



Al-Zahrawi: A Prominent Muslim Medical Scientist and His Impact on West

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Abstract

Abu al-Qasim Al-Zahrawi (936-1013AD), known in the west by his Latin name *Albucasis*, was born in Al-Zahra'a six miles northwest of Cordova in Andalusia (Spain). He is regarded as the greatest of Muslim surgeons; European surgeons, who came after him, considered him a greater surgeon than even Galen (Greek physician and surgeon b.129AD) and described him as the father of modern surgery. His greatest contribution to medicine is the *Kitab al-Tasrif*, a thirty-volume encyclopaedia of medical practices. His pioneering contributions to the field of surgical procedures and instruments had an enormous impact on the East and the West, well into the modern period. This paper is a study of Al-Zahrawi's remarkable work and its influence on medical science in the West.

Keyword: Al-Zahrawi, Medicine, Surgeon, West, Impact

Abstrak

Abu al-Qasim Al-Zahrawi (936-1013AD), yang dikenali sebagai Latin al Zahrawi, dilahirkan di Al-Zahra'a, enam batu barat laut Cordova di Andalusia (Sepanyol). Beliau merupakan seorang pakar bedah Muslim yang hebat; pakar-pakar bedah Eropah di zamannya menganggap dia beliau sebagai pakar yang lebih hebat berbanding Galen (saintis perubatan c.129AD). Beliau juga dianggap sebagai salah seorang pakar bedah yang paling hebat dari Dunia Islam, dan telah digambarkan oleh ramai sarjana sebagai perkembangan pembedahan moden. Sumbangan terbesar beliau kepada perubatan adalah Kitab al-Tasrif, sebuah ensiklopedia amalan perubatan dengan tiga puluh jilid. Sumbangan perintis beliau dalam bidang prosedur pembedahan dan instrumen mempunyai impak besar di Timur dan Barat dalam tempoh moden, di mana beberapa penemuan beliau masih digunakan dalam perubatan sehingga ke hari ini. Saya akan memberi tumpuan terhadap kerja yang luar biasa dari Al-Zahrawi dan kesan barat mempengaruhi kajian beliau melalui penulisan ini.

Kata kunci: Al-Zahrawi, Perubatan, Pakar Bedah, West, Kesan

Introduction

The beginning and development of Islamic concept and practices of health are inextricably interwoven into the general body of Islam. The organic nature of Islam encompasses the core principles of Islamic health traditions. For an understanding of the historical or conceptual aspects of Islamic medicine reference to Islam itself has to be made. In Qur'an many Ayat are stress and to encourage toward medical science.

About the reproduction of baby in Qur'an Allah says:

"Then we made the sperm into a clot of congealed blood; then of that clot we made a (foetus) lump; then we made out of the lump bones and clothed the bones with flesh; then we developed out of it another creative. So blessed be Allah, the Best of create!"

(Qur'an, 23:14)

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The purposes of Islam to built a healthy society because sound physical and mental health is essential not only to enjoy the fruits of the universe, but also to understand. For that sleep in night is importance thing. In Qur'an

“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 78:9-10)

Qur'an is a guide for all facts of human life, and also to concern itself with the more general principles of medicine and hygiene. There are several verses of the Qur'an in which medical question of a very general order are discussed; there are also many saying of the prophet Muhammad(pbu) dealing with health, sickness, hygiene and other question pertaining to the field of medicine. The Muslim scholar of the middle age much inspired with the Qur'anic scientific ayat and prophet tradition. They realized the value of the existing medical service. Various medical scientists emerged in medieval period and reached the medical science in its zenith. They were not popular in Islamic world but as well as in west. One of them was Abu Qasim khalaf Ibn Abbas, a greatest physician at that time.

Eminent Medical Scientist

Abu Qasim khalaf ibn Abbas al-Zahrawi (936-1013 AD) was also known as *Abulcasis*, *Alzaharavius*, *Bucasis* in the west. He was born in Zahra in the neighbourhood of Cordova, the capital of Spain.ⁱ He became one of the most reorganize surgeons of the Muslim medieval period. He studies medicine and other current Islamic sciences at the schools of Cordova. He was renowned court physician to Caliph Abdul Rahman III(912-61AD)ⁱⁱ of Spain. He contributed original significant work on medicine and it was studied for long time.ⁱⁱⁱ Along with this he served as an imperative educator and psychiatrist.

