



## Al-Razi: A Distinguished Physician of the Medieval History: A Review of his Method and Influence

Saba Anjum

Research Scholar of Islamic Studies  
Aligarh Muslim University, Aligarh, India

### Abstract

Abu Bakr Muhammad ibn Zakriya al-Razi (841-924 CE) known in West as *Rhazes* and *Alububator* was born in the city of Ray, worked as a chemist and pursued his study in medicine to become a distinguished physician. He was one of the prominent medical scientists of the middle age. He was known as "the Arab Galen". He was an intellectual and arguably the most innovative of all the Muslim physicians. He became superintendent in the hospital of Baghdad. He was also one of the most profound and prolific writers of his age, and left voluminous writings. He wrote 237 books but most of them are extinct. Based on the existing documents, he was known as the most distinguished character in the world of medicine up to the 17th century. A great number of innovations and pioneering works in medical science have been recorded in the name of Rhazes. He described the etiology, signs, symptoms, epidemiology, treatment and prevention of this malady (any disorder or disease of the body, especially one that is chronic or deep seated) more than a thousand year ago, hasn't been taken into consideration appropriately. Path physiology of the urinary tract, venereal diseases, and kidney and bladder calculi are among his main interests in this field. He also presented a very exact and precise description of neuropathic bladder followed by vertebral fracture. Rhazes was not only one of the most important Persian physician-philosophers of his era, but for centuries, his writings became fundamental teaching texts in European medical schools. He also conducted research on smallpox and measles and was the first to announce the usage of alcohol for medical proposes. Some these important aspects of his contributions to medicine are reviewed. This paper will try to some shed on life and contribution that has been carried out by Al-Razi. It is hoped that, by remembering Al-Razi contribution to medical science; contemporary societies, particularly Muslim scholars will be inspired.

**Keyword:** *Al-Razi, medicine, contribution, kidney, neuropathic bladder, smallpox and measles.*

### Abstrak

Abu Bakr Muhammad ibn Zakriya al-Razi (841-924 AD) yang dikenali sebagai Rhazes dan Alububator di barat, dilahirkan di kota Ray, bekerja sebagai ahli kimia dan menyambung pengajian perubatan untuk menjadi seorang doktor yang terkenal. Beliau adalah salah seorang saintis perubatan terkemuka pada usia pertengahannya. Beliau dikenali sebagai "Arab Galen". Beliau adalah seorang intelektual dan yang paling inovatif di kalangan semua pakar perubatan Islam. Beliau menjadi penguasa di hospital Baghdad. Dia salah seorang daripada penulis-penulis yang berfikiran secara mendalam dan prolifik pada usianya, dan menulis karya yang banyak. Beliau telah menulis 237 buku tetapi kebanyakannya telah pupus. Berdasarkan dokumen-dokumen yang ada, beliau terkenal dalam dunia perubatan sehingga abad ke-17. Sejumlah besar inovasi dan kerja-kerja perintis dalam ilmu

perubatan telah direkodkan atas nama al-Razi. Beliau menyifatkan etiologi, tanda-tanda, gejala, epidemiologi, rawatan dan pencegahan penyakit ini lebih daripada seribu tahun yang lalu, belum diambil kira dengan sewajarnya. Laluan fisiologi bagi saluran kencing, penyakit kelamin, dan buah pinggang serta pundi kencing kalkuli antara minat utama beliau

*\*Corresponding author:*

*Saba Anjum*

*Research Scholar of Islamic Studies*

*Aligarh Muslim University, Aligarh, India*

*E-mail: sabaanjum127@gmail.com*

dalam bidang ini. Beliau turut menyampaikan penerangan yang tepat dan teliti mengenai pundi kencing neuropatik diikuti dengan retakan tulang belakang. Al-Razi bukan sahaja salah seorang yang penting di kalangan doktor-ahli falsafah Parsi semasa di era beliau, tetapi selama berabad-abad, penulisannya menjadi teks pengajaran asas di sekolah-sekolah perubatan Eropah. Beberapa aspek penting dalam sumbangan beliau kepada perubatan dikaji semula. Beliau juga menjalankan penyelidikan mengenai cacar dan campak dan orang yang pertama untuk mengumumkan penggunaan alkohol untuk tujuan perubatan. Kajian ini akan cuba membincangkan beberapa pengalaman dalam kehidupan serta sumbangan yang telah dilakukan oleh al-Razi. Adalah diharapkan, dengan mengingat sumbangan al-Razi dalam sains perubatan; masyarakat kontemporari, terutamanya ulama Islam akan mendapat inspirasi.

