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Razi's unique approach to *Amraz-e-Wabaiya* (Infectious Diseases): An overview

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Abstract

The history of infectious diseases has been documented throughout the ancient ages. A highly infectious disease rabies was well known since Babylonian period mentioned in tomb of Babylonian which is nearly 23rd century B.C. old. Hippocrates the father of medicine was supposedly the first ancient Unani physician to document the infectious diseases with their distinguished clinical features which are today named as malaria, tuberculosis, influenza, mumps and diphtheria etc. Galen proposed miasma theory of disease transmission such as cholera, chlamydia or plague were caused by a miasma (pollution), a noxious form of bad air. But none of them before Razi gave detailed and descriptive features of infectious diseases. The contribution of Razi in the field of medicine is immense and unparalleled. The stalwart during the period of 9th century A.D has laid the foundation of fundamental concept of infections while proposing to construct the hospital in the city of Baghdad. This unique approach was adopted when the facilities were very much limited during that period. The sterling contribution of Razi has been acknowledged by the Bulletin of the World Health Organization (May, 1970) in such valuable words "the knowledge of the great Hakim Razi about smallpox and measles showed uniqueness and exactness and his article on infectious diseases was the first scientific and meticulous treatise on this subject".

Keywords: Razi, *Amraz-e-Wabaiya*, infectious disease, contribution to medicine

1. Introduction**1.1 Early history of *Amraz-e-Wabaiya* (Infectious diseases)**

Epidemic of infectious diseases have been acknowledged throughout the history. The classical literatures of ancient Greece and Egypt revealed the prevalence of some diseases such as meningitis, tuberculosis, Hansen's disease and smallpox in those days [1]. The Greeks were also aware of pulmonary tuberculosis, seems to have raged during Hippocrates lifetime [2]. Rabies was the most prevalent disease documented in Babylonian manuscripts many centuries ago before the Christ period. Hippocrates (460-377 B.C.) the excellent scientist brain in Greek medicine was probably the first physician to records the different clinical signs of several contagious diseases which are presently termed as influenza, diphtheria, tuberculosis, mumps and malaria [2]. It also asserts that Hippocrates coined the terms epidemic and endemic. He is an author of three most popular treatises on epidemiology named as Epidemic I, Epidemic III and on Airs, Waters and Places. These manuscripts of Hippocrates describe diseases from a rationale and hypothetical perspective rather than supernatural theory [1]. The eminent Greco-Roman physician Galen projected miasma theory of disease transmission such as cholera, chlamydia or plague were caused by a miasma (pollution), a noxious form of bad air. Miasma was pollution of the air by noxious vapours containing poisonous elements caused by rotting putrid matter. It was spread by wind and therefore could spread speedily; enter humans by breathing and through the pores of the skin [3]. The very ancient country India has records to origin one of the most highly infectious diseases smallpox. It is noted that the smallpox was existed amongst the Indian populations especially in Brahmins in olden days [2]. While some accounts cited smallpox had been emerged in the earliest Egyptian and Chinese writings. However, the first clear and scientific description and distinction between smallpox and measles was put forth by Razi [4]. It is alleged that in 160 A.D. the Han Empire and six years later the Roman Empire were died of plague. Plague and other contagious diseases were flourished in the cities of Roman Empire and surely contributed to its final demise [1]. The germ theory was proposed in the mid-16th Century A.D. and gained much credibility when substantiated by scientific discoveries between 17th and late 19th Century A.D. The germ theory has given supplementation of ancient explanation of contagious diseases such as Galen's miasma theory [5].

