

НАУКА І ТЕХНОЛОГІЯ ЯК ФАКТОРИ, ЩО СПРИЯЮТЬ РОЗВИТКУ ОХОРОНИ ЗДОРОВ'Я В ГАНІ: МИНУЛЕ І СЬОГОДЕННЯ

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SCIENCE AND TECHNOLOGY AS FACTORS ADVANCING GHANA'S HEALTHCARE: PAST AND PRESENT

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Самуель Аду-Гуамфі, Ернест Фолей Окіне, Річард Оваре. Наука и технологии как факторы, способствующие развитию здравоохранения в Гане: прошлое и настоящее. На основе качественного исследования авторы смогли собрать информацию из первичных и вторичных источников, чтобы выделить некоторые существенные аспекты того, что объясняет прогресс, достигнутый в сфере здравоохранения в Гане. **Цель статьи** – изучить влияние науки и новых технологий на качественные изменения в системе здравоохранительной системы Ганы, а также рассмотреть процесс изменения в историческом ключе. **Источниковедческая база работы** – документы, регламентирующие деятельность здравоохранения Ганы, международные источники. **Методологические подходы:** исторический сравнительный анализ, статистический и описательный методы. **Результаты,** представленные в этом исследовательском документе, указывают на развивающиеся традиционные и альтернативные подходы, а также на достижения в сфере биомедицины в Гане. **Выводы.** Благодаря постепенным и, в некоторой степени, прагматическим формулировкам и реализации новой политики в области здравоохранения. В статье также говорится о приверженности специалистов-практиков, исследователей и политиков к обеспечению и принятию некоторых соответствующих обязательств на пути повышения качества здравоохранения в Гане. Предполагается, что эта часть побудит ганцев и политиков, в частности, продолжать заниматься научными исследованиями и избегать абсолютной консервативности.

Ключевые слова: наука, технология, народная медицина, православная медицина, здравоохранение Ганы.

Introduction. Science is the realm of discovering the unknown; through wonder, curiosity and imagination¹. It is every human desire to know the wonders of the world and try to solve it or use it for his or her gain. The role of science has aided many countries to advance and improve the lifestyle of humanity. It is therefore a necessity of every country to invest into science to enable it grow and improve to higher standards in every facets of human life. Technology is vastly changing the world with invention and innovations and it is currently the master-tool in which the world is operated. Technology is all around us; we live in a world in which everything that exists can be named as work of nature or work of man². Through time, technology is getting faster, better and smaller. Therefore, prioritizing and reprioritizing principles to work hand in hand with healthcare and technological developments continues to be significant especially in contemporary times⁴. Innovations in science and technology being the master tool in changing the world and Ghana in particular must not be left out, it should rather be prioritised especially innovations in healthcare. Ghana's return back to democratic ideals have also created a congenial at-

mosphere for a peaceful society and some level of macro-economic stability. Within the scheme of things, it is envisaged that Ghana would use the advent of the information age and the technology revolution to further enhance her healthcare sector through advancement in healthcare training and delivery.

To become a cutting-edge twenty-first century nation, it is anticipated that Ghana would strategically, competitively and progressively position itself within the fast pace in which the world is advancing, and technological advancements is the tool⁴. Science and technology have been part of Kwame Nkrumah's development vision for decades dating back to 1964, when he published the seven-year plan for national reconstruction development⁵. Without technological advancements in Ghana's health sector, her peoples' wellbeing will not be fully cared for in time for them to participate in day-to-day activities and bring up innovations and ideas to help to improve the nation. Science and technology has the tendency to be the panacea for several of the challenges that the people of Ghana are confronted with, including healthcare.

¹Sakyi Atta Kwesi "Role of Science and Technology in Development of Ghana", Accessed on 25th January, 2019, URL: <https://www.ghanaweb.com/GhanaHomePage/> [in English].

²McNeil I. "An encyclopedia of the history of technology", Routledge, 2002, P. 1–5 [in English].

³Thimbleby H. "Technology and the Future of Healthcare", *Journal of Public Health Research*, N. 2.3, 2013, P. 161–167 [in English].

⁴Mensah, Gilbert. "Achieving and sustaining Ghana's science and technology." Accessed on 22nd August 2017 www.newsghana.com.gh [in English].

⁵Al-Bader Sara, Abdallah S. Daar, Peter A. Singer "Science-based health innovation in Ghana: health entrepreneurs point the way to a new development path", *BMC international health and human rights*, S 2. 10.1, 2010, P. 1–13 [in English].

Healthcare in Ghana has developed in so many ways. It includes the local traditional healers and indigenous priests using nature's herbs and other ingredients to cure humanity's sickness to the adoption and adaptation of the white man's way of providing healthcare, which repudiated indigenous strategies of healing and curing the sick⁶. This has brought about biomedical education of doctors and orthodox physicians as well as other practitioners like nurses and para-medical practitioners who work in hospitals and clinics to provide healthcare for the Ghanaian populace. The fast growing population of the country in which patients-physician ratio cannot catch up, coupled with archaic or no better infrastructure or equipment to provide intensive and better healthcare, as well as limited hospitals with advanced equipment and human resource to provide healthcare in the health sector among other things continue to be problematic. Again, there have been countless policies and promises from respective governments to improve healthcare through strategies such as teaching of potential healthcare workers with the latest skills set and technological training, renovation of existing facilities and updating health centres with the necessary modern gadgets to match up with the number of patients among others.

Healthcare in Ghana dates back to pre-colonial times with medicine men using divine knowledge and powers to care for the sick but things changed when the Europeans introduced their culture to Africans with so-called attempt to "modernize" them. Western ways of providing and caring for the health and well-being of people has been a main system through which health practitioners are taught and graduate from established medical schools to practice their professions in hospitals and clinics. Some of the major and well-known hospitals in Ghana include the Korle-Bu Teaching Hospital, Komfo Anokye Teaching Hospital and the Tamale Teaching Hospital of Ghana. The population rate and health sector ratio is very wide and without much interest for both the government of Ghana and the people who have interest in science and technology, healthcare delivery, solutions to diseases among others would remain at a snail pace. According to Dr Kwame Ofori-Kuragu, a lecturer at the building technology department of KNUST, "There are some who as a result of their experiences describe our best hospitals as *graveyards* due to the high number of deaths recorded at these facilities"⁷.

Therefore, government policies like the vision 2020, which includes ways to improve the health sector to enable national development must be looked into and applied. Saleh (2013) argued that the Ghana health sector has gone through major policy changes and these changes do not create a stable system in the sector, therefore these policies

must be investigated⁸. In the same tone, Al-Bader et al (2010) argued on the absence of solid administration around science and technology and poor policy implementation because of poor co-ordination between the various ministries⁹. This explains administrative weakness and inability to sustain a constant standing system responsible for national development. This needs to be scrutinized. With this, the nation can compete in the globalised world. Little emphasis is placed on improving the health sector since few hospitals contain the much-needed resources to help healthcare delivery. Only few hospitals including Korle-Bu Teaching Hospital, Komfo Anokye Teaching Hospital and the Tamale Teaching Hospital of Ghana have somewhat up to date equipment and infrastructure to cater for patients.

