Medical Inventions in the Abbasid Caliphate and their Development in the Present Era

Toryalai Hemat¹ and Nasar Ahmad Hamid²
1Vice-Chancellor of Academic Affairs and Lecturer, Faculty of Law & Political Sciences, Rokhan Institute of Higher Education, Jalalabad, Afghanistan.
2Lecturer, Rokhan Institute of Higher Education, Jalalabad, Afghanistan.

Corresponding Authors’ Emails: Hemat_safi58@yahoo.com, nisarhamid399@gmail.com

Abstract

Aim: This research aimed at collecting information relating to the attention of the rulers in the Abbasid Caliphate on medical inventions and the innovative forms of the achievements in medicine in the current era.

Methods: The doctrinal research methodology and descriptive, explanatory, analytical, and comparative research approaches were used in this study. It is worth mentioning that this research study is entirely based on library sources.

Results: The study found that medical inventions such as construction and development of hospitals, the production and use of surgical wound sutures, the appointment of medical professionals and scholars from the various parts of the globe, first time eye, nose, and tonsillectomy surgeries happened during Abbasid Caliphate. Also, the training of some famous medical professionals and doctors like Abu Bakr al-Razi, Abul Qasim al-Zahrawi, Ibn al-Nafis, Ibn Sina, Ibn al-Haytham, and Mahzab al-Din al-Baghdadi were the developments and inventions during the era of Abbasid Caliphate.

Conclusion: Special attention was paid to the profession of medicine in the Abbasid Caliphate and many inventions and developments in the field of medicine took place.

Recommendation: The study recommended Ministry of Public Health to organize scientific and research seminars on the personalities and achievements of famous Muslim doctors of the Abbasid Caliphate. This will assist medical doctors and other professionals of the modern era to get more reliable information about the developments, progress, and inventions of the Abbasid Caliphate era and use and take advantage of the inventions, experiences, and instructions in their professional careers.

Keywords: Abbasid Caliphate, medical inventions, surgical wound sutures, medical surgery.

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INTRODUCTION

The blessed religion of Islam is a complete and inclusive religion that has given instructions for the regulation of all aspects of life in light of the provisions of the Holy Quran. As a result of the hard work and effort of Muslims in many fields since the beginning of time, doors to inventions and developments have been opened, which has been good for society. Muslims have many achievements in various aspects of life such as education, science, chemistry, and especially in the field of medical sciences. In the chain of Muslims’ developments and innovations, the actions of the Abbasid Caliphate in various areas are worth mentioning.

During the sovereignty of the Muslim Ummah, there were many developments and achievements in politics, education, administration, governance, agriculture, economics, social life, and especially the medical sciences, which are considered the basis for the medical innovations of the modern age. Furthermore, in the Abbasid caliphate, many laws and regulations were enacted in the field of medical science. As well as, the Abbasid Caliphate not only was limited to inventions and developments but also a lot of work has been done on the quality and standard of the medical sciences. For instance, taking a final exam from the graduates of medical sciences, which is still continuous in the modern era under the concept of an exit exam.

Problem Statement

Although books related to Islamic shariah and culture are taught in medical faculties in Afghanistan, topics related to medicine from the Islamic perspective, especially the history of medicine in Islamic societies and related achievements, are not taught much. After appearing as doctors, the doctors rely those books to be guided on how to go forward in the case of treatment and disease diagnosis. That is why the people in medical profession remain detached from the history and achievements of medicine in Islam. The information collected on a regular basis during the research can be a good source for doctors and related professions. This will help them to know about the medical achievements of Muslims, especially the Abbasid Caliphate, and their own innovations.

Research Questions

1. How much attention have the Abbasid caliphate's rulers given to the medical field?
2. What inventions and achievements were made in the field of medicine during the Abbasid Caliphate?
3. To what extent are the inventions and developments of the Abbasid Caliphate promoted in the modern era?

Research Objectives

1. To provide information about the era of the Abbasid Caliphate regarding the inventions and developments in the field of medicine.
2. To comparatively analyze the inventions and achievements in the era of the Abbasid Caliphate.
3. To clarify to what extent the inventions and developments of the Abbasid Caliphate are promoted in the modern era.
LITERATURE REVIEW

Marjuna (2016) published a book titled Health Care in Iraq During the first Abbasid Era: A Historical Study. In this book, the achievements and inventions of the Abbasid Caliphate in the medical field are described in depth and detail. The difference between this research study and the content of the book is that the book has only mentioned the medical achievements of the Abbasid period; this research study has clarified and well explained the continuation of the achievements and inventions in the modern era.

