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Review Article

A Historical Correlation of Medical Advancements with Socio-Political and Technological Epochs

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About Article

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ABSTRACT

Modern medicine relies on observing clinical symptoms and tracking disease progression, enabling rational diagnosis, treatment, and prevention. Since the prehistoric era, medicine has advanced through observation, experimentation, and innovation, resulting in effective treatments and longer life spans. However, despite these successes, many diseases still challenge modern medicine. Our main argument is that medical progress is shaped by the interdependence between medicine, socio-political stability, and technological development. To demonstrate this, we analyzed major databases from prehistoric to modern times and conducted a narrative review of secondary sources. We found that transformative eras; from Imhotep's promotion of natural disease causes in ancient Egypt to Hippocrates' reforms in Greece and Avicenna's contributions in the Middle Ages align with strong socio-political contexts. In recent times, technological advancements, such as artificial intelligence, have driven new developments like robotic-assisted surgery and genetic medicine in the Global North. Therefore, our review concludes that robust socio-political and technological environments are crucial for medical advancement, forging a dynamic relationship between medicine, politics, and technology.

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1. INTRODUCTION

Modern medicine relies on a natural conception of disease causation. It uses observation of clinical symptoms and signs to make rational conclusions for diagnosing, treating, and preventing disease conditions (Forrester, 2016). Over the ages, humanity has developed a rational form of medicine through progressive observation, experimentation, and innovation. This stands in sharp contrast to earlier eras characterized by supernatural views. At that time, treatment often involved magic, sorcery, and shamanism. For example, in the prehistoric era, illnesses were attributed to the whims of gods and deities or seen as punishment for human misdeeds (Forrester, 2016). Allopathic medicine moved away from these views. It migrated into global medicine as it evolved from ancient to contemporary times through ongoing research. However, medicine needed profound reforms during various cultural, economic, political, and technological eras. From Imhotep, the Egyptian considered the grandfather of modern medicine, who described the empirical treatment of over 200 diseases in 2600 BCE, to the germ theory and development of vaccines in the late modern era, to genetic engineering and AI-powered medicine in the metamodernistic era, medicine has evolved greatly (Hajar, 2015; Open Medscience, 2024). Allopathic medicine has advanced significantly and continues to improve in the contemporary era. Over millennia, modern medicine has enabled the management and prevention of countless diseases. It has improved well-being, increased longevity, and raised life expectancies (Singh, 2010). For example, revolutionary discoveries such as vaccines, antibiotics, organ transplantation, and genetic medicine have positively transformed our world.

However, despite these groundbreaking medical breakthroughs, some medical conditions remain beyond the reach of modern medicine (Spillman *et al.*, 2017). Many cancers, advanced heart, lung, and liver diseases, Alzheimer's disease, motor neuron disease, and multiple sclerosis lack definitive treatment. We focus on symptomatic and palliative care for these illnesses. We thus expect more advancements in the coming decades and centuries. To prepare, we must study the historical trajectory and the dynamics of medical evolution. This will inform future projections and development. Understanding the past can help us to prioritize areas for advancement. It also reveals connections between medical progress and socio-economic, political, and technological changes. We need to link the history of medicine from prehistoric times to the present. In this regard, this review article intends to highlight social factors that shape the advancement of medicine throughout history.

2. LITERATURE REVIEW

The domain of the history of medicine is not a fascinating discipline for many historians and medical practitioners. Therefore, it is unsurprising that there is a paucity of qualitative research that studies the historical trajectory of modern medicine across the eras. In recent times, however, only a few scholarly works have explored this theme by detailing the period of medical advancements. For example, Hajar (2015) and Naal (2023) highlighted the chronology of critical inventions with their key personalities throughout history. In a similar vein, Teponne (2024) and Koutsouris (2017) explored the materialistic and technological dynamics of medical advancements from the ancient to the contemporary era. However, this study differs from previous research by correlating medical progress with socio-political and technological advancements across the eras. As initially stated, the ascription of definite eras to specific medical discoveries would illuminate the intricate connections between political and technological developments of given communities and societies with medicine in historical contexts. In this light, this historical research sets out to highlight the social factors shaping medical advancements from the prehistoric to the late modern era.