**Kata kunci:** *Al-Razi, perubatan, sumbangan, buah pinggang, pundi kencing neuropatik, cacar dan campak.*

### **Introduction**

It is an established fact that the science of medicine has developed a great deal at the hand of the Arabs and Muslims. They cultivated it with a great zeal and made spectacular achievements in almost all the branches connected with curative science namely, medicine, pharmacy, surgery, the art of nursing patient, organization of hospitals, etc. Islam, as a complete code of life, provides guidelines for establishing a model of healthy society, wherein its members may be capable to promote all the physical, mental and spiritual faculties fully. There are several instances in the Qur'ān where the medical questions of general order have been discussed. The Qur'ān gave general guidelines and rules on nutrition, cleanliness, marital relations, child rearing, etc. As an example, the Qur'ān and established the relationship between nutrition and behavior.

*“And made your sleep for rest, And made the night as a covering, And made the day as a means of subsistence” (The Qur'an 78:9-11)*

So inspired by these teaching in the middle age, a great medical scholar emerged named was al-Razi. He was a distinguish scientist, influenced not only in the Muslim world but also influence in European world.

### **Life of Al-Razi**

Abu Bakr Muhammad ibn Zakariyya (c. 841-926 A.D.), known as al-Razi, and by the medieval Latinists “*Rhazes*,” and *Alubator* was probably the greatest and most original of all the Muslim physicians, and one of the most prolific authors. He was born in (in khurasan) situated a few miles

from Tihiran, the modern capital of Persia. In early life music was his chief interest, and he was a skillful lute player. He then devoted himself to Philosophy. He started pursuing the medical knowledge at maturity age (Browne, 1921). He was the most celebrated and probably the most original of the Arabic writers who followed both Hippocrates and Galen in their methods and idea. He was a great clinician and ranks with Hippocrates as one of the original portrayers of disease. Rhazes was the first to introduce chemical preparations into the practice of medicine (Campbell, 1973).

Ibn Abi Usaybia who spent most of his life in Persia, said that al-Razi's interest in medicine was aroused when he was of mature age of due to by visits and conversations with an old druggist or dispenser who served in a hospital. He enjoyed the friendship and patronage of Mansur ibn Ishaq, the ruler of Khurasan, for whom he composed his *Kitab al-ibb al-Mansuri* (“*Liber Al-mansocies*”) (Al-Nadīm, & Ibn Isahaq, 1970). The chronology of his life is very uncertain, for the dates assigned to his death vary between 903 and 923 A.D. (Browne, 1921) From Ray, al- Razi went to Baghdad during the caliph Muktafi's time (r. 901-907) and there he directed a hospital (Sharif, 1966).

As chief physician of Baghdad the fame of *Rhazes* spread through the lands of the caliph and his services were in constant demand even in distant cities. Being a Persian he had a very warm corner in his heart for his Persian clients. He attended most of the noble and princes of the minor Persian courts (Elgood, 2010). It seems that after al-Muktafi's death (907) al-Razi come back to Ray, where he gathered round him many

students. Al-Razi was generous towards his patients, and charitable to the poor, so that he used to give them full treatment without charging any fee, and even stipends (Sharif, 1966).

Al-Razi was a prolific author who has left monumental treatise on numerous subjects such as medicine, physics, mathematics, astronomy, and optics. He was credited with about 237 works, the greater numbers of which are lost. The *fihrist* enumerates 113 major and 28 minor works and two poems. While Ibn Usaybia in his '*Uyunu'l-Anba fi Tabaqati'l-Atibba*' mentions 232 works (Ali, 2001).

