

## REVIEW

# AL RAZI'S BOOK ON SMALLPOX AND MEASLES

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### Summary:

*Al Razi was the first physician in history to describe in detail the symptoms and signs of smallpox and measles based upon clinical examination. He was the first to distinguish between the two diseases by what is called now 'the differential diagnosis' in "The Book on Smallpox and Measles". A manuscript of this book is kept now in Lieden University, Netherlands (manuscript #656) and a microfilm copy is in our institute at Aleppo. This book of fourteen chapters was twice translated into Latin in the 18<sup>th</sup> century. The third chapter on the symptoms suggesting the exacerbation of smallpox and measles is considered the most important. The aim of this study is to reveal the importance of this book in the history of Islamic medicine.*

### Al-Razi

Abu Bakr Muhammad Ibn Zakariya Al Razi (Al Razi) was a Muslim physician and writer of the Middle Ages who wrote on many aspects of medicine and whose writings greatly influenced the Islamic world as well as Western Europe, where he was known by the Latinised form of his name, Rhazes.

Al Razi was born in Al Ray City close to Tehran and moved to Baghdad when he was forty years old where he headed many hospitals. In particular Adul Al Dawlah asked him to find a suitable place for establishing the Bimaristan Al Adudi. To determine a suitable location he hung pieces of meat in various areas of the city and selected the one in which the putrefaction of the meat was the slowest.

Al Razi wrote more than two hundred books related to medicine, pharmacy, philosophy, music and other sciences. He is considered the founder of experimental science, especially in the field of medicine and chemistry, since no one else before or during his time was interested in experimental science in its methodical form.

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### Al Razi's book on Smallpox and Measles

Al Razi was the first physician in history to describe in detail the symptoms and signs of smallpox and measles based on clinical examination. He was the first to distinguish between these two diseases by putting what is called now the differential diagnosis in his book "*The Book on Smallpox and Measles*" which was published in Arabic and Latin in 1766. A manuscript of this book is in Lieden University in the Netherlands under the reference number 656 and we have a microfilm in our institute.

The book gained great popularity in Europe and was translated into Latin, French, English and German. According to Honka<sup>(1)</sup> the book was published in Europe forty times between 1498 and 1866 with the most important one being in the 18<sup>th</sup> century around 1720. At that time there was much interest in inoculation or variolation following the description of the procedure in Turkey by Lady Mary Wortley Montagu, wife of the Ambassador Extraordinary to the Turkish court in Istanbul<sup>(2)</sup>.

Al Razi began his book with a short introduction in which he explained that the main reason for writing the book was that he could not find another suitable book dealing with the subject. Then he introduced the fourteen chapters.

He devoted the first chapter to the causes and explaining why just a few people could escape an attack. He mentioned that smallpox was more likely to attack children and young adults rather than old people and that old people might suffer from the disease only in the face of an epidemic. He attributed this to the blood of the younger people being more hot and humid.

In the second chapter he mentioned the bodies which are more susceptible to smallpox and the times of the year in which the disease is more common. He said that thin, hot, dry bodies were more susceptible to measles and less to smallpox, while thin, cold, dry bodies were not susceptible to either disease but if they were attacked by smallpox the disease would be benign. Smallpox was most likely to be widespread at the end of autumn and the beginning of spring. In a severely hot dry summer and also if the autumn was hot and dry without rain, measles was to be expected in susceptible individuals.



The third chapter is considered the most important. Entitled "*The chapter related to the symptoms suggesting the eruption of smallpox and measles*", in this chapter Al Razi declared that, before smallpox eruption, the patient complains of continuous fever, back pain, nose itching and sleeping disorders. Then he mentions other general symptoms and signs such as generalized pain, breathing difficulties, cough, redness of the cheeks and eyes, sore throat, dry mouth, hoarseness, headache, anxiety and that sometimes syncope may develop.

Reading the text it is clear that Al Razi emphasized that smallpox and measles were different diseases and that, although they had some signs in common, there were also specific signs for each disease that enabled the physician to make a differential diagnosis.