3. METHODOLOGY

In this study, medicine is deployed as a lens to study history. To achieve this lofty objective, we deployed a historical article using a narrative review to analyze and make meaning of relevant secondary sources from major databases. We obtained relevant articles from major databases such as PubMed, Google Scholar, Web of Science, Directory of Open Access Journals, and ResearchGate. Our search included keywords such as evolution of modern medicine, history of medicine, history of modern medicine, history of trajectory of modern medicine, timeline of medicine, medical advancement throughout the eras, and medical advancement throughout history. To improve our search, we set up some research questions, such as, what are the medical advancements through history and we also asked similar questions for each era, for instance, what are the medical advancements in the ancient era? We collated suitable articles that highlight the progression of modern medicine in the prehistoric era, from pre-3000 BCE to 2025. We narrowed our search and included recent and relevant articles from 2010 to 2025, although some older and relevant articles also featured in this study. The studies were assessed recurrently in three successive steps to determine their suitability. In step 1, we appraised articles based on the information presented in the titles and abstracts. We searched for basic keywords relating to historical events and medical advancements in the abstracts as highlighted above. In step 2, if they were available, the articles were further assessed for full texts. The full texts of the articles selected for step 2 were read for their suitability and appropriateness for data extraction. In step 3, we obtained and curated relevant data from carefully chosen articles. Some related articles from the references of the analysed articles in Step 3 were also added and analysed via snowballing. Relevant works relating to the cultural, social, and economic history of medicine over the millennia were incorporated to add valuable insights into this study. We excluded the history of pandemics, their key innovations and eminent personalities, as well as some key political figures such as emperors, kings and presidents who sanctioned some medical inventions. We excluded non-peer-reviewed articles and studies focusing on the microbiological properties of pathogens, clinical manifestations, and treatment of the main diseases that shaped medical advancement throughout history. We curated relevant articles before using a narrative review to highlight and analyze the historical trajectory of key medical developments and the factors that shape them throughout history. To facilitate clarity of analysis and enhance a better understanding, we described

the main historical attributes of each era as well as relevant medical advancements in separate tabular forms before subsequent analysis.

3.1. Historical characteristics across the eras

Given that history generally is the reconstruction and analysis of past events to make rational conclusions for present and future use, then the concept of time and place in historiography cannot be overemphasized. In this light, firstly, we intend to highlight the main historical events and characteristics of each era to further enhance our insights regarding the medical advancement over the millennia. Table (1) shows the periodization and the main historical events of each era.

Table 1. Periodization and specific historical characteristics of each era

Eras	Period and historical rationalization	Major Historical Events/ Place	References
Prehistory	<3000BCE (Before the advent of writing)	-Dependence on stone and bone technology, cave arts and early shelters -Discoveries of burial methods -Hunter -gatherer to Agrarian societies and early settlements -Dispersal of Homo Sapiens from Africa globally.	Fagan (2017), Gosden & Lock (1998)
Ancient	3000BCE-500 (From the advent of writing to the fall of the Roman Empire and the rise of Germanic Kingdoms and the Islamic Empire)	-From the invention of writing in Mesopotamia to late antiquity. -The invention of sophisticated agriculture and cities -Formation of complex social and government structures and hierarchies and organized religion. -The invention of complex technological tools such as sophisticated metallurgy, mathematics, astronomy and architecture	Stearns (2017); Parker (2017)
Middle Ages (Dark)	500-1500 (From the fall of Roman Empire to the end of Crusaders' campaigns, the fall of Constantinople, the voyage of Christopher Columbus or the discovery of printing by Gutenberg)	The commencement of feudalism -Heightened influence of the Catholic church on culture, governance and Gothic architecture. -The fall of Roman and the rise of the Islamic Empire -Pervasive conflicts and wars such as the Islamic wars of conquests, Crusaders and the Vikings expedition leading massive displacements and migration. -Lack of centralized authorities and limited technological advancement compared to other eras -The invention of wall clock, glass and the universities -Prevalence of plagues and famines	Bauer (2010)
Early Modern (Renaissance)	1500-1800 (From the printing era of Johannes Gutenberg or voyage of Columbus to the American Wars and the French Revolution or the defeat of Napoleon)	-The age of discovery, voyages, and European colonization of America and the beginning of Globalisation. -Declining feudalism and the rise of capitalism and European nation states -Protestant Reformation and the end of Crusaders' expedition -Departure from scholasticism based on Christian dogma to humanism and the rise of innovative idealism. -Rapid technological advancement such as printing press improved literacy and gunpowder revolutionized the arts of wars.	Wiesner-Hanks (2021); Hopkins (2003),
Late Modern	1800-1945 (From the end of Napoleonic wars, French Revolution and American Independence and slavery to the end of World War 2)	-The rise of industrialization (Industrial revolutions – First Second and the Third) -Globalisation and Mass Production and Electrification -The invention of steamship and telegraph -Heightened imperialism and the World Wars -Abolition of slavery and colonisation of Africa -Decolonization of the Americas -Notable Philosophical personalities: Charles Darwin, Sigmund Freund, Albert Einstein and Karl Marx	Williams (1998); Daemmrich (2017)