### **Al-Razi's Concepts and Manuscripts on Head to Toe in Human Body and Treatment and Health Care**

Al-Razi was a great physician of medieval history. In the field of medicine he did not leave single part of human body that he did not write about. His valuable book *Kitab al-Mansuri* book comprised of treatise in ten volumes was dedicated to al-Mansur the Prince of Khurasan. The first book was on anatomy and physiology; second book, was on temperaments; third book, on simple remedies; the fourth book treats of the means of preserving health; the fifth book is given to a consideration of skin diseases and cosmetics; the sixth book is on diet for travelers; the seventh on surgery; eighth book is on poison; the ninth, the most influential in the Latin west, is the nouns *almansoris* of the later middle ages, and is devoted to a consideration of the various organs of the body from "top to toe"; the tenth and last book is given to a study of fevers (Campbell, 1973).

Rhazes usually dedicated whole chapters to food and nutrition therapy in his manuscripts, thus he included dietary recommendations and special foods to avoid, as well as medicaments and other approaches. He also wrote specific manuscripts and books about food and drink for health care and treatment of disease. Some of Rhazes' books on nutrition are mentioned below. *Kitab Daf' Madarr al-Aghiyah* (book on repelling harms caused by diets). This is a comprehensive encyclopedia of foods including the health benefits of certain foods as well as advice on how to avoid harmful effects of certain food. This book contains 19 chapters in two main sections:

(1) categorization of food and drink types and their properties and (2) general issues about food and drink. He believed that different types of food should be eaten separately at different meals, because each one has a special process of digestion and they can be digested better when eaten separately. For example, he advocated that eating vegetables with meat could lead to incomplete digestion and absorption of the meat, which would cause weight loss (Ali, 2001).

### **Method and Impact**

Some of Rhazes' manuscripts are available for research, other were inaccessible or non-existent. As a result, it is suffice to mention the name of non-existent manuscript with brief information obtained from old and famous bibliographies. One of his book *Kitab Daf' Madarr al-Aghiyah* was comprises two sections. The first section deals with the methods and means of getting rid of the harms caused by foods in different seasons and surroundings. The second section is on the consumption of suitable, balanced diets. it was written on the pattern of a similar book authored by Galen with the difference that it is more comprehensive and more accurate, as it is free from the error committed by the Greek physician in his book. Razi's manuscripts are preserved in the libraries of Munich (840), Paris (2868), and the Escorial (828). Its Latin translation is also available.

Rhazes emphasised great importance to food in medical practice. He preferred to use appropriate foods instead of drugs to treat patients and recommended that physicians use food as the first line of treatment, and only then to administer simple medicines. The use of drugs should be reserved as the last option. He also denoted that a physician who eases disease by food is successful and blissful. He knew about the nutritional values of various foods and gave advice according to these values for the obese and the underweight. He administered dietary regimes for weight gain and weight loss. For example, pepper and vinegar were used by Rhazes for weight loss and cumin (Rhazes, 1964). He believed that the pots and pans used for cooking had a special effect on nutrition and advocated the use of metal instruments made of iron and copper.

Rhazes believed that eating fresh fruit, especially sour fruit, had adverse effects on those patients suffering from alimentary tract malfunction, poor digestion, intestinal gas production, and flatulence (Nikaein, Zargaran, & Mehdizadeh, 2012). He also prescribed peppermint as a digestive herbal medicine. He recommended consumption of more prunes in diet as a food therapy for people who had constipation in warm weather, particularly in summer. This practice is still widely recommended today in medical nutrition therapy to control constipation. Latin version of *Kitab al-Mansuri* work were published at Milan in 1481, Venice in 1497, Lyons in 1510, and Basle in 1544. The *almansories* was repeatedly published separately at Venice in 1483, 1490, 1492, and 1497, and at padua in 1480. The ninth book was also published in Italian under the title *liber tertio dell almansore chiamato cibaldore*. J. J. Reiske issued an Arabic-Latin edition at Halle in 1776 (Campbell, 1973).

