

Government Health Care Financing and Health Care Outcomes in Africa

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This paper uses the World Bank data on healthcare expenditures as a percentage of gross domestic product to analyze the funding available to the public health care sectors in 54 African countries. In the 2001 Abuja Declaration, these African countries vowed to allocate at least 15 percent of their annual budgets to improving their health care sectors and infrastructures. We developed the Compliance with Abuja Declaration Index (CAD Index) to gauge the extent to which African governments complied with the pledge. Our empirical results reveal that health care financing is grossly inadequate in Africa. The failure to finance the health care sectors at or above the 15 percent pledged in the 2001 Abuja Declaration has undoubtedly slowed Africa's march towards providing improved health care for its citizens. Furthermore, African countries face acute shortages of medical doctors, nurses, and medical infrastructures to provide the robust health care sectors required for sustainable economic growth and development. African governments must implement policies to attract health care professionals by providing the necessary medical infrastructures.

Keywords: Abuja Declaration, pledge, infectious diseases, health infrastructures, CAD Index, HAQ Index

INTRODUCTION

According to the World Health Organization (2015), Africa carries 25 percent of the world's disease burden. It is responsible for over 43 percent of the global burden of infectious diseases, while its share of global health expenditures is less than one percent, and more than half of its population without access to essential health care services. Given the high poverty incidence in the continent, the relationship between government healthcare financing and good healthcare sectors remains a core issue to African countries as they struggle to build healthcare systems for disease control that are robust enough to tackle the frequent infectious disease outbreaks, including the recent outbreak of COVID-19 pandemic, that continued to plague the continent.

Furthermore, the World Health Organization and the World Bank data showed that only five countries out of 54 African countries have one or two doctors/physicians per 1,000 people. Most of the remaining 49 African countries have less than one doctor/physician per 1,000 people. In general, African countries are far below the 4.5 physicians or doctors per 1,000 people required to achieve goal number three of the Sustainable Development Goals (SDGs).¹ Notably, this goal addresses the issue of good health and well-being across countries and communities. Medical experts at the World Health Organization and other

international agencies consider the African continent to have one of the world's worst health care systems and public health infrastructures. This is further manifested by the fact that for decades, African leaders sought and preferred to obtain medical treatments in the United States, European countries, India, and Singapore while neglecting the dilapidated and inadequate healthcare systems and medical infrastructures in their own countries. For example, presidents from African countries such as Ethiopia, Gabon, Guinea-Bissau, Malawi, Nigeria, Zambia, and Zimbabwe have sought medical treatments overseas, and some have ultimately died in foreign hospitals. These raise some pertinent questions: Why do African presidents and state/regional governors prefer medical treatments in foreign countries? Why not finance and fix their dilapidated healthcare infrastructures? Why do home-trained medical doctors and nurses emigrate to the United States, Europe, Australia, New Zealand, and Saudi Arabia? What plans do African leaders have to bring back their doctors, nurses, and other professionals to remedy the severe healthcare workers gaps in the 21st century? Do African leaders know that the World Health Organization ranked the African continent as one of the worst regions in the world concerning healthcare worker shortages?

The exceptional healthcare challenges, which HIV/AIDS, tuberculosis, malaria fever, and other infectious diseases pose to African countries and their healthcare sectors, prompted the African Union (formerly the Organization of African Unity) to summon a meeting of African leaders in April 2001 in Abuja, Nigeria in what is now known as the Abuja Declaration. At that meeting, African governments pledged to set a target of at least 15 percent of their annual budgets allocated to improving their healthcare sectors and to make available resources necessary for improving their health infrastructures. To follow up, the African Union summoned a special summit in Abuja, Nigeria on July 15-16, 2013 "to review the progress made and the challenges faced in implementing the Abuja Declaration and Plan of Action on Roll Back Malaria (RBM) of 2000; the Abuja Declaration and Plan of Action on HIV and AIDS, Tuberculosis and Other Infectious Diseases (ORID) of 2001." Importantly, the Abuja Call for Accelerated Action Towards Universal Access on HIV and AIDS, Tuberculosis and Malaria Services in Africa by 2010.

