

Medicine from Ancient Times until Renaissance: Contributions of Early Physicians and the Impact of Religion

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Abstract

Great advancements in medicine and its many achievements are a fact for the modern civilizations. Religion coexists harmoniously with science while technology allows rapid access to an exchange of information, both playing an increasingly important role in the whole process of medical development. However, obstacles encountered by physicians were usually insurmountable and without them, the progress of science would have been undiminished. The established religious beliefs, non-progressive thinking, geopolitical imperialism, corruption, contributed many times to a misinterpretation on the original role of medicine, leading to a delay in medical progress. While being influenced by social and technological innovations, knowledge always prevented the medicine from stagnating and helped overcome differences between science and religion. The aim of this paper is to provide a survey on the contributions of some influential physicians and civilizations, and the role of religion on the evolution of medicine, from ancient times until the Renaissance.

Keywords: Medicine, history, healers, religion, renaissance

Introduction

In the beginning, early observations and attempts led from just an experience to given knowledge. The environment supplied people with herbs for therapeutic purposes, healers nursed a wound by bandaging it to stop bleeding, people learned how to make a birth easier and noticed that human life was similar to that of animals. Death was not recognized as a disease, but a continuation of life. Natural phenomena were thought to be controlled by

Gods and considered to be the causes of all epidemics. Literature shows ancient civilizations of Egyptians, Sumerians, Hittites, and Assyrians to have such beliefs that also determined each treatment procedure. Medicine became valuable, performed by both priests and kings and even though these beliefs and superstitions helped humanity to evolve, the persistence of them in the present day is the obstacle that can hold back the progress of science and medicine.

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Ancient Medicine

Finding proof and evidence through historical records is very difficult. However some sciences are particularly favored as a number of relevant archeological findings have been discovered and kept in the museums and libraries of Asia, Africa and Europe (Rosenthal, 1978; Kwiecinski, 2013). Excavations in the Middle East and Egypt revealed papyruses and manuscripts with one of the first scientific information of the ancient world. Nine scrolls have been translated. The papyrus of Kahun, dating back to 3000 B.C., provides information about mathematics and gynecology (1). The scrolls of Ramses created about 1900 BC, include pharmaceutical advice (2). The Papyrus Ebers, written in approximately 1500 B.C., is one of the first descriptions of physiology and pathology (3). It is considered to be important because it was the first medically published script that contained no superstitions. The papyrus of Edwin Smith, dating back to 1600 B.C is considered to be equally valuable, including the information about physiology, anatomy, and neurology, and it is the oldest known treatise on trauma, with first mentions for the plastic repair of the broken nose (rhinoplasty) (4). It seems that Egyptians were the first to approach medicine without magic. Finally, in the papyrus of mother and child, we find the study of medical information and mythological fragments (5).

In contrast, Persians did not deal with medicine that much, because of their primary concerns about expansive policy and martial affairs many of the Persian kings had Greeks and Egyptians doctors (5). In addition to the Arabic conquest that didn't aim at knowledge transmission, not many details considering the development of Persian medicine (3rd-7th century AD) have been rescued (6).

The Library of Alexandria was one of the largest libraries and its destruction was a great loss of information. An enormous number of books were burned during the reign of Julius Caesar. However, the Alexandrian philologists gathered and rescued a large number of medical books called the "*Hippocratic collection*". The later reconstitution concentrated a sufficient number of scrolls, however, evidence of doctors' achievements in ancient times like those of Herophilus and Erasistratus were lost (7).

Religious fanaticism and intolerance affected historical evidence too. During the 12th century, religious leaders were given the privilege to decide the "*appropriate*", with many scrolls being lost, whether for being banned or burned. In particular, the caliph Moustantzit in Bagdad gave the order to burn all the works of Avicenna. During the same century, most of Averroes' works was destroyed while Genghis Khan caused an equal disaster by burning the libraries of Samarkand and Merwe, eliminating valuable medical information (8).

As a result of the prejudices of the time, many ancient medical texts - the source of immeasurably valuable information - have been lost. Medical history is not just a science that managed to spread its' knowledge from the past to modern scientific and technological world, but a "*revolutionary movement*" that determined the evolution of human species, cultures, and people. Thus, the effort to contain in an academic text all the historical aspects of medicine would be an impossible task.

Ancient and Medical Contributors

Doctors have always been a much-respected group in every civilization formed. Except being the healers, most of them were also famous astronomers, magicians, poets, mathematicians, engineers, and many other specialties. These

characteristics helped to accomplish innovative contributions for medicine, improving hygiene, survival, and quality of life (9).

Imhotep lived during the Third Dynasty and was an Egyptian chancellor to pharaoh Djoser. He was a venerable healer that approximately 2850 and 525 BC. and a protector of the sciences. Imhotep was often called "*God of medicine*" and "*Prince of Peace*" and was deified due to his great capacity to study and practice medicine. He is considered one of the first healers in ancient Egypt (10).

