Review Article

Health Policy and the Fight Against COVID-19: A Narrative Review of Ghana's Response

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ABSTRACT

Background: The COVID-19 pandemic continues to adversely affect healthcare systems worldwide. Developed and underdeveloped countries continue to strive toward sustainable health policies that will help contain the spread and, at the same time, manage the patients. Global policy initiatives since the confirmation of the outbreak are guided by the recommendations from the World Health Organization. Countries, states, and territories develop domestic policies based on their capacities and resources. This study aims to provide insight into Ghana's health policy response to the COVID-19 pandemic.

Materials and Methods: This study is a narrative review of literature in which data were extracted from electronic databases such as Embase, PubMed, Google Scholar, ScienceDirect, and Web of Science that published research articles on the initial policy response to COVID-19 in Ghana. A concurrent relative search was also conducted on the websites of the Ghana Ministry of Health and Ghana Health Service to aggregate and synthesize existing policies enacted in response to the coronavirus pandemic within the first year of the outbreak.

Results: Ghana's health policy response to COVID-19 was proactive and reactive. Policy changes occurred when cases started emerging in Ghana. The focus of health policy was mainly to preserve lives. Policy implementation was a collaborative effort between public and private organizations.

Conclusion: The government of Ghana, through the Ministry of Health and the Ghana Health Service, has remained at the forefront of providing policy directions to the Ghanaian people in the fight against COVID-19.

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1. Introduction

The coronavirus (COVID-19) pandemic has shaken the foundations of global healthcare systems. From what started as a pneumonia-like disease in Wuhan, China [1], the COVID-19 pandemic has affected more than 90% of countries worldwide as of September 7, 2021 [2].

The World Health Organization (WHO), following the recommendation of its emergency committee, declared COVID-19 a public health emergency of international concern on January 30, 2020, when there were less than 100 confirmed cases outside China [3].

As of September 7, 2021, the global number of confirmed cases was estimated to be around 221775191, with approximately 4.5 million deaths [2]. The impact of the pandemic has been felt in both developed and underdeveloped countries, with a significant spike in the number of cases that often overwhelm health and emergency systems. Notably, countries such as Italy, Spain, The United Kingdom, The United States of America, Brazil, Iran, and India have experienced acute surges in the number of patients and hospital admissions.

The importance of health policy in managing health emergencies such as the coronavirus pandemic cannot be overstated [4, 5]. Public health policy encompasses those regulations, laws, legislation, actions, and decisions implemented to safeguard the health and well-being of the population [6]. These policies are usually borne out of continuous research and serve as the bridge between research outcomes and the application of these findings towards achieving a healthier society. WHO and other international health bodies have remained at the forefront of providing global policy directives regarding the coronavirus pandemic. Within 10-14 days after the WHO office in China picked up a media report of ongoing atypical pneumonia in Wuhan, WHO developed an interim guideline for managing "a new disease" [7]. This guideline contained 9 key components, which included infection prevention and control, laboratory testing, a tool kit for reviewing national capacities, risk communication, community engagement, disease comorbidity packages (1&2), travel advice, clinical management, and surveillance case definitions [7]. On January 20, 2020, WHO published the guideline on home care for suspected COVID-19 cases.

Globally, there are variations in national health system capacities. Developed countries have better and more comprehensive healthcare systems than developing and underdeveloped countries [8, 9]. Developing, implementing, and sustaining health policies in developing countries has been a challenge prior to the coronavirus pandemic [10-12]. There are increasing concerns about the capacity of countries in Sub-Saharan Africa to manage the pandemic in case of a major outbreak on the continent. WHO and the African Center for Disease Control continue to monitor the impact of the pandemic within the African subregion. With the recent vaccine rollout, WHO has raised concerns about the risk of diminishing health system capacities, including policy failures, as the continent struggles with vaccine shortage [13].

Ghana, like many developing countries, continues to work tirelessly to optimize its meager health resources to provide quality healthcare to the over 30 million people living in the country during the pandemic [8, 14]. Ghana, as of September 7, 2021, has recorded approximately 120000 confirmed cases and 1000 deaths [15]. Ghana's response to the COVID-19 pandemic at the initial stages of the outbreak was hailed to be among the best in the subregion. However, an alarming spike in the number of reported cases across the country is seen (Figure 1 and Table 1) [8, 16].