However, Novignon and Novignon (2017) acknowledged the importance and presence of primary health care facilities (PHF) in Ghana and described them as to be an important tool in achieving health coverage (UHC)¹⁰. These primary healthcare facilities help to bridge the gap between deprived and vulnerable populations¹¹. In addition, there are still challenges in the health sector. The efforts of PHFs like the Community Health Improvements Services (CHIPS) compounds and other districts health centres, notwithstanding, there are several challenges that continue to hinder their effective operations¹². This necessitates the question concerning what, when, where and which roles can science and technology based solutions improve, aid and maintain these PHFs among other bigger and tertiary hospitals? Few research institutions as recorded by Al-Bader et al are responsible for improving Ghana's health and other stakeholders mainly in biotechnology. However, Novignon and Novignon (2017) based their arguments on the gains and efficiency in managing PHFs¹³. Al-Bader et al (2010) noted that to date there has been little research on science-based health product innovation in Ghana¹⁴.

The concerns on lack of focus on the private sector, especially private research institutions and hospitals might continue to regrettably sustain the existing gaps in healthcare. Some of these private hospitals are well resourced with some useful equipment and technology to boost healthcare in support of the activities of the Ghana Health Service. The need for governments to make critical and technological investments through better policies and strategies that align with public health goals and priorities cannot be gainsaid. "Ghana's first National science and technology policy was developed in 2000 and outlined measures to address development challenges in areas such as health, agriculture and ICT using 'innovative and modern technologies', including biotechnology."¹⁵ Enos (1995) also highlighted some structural adjustment policies created by government to develop

⁶ Adu-Gyamfi S. "British colonial reform of indigenous medical practices amongst the Asante people of the Gold-coast 1930–1960", *African journal of History and Culture*, 7.2, 2015, P. 57–63 [in English].

⁷ Ofori-Kuragu, Kwame "It's time to re-build Ghana's broken healthcare infrastructure", accessed on 2.09.2017, URL: www.myjoyonline.com [in English].

⁸ Saleh Karima "The Health Sector in Ghana: A Comprehensive assessment", *Directions in development: human development*, World Bank, 2013, P. 31-32, URL: <https://openknowledge.worldbank.org/handle/10986/12297> [in English].

⁹ Al-Bader Sara, Daar S. Abdallah and Singer A. Peter. "Science-based health innovation in Ghana: health entrepreneurs point the way to a new development path", Op. cit., P. 1–13.

¹⁰ Novignon J and Novignon J. "Improving primary health care facility performance in Ghana: efficiency analysis and fiscal space implications", *BMC Health services Research*, 17.1, 2017, P. 399–405 [in English].

¹¹ Ibidem.

¹² Ibidem.

¹³ Ibidem.

¹⁴ Al-Bader Sara, Daar S. Abdallah and Singer A. Peter. "Science-based health innovation in Ghana: health entrepreneurs point the way to a new development path", Op. cit., P. 1–13.

¹⁵ Ibidem.

Ghana through science and technology; he raises arguments that cut across all sectors to improve the country without delving much into health¹⁶.

Alatinga and Williams (2014), as well as Adu-Gyamfi (2017) who cites Patterson noted that the activities of the colonial government played an important role in the improvement of healthcare in Ghana from the 1920s. Alatinga and Williams (2014) highlighted the immense contribution of the colonial government in the quest to improve medical practices and health care delivery through health policy development and healthcare provision. Senah (2001) has also argued that modern healthcare started during the tenure of Governor Guggisberg who established about 39 hospitals in the country especially Korle Bu which was built for Africans and for research into tropical diseases¹⁷. These hospitals were mostly in urban areas. However, the literature points to the colonial period, progression in infrastructure and medical facilities as well as the increasing innovative training of Ghanaian physicians seem to have amplified some of the gains that were made during the colonial period.

In the Traditional medicine sector, Adu-Gyamfi (2015) and Berry (1994) have highlighted significant changes in health practices in colonial Ghana by the auspices of the colonial administration. In pursuit to change the way of life of the indigenes, and fundamentally to satisfy European interests, there were significant changes and the introduction of new remedies to enhance medical care in the Gold Coast. There was the registration of the indigenous medical practitioners who were licensed and urged to improve upon their services. The motives of the British colonial administration concerning healthcare at the Gold Coast now Ghana, has been highlighted by Adu-Gyamfi among others. However, several of these studies as already stated in the forgoing introduction among others have paid little attention to a historical study of the role of science and technology in healthcare in Ghana. Therefore, this contribution seeks to explore the role of science and technology in the health sector of Ghana from 1960 to 2015. It pays attention to both the traditional and the western/biomedical spheres

Method and Scope. This contribution focuses on the role of science and technology in the health sector of Ghana. The qualitative approach was found useful in exploring the research theme. The study used snowballing and convenient sampling techniques to select 41 health professional from three purposively selected hospitals, thus Manhyia District Hospital, KNUST Hospital and South Suntreso Government hospital. The study used questionnaires to collect data from the selected health professionals from nursing and mid-wifery profession, Ghana medical Association, Ghana Ambulance Service, Ghana Association of Social Workers and Ghana Pharmaceutical Association.

Also, primary sources were gleaned from archival data at the Manhyia archives in Kumasi and also the Public Records and Archives Administration Department (PRAAD) in Kumasi and Accra. Other primary data include; personal observation, government official reports and surveys, official statistics from the Ministry Of Health, Ghana health services, Ministry of Environment, Science and Technology and videos containing in-depth interviews of resourced

health personnel concerning the topic under review. The secondary sources were gleaned from books and journal articles concerning the Ghana health sector; they were sourced from aspects of the literature that deals with traditional medicine and the evolution and development of western or scientific medicine in Ghana. The literature include; Stephen Addae's *Evolution of Modern Medicine in a Developing Country*, Saleh Karima's *The Health Sector in Ghana: A Comprehensive assessment*, Adu-Gyamfi Samuel's "*British colonial reform of indigenous medical practices amongst the Asante people of the Gold-coast 1930-1960 and From Vital Force to the Scientific or an Admixture: A Historical Discourse on Individuals Value for Indigenous Medical Practices in Ghana*", Al-Bader Sara, Daar S Abdallah et al's *Science-based health innovation in Ghana: health entrepreneurs point the way to a new development path*, Senah Kojo's *In Sickness and In Health: Globalization and Healthcare Delivery in Ghana* among others.

In addition, oral interviews were conducted using interview guides to solicit quality responses from some key informants in the Ghana health sector. These key informants are from the directorates of hospitals, personnel in academia and Ghana health Service. The period 1960 to 2015 was chosen for this study. The basis for the period is that, by 1960 Ghana had become a republic under the leadership of Dr Kwame Nkrumah who formulated and implemented policies to develop Ghana from then on. However, change of government and political instability halted these programmes and policies especially in the health sector of Ghana. Governance became stable at the dawn of the fourth republic with latter health polices like the national health policy in 2007, the current health sector Medium Term Development Plan 2010-13 and strategy links towards the attainment of Millennium Development Goals among others. As argued by Saleh (2013), these aimed at improving the health outcomes of the people and ensured that the health system were sustainable and efficient¹⁸.

Discussions. This research is divided into three main sections. The first section consists of the introduction, method and scope. The second focuses on the discussions: brief history of the evolution of science and technology in medicine, the state of the healthcare system in the pre-colonial and colonial Ghana, and health reforms in post-colonial Ghana. The final section concludes the research paper.

Brief history of the evolution of science and technology in medicine. The idea of improving medical practices in the world started around the nineteenth century in some parts of the world including the United States. Warfare brought about a new way of treating wounded soldiers and other patients and during the industrial revolution, the creation of new hospital organizations, socialized healthcare and preventive medicine evolved¹⁹. As the world evolved and knowledge abounded in all areas like health; everyday life was consciously guided with the knowledge being acquired in health. Due to this, scientific knowledge in health was applied to the day to day activities of mankind in advanced countries in the world.