The most common signs of both smallpox and measles were continuous fever, nose itching, allergy in the body, redness of the cheeks and eyes, sore throat, chest pain, breathing difficulties, cough, hoarseness, headache and sometimes syncope. It was not necessary for all these symptoms and signs to appear together, some might be absent. On the other hand, regarding the specific signs, he said that back pain was more severe in smallpox, while it might be slight or absent in measles. Distress, syncope and anxiety were more prominent in measles.

The fourth chapter is on the management of smallpox in general and he indicated ten procedures, which should be carried out and on which he elaborated in later chapters.

The fifth chapter is on the prevention of smallpox before the appearance of its signs, and diminishing its diffusion after the signs appear. This is the longest chapter of the book. Al-Razi advised venesection on all patients above fourteen years of age, and cupping for younger patients. Then he indicated special diets according to the patient's condition and age, including calorem, lentibus falvis, sicbage, gallinis and phafianis<sup>(3)</sup>.

The sixth chapter is on the factors accelerating the appearance of skin lesions in smallpox. Al Razi said that massage and drinking cold water could accelerate the appearance of smallpox and measles especially when the fever is severe, thus causing the disease to pass quickly and easily. He also mentioned many herbal drugs which might play an important role in achieving this purpose, feminis foeniculi, rofarum rubrarum, lentium excorticatarum and ficus flavae<sup>(4)</sup>.

The seventh chapter is on taking care of the eye, throat and other organs, which need special care after the appearance of smallpox signs. In this chapter Al Razi explains how care should be taken of the eyes, throat, nose, ears and joints. He also draws attention to the care of the foot and hand, as severe pain may develop there as a result of scarring and sclerosis of the skin.

The eighth chapter describes the factors which accelerate the maturation of smallpox. Al Razi advises that, where the patient is in a good condition, the physician should do his best

to mature smallpox. Bandages of hot water with some flowers<sup>(5)</sup> boiled inside should be applied to the lesions.

The ninth chapter is about the factors which dry or desiccate smallpox. Where the smallpox lesions are wet, ointments made from mixtures of herbs and plants, such as rice, are applied to dry them and make it possible for them to be removed.

The tenth chapter is on substances which remove the crust. Al Razi says that if the lesion becomes dry and a residual crust is still dominant, the physician should see if it is thin and dry and then apply an ointment of acetic acid many times until the lesion disappears completely. When the lesion is on the face, a special kind of ointment derived from peanut should be used. If the crust is wet, the physician may carefully scrape it off without using any ointment.

The eleventh chapter is on the substances which remove the residual effect of smallpox on the eye and all the body. Here Al Razi differentiates between the residual effect of smallpox on the eye from that on the rest of the body. In the first case he indicates the use of many types of ointments, some of them derived from animal products. If the lesions are located all over the body, many compound ointments may be used.

The twelfth chapter concerns the diet of the smallpox patient. The patient should drink malt (barley germinated by sprouting in water) exactly as for acute diseases. Also peeled lentils mixed with liquids such as acetic acid, may be beneficial.

The thirteenth chapter is on the management of bowel function. Al Razi stated that in the last stages of most cases of measles and smallpox the faeces are soft especially in measles, therefore laxatives should be avoided except in the early stages of some cases of smallpox especially when there is fever or headache.

The fourteenth chapter is on the prognosis of smallpox and measles. Al Razi describes the signs where the prognosis is bad and those where the prognosis is good. He considered severe pain, continuous fever, insomnia, nose itching and shining color of the eruption to be signs of a bad prognosis.

### ***The scientific value of this book:***

1. This book is considered the first one of its kind giving an explanation for smallpox and measles in a dedicated book.
2. In the first chapter he mentioned that putrefying air is a contributory factor for spreading the disease.
3. Many historians such as Justaph Lobon, Sigrid Honka, Dughlas and others considered Al-Razi to be the first in the history of medicine to differentiate between these two diseases. He described each disease separately and in detail, unlike all the Greek and Arab physicians before him, who considered the two diseases as one.