Early Post Modern	1945 – 1998 (Gained ascendancy in the 1950s and 1960s) (From the end of World wars through the era of Cold War to the disintegration of USSR and the age of internet.)	The espousal of relativism, skepticism and subjectivism regarding the history, culture and progress of societies. -Nihilistic approach to grand narratives of modernism like rationality, objectivity universalism, patriarchy. -The rise of feminism and gender equality. -The age of computers, microchips and heightened dispersal of culture, knowledge and arts via digitization	Barth (1967); Huyssen (1986); Jameson (1991); Potter & Lopez (2001)
Late Post Modern/ Meta modernistic/ Post postmodernism	1998- present (It heralds the rise of internet and the beginning of the dot.com boom, which have shaped global communication, commerce, politics. The collapse of some Asian economic sectors (Asian Financial Crisis) and concomitant disruptions of affiliated economies, a major setback for Globalisation and capitalism)	-The synthesis of modern and postmodern philosophical and social ideologies. -The invention of phones, smartphones, internet, social media, artificial intelligence (AI) and machine learning. Heightened digital evolution of arts, culture, technology and science.	Eve (2012); Kovalova *et al.* (2022)

Table (1) depicts the main historical events that shaped the history, culture, and progress of humankind throughout antiquity. A broad-brush approach to the above table specifically shows the social, cultural, and technological advancement chronologically from the prehistoric to the metamodernistic era. It underscores the essentiality of social, economic, technological, and political development to the progress of humans throughout history. Thus, it sustains Carr's assertion that history is progressive and depends on the dynamics of culture, economics, and technological advancement (Carr, 1990). However, from a microanalytic and a geographic context, Carr's theory of the progress of history is not universal for all communities and societies. Human development occurs at different rates in diverse eras in history. For instance, the dynamics of the ancient era in Europe, characterized by wars, plagues, and disruptions of social hierarchies, could not be universally applied during the same era in the African or Asian contexts. Moreover, the epochal political events such as colonization and slavery considerably hampered the socio-political and economic development of many colonized societies. Hence, history could not be regarded as wholly progressive in such climes. Therefore, the historical trajectory of human societies has oscillated between progressive and non-progressive phases due to the vicissitudes of landmark historical events. The correlation and analysis of monumental medical inventions throughout the eras with the revolutionary events is the main theme of the next phase of this article, in Table (2).

3.2. Key medical advancements across the eras

Table 2. Main medical discoveries/ advancements throughout historical eras

Eras	Period	Major Medical Discoveries	Place of Invention and key historical figure/s	References
Prehistory	< 3000BCE	-Herbalism -Geophagy -Trepanning -Rudimentary bone setting with clay	Throughout the World – Shamans, druids, magicians and sorcerers and other medicine men	Samorini (2019); Pierk *et al.* (1999); Krishnamani & Mahaney (2000)
Ancient	3000BCE – 500	-Documentation of over 200 diseases and treatment including simple surgeries, drains, drainage of abscess, dental extraction -Institutionalisation of clinical observation and rational medicine -Discovery of the four humors- blood, phlegm, black bile and yellow bile. -Discovery of a form of Aspirin	Ancient Egypt – Imhotep (2600BCE) Grandfather of Medicine Ancient Greece – Hippocrates (460-377BCE) Father of Medicine Ancient India – Sushrita Samhida (500BCE) Ancient Rome –	Hajar (2015); Forrester (2016)