1.2 Short life history of Razi

Abu-Bakr Mohammad Ibn Zakariya Razi was born in 865 A.D. in an ancient city of Rey. In olden days it was the provincial capital of the Samanid dynasty, which is presently near to famous city Tehran, Iran. He was died in 925 A.D., although some scholars put forward he was born in 864 A.D. and died in 930 A.D. [6] Very little information is available about his childhood except that he loved music and was a talented lute player. At an early age, Zakariya Razi was developed an interest in several fields such as philosophy, medicine and alchemy. After developed few skills in medicine he was taken training in Baghdad under the inspiring guidance of Rabban Tabri the author of first medical book which was composed in Arabic language 'Firdaus al-Hikmat' in Latin acknowledged as 'Paradise of Wisdom' [7]. The esteemed physician Razi was served as the chief medical doctor in several hospitals in Islamic world. He was the most scientifically intellectual person during Middle age and one of the immense scientists and great physicians of all time [8]. He has been known for great contributions in philosophy, medicine, alchemy, and ethics of medicine as well as in metaphysics [6]. The indefatigable personality Razi has written many books in different sciences. It is to claim that he is the author of approximately 200 treatises in medical and non-medical sciences [8, 9]. He was chosen as director of one of the first great hospitals in Baghdad in competition with 100 other scientists. He had written more than 20,000 pages in one year and had damaged his eyes and hands by working day and night for more than 15 years. All biographical accounts agree that Razi had lost his eye sight during geriatric age and when somebody advised him to take treatment; he refused and answered now he became tired of seeing the world and unwilling to undergo the ordeal of surgery to see any more [8, 10].

2. Contribution of Razi in the field of Amraz-e-Wabaiya (Infectious diseases)

2.1 Kitab al-Judari va al-Hasbah (*De variolis et morbillis*)

The most scientific compilation of Razi not only mentions the clinical manifestations and management of smallpox and measles but also covers descriptive epidemiology and infectious diseases. He was the first medical man who was given the differential diagnostic points to diagnose the two highly and most prevalent infectious diseases in his time such as measles and smallpox. He explained smallpox and measles as distinct disease in 'Kitab al-Judri va al-Hasbah' [11]. The famous treatise of Zakariya Razi has received enormous citation in Europe and was translated nearly into forty languages including Latin, English, German and French etc [6, 11].

This manuscript comprises fourteen chapters. In the third chapter, he evidently differential diagnosed the small pox and measles by differentiating the eruptions of both diseases. He was also described both common and specific sign of diseases. Common signs viz; continuous fever, itching nose, allergy in the body, eye redness, sore throat, chest pain, dyspnoea, cough, hoarseness in voice, headache and less often syncope. Specific signs such as severe back pain in small pox, which is slight or absent in measles. Distress, syncope and anxiety are more common in measles [11, 12].

In addition to differentiating the clinical pictures of smallpox and measles, Razi made a distinction between the milder and more serious appearance of the two diseases. He revealed that when the sores due to illness appeared sizable, white in colour, and relatively limited in figure, he deemed the case less severe, if the patient is having large and white sores that

existed in large numbers, he considered the case as mildly severe [12]. Eight and ninth chapters put forward measures of regimental therapies and advise the physicians to make the disease mature. For this, he recommended, application of bandage of hot water in patients whose condition is not serious and simultaneously apply rice to make the lesion dry. Twelfth chapter incorporate dietetic planning of not only for small pox and measles but also for other acute respiratory infectious diseases [11]. Thirteenth chapter consists of the management of smallpox and measles, he stated to avoid purgation in most cases of small pox and measles, except in those who have severe headache and fever [11]. He acknowledged that better prevention and appropriate management of smallpox especially before its onset may reduce the virulence. But once when the disease is inevitable the physician should promote eruptions of smallpox by rubbing the skin, given steams to the skin, can be given oral medication for purgation, and blood can be withdrawn. These all may prevent the morbid complication such as blindness in patients. In relation to prognosis, he expressed in the last chapter, pustules that become hard and warty instead of ripening obviously indicated that the patient would die [8, 11].