As A Surgeon

The fame of Al-Zahrawi rests upon his encyclopaedic work of *al-Tasrif*. This accomplishment in the health field was probably the first of its kind with such a wide scope and outlook ever to be undertaken in Muslim Spain.^{iv} In Al-Zahrawi's capability as physician- surgeon, he provide precious service to humanity by making lot of researches and invention which helped laid the foundations of modern surgery. He introduced such new ideas as *cauterization of wounds*^v, devastating a stone inside the bladder and the necessity of *vivisection and dissection*^{vi}. He was incredibly specialist in the treatment of wounds and accident injuries as well as expert in the setting of bones in straightforward and complex fractures. He also performed numerous subtle operations including removal of the dead foetus and amputations.^{vii} Hitti

consider him as the greatest surgeon of the Arabs which indicates that he was greatest both in the eastern and the western Muslim world.^{viii}

Al-Zahrawi, beside with medicine and surgery he also worked on *midwifery*^{ix}, *meteria medica*^x, *cookery and dietetics*, *weight and measures*, *groundwork medical chemistry*, *thereprapeutics*, *psychotherapy* and *treatment of wound*. He also gives technical terminologies in his *Tasrif*. Since in his period assort science were mixed and were interconnected each other. He tried to split various disciplines from medicine in the name of its specialism. Among such discipline were alchemy, theology and philosophy which were being mixed with medical science by a numerous scholars of the field.^{xi} Being an enormous educator and psychiatrist as well dedicated a substantial section in the *Tasrif* to child education and behaviour, table etiquette school curriculum, and academic specialization.^{xii} As a psychiatrist he equipped such drugs that were based on opium and that introduced the patient towards happiness and joy. After having the dose it relaxes the soul, dispels the bad thought and worries, moderate, temperaments and also treated in other ways.^{xiii} He also discussed technical process of preparing and purifying for medicinal uses such chemical substances as *litharge*^{xiv}, *ceruse*(white lead), *iron pyrite (crystalline marcasile)*, *vitriols*, and *verdigris*.^{xv}

Al-Tasrif: Most Valuable Work of Al-Zahrawi

Al-Zahrawi, was known as the renowned surgeon and also regarded as the father of modern surgery for his principle encyclopaedic work *Al-Tasrif*. Full name of this work is *Al-Tasrif Li-man 'Ajaz 'an al-Ta'alif* (book of concession or the method of medicine) thirty volume medical encyclopaedia^{xvi} completed in 1000 AD, before the thirty year of his death,^{xvii} which was later translated to Latin and last surgical section of treatise published separately. This surgical part translated by Gerard of Cremona into Latin and which was studied for several centuries in Hebrew and Catalan translations.^{xviii} In his *al-Tasrif*, a medical encyclopaedic work, al-Zahrawi discussed all aspect of the curative arts known at that time.^{xix}

Al-Zahrawi discussed in his *Tasrif*, the anatomy of human body in first two treatises. Being aware of the importance of the science of anatomy, he made it obligatory for surgeons to be well-versed in it. He also embrace chapters on general medical recognition of terms and classification; *remedial agents* and *pathology*; *prognoses and diagnoses*; counselling the patient with solicitude; and require to know the patient's general situation and his personal history. Besides, the author has clarified that both habit and

natural mentality of man play an important role in the making of his personality.^{xx}

Of the remaining parts of the book, the 28th, 29th and 30th treatises deserve special mention. The 28th treatise strictly related to pharmacy. Their significance lies in the fact that was intended more as illustration of pharmaceutical pieces than as ornamentation of manuscript.^{xxi} The 28th treatise was significantly pleasant in Europe under the Latin title *Liber servitor* that deals mainly with the research and manufacturing processes of products and extracts from the three natural kingdoms, i.e., plants, minerals and animals. Pharmaceutical techniques for manufacture tables, *lozenges*^{xxii}, *troches*, *syrups*, etc., are also discussed in it.^{xxiii} Likewise, the 29th treatise is also of great historical significance. It is on synonyms of drugs in several language, namely Arabic, Greek, Syriac, Latin and Spanish, arranged in the alphabetical order; substitutes of drugs in case of non-availability of the unique ones; and weight and measures as used in various localities. Comparisons between different weight and measures have also been prepared it.^{xxiv}

Finally, the 30th treatise of the book comprising three sections (abwab) is on surgery and its application, a field which was completely neglected by the author's contemporary physicians. The first section containing 56 chapters deals in detail with different aspects of cauterization for e.g discuss ancient regarding cautery of fistula in the inner corner of the eye and also cautery of the stomach and the 'cold liver' and the tools and techniques used in it. The second section comprising 93 chapter deals with matters relating to *incision*^{xxv}, *perforation*, wounds and their healing, *bloodletting*, wet and dry cupping; while the third section is devoted to the discussion of fractures and dislocation of joint including fracture of the pelvis, bone-setting, bruises joint. For it used the medical dressing and bandages.^{xxvi} He was also well-known for high-ranking of *al-Tasrif* introduced his eminent collection of over 200 surgical instruments. Some of which the author had designed and developed himself. Many of these instruments were never used before by any previous surgeons.^{xxvii} Al-Zahrawi, for the first time drew each instrument in colour.^{xxviii}

