 2016).

### 3.3 Epidemiology

The prevalence of cataract increases with age from less than 5% in persons fewer than 65 years of age to approximately 50% in those 75 years of age and older; thus it has become a problem associated with getting old (Nishad et al, 2019). Cataract is the leading cause of blindness (51%) and low vision (33%) worldwide (WHO | Cataract, 2021). Cataract is responsible for 50– 80% of the bilaterally blind (Jain, 2019).

Poor visual function has been associated with limitations in mobility, activities of daily living, and physical performance. Blindness and visual impairment are not only health issues for the elderly but also significant determinants for all aspects of life, including the quality of their lives (Nishad et al, 2019).

### 3.4 Pathophysiology

According to Unani system of medicine the genesis of *Nuzul al Maa* is related with extrinsic and intrinsic causative factors. One or the other of these causative factors cause *sue mizaj Haar* (abnormal heat) in the lens of the eye. Usually it is believed that the effects of heat either externally or internally will cause increase warmness in the lens that leads to temperamental disturbances within the lens, therefore, to bring back the normal temperament of the lens, the *Tabi'at* tries to neutralize the increased warmness of the lens by absorbing fluid from the body towards the lens. As a result, the dehydrated structure lens becomes hydrated lens and denature the lens protein gradually causes visual impairment or blurriness.

### 3.5 Etiology

According to Unani system of medicine, cataract develops due to some internal factors like *Imtila-e-Badan* (plethora) and *Sakht shadeed dard-e-sar* (very severe headache), and the external factors like *Choot/zarba* (trauma or injuries), exposure to *Sakht tandi hawa* (extremely cold water), *shadeed qae* (severe vomiting), and *Amraz-e-dhimagh* (diseases of brain) or *Muzmin Amraz* (chronic diseases) (Sina, 2010).

High intensity of pain causes abnormal heat, which affects all *rutubat* (humour) of the body including the *rutubat* that present in the lens. By this abnormal heat, denature the lens protein gradually and then the lens becomes hydrated causes visual impairment or blurriness. This process is accelerated by diseases such as diabetes mellitus and hypertension.

Trauma to the eye causes swelling, thickening and whitening of the lens fibers. While the swelling normally resolves with time, the white color may remain. The lens capsule can be damaged by severe blunt trauma or injuries if they penetrate the eye. This allows water from other parts of the eye to rapidly enter the lens leading to swelling and then whitening, obstructing light from reaching the retina.

Other influencing factors are age, prolonged exposure to sunlight, UV radiation, tobacco using and alcohol drinking, hereditary and medications like corticosteroids. Aging is the most common cause which is multi factorial in nature. At the same time, exposure to sunlight, UV radiation, tobacco using, alcohol drinking and medications are avoidable risk factors for cataract (Davis, 2016). Further, it is caused by pouring very hot water on the head, sleep after eating, strenuous exercise, coitus before digestion and chronic frontal headache.

### 3.6 Clinical features (Sina, 2010)

The clinical features or the presentations may vary from individual to individual in terms of severity, duration and the nature of etiologies or type of cataract, there are some common complaints; and it is often unnoticed if unilateral eye is involved.

- Blurring (smudge) of vision is the main symptom, usually it starts on unilateral, difficulty in appreciating colors and changes in contrast, driving specially at night, reading, recognizing faces, and coping with glare from bright lights.

- Bilateral cataract may cause gradual loss of vision and frequent spectacle changes due to refractive index of the lens changing.
- Monocular diplopia (double objects in an eye) or polyopia (multiple objects in an eye)
- In children they may present as squint
- Reduction of visual acuity (sharpness of vision).
- Secondary imagination (*Istilahani khiyalat*) like flying insects or flashes or floaters in front of the eye
- To get clear the vision, need to bend the head backward
- Need bright light to read

Without these complaints there would be no *Nuzul al Maa*.