2.2 Kitab al-Mansuri fi al-Tibb (*Liber Almansoris*)

The second most distinguished compilation of Razi is 'Kitab al-Mansuri' comprising with ten chapters. He had devoted this book to the Samanid prince Abu Salih al-Mansur Ibn Ishaq, Governor of Rey [6, 13]. This medical treatise was very influential and part of syllabus of medical courses in European universities up to the 16th century A.D. [8]. Gerard of Cremona an Italian translator translated this book into Latin in 13th century A.D. [6]. Subsequently, it was translated into many languages such as French, Persian and even Urdu [14]. Razi had absolute idea of quarantine; he stated transportation of public must be stopped during epidemic of plague and also advised the people should not together in crowding places when somebody has leprosy or epidemic fever because infection can be transferred to others. The fourth chapter of Al-Mansuri discuss about infectious diseases which are more common in rainy season and advised the public to take fruits particularly apple, grapes, pomegranate, barley water and lemon frequently for prevention of infectious diseases. The tenth chapter shortly describe the management of smallpox and measles [14].

2.3 Kitab al-Hawi fi al-Tibb (*Liber Continens*)

More appreciably, Razi wrote a comprehensive compilation 'Kitab al-Hawi fi al-Tibb', a 25-volume collection. This multi-volume work 'Al-Hawi' is the outcome of a posthumous collection of Razi's medical observations, and astonishing subjects in the fields of pathology, medicine, pharmacology and pharmacy. Ibn Amid (d. 961 A.D.) was credited with the initiative to compile the book together; he is reported to have purchased Razi's papers from a surviving sister of his, who had them in her ownership which was transcribed and collected by a group of Razi's students. This book was rendered into Latin in 1279 A.D. as '*Liber Continens*' by Faraj bin Salem and presented to Charles of Anjou, king of Nepales [6, 12, 15]. Total 23 volumes of this compilation have also been translated till now in Urdu by the Central Council for Research in Unani Medicine. These volumes of 'Al-Hawi' have mentioned details of several infectious diseases such as meningitis, ear infections, throat infections, chest infections including pulmonary tuberculosis, pneumonia and pleuritis, intestinal infections, urinary tract infections and wounds caused by *ufofonat* (infections) etc.

2.4 Place selection for foundation of Hospital

Razi was well aware about the occurrence of *ufooonat* (infection), when king Adud-ul-dawlah asked him to select a suitable place for establishing the '*Bimaristan al-Adudi*' (a separate hospital particularly for infected patients). His scientist brain was decided to hang several pieces of fleshes of animals in different places of the city and selected the place where the flesh of animals was slowly got putrefaction which may have laid the foundation of germ theory of diseases in later centuries^[10, 11].

3. Conclusion

Razi was the first man who initiated the experimental science in medicine and the foremost physician who bestowed the differential diagnosis of diseases based only on clinical examinations. Everybody regard Hippocrates as the first factual epidemiologist since he classified the infectious diseases according to their worldwide distribution particularly diseases of endemic and epidemic distribution. Galen, a versatile physician who explained the role of three factors responsible for diseases, viz. predisposing, exciting, and environmental factors, but the world is unaware from the fact that Razi, a great Arab physician has also been honoured as great epidemiologist, who was given all the primitive tools of modern epidemiologist in his '*Kitab al-Judari wa al-Hasbah*', '*Kitab al-Hawi fi al-Tibb*' and '*Kitab al-Mansuri*'. These original manuscripts of Razi gained high status and value in European countries and have been translated into different languages such as Latin, French, German, and Urdu but could not gain popularity as books of epidemiology^[11]. '*Kitab al-Judari wa al-Hasbah*' provides further evidence of clinical acuteness as well as worthwhile knowledge about diagnosis, therapy and concepts of diseases. In ancient period, diseases were generally defined in terms of symptoms, e.g. fever, diarrhoea, skin lesions and so forth. However, Razi's treatise on smallpox and measles has been called a major landmark in establishing the concept of specific disease entities^[8]. His extensive research and exploration on smallpox and measles demonstrated his role as a pioneer in the field of clinical practice and observation. His career benefitted future generations of physicians because he documented his observations that he had compiled throughout his practice^[12]. These works of Razi may have laid the foundation for germ theory of disease in the later centuries.

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