		-Formulation Hippocratic Oath for Doctors Discoveries of Rhinoplasty, Lithotomy and Otoplasty via Ayurveda medicine Differentiation of seven cranial nerves Differentiation of the structural and anatomical differences between arteries and veins	Galen (129-217AD)	
Middle Ages / Dark	500-1500	-Differentiation between Measles and Smallpox -Description of 7 Cranial nerves from Optic to Hypoglossal nerve Writing of Canon of Medicine (one of the greatest compendium of diseases and treatment in the world). It was relevant from the 11th to 16th centuries Other Notable Inventions -Improved and systematic surgical dissection -Discovery of rudimentary anesthesia (opiates, alcohol mixed with herbs) and wines as antiseptics. -Pioneering medical school in Salerno	Golden Islamic Era (Persia) –Abu Bakr Mohammed Ibn Zakariya Al Razi (865-925) Popularly known as Rhazes in the Western World Abu Ali Al-Hussein Ibn Abdullah Ibn Sina (980-1037)	Forrester (2016); Cobban (1975)
Early Modern	1500- 1800	-Extensive dissection of cadavers and editing of De Humani Corporis fabrica (On the fabrics of Human Body) -Pioneering of modern anatomy -Discovery of closed circulation system of blood and editing of De Motus Cordis (On the motion of the heart and blood) -Invention of microscope -Discovery of blood cells and first observation of bacteria under the microscope -Pioneering of the first successful appendicectomy -Discovery of smallpox vaccines -Pioneering of vaccination in modern medicine	Belgium – Andrea Versalius (1543) English – William Harvey (1628) Netherlands – Hans and Zacharias Janssens (1590) Netherlands – Anton van Leeuwenhoek (1670 and 1683 respectively) England – Claudius Aymand (1763) England – Edward Jenner (1796)	Hajar (2015); Noble *et al.* (2025)
Late Modern	1800-1945	-Invention of Stethoscope -Invention of modern syringes Germ Theory – pioneered the linkage of diseases to micro-organism Improvement and proof of Germ Theory -Discoveries of the causation agents for (Anthrax, Tuberculosis and Cholera) -Foundation for modern microbiology and public health -Discovery of Electrocardiography -Discovery of X ray -Revolution of Radiological investigation -Discovery of Insulin -Revolutionization of Diabetic treatment -Discovery of Penicillin (the first ever antibiotics) -Revolutionization of treatment against infections	France –Rene Laennec (1816) France – Charles Pravax (1853) Scotland – Alexander Wood (1853) France – Louis Pasteur (1861) Germany – Robert Koch (1876, 1882 and 1883 respectively) Netherlands – Willem Einthoven (1887) Germany –Wilhelm Roentgen (1895) Canada – Frederick Banting and Charles Best (1921) Scotland – Alexander Fleming (192	Hajar (2015); Magner (2005); Bliss (1982); Barold (2003)

Early Post Modern	1945-1998	-Pioneering of Chemotherapy for Cancer patients -Discovery of double helical DNA (foundation of genetic engineering and mapping) -Discovery of Pacemaker -First heart transplant -Invention of Magnetic Resonance Imaging (MRI) -Invention of Computer Tomography (CT scan) -First laparoscopic surgery -Birth of the first baby conceived using in-vitro fertilization -First recorded robotic surgery -Stem cell th	USA –Alfred Gilman and Louis Goodman (1946) USA – James Watson and Francis Rick (1953) Sweden – Rune Elmqvist (1958) South Africa- Christiaan Barnard (1967) USA – Raymond Vahan Damadian (1971) England – Godfred Hounsfield (1971) 1975 1978 1985 USA – James A. Thomson (1998)	Rutkow (2022); Gawande (2012); Forrester (2016)
Late Post Modern / Metamodernistic / Post post modernism	1998-present	-Artificial Intelligence and Machine Learning (AI powered diagnostics) -Telehealth and wearable medical devices -Genetics and Gene therapy (advancement in CRISPR based gene editing) -Electronic Medical Records (Health Information System) -Regenerative Medicine (3D Printed organs and tissues for transplantation) -Robotics (Robot- assisted surgeries for appendectomy, cholecystectomy, hysterectomy, Thyroidectomy, Total Knee and hip replacements and others) -Nanomedicine -Telemedicine	Predominantly in the Global North	Reddy *et al.* (2023); Mahara *et al.* (2023); Bajwa (2014)