Arad-Nana lived until approximately 626 BC. He was a secular doctor, with significant knowledge of empirical medicine. Although he was considered a court physician of the monarch Esarhaddon, he was independent of religion. He offered his services to lords, priests, princes and wealthy residents of the Assyrian capital and was the first to the institute medical remuneration, with historical mentions of him applying bandages for ophthalmia or for facial erysipelas (Kock, 1977; Sigerist, 1955).

Hippocrates, the Greek doctor from Kos, is certainly the most famous doctor in the world. Born in 460 BC and influenced by the sophistic argument, he claimed every disease had natural causes, thus rejecting supernatural causes. His medicine is rational making it hostile to magic and supernatural intervention. His approach ushered in the dawn of scientific medicine. As the founder of the Hippocratic School of Medicine, he is usually referred to as the Father of Medicine and The Hippocratic Oath is the earliest expression of medical ethics in the Western world. Even though Hippocrates was a famous doctor, a mention of his name is necessary, because, without his contributions, many doctors of the later period wouldn't have been distinguished (11).

Galen is considered to be the second most important doctor in the history of medicine after Hippocrates. He was born in Pergamos (Galen of Pergamos) and lived in the Roman empire in the 2nd century AD. Being involved in all medical specialties, he studied the anatomy of the heart, veins, arteries, and the respiratory system, and even though he made several false assumptions, he made great contributions to pharmacology, anatomy, physiology, and pathology. Galen believed that a change in the body's function was due to some sort of the damage and developed many different medicines for many diseases. He also believed that liver was the organ responsible for hemopoiesis. Galen's therapies and beliefs prevailed until the 15th century and until then, any observation contradicting the teaching of Galen was being rejected (11, 13, 14).

Asclepiades of Bithynia is less known than Galen, despite his work on rational views in medicine. He lived during the 1st century BC. Described by his contemporaries as the "*prince of physicians*", he was the first to distinguish diseases in acute and chronic stages and seizures between tonic and clonic. He also examined mental illness and distinguished delusion from illusion. He is considered as the father of molecular medicine due to his beliefs that the human body is composed of molecules and he is credited as the first doctor to perform a tracheotomy - even though the procedure is portrayed on Egyptian tablets dated back to 3600 BC (10, 15).

Oribasius was a writer and the personal doctor of the Roman emperor Julian the apostate. He lived two centuries after Galen (320-403 AD) and became the most important representative of early Byzantine medicine. He was born in Pergamum and studied medicine at Alexandria

and became one of the most recognizable figures of his era. His characteristic approach was the rational treatment of illness through its control by logical methods. His work was excerpted and constantly quoted by early Byzantine medical writers and it is believed that he practiced medicine free of the superstitions and magic that influenced many scientists, including doctors. He holds the title of the "*last great of Hellenistic medicine*" (Mann, 2012; Vassilyadi, 2013).

Stephanus of Alexandria is a remarkable figure of the 7th century's Byzantine medicine that made several important contributions in the pharmacology. He lived during the long period of dominant Christianity, practicing philosophy, astronomy, teaching, and medicine. Being a respected public lecturer in the court of Heraclius, Stephanus is often mentioned in the manuscripts as the "*Universal Philosopher*". Especially, he is known to be an alchemist, because of his valuable efforts on combining different pharmacy methods and substances for treating various diseases (15–17).

Abū Bakr Muhammad ibn Zakariyyā al-Rāzī had Persian origins and lived and practiced medicine in the East caliphate (854-925 AD). He was one of the most famous Arab healers and he is the first doctor to use humoral theory to distinguish one contagious disease from another. He is known for writing the first books about smallpox and measles, describing the characteristics of contagious diseases, defining their character in details. He enfranchised the commitments of coreligionists to avoid surgery and his beliefs affected medicine of Arab and European cultures until the 16th century (13, 18).

Ibn al-Nafis is an unknown figure of medical history that lived in the 13th century and practiced medicine in Syria. He disputed the

opinions of Avicenna and Galen at a time when the study of anatomy was prohibited in the Arab world making his opinions on minor bloodstream original but they were soon prohibited to be taught. He was characterized by his typical research, seeking the truth without prejudices and doctrinal beliefs. He is famous for being the first doctor to describe the pulmonary circulation of the blood (16, 18).