Three notable invention of al-Zahrawi's surgical instrument mention here:

- an instrument for internal examination of the ear,
- an instrument for internal inspection of the urethra and
- Instrument for applying or removing foreign bodies from the throat.

He specialized in during disease by cauterization and applied the technique to as many as 50 different operations.^{xxix}

It is incredible to note that the surgical instruments discussed in his book he had been abundantly illustrated and intensely described for the first time in history for both teaching purposes and practical application.^{xxx}

As Gynaecologist

Al-Zahrawi had immense expertise in midwifery and gynaecology also. He adroitly performed caesarean operation and wrote in detail about them. Likewise, he successfully performed the operation of craniotomy for bringing out the dead foetus.^{xxxi} He discussed the lithotomy and became the first to practice it on women. He suggested removing the broken patella with the surgical operation. According to the available information he was the first Muslim surgeon who introduced new and better obstetrical forceps to operate the women.^{xxxii}

As Orthopaedist and Dentist

Al-Zahrawi was a brilliant orthopaedic surgeon of his time. He was the first to carry out the treatment of the fracture of the pelvis. He has written in detail about different kinds of straightforward and complex fractures as well as dislocation of joints including those of the shoulder joints. His guidance to immobilize the shoulder joints is very similar to the (A-0) splint of the modern age. He also developed a plaster of his own formula, and the modern plaster known as plaster of Paris is an superior form of the said plaster.

Similarly, as a dentist his main contribution was that he prepared sophisticated instruments to cleanse dirty teeth as well as pull off rotting ones by shaking and loosening them. He also developed the art of setting artificial teeth made from the bones of animals. Of the several dental instruments developed by him, turn-key for extraction, dental saw and file, and instruments for extraction of roots were particularly very important. He is also credited with having developed and applied the method of tying gold and silver wires to bridge the gaps between the teeth.^{xxxiii}

Tremendous Impact on West

Al-Zahrawi was influenced on western medical scholar later period so that his work was translated into European languages by eminent scholars and translators of the west. Al-Zahrawi's advocacy of the actual cautery led to the wide-spread use of this means of treatment throughout Western Europe during the middle ages. However his book *Al-Tasrif*

was the standard textbook on surgery in Europe for several centuries, being translated into Latin by Gerald of Cremona^{xxxiv} who is recognized to be the greatest translator of the west, who translated a large number of mathematical, astronomical, medical and other works from Arabic into Latin. The chief influence of *Albucasis* on the medical system of Europe was that his lucidity and method of presentation awakened a prepossession in favour of Arabic literature among the scholars of the west. The method of *Albucasis* eclipsed those of Galen and maintained a dominant position in medical Europe for five hundred years, long after it had passed its usefulness.^{xxxv} The Latin translations of the *Al-Tasrif* were printed at Venice in 1497, stassburg in 1532, at Basel in 1541 under the title *Albucasis methodus medendi, cum instrumentis ad omnes fere morbos depictis*. The besle edition is also of interest, as it formed the basis of the work of John Channing, who published his *Albucasis de Chirurgia* in 1778 in oxford. This edition is in Arabic and Latin, and there is a copy in the British museum and another in the Bodleian library. It was also translated in French in 1881.^{xxxvi} It held its place for centuries as the manual of surgery in Salerno, Mantpellier and other early schools of medicine. It comprised illustration of instruments which influence other Arab authors and helped lay the foundations of surgery in Europe. A colleague of al-Zahrawi was Hasday Ben-Shaprut, the Jewish minister and physician who translated into Arabic, with the participation of a Byzantine monk Nicholas, the magnificent illustrated manuscript of the Material *Madica of dioscorides*, which had been sent as delicate present to Abdul Rahman III from the Byzantine Emperor Constantine II.^{xxxvii}