N.B – Acupuncture is an ancient form of Chinese Traditional medicine developed over 3000BCE ago, it involves insertion of needles to targeted points in the body to relieve painful conditions. The first document that aptly described acupuncture is the Yellow Emperor 's Classic of Internal Medicine dating as far back as 100BCE. It is not a classical form of modern medicine, (hence, not listed in the table), it is a form of integrative medicine accepted in the medical fold due to unmet needs of pain management.

CRISPR – Clustered regularly interspaced short palindromic repeats (allows scientists to cut, delete or alter target genetic materials, applicable for treating genetic diseases like sickle cell anemia and other genetic disease research).

4. RESULTS AND DISCUSSION

Table (2) highlights the trajectory of modern medicine from the prehistoric period through different timelines till the present era. It shows a progressive evolutionary trend of medicine chronologically. Although the early Dark Ages witnessed political upheavals, wars, mass migrations, and a consequent dip in intellectual progress, the wheels of medical progress continued unabated in the late Middle Ages. Main medical inventions that substantially advanced the course of modern medicine, such as eyeglasses, quarantine, and the first medical university in Salerno, remain some of the epic contributions from the Dark Ages. More significantly, socio- political developments shape medical advancement. There are interdependence and codependence of the evolution of medicine with the political, economic, and technological advancement of humans. Medicine develops or progresses along with the evolutionary trends of civilizations of communities, societies, and nations. From table (2), in the ancient world, Imhotep, who was a priest and a personal physician to Pharaoh Djoser, pioneered the concept of natural causes of maladies. If we correlate this with Table 1, it is evident that this groundbreaking philosophical framework of modern medicine, among other advancements, emerged at the peak of the socio-political development of the ancient Egyptian Civilization. Similarly, this correlation applies to the latter ancient era. The rational theory of humors propounded by Hippocrates and reformed by Galen flourished during the zenith of the political powers of the Greek and the Roman Empires. In the Middle Ages and the Persian world, the trailblazing medical contributions of Avicenna and Rhazes coincided with the Golden Islamic Empire. This epoch was characterized by heightened social, political, and cultural developments. Moreover, in the early modern era of Europe, the rise of nations and the progressive socio-political stability after the debacles of the Middle Ages heralded some unprecedented advancements in medicine. For example, the pioneering of modern anatomy,

the invention of microscope, and the discovery of vaccinations were some of the developments that revolutionized medicine. From table (1) and (2), in the metamodernistic era, there is a positive association between socio-political growth and economic advancements of the countries in the Global North with the development of robotic and genetic medicine. The development and advancement of Artificial intelligence in the High-Income Countries (HICs), which are mostly domiciled in the Global North, is enabling unprecedented medical inventions in the late postmodern era. Due to the dynamics of colonisation, Globalisation, industrialization and imperialism from the modern eras, the dynamics of medical advancements have shifted towards the advanced economies and nations of the Global North.

Similarly, materials and technological progression throughout history remain key facilitators of allopathic medical transformation. If we correlate table (1) and table (2), it shows a positive relationship between technological advancement and medical evolution throughout antiquity. The prehistoric era, dominated by stone, copper, and clay stools, corresponded to the era of trepanning (burring of holes through the skull with stones to apparently relieve headaches, epilepsy, or other related maladies). Similarly, in ancient times, in the golden era of metallurgy, iron and bronze scalpels and forceps were developed in tandem with the preexisting technology. In the early modern era, the invention of printing ushered in enhanced proper documentation of medical records as well as safekeeping for future reference. This dynamic reverberated since then to the post-modern era. In the metamodernistic era, telemedicine, gene mapping, robotics, and others correlate with the unprecedented invention of Artificial Intelligence (AI) and machine learning that pervades our world since the turn of the 21st century. Hence, the role of technology in shaping the trajectory of medicine throughout history could not be overstated.