### **Al-Razi in Sifferentiation of Smallpox and Measles**

This study is an attempt to compare modern medicine with the chapters of Rhazes's Treatises on *Al-judari wa al-Hasbah*. The book is deemed to be the most original contributions of Muslim in medicine.

*"The out breaks of small-pox are preceded by continues fever, aching in the back, itching in the nose and shivering during sleep. The main symptoms of its presence are: back-ache with fever, stinging pain in the whole body, congestion of the face, sometimes shrinkage, violent redness of the cheek and eyes, a sense of pressure in the Body, creeping of the flesh, pain in the throat and breast accompanied by difficulty of respiration and coughing, dryness of the mouth, thick salivation, hoarseness of the voice, headache and pressure in the head, excitement, anxiety, nausea and unrest. Excitement, nauseas and unrest are more pronounced in measles than in small-pox, whilst the aching in the back is more severe in small-pox than in measles."* (Arnold & Guillaume, 1931).

At the end of chapter one of his book, Rhazes indicated the cause of smallpox was by yeast and transmission via blood. The idea of Rhazes about

the cause of infection is similar to that known today. Rhazes distinguished different types of smallpox and also pinpointed its differences from measles. He determined whether the disease is benign or malignant. The symptoms of smallpox and measles was described in the third chapter of his book, and the eruptions and the complications of the sickness in chapter four was noted. Rhazes noted the examinations of the eyes, throat, joints and ears in the seventh chapter and demonstrated when symptoms point to smallpox (Dick, 1966). He also indicated the benign and lethal forms of smallpox and measles in chapter fourteen of the book, presenting the symptoms that determine whether they are benign or lethal. He stated that having healthy respiration and mental faculties, a desire for food, agility of movement, normal pulse, comfortable sleep, and low stress are signs indicating that the disease is harmless, and noted that the benign type of smallpox appears with limited blisters with no hardship or high fever, while lethal smallpox appears with widespread spots and fever (Sarton, 1950).

Rhazes gave sound and detailed advice as to the treatment of the pustules after full development of small-pox. These pustules are of course the cause of the unsightly scars left by the disease, which is still common in the east (Arnold & Guillaume, 1931).

### **Method of Al-Razi's Work and Its Impact**

Rhazes was among the first to recognise the need of sanitation for infected patients in hospitals. Rhazes prepared *Al-Judari wa al-Hasbah*, the first treatise ever written on smallpox and measles for diagnostic differentiation between these two infections, which is the basis for new medicine to diagnose and treat smallpox and measles, according to his experience of patients in hospital. Rhazes not only classified the type of infections based on location and the time of the appearance of the symptoms in these two infections, but also he scaled the degree of severity and prognosis of infections according to the colour and location of rashes.

Rhazes is known for using cotton in the prevention of wounds in smallpox patients. He used cotton soaked in rose water and camphor in the nose of patients for prevention of symptoms in measles and smallpox. For prevention of eye

problems in smallpox, he used two kinds of drugs, dropped into the eyes; first, rose water, and second, a kind of collyrium that was a mixture of antimony. In addition, he used an ointment rubbed on the eyes. He used diuretics such as beers, verjuice, watermelon chicory, and jujube and also environmental treatments such as cold air. The use of drugs by Rhazes for treatment of smallpox and measles in his book relies on his experience of case presentation. The discussion by Rhazes about measles and smallpox, their occurrence and prevention, and their effect on body organs was highly scientific; necessitating more attention to how a physician of earlier times treated these diseases and his observations in all aspects. (Hamarnah, 1971).