Talib and Ramash (1945) published a book titled Al-Jazair "Physicians and Medical Sciences in Iraq during the Abbasid Caliphate Era. In this publication, they talked about the history of well-known doctors as well as medical inventions and achievements. The difference between this research study and the master's thesis is that the thesis only talked about famous doctors and their inventions in the Abbasid Caliphate under a certain title. On the other hand, this research study not only talked about the doctors' achievements but also talked about how they are still used today.

al-Arjani published in (2013) a book entitles The Story of Medical Sciences in Islamic Civilization. The author has generally given the information and analyzed it in the field of medical sciences in the pre-Islamic and post-Islamic eras. The difference between this research study and the research of Dr. Raghib Al-Arjani is that Dr. Raghib Al-Arjani has discussed the achievements in the field of medical sciences in the pre-Islamic and post-Islamic eras, while this research study covers the achievements and inventions of Muslims only in the Abbasid caliphate.

RESEARCH METHODOLOGY

The systematic research approach was used in this study. It is worth mentioning that this research study is entirely based on library sources. References were secondary sources that include textbooks, scholarly published and unpublished journal articles, medical reports, and online websites related to the research topic.

FINDINGS

The Importance of Medicine in Islam

The blessed religion of Islam has emphasized seeking knowledge for every Muslim. Almighty Allah says in the Holy Quran, "O Prophet," in the name of your Lord, who created. (Deobandi, 1414). In the above Quranic verse, reading, learning, and knowledge are greatly emphasized. There is no doubt that the problems of various parts of human life can be solved with education, and the survival and development of human life are dependent on good health. Progress and development in the medical field are not possible without seeking knowledge and education, which is one of the legitimate purposes of protecting one's own health and the health of others. Because of good health and other aspects of life, the worship of Almighty Allah can be done in a good way. In order to save mankind, promoting and working to strengthen the medical field is very essential. Moreover, the profession of medicine should be equipped in such a way that it can correctly diagnose and treat human diseases and provide ways of healthy living.

Almighty Allah says in the Holy Quran that we send down from the Qur'an that which is healing and mercy for the believers, but it does not increase the wrongdoers except in loss. (Deobandi, 1414). It infers from the above-blessing verse that it is useful to treat illness, and the Qur'an is a book whose verses are about curing (shefa), so it means that the holy book of Quran allows people
to work for the development and betterment of the medical sciences. In another verse, Almighty Allah states that whoever saves one, it is as if he had saved mankind entirely (Al Quran, 5-32). Besides the Holy Quran, the prophet Mohammad (SAW) said, "There is no disease that Allah has created, except that he has also created its treatment" (Bukhari, 2018).

Medicine is a theoretical science that the blessed Shari’ah has allowed to get its knowledge because the medical sciences cure people’s illnesses (Al- Razi, 2003). There are two sciences in the world which are religious, which is jurisprudence (Fiqh), and the medical sciences (Al-Bayhaqi, 1970). Furthermore, medical science is important because the doctor's opinion is reliable when the patient needs it. If there had been no doctor, there would have been many problems for the patient (Al-Nawawi, 2006).

The Historical Background of the Medical Sciences in the Muslim World

Before Islam, there was no education, knowledge, or progress in human society. Ignorance was the norm in the Arab Peninsula. Instead of a professional medical science, illness was being treated unprofessionally based on the elder’s experiences and home-made remedies, which sometimes worsened the health of individuals. There were medical developments in the countries of the Arabian Peninsula, such as in 331 BC when people were getting their graduation certificates from the medical school of Galen in Alexandria. Furthermore, there was another medical school in Alexandria called Nusaybin. As well, there was a medical school named Gundeshapur in the city of Antioch, Spain (Al-Shaibani, 2005).