According to the Ghana health service, approximately 1.2 million vaccine doses were administered in Ghana as of July 7, 2021, with about 865000 first doses and 406000 double vaccinations [16]. Ghana was among the first countries to receive vaccine supply from external donors in the subregion and has been noted to have chalked a great success in rolling out the initial supplies. This success has been primarily attributed to Ghana's existing health policies related to polio eradication and experience in other mass immunization projects in the past.

As the number of COVID-19 cases continues to rise and access to vaccines is increasingly becoming a challenge, countries must begin to rethink and provide stringent policy directions to contain the spread of the virus. This issue is even more critical due to the constant mutation of the coronavirus, the disturbing pattern of transmissibility, and the disease severity of the emerging Delta variant [17].

The purpose of this paper is to review the available literature regarding Ghana's health policy response in the first-year post declaration of the pandemic. Findings and recommendations from this study will give an insight to policymakers on Ghana's current and future needs in managing these pandemics and future pandemics.

2. Materials and Methods

This study is a narrative review of literature in which the relevant data were extracted from Embase, PubMed, Google Scholar, ScienceDirect, and Web of Science that published research articles on the initial policy response to COVID-19 in Ghana. Words such as COVID-19, Ghana, health policy, public policy, and healthcare were used either alone or in combination to conduct the search for literature in databases. A concurrent relative search was also conducted on the websites of the Ghana Ministry of Health and Ghana Health Service websites to aggregate and synthesize existing policies enacted in response to the coronavirus pandemic within the first year of the outbreak. Studies that reported on health policy in Ghana relative to the pandemic were included in the study. Themes of interest were generated from existing literature, and a comparative analysis was carried out in relation to existing policies from the global perspective, which forms the framework for the ensuing discussion.

3. Results and Discussion

Health policy in context

The right to healthcare is a fundamental human right enshrined in the language of the Constitution of the Republic of Ghana [18]. Article 12 (2c) of the International Covenant on Economic, Social, and Cultural Rights, to which Ghana is a treaty, also requires member states, among other things, to protect the citizens from endemics and epidemics [19].

Enacting and implementing policies during the coronavirus pandemic thus becomes a constitutional mandate of the government of Ghana and its associated health bodies. Due to the magnitude of "mysteries and unknowns" surrounding the coronavirus pandemic [20], formulating policies require stringent measures that consider many contextual factors to meet the specific demands of people living in specific geographical areas. As admitted by WHO, mitigating the impact of COVID-19 is an ongoing process and involves "building the ship as we sail, and it is critical that we continue to share learnings and innovations so that we can improve surveillance, prevention, and treatment, and ensure equitable access for the poorest to all R&D breakthroughs" [21].

Policy initiatives prior to confirmed cases in Ghana

WHO, after declaring COVID-19 as a pandemic of international concern, entreated countries and their leaderships to adopt measures that will protect and prevent the spread of the pandemic. Health policies in Ghana became a necessity, and the extent of protection of the borders depended mainly on implementing these policies. As explained by Torjman et al. [22], policy response in times of crisis takes the form of new legislation, amending old legislation, and providing new special directives which become formalized over time. The government of Ghana, through the National Disease Surveillance Department of the Ghana Health Service, conducted a risk assessment and developed a response strategy [23]. This strategic measure ensured a plan of action to mitigate the effect of COVID-19 in the country. Many countries, states, and territories developed strategic plans with no reported cases [24, 25].

The Ghana Health Service, in collaboration with port health services and other stakeholders, organized orientation and training programs for port staff across the various ports of entry to Ghana [23]. This training, among other things, included the procedures for comprehensive screening for cases and handling of suspected cases. Additional training was also provided to a selected group of health professionals on contact tracing, referral of suspected cases, and documentation using structured contact tracing forms [23, 26]. Training of healthcare providers towards contact tracing and increasing health surveillance has been well documented across the world as a public health intervention strategy to identify early, manage, and prevent the spread of COVID-19 [27-29]. Like many countries before recording their first COVID-19 cases, Ghana had no access to digital platforms and mobile apps that enhanced contact tracing.