In the nineteenth century, societies started experiment-

¹⁶ Enos J. N. "In pursuit of science and technology in Sub-Saharan Africa: The Impact of Structural Adjustment Programmes", *Rutledge*, 35. 4, 1995, P. 745-778 [in English].

¹⁷ Alatinga Kennedy, Williams John "Development Policy Planning in Ghana: The Case of Health Care Provision", *European Scientific journal*, 10. 33. 2014, P. 363-366 [in English].

¹⁸ Saleh Karima "The Health Sector in Ghana: A Comprehensive assessment", Op. cit., P. 31-37.

¹⁹ De Syon, Guillaume "Medical Awareness", *Science and Technology in Modern European Life*, Greenwood Press, 978.0, 2008, P. 159-164 [in English].

ting and inventing vaccines and drugs to cure illnesses. China started creating a patent for the cure of small pox but in Europe, Pasteur and Koch attempted to invent a vaccine with an initial experiment on animals²⁰. Historians described Louis Pasteur as one of the greatest benefactors to humanity at all times²¹. The works of Pasteur was used as a basis to develop microscopes in Europe and America²². The 1830s saw a scientific body of microscopical knowledge pioneered by Lister and many others²³. Their experiments on animals took time to develop before it was administered to humans and that by the end of 1889 people knew the use of vaccines across Europe. Diseases like rabies, bubonic plague and influenza among others were but few among the numerous diseases the vaccines were used to prevent in Europe and America²⁴.

Again, in terms of equipment and devices, the x-ray machine was one of the first to be invented in the field of healthcare. Rontgen; a German professor discovered some mysterious rays through some experiments which later became known as X-rays that depicts pictures showing the bones of human beings²⁵. The rays contain very fast stream of electrons that come to a sudden stop on a metal plate and this brought to light the ability to diagnose musculo-skeletal disorders and injuries²⁶. After the First World War, some hospitals boasted of having X-ray laboratory though acquiring such facility is difficult and involves a lot of money²⁷. Dr Chamberland, a French physician in 1879, first designed an early prototype of a modern day autoclave²⁸. His thesis "Research Concerning the Origin and Development of Microscopic Organisms" led to the invention of the Chamberland filter and later the Chamberland autoclave, which filtered microorganisms from water and heats solutions above boiling points, to effectively destroy dangerous microorganisms respectively²⁹. Improved ambulance services and intensive care services were the master brain of Dr Safar³⁰.

In Europe, there was a conscious effort at improving the health standards and healthcare delivery by means of improving sanitary conditions in the cities and in hospitals, which accounted for healthy living among people in Europe. The state also acted as a catalyst for the improvement of healthcare delivery by setting up health ministries. For example, in 1930, France established its health ministry³¹. By

the end of the twentieth century, in Europe and in advanced countries, there were a lot of science and technological innovations and advancements in their health sector that helped to clampdown mortality rates and improved standard of living in respective countries³². There are still innovations and improvements that are required for some of these advanced and emerging economies.

The state of the healthcare system in pre-colonial and colonial Ghana. The health sector in pre-colonial Ghana was mainly the use of traditional medicine. Herbalists or indigenous priest healers applied medicinal herbs to cure the people. Diarrhoea and stomach pains were treated with these medicinal herbs³³. Concoctions and decoctions were made from roots, stems and leaves of trees to cure diseases like malaria. Enemas were used for dispensing concoctions if the illness was believed to be intestinal³⁴. These herbs, especially those from quack practitioners were harmful and resulted in severe infections or even death. It was because of fear of quackery that the British colonial government refused to recognise traditional /native physician but rather placed emphasis on scientific/western oriented medical approaches. During this era, the European government brought in European medical practitioners to treat illnesses like malaria and improve health conditions firstly among the European population who were employed in the colonial civil service and later by extension, the African population. This is because more Europeans were dying because of the so-called harsh environmental conditions³⁵.

The government introduced this health system to handle communicable diseases and other emerging infections of colonial administrators, technicians, commercial entrepreneurs and professional workers³⁶. It can be emphasized that the introduction of scientific or modern medicine catered for the Europeans in the first instance, whilst traditional medicine was widely patronized by the indigenous population who gradually embraced scientific medicine. Firstly, they embraced it because of extension of medical service and dispensaries beyond the coastal territories to the interior and due to social and economic change.

In 1864, the Gold Coast colony witnessed the building of the first hospital in cape coast then the capital and subsequent rural dispensaries were built in several localities³⁷.

²⁰ Ibidem, P. 159–161.

²¹ Sheingold Helen, Brenda Halm A. Joyce "The history of healthcare Quality: The First 100 Years 1860-1960", *International Journal of Africa Nursing Sciences*, 1.9, 2014, P. 19–22 [in English].

²² Addae Stephen "Evolution of Modern Medicine in a Developing Country: Ghana 1880-1960", Durham Academic Press, 42.3, 1996, P. 19–25 [in English].

²³ Ibidem.

²⁴ Ibidem.

²⁵ De Syon, Guillaume "Medical Awareness", *Science and Technology in Modern European Life*, Greenwood Press, 2008, P. 163–167 [in English].

²⁶ Sheingold Helen Brenda, Halm A. Joyce. "The history of healthcare Quality: The First 100 Years 1860-1960", Op. cit., P.19–22.

²⁷ De Syon, Guillaume. "Medical Awareness", Op., cit., P. 159–164.

²⁸ Sheingold Helen Brenda, Halm A. Joyce. "The history of healthcare Quality: The First 100 Years 1860-1960." *International*, Op. cit., P. 18–24 [in English].

²⁹ Ibidem, P. 18–21.

³⁰ Ibidem.

³¹ De Syon Guillaume "Medical Awareness", *Science and Technology in Modern European Life*, Greenwood Press, 978.0, 2008, P. 159–164 [in English].

³² Ibidem.

³³ Berry LaVerle Bennette, ed. "Ghana: A country study", *US Government Printing Office*, 550.153, 1995, P.643–644 [in English].

³⁴ Adu-Gyamfi Samuel, Donkoh, J Wilhelmina "A Historical Review of Diseases and Disease Prevention in Gold Coast: A Focus on Asante (1900-1957)", *Historical Research Letter*, 2225-0964, 2013, P. 15–21 [in English].

³⁵ Addae Stephen "Evolution of Modern Medicine in a Developing Country: Ghana 1880-1960", Durham Academic Press, 42.3, 1996, P. 10–17 [in English].

³⁶ Twumasi A. Patrick "Modern Health System", Accessed on 30.01.2018, URL: www.ghanaculture.gov.gh [in English].

³⁷ Senah Kojo "In Sickness and In Health: Globalization and Healthcare Delivery in Ghana", *Institute of African Studies Research Review*, 17.1 2001, P. 83–89 [in English].

Accra also witnessed the first colonial hospital in 1830³⁸. The strategic positioning of Cape Coast and Accra as political stations for the Europeans made their hospitals one of the best in the country³⁹. The government continued to set up health centres in some parts of the colony to attend to sick patients. The army medical service also provided health facilities in some areas like Keta and Elmina⁴⁰. Significantly, the first half of the 20th century witnessed the establishment of health centres and dispensaries, which handled diseases and epidemics. In their article “A Historical Review of Diseases and Disease Prevention in Gold Coast, A Focus on Asante (1900-1957)” Adu-Gyamfi and Donkoh (2013), hinted that there were a number of cases reported to the various health centres in Kumasi and its environs during epidemics between 1933 to 1935⁴¹. The colonial government banned traditional healing because its remedies were presumed to be quack⁴². Dr Sam also argues that the British government decided to ban any form of local development in Ghana⁴³. These include the production and selling of guns, and local alcohol among others. This affected Traditional Medicine practice⁴⁴. He hinted that the British government did not understand the local culture, thus it stifled local or indigenous initiatives⁴⁵.