The king of Persia, Noshiwan, instructed his followers especially the medical professionals to translate the Greek medical books into Persian so that they could easily use them and create innovation in the medical sciences. Apparently, in the post-Islamic era, knowledge took the place of ignorance, and facilities were created for human life in various areas, especially in the field of medicine. In the post-Islamic era, especially in the Umayyad Caliphate, many academic efforts were carried out in the fields of science and culture, and people wanted to seek knowledge and make positive changes in their lives (Al-Shaibani, 2005). During the caliphate of Hazrat Umar Ibn Abdul Aziz, an Israeli doctor (Masar Jawieh), a resident of Basra, Iraq, was obliged to start the translating of medical books from Syriac to Arabic. The process of medical book translation was expanded during the Abbasid Caliphate when various books were translated from different languages into Arabic. Ishaq and his niece Habish translated Syriac and Greek books into Arabic and published them (Al-Shaibani, 2005).

Muslims, especially medical doctors, made good use of the translated medical books and later authored their own special medical books. These books were published in various other countries, and thus the world benefited from the achievements of Muslims in the medical sciences. The books of medical sciences authored in the Abbasid caliphate had many characteristics and privileges. For instance, chapterization, detailed explanations of each topic, and the usage of a comprehensive language. When Abu Jafar al-Mansur, the second caliph of the Abbasid Caliphate, got sick, doctor Jor Jess treated him (Al-Shaibani, 2005). After treating the Caliph, the doctor settled in Iraq, while other members of his family also returned to Iraq to work in the field of medicine. As a result of the special attention given to medical science by the Abbasid Caliphate and the arrival of doctors from other neighboring countries, medical science made great progress and achieved many achievements (Al-Shaibani, 2005).
The Relationship between a Medical Doctor and a Caliph in the Abbasid Caliphate

Naturally, every human being can get sick and then need a medical doctor to treat him. In the Abbasid Caliphate, a medical doctor and a caliph had very good relations. Officially, the relationship between the royal court and the doctors started in the period of Bani Umayyad in 134-21Hijri (Ahmadvand, 2017). Historical narrations show that important members of the Caliphate family did not eat anything without the advice of doctors. The doctors sought financial support from the caliphs and ministers or the royal court until Gabriel bin Bakhtishu constructed the first hospital in Baghdad under the guidance of the rulers. Moreover, on the recommendation of Haroon al-Rashid and Mamoon al-Rashid, medical doctors from Gundeshapur started translating medical books from Greek to Arabic (Zadeh, 2018). The special physician of Caliph Harun Rashid, Gabriel bin Bakhtishu, used to do cupping twice a year for Harun Rashid and was also paid 10,000 dirhams monthly from the royal court (Kaviani, 2015).

Famous Hospitals in the Abbasid Caliphate

**Baghdad Hospital**

During the reign of Caliph Abu Ja'far al-Mansur Abbasi, Baghdad Hospital was built. It was thought to be the first hospital in the Abbasid Caliphate. At that time, most of the medical staff was from Gandhishapur and related to Bakhtishua's family. Caliph Abu Jaafar al-Mansur Abbasi had stomach problems and a lack of appetite. Doctor Georges was taking care of him and helping him get better. And in fact, Georges was the first doctor to start working in the Baghdad hospital, and he recommended the Caliph eat less. Later, during the reign of Haroon al-Rashid, in 171 AH, Baghdad hospital was expanded, and some of its parts were named after Caliph Haroon al-Rashid. When Harun al-Rashid got a headache, the doctors at Baghdad Hospital were unable to treat him. Then Bakhtshiwa bin Jurgis was called by Gandhi Shapur, accompanied by Masawiya (Yohanna), a famous doctor, and a pharmacist, to treat the Caliph. Bakhtishu was appointed as the head of the medical staff and was given a monthly salary of 10,000 dinars. In the Baghdad hospital, not only were diseases cured but also medical sciences taught. Many Muslim doctors like Abu Bakr al-Razi and the family members of Bakhtshiwa graduated from Baghdad Hospital and were hired as instructors (Kaviani, 2016).

**Bramka Hospital**

Baramka Hospital was built in Baghdad during the reign of Yahya bin Khalid Barmaki. The head of this hospital was Indian doctor Ibn Dehan, who came from Gandhi Shapur, accompanied by another Indian doctor, Minka. According to the narrations, Yahya bin Khalid was very interested in Indian doctors and wanted to have more information about India, so he appointed a number of Indian doctors to translate Hindi books into Arabic. And his interest in India also caused him to send a number of people to India, who collected information in the form of a book and named the book "The Book on the Nations of India and Religions" (Kavian, 2016).

