HISTORY OF MEDICINE

Abstract

This book chapter delves into the profound history of medicine, tracing its roots from ancient civilizations to the contemporary era. It explores the evolution of medical knowledge in regions like India, China, and Egypt, as documented in Ayurvedic texts and the Ebers Papyrus. Notable figures such as Hippocrates, the Father of Western Medicine and his enduring Hippocratic Oath are highlighted, illustrating the ethical foundations still integral to modern medical practice.

The narrative unfolds the critical role medicine has played in the survival and progress of civilizations, examining the transformative impact of epidemics and pandemics on culture, religion, and politics throughout history. From the Black Death in the 14th century to the ongoing challenges posed by the COVID-19 pandemic, the chapter underscores medicine's role in shaping societies. It also explores medicine's influence on military conflictsciting examples like COVAXIN and Penicillin that revolutionized infection treatment. Advances in surgery, drugs, vaccines, and antibiotics have not only increased life expectancy but also eradicated dangerous diseases. The collaborative spirit from ancient healers to modern research teams is emphasized as a driving force behind medical progress. Studying the history of medicine is presented as more than a factual exploration—it is a means to comprehend the cultural, social, and philosophical dimensions impacting medical practices. Drawing lessons from historical successes and mistakes, particularly the abolition of smallpox informs evidence-based decision-making in contemporary healthcare. The chapter concludes by celebrating the remarkable story of medicine portraying human resilience, shared aspirations for better health and the potential for a healthier and happier future.

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I. INTRODUCTION

The field of medicine is all about understanding and treating illnesses and injuries to keep people healthy. It has been an essential part of human history since ancient times. In the beginning, early civilizations had healers and wise people who tried to help their communities stay well. They observed the human body and used ancient knowledge to develop the first ideas of medicine [1]. Places like India, China, and Egypt were pioneers in this field. They wrote down their medical knowledge in documents like the Ayurvedic texts and Ebers Papyrus, which taught how to heal and treat various conditions. As time passed, more great scholars, like the ancient Greeks, made significant contributions to medicine. Hippocrates, known as the Father of Western Medicine, was among them, and he left behind the Hippocratic Oath, a set of ethical precepts that doctors still follow today [2,3].

Medicine has played a crucial role in the survival and development of civilizations. Throughout history, terrible epidemics and pandemics have affected societies, leaving long-lasting effects on culture, religion, and politics [4]. For example, the Black Death in the 14th century caused a massive loss of life in Europe, changing the balance of power and work [5]. Moreover, the Coronavirus disease 2019 (COVID-19) pandemic began in Wuhan, China, and has since spread throughout the world, posing significant health and safety risks [6]. Medicine has also had an impact on military conflicts, influencing the outcomes of wars and conquests. Discoveries like COVAXIN in the twenty-first century and Penicillin during World War II transformed how infections were treated and saved many lives. Understanding how our bodies work, along with advances in surgery and drugs, has increased life expectancy and improved the quality of life. Vaccines and antibiotics have eradicated dangerous diseases and brought in healthier times [7,8].

Studying the history of medicine is more than just learning facts; it helps us understand our past and plan for the future. It demonstrates the cultural, social, and philosophical impacts on medical practices throughout history, allowing modern healthcare to be more understanding and patient oriented. Throughout history, medical progress has relied on people working together and being resilient, from ancient healers to modern research teams. By embracing this spirit of collaboration, we can inspire more medical breakthroughs [9]. Learning from past mistakes and successes guides us to make better choices based on evidence. Historical examples, such as the abolition of smallpox, demonstrate the effectiveness of public health measures. The story of medicine is amazing! It's about how humans faced challenges and achieved great things, all to improve our health [10]. By looking at this history, we can learn valuable lessons from the past. It also shows that we all share a common bond as humans and are always striving for better health. This knowledge can help us create a healthier and happier future for everyone.

II. EARLY MEDICAL PRACTICES AND BELIEFS IN INDIA

Throughout history, civilizations across the globe have developed their unique medical beliefs and practices. In ancient times, India stood out with its highly regarded and influential medical traditions. The roots of ancient Indian medicine can be traced back to the Vedas, which encompassed various sacred texts like Brahmanas, Aranyakas, and Upanishads [11-13]. The Vedic people held a profound belief that God resided within every object, animate or inanimate, and this spiritual perspective laid the foundation for their medical practices. These ancient healers were revered for their seemingly magical healing abilities, as

they chanted mantras to alleviate the suffering of the common people. This rich heritage eventually gave birth to Ayurveda, a more systematic and sophisticated medical system that is considered the mother of modern medicine in India. The practitioners of Ayurveda, known as Vaidyas, were esteemed as highly knowledgeable beings in the ancient world [14,15]. At the core of Ayurveda were two seminal Sanskrit medical texts: Charaka Sambita (Charaka's Collection) and Sushruta Sambita (Sushruta's Collection) [13]. Vagbhatta's Astangabrdaya also played a vital role in shaping Ayurvedic theory [11]. These texts laid down the principles of Ayurveda, which encompassed holistic approaches to healing, taking into account the interconnectedness of the mind, body, and spirit.