The ministries of health and information commenced mass education about the pandemic and encouraged the people to be on the lookout. Both print and electronic media started educating their readers and listeners on the outbreak and the need to report any suspected symptoms to healthcare facilities. This health advice and initiative was evident in the demeanor of the president of the republic when he adopted the "elbow to elbow" greeting strategy instead of traditional handshakes during the independent day celebration on March 6, 2020 [30]. Leadership through health education and health literacy have been identified as significant in preventing the spread of COVID-19 [31-33].

Implementing health policies during a crisis comes at a cost often outside institutions' budgets. WHO encouraged countries at the start of the pandemic to work together and commit enough finances towards the fight against COVID-19. On March 11, 2020, a day before the first cases were identified in Ghana, the government

Table 1. Regional COVID-19 breakdown as of June 3, 2021 [8]

Region	Case Count
Greater Accra Region	51723
Ashanti Region	15612
Western Region	5891
Eastern Region	4279
Central Region	3513
Volta Region	2532
Northern Region	1654
Bono East Region	1439
Bono Region	1410
Upper East Region	1320
Western North Region	888
Ahafo Region	725
Upper West Region	500
Oti Region	436
North East Region	229
Savannah Region	123

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of Ghana announced a $US 100 million support fund to boost preparation capacity for a possible outbreak [34]. Financing health budgets, especially in emergencies such as COVID-19, is pivotal in enhancing containment efforts and case management [35].

Policy initiatives after the confirmation of COVID-19 cases in Ghana

The health policy initiatives in Ghana shifted from being mainly proactive to a more reactive approach after the first cases were confirmed on March 12, 2020. The government's primary objectives in relation to public health included curtailing the further importation of COVID-19 cases, identifying cases when they present in the communities, and caring for the sick [36]. Related policy initiatives broadly covered public health and healthcare service management.

On March 15, 2020, three days after Ghana recorded the first two COVID-19, the president of the republic, in his address to the nation, outlined a course of action to prevent the spread of the virus [37]. In his address, the president announced the closure of the country's borders to non-resident permit holders traveling to Ghana from countries with more than 200 COVID-19 cases, with a mandatory 14-day quarantine for individuals allowed into the country [38]. As the number of imported cases rose despite the initial restrictions, the president announced a complete closure to human traffic at all ports of entry starting from midnight of March 22, 2020, for two weeks [39]. This restriction was extended indefinitely, and international commercial flights were not allowed into the country following the increasing number of cases [38].

The Ministry of Health, Ghana Health Service, and the Ministry of Information intensified their health education strategies to reach every part of the country. These activities primarily covered preventive measures, identifying symptoms, and the need for urgent isolation when symptoms manifest. The Ministry of Health, through the Ghana Health Service, also issued guidelines for isolation, among other things, on March 19, 2020, which mandated close contact of infected people to self-isolate for a minimum of 14 days [16].

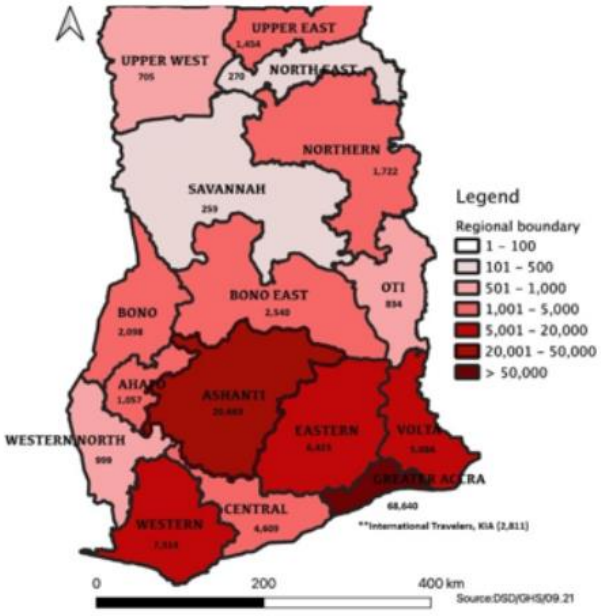

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Figure 1. Cumulative case count in Ghana as of September 27, 2021

Adopted from Ghana health service.