Pietro d'Abano was a professor of philosophy at the University of Padua that lived during the 13th century. He tried to create a whole medical system based on observation and reasoning and influenced by Aristotle, Galen, Avicenna, and Averroes. He was affected by the culture of his times and was related to magic and astrology but practiced them only when he had no confidence in the technical methods available to him. He is known for writing the book "*Conciliator Differentiarum, quæ inter Philosophos et Medicos Versantur*" in which he tried to connect philosophy and medicine and the book "*Liber de venenis*" (Treatise on Venoms and Poisons) that gave basis to Paracelsus for development of toxicology. A few years later he was later accused of heresy and atheism that led to his imprisonment and death (19–21). Henry de Mondeville, was a famous French doctor of the 13th century. He is the author of *Cirurgia* (Surgery) and he primarily dealt with surgery during the second half of the 13th century. Being detached to those who claimed that they were "*surgeons via Divine Grace*", he tried to prevent the division of surgery from medicine until his death of pulmonary tuberculosis. He is considered as the "*Father of French surgery*" even though he was soon eclipsed by the more famous Guy de Chauliac and his book "*Chirurgia Magna*" (Glick, 1952; Mann, 2012; "*The surgeon and the saints: Henri de Mondeville on divine healing*," 2000).

Paracelsus (Theophrastus von Hohenheim) was a Swiss doctor of the German Renaissance, born in Egg of the Einsiedeln region in 1541. His real name was used only for medical publications while "*Paracelsus*" pseudonym was used for non-medical purposes and it is first noticed in "*Practica of political-astrological character in Nuremberg*". He attached great importance to experiment and observation and fought with passion for scholasticism. He was one of the doctors that also contributed in medicine by using chemical substances for therapeutic purposes. He was a critic of Galen and made the first assumptions on substance metabolism by specific organs. Combining biology and chemistry led him being credited as "*the father of toxicology*" and for claiming that it is the dose that defines a drug and by encouraging experimental animals for drug tests, he created what is now considered as toxicology (9, 23, 24). Many more doctors made medical contributions during this period, however, they are impossible to mention in an article of this size. The history of medicine gets nearer to approximating a global system. Medical issues provide a general overview of fabric of interactions in a society, including the introduction of novel ideas and techniques. Problem entangle the most fundamental and revealing aspects of society, health, and disease, wealth and poverty, and incapacity. People in every historical period have faced the problems of birth, aging, and death and developed resistance against those problems.

The Influence of Religions on Medicine

The human effort on gathering and creating communities helped the spreading of diseases through a direct transmission that was further assisted by animal domestication (25).

Combining the physical disasters to all those unexplained diseases, the primitive humans created the notion of supernatural forces in order to explain these phenomena, and as time passed, they impersonated these forces and tried to be expiated through various ways and ceremonies such as animal and human sacrifices. Magicians performed these rituals to propitiate the evil, especially the diseases. However, as the society improved its culture and increased its population, and since the intermediaries of God were the priests, religion started taking over the healing role, mainly based on the experience of some members of the priesthood (6, 26).

Even though there is a belief that medicine had become independent from the priesthood, the location of schools of medicine in Egypt proves the opposite. While the connection between medicine (especially surgery) and religion is evident by the medical process of mummification, especially done for religious purposes, priests and magicians were both considered to be doctors, apparently retaining their original capability (9). A similar situation observed reveals that Mesopotamians also believed that diseases were connected to gods and evil spirits, with some of these gods also having a healing character (9).

Ancient Israelites had a strong connection between medicine and religion too. Their medicine perfectly correlated with their unique god, who controlled both punishments in the form of illness and reward in the form of prosperity. It is firmly believed that priesthood in ancient Israel gathered the greatest power than any other principle of the ancient world (Glick, 1952). Before the 4th century B.C., as revealed in the oldest scriptures of Hinduism, Indian medicine was dominated by religious

beliefs (27). Healing was developed through empirical medicine, great achievements were made in surgery, especially in wound treatise and rhinoplasty, and the first hospital in the history of medicine were established (28).

The religious-philosophical beliefs influenced medicine in China, as well. Without being wholly absent, religion did not take a dominant part in the performance of medicine and with only a mild influence, ancient traditions were strong and severe (29, 30). The philosophy of Yin and Yang, traced back to the Shang dynasty, extends to the various body functions, justifying the disease symptoms (31).

Ancient Greeks believed that disease is the way of Nemesis (the goddess who enacted punishment against those who succumb extreme or foolish pride or dangerous over-confidence-hybris) distributed punishment (32). With the passing of time, rest of gods acquired this capacity, although Nemesis retained the title of *"the judge"*. To gain the favor of the gods, to avoid divine justice and to find the precious cure, people carried out sacrifices, praying and practiced magic (32, 33). However, by the 5th century, Greek medical practitioners started taking interest on body's functions, explored the relations of symptoms to illness and gave more ground to reasonable treatments, rather than staying in divine interventions. Nevertheless, the trend toward logical explanations did not start from the scratch. Primarily, the silk road let Chinese practitioners spread their knowledge to the Mediterranean sea (34). Priests and healers espoused the new beliefs and enlightened their techniques, by opening the way to the new empirical, ethical and proved science, that was later developed by Hippocrates (35). The extent of Roman Empire marks a period of great medical

achievements. Medicine gradually developed through engineering with the creation of numeral surgical instruments, the establishment of modern medical schools and the division of medicine into specializations (36). However, because of the sudden and abundant wealth of the provinces, societies began to disintegrate. Within this atmosphere, epidemics expanded through the countries of the Roman Empire, created a constant fear of death among the population, and confidence in doctors disappeared.