4.1. Some pictural depictions of medical advancements across the epochs and key personalities

Figure 1. An archeological specimen depicting trepanning in the prehistoric era, a primitive form of brain surgery.
Source: History of Medicine
The Association of British Pharmaceutical Industry (ABPI), 2025.

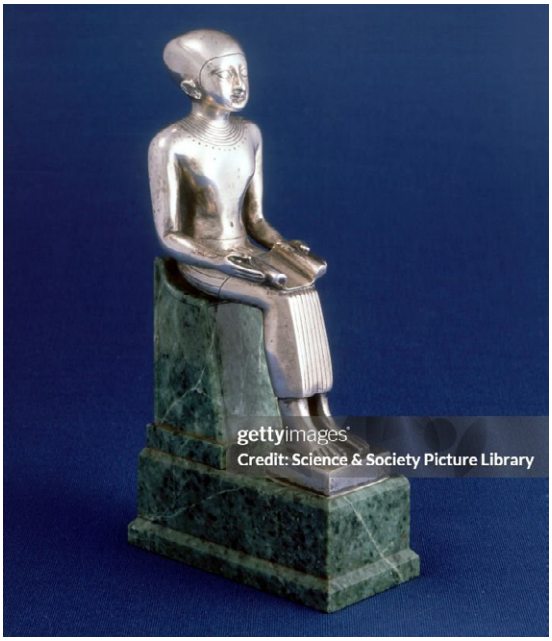

Figure 2. Statuette of Imhotep seated.
Source: Science and Society Picture Libraries

Imhotep (2686-2613 BC) was the first known physician and chief adviser to King Djoser (3rd dynasty). He was also the architect of the first pyramid in Egypt, the famous Step Pyramid at Saqqara near Cairo, Egypt. In time he came to be regarded as a sage, and during the Saite period (500 BC) he was worshipped as the life-giving son of Ptah, God of Memphis. (Photo by SSPL/ Getty Images).

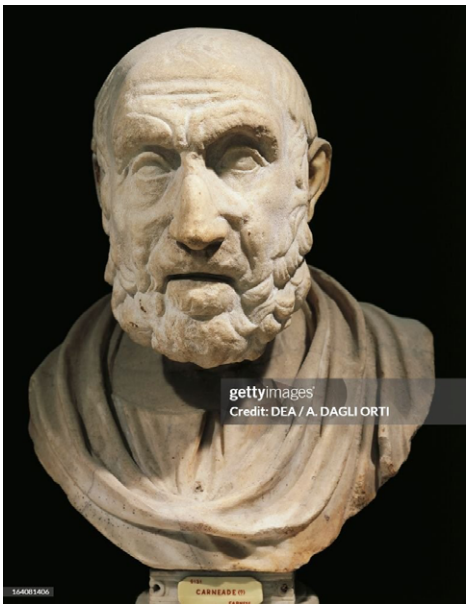

Figure 3. Hippocrates of Kos (c.460-c.370 BC).
Source: De Agostini Editorial

Bust of Hippocrates of Cos (Cos, 460 BC circa-Larissa, 377 BC), ancient Greek physician and geographer, considered the father of Western medicine. Marble copy after a Greek original of the 4th century BC. Naples, Museo Archeologico Nazionale (Archaeological Museum) (Photo by DeAgostini/Getty Images).

Figure 4. Dr Edward Jenner performing vaccination.
Source: De Agostini Editorial

Dr Edward Jenner (1749-1823) performing his first vaccination against smallpox on James Phipps, a boy of eight, May 14, 1796, oil on canvas by Ernest Board (1877-1934), 1920-1930, United Kingdom, 20th century.

Figure 5. Medicine in the Metamodernistic Era – Robotic Assisted Surgery.
Source: Olimpik/Nur Photo Collections

Surgery Performed Using The Da Vinci Medical Robot
Bariatric surgery for an overweight patient performed using the Da Vinci medical robot at the Military Institute of Medicine in Warsaw, Poland on December 05, 2024. (Photo by Foto Olimpik/Nur Photo via Getty Images).