Rhazes is rightly considered as one of the greatest medical practitioners and writers in the period between Galen and the Renaissance emergence of medicine as an empirical discipline. He was a rationalist, extremely confident in the power of reason, free from every kind of prejudice, and daring in the expression of his thoughts. He was described as outstanding in generosity and always willing to treat and help the poor. He was an independent thinker and not afraid to rely on his own observations when they contradicted the past. Razi's fame rested on clear-cut clinical descriptions of illnesses, original observations, and a pragmatic approach to treatment (Ashtiyani, 2010).

### **Physician in Diagnosis and Treatment of Kidney Calculi**

Rhazes' insight into the concept of kidney diseases can be perceived from his writings. The kidneys can have stones and their pain resembles that of the colon. Pain in the loin, sediments in the urine or the passage of stone, black urine passed with pain. If the patient experience nausea or pain following a meal or pain is located in the abdomen and more to the front than the back, then it is more likely to be colonic pain. The site of the pain is important: in abdominal colic, the pain is more generalised and tends to be anterior, while in kidney stones, the pain is more limited and tends to be at the back (Desnos, 1972).

The *Maqalah fi al- Hasa al- Mutawallid fi al-kula w-al- Mathanah* is an important monograph discussing in details the formation of stone in

kidneys and bladder, which is very common diseases in Middle East (Arnold & Guillaume, 1931). It was published in London in 1896 and later was translated into French by P. de Koning (Browne, 1921).

### **Method and Impact on West**

Relative to today's clinical practice, his recommendations for the prevention of kidney calculi were quite applicable, and there is not much difference from current suggestions, like avoidance of hypercalciuria and increased saturation of the urine. Surgical removal of the bladder calculi dates back to ancient times. In those days, it used to be performed through a perineal incision up to the bladder neck. Al-Zahrawi outstandingly improved this procedure and reduced the risks involved. His innovation reached Europe in the Middle Ages and remained the procedure of choice until early 18th century, when the present suprapubic method was introduced (Abdel-Halim, 1986). Rhazes was a dedicated observer, and while he described the signs and symptoms accurately, he differentiated diverse conditions that produced similar complaints in a methodical and advance way.

In ancient Iran, kidney calculi would be treated with baths, dietary restriction (particularly milk) and scormelon pips, Indian beans, and a pill made from burnt scorpions, which was translated into French by P. de Koning and also published in London in 1896. Rhazes recommended immersion in khazineh (A big bathtub full of hot water) to augment urinary output, alleviating pain and facilitating kidney calculus passage. He also underlines the importance of physical activity in ureteral calculi. After getting out of bath or Khazineh, the patient should be ordered to move and jump around incessantly and for a long duration of time. Having done this, the patient should enter Khazineh again and stay there till the time he feels that the pain has been displaced and it is running down the inguenes (Broumand & Nobakht, 2008).

### **Rhazes Viewpoints about Causes, Diagnosis, Treatment and Prognosis of Gout**

Gout is one of the most common inflammatory joint disorders in which patients' experiences recurrent attacks. These patients may have more

co-morbid conditions such as cardiovascular and kidney problems. Hyperuricemia, which is known as the classic feature of gout, is an independent risk factor that can cause hypertension (Chen & Schumacher, 2008). Al-Hawi, written in 20 volumes, which were amongst his most invaluable medical heritages (Ali, 2001). The book is also known as *al-kitab al-jami' li-sina' at al-tibb* (compendium on medicine) (Campbell, 1973). When he died, the whole of this disorderly matter, the original observations, and the extract from other people's works, was sold by Rhazes's sister for a large sum to Ibn ul-'Amid, the wazir of Rukh-ul-doula. He was being not only a statesman but also a scholar, summoned Rhazes' pupils and the best doctors of ray to draft these rough notes into book form. Their united effort produced the book which was known thereafter as *kitab-ul-Hawi fi il-tibb* or "*system of medicine*" (Elgood, 2010). He has described the majority of known diseases in that period of time, one of the most important of them being gout. He described its diagnostic criteria, treatment and several ways to soothe the pain. Rhazes described the disease as a condition in which a joint is affected and he proposed to cure the disease as soon as possible in order to prevent the ensuing chronic arthritis (Razi, 2002).