There was a ban on all social gatherings, including schools, workshops, religious gatherings, and conferences, to limit the spread of the virus [23, 40]. Private burials were allowed with a limited number of 25 people in attendance. There was a directive for the operators of public transport services, restaurants, and hotel services to provide handwashing equipment at convenient places for public use [36].

The imposition of the restriction Act 2020 was approved by the president on March 21, 2020, with the sole aim of controlling human movement and reducing the impasse of the looming community spread of the coronavirus [37, 41]. On March 27, 2020, following the advice from the Ministry of Health and Ghana Health Service, the president announced a partial lockdown of four principal cities (Accra, Tema, Kasoa, and Kumasi) effective March 30, 2020, which were identified as hotspots [36, 42].

By April 20, 2020, all lockdown orders were lifted, and by June 15, 2020, educational institutions were opened to final-year students to continue their academic work [37]. Moreover, though the ban on social gatherings was still effective, religious meetings, conferences, workshops, and weddings, among others, were permitted at a capacity of 100 attendees and to last for a maximum of one hour, with strict social distancing orders and compulsory wearing of masks [23, 37].

Ghana, like many developing countries, has inequitable healthcare delivery systems in which many people in the far-to-reach communities cannot access quality healthcare [8, 40, 43]. The massive infrastructure deficit in the healthcare delivery system in Ghana was of great concern when the outbreak was announced by WHO [8, 36]. The government of Ghana, at the start of the pandemic, designated some main hospitals as COVID-19 treatment centers to better attend to the unique needs of infected people. Some district and regional hospitals also saw a facelift in capacity building to manage COVID-19 cases. In support of the government's efforts, some religious organizations converted their premises into COVID-19 isolation and treatment centers.

In collaboration with the private sector, the government of Ghana developed the Ghana Infectious Disease Center, a 100-bed facility to provide specialist intensive care to COVID-19 patients requiring advanced care [37, 44, 45]. The president also announced the government's commitment to constructing similar facilities across the country.

Concerns about the lack of equipment, especially for infection prevention in healthcare facilities, almost led to industrial action by a section of the healthcare workforce who felt threatened by the increasing number of cases [44]. This event called for action to avert further cracks in the overburdened healthcare system. The government of Ghana initiated a $US 10 million loan system through

the Exim bank for the local production of personal protective equipment for healthcare personnel [44, 46]. Frontline healthcare workers were given allowances, tax exemptions, and insurance packages to show their continued support through the country's difficult times [38].

To boost Ghana's testing capacity, the Ghana Health Service directed all contacts of positive cases to be tested at no cost [26, 37]. Samples were aggregated and tested in groups (pool testing) which made testing more efficient. In collaboration with Zipline company, drones were deployed to various parts of the country to transport blood samples to major testing sites for early testing, diagnosing, and prompt initiation of isolation and treatment modalities [47]. The use of technology in the fight against COVID-19 has significantly complemented management efforts globally [48]. University laboratories, in collaboration with allied health personnel, have been instrumental in developing measures to boost Ghana's testing capacity. Noguchi Memorial Institute for Medical Research (NMIMR) and Kumasi Center for Collaborative Research (KCCR), respectively of The University of Ghana and Kwame Nkrumah University of Science and Technology, continue to play instrumental roles in COVID-19 testing in Ghana since the outbreak was confirmed in Ghana [23].

4. Conclusion

The COVID-19 pandemic has called for urgent health policy initiatives to prevent the spread and preserve lives. Both proactive and reactive policies were adopted before and during the outbreak in Ghana. Ghana recorded its first COVID-19 cases on March 12, 2021. The government of Ghana, through other local health agencies, continues to provide policy guidelines and technical support for the management of COVID-19 in line with recommendations from the World Health Organization. The implementation of these policies has primarily been a collaborative effort between the public and private sectors.

Significance to public health

Health policy plays an integral part in safeguarding the health and wellbeing of populations. The decisions, actions, and inactions of policy actors, especially during health emergencies such as the coronavirus pandemic, determine overall health outcomes. Whereas developed countries have systems and resources to execute policy intents, the same cannot be said for developing and underdeveloped countries. This study explored the health policies adopted in a developing country during the early days of the coronavirus outbreak. Findings from this study can guide ongoing planning for further policies during this pandemic and future pandemics.