In response to this, series of changes were to be made to improve the efficacy of traditional medicine and to give it the requisite recognition. A noticeable personality, Aaba, who tabled the setting up of a school which would have focused on the in-depth knowledge in herbalism and teach subjects like African dietetics, material medicine, diagnosis, modern hygiene and sanitation⁴⁶. Aaba was a photographer who pioneered traditional medicine teaching in Ghana⁴⁷. He got support from J.B. Danquah, Nana Sir Ofori-Atta and C.L. Christian to champion the course of African ‘science’⁴⁸. He set up an association called the Society of African Herbalists at Sekondi on 12th December, 1931 with the aim to improve the standard of local medical practices ‘Medical Herbalism’ among its members without any hindrances⁴⁹.

Aside the use of words like ‘quack’ the colonial government used words like “charlatany”, “fraud” and “superstition” to describe indigenous medical practices that had “spiritual” religious connotations within the African community. According to Adu-Gyamfi (2018), it is believed among indigenous medical practitioners that they seek spiritual guidance before they try to cure some illness⁵⁰. This is because some illnesses are caused by spiritual forces⁵¹. This indicates that these practitioners obtain their knowledge from the spiritual realm.

Adu-Gyamfi (2018) highlights that, through incantations, spells, exorcism and the invocation of deities; healers administer healing to the sick⁵². The Society of African Herbalists was required to report every disease to the colonial government doctors⁵³. The mistrust by the colonial government towards the efficacy of the indigenous medical practices gave rise to modern scientific medicine and its popularity among the natives. Aaba’s proposition to improve the scientific knowledge in herbal medicine by advocating a school that will impact the knowledge of herbal medicine practices with subjects like African Herbal massage, Astro Herbalism and organic chemistry did not receive the necessary impetus from the British colonial administration⁵⁴.

Traditional medicine is not only practiced by herbalists and priests alone but it includes traditional bone setters who play a vital role in the treatment of serious cases with regards to the bone. According to Adu-Gyamfi (2018), traditional bone setters specialise in the treatment of broken bones with the aid of herbs and animal parts⁵⁵. He asserts that these practitioners of such early traditional medical practice have the mastery in the art of manipulating the bone with herbs and it is mostly done by Muslims⁵⁶. In terms of child birth, traditional birth attendants were the specialists involved. They attend to pregnant women during labour and help with the delivery of new born babies. They have the necessary skills and knowledge to use herbs and also sup-

³⁸ Addae Stephen “Evolution of Modern Medicine in a Developing Country: Ghana 1880-1960”, Op. cit., P. 10–17.

³⁹ Ibidem, P.61–63.

⁴⁰ Addae, Stephen. “Evolution of Modern Medicine in a Developing Country: Ghana 1880-1960”, Op. cit., P. 820–824.

⁴¹ Adu-Gyamfi Samuel, Donkoh, J Wilhelmina “A Historical Review of Diseases and Disease Prevention in Gold Coast: A Focus on Asante (1900-1957)”, *Historical Research Letter*, 2225-0964, 2013, P. 14–21 [in English].

⁴² Adu-Gyamfi, Samuel. “British colonial reform of indigenous medical practices amongst the Asante people of the Gold-coast 1930-1960”, *African journal of History and Culture*, 7.2, 2015, P. 55–63 [in English].

⁴³ Dr George Henry Sam, Personal interview, 17.05.2018, Dr Sam is a retired lecturer and a former head of phytochemistry and I.C.U Department at the Centre for scientific Research into Plant Medicine, Mampong [in English].

⁴⁴ Ibidem.

⁴⁵ Ibidem.

⁴⁶ Adu-Gyamfi Samuel “British colonial reform of indigenous medical practices amongst the Asante people of the Gold-coast 1930–1960”, Op. cit., P. 59–63.

⁴⁷ Patterson K David “Health in Colonial Ghana: Disease, Medicine and Socio-economic Change 1900-1955”, USA, Crossroad Press, 19.5, 1981, P. 15–18 [in English].

⁴⁸ Patterson K. David “Health in Colonial Ghana: Disease, Medicine and Socio-economic Change 1900-1955”, Op. cit., P. 16–23 [in English].

⁴⁹ Adu-Gyamfi Samuel “A Historical study of the Impact of Colonial Rule on Indigenous Medical Practices in Asante: A Focus on Colonial and Indigenous Disease Combat and Prevention Strategies in Kumase, 1902–1957(Unpublished PhD Thesis), Kwame Nkrumah University of Science and Technology, 2010, P. 103–111 [in English].

⁵⁰ Adu-Gyamfi Samuel “From Vital Force To The Scientific Or An Admixture: A Historical Discourse On Individuals Value For Indigenous Medical Practices In Ghana”, *Journal of Basic and Applied Research international*, 43.2, 2018, P. 9–15 [in English].

⁵¹ Ibidem, P. 3–7.

⁵² Ibidem, P. 8–9.

⁵³ Adu-Gyamfi Samuel “A Historical study of the Impact of Colonial Rule on Indigenous Medical Practices in Asante: A Focus on Colonial and Indigenous Disease Combat and Prevention Strategies in Kumase, 1902-1957, Op. cit., P. 103–111.

⁵⁴ Ibidem, P. 105–107.

⁵⁵ Adu-Gyamfi Samuel “From Vital Force To The Scientific Or An Admixture: A Historical Discourse On Individuals Value For Indigenous Medical Practices In Ghana”, *Journal of Basic and Applied Research international*, 43.2, 2018, P. 9–15 [in English].

⁵⁶ Adu-Gyamfi Samuel. “From Vital Force To The Scientific Or An Admixture: A Historical Discourse On Individuals Value For Indigenous Medical Practices In Ghana”, Op. cit., P. 9–10 [in English].

port during challenges in times of delivery⁵⁷. The two specializations above are known to have full knowledge of the use of the required herbs in treating their patients or clients.

However, with the introduction of scientific medicine, the colonial government took charge of the provision of drugs and equipment and initially imported health labour from abroad. They made a conscious effort to promote scientific medicine in the colony⁵⁸. Though the colonial government was importing equipment and drugs from abroad and missionaries were extending modern health services in the rural areas⁵⁹, malaria continued to remain as the disease with the highest mortality ratio especially among children. New drugs were sought and brought into the country under the auspices of the colonial government and such drugs that were shipped into the country to cure malaria were the quinine and later mepacrine. Quinine was one of the initial drugs proposed by the government to help treat malaria and the government made efforts to inform the indigenes about the efficacy of this new drug⁶⁰. The medicine was pink in colour with tubes and available in every hospital and clinics and also sold at postal agencies and offices⁶¹. The indigenes were largely unlettered; therefore, the colonial administration schooled them concerning the use of the drug via interpreters⁶².

The colonial government ordered a quinine distribution scheme throughout the Gold Coast colony and as Dr Duff hinted, the medicine was to be distributed to post offices by a general postmaster from Tarkoradi⁶³. Mepacrine was also another drug which was purchased by the government to replace the short supply of Quinine⁶⁴. Quinine was the sole drug for the cure of malaria in the Gold Coast but faced with a shortage of supply in the colony, the colonial government opted for the mepacrine drug as a replacement for the quinine to cure patients suffering from malaria⁶⁵.