### 3.7 Types

*Nuzul al Maa* can be classified according to the involving *maaddaah* and colour of the lens (Sina, 2010):

a. *Raqeequn Abyaz*

b. *Raqeequn Abyaz murakkun Shadeedul safa* (pearl like), white but not opaque (*shafaf*), individual feels light when thirst.

c. *Rasasi* (lead)- reduces eye movements

d. *Jassi* (lime)

e. *Najooni*- in between red and yellow

f. *Ghamum* (cloudy)

g. Bluish – in this lens becomes fixed

Another classification as follow (Kabeeruddin):

a. *Khalqi*- congenital *Nuzul al Maa* due to *Iltihab-e cheshm*

b. *Sheekhvaakhi*- senile *Nuzul al Maa*, which is common after the age of 50. Moreover, senile one can be caused by kidney diseases, *Ziabetas* (diabetes mellitus), *Nigras* (gout), *Aatishak* (syphilis), *sara tashannuj* (epilepsy), *shiryan e marz* (vascular diseases), trauma to the eye, foreign body in the eye, *Quruh-e-qarnia* (corneal ulcer), *Iltihab-e-anbia* (iritis), *Iltihab-e-masheemia* (choroiditis) & *Maa-e-Aksar* (glaucoma) and *Makhsos advia* (specific drugs).

### 3.8 Darja e Nuzul al Maa (Stages of Nuzul al Maa)

#### I. Initial stage (*Ibtida*)

This is the very initial stage of the development of *Nuzul al Maa*. The lines form from the circumference of the lens that spread to crystallized *khilt*. Hydration of the lens fibres and capsule causes osmotic changes within the lens lead to collection of fluid between the lens fibre produces lamellar separation. There will be change in refractive index of the cortex of the lens and mostly asymptomatic.

#### II. Bulging stage (*Poolne ka darja*)

The affected lens absorb fluids causes irregular refraction produces polyopia, halos and visual disturbance, also will have defective vision in the evening or night. Hydration of deeper cortical layer causes swelling and opacity of the lens, push the iris forwards, so the lens become opaque grayish. On examination, can see the Iris shadow and the pupil will be whitish blue, shiny and star like scars.

#### III. Mature stage (*Pakne ka darja*)

Most of the fluid enter into the lens causes opaque and the colour will be yellow amber. There will be star like scars on examination. In this stage visual acuity will be reduced to hand movements.

#### IV. Hyper mature stage (*Ziyada pakne ka darja*)

This is the last and well developed stage of *Nuzul al Maa*. It is very difficult to treat. The affected pupil becomes soft, thin and milky in colour. Continuation of degenerative changes occur.



### 3.9 Preventive measures

- Though there has been no scientifically proven means of preventing cataracts, wearing ultraviolet-protecting sunglasses at an early age can slow the development of cataract in later life.
- Regular intake of antioxidants like vitamins A, C and E would protect against the risk of cataract.
- Regular exercises like blinking, palming, figure of eight, near and far focusing and zooming will help to minimize strain of the eye and help to improve vision.

### 3.10 Management

In the book of Al Qanoon, it has clearly mentioned that, *Nuzul al Maa* can be managed in 3 steps:

#### a. Prevention before the development of *Nuzul al Maa*

- If anyone has the symptoms like alternative dim and bright vision, treat by using *Ayarij*, *Ghariqoon*, *Davaul misk*, *Ma'joon hurmus* internally and *Surma* or *kohl* prepared by *Sibr* or brain of hen mixed with human milk or brain of "martin" bird with *Asal* externally.
- To improve vision can apply *surma* of *Asal* with *Heeng*
- If the visual impairment is due to trauma, can apply *Zimad* of *Arad e baqila* mixed with *Sharab*
- To evacuate the *maaddah* from the body, can apply *Fasd and Ishal*
- Advisable to give easily digestible foods.

#### b. Immature *Nuzulul maa*

- With the above medicine, can instill eye drop of honey, *misk* and *lu'lu*.
- Advisable to give *Munzij* and *Mushil – e Balgham* to drink
- Apply *Kohal-e-chikni dava* dissolved in water.
- Give *Muqavvi-e-dimagh* like *Kust-e-marwarid*, *Kust-e-habsul hadeed* mixed with *Itrifal-e-ustokhuddus*.

#### c. Mature *Nuzulul maa*

Surgery is the only solution.

## 4. CONCLUSION

It can be concluded that *Nuzul al Maa* is multi-factorial disease, but most commonly due to alteration of humours either quantitatively or qualitatively. There has been no scientifically proven means of preventing cataracts, but wearing ultraviolet-protecting sunglasses at an early age can slow the development of cataract in later life; regular intake of antioxidants with regular exercises would help to improve vision and protect the eye against the risk of cataract.

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