Study limitations

This study is a narrative literature review that does not follow systematic evidence-based criteria. This condition may result in reporting bias.

Ethical Considerations

Compliance with ethical guidelines

There were no human subjects involved in this review. Data were extracted solely from electronic databases. Therefore, no ethical approval is required for this paper.

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Authors' contributions

All authors equally contributed to the writing and review of the manuscript.

Conflict of interest

The authors declared no conflict of interest.

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References

[1] Sanyaolu A, Okorie C, Hosein Z, Patidar R, Desai P, Prakash S, et al. Global pandemicity of COVID-19: Situation report as of June 9, 2020. Infectious Diseases: Research and Treatment. 2021; 14:1178633721991260. [DOI:10.1177/1178633721991260] [PMID] [PMCID]

[2] World Health Organisation (WHO). Coronavirus (COVID-19) Dashboard. Geneva: World Health Organisation; 2022. [Link]

[3] World Health Organisation (WHO). Statement on the second meeting of the international health regulations (2005) emergency committee regarding the outbreak of novel coronavirus (2019-nCoV). Geneva: World Health Organisation; 2020. [Link]

[4] Lal A, Erondu NA, Heymann DL, Gitahi G, Yates R. Fragmented health systems in COVID-19: Rectifying the misalignment between global health security and universal health coverage. The Lancet. 2021; 397(10268):61-7. [DOI:10.1016/S0140-6736(20)32228-5]

[5] Ortega G, Rodriguez JA, Maurer LR, Witt EE, Perez N, Reich A, et al. Telemedicine, COVID-19, and disparities: Policy implications. Health policy and Technology. 2020; 9(3):368-71. [DOI:10.1016/j.hlpt.2020.08.001] [PMID] [PMCID]

[6] Mailman School of public health. What is Public Health Policy? [Internet]. 2021. [Updated 2022 Jun]. Available from: [Link]

[7] World Health Organisation. Listings of WHO's response to COVID-19. Geneva: World Health Organisation; 2020. [Link]

[8] Dzando G, Salifu S, Donyi AB, Akpeke H, Kumah A, Dordunu R, et al. Healthcare in Ghana amidst the coronavirus pandemic: A narrative literature review. Journal of Public Health Research. 2021; 11(1):2448. [DOI:10.4081/jphr.2021.2448] [PMID] [PMCID]

[9] Lone SA, Ahmad A. COVID-19 pandemic - an African perspective. Emerging Microbes & Infections. 2020; 9(1):1300-08. [DOI:10.1080/22221751.2020.1775132] [PMID] [PMCID]

[10] Chudi IP. Healthcare problems in developing countries. Medical Practice And Reviews. 2010; 1:9-11. [DOI:10.5897/MPR.9000011]

[11] Carrin G. Social health insurance in developing countries: A continuing challenge. International Social Security Review. 2002; 55(2):57-69. [DOI:10.1111/1468-246X.00124]

[12] Kasthuri A. Challenges to healthcare in India: The five A's. Indian Journal of Community Medicine. 2018; 43(3):141-43. [DOI:10.4103/ijcm.IJCM_194_18] [PMID] [PMCID]

[13] World Health Organisation (WHO). Africa faces 470 million COVID-19 vaccine shortfall in 2021. Geneva: World Health Organisation; 2021. [Link]

[14] Blanton RE, Mock NB, Hiruy HN, Schieffelin JS, Doumbia S, Happi C, et al. African resources and the promise of resilience against COVID-19. The American Journal of Tropical Medicine and Hygiene. 2020; 103(2):539-41. [DOI:10.4269/ajtmh.20-0470] [PMID] [PMCID]

[15] COVID-19 updates Ghana 2021. [Internet]. [Updated 2021]. Available from: [Link]

[16] No author. COVID-19 Updates in Ghana [Internet]. 2021 [Updated 2022 July] Available from: [Link]

[17] Burki TK. Lifting of COVID-19 restrictions in the UK and the Delta variant. The Lancet Respiratory Medicine. 2021; 9(8):e85. [DOI:10.1016/S2213-2600(21)00328-3]

