

MUSLIM INVENTIONS AND THE GLOBAL FIGHT AGAINST COVID-19

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Abstract: COVID-19 has wreaked havoc all across the globe, whether it be through the rising number of cases, deaths, lockdowns, economic slowdown or just the media induced panic. In this sense we are all affected by the 'virus'. As the world grapples with this pandemic, there is a notable resonance with the past, especially between the global defense against the pandemic and the great medical innovations of the Islamic golden age. During the Islamic scientific revolution, Muslims became pioneers in the field of medical science. Inspired by the Quran and the various Hadith that consider the science of healing a sacred endeavor, Muslims made ground breaking discoveries in different areas of medicine like anatomy, pharmacology, physiology, surgery, epidemiology and so on. These contributions led to the significant growth in the field of medical science and its various branches and went on to influence the modern medical revolution. In the present survey an effort is made to discuss the historical roots of the global medical response and measures made to combat the COVID-19 pandemic and the various significant contributions of medieval muslim scientists in this field.

Keywords: COVID-19, inventions, Islamic golden age, Islamic medicine, Islamic science

Abstrak: COVID-19 telah mendatangkan malapetaka di seluruh dunia, baik melalui peningkatan jumlah kasus, kematian, *lockdown*, perlambatan ekonomi, atau hanya kepanikan yang dipicu oleh media. Dalam pengertian ini kita semua dipengaruhi oleh 'virus'. Saat dunia bergulat dengan pandemi ini, ada resonansi penting dengan masa lalu, terutama antara pertahanan global melawan pandemi dan inovasi besar dalam dunia medis pada zaman keemasan Islam. Pada masa revolusi keilmuan Islam, umat Islam menjadi pionir dalam bidang ilmu kedokteran. Terinspirasi oleh Al-Qur'an dan berbagai Hadis yang menganggap ilmu penyembuhan sebagai upaya suci, umat Islam membuat terobosan penemuan di berbagai bidang kedokteran seperti anatomi, farmakologi, fisiologi, bedah, epidemiologi, dan sebagainya. Kontribusi ini menyebabkan pertumbuhan yang signifikan di bidang ilmu kedokteran dan berbagai cabangnya yang kemudian memengaruhi revolusi medis modern. Dalam survei kali ini, dilakukan upaya untuk membahas akar sejarah terkait respon medis global dan langkah-langkah yang dilakukan untuk memerangi pandemi COVID-19 dan berbagai kontribusi signifikan ilmuwan muslim abad pertengahan pada bidang ini.

Kata Kunci: COVID-19, invensi, zaman keemasan Islam, pengobatan Islam, ilmu Islam

Introduction

Between the 9th and the 18th centuries Muslims made pioneering discoveries and inventions in the field of medicine. The primary impetus and inspiration for the development of Islamic Medicine was the Quran and the various statements of the Prophet Muhammad (pbuh) related to health, well being and the virtue of caring for patients. The Quran is described as a Book of healing or *shifa* (Q.S. 17:82) for the body and soul. Prophet Muhammad (pbuh) said, "*There is no disease except that Allah has sent down a cure for it*" (Sahih Bukhari: 5678). These provided the required enthusiasm and impetus for the early Muslim community to develop the medical field. Muslim Physicians like Ibn Sina, Abdul Latif Baghdadi, Ibn Hayyan, Ibn Nafis, armed with the prophetic exhortation that "*wisdom is the lost property of the believer. He takes it from wherever he finds it*" (Tirmidhi: 2687), found religious sanction in studying Greek physicians like Galen and Hippocrates. After introducing Greek theories in the Muslim world, they built on them, incorporated Islamic ethics, experimental approach and original research, thus finally creating a medical system that was a projection of Islam in the medical field.

Medicine was one the first few sciences, along with astronomy that saw its inception in the very lifetime of the Prophet Muhammad (pbuh). A new kind of medicine emerged in the formative years of Islam called Prophetic medicine. This was a collection of hadith that outlined general hygiene practices, recommended treatments for some diseases and rules related to eating, drinking, and other activities. The

famous scholar Ibn Qayyim al-Jawziyya compiled all of these in his book, *Tibb al-Nabawi* (Prophetic Medicine) which today is the primary source of Islamic Homeopathy.