Al-Razi differentiated between the two diseases in the second chapter when he talked about the bodies which are more susceptible to smallpox and the times in the year in which the disease is more common. In the third chapter he described the symptoms suggesting the eruption of smallpox and measles and in the fourteenth chapter the prognosis of smallpox and measles.

4. He recognized the relationship between the type of the eruption in measles and the severity of the disease.
5. The opinions of Al Razi were free of old false concepts and he was very keen to prescribe the treatment in detail including the kind of food most suitable, as he believed that food had an important role in the treatment as described earlier.
6. Al Razi disagreed with other physicians before him in using cold water to neutralize severe fever in smallpox and measles.
7. This book provides decisive proof that Al Razi, like many other Muslim physicians, was not just a translator of Greek, Indian and Syrian medicine. He innovated many theories and new opinions which contributed to medical development at that time.

## 2. Al Hawi Fil Tibb:

This book is an extremely important source for our knowledge of Greek, Indian and early Arabic medical writing because Al Razi was meticulous about crediting his sources. He died before arranging this book but his followers rearranged it under the supervision of Ibn-Alamid who was the minister of Al Hassan Ibn Boueh. This comprehensive book on medicine, "*Al-Hawi*", was translated into Latin in 1279 under the title of "*Liber Continens*" by Faraj ben Salem, a physician of Sicilian-Jewish origin, employed by Charles of Anjou to translate medical works. Then it was translated many more times into Latin, and became one of the nine essential books of the medical college library of Paris in 1395. A special part of this book, related to pharmacology, was still considered the primary reference in Europe for a long time after the Renaissance. There is a rare manuscript of the translation of "*Al Hawi*" into Latin, written in 1282, in the national library of Paris. The first edition was published in Italy in 1486 under the title "*Liber Dictus Elhavi*", then many editions appeared, the last one under the title "*Continens Rasis*" in 1542 of which there is a rare copy of this edition in Cambridge.

"*Al Hawi*" is still considered the largest medical textbook edited in Arabic to date, as it consists of twenty three volumes in the edition by the Ottoman printer in Hyderabad, India between 1955–1971.

In the seventeenth volume of the book Al Razi discussed smallpox and measles. He described the eruption of measles as red skin maculae without protrusion into or out of the skin while

the eruption in smallpox is infiltrated into skin. Then he mentions that smallpox eruptions appear patchily over a period of days whereas measles spots appear all over the body at the same time. He considered the black and violet colors of the eruption in smallpox to indicate a bad prognosis.

## 3. A treatise on Pediatric Diseases:

(was written by Al Razi in the year 900.

Historians such as Rabdill, Justaph Lobon and Sigrid Honka consider it the first book written solely on pediatric diseases, because Al Razi for the first time in the history of medicine distinguished between paediatrics and gynecology while all other physicians before him considered the two subjects together in one book.

Unfortunately the original copy of this book, written in Arabic, has been lost. In the past it was translated into Hebraic [syn. Hebrew] then into Latin between 1114–1187, and was published many times. Later Pieper translated many chapters into German, Ruhra made another translation into English, then the entire treatise was translated into Italian. Recently, Dr. Samuel Rabdill made a new English translation of this treatise and published it in the American Pediatric Journal No. 5, Vol. 122, 1971. This translation is considered the best. Dr. Mahmoud Haj Kasem from Iraq has translated it into Arabic.

The treatise contains twenty-four chapters discussing many pediatric diseases and their treatment. Amongst these diseases smallpox and measles are discussed. Also many other pediatric diseases are described such as tinea, scabies, hydrocephalus, abdominal enlargement, sneezing, insomnia, epilepsy, ear discharges, eye disease, tooth diseases, mouth ulceration, vomiting, diarrhoea, cough, worms, umbilical protrusion, hernia, urethral stone, and poliomyelitis.

