

THE CONTRIBUTION OF MUSLIM SCHOLARS TO THE FIELD OF MEDICINE (WITH PARTICULAR REFERENCE TO IBN SINA AND AL- RAZI DURING THE ISLAMIC GOLDEN AGE)

Tijani Ahmad Ashimi

ABSTRACT

Science is a part of the systematic knowledge of nature which is undoubtedly acquired through a methodology based on observation, hypothesis and experiment. In the Qur'an science is an essential activity for any Islamic community for it increases the understanding of the signs of God and hence brings the ummah closer to the Creator. Based on this fact, the scientific spirit of Muslim scientists and scholars flows from their consciousness of Tawhid (Unity of God), this tawhidic worldview has played a very vital role in exploring the physical world and discovers its secret (sunnatullah). Hence the famous Muslim scientists like al-Razi, Ibn Sina, al- Biruni, Ibn al- Haitham, al Zahrawi just to mention a few, were all noted for their observational power and experimental tendencies as displayed in their wide ranging studies of the natural sciences. As such, these great scholars have produced a lot of books which then being the important references to the later researchers notably the westerners toward the end of the dark age of Europe. Thus, this humble paper by applying a historical approach aims to explore the biographies and the immense contributions vis-a- vis the two gigantic Muslim Scholars (Ibn Sina and al Razi) to the field of Natural sciences, with particular reference to their unique contributions in the aspect of medicine. Finally, the paper will provide a brief conclusion followed by some suggestions and recommendations.

Keywords: Islamic golden age, Muslim contributions, medicine, Ibn Sina, Al- Razi, natural sciences.

INTRODUCTION

It is beyond reasonable doubt that the field of medicine would not have gone far in the Muslim world without the unique contributions of some energetic Muslim scholars (such as Ibn Sina, al- Razi etc..) who invented several discoveries that have improved our understanding of healthcare today. For instance, it is recorded historically, that some Muslim physicians were among the pioneers in differentiating between the small pox and chicken pox, as well as diagnosing the plague, leprosy, diabetes and hemophilia etc.. Indeed, mostly, the history that was passed on through generation is about how the Greek civilization started to civilize the world and empirical knowledge that the modern world is adopting today. However, very few people are aware that the Muslim *Ummah* was once the most powerful, dynamic and forefront in all sciences, technology, medicine, etc.. and they contributed immensely to the field of many branches of knowledge, without which the western civilization would have been in the dark age. As a matter of fact, Islam as a religion of knowledge (1988) has urged the Muslims to seek knowledge and called them to excel in all branches of knowledge and science, therefore, the early Muslim scholars were motivated by the spirit of seeking knowledge and attempt to transform the ideals of the Qur'an to daily conduct in terms of hard work, perseverance, sincerity, honesty and patience. As such, many of the Muslim scholars such as al- Razi, al- Bairuni, al-Zahrawi, Ibn Sina al- Khawarizmi etc contributed to the various aspects of knowledge with particular reference to the field of natural sciences, and their immense contribution has played a vital role in shaping the modern natural sciences today. Hence, this humble paper with application of historical method will shed some lights on the biographies of Ibn Sina and Al- Razi and demonstrate their unique contributions in the field of medicine. Finally, the paper will provide a conclusion followed by some recommendations and suggestions.

Biography of Ibn Sina:

Ibn Sina famously known as Avicenna in Europe. His real name is Abu Ali al- Husayn bin Abdullah bin al-Hasan bin Ali Ibn Sina. He was born in Persia province of Balk which is now in Afghanistan in 980AD. During his childhood, he moved to Bukhara which is now known as Uzbekistan (M. Basheer Ahmad, 2008). He died in Hamadhan in 1037 AD. According to 'Abd Rahman (1993), he lived in the fourth century of the Islamic era which was considered as the most flourishing 'Abbasid period in respect of learning and knowledge despite of the political situation during that time. At that time, learning was so in demand, scholars were numerous and libraries were filled with Muslim scholar's outpouring. Islamic Arabic culture was about at the climax during the time of Ibn Sina's birth.