5. CONCLUSION

Throughout history, the art of healing has evolved through several distinct phases. Medicine has evolved from early practices involving magic and shamanism to today's advanced techniques, including genetic mapping, robotics-assisted surgery, and electronic medical systems. This article argues that the primary drivers of medical advancements have been the socio-economic, political, and technological development of societies. We review key medical innovations from different eras, correlating each with major societal changes. Our analysis reveals that robust economic growth, political stability, and technological capacity have a significant influence on medical progress. This explains why politically stable and wealthy countries—including those in the G7 and Global North—are currently leading in fields like genetic, robotic, and AI-assisted medicine. However, this ongoing trend may widen health inequalities for low- and middle-income countries. Looking forward, as diseases like Alzheimer's and HIV remain challenging for modern medicine, advances in genetics and robotics will be crucial for new cures and better outcomes. Thus, examining the intersection of societal development and medical innovation clarifies both the past trajectory and likely future of medicine.

However, this research's assertion is not absolute or applicable to all socio-political, cultural, or economic contexts, especially in non-Western countries. Necessities often drive invention, and medical advancements occur across eras, even in societies lacking dominant political and technological systems. While not components of modern medicine, some indigenous medical inventions, such as acupuncture and ayurveda, are utilized in the present era due to unmet needs of modern approaches. Future research investigating historical advancements of key indigenous medicines and their intersections with modern medicine would offer valuable insights about the holistic progress of global medicine. Moreover, this article does not address how specific political, economic, and technological models inform definite medical developments. Further historical analysis of these variables across specific eras could deepen understanding of the social factors shaping medical progress.

REFERENCES

Bajwa, M. (2014). Emerging 21(st) Century Medical Technologies. *Pakistan journal of medical sciences, 30*(3), 649–655. https://doi.org/10.12669/pjms.303.5211

Barold, S. S. (2003). Willem Einthoven and the birth of clinical electrocardiography a hundred years ago. *Cardiac Electrophysiology Review, 7*(1), 99–104. https://doi.org/10.1023/a:1023667812925

Barth, J. (1967). *The Literature of Exhaustion* (pp. 29-34). The Atlantic Monthly.

Bauer, S. W. (2010). *The History of the Medieval World: From the Conversion of Constantine to the First Crusade.* New York: W. W. Norton.

Bliss, M. (1982). *The Discovery of Insulin.* Chicago: Chicago University Press

Carr, E. H. (1990). *What is History.* Penguin books. https://www.scribd.com/document/427926031/Edward-Hallett-Carr-What-is-History-Penguin-Books-1990-pdf

Cobban, A. B. (1975). *The Medieval Universities: Their Development and Organizations* (pp. 38-40). Harper & Row Publishers Inc.

Daemmrich, A. (2017). Invention, Innovation Systems, and the Fourth Industrial Revolution. *Technology and Innovation, 18* (4), 257-265.

Eve, M. P. (2012). Thomas Pynchon, David Foster Wallace and the Problems of Metamodernism. *Journal of 21st-century Writings, 1*(1), 7–25.

Fagan, B. (2017). *World Prehistory: A brief introduction* (Ninth ed.). London: Routledge.

Forrester, R. (2016). *A History of Medicine.* /https://philpapers.org/archive/FORTHO-2.pdf

Gawande A. (2012). Two hundred years of surgery. *New England Journal of Medicine, 366*(18), 1716-1723. https://doi.org/10.1056/nejmra1202392

Gosden, C., & Lock, G. (1998). Prehistoric histories. *World Archaeology, 30*(1), 2–12. https://doi.org/10.1080/00438243.1998.9980393

Hajar R. (2015). History of medicine timeline. *Heart views : the official journal of the Gulf Heart Association, 16*(1), 43–45. https://doi.org/10.4103/1995-705x.153008

Hopkins, A. G. (Ed.). (2003). *Globalisation in World History.* New York, NY: W.W. Norton & Company. https://doi.org/10.1016/j.joim.2019.03.008.

Huyssen, A. (1986). *After the Great Divide. Modernism, Mass Culture, Postmodernism.* Bloomington: Indiana University Press.

Jameson, F. (1991). *Postmodernism or, The Cultural Logic of Late Capitalism.* Duke University Press.