**Waleed Bin Abdul Malik Hospital**

Waleed Bin Abdul Malik, who was in charge at the time, built Waleed Bin Abdul Malik Hospital in Damascus, Syria. Mostly leprosy patients were treated here, and most of its activities were dedicated to the treatment of such patients. The Caliph granted many privileges to doctors like Gandhi Shapur, who worked in the hospital. Since leprosy was a contagious disease, hospital
doctors and staff were given high privileges and were forbidden to go outside. In fact, at that time, the decision was made not to leave the doctors outside of the hospital to prevent the transmission of the disease and to protect the people. Not leaving doctors outside of the hospital arena is similar to the concept of quarantine, in which the government decided to protect the people of the community during the Corona pandemic.

Another part of this hospital was reserved for the treatment of the blind, where patients were treated free of charge. For those who did not recover after treatment, the Caliph hired a servant to take care of them and provide free services. There were two types of treatment in Waleed Bin Abdul Malik Hospital. One type was that, after the doctor’s examination and treatment, the patients got discharged. Another type was that the patients were hospitalized for some time. At present, hospitals generally have such services as OPD and IPD. Those patients who are discharged after the diagnosis and treatment. Those patients who are admitted to the hospital after the diagnosis of the disease.

Al-Muqtadriya Hospital

Al-Maqtadriya Hospital, which was located to the west of Baghdad city, was established in the year 306 Hijri during the time of the ruler of the Abbasid Caliphate, Al-Maqtadar Billah Abbasi, on the recommendation of Sunan bin Thabit. Various departments were active in this hospital, including the department of surgery. Free treatment was provided to the patients, and the treatment expenses were paid by the ruler of the time, Al-Maqtadar Billah Abbasi. In addition to the treatment of patients, the students were getting professional training (Essa, 2011).

Abul Hasan Ali Bin Isa Hospital

The hospital was located in the south of Baghdad city next to the tomb of Imam Ahmad bin Hanbal. The hospital was established in the year 302 AH by the minister and secretary of Al-Maqtadar Billah Abbasi, Abul Hasan Ali bin Isa, and was financially supported by him too. Abu Othman Saeed bin Yaqub was appointed as the head of this hospital by Abul Hasan Ali bin Isa. Abu Othman Saeed bin Yaqub was one of the most famous authors who translated various books from other languages into Arabic. (Najmabadi, 2014). This hospital had different departments, including those for leprosy, mental illness, child care, and the treatment of the blind. Besides providing treatment facilities to the public, students in the medical field were trained (Asama Abu Talib

Famous Muslim Doctors in the Abbasid Caliphate

Initial services and works in the medical field were started by non-Muslim doctors from Greece, Egypt, and Andalusia. However, Muslim rulers paid special attention to the medical sciences, and many Muslim doctors were trained in the medical field in the Islamic world and became much advanced. Apparently, there are some names of people who have performed special services and activities in the medical field in the Islamic world and their achievements and experiences are used in medicine in the modern world. Some of the famous doctors of the Abbasid Caliphate are mentioned as follows: Abu Bakr al-Razi, Abu al-Qasim al-Zahrawi, Ibn al-Nafis, Ibn Sina, Ibn al-Haytham, Mahzab al-Din al-Baghdadi.

1. Abu Bakr al-Razi and his medical services

Abu Bakr Muhammad bin Zakaria al-Razi was born in the year 854 in Bukhara. He spent his early life there and then travelled to Baghdad to study. He has accomplished many achievements and

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successes in the field of knowledge, especially in the medical sciences. Throughout his life, he was in charge of various hospitals. Such as Al-Azdi, Ray, and Al-Maqtabriya. He passed away in Baghdad in the year 925 A.D (Al-Dhahabi, 1985).

**Abu Bakr al-Razi’s famous books and compilations**

Abu Bakr al-Razi has written about 200 books in many different fields but most of them are about medicine. His famous books include:

1. **Ktab Al-Hawi fi Eilm Altadawi**, which is written in fifteen volumes and has been translated from Arabic to Latin.
2. **Almansur fay tasharyh** (Mansour in anatomy).
3. **Manafie al'aghdhat wadafe madariha** (food benefits and prevention of its harms) This book discusses the benefits and values of food and how to prevent its harms.
4. **Walhasaa fi alkliy almathana** (stones in the kidneys and bladder) This book deeply discusses the diseases and health of the bladder and also provides information on how to cure the diseases of the kidney and bladder.
5. **Alfasd walhijamuh** (Phlebotomy and cupping). This book discusses the purification and protection of the blood.