Apart from malaria, small pox, cerebrospinal meningitis and trypanosomiasis were some major illnesses that were treated in the colony. Vaccinations were also carried out throughout the colony to help prevent some diseases. In the case of patients with trypanosomiasis, they were urged to visit hospitals. The government through their chiefs urged trypanosomiasis patients to report to the hospital to complete the treatment procedure⁶⁶. Patients were quarantined in order to receive treatment. This is to enable a careful study and treatment of the illness and also to prevent it from spreading.

In the field of education, faculties were trained in the

field of science to be able to work in health institutions. This increased the number of skilled persons within the health sector of the economy. They were tooled with the necessary skills sets and knowledge to invent, create and administer health to the general public. The study of science was also added to the education system based on the English system by the government to lure the interest of students into hospital work⁶⁷. Education was always a pre-requisite for individuals to qualify as doctors who could work in hospitals. Initially, most registered practitioners were non-Ghanaians⁶⁸. Prior to independence, scholarships were awarded to ten deserving students for medical training for a year and not until 1945, there were no top nursing training schools at the Gold Coast⁶⁹.

In addition, the Guggisberg era witnessed some massive developments in the country and the health sector was greatly affected. It shaped the health sector prior to independence before further expansions were made to the health sector after independence. For example, The Korle Bu teaching hospital was built with the support of governor Guggisberg to treat sick people and to teach and train health experts. It evolved from only 192-bed capacity throughout the years to become Ghana's referral health centre. Plans like a built-in plan for constructing facilities for the training of nurses and doctors were also in perspective⁷⁰.

Health reforms in post colonial Ghana. The provision of healthcare at the Gold Coast went through some changes during the leadership of Ghana's first president, up until the time he was overthrown through a coup. An immediate post-independence reform was the issue of health care equity by expanding the availability of hospitals and health centres in the country⁷¹. This notwithstanding, more hospitals were needed in other areas since the colonial government only built hospitals in some selected urban areas in the colony. The narratives concerning Europeans contribution to Ghana's healthcare has not always been positive. Some sources argue that, Europeans left the health sector of Ghana in a bad shape. However, the first Ghanaian president, Kwame Nkrumah and his government made some reforms to correct this legacy by providing infrastructure and a medical school⁷². Akosa has argued that the Europeans left Ghana few medical Units to contend with and that the new Ghanaian government made efforts to train Ghanaians and employ them but subsequent governments mostly the military regimes failed to uphold or continue this agenda⁷³.

Under Nkrumah's government, there was an increase

⁵⁷ Ibidem, P. 4-7.

⁵⁸ Ibidem, P. 5-7.

⁵⁹ Twumasi A. Patrick Modern Health System, Accessed on 30.01.2018, URL: www.ghanaculture.gov.gh [in English].

⁶⁰ Manhyia Archives of Ghana, Kumase, MAG 1/1/35, African Mothers Broadcast, Accra, by Dr Duff, Director of Medical Service, 1.07.1936, The Doctor highlighted the efficacy of the 'Government Quinine' and also the threats of the mosquito. The doctor urged Ghanaian mothers to purchase it to cure their children [in English].

⁶¹ Manhyia Archives of Ghana, Kumase, MAG 1/1/35, Op. cit.

⁶² Adu-Gyamfi, Samuel and Donkoh, J Wilhelmina. "A Historical Review of Diseases and Disease Prevention in Gold Coast: A Focus on Asante (1900-1957)" *Historical Research Letter*, 2225-0964, 2013, P. 15-21 [in English].

⁶³ PRAAD, Kumasi, Preliminary Notice, Quinine Distribution Scheme by the medical department, 11.05.1935 [in English].

⁶⁴ Manhyia Archives of Ghana, Kumasi, MAG 34/42, Letter from the colonial office by C.O. Buttler, 6.11.1942 [in English].

⁶⁵ Ibidem.

⁶⁶ Adu-Gyamfi, Samuel. "A Historical study of the Impact of Colonial Rule on Indigenous Medical Practices in Asante: A Focus on Colonial and Indigenous Disease Combat and Prevention Strategies in Kumase, Op. cit.

⁶⁷ Twumasi A. Patrick. "Modern Health System". Accessed on 30.01.2018, URL: www.ghanaculture.gov.gh [in English].

⁶⁸ PRAAD, Seven Year Plan for Reconstruction and Development by Dr Kwame Nkrumah, Accra, Ghana, 1964. 175, Dr Kwame Nkrumah, the first president of Ghana presented the seven year development plan in parliament during his tenure of office to develop the country under his term of office [in English].

⁶⁹ Ibidem.

⁷⁰ Twumasi A. Patrick "Modern Health System", Op. cit.

⁷¹ PRAAD "Seven Year Plan for Reconstruction and Development". Op. cit.

in health personnel in independent Ghana. Trained health-care workers like medical assistant, technical officers and field technicians for Disease Control and surveillance emerged. In 1964, Nkrumah stated in his seven-year plan for National Reconstruction and Development, concerning health policies that there is a large increase in the recruitment and training of all cadres of modern personnel. In 1961 to 1962 two hundred and sixty-five new nurses and midwives emerged out of nursing training schools⁷⁴.

However, there were increase in both infrastructure and qualified human personnel in the country. The number of hospitals increased in the country likewise the number of doctors and nurses improved. This improvement caused an overflow in the outpatient departments in both Korle-Bu and the Kumasi hospitals alone. A total of 31 million pounds was allocated in the establishment of hospitals facilities and the raining of personnel in both rural and urban centres⁷⁵. Rural areas were to have an initial number of 47 hospitals. Financial allocation was budgeted towards this upgrade of health centres and facilities⁷⁶. Health centres were to be upgraded with station units, like maternity clinic, health posts, dressing stations and other station units. It is clear thus far, that the post-independence period required the expansion of medical infrastructure and the training of medical personnel to meet the burgeoning health needs of independent Ghana. This would also require the injection of capital and provision of the necessary basic and required tools to facilitate the level of efficiency and results the government intended to achieve.

The governance of Nkrumah proposed a working hospital service with the needed posts of specialization in health practices. Not only the old hospitals were modernized but also there was the expansion of hospital facilities and the necessary equipment and gadgets to help efficient healthcare in the country. Post-independent hospitals had kitchens, laundries, and X-ray as well as theatre facilities as part of a growing medical field. Corroborating this discourse, Yeboah-Awudzi has hinted that post-independence Ghana has witnessed the introduction of medical equipment like X-ray machines, ultrasound machines, and laboratory equipment as well as computed tomography (CT)-scans; that is a more advanced test of x-ray measurements taken from different angles⁷⁷. In affirmation of Akosa's position, Yeboah Awudzi argues that the health sector of Ghana after independence improved at a steady pace by the government of Ghana⁷⁸. Respondents from the Suntreso Government hospi-

tal and the Manhyia District hospital also agreed with Yeboah-Awudzi concerning the fact that x-ray machines, CT-scans and simple laboratory equipment were part of the earlier equipment used. Moreover, other equipments like suction machine or aspirators, Magnetic resonance imaging (MRI) scanners and oxygen followed suit⁷⁹.