Rhazes mentioned that gout is a chronic and complicated disease which needs a long term treatment and holistic approach. He proposed that one of the best medications for this disease is Suranjan which is the traditional name of *Colchicum autumnale* (Tausche et al., 2009). This herb is known as Colchicum in most herbal medicine text books.

#### **Method and Impact on The West**

Rhazes pointed out that gout is less common in women and children in comparison with men. It is written in other literatures that the age of its onset in women is later than men which can be defined by the role of estradiol in lowering the level of serum urate in females. He also alluded that the incidence of this disease in rich people is considerably higher than other socioeconomic classes (Razi, 2002). Al-Razi indicated that some lifestyles and habits like gluttony, hyperactivity and drinking wine can aggravate the pain (Razi, 2002). Recent studies have confirmed his claim by demonstrating its strong association with

dietary regimens which contain high levels of purine and consumption of alcohol (Pillinger & Keenan, 2008). He emphasized that consumption of any kind of meat can be prejudicial.

Elgood mentioned that he found that Rhazes mention in it everything the knowledge of which is necessary to the medical man, concerning hygiene and medical and dietetically treatment of disease and their symptoms. Al-Razi did not neglect the smallest thing required by the student of this art concerning treatment of diseases and illnesses (Elgood, 2010). The Latin edition of the *al-Hawi* was published at Brescia in 1486, and Venice in 1500 (this edition contained 25 books), 1506, 1509, and 1542. The Brescia edition weighed over seventeen pound and contains about 588 pages, a magnificent volume. Rhazes' "*liber de variolis et morbillis*" is the oldest and the most important original work on smallpox and measles, and constitutes a distinct original contribution to medicine by the Arabs (Campbell, 1973).

#### **Some other Works**

Rhazes produced many minor works but the majority are known only by their titles. His *Barr'-ul-sa'at* or '*cure within the hour*' was translated into Persian under the title of *Tubfa-i-shabi* by Shaykh Husayn Jabiri al-Ansari about A.D.1700 for the use of Sultan Muhammad 'A'zamshah of Delhi and translated again by Mir Muhammad Husayn ibn karam 'Ali under the name of *Dastur-ul-tibb*. Rhazes also wrote a pamphlet which he called "*of habit which becomes natural*", thus anticipating Sherrington's condition reflex theory. By writing a monograph on 'diseases in children' he may also be looked upon as the father of pediatrics. Several of his minor works were translated into Latin in medieval times and collected together and printed under the title of opera *Parva abubetri* (Elgood, 2010).

Some of his work in their original Arabic version were lost, but these works existed in Latin such as *Liber divisionum*, translated by Gerard of Cremona and *Antidotarium*, translated by the provincial Jew Abaham kaslari (c.1349). The *liber de pestilentia* was published in Venice in 1498 and 1555, Basel in 1529 and London 1749, and Gottingen 1781. Among other works of

Rhazes that were rendered into Latin in the middle ages were *de aluminibus et salsis, epistola de lepidis philosophis, experimentorum (alchemy and medicine), praeparatio salis, lumen luminum and explanatio verborum hermetic* translated by Gerard of Cremona (Campbell, 1973).

Al-Razi gave priority to the doctor-patient relationship and was responsible for introducing new concepts and practical and psychological ideas. He postulated that the physician should encourage and support the patient. He fought the charlatans, warned that even the best doctors could not have answers and solutions for everything and stressed the importance of constant education through books and practice. It is not exaggeration to say that the Muslim world owed to al-Razi its first formulation of the faith in continuous scientific advancement, with emphasis on the provisional nature of all research whose conclusions can be revised at all times. He is perhaps the most outstanding example of the analytical and questioning attitude found in many medieval Muslim scholars.