Prophetic Medicine led to the development of medical science in the Islamic world and as a seed it grew into pioneering research and ground breaking encyclopedic works pertaining to different branches of medicine-Ophthalmology, epidemiology, psychology, pediatrics, gynecology, psychotherapy, hematology, dentistry, surgery, biomedical engineering, medical ethics and so on. To some the term 'Islamic Medicine' or 'Islamic Science' is not appropriate as they claim that science being a secular field has little to nothing to do with any religion. But this is not true in the case of the Islamic Golden Age. The science that was developed in the Islamic world, deserves to be called 'Islamic' not just because it was produced by Muslims. As a matter of fact, many non-Muslims made important contributions to the growth and development of Islamic science. Rather, these sciences deserve the name 'Islamic science' because they are, conceptually speaking, organically related to the fundamental teachings of Islam, the most important of which is the principle of Tawhid. Islamic medicine, in particular, is primarily based upon principles which are derived from the basic teachings of Islam (Bakar, 1991)

Muslim doctors pushed the boundaries of medical science into bold new places and sought to provide the best care and advice they could during epidemics and outbreaks of infectious diseases, and today the guidance given by governments and health practitioners across the world is remarkably similar. The Islamic world encountered a number of pandemics during the course of its history. This enabled Muslim physicians to gather sufficient expertise on the subject of epidemiology. It is imperative to understand that while the Islamic civilization is a theocentric civilization and there are numerous statements of the Prophet Muhammad (pbuh) regarding epidemics being a 'punishment from God' and 'martyrdom for the believers' (Sahih Nukhari: 5402). But such a metaphysical view on epidemics did not deter Muslim scientists from addressing the challenge of an epidemic in a scientific manner. The Muslim civilization balanced these two parallel and self containing visions of reality; one being the physical and scientific aspect of an epidemic and another being the metaphysical explanation of why such a phenomenon occurs. Unlike Christian Europe, the Muslim world did not accept one view at the cost of the other, neither was one view considered more logical than the other. These were accepted as being different sides and reflections of the same phenomenon.

Dr Osman Bakar elaborates,

"Islamic Medicine must be ranked amongst the most developed and the most effective medical systems the world has ever known. During the long period of its history, it initiated new medical practices and gave birth to new medical and health institutions which made possible a more systematic organization and development of preventive medicine, medical education, medical ethics, drug production, registration and distribution than ever seen before. These new practices and institutions remain to this day a part and parcel of the very organization of the modern medical system" (Bakar, 1990).

Today more than ever before, the world has understood the critical importance of the medical field in national and international affairs. A nation's medical innovations and quality of institutions now serve as a vital index to evaluate its ability to deal with crisis. Medical infrastructure and facilities in hospitals, a sufficient supply of protective gear, disinfectants and the urgent need for vaccines are the main requirements of countries around the world. And it is here that we find a profound resonance with our past. Therefore, out of the various medical innovations of the Islamic golden age and its great medical revolution we will be taking a look at a few that have served as our guard and global defense against the current COVID-19 crisis.

Medical Inventions in The Islamic World and Their Relevance in The Current World

Microbiology and the Germ Theory

The germ theory or pathogenic theory of disease, being the currently accepted scientific theory for many diseases, states that microorganisms known as pathogens can lead to disease. Diseases caused by pathogens are called infectious diseases and often become epidemics like our current pandemic of COVID-19. Muslim scientists were pioneers of the field of Microbiology or the study of microorganisms even before the invention of the microscope. The existence of unseen microbiological life was postulated in the late Middle Ages by Muslim physicians like Ibn Sina in 1025 who in his book the Canon of Medicine

writes that his study of contagious diseases eventually led him to conclude that germs are the main carriers of disease. He states explicitly that *"bodily secretion is contaminated by foul earthly bodies before contracting infections"* (Tschanz, 2017). This is popularly known as Ibn Sina's Microbe theory.