[18] Zuniga JM, Marks SP, Gostin LO. Advancing the human right to health. Oxford: Oxford University Press; 2013. [DOI:10.1093/acprof:oso/9780199661619.001.0001]

[19] World Health Organisation (WHO). International covenant on economic, social and cultural rights. Geneva: World Health Organisation; 1966. [Link]

[20] Van Damme W, Dahake R, Delamou A, Ingelbeen B, Wouters E, Vanham G, et al The COVID-19 pandemic: Diverse contexts; different epidemics-how and why? BMJ Glob Health. 2020; 5(7):e003098. [DOI:10.1136/bmjgh-2020-003098] [PMID] [PMCID]

[21] World Health Organisation (WHO). WHO Director general's remarks launch of appeal: Global humanitarian response plan - 25 march 2020. Geneva: World Health Organisation; 2020. [Link]

[22] Torjman S. What is policy? [Internet]. Ottawa, Ont,: Caledon Institute of Social Policy; 2005 [cited 2022 Jul 24]. 20 p. (desLibris. Documents collection). Available from: [Link]

[23] Kenu E, Frimpong JA, Koram KA. Responding to the COVID-19 pandemic in Ghana. Ghana Medical Journal. 2020; 54(2):72-3. [DOI:10.4314/gmj.v54i2.1] [PMID] [PMCID]

[24] Sturmberg JP, Tsasis P, Hoemeke L. COVID-19–an opportunity to redesign health policy thinking. International Journal of Health Policy and Management. 2022; 11(4):409-13. [DOI:10.34172/IJHPM.2020.132]

[25] Raoofi A, Takian A, Akbari Sari A, Olyaeemanesh A, Haghighi H, Aarabi M. COVID-19 pandemic and comparative health policy learning in Iran. Archive of Iranian Medicine. 2020; 23(4):220-34. [DOI:10.34172/aim.2020.02] [PMID]

[26] Asiimwe N, Tabong PT, Iro SA, Noora CL, Opoku-Mensah K, Asampong E. Stakeholders perspective of, and experience with contact tracing for COVID-19 in Ghana: A qualitative study among contact tracers, supervisors, and contacts. Plos One. 2021; 16(2):e0247038. [DOI:10.1371/journal.pone.0247038] [PMID] [PMCID]

[27] Kretzschmar ME, Rozhnova G, Bootsma MCJ, van Boven M, van de Wijgert JHHM, Bonten MJM. Impact of delays on effectiveness of contact tracing strategies for COVID-19: A modelling study. Lancet Public Health. 2020; 5(8):e452-9. [DOI:10.1016/S2468-2667(20)30157-2]

[28] Salathé M, Althaus CL, Neher R, Stringhini S, Hodcroft E, Fellay J, et al. COVID-19 epidemic in Switzerland: On the importance of testing, contact tracing and isolation. Swiss Medical Weekly. 2020; 150:w20225. [DOI:10.4414/smw.2020.20225] [PMID]

[29] Keeling MJ, Hollingsworth TD, Read JM. Efficacy of contact tracing for the containment of the 2019 novel coronavirus (COVID-19). Journal of Epidemiology and Community Health. 2020; 74(10):861-6. [DOI:10.1136/jech-2020-214051] [PMID] [PMCID]

[30] Osei-Appiah S. Ghana political expediency or competent leadership? In: Lilleker D, Coman LA, Gregor M, Novelli E, editors. Political communication and COVID-19. Oxfordshire: Routledge; 2021. [DOI:10.4324/9781003120254-28]

[31] Li W, Liao J, Li Q, Baskota M, Wang X, Tang Y, et al. Public health education for parents during the outbreak of COVID-19: A rapid review. Annals of Translational Medicine. 2020; 8(10):628. [DOI:10.21037/atm-20-3312] [PMID] [PMCID]

[32] Anwar A, Malik M, Raees V, Anwar A. role of mass media and public health communications in the COVID-19 pandemic. Cureus. 2020; 12(9):e10453. [DOI:10.7759/cureus.10453] [PMID] [PMCID]