In addition to the historical importance of this treatise it has a scientific importance, as it contains new opinions and theories related to pediatric diseases.

The effect of Al Razi concepts related to smallpox and measles on the physicians after him.

It is well known that during the time of Al Razi books were not written and widely published as in the present time. There were only a few manuscripts of every book available for scholars. Therefore we can expect that many Muslim physicians after the time of Al Razi were not aware of and did not mention his concepts of smallpox and measles. I would like here to trace the effect of Al Razi's concepts on the Muslim Physicians after him.

Ali Ibn Abbas Al Majusi died in 994 (about 70 years after Al- Razi). In the fourteenth chapter of the first volume of his book "*Kamel Al-Sinaa Al-Tibiah*", he talked about smallpox but considered smallpox and measles to be one disease. This means that Al Majusi had no knowledge of Al Razi's writings



or perhaps his pride prevented him quoting from Al Razi's book.

**Ibn Sina** lived a century later than Al Razi and it is clear that in his book "*Al Qanun*" he quotes extensively from Al Razi's writings on smallpox and measles and in the third book of "*Al Qanun*" he devoted a special part to smallpox and measles. Ibn Sina differentiated between the two diseases and said they have common signs, and other signs specific for every disease. He described the skin eruption of each disease in the same way as Al Razi but he did not acknowledge Al Razi's work.

**Ibn Zuhr** lived in Al Andalus and died there in 1162. His book "*Al Taysir fil modawati waltadbir*" was translated into Hebraic then into Latin, and published many times under the name of "*Facilicito Adjumentum*". In the second volume of this book, Ibn Zuhr devoted a chapter to smallpox and measles considering them as one disease. It is clear that Ibn Zuhr did not quote from Ibn Sina or Al Razi especially as we know that "*Al Qanun*" was well known in Al Andalus at that time.

**Ibn Al Nafis** was born in Damascus and died in Cairo in 1288. His book "*The Concise Book of Medicine*" is considered a revision of "*Al Qanun*". Consequently Ibn Al Nafis repeated briefly what Ibn Sina said about smallpox and measles and he did differentiate between the two diseases although he did not mention back pain as a differential sign of smallpox.

**Dawood Al Antaki** was born in Antakia and died in Mecca in 1599. In the first part of his medical book "*Tathkarit Dawood*" he describes the signs of measles and smallpox in a way similar

to Al Razi and he differentiated between the two diseases. In the same chapter he described chicken pox and considered it a benign form of smallpox.

**Madian Al Qawsoni** was an Egyptian living in the seventeenth century. In the first chapter of his book "*The Physician's Dictionary*" under the title of "*Measles*", he described the signs of measles and smallpox, mentioning that he quoted from Al Qanun. He differentiated between the two diseases saying that the lesion in measles is small, thin and does not extend outside the skin, while the smallpox lesion is thick and protrudes outside the skin.

## Conclusion:

Al Razi was the first physician in the history of medicine to differentiate between smallpox and measles and consider them as two separate diseases. The influence on Muslim physicians of Al Razi's concepts in the diagnosis of these diseases was very obvious, especially on Ibn Sina, Ibn Al Nafis, Al Antaki and Al Qawsoni although the majority of these physicians quoted from Ibn Sina's "*Al Qanun*" which was the most celebrated and well-known medical book in the east and west.

Finally I would like to conclude with the words of the European doctor De Pourc; "*Medicine was absent till Hippocrates created it, dead till Galen revived it, dispersed till Rhazes collected it, deficient till Avicenna completed it*".

## References:

1. Zigrid Honka, Shamsul Arab Tastue ala al-Gharb, Second edition, Beirut - Lebanon. 1969 p250.
2. Emilie Savage-Smith, Islamic Culture and the Medical Arts, National Library of Medicine, Bethesda-Maryland. 1994 p9.
3. Sweet violets, Wild pansies, Common melilot, Marsh mallow, Hollyhock.