Andalusian physician Ibn Khatima while staying indoors during the Black Death made best use of his 'quarantine' period by studying the nature of the disease and tending to patients. His findings are recorded in his book *Tahsil Gharad al-Qasd fi Tahsil al-Marad al-Wafid* (The fulfilment of the Inquirer's Aim Concerning All About the Invading Epidemic) (Syed, 2002). He is credited to be the first to discover bacteria and microorganisms, centuries before Antonie van Leeuwenhoek (1676), the Dutch scientist who was ridiculed for his discovery of the microbial world using a single-lens microscope of his own design.

Ibn al-Khatib, another Andalusian polymath in the 14th century explored the idea of transmission of disease through contagion, centuries before Louis Pasteur conducted his experiments in Europe. In his treatise, *On the Plague*, Ibn al-Khatib writes, *"The existence of contagion is established by experience [and] by trustworthy reports on transmission by garments, vessels, earrings; by the spread of it by persons from one house, by infection of a healthy sea-port by an arrival from an infected land [and] by the immunity of isolated individuals"* (Byrne, 2012). Akshamsaddin, an influential Ottoman religious figure and a mystic saint in the 15th Century postulated the existence of microbes (Taskopruluzade, 2013) and he wrote *"It is incorrect to assume that diseases appear one by one in humans. Disease infects by spreading from one person to another. This infection occurs through 'seeds' that are so small they cannot be seen but are alive"* (Osman, 1969).

Vaccinations and Immunology

Since the beginning of 2020 and the outbreak of the pandemic, there has been a global race to prepare a vaccine for COVID-19. Many pharmaceutical companies have been putting effort into getting a vaccine ready before the end of the year. Among the various medical innovations introduced by Muslim physicians included are the discovery of the immune system and vaccinations (Bin Murad, 1991; Hunke, 1962). Al-Razi distinguished smallpox from measles for the first time in medical history. He went on to write the first recorded theory of acquired immunity, noting that a smallpox infection protected its survivors from future infections. In *Al-Judari wa al-Hasbah*, he explains what was to become the critical first step in the global eradication of smallpox-the concept that a single disease could alter an individual so that he or she became resistant to that disease in the future. The practice of inoculation against small pox became widespread in the Muslim world.

In 1717, Lady Montagu, the wife of an English Ambassador arrived at the court of the Ottoman Empire. While living in Istanbul, she noted that the local practice of deliberately stimulating a mild form of the disease through inoculation conferred immunity (Miller, 1957). An account of the variolation is described by Lady Mary Wortley Montagu in a letter to her acquaintance in 1717 (Stearns, 1950). This is how she introduced Europe (Maitland, 1722) to the modern concept of vaccination as it was practiced in the Ottoman Empire (Woodville, 1796). This import of technology from the Muslim world to Europe played a critical role in the eventual eradication of small pox.

Quarantine and Travel Bans

Islam is essentially a spiritual/religious tradition and a theocentric civilization, nonetheless it emphasizes on the potency of physical causes and importance of taking physical and scientific means. While in the Medieval European world, sacrifices, magic, religious ceremonies were performed and miracles were expected from saints during the outbreaks of epidemics. In the Islamic world the clear instructions of Prophet Muhammed (pbuh) were followed. He (pbuh) said *"If you hear of an epidemic in a land, then do not go into it. If it happens in the area where you are, then do not go out of it"* (Sahih Bukhari, 5396). The Prophet's word was taken as the ultimate guidance on all matters and thus for the first time in history the concept of a public and institutionalized quarantine was developed in the Muslim world. During the reign of the second Caliph Umar, the area of the Levant was affected by an epidemic. Before entering the region Umar was made aware of the situation and he decided to hold a consultation with the earlier

companions of the Prophet (pbuh). Umar along with his entourage did not enter the city and moreover understood this whole event from a spiritual perspective (Tabari,1980).