The Vaidyas shared many similarities with modern-day doctors, evident in their thorough and comprehensive patient examinations. They took into consideration various relevant details about the patient, including their innate physiology, mental health, age, food habits, and the season in which the disease occurred [15, 16]. This meticulous approach allowed them to tailor treatments to each individual's unique needs, recognizing that no two patients were exactly alike. Moreover, the ancient Vaidyas were not just healers but were also skilled surgeons [17]. They possessed a wide array of medical knowledge and were expected to perform various surgical procedures when necessary. Ayurveda emphasized the balance of the three doshas – Vata, Pitta, and Kapha – which are believed to govern various physiological and psychological processes in the body. When these doshas were in harmony, it was thought to result in good health, whereas imbalances were believed to lead to illness. The Vaidyas used various herbs, minerals, and natural substances to restore this balance and promote healing. Additionally, lifestyle recommendations such as diet, exercise, and meditation were integral parts of Ayurvedic treatment.

III. GREEK CONTRIBUTIONS IN THE MEDICAL ERA

In early times, medical practices were largely based on magical beliefs, superstitions and religious ideas. Then came a gentleman from Kos, a Greek island of South-eastern Aegean who is predominantly regarded as ‘The Father of Modern Medicine’ because of his observations based on clinical signs and symptoms and logical interpretations [18,19].
It was he who established the ordeals of medicine which are practiced even today. It required the physician to carefully examine the patient first, followed by observing the signs and symptoms, making a correct diagnosis and finally providing suitable treatment [20-24]. Hippocrates lived in an era which had many epidemics. Reports suggested that he was persuaded by Illyrians and Persians to treat their citizens suffering from plague [17-19]. All the works of Hippocrates and his followers on medical theory and practices are compiled together in the form of Hippocratic Corpus. Hippocratic Oath, which is famous till today was given many centuries after he died but certainly similar ethical oral vows were laid down by him regarding correct medical conduct [21-24].

IV. INDUSTRIAL REVOLUTION AND MODERN MEDICINE

Industrial Revolution reached Europe at its ultimate heights during the nineteenth century and it tried to bridge the gap between early and modern medicinal practices. Urbanization accompanied it and people shifted from rural to urban areas for their betterment. Educational reforms made it possible for upcoming surgery students to learn efficiently and also for existing surgeons to share their work and knowledge easily. Royal College of

Surgeons of England was established during this time which had immensely contributed for the welfare of surgeons [25].

Surgery in today's world is regarded as a reputed and highly paid profession but in the eighteenth century, it had different opinions related to it. Removal of any abnormality in fetus while it is still in the womb or cysts and tumor removal by minimal invasion and pain is nowadays possible due to major advancements in the field of medicine and also invention of new technologies. But when we go back in past, the horror associated with surgery prohibited the physicians and doctors to practice surgery very often. It was considered as a last resort and people preferred to die rather experience surgery. Mortality rates were as high as 50% even for routine operations and despite the operation being successful, people died due to enormous pain which they endured as there was a lack of proper anesthetic [25]. Alcohol was the only element which could be identified as a pain reliever for surgical procedures. All these factors together paved the way for the invention and use of anesthesia and antiseptics. The first ever modern anesthesia 'Ether' was invented back in 1540s by a German physician and botanist named Valerius Cordus. After this, the analgesic effect of other compounds like nitrous oxide were identified as early as eighteenth century by doctors to help people get rid of pain but they were not prevalent until mid-nineteenth century. Due to industrial revolution, people started shifting towards urban areas for their betterment. Undoubtedly, this period marked an increase in work opportunities for the common mass but it also made people prone to acute, work site associated injuries. In the eighteenth century, many major painful surgeries were performed but the nineteenth century doctors were not ready to risk the lives of people as already many lost it [26]. These factors then contributed towards the discovery of better anesthetics by Dr. William Morton, The Father of Modern Anesthetics who pioneered the use of Ether as an anesthetic compound which can be used in surgeries [27]. Gradually, with acceleration in the use of anesthesia, doctors also experimented with new approaches in operation. Anesthesia therefore not only helped to subside the pain of patients but also removed time constraint in surgeries which directly provided relief to doctors as well. Anesthesia therefore changed the line of thinking of people and allowed them to consider surgery not as a last resort but as an effective way of treatment.

As urbanization accompanied industrial revolution, cities became densely populated. This increased filth around cities which lighted major infectious outbreaks even in large major cities. This caused a shift towards public health. Apart from anesthesia, surgeries also demanded an aseptic environment, free of any microbial contamination. Hence came Louis Pasteur, a common figure in today's world who did some of the majorly required inventions in his time. He revised the germ theory and also mentioned that these microscopic creatures travelled via air surrounding us and are invisible to naked eyes. Pasteur's work significant in surgical field was the creation of aseptic technique which aimed to cut infections by sterilizing operating areas, surgical instruments and also surgeon's hands.