During his era, Arabic language was the medium of the transmission of knowledge and therefore, Ibn Sina was taught the Arabic language by Abu Bakr Ahmad bin Muhammad al- Barqi al- Khawarizmi even though his mother tongue was Persian. Then, he was taught the Qur'an and literature by another two teachers as soon as he had mastered the Arabic Language. By the age of ten, he knew the Qur'an and considerable amount of literature as he was a fast learner from his two teachers.

Next, his father decided to send him to the school of Mahmud al Massah' since he has developed interest towards philosophy, geometry and Indian mathematics. Besides that Ibn Sina also studied *fiqh* or Islamic law and jurisprudence as well as *sufism* (Mysticism) from Ismail al Zahid al- Bukhari. Ibn Sina's father has invited a philosopher, Abu 'Abdullah al- Natli to his house in order to teach Ibn Sina the intellectual subjects. Then, Ibn Sina had been diverted from preoccupation with the law and *sufism*(

Mysticism) into theoretical sciences and philosophical studies. Since then, he had developed a deep interest in the field of sciences of wisdom. Moreover, medical science was a major field that he was attracted to and had spent a brief of time in order to acquire that knowledge, he had surpassed all the scholars successfully in this science, and he was not more than sixteen years old. In the theoretical study of medicine, he also practiced the humanitarian motives so that he could put his learning in the good use. He was also into the intensive studies and reading in which he read through logic and all sections of philosophy by the age of 18. His famous reputation in philosophical and medical knowledge had widely spread. Due to his good reputation in medical knowledge he was acknowledge as an expert physician, therefore, he was known as king of physician. Based on the above biography we can now explore the unique contribution of ibn Sina to the field of medicine and which is the next topic of this humble paper.

Contribution of Ibn Sina in Medical field:

In fact, Ibn Sina's most enduring legacy was in the field of medicine, His most famous book(*Canun fi al tibb*) (The Canon of Medicine) is still one of the most important medical books ever written, and served as the medical authority throughout Europe for 600 years.

As mentioned by Okan Turqut, Sinasi Manduz and Izzet Tandogan(2009), Avicenna deserves to be remembered for his contributions to the field of cardiovascular medicine. The Canon which is a general treatise on medicine consists of five books. The eleven sections of the third book principally deal with various kinds of heart diseases, their causes, effects and treatment. He has expressed that the heart is the noblest and the best of all the chief organs of the human body. This fact might be supported by the holy Qur'an where the word heart is used not less than 137 times which proves the important of this organ in human body. It is in fact the Centre of human actions. Hence many verses in the holy Qur'an has touched on this organ. For example, in the Qur'an 2:225 the Almighty Allah stated that: "God will not take you to task for a slip, but He will take you to task for what your hearts have earned". In another chapter, Allah said "The Day when neither wealth nor children shall profit, [and when] only he [will be saved] who comes before God with a sound heart" [free of evil]. 26:88-89.

Lastly, Allah said: "God has sent down the best discourse as a Book, fully consistent within itself, oft-repeated, whereat shiver the skins of those who fear their Lord; then their skins and hearts soften to the remembrance of God". 39:23
Furthermore, according to Prophet Muhammad , he stated that: " Truly in the body there is a morsel of flesh which, if it be sound, all the body is sound and which, if it be diseased, all of it is diseased. Truly it is the heart". [al-Bukhari&Muslim].

According to Ibn Tymiyyah in this regard, he said that many doctors and philosophers have said that the mind is in the brain, so we think and understand with our brains and not with our hearts. He then said that the Centre is actually the heart. Ibn Kathir said: The arrogant philosophers say that the mind is in the brain. [Tafsir ibn Kathir vol 4 p.508].

Based on the above *Ayyahs* and the prophetic *hadith* , it is very clear and obvious that the heart of human being as claimed by Ibn Sina is no doubt the most significant organ that needs to be well protected and preserved, and spiritually, it also needs to be purified and engaged with good deeds and virtues.

Meanwhile, Ibn Sina has tried to find out the causes of heart diseases and classify them in accordance with the different signs and symptoms. His legacy will continue to inspire his modern colleagues in investigating heart diseases.