[33] Paakkari L, Okan O. COVID-19: Health literacy is an underestimated problem. Lancet Public Health. 2020; 5(5):e249-e250. [DOI:10.1016/S2468-2667(20)30086-4] [PMID] [PMCID]

[34] Amewu S, Asante S, Pauw K, Thurlow J. The economic costs of COVID-19 in Sub-Saharan Africa: Insights from a simulation exercise for Ghana. European Journal of Development Research. 2020; 32(5):1353-78. [DOI:10.1057/s41287-020-00332-6] [PMID] [PMCID]

[35] Kwon S, Kim E. Sustainable health financing for COVID-19 preparedness and response in Asia and the Pacific. Asian Economy Policy Review. 2021; 17(1):140-56. [DOI:10.1111/aepr.12360] [PMCID]

[36] Quakyi NK, Agyemang Asante NA, Nartey YA, Bediako Y, Sam-Agudu NA. Ghana's COVID-19 response: The black star can do even better. BMJ Global Health. 2021; 6(3):e005569. [DOI:10.1136/bmjgh-2021-005569] [PMID] [PMCID]

[37] Sibiri H, Zankawah SM, Prah D. Coronavirus diseases 2019 (COVID-19) response: Highlights of Ghana's scientific and technological innovativeness and breakthroughs. Ethics Ethics, Medicine, and Public Health. 2020; 14:100537. [DOI:10.1016/j.jemep.2020.100537] [PMID] [PMCID]

[38] Antwi-Boasiako J, Abbey CO, Ogbey P, Ofori RA. Policy responses to fight COVID-19; the case of Ghana. Revista de Administração Pública. 2021; 55:122-39. [DOI:10.1590/0034-761220200507]

[39] Ghana: Authorities close borders as of March 22 [Internet]. 2020. [Updated 2022 July]. Available from: [Link]

[40] Asante D, Twumasi MA, Sakyi ASK, Gyamerah S, Asante B. A socio-geographic perspective of health and economic impacts of COVID-19 on poor households in Ghana. GeoJournal. 2021; 1-13. [DOI:10.1007/s10708-021-10487-2] [PMID] [PMCID]

[41] Addadzi-Koom ME. Quasi-state of emergency: Assessing the constitutionality of Ghana's legislative response to COVID-19. The Theory and Practice of Legislation. 2020; 8(3):311-27. [DOI:10.1080/20508840.2020.1777648]

[42] Danquah, M. Schotte S. COVID-19 and the socioeconomic impact in Africa: The case of Ghana'. Helsinki: United Nations University World Institute for Development Economics Research. 2020. [DOI:10.35188/UNU-WIDER/WBN/2020-5]

[43] Amoah PA, Phillips DR. Health literacy and health Rethinking the strategies for universal health coverage in Ghana. Public Health. 2018; 159:40-9. [DOI:10.1016/j.puhe.2018.03.002] [PMID]

[44] Ashinyo ME, Dubik SD, Duti V, Amegah KE, Ashinyo A, Asare BA, et al. Infection prevention and control compliance among exposed healthcare workers in COVID-19 treatment centers in Ghana: A descriptive cross-sectional study. Plos One. 2021; 16(3):e0248282. [DOI:10.1371/journal.pone.0248282] [PMID] [PMCID]

[45] Aduhene DT, Osei-Assibey E. Socio-economic impact of COVID-19 on Ghana's economy: Challenges and prospects. International Journal of Social Economics 2021; 48(4):543-56. [DOI:10.1108/IJSE-08-2020-0582]

[46] Afriyie DK, Asare GA, Amponsah SK, Godman B. COVID-19 pandemic in resource-poor countries: Challenges, experiences and opportunities in Ghana. Journal of Infection in Developing Countries. 2020; 14(8):838-43. [DOI:10.3855/jidc.12909] [PMID]

[47] Lamptey E, Serwaa D. The use of zipline drones technology for COVID-19 samples transportation in Ghana. HighTech and Innovation Journal. 2020; 1(2):67-71. [DOI:10.28991/HIJ-2020-01-02-03]

[48] Ting DSW, Carin L, Dzau V, Wong TY. Digital technology and COVID-19. Nature Medicine. 2020; 26(4):459-61. [DOI:10.1038/s41591-020-0824-5] [PMID] [PMCID]