The great French surgeon Guy de chauliac(1300-1368 AD) in his work *chiugia magna* (great surgery itself used as medical text for ore them 300 year) quoted *Albucasis* more than 200 times. In 1471 *Al-Tasrif* was printed in Venice, and quickly became a standard medical text. As a late as the sixteenth century, Another French surgeon Jacques Dalechamps(1513-1588 AD) was quoting *Al-Tasrif*. *Albucasis* had well earned his title of "the chief of all surgeon" as Italian translator Pietro Argallate(d.1423 AD) called him in fifteenth century.^{xxxviii} Al-Zahrawi wrote another medical work entitled in the Latin translation *liber servitoris*: book xxviii of this treatise was published in Venice in 1471 by Nicholas Jenson. It was translated into Latin by Simon Januensis and Jew Abraham of Tortosa. A Latin version is in the British museum. This compilation described the medical preparation obtained from mineral, plants, and animal, and represents an early example of

chemistry applied to the practice of medicine.^{xxxix} The other Christian western scholars were Rogerious Frugardi, Rolandus Pernensis, Arnald of villanova has been translated *Al-Tasrif*. These translation works were used in various institutions of Europe as the text book and the main work on medical science. It is consequently he could not exercise so much influence on Muslim east. His writing became the landmark for future physicians to guide and encouraged them and he also emphasised on importance on human anatomy and physiology. He discussing the brain disclosed that it has three factions, memory thought and imagination.^{xl}

Some of His Work Not Consider

It is height level of dishonesty or ignorance by western historians of medicine that some of the most original inventions of Al-Zahrawi are ascribed to western physician's surgeons. For example, the obstetric position known as the Walcher position after used by German physician Walchar(d. 1935) but that was first successfully applied by Al-Zahrawi. Likewise, Al-Zahrawi was also the inventor of the obstetric forceps for the sake of facilitating the task of delivery in cases of emergency. But the credit for this invention is erroneously given to peter chamberlen I (1560-1631), physician to James I and his wife. It is said that this instrument was kept a directly guarded secret by the succeeding generations of his family for a long period of time.^{xli}

Conclusion

I conclude that after writing this paper we understand that al-Zahrawi was the distinguished surgeon of the medieval period and his encyclopaedic book *Al-Tasrif* has crucial information of surgery that is useful in today's medical science. This have shows tremendous impact of al-Zahrawi on western medicine. Along with Al- Zahrawi, Ibn Sina, al- Razi, al-Khwarizmi and others were have a great impact on west because Islam always encourage the human towards science. Prophet Mohammad (pbuh) gave huge emphasis on medicine and other scientific work. Many ayat of Quran stressed upon reason, logic, understanding of the universe. The people of medieval period were passionate to understand of Quran that why that period is called the period of *golden age*.

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- ⁱ Campbell, Donald, *Arabian medicine and its influence on the middle ages*, Amsterdam, philo press, 1926, p-85 see also Browne, Edward G., *Arabian medicine*, Cambridge, university press, 1921,p-97
- ⁱⁱ Abdul Rahman was caliph of Spain of Umayyad dynasty in 912-961 AD
- ⁱⁱⁱ In brief life history of al-Zahrawi see Said, Hakim Mohd., *Medieval Muslim Thinker and Scientist*, Renaissance Publishing House Delhi,1991, p-59. This book provides a heart warming glimpse of golden period of Muslim history and invited Muslim to develop the glories tradition of Muslim.
- ^{iv} *Health Science in early Islam*, collected by Hamarneh, Sami k., and edited by Anees, Munawar A., vol-II, Noor Health foundation and Zahra publication, 1925, p-39
- ^v The medical practice or technique of *cauterization* is the burning of part of a body to remove or close off a part of it in a process called *cautery*, which destroys some tissue, in an attempt to mitigate damage, remove an undesired growth, or minimize

other potential medical harmful possibilities such as infections, when antibiotics are not available.^[1] The practice was once widespread for treatment of wounds

^{vi} Dissection is the process of taking apart a dead body in order to study it - this is performed routinely on human and animal cadavers by students learning anatomy. Vivisection is the process of taking apart a live body for the purpose of studying it - this is different from surgery, as vivisection results in the death of the organism being studied. See Hitti, Philip K., *History of the Arabs*, sixth edition, London, Macmillan and Company LTD, 1958, p-577 for the paragraph.

^{vii} Hitti, Philip K., *History of the Arabs*, op.cit.,p-577

^{viii} Hitti, Philip K., *History of the Arabs*, sixth edition, London, Macmillan and Company LTD, 1958, p-576

^{ix} Midwifery is a health care profession in which providers offer care to childbearing women during pregnancy, labor and birth, during the postpartum period, and between pregnancies.

^x *Materia medica* is a Latin medical term for the body of collected knowledge about the therapeutic properties of any substance used for medicines.