As a result, superstitions spread and religious thinking prevailed once again (23). This way of thinking is also observed throughout the period of the Byzantine Empire, where the pain was considered to be a sign more of a divine test than punishment. Nevertheless, despite obscurantism, hospitals were founded according to Christian faith and practice and provided a support to all people without discriminations (9).

At the same time, Asian cultures regained power, Indian medicine flourished again and so did the Chinese medicine that experienced rapid growth. At the same time, the Persian Empire - though strictly religious - showed tolerance to other religions and became a shelter for refugee doctors of different beliefs, persecuted in Byzantium for their faith. As a result, Persian medicine blossomed between the 5th and 6th century (37, 38). In its early appearance, the Arabic-Islamic civilization was tolerant and receptive to contrary religious beliefs, integrating medical knowledge from Greek, Persian, Indian and Roman traditions. During the Islamic golden age (8th-13th century) the Islamic scientific world reached its cultural peak, supplying translations of Greek and Arabic medical texts, as long as, technological

innovations to Europe. The House of Wisdom was a major intellectual center, founded as a library by Caliph Harun al-Rashid, that hosted many books on the study of humanities, medicine, mathematics, alchemy and was the library with one of the largest selection of books during the Islamic Golden Age (39, 40).

However, as the Middle Ages progressed in the era of crusades and Reconquista, the Christian and Islamic relations were disrupted and there was only limited direct interaction between the two cultures (41, 42). With the increased provincial autonomy and frequent uprisings, the Arabic civilization started to fade. This situation helped the rise of the anti-philosophical Ash'arism school, linked directly to the decline of Arabic science (43). In order for the Islamic Empire to be justified as being in accordance with the beliefs of Islam religion and with the rise of Ash'arites, every scientific inquiry or original scholarship that did not agree with the Quran (opposed to religion regulations) was rejected. Finally, geopolitical factors led the Abbasid Caliphate to fragment with the siege of Baghdad by the Mongols in 1258 AD, ending the period of cultural prosperity (44).

Since the 4th century, western medicine is deeply influenced and based on religion, and as mentioned before, priests perform it until the 13th century. Christian church established monasteries, first to treat patients and later to provide training for doctors (45). The counter-reformation of the 16th-17th century aggressively turned religion against any form of modernity. People with opposing to religious beliefs that came into conflict with the Catholic Church were punished for being deemed heretics. Many patients were imprisoned, hanged, exiled, burned due to (46). Medicine as science began

to develop again at the end of the 18th century with prevalence of rationalism. This brought Encyclopaedists, enlightenment in France and separation from religious tutorage (38).

The history of medicine can be envisaged as the assessment of patient and physician throughout the years. Prudence and care of the sick are the vital parameters of the historical role of the physician. The questions examined have to do with the fundamental aspects of the art and science of medicine; the soaring costs, access and to health care systems, and equity within the social structures. The evaluation of the health care systems in countries reveals that people experience depression caused by the rising costs, the not fulfilled expectations, unfair distribution of social benefits and burdens and restrictions on funds and resources. In a world where problems of growth, governance, poverty, economic inequality reaching new heights, corruption and women's rights persist as central questions of global affairs, the demand for advanced study in the history of medicine has never been higher.

Conclusion

The development forwards an improved and more advanced condition, is not always intertwined with the creation of developed equipment. Throughout history, religion has proved that it had both an ancillary and negative role. Religious beliefs were one of the driving forces for the initiation of medicine by the ancient civilizations but limited the acquired knowledge, since the religious processes (e.g. mummification) were used for preservation rather than understanding organs' functions. The creation of religious institutions provided training for doctors, offered psychological support through confession and preaching, and are responsible for modern nursing. Many

religious centers maintained and transmitted knowledge by operating as libraries and via translating and hosting manuscripts for centuries. However, while it was the religion that promoted medical care for people who otherwise couldn't afford therapy, the role of religion was frequently paraphrased on purpose to satisfy geopolitical interests and imperialist rivalries. Religion taught the ideas of Galen and Hippocrates for centuries and nobody would dare to challenge mistakes in these teachings because the church reflected the words of God. Many scientists pushed science and medicine forward progress, and religion often condemned those efforts.

Conflict of Interests

The authors declare that they have no conflict of interest in the present article.

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