Al-Razi said about his authorship memories that "my patience and efforts had reached such a limit that in one year I wrote more than twenty thousand pages." He added that I wrote the book "Al-Jamaa Al-Kabeer" in fifteen years, worked it day and night, even though my eyesight and vision were weak, and used to ask others for help in writing (Shaibani, 2005).

**Abu Bakr Al-Razi’s Medical Inventions**

Abu Bakr al-Razi looked at blood flow for the first time and explained the difference between arteries and veins and how they work. He said that the artery takes blood from the heart and delivers it to all the organs, and the vein collects blood from the organs and delivers it to the heart for purification. In the field of orthopedics, he developed various methods for repairing broken bones. Also, he made his own inventions for the purpose of creating incisions in the bones. Furthermore, special tools and pipes were made to remove the blood from the inside of the body, which is dangerous and caused by any internal injury. He made special sutures from cat intestines to suture wounds during surgical operations. Currently, in modern medical sciences, the term "catgut sutures" is used for the sutures. Abu Bakr al-Razi was famous in the medical sciences for the fact that he used to rely more on the mental state of the patient than on medicine during treatment. He always advised his students to pay attention to the psychological and mental treatment of patients. He added that it is necessary for a medical doctor to counsel and assure the patient of recovery even though the patient is not sure of his health (Dimashqi, 2002).

2. **Abul Qasim al-Zahrawi and his medical services**

Abul Qasim Khalaf Ibn Abbas al-Zahrawi was born in Andalusia, which is now Spain, in the year 936. He is famous in the field of surgery (Al-Amrouqi, 1966).
Abul Qasim al-Zahrawi’s famous books and compilations

Abul Qasim al-Zahrawi has written various books most of which are related to the medical sciences. Some of his books have become so popular that they have been used as study and teaching resources in the medical field in European countries. The most famous book of Abu al-Qasim al-Zahrawi is Altasrif liman eajiz ean altaali (conjugation for those unable to author). This book is in 30 volumes, and all medical issues are described and explained in this book. Abul Qasim al-Zahrawi had dedicated Volume 30 to surgery (Al-Dhabi, 1967).

Abul Qasim al-Zahrawi’s medical inventions

Abul Qasim al-Zahrawi was one of the famous doctors of the Abbasid Caliphate. He not only provided teaching and treatment services in the medical field, but he also made a number of inventions in that field that are still known by his name. Abul-Qasim al-Zahrawi was the first Muslim doctor who performed the first successful eye surgery. He also treated tears and redness of the eyes (fistula). Moreover, he was the first to perform an operation on the extra meat of the nose and also performed tonsillectomy operations. Historical narrations show that Muslim doctors treated dentistry as part of general medicine and that there was no separate and permanent department for dentistry. Generally, the name of Abu Bakr al-Razi is mentioned in the field of dental treatment and dental surgery. In all the above fields, the activities of Abul-Qasim al-Zahrawi are mentioned (Golshani, 2016).

Abul-Qasim al-Zahrawi was the first Muslim doctor to treat dental problems, fix broken teeth, and take out teeth with medical help. He also treated crooked and misplaced teeth. In today’s modern world and medicine, straightening crooked teeth is called orthodontics. Abul-Qasim al-Zahrawi also started to make white and gold coverings for the teeth in order to fix bad teeth and prevent them from getting worse. For the first time, operations were started for those who had speech and language disorders or stuttering, which were successfully performed.

Abul-Qasim al-Zahrawi was the first Muslim doctor to operate on bladder stones. He made such devices based on which the bladder stone was crushed first and then expelled through the bladder pipe through the operation, and these types of operations were only performed on men. Nowadays, advanced forms of these inventions are laser operations. Furthermore, Abul Qasim al-Zahrawi had achievements related to operational procedures in the field of obstetrics, where he used to perform various operations in abnormal births. Special instruments and devices were invented for the birth of a dead child in the mother's womb, and these inventions are continuously practiced in modern shapes and using modern devices. (Ahmad Ibn al-Qasim Ibn Khalifah Ibn Yunas, 2008).