In addition, the canon's contribution to modern medicine was the recognition that tuberculosis is contagious disease which can spread through water and soil, and a person's emotional health influences his or her physical health. Ibn Sina was also the first physician to describe meningitis, parts of the eye, and the heart valves, and he found that nerves were responsible for perceived muscle pain. He also contributed to advancements in anatomy, gynecology and pediatrics.

According to Rahimi et Al (2007) Avicenna contributed to neurosurgery by providing descriptions of vertebral anatomy and clinical annotations. In one of his annotations he describes making a cranial incision. When one decides to make incision or opening, one should take into consideration the various small and larger folds of the skin. In the case of forehead however, one would act otherwise, because an incision along the folds there would divide the muscles and cause drooping of the eyelids. Similar care must be taken in the case where the muscular fibers take a different course to the surface folds. The surgeon must therefore know the anatomy of the nerves, the veins and the arteries, so as not to sever them by mistake.

Meanwhile, the book of Canon of medicine contains over a million words in five books titled:

- (1) General Principles of Medical practice. (2) Simple Drugs (3) Local disease, (4) General Diseases and (5) Compound Medicine (Smith, 1980). The Principles of Galen and Hippocrates are being used as reference for the first four books with the addition of teachings of Arabic physicians and Avicenna's own point of view.

Avicenna described in his book that the spine as having four functions: Protecting the spinal cord, protecting the organs of the thoracic cavity, providing structural support for the entire skeletal system, and allowing movement. He described the vertebrae of the cervical, thoracic and lumbar spine as well as the sacrum and coccyx in great detail that still being used in this modern world medicine. He illustrated the various processes, foramina, facets and ligaments.

After reginal analysis of vertebrae, and their presumed functions, Avicenna provided treatment options for back complains. In the first book of the Canon of Medicine, there are many considerations of spinal injuries and their treatment. For example, Avicenna describes different maneuvers to treat thoracolumbar back pain (Rahimi et al, 2007).

Avicenna's depth of understanding of spinal anatomy allowed him to be one of the first to provide ways of stabilizing the spine. In the Canon of Medicine, Avicenna provides treatment options for spinal deformities such as kyphosis as well as for dislocations and fractures of the vertebrae. He did not only describe what he observed, but also tried to provide a rational explanation for the anatomy.

According to Naderi et al (2003), he argues that without the spinal cord: nerves innervating the hands and feet would travel a longer distance and, thus be more prone to injury. Therefore Allah created the spinal cord below the brain. The spinal cord is like a channel coming out of a fountain in the way that nerves emerge from both sides and go down, thus putting the organs closer to the brain.

Although Avicenna's greatest contribution to modern neurosurgery was his depiction and explanation of the spine, he also contributed observations on intracranial anatomy and pathology. His assessment of intracranial anatomy divided the brain into the cortex and medulla. He had an in-depth understanding of the brain as described by his predecessors, specifically Galen, who went so far as to attempt to number the cranial nerves. Avicenna describes intracranial disease, like meningitis, and conditions such as hydrocephalus. He also performed cranial and intracranial surgeries and interventions such as The Canon of Medicine by Avicenna chronicles major advancements in the field of neurosurgery, which-along with the contribution of other intellectuals of the time such as Albucasis and Rhazes- distinguishes the medical and surgical enlightenment achieved at this time.

In this juncture, we ought to explore the contribution of al-Razi whose contribution to the field of natural sciences is also remarkable, with particular reference to his invention to the aspect of medicine.

Al Razi and His Major Contribution to the Field of Medicine His Biography

His name is Abu Bakr Mohammad Ibn Zakariya al-Razi. He was born at Rayy, Iran, in 862 A.D (Sharif Kaf Al Ghazal, n.d). He is known in the west as Rhazes. He was also interested in music at the beginning, and later on he learnt medicine, mathematics, astronomy, chemistry pharmacy and philosophy. He began to have interest in medicine when he visited the famous Azudi Hospital in Baghdad at the age of 30. Then, he became a physician who was in charge of the hospital at the age of 52. He was blinded by cataracts and refused an operation twice in several years before his death on 932 A.D. at the age of 73 at Rayy or Baghdad.