However, according to Mrs Acheampong, the X-ray machine was one of the earliest equipment used in hospitals together with some basic laboratory equipment but the CT-scan equipment was added quite later on in the early 2000⁸⁰. She argued that, most scans were taken by the X-ray machine prior to the 21st century and other equipment were added which include the Electrocardiography (ECG) machine which is used to record the process of the heart over a period of time. the MRI scanners have also aided in the area of producing detailed images of the inside of the body⁸¹. Another critical area in Ghana's quest to provide healthcare would include ambulance service. The ambulance service is one important sector in healthcare delivery, however according to Asante, there has been slow and little improvement in the Ghana Ambulance Service⁸². No equipment are available to facilitate improvement in healthcare and that the only method used to administer first aid is the scoop and run method due to lack of both equipment and health personnel⁸³. We infer that ambulatory care in the proper definition of the word and practice is entirely missing in medical provision or service for the Ghanaian population even in contemporary times.

Some regional capitals like Tamale, Koforidua, Ho and Sunyani witnessed the establishment of these regional hospitals together with district hospitals and polyclinics. A total of 12, 000 pounds was allocated in the building and modernizing these hospitals including Korle-Bu and a grand total of 20, 880 was spent with training establishment, with other facilities and a medical school⁸⁴. Aside the establishment of hospitals, training centres, medical schools, was the need for specialized units or hospitals among others. These special hospitals and health services including the expansion of the number of mental hospitals with unite to enable speed up patient treatments and also dental health services with the necessary resources were very pivotal within the period under review.

The years 1990-2015 witnessed a lot of reforms in the health sector. Several strategies were adopted by the governments of Ghana to improve the technological capabilities especially in terms of equipment and human resource spe-

⁷² Yeboah L. "Health Sector has Seen Many Reforms", Accessed on 01.04.2018, She is a journalist of the Ghanaian leading newspaper; The Daily Graphic. She is interested in going beyond in health reporting. She cited Professor Akosa whose was a former Director General of the Ghana health service from a report covered by VOA news, URL: www.lucyadoma.blogspot.com [in English].

⁷³ Ibidem.

⁷⁴ PRAAD Seven Year Plan for Reconstruction and Development by Dr Kwame Nkrumah, Op. cit.

⁷⁵ Ibidem.

⁷⁶ Ibidem.

⁷⁷ Dr Kwasi Yeboah-Awudzi. Personal interview, Access on 09.04.2018, Dr Yeboah-Awudzi is the Deputy Director for public health at the Ashanti Regional Ghana Health Service Department, URL: <https://gh.linkedin.com/in/dr-kwasi-yeboah-awudzi-23371217> [in English].

⁷⁸ Dr Kwasi Yeboah-Awudzi. Personal interview. Op. cit.

⁷⁹ Field Work, author's archive, 2018 [in English].

⁸⁰ Mrs Adelaide Acheampong Personal interview, Access on 24.04.2018, Mrs Acheampong is the Deputy Director of Nursing Services at the Manhyia District Hospital, Kumasi Ashanti Region [in English].

⁸¹ Ibidem.

⁸² Mr. Asante. Personal interview, 19th March 2018, Mr. Asante is the head of St John's Ambulance Service in Kumasi. They help in the administering of first aid to patients and transport patients to hospital. They also collaborate with the Ghana Ambulance Service [in English].

⁸³ Ibidem.

⁸⁴ PRAAD "Seven Year Plan for Reconstruction and Development" by Dr Kwame Nkrumah, Op. cit.

cialization: A vital reason for this was the frequent coupe d'état and changes of government and economic decline which mitigated against resources assigned to health care which resulted in the institution of the user fee in 1985⁸⁵. The Ministry of Health (MOH) was solely playing the role of providing services together with other institutions like mines, police and the military⁸⁶. There was a growing challenge until the government of Ghana developed a policy that will see structured changes in several sectors of the economy of Ghana the country including the health sector. The vision 2020 developed in 1996 aimed at maximizing the healthy and productive lives of Ghanaians and to promote science and improved technologies as tools for growth and development⁸⁷. This agenda also aims at seeing the development in the health sector until the year 2020. Other policies include the medium-term Health Strategy (MTHS) developed by the MOH; a five year programme which will serve as a guideline for development in health from 1991 to 2001 which aimed at improved quality of facilities, efficiency and increase in the resources provided for and geared toward the development of the health sector⁸⁸.

In addition, Ghana's science and technology policy in the year 2000 saw the country in a sense, leapfrogging from the challenges of the early years of independence and those of the 1980s. This era of governance in Ghana witnessed development of policies for the next two decades in the country's healthcare. A decentralization system occurred with the passage of Act 525 in 1996, which gave birth, to the Ghana Health service and subsequent boards that served as good signs to enable developmental innovations in the health sector. This also encouraged both the traditional and private sector, especially NGOs to partake in specific health services. Again, the government of Ghana in 2010 launched an E-health strategy to improve healthcare delivery in the country through some pilot projects, collection of data, education initiatives and telemedicine⁸⁹. It is a strategy at improving access to healthcare information through advanced information communication technology. E-health is simply gaining access to healthcare information through improved information and communication technology with the help of the internet and related technologies⁹⁰. The use of mobile phones and the internet is the major proponent for this strategy to get access to medical data. Such projects, according to Afarikumah (2016), includes the SENE PDA Project, which aimed at getting access to medical reports in the lowest serviced areas. Medical Technology for Community

health in Ghana, Millennium Villages and Mobile Telemedicine, Mobile Teledermatology among educative projects like the Vodafone Healthline project have also aimed at creating medical awareness for the people⁹¹.

In terms of medical infrastructure, technology and specialization, Saleh (2013) argues that there are a number of health centres such as teaching hospitals in both Kumasi and Accra. However, there are regional hospitals situated in all regional capitals, district hospitals, clinics and Community-Based Health Planning Services (CHPS) which is a community-based health initiative to reach rural and remote areas⁹². Aside public owned hospitals; there are private owned hospitals and health facilities, which are owned by the Christian Health Association of Ghana (CHAG). They are equipped with beds but several facilities are not present in some areas. Facilities like laboratories, pharmacies and operating theatres, which are only present in only regional and teaching hospitals, vary across regions⁹³. By 2010, operating theatres for obstetrics could not be seen in several hospitals⁹⁴. In addition, beds form part of the major infrastructure together with up to date medical equipment; the number of the former vary from health centres and hospitals in the rural and urban areas.

It has also been reported that 3000 beds were added to the Ghanaian health sector between the years 2002 – 2009 to add up to the existing ones to a total of 19,687 hospital beds across the country within the period⁹⁵. The number of hospital beds did not match to the population growth from 1990 with hospital bed ratio at the national level dwindling from 1.46 to 0.81 in 2009⁹⁶. Medical equipment on the other hand is of very poor quality with few or no improved gadgets and machines to enhance healthcare delivery. It is reported that by 2010, 95% of health facilities had access a baby weighing scales but few had access to a filled oxygen cylinder, which is less than 40 per cent⁹⁷. By 2010, primary health care facilities had low number of oxygen and maternity care equipment package and it got worse by the same year with Upper East and the Northern regions having the worst rate of equipment management⁹⁸. Equipment and other facilities are generally modern in the university hospitals but are absent in rural areas⁹⁹. There are relatively few ventilators except in operating rooms and in the thoracic surgery ICU at the teaching hospital in Accra with smaller unit at large teaching and military hospitals¹⁰⁰. Cardiopulmonary resuscitation; a lifesaving technique administered to a person whose heartbeat and breathing has ceased is rarely used

⁸⁵ Dovlo Delanyo "Health Sector Reform and Deployment, Training and Motivation of Human Resources towards Equity in Health Care: Issues and Concerns in Ghana", 2018 [in English].