Koutsouris, D. (2017) .The evolution of medical care: from the beginnings to personalized medicine. *Health Technology, 7*, 3–4. https://doi.org/10.1007/s12553-016-0163-1

Kovalova, M., Alforova, Z., Sokolyuk, L., Chursin, O., & Obukh.,L. (2022). The digital evolution of art: current trends in the context of the formation and development of metamodernism. *Revista Amazonia Investiga, 11*(56), 114–123. https://doi.org/10.34069/AI/2022.56.08.12

Krishnamani, R., & Mahaney, W. C. (2000). Geophagy among primates: Adaptive significance and ecological consequences. *Animal Behaviour, 59*(5), 899–915. https://doi.org/10.1006/anbe.1999.1376

Magner, L. N. (2005). *A History of Medicine.* Taylor & Francis.

Mahara, G., Tian, C., Xu, X., & Wang, W. (2023). Revolutionising health care: Exploring the latest advances in medical sciences. *Journal of global health, 13*, 03042. https://doi.org/10.7189/jogh.13.03042

Naal, M. (2023). The Historical Development of Modern Medicine: Breakthroughs, Challenges and Prospects. *Journal of Contemporary Medical Education, 13*(07), 1-2 .

Noble, C. A., Biesemier, A. P., McClees, S. F., Alhussain, A. M., Helms, S. E., & Brodell, R. T. (2025). The history of the microscope reflects advances in science and medicine. *Seminars in Diagnostic Pathology, 42*(2), 150831. https://doi.org/10.1053/j.semdp.2024.01.002.

Open Medscience. (2024). *The Evolution of Medicine: A Historical Journey from Ancient Times to Modern Advances.* https://openmedscience.com/the-evolution-of-medicine-a-historical-journey-from-ancient-times-to-modern-advances

Parker, P. (2017). *World History: From the Ancient World to the Information Age* (Revised ed.). New York.

Piek, J., Lidke, G., Terberger, T., von Smekal, U., Gaab, M. R. (1999). Stone age skull surgery in Mecklenburg-Vorpommern: a systematic study. *Neurosurgery, 45*(1), 147–51. https://doi.org/10.1097/00006123-199907000-00033.

Potter, G., & Lopez, J. (Eds.). (2001). *After Postmodernism: An Introduction to Critical Realism.* London: The Athlone Press.

Reddy, K., Gharde, P., Tayade, H., Patil, M., Reddy, L. S., & Surya, D. (2023). Advancements in Robotic Surgery: A Comprehensive Overview of Current Utilizations and Upcoming Frontiers. *Cureus, 15*(12), e50415. https://doi.org/10.7759/cureus.50415

Rutkow, I.(2022). *Empire of The Scalpel.* New York, NY: Scribner.

Samorini, G. (2019). The oldest archeological data evidencing the relationship of Homo sapiens with psychoactive plants: A worldwide overview. *Journal of Psychedelic Studies, 3*(2), 63–80. https://doi.org/10.1556/2054.2019.008

Singh A. R. (2010). Modern Medicine: Towards Prevention, Cure, Well-being and Longevity. *Mens sana monographs, 8*(1), 17–29. https://doi.org/10.4103/0973-1229.58817

Spillmann, R. C., McConkie-Rosell, A., Pena, L., Jiang, Y. H., Undiagnosed Diseases Network, Schoch, K., Walley, N., Sanders, C., Sullivan, J., Hooper, S. R., & Shashi, V. (2017). A window into living with an undiagnosed disease: illness narratives from the Undiagnosed Diseases Network. *Orphanet journal of rare diseases, 12*(1), 71. https://doi.org/10.1186/s13023-017-0623-3

Stearns, P. N. (2017). Periodization in World History: Challenges and Opportunities. In R. Charles Weller (ed.). *21st-Century Narratives of World History: Global and Multidisciplinary Perspectives.* Palgrave.

Teppone, M. (2019). Medicine has always been "Modern" and "Scientific" from ancient times to the present day. *Journal of Integrative Medicine, 17*(4), 229-237.

Wiesner-Hanks, M. E. (2021). *What is Early Modern History?.* Cambridge: Polity.

Williams, M. (1998). The End of Modern History?. *Geographical Review, 88*(2), 275–300. https://doi.org/10.2307/215805. JSTOR 215805