V. MEDICAL DISCOVERIES AND INNOVATIONS

Medical discoveries and innovations have played a crucial role in improving healthcare in the 19th and 20th centuries. Some key breakthroughs during this period include vaccinations, antibiotics, and X-rays. These developments have transformed the way we prevent and treat disease. Vaccinations have been a significant milestone in medical history. They are a way of introducing weakened or inactive pathogens into the body to trigger an immune response without causing the actual disease. This immune response helps the body

build immunity against the disease, protecting individuals from future infections. Vaccines have successfully eradicated or controlled many deadly diseases like smallpox, polio, measles, covid19 and hepatitis, saving millions of lives worldwide [28].

Antibiotics have been another groundbreaking discovery that revolutionized medicine. It has always been considered one of the wonder discoveries of the 20th century. These are powerful drugs that can kill or inhibit the growth of bacteria. Before antibiotics, bacterial infections were a leading cause of death, and there were limited treatment options available. With the discovery of antibiotics such as Penicillin, Streptomycin, and Tetracycline, doctors gained the ability to effectively treat bacterial infections and save countless lives [29]. Moreover, X-rays, a form of electromagnetic radiation, have transformed medical diagnosis. X-rays can pass through soft tissues but are blocked by dense materials like bones. This property allows medical professionals to visualize internal structures without the need for surgery. X-rays have become a common diagnostic tool, assisting in the detection of fractures, tumors, and other medical disorders, resulting in more accurate and quicker treatments [30].

Furthermore, the development of medical technology has significantly enhanced patient care. Medical technology encompasses a wide range of tools and equipments used in healthcare settings. From simple instrument like stethoscopes and thermometers to sophisticated machine like MRI scanners and robotic surgical systems, medical technology has transformed the way we diagnose and treat illnesses [31].

In the 19th and 20th centuries, medical researchers and scientists worked tirelessly to understand the causes of diseases and find ways to combat them. Their dedication and perseverance led to groundbreaking discoveries and medical breakthroughs that have had a profound impact on global health. However, it is essential to acknowledge that medical progress also faces challenges. The overuse and misuse of antibiotics have led to the emergence of antibiotic-resistant bacteria, posing a significant threat to public health these days. Additionally, vaccinations have faced controversies and resistance in some communities, leading to outbreaks of preventable diseases [32]. Despite these challenges, medical research and technological advancements continue to push the boundaries of healthcare. New and innovative treatments, such as Gene therapy and Immunotherapy, offer promising avenues for addressing previously untreatable conditions. In conclusion, the 19th and 20th centuries witnessed remarkable medical discoveries and innovations that have shaped modern healthcare. Vaccinations, antibiotics, and X-rays have become cornerstones of medicine, preventing diseases, saving lives, and improving diagnostics. While there are difficulties to overcome, the ongoing search for medical knowledge continues to propel us towards a better future.

VI. ARTIFICIAL INTELLIGENCE IN MEDICINE

Artificial Intelligence (AI) is a term which basically means the use of computers to channel intelligent behavior with minimum human intervention. It came into existence with the invention of robots. With latest research advancements, it has become a prominent tool to diagnose human health issues at a deeper level and thus a significant contributor in the medicinal world. The use of data and algorithms has provided scientists a better vision to learn about diseases and find suitable cure. Currently, the most basic and widespread example of AI in medicine is the use of glucose monitoring chips. Continuous glucose monitoring

allows diabetics to assess their real time glucose levels which provides an insight about the change of direction and blood glucose level [33].

Another example of use of AI in medicine are Carebots. These are care providing robots that are highly sophisticated in their work [34]. Japanese carebots are a highly skilled example of these carebots. Robots can be used to provide assistance to aging patients with decline in brain activity or restricted mobility. The advancement in the use of robots for performing surgeries is a breakthrough in today's world. These non-living yet highly efficient entities need less/no human assistance and can perform either solo or as assistant surgeons in the operation theatres. [35]. In the near future, we can expect AI to take control of our lives and also replace us completely if their use is defined by certain ethical protocols.

VII. CONCLUSIONS

In conclusion, medicine has been crucial to human history since ancient times, with healers and wise individuals striving to keep communities healthy. From early civilizations like India, China, and Egypt to the contributions of great scholars like Hippocrates, medicine has continuously advanced. It played a significant role in the survival and development of civilizations, facing and overcoming terrible epidemics and pandemics throughout history. Medicine's impact on society extends beyond health, shaping culture, religion, and politics. Recent events like the COVID-19 pandemic highlighted its importance in safeguarding global well-being. Medical discoveries such as COVAXIN and Penicillin revolutionized treatments, increasing life expectancy and eradicating dangerous diseases. Studying the history of medicine allows us to understand our past and better plan for the future. It reveals the cultural and social influences on medical practices and emphasizes the values of collaboration for medical progress. By learning from the past, we can make informed choices based on evidence and continue striving for better health for all. The story of medicine is a testament to human resilience and the drive to achieve remarkable feats in the pursuit of improved well-being.

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