Abul Qasim al-Zahrawi performed the anesthesia procedure on the patient for the first time without experiencing many side effects. Earlier, the medicine for anesthesia was given to the patient in the form of food; however, he invented a new method by dissolving opium, cannabis, and other plants in water and then using a sponge to draw it, putting the sponge in the sun to dry, and placing the sponge near the patient's nose. The same types of procedures are being used in modern medicine by utilizing new and more modern devices and methods (Ahmad Ibn al-Qasim Ibn Khalifah Ibn Yunas, 2008).
Abu al-Qasim al-Zahrawi Medical Laws and Principles

During his time as a teacher and doctor, Abul Qasim al-Zahrawi gave his students some medical advice. At the time, these rules and suggestions were seen as laws and specific principles of medical science. Some of them are still laws and principles of medical science. He always advised his students to avoid prejudice while treating patients. Currently, the principle of avoiding prejudice is used as a health slogan in international medical institutions.

Abul Qasim al-Zahrawi thought that everyone should be treated with respect, so he always told his students to treat all of their patients with respect and care. He used to tell his students that whenever they were performing an operation, a procedure, or treating a patient, they should perform them with extreme care and concentration and think that it was their first time and attempt. Moreover, Abul Qasim al-Zahrawi emphasized that all the procedures should be documented. Nowadays, it is considered mandatory to write a prescription for each patient, to have diagnosis-related documents, and to mention the procedures and history in the special file of each patient (Al-Hazmi, 1994).

He especially emphasized ethical standards and the ethics of medical sciences, and he has always advised his students on the implementation and observance of ethical standards. One of the most important of his recommendations is that medical professionals should not pay too much attention to material things but always try to give priority to spiritual things (Ahmad Ibn al-Qasim Ibn Khalifah Ibn Yunas, 2008). Abul-Qasim al-Zahrawi presented such principles that when a doctor becomes disabled, his contract will be cancelled and he will be fired. According to him, disability is blindness, severe visual impairment, or the disability of a body part that is unable to perform the activities related to the medical profession (Al-Hazmi, 1994).

3. Ibn al-Nafis and his medical services


Ibn al-Nafis’ famous books and compilations

Ibn al-Nafis was an excellent writer who authored around 80 books in many academic fields, but his most books are in the medical field and medical principles and laws area. His two most famous books are Al-Shamal and Sharh al-Qanoon (Explaining the Law) (Dimashqi, 2002). He has claimed in his authorship that if I do not believe in my books, people will not use them ten thousand years after me; so, I used to write books. It is clear from this claim that he had strong self-confidence and was a person of special study and education in his writings and profession.

Ibn al-Nafis’ medical inventions

Ibn al-Nafis said that his discoveries showed that the eyes’ job is not to see but rather to transfer images. According to him, seeing is the job of the brain, which transmits images to the eye. In modern times, medical science has also supported the ideas of Ibn al-Nafis (As Al-Din Abu Al-Fadl Abdul-Razzaq bin Ahmed, 1996).
4. Ibn Sina and his medical services

Ibn Sina Abu Ali Al-Hussein Ibn Abdullah Ibn Al-Hassan Ibn Ali Ibn Sina Al-Balkhi was named in Arabic as the Chief of Scholars (Al-Sheikh Al-Rais). He was given the title "Father of New Medicine" in Arab society. Ibn Sina was known as Aristotle in the Islamic world, and it was said about him that Ibn Sina was the third teacher after Aristotle and Farabi. Ibn Sina was born in the year 370 AH in Afshana village of old Bukhara and passed away in 427 AH (Ahmad Ibn al-Qasim Ibn Khalifah Ibn Yunas, 2008).

Ibn Sina's famous books and compilations

Ibn Sina authored many books. Most of which are related to medical science. His famous books are as follows:

1. The law in medicine (Al-Qanun fi Tab) The book is written in five volumes that describe the developments and principles of Greek people's medicine, the medical achievements and developments of the Islamic world, and medical laws and principles.
2. Eulum Altasharyh (Anatomy): In this book, the topics and issues related to medical surgery are described.
3. Wazayif al'aeda' (Functions of Organs): In this book, he has discussed the functions of all the organs related to human anatomy.
4. Tabayie alamirad (Natures of Diseases): This book describes the specific diseases, their symptoms, and treatments.
5. Alsiha (Health): The book describes the importance of health, the benefits of health, and ways to protect health.

Until the 18th century, many universities used Ibn Sina's books and collections as textbooks and teaching materials. Such as Belgium, France, and Italy (Shams al-Din Muhammad ibn Ali ibn Khumarawayh ibn Tulun al-Dimashqi, 1998).