One can infer from these summits that African leaders had come to realize that Africa is one of the regions of the world most affected by HIV/AIDS, tuberculosis, and malaria fever and that these infectious diseases pose "major threats to national and continental socio-economic development as well as to peace and security." The emergence of the COVID-19 pandemic further highlights the bidirectional causal relationship between good health (bad health due to infectious diseases) and economic growth (economic deterioration) in countries worldwide. The importance of adequate healthcare funding has been controversial, which Savedoff (2003) clarified because the World Health Organization did not set a particular target for funding the health care sectors. Gatome-Mungua and Olalere (2020) emphasized the importance of public financing for the healthcare sectors in Africa in light of the 15 percent pledge in the 2001 Abuja Declaration.

This paper contributes to the literature by answering these research questions. Towards that end, we focus on healthcare financing and healthcare infrastructures in Africa because both indicate the country's preparedness for curtailing the impacts of deadly infectious diseases. The 2001 Abuja Declaration, in which governments from the African Union pledged to set at least 15 percent of their annual budgets to improving their healthcare sectors, is a manifestation of the importance of providing adequate infrastructures in the healthcare sectors. Using health expenditures as a percentage of gross domestic product (GDP), we developed the Compliance with Abuja Declaration Index (CAD Index) to gauge how many African countries complied with their pledge.

Based on the *CAD Index*, we found that, among the 54 African countries, only Sierra Leone's health expenditures as a percentage of GDP complied with and exceeded the 2001 Abuja Declaration pledge of 15 percent for five consecutive years since 2014, while the remaining 53 African countries remained far below the 15 percent target. According to the latest available data from the World Bank, the world average health expenditure as a percentage of GDP was 9.858 percent in 2018. From our data analysis, we found that 52 African countries also fell below the world average. The failure to comply with the 2001 Abuja Declaration as measured by the *CAD Index* exemplifies inept leadership, and the failure to meet the 2018 world average is indicative of inept leadership nurtured by the lack of accountability and the absence of

ethical standards concerning public governance. The African continent is plagued with leaders who can pledge endlessly but are not cognizant of the morality of compliance with the pledge.

The 2001 pledge to provide adequate funding for their healthcare sectors was an ethically good policy action for all African citizens' good health and well-being. Since then, what has been amoral has been the noncompliance to the pledge and the inability to meet the world average health expenditure as a percentage of GDP despite the challenges facing their healthcare sectors. The ethical flaws linked to the lack of transparency, dishonesty, and self-centeredness, continue to manifest because African leaders are rarely held accountable for their policy misconduct, which could explain their failure to meet the Eight Millennium Development Goals that ended in 2015. In essence, African leaders are quick at policy proposals and formulations or declarations to convince their supporters and external donors or to gain the support of their citizens. Still, in reality, these policy declarations are worthless because they are rarely implemented because of the deficient transparent performance-assessment systems.

Our analysis also showed that no African country is close to achieving the 4.5 doctors per 1,000 expected for achieving the SDGs by 2030. Given the inadequate funding of the health care sector, reaching the proposed 4.5 doctors per 1,000 people target appears unachievable, and this may worsen over the next decade or two due to what Clemens and Pettersson (2008) termed "African health workers emigration." Our finding is consistent with Clemens and Pettersson's (2008) study: "Approximately 65,000 African-born physicians and 70,000 African-born professional nurses were working overseas in a developed country in the year 2000." Since 2000, these numbers must have increased by more than fiftyfold because doctors cannot function professionally with outdated, worn, and inadequate medical facilities.

The rest of this paper is organized as follows. In section 2, we provide a brief review of studies that examine the threats of infectious diseases that confront African countries. Section 3 provides the methodology used to compute the compliance index and data analysis of important healthcare outcomes in African countries. Section 4 provides the estimated results of the link between the "healthcare access quality index" and healthcare outcomes and the correlation matrix of healthcare outcomes. The paper concludes in section 5 with some policy implications.