Al- Razi was also famous on the scientific method and promoting experimentation and observation. One of his famous achievements was in determining a good location to build a hospital in Baghdad by hanging meats in several locations around the city to find which area the meats rotted the least. It was like analogically, the patients would be less to suffer from illness. He gained eminence as an expert in medicine and alchemy at an early age, so that patients and students flocked to him from distant parts of Asia. He was the first person responsible in charge the first Royal Hospital and moved to Baghdad to become the head of *Muqtadari* Hospital for a long time. Some of his books are as followed: *Kitab al- Mansuri*, *al- Hawi*, *kitab al- Mulooki* and *kitab al judari wa al- Hasabah*.

His Contributions to the field of Medicine

1. Treatise on smallpox versus Measles

According to Muhammad Hamidullah (1989) the major contribution of al-Razi on medicine is treatise on smallpox and measles. Al-Razi was the first physician in history who described and distinguished in details the symptoms and signs of smallpox based on clinical examination by putting differential diagnosis. As chief physician of the Baghdad hospital, al- Razi formulated the first known description of smallpox. According to him, smallpox appears when the blood boils and is infected, resulting in vapors being expelled. Thus juvenile blood is being transformed into richer blood, having the color of mature wine. At this stage, smallpox shows up as blisters essentially as bubbles found in wine. This disease can also occur at other times, and not only during childhood. The best thing to do during this first stage is to keep away from it; otherwise, it might turn into an epidemic.

Furthermore, al- Razi noted that the illness was transmitted from person to person. His explanation of why survivors of smallpox do not develop the disease for the second time is the first theory of acquired immunity. In differentiating smallpox from measles in his book of *al- Judari wa al- Hasbah*, Razi wrote "The eruption of smallpox is preceded by a persistent fever, pain in the back, itching in the nose, and terrors in the sleep".

These are the more peculiar symptoms to approach, especially a pain in the back with fever; pricking which the patient feels all over his body, a fullness of the face which at times comes and goes; an infectious color, and vehement redness in both cheeks; redness of both eyes, heaviness of the whole body; great uneasiness, presenting as stretching and yawning; pain in the throat and chest, with slight difficulty in breathing and cough; dryness of breath, thick spittle and hoarseness of the voice; pain and heaviness of the inquietude, nausea and anxiety; (with this difference that the inquietude, nausea, and anxiety are more frequent in measles than in the small pox; while the pain in the back is more peculiar to the smallpox than to the measles) heat of the whole body; an inflamed colon, and shining redness, especially an intense redness of the gums,(Abdul Nasser Kaadan, n.d)

2. Major Books of Al- Razi

1- *Kitab al-Mansuri*: This book was translated into Latin in the 15th century A.D., comprised ten volumes and dealt exhaustively with Greco-Muslim medicine. Some of its volumes were published separately in Europe.

2-*Kitab al-Judari wa al-hasbah*: It was the first treatise on smallpox and chicken-pox, and is largely based on Razi's original contribution.

He was the first to draw clear comparisons between smallpox and chicken-pox.

This book was the first book on smallpox, and was translated over a dozen times into Latin and other European languages.

Kitab al-Hasa fi al-kula wa al-mathanah: Which means (Stones in the kidney and bladder) is one of the most famous of his medical writings.

Al-Hawi: It was the largest medical encyclopaedia composed by then.

It contained on each medical subject all important information that was available from Greek and Muslim sources, and this was concluded by him by giving his own remarks based on his experience and views.

Lastly, Bulletin of the World Health Organization on May 1970 paid special tribute to Razi, stating that his writings on smallpox and measles show originality and accuracy, and his essay on infectious diseases was the first scientific treatise on the subject. Razi was a pioneer in many areas of medicine particularly in the fields of pediatrics and infectious diseases. As such, both Eastern and Western writers in history described Rhazes' works as medical encyclopedia and called him Rhazes, the encyclopedist. This diagnosis is acknowledged by the Encyclopedia Britannica (1911), which states: "The most trustworthy statements as to the early existence of the disease are found in an account by the 9th century Persian physician Rhazes, by whom its symptoms were clearly described, its pathology explained by a humoral or fermentation theory, and direction given for its treatment".