Ibn Sina's medical inventions

Ibn Sina made a number of innovations in the field of medicine that are still being used. Ibn Sina was the first Muslim doctor who discovered infectious diseases and their ways of transmission and proved that, in practice, a number of diseases are transmitted from sick people to healthy people. Ibn Sina discovered a type of worm in humans’ bodies called a roundworm. Eight hundred years after Ibn Sina made this discovery, Italian doctors confirmed it and said that the presence of this kind of worm causes weakness in the human body. Ibn Sina was the first Muslim doctor to discover the inflammation of the human brain, called meningitis in medical terminology. Moreover, Ibn Sina discovered cancer and wrote the first medical information related to cerebral stroke. Additionally, Ibn Sina first invented a number of medicines for the purpose of strengthening the movement of the human heart and treated many patients in this regard (Al-Akkad, 2012).
5. **Ibn al-Haytham and his medical services**


**Ibn Al-Haytham’s famous books and compilations**

In addition to providing medical services, Ibn al-Haytham also wrote various books. Some of the famous compilations are as follows:

1. *Zad Almusafir Liabn Aljazaar*: This book discussed various medical topics, especially eye-related issues.

**Ibn Al-Haytham’s medical inventions**

Ibn al-Haytham was the first Muslim doctor to successfully operate on the eye and explain how each part of the eye works (Al-Dhahabi, History of Islam, 2003).

5. **Mahzab al-Din al-Baghdadi and his medical services**

Mahzab al-Din al-Baghdadi, Abu al-Hasan Ali Ibn Ahmad, who was born in 1117 AH in Baghdad, Iraq, and passed away in 1213 AH. (Al-Arbili, 1980).

**Mahzab al-Din al-Baghdadi’s famous books and compilations**

Mahzab al-Din al-Baghdadi also authored a number of books. Some famous of them are as follows:

1. *Almukhtar Fi Altib*: The Encyclopedia of the Ottoman Society in Hyderabad, Pakistan, published this book in four volumes in 1943, and Frankfurt University published it again in 1996. The book talks about how important medicine is and how teachers should watch their students during practical education.
2. *Alghidha' Almutawazin* (Balanced Food): This book discusses related topics about the diet.
4. *Ma'aelijuh Amirad Alaitifal* (Treating Children's Diseases) talks about the growth of children as well as other diseases that affect them. (Ahmad Ibn Al-Qasim Ibn Khalifah Ibn Yunas, 2008).

**Mahzab al-Din al-Baghdadi’s medical inventions**

A lot of what Mahzab al-Din al-Baghdadi did have been written down as medical inventions. He was the first Muslim doctor to perform the first urinary device surgery. Moreover, he distinguished between kidney and bladder stones and their diagnoses and treatments. Additionally, he invented medical devices that allowed him to diagnose kidney pain and intestine pain. Mahzab al-Din al-Baghdadi made 70 different types of medicine from herbs and plants for the treatment of kidney pain. He proved in his discoveries that fried meat, milk, and cereals increase kidney disease and
always advised patients to avoid these foods. In the modern era, medical doctors, along with other recommendations, recommend patients avoid milk and cereals (Al-Ghazi, 1990).

**Medical Laws in the Abbasid Caliphate**

During the Abbasid Caliphate, various laws were set in the medical field. Some of which are as follows:

*Final exam after graduation*

Since the 3rd century A.D., Muslims invented the medical certificate, which allowed doctors to work and practice in the medical field. The first person to invent "licensing" was Sinan bin Thabit. Caliph al-Muqtadhir, the ruler of the Abbasid Caliphate, asked Sinan bin Thabit, the head physician of Al-Muqtadriya Hospital, which was located in Baghdad, to examine all the newly graduated doctors in Baghdad. He also ordered that the Muhtasibeen (individuals who order people to do good and forbid them from doing bad deeds) should walk into the city and stop the work of all those doctors who do not have the final professional examination certificate.

In the 3rd century AH, Dr. Ali bin Ishaq al-Rahawi wrote in his book "Physician Etiquette" that a patient should make sure he knows that the doctor is knowledgeable and dedicated to his job. The number of graduating doctors was 860 at the time Sanan Bin Thabit was taking their examinations. The special pattern of the exams was that for each medical branch, an exam manual and curriculum were given to the graduating doctors, and the exam was taken from the same sources. Those who successfully passed the exam were issued licenses.