⁸⁶ Ghana Statistical Service, Health Research Unit, Ministry of Health and ORC Macro, *Ghana Service Provision Assessment Survey 2002*, Calverton, Maryland: Ghana Statistical Service and ORC Macro, 2003 [in English].

⁸⁷ Ibidem.

⁸⁸ Ghana Statistical Service, Health Research Unit, Ministry of Health and ORC Macro, Op. cit.

⁸⁹ Afarikumah Ebenezer "Electronic Health in Ghana: Current Status and Future Prospects", *Online Journal of Public Health Informatics*, 5.3, 2016, P. 230–236 [in English].

⁹⁰ Ibidem.

⁹¹ Afarikumah Ebenezer. "Electronic Health in Ghana: Current Status and Future Prospects", Op. cit.

⁹² Saleh Karima "The Health Sector in Ghana: A Comprehensive assessment", *Directions in development: human development*, World Bank, 2013, P. 45-48, URL: <https://openknowledge.worldbank.org/handle/10986/12297> [in English].

⁹³ Ibidem, P. 46–48.

⁹⁴ Ibidem.

⁹⁵ Ibidem.

⁹⁶ Saleh Karima. "The Health Sector in Ghana: A Comprehensive assessment", Op. cit.

⁹⁷ Ibidem.

⁹⁸ Ibidem.

⁹⁹ Drislane W Frank, Akpalu Albert, Wegdam Harry "The Medical System in Ghana", *Yale Journal of Biology and Medicine*, 87.3, 2014, P. 323–323 [in English].

¹⁰⁰ Ibidem.

outside urban centres and also patients in coma from severe head injuries together with those with respiratory diseases are not intubated¹⁰¹. Cardiogram and medical autoclaves are difficult to be accessed and only the two teaching hospitals have haemodialysis units¹⁰².

According to Mrs Acheampong, only tertiary hospitals, which are the teaching hospitals, have advanced and up to date equipment to treat patients and serve the purposes of research¹⁰³. These hospitals are located in only three regional capitals, which are the Komfo Anokye Teaching hospital in Kumasi- Ashanti Region, Korle-Bu Teaching Hospital in Accra the capital of the Greater Accra Region and the Tamale Teaching Hospital in the Northern region. Urban areas have a fair share of equipped hospitals than rural areas and mostly public hospitals in these urban areas are overcrowded. Ghana has an average standard in terms of highly improved medical facilities¹⁰⁴. An internet survey asserts that the private sector which number up to 1294 hospitals have a better quality of both medical facilities and treatment than public hospitals which has a total number of 1818¹⁰⁵.

Concerning Traditional Medicine. Traditional medicine after the independence of Ghana has been given a face lift. Adu-Gyamfi (2018) argues that the interactions between Nkrumah and the Akonedi shrine of Larteh led to the establishment of the Ghana Physic and Traditional Healing Association¹⁰⁶. The association was set up to enable the efficiency of traditional medicine¹⁰⁷. He further highlighted the improvements traditional medicine has gone through and has been a vital force in healthcare delivery rivalling orthodox medical practices¹⁰⁸. Dr Sam also acknowledges the fact that Nkrumah made giant steps to revive Traditional Medicine but he added that Nkrumah also developed indigenous industries¹⁰⁹. Policies have been put in place to enable traditional medical practice to work alongside biomedical or orthodox medicine. As suggested by Dapaa, the government of Ghana has implemented a policy to integrate traditional medicine into the mainstream medical system of Ghana¹¹⁰. This will help traditional medicine gain recognition in the health sector of Ghana. The establishment of the Centre for Scientific Research into Plants Medicine (CSRPM) in 1974

at Mampong Akuapem in the Eastern Region helped with the technological advancement of herbal medicine¹¹¹. Dr Oku Ampofo started it after attaining some level of knowledge at the Liverpool School of Tropical Medicine¹¹². According to Dr Sam, Dr Oku Ampofo was denied privilege to practice his expertise in any hospital because he is an African¹¹³. Dr Gbedema noted that the Centre for Scientific research into Plant Medicine (CSRPM) now called Centre for Plant Medicine Research was a government initiative to develop Traditional Medicine in the Ghanaian healthcare system¹¹⁴. The centre is comprised of two sections; a clinic and research centre¹¹⁵. The establishment of the CSRPM earmarked serious plans to improve Traditional Medicine in Ghana. It is important to state that some of these gains were made during the military regime of Col. I.K. Acheampong¹¹⁶.

Adu-Gyamfi (2018) highlights that the institution is divided into nine departments, which are phytochemistry, pharmacology, toxicology, microbiology, plant development, outpatient clinic, clinical laboratory and drug production¹¹⁷. The facility was housed with only one brick room where herbs and other pharmacopeia were boiled in huge pots with a big ladder¹¹⁸. The government of Ghana is making efforts to improve the state of traditional medicine in Ghana to enable healthcare delivery to ease it off the absolute dependence on orthodox medicine. Other institutions like the Nogouchi Memorial Institute and research centres like the Ghana Federation of Traditional Medical Practitioners are also making efforts to improve the efficiency of traditional medicine¹¹⁹. Mrs Acheampong agrees with this and gives credence to the fact that traditional medicine department/units have been incorporated into some biomedical hospitals; these include Tafo hospital and Kumasi South hospitals found in the Ashanti region of Ghana¹²⁰.

Tertiary institutions including the faculty of pharmacy of the Kwame Nkrumah University of science and Technology and the faculty of science of the University of Ghana have produced graduates in herbal medicine¹²¹. The Herbal Medicine Department in Kwame Nkrumah University of Science and Technology (KNUST) was established in 2001 to facilitate the training of human resource, that is, both stu-

¹⁰¹ Ibidem, P. 323–325.

¹⁰² Drislane W Frank, Akpalu Albert, Wegdam Harry “The Medical System in Ghana”, Op. cit., P. 47.

¹⁰³ Interview with Mrs Adelaide Acheampong at the Manhyia District Hospital’s D.D.N.S Office, 24th April 2018.

¹⁰⁴ “Healthcare in Ghana”, accessed on 10th April 2018, URL: www.justlanded.com [in English].

¹⁰⁵ Ibidem.

¹⁰⁶ Adu-Gyamfi Samuel “From Vital Force To The Scientific Or An Admixture: A Historical Discourse On Individuals Value For Indigenous Medical Practices In Ghana”, *Journal of Basic and Applied Research international*, 43.2, 2018, P. 14–17, [in English].

¹⁰⁷ Ibidem.

¹⁰⁸ Ibidem.

¹⁰⁹ Interview with Dr George Henry Sam at the Department of Herbal Medicine (KNUST), 17th May 2018.

¹¹⁰ Adu-Gyamfi Samuel “From Vital Force To The Scientific Or An Admixture: A Historical Discourse On Individuals Value For Indigenous Medical Practices In Ghana”, Op. cit., P. 14–17.

¹¹¹ Ibidem, P. 15–17.

¹¹² Ibidem.

¹¹³ Interview with Dr George Henry Sam at the Department of Herbal Medicine (KNUST), 17th May 2018.

¹¹⁴ Interview with Dr Stephen Y. Gbedema at the Department of Herbal Medicine (KNUST), 18th May 2018, DR Stephen Y Gbedema is the Head of Department of the Herbal Medicine Department of Kwame Nkrumah University of Science and Technology.