## Conclusion

In this article we see that Islam emphasizes and promotes the development of medical science. Al-Rāzī was one of the few medical scientist who added very valuable contributions to medicine and pharmacy while most of Europe was still living in the dark ages. He also wrote on physics, mathematics, astronomy and optics, but these writings could not survive. A number of his books have been published into various European languages. About 40 of his manuscripts are still extant in the museums and libraries of Iran, Paris, Britain, Rampur, and Bankipur. His contribution has greatly influenced the development of science, in general, and medicine, in particular.

## Reference

- Abdel-Halim, R. E. (1986). Paediatric Urology 1000 Years Ago. In P. Rickham (Ed.), *Historical Aspects of Pediatric Surgery* (Vol. 20, pp. 256-264): Springer Berlin Heidelberg.
- Al-Nadīm, I., & Ibn Isahāq, M. (1970). *The Fihrist of al-Nadīm: A Tenth-Century Survey of Muslim Culture* (Bayard Dodge, B., Trans. and Ed. Trans). New York: Columbia University Press.
- Ali, A. Y. (1983). *The Meaning of the Holy Qur'an*. US: Amana Publications.
- Ali, A. (2001). *Eminent Arab-Muslim medical scientists, 622-1600*: Kitab Bhavan.
- Arnold, T. W., & Guillaume, A. (Eds.). (1931). *The legacy of Islam*. Oxford University Press.
- Broumand, B., & Nobakht, A. (2008). The kidney and bladder stones from view of Muhammad Ibn Zakariya Razi. *Tehran: The Iranian Academy of Medical Sciences*, 3-50.
- Browne, E. (1921). *History of Arabian Medicine*. New Delhi: Cambridge.
- Campbell, D. (1973). *Arabian medicine and its influence on the Middle Ages* (Vol. 1). New York: AMS Press.
- Chen, L. X., & Schumacher, H. R. (2008). Gout: an evidence-based review. *JCR: Journal of Clinical Rheumatology*, 14(5S), S55-S62.
- Desnos, E. (1972). The history of urology up to the latter half of the nineteenth century. *The history of urology*. Springfield, Ill: Thomas.
- Dick, G. (1966). Smallpox: a reconsideration of public health policies. *Progress in medical virology*, 8, 1-29.
- Elgood, C. (2010). *A medical history of Persia and the Eastern Caliphate: From the earliest times until the year AD 1932*. Cambridge University Press.
- Hamarneh, S. (1971). The physician and the health professions in medieval Islam. *Bulletin of the New York Academy of Medicine*, 47(9), 1088.
- Najmabadi, M. (1992). *Moalefat va Mosanefat e Abubakr Mohammad ibn Zakaryya Razi (Books and manuscripts of Rhazes)*. Tehran: Tehran University Publications.
- Nikaein, F., Zargar, A., & Mehdizadeh, A. (2012). Rhazes' concepts and manuscripts on nutrition in treatment and health care. *Ancient science of life*, 31(4), 160.
- Pillinger, M. H., & Keenan, R. T. (2008). Update on the management of hyperuricemia and gout. *Bulletin of the NYU Hospital for joint diseases*, 66(3), 231.
- Razi, R. M. B. Z. a. (2002). Alhawi Fitteb (Vol. 11, pp. 450-456). Beyrouth: Dar Ehia Altorath Alarabi.
- Rhazes. (1964). *Manfe' al Aghzie va Mazareha (Benefits of Food and its Harmfulness)*. Tehran, Iran: Taban Press.

- Saeed Changizi Ashtiyani, A. C. (2010). Rhazes, a genius physician in diagnosis and treatment of kidney calculi in medical history. *Iranian journal of kidney diseases*, 4(2).
- Sarton, G. (1950). *Introduction of the History of Science*. Baltimore: Camegic Institute of Washigton.
- Sharif, M. M. (1966). *A history of Muslim Philosophy* (Vol. 2): Royal Book Company.
- Tausche, A.-K., Jansen, T. L., Schröder, H.-E., Bornstein, S. R., Aringer, M., & Müller-Ladner, U. (2009). Gout-current diagnosis and treatment. *Pathophysiology*, 1, 2.

### **Article History**

Received: 19/03/2014

Accepted: 03/06/2015