*Supervision of doctors by the promotion of virtue and prevention of vice authorities*

In order for the medical staff to perform their duties properly and for the relevant laws of the ruling government to be implemented, the ruling Caliph Al-Muqtadir ordered that the supervision of the doctors be done by the officials of the Promotion of Virtue and Prevention of Vice committee. The list of duties for the officials of the Promotion of Virtue and the Prevention of Vice committee is as follows: The examination of new doctors was under the supervision of the ombudsman (an individual from the Promotion of Virtue and Prevention of Vice committee). Whenever a deficiency in his knowledge was found, the doctor's work permit or license was suspended until a new examination, and the doctor was strictly ordered to further study and get more information in his field of expertise.

Moreover, the doctor is given the task of writing a prescription for the patient. If the patient's health condition gets worse or he dies, the deceased family will show the document to the chief of doctors, who will take the deceased body. In the event that the physician's negligence is proven, the heirs of the deceased would appeal for diyah (blood money). The officials were responsible for monitoring the work and professional conduct of doctors and pharmacies, as well as the medical equipment used by doctors. It infers from the above discussion that the government officials were committed to transparency and professionalism; therefore, they were continuously monitoring the medical staff’s, doctors, and pharmacies daily actions and enacting such laws and principles (Abdullah, 1949).

**General Principles and Recommendations in the Medical Field**

The medical laws and principles of the Abbasid Caliphate emphasized professionalism and specialization. The provisions of the laws recommended that the doctor should be competent,
experienced, and careful during his duty. Furthermore, it was prescribed in the medical laws and principles of the Abbasid Caliphate that the doctor should conduct laboratory examinations and tests for the proper diagnosis and treatment of the patient and then start the treatment. As well, it was emphasized that all the drugs must be prescribed by the doctor. In the modern era, prescription is very important and part of the law. It was also recorded in the laws that doctors should take an oath at the beginning of their practical work, which is still part of the medical laws and principles. In addition, the provisions of the medical laws and principles stated that doctors should protect the secrets of patients and not disclose secrets during treatment (Abdullah, 1949).

CONCLUSION

It is very obvious and clear that the history of medicine is connected to the time of the prophet Mohammad (SAW) and his companions. During this time, and especially during the time of the Abbasid Caliphate, there were hints of medical progress, development, and facilities. There were good conditions and an environment in the Abbasid Caliphate for the development and progress of medical sciences because the first medical school was started and the government invited professors and doctors from different parts of the region to enhance the level of education in the medical field. Several hospitals were built to train doctors and treat patients so that the medical field could grow. Also, the process of translating medical books from other languages started because many doctors were trained so that they could make a lot of medical discoveries and innovations in a very short amount of time.

Scholars in the medical field in the Abbasid Caliphate improved their jobs and came up with new ideas, which shows how much they cared about their work. The important point is that the rulers of the time had provided many facilities for the medical doctors and professionals to work and strengthen the field of medical science. The inventions of the doctors of the Abbasid Caliphate and the progress in medicine solved many health issues, which is a matter of pride for all Muslims.

RECOMMENDATIONS

The honorable Ministry of Public Health should organize scientific and research seminars on the personalities and achievements of famous Muslim doctors of the Abbasid Caliphate. This will assist medical doctors and other professionals of the modern era to get more reliable information about the developments, progress, and inventions of the Abbasid Caliphate era and use and take advantage of the inventions, experiences, and instructions in their professional careers.

The honorable Ministry of Information and Culture should name the medical educational institutions and hospitals after the names of the Abbasid Caliphate's medical doctors and professionals. Likewise, it should pay special attention to holding awareness programs for the public regarding medical inventions and developments.

Universities and educational institutions, especially those that offer medical services, should teach about the accomplishments and inventions of Muslim doctors and medical professionals. In addition to the things Muslim doctors have done and invented, information about their morals and values should be put in the classroom and taught to the students.

Instructors and researchers should teach students about the things Muslims have done and invented in the medical sciences. Also, it is suggested that researchers write academic articles about the lives and medical accomplishments of all of the well-known doctors and scholars of the Abbasid
Caliphate. In addition, researchers would conduct research related to the economic programs, conquests, management, and educational services of the Abbasid Caliphate.

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