Many of the Prophet's (pbuh) statements encouraged the practice of social distancing and quarantine in the time of an epidemic. He said, "*The cattle suffering from a disease should not be mixed up with healthy cattle or said "Do not put a patient with a healthy person as a precaution."* (Sahih Bukhari, 5771). He singled out the practice of social distancing with regards to infectious diseases when he said, "*One should run away from the leper as one runs away from a lion."* (Sahih Bukhari, 5707). We have seen from the very beginning of the COVID-19 pandemic that the primary reason for the rapid spread of the infection and its vast reach across the globe was due to infected people, whether symptomatic or asymptomatic travelling from one location to another. The most effective way to confine and contain the spread of the infection was lockdowns and travel bans.

Hospitals

One of the greatest achievements of Islam and its significant contributions to the modern world is the institution of a hospital. While other civilizations had health care centers, the institution of a hospital is an invention of the Islamic civilization (Tschanz, 2003; Miller, 2006). The first hospital in Islam was the mobile hospital, located in a tent during the Battle of Khandaq (627 CE) set up by the instruction of the Prophet (pbuh) himself. Quickly the idea of mobile hospitals evolved into fully functional hospitals in all the big cities of the Muslim world. Between the 9th and 13th centuries five hospitals were built in Baghdad, Damascus and Cairo, Rayy and Mecca and Medina. These were called Bimaristans.

Resembling the modern hospital complex, these Bimaristans were the first to require medical diplomas to license doctors. Medical students were given rigorous training both in theory and medical practice by the chief physician of the Bimaristan. Only after passing the final exam would the students receive a license to practice medicine. The Bimaristans had separate wards for different diseases, a library for doctors, a pharmacy and a laboratory within the building. Every department had an officer-in-charge and a supervising specialist. By the 10th century laws were passed to keep hospitals open 24 hours a day. Baghdad was also known to have a separate hospital for convicts. (Khairallah & Haddad, 1936)

The concept of a hospital as a secular public institution inspired Europe and eventually became a global necessity of today. It was as late as the 13th Century, that Europe began to adopt the Islamic Hospital (Bimaristan). In the words of historian George Sarton, "*We have reason to believe that when, during the crusades, Europe at last began to establish hospitals, they were inspired by the Arabs of the Near East. The first hospital in Paris, was founded by Louis IX after his return from the crusade of 1254-1260*" (Sarton, 1948). But while the hospital may be a Muslim invention, there is a big difference between the Islamic hospital and the modern hospital and healthcare in general. The Islamic hospitals or Bimaristans were 100% free, complete philanthropic institutions. Even though the budgets were high for the maintenance of these complexes, the salaries of the doctors etc, all of that was taken care of by state endowments or waqf (Islamic trusts). On the contrary modern healthcare is a highly capitalistic corporate enterprise.

Soaps

During the first few weeks of the outbreak of the COVID-19 pandemic, the World Health Organization issued a global advisory emphasizing on hand hygiene to prevent the spread of the virus. The regular hand washing throughout the day has now become a part of our daily regiment. Islam as a complete way of life, emphasizes on personal and public hygiene. The first and foremost Islamic injunction of *Salah* or prayer places the ritual washing (Ghusl and Wudhu) as its primary condition. Muslims are required to pray five times a day and that requires obligatory washing of hands, face, arms, nose, ears etc called *Wudhu*. The Prophet (pbuh) called hygiene and cleanliness half of faith (Sahih Muslim: 223). That tells us the central position of hygiene in the religion of Islam. It was because of influences like these that Muslims invented hard soaps (Al Hassan, 2001).

Consequently, in the Muslim world, soap making became an established industry. Recipes for soap making are found in Razi's books. Soaps are made by mixing fatty oils or fats with alkali. Even Alkali is a Muslim invention and the name Alkali is a transduction of the Arabic name for the substance *alqeli*. In Journal of Islam and Science Vol 8, No. 1, January-June 2021

Syria, soap production was a thriving industry where Alkalies were mixed with olive oil and lime. Colored and scented soaps were imported from Syrian cities to the rest of the Muslim world and eventually introduced into Europe.