^{xi} *Health Science in early Islam*, collected by Hamarneh, Sami k., and edited by Anees, Munawar, op. cit,p-391

^{xii} Hamarnah, S.K., *Dictionary of Scientific Biography*,vol-xiv, P-584 see also *Encyclopaedia of Islamic science and scientist*, edited by Kirmani, zaki, and N.K. Singh, vol.4 New Delhi, Global vision publishing House, 2005,P-1140

^{xiii} Hamarnah, S.K., *Dictionary of Scientific Biography*, op. Cit., P-584

^{xiv} *Litharge* is one of the natural mineral forms of lead oxide, PbO. Litharge is a secondary mineral which forms from the oxidation of *galena ores*

^{xv} *Verdigris* is the common name for a green pigment obtained through the application of acetic acid to copper plates or the natural patina formed when copper, brass or bronze is weathered and exposed to air or seawater over a period of time. and for paragraph ref. see *Encyclopaedia of Islamic science and scientist*, edited by Kirmani, zaki, and N.K. Singh, op. Cit., pp-1140-41

^{xvi} Hitti, Philip K., *History of the Arabs*, op.cit.,p-577

^{xvii} *Health Science in early Islam*, collected by Hamarneh, Sami k., and edited by Anees, Munawar, op. cit,p-391

^{xviii} Campbell, Donald, *Arabian medicine and its influence on the middle ages*, Amsterdam, philo press, p-86; see also Nasr, Seyyed Hossein, *science*

- and civilization, Harvard University Press, Cambridge, Massachusetts, 1968, p-214.
- ^{xix} Hamarneh, S.K., *Medicine and pharmacy in al-Andalus (tenth-twelfth centuries)* in Hamdard Medicus, Pakistan, vol. Xxxvii (October-December 1995), No.14, p-13,
- ^{xx} *Health Science in early Islam*, collected by Hamarneh, Sami k., and edited by Anees, Munawar, op. cit, p-152
- ^{xxi} Ibid, p-39
- ^{xxii} The definition of *lozenge* is not strictly fixed, and it is sometimes used simply as a synonym for *rhombus*. Most of the time, *lozenge* refers to a *thin rhombus* and a *rhombus* with acute angles of 45°.
- ^{xxiii} Hamarneh, S.K., *Medicine and pharmacy in al-Andalus (tenth-twelfth centuries)*, op. cit., pp-13-14
- ^{xxiv} Ibid, p-15
- ^{xxv} Incision, a cut into a body tissue or organ, especially one made during surgery.
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- ^{xxxii} Hamarnah, S.K., *Dictionary of Scientific Biography*, op. Cit., p-584
- ^{xxxiii} Dr. Ali, Abdul., *Eminent Arab-Muslim Medical Scientists*, op.cit., pp-78-79; cited from Azmi, Hakim Altaf Ahmad, *contribution of Muslim surgeon to the development of surgery during the middle age*, in the journal studies history of medicine, New Delhi, vol, viii (march- june 1984), Nos, 1&2, p-51, see also Fariduddin Baquai, *Surigical techniques of Abdul Qasim al- Zahrawi*, proceeding of the first international conference on Islamic medicine, Kuwait, 1981, p-280
- ^{xxxiv} Gerald of Cremona (1114-1187) was the greatest of the early translators of Arabic works into Latin. Who is credited to be the greatest translator of the west who translated a large number of mathematical, astronomical, and medical. He was also translated ibn sina's work *al Qanun fi al tibb* and *Kitab al-tibb al Mansuri* (an encyclopaedia of medicine) and al Khwarizmi's work *Hisab al-Djabr wa' l-Mukabala* with the Latin title *al – Goritmi de numero indorum*.
- ^{xxxv} Campbell, Donald, *Arabian medicine and its influence on the middle ages*, op.cit., pp-87-88
- ^{xxxvi} For detail of influence of al-zahrawi on west see Ibid, pp-89-90, see also Hitti, Philip K., *History of the Arabs*, op. Cit., p-577
- ^{xxxvii} Hitti, Philip K., *History of the Arabs*, op. Cit., p-577
- ^{xxxviii} Ramen, fred, *Albucasis (Abu al-Qasim al-Zahrawi): renowned muslim surgeon of the tenth century*, New York, the Rosen publishing group, inc. 2006, p-90
- ^{xxxix} Western much inspire to al- Zahrawi and his work translated into Latin and many European language see Campbell, Donald, *Arabian Medicine and its influence on the middle age*, op.cit. ,p-90
- ^{xl} *Health Science in early Islam*, collected by Hamarneh, Sami k., and edited by Anees, Munawar, op. cit, p-151
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