¹¹⁵ Ibidem.

¹¹⁶ Interview with Dr George Henry Sam at the Department of Herbal Medicine (KNUST), 17th May 2018.

¹¹⁷ Adu-Gyamfi Samuel. “From Vital Force To The Scientific Or An Admixture: A Historical Discourse On Individuals Value For Indigenous Medical Practices In Ghana”, Op. cit., P. 15–16.

¹¹⁸ Interview with Dr George Henry Sam at the Department of Herbal Medicine (KNUST), 17th May 2018.

¹¹⁹ Adu-Gyamfi Samuel. “From Vital Force To The Scientific Or An Admixture: A Historical Discourse On Individuals Value For Indigenous Medical Practices In Ghana”, Op. cit.

¹²⁰ Interview with Mrs Adelaide Acheampong at the Manhyia District Hospital’s D.D.N.S Office, 24th April 2018.

¹²¹ Adu-Gyamfi Samuel, “From Vital Force To The Scientific Or An Admixture: A Historical Discourse On Individuals Value For Indigenous Medical Practices In Ghana”, Op. cit., P. 15–19.

dents and traditional medicine practitioners, to enable them to improve the administering of herbal medicine and patronage of same in Ghana¹²². The first batch of students graduated in 2005¹²³. This shows that there has been a conscious effort to improve traditional medicine through science and technology since students are equipped with scientific knowledge to research into traditional medicine. They have used their expertise to improve the health sector. International organizations like UNAID and UNICEF were recognized as being deeply involved in the advancement of the Ghana health sector. Traditional Medicine also benefited support from UNESCO in terms of the supply of equipment and DANAFCO Ghana; a Danish surgical company¹²⁴.

The Ghana health sector has gone through some tremendous changes through science and technology since independence. Although this has come about at a slow pace, the government of Ghana is trying to use science and technology as a tool to improve the standard of healthcare delivery in the country.

Conclusion. The study concludes that the standard of healthcare in Ghana is quite advanced though it is lagging behind when compared to first world or developed countries in terms of scientific and technological innovations. It is evident that significant improvements have been made in Ghana's health sector especially in resourcing medical personnel and to an extent the provision of some level of infrastructure. Tertiary institutions have made significant contributions by producing specialized human resource to enhance healthcare delivery in Ghana. In addition, NGOs and other International organizations have been seen as partners in the development of the healthcare sector through science and technological initiatives, funding and donation of equipment among others.

On the other hand, traditional medicine has been re-focused severally on "scientific" research in the healthcare system of Ghana despite the strategies implemented by the colonial government to suppress it in the first instance. Government policies, stakeholders and efforts of individuals have contributed immensely to the fusion of scientific knowledge and traditional medicine especially herbal medicine. Researchers have been trained to deal with the herbal medicine question in particular those that are devoid of Spiritism or superstition. These experts among others have adopted scientific procedures to produce and enhance the efficacy of drugs. At least, in contemporary times, these efforts among other things aimed at improving healthcare delivery in Ghana. It is therefore envisaged that the people of Ghana and policy makers in particular would shun what is mundane and embrace a more progressive and results oriented medical provision for the people of Ghana.

Самуель Аду Гуамфі, Ернест Фолей Окіне, Річард Оваре. Наука і технологія як фактори, що сприяють розвитку охорони здоров'я в Гані: минуле і сьогодення. На основі якісного та кількісного дослідження автори змогли зібрати інформацію з первинних і вторинних джерел, щоб виділити деякі істотні аспекти того, що пояснює прогрес, досягнутий у сфері охорони здоров'я в Гані та прослідкувати історію розвитку медичної галузі. **Мета статті** - вивчити вплив науки і нових технологій на якісні зміни в системі системи охорони здоров'я Гані, а також розглянути процес зміни в історичному ключі. **Джерельна база роботи** - документи, що регламентують діяльність охорони здоров'я Гані, міжнародні джерела. **Методологічні підходи:** історичний порів-

няльний аналіз, статистичний і описовий методи. **Результати,** представлені в цьому дослідницькому документі, вказують на документальну базу щодо охорони здоров'я в країнах, що розвиваються, а також на традиційні і альтернативні підходи, досягнення в сфері біомедицини в Гані. **Висновки.** Завдяки поступовим і, в деякій мірі, прагматичним формулювань і реалізації нової політики в галузі охорони здоров'я. У статті також йдеться про прихильність фахівців-практиків, дослідників і політиків до забезпечення і прийняття деяких відповідних зобов'язань на шляху підвищення якості охорони здоров'я в Гані. **Передбачається,** що дана стаття спонукатиме громадян Гані і політиків, зокрема, продовжувати займатися науковими дослідженнями і уникати абсолютної консервативності в питанні охорони здоров'я.

Ключові слова: наука, технологія, народна медицина, православна медицина, охорона здоров'я Гані.

Самуель Аду Гуамфі є старшим викладачем в Університеті науки і технологій ім. Кваме Нкрума (KNUST). Його дослідження спрямовані на розвиток охорони здоров'я, політики охорони здоров'я, навколишнього середовища та санітарії, науки та техніки, традиційної та інтегративної медицини, а також громадської думки й соціально-політичного розвитку Африки та Гані зокрема. Його поточний проект: "Медсестри та нетрадиційні методики терапії: наслідки для міжкультурної охорони здоров'я". Автор має понад 60 публікацій за своєю спеціальністю та в суміжних галузях знань.

Samuel Adu-Gyamfi - He is a senior lecturer at the Kwame Nkrumah University of Science and Technology (KNUST). His research focus is on evolutions in health, public health, health policy, environment and sanitation, science and technology, traditional and integrative medicine as well as public opinion and social and political development of Africa and Ghana in particular. His current project includes 'Nurses and unconventional therapy practices: Implications for intercultural healthcare. The author has over sixty publications in his speciality and other related areas.

Ернест Фолей Окіне – випускник кафедри історії та політичних досліджень Університету науки і техніки ім. Кваме Нкрума. Коло наукових інтересів включає історію науки, технології та історію медицини і політику в галузі охорони здоров'я.

Ernest Foley Okine – He is a graduate from the Department of History and Political Studies, of the Kwame Nkrumah University of Science and Technology. His research interest includes History of Science, Technology, and History of Medicine and Health policy.

Річард Оваре – випускник кафедри історії та політичних досліджень Університету науки і техніки ім. Кваме Нкрума. Працював асистентом викладання та досліджень у відділі Історії та політичних досліджень того ж університету протягом 2017–2018 рр. Зараз він викладач і дослідник. Стипендіат на отримання магістерського сертифікату для проведення Mphil в історичних дослідженнях. Коло наукових інтересів включає політику в традиційній медицині, формування політики охорони здоров'я, навколишнє середовище, науку і техніку.

Richard Oware – He is a graduate from the Department of History and Political Studies, of the Kwame Nkrumah University of Science and Technology. He worked as a Teaching and Research Assistant in the Department of History and Political Studies of Same University within the 2017-2018 academic. He is now an educator and a researcher. He has recently won a master card scholarship to pursue Mphil in Historical Studies. His research interest includes Policy in traditional medicine, health policy making, environment and science and technology among others.

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¹²² Interview with Dr Stephen Y. Gbedema at the Department of Herbal Medicine (KNUST), 18th May 2018.

¹²³ Ibidem.

¹²⁴ Interview with Dr George Henry Sam at the Department of Herbal Medicine (KNUST), 17th May 2018. [in English].