Disinfectant Alcohol

The most important tool against viruses today are sanitization substances that have rubbing alcohol. Used excessively in medical environments to protect against the spread of pathogens, disinfectant alcohol is an invention of the Islamic golden age. Muslims were pioneers of experimental chemistry which differed greatly from the Greek pseudoscience Alchemy. Chemists like Jabir bin Hayyan and Abu Bakr Razi established the experimental method in the practise of chemistry. Jabir bin Hayyan perfected the process of Distillation and its equipment which has been more or less the same that is used today to distill out petrol, diesel, kerosene from crude petroleum.

While the consumption of alcohol is prohibited in Islam, Muslim scientists were the first to realize the medical properties of alcohol. The word 'alcohol' like 'alkali' is of Arabic origin, as Muslims pioneered the distillation of alcohol. Ar-Razi was the first to introduce what we today know as rubbing alcohol (Al Hassan, 2001). This is used all over the world as a disinfectant and an important weapon today in the global fight against COVID-19.

Conclusion

Thus a historical sketch has been drawn to understand and analyze the remarkable role Islamic Science played in the development of Modern medicine. Many of the things we take for granted today find their inception in the Islamic Scientific revolution. Islamic medicine influenced the development and growth of Modern medicine. The books of famous Muslim physicians like Ibn Sina and Zahrawi were standard medical texts in Europe up until the 18th century. Many of the medical tools and facilities that define our global defense against the COVID-19 crisis, were innovations of the Islamic medical revolution.

References

- Ahmad Y, al-Hassan. 2001. *The Different Aspects of Islamic Culture in Science and Technology in Islam: Technology and applied sciences*. UNESCO Publishing.
- Bakar, O. 1991. *History and Philosophy of Islamic Science*. Cambridge: The Islamic Texts Society.
- Baker, O. 1990. The Philosophy of Islamic Medicine and Its Relevance to The Modern World. *MAAS Journal of Islamic Science*, 6(1), 39-58.
- Bin Murad. 1991. *Research Into The History of The Medicine and Pharmacology of The Arabs*. Beirut, Lebanon: Dar Al Garb Al Islami.
- Byrne, J. P. 2012. Ibn Khatib, Lisad ad Din in *Encyclopedia of the Black Death*, ed. Joseph P Bryne, Abc Clio Taşköprülüzâde 2013 العثمانيّة في علماء الدولة العثمانية في الشقائق النعمانية *Sbaqaiq-e Numaniya*, v. 1, Dubai: al-Riyāḍ: Markaz al-Turāth lil-Barmajīyāt.
- Hunke, S. 1962. *Shams Al Arab Tastaa Ala Al Gharb (The Arab Sun is Shining on the West)*, translated from German to Arabic in 1991. Casablanca (Morocco): Dar Alafak Al Jadedah.
- Khairallah & Haddad, 1936. A Study of Arab Hospitals in the Light of Present Day Standardization. *Bull. Amer. Coll. Surg.*
- Sarton, G. 1948. Introduction to the History of Science vol. 3. Baltimore.
- Maitland, C. 1722. *Mr. Maitland's Account of Inoculating The Small Pox*. London: J. Downing (Digital Edition by Harvard University Library).
- Miller, A. C. 2006. Jundi-Shapur, Bimaristans, and The Rise of Academic Medical Centres. *Journal of the Royal Society of Medicine*, 99(12): 615–617.
- Miller, G. 1957. *The Adoption of Inoculation for Smallpox in England and France*. Philadelphia: University of Pennsylvania Press.
- Stearns, R. P. 1950. Remarks Upon The Introduction of Inoculation for Smallpox in England. *Bulletin for the History of Medicine*, 24: 103-22.
- Syed, B. I. 2002. Islamic Medicine: 1000 Years Ahead of Its Times. *Journal of the Islamic Medical Association*, 2: 2-9.
- Tabari, 1980. *Tarikh al Rusul wal Muluk*, Cairo ed, 3: 613.
- Tschanz, W. D. 2017. Arab Roots of European Medicine. *Saudi Aramco World*, 68(2): 22-27.
- Uludağ, O. Ş. 1969. *Beş Buçuk Asırlık Türk Tabâbet Tarihi (Five and a Half Centuries of Turkish Medical History)*. Istanbul.
- Woodville, W. 1796. *The History of The Inoculation of The Smallpox in Great Britain*. London: J Phillips.