Conclusion

The contribution of the early Muslim scholars to the various fields of knowledge is highly remarkable in the history. For instance, Ibn Sina who is well known in the West as Avicenna has immensely contributed to the field of natural sciences with particular reference to the aspect of medicine. His medical inventions and researches have played a great role on contemporary medicine, especially his book of *al-Canoon fi al-Tibb* which means law in medicine. This book is also considered as an authentic reference for not only Muslim medical practitioners, but for the entire globe. Likewise, al Razi who is also famous in the west as Rhazes has beautifully contributed to the field of medicine; he was the first Muslim medical scientist to differentiate between smallpox and chicken pox, his unique experiment and discoveries in this field had played a very significant role in the treatment of small pox. Al- Razi had left some important legacies for the humanities, such as *Kitab al Mansuri*, *Kitab al-Judari wa al-Hasbah* and *Kitab al-Hawi*. These books are the best reliable references for medical specialists. To conclude this humble paper, it is worthwhile to mention that the energetic contribution of the Muslim Scholars to many aspects of knowledge can be attributed to some factors such as; their love and their strong spirit for seeking knowledge, their deep understanding of the message of the Qur'an and their sincere implementation of the prophetic *Sunnah*. These factors have seriously contributed to their success and achievement during the Islamic golden age.

Solutions and Recommendations

The history has recorded the unique achievement made by some early Muslim Scholars (such as Ibn Sina, al Razi, etc..) to the many fields of Knowledge, and the West peculiarly have paid a special tribute to these gigantic Muslim Scholars whose unique contributions to the field of Medicine have play a positive impact on humanity at large. It is beyond reasonable doubt that knowledge is power, and this fact is obvious during Islamic golden age when Muslims conquer the world due their spirit of seeking knowledge. Their civilization produced some remarkable versatile intellectual thinkers in many fields of knowledge ranging from religious scholars, social sciences, natural scientists and many more. However, out of blue, the civilization that reached the pinnacle of achievement in various aspects of human life had subsequently experienced unprecedented predicament and decline. In my humble opinion, this sudden collapse of the Islamic civilization and the present weakness of the *Ummah* perhaps can be attributed to the intellectual malaise and loss of knowledge. Therefore, what can be done to rescue such a civilization that experienced and *déjà vu* the success in the past? In another word what are the possible solutions that can help to rescue Islamic civilization in order to regain its past glory? In my personal view, I think the following recommendations might be the perfect remedies for the problems faced by the *Ummah* today.

1. There is a strong need for the Muslim *Ummah* to return to the true teaching of Islam Based on the Qur'an and *Sunnah* which are the main fundamental principles of success in this life and in the hereafter.
2. The spirit of seeking knowledge for the sake of knowledge should be revived. I mean Muslims nowadays are lack behind, simply because of the loss of the spirit of seeking knowledge. Therefore, to regain our loss glory, the resurgence of the spirit of seeking knowledge is urgent. It is because of this spirit, the early Muslim *Ummah*, such as Jabir Hayyan, Ibn Sina, Kawarizmi, Zahrawi, Razi and etc. have excelled in all sorts of knowledge.
3. The application of integrative methodology in research is also urgent. That means the revelation which is the first source of knowledge in Islam needs to be applied in our empirical world. It also means human acquired knowledge and revelation are undoubtedly compatible, they can work together hand in hand without any contradiction.
4. Unity and solidarity among the contemporary Muslim *Ummah* is highly needed. It is beyond reasonable doubt that the unity is a sign of power of any civilization, and division in contrast, is a symbol of its weakness. Based on this fact, the early Muslim *Ummah* used to observe the concept of "*Wa'tasimu bi hablillah Jami'an wa la tafraquu*" (unite with the robe of Almighty Allah and do not separate among each other) in their daily and routine activities. This principle was another factor that drove the early Muslim scholars to reach the pinnacle of success in all dimensions.

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Tijani Ahmad Ashimi