LITERATURE REVIEW

Studies have detailed the threats that debilitating infectious diseases pose to African countries, the enormous challenges these countries face in the wake of the chronic and persistent shortages of healthcare workers due to emigration, and the performance of the healthcare sectors in Africa countries relative to other countries worldwide. According to Tandon *et al.* (2000), measuring the performance of healthcare systems depends on how the goals of a healthcare system is defined against which outcomes can be judged and performance quantified.

Savedoff (2003) highlighted the importance of per capita health spending across countries and suggested that spending could be anywhere between 1 percent to well over 10 percent of national income. Savedoff's (2003) study dispelled the frequent references by many research scholars and health pundits that the World Health Organization recommended that countries spend 5 percent of their GDP on health. In addition, the study showed that the issue of how much a country should spend could be viewed from at least four different approaches. First, the peer pressure approach hinges on considering spending more or less on health care relative to other countries with similar characteristics. Second, the political economy approach tackles the issue of spending from a social science perspective, given the political mechanisms involved in determining health spending and the behavior of the social actors who could influence health spending decisions. Third, the production function approach can be used to explicitly estimate a health production function through cross-country or panel data analyses using aggregate spending data. Fourth, the budget approach hinges on the desired health status changes necessary to determine what should be purchased to achieve the preferred health care outcomes.

Clemens and Pettersson (2008) addressed the issue of doctors, nurses, and related healthcare workers trained in African countries who continued with outward migration to highly industrialized countries. They used destination-country-based census data to estimate the number of African-born doctors and professional

nurses working in advanced countries compared to the stocks of these medical professionals in each country of origin. Furthermore, Clemens and Pettersson (2008) found that approximately 65,000 African-born physicians represented about one-fifth while 70,000 African-born professional nurses represented about one-tenth of the professionals in the world in 2000. In a related study, Krah (2020) pointed out that Nigeria has more than 4,000 doctors in the United States and 5,000 in the United Kingdom alone because both countries are open to highly qualified physicians and nurses from less developed countries. A similar study by Kinfu *et al.* (2008) also examined the issue of health worker shortage in 12 African countries. They attributed the health worker shortage to past investment shortfalls in pre-service training, international migration, career changes among healthcare workers, premature retirement, morbidity, and premature mortality. According to Reesor (2017), these doctors, nurses, and healthcare professionals leave Africa because of the promise of better pay, access to better medical facilities and learning-training opportunities, and a better supportive environment in their new locations outside Africa. Worse, Africa is losing more than \$2 billion per year from subsidizing training for doctors who take their expertise elsewhere.

Tumusiime (2017) addressed the issue that the African continent has the most severe health workforce shortages estimated to reach 6.1 million by 2030 and suggested what African countries can do to solve health workers shortage in the region. The region's average of 1.30 health workers per 1,000 population falls far below the 4.5 per 1,000 people required to achieve the Sustainable Development Goals (SDGs) by 2030.² According to Tumusiime (2017), the proposed actions to mitigate the health workers shortage included the urge to train more health workers, attract back workers from diaspora, build the human capital required to manage the system, and ensure the effective use of available resources such as the compliance with Abuja Declaration target that required the allocation of 15 percent of annual budget for health sector, which only Liberia, Rwanda, Eswatini (formerly Swaziland), and Zambia complied within 2014.

In a related study, Racoma (2019) identified 25 countries that lack health care the most, and 23 of these countries are from Africa. Racoma (2019) attributed the gaps in healthcare availability in developing countries to the deficiency in resources, inequality of service, and lack of access to proper healthcare. These shortcomings in the healthcare sectors, especially the quality of healthcare³ in Africa, provide the rationale for why many African leaders and government officials prefer to travel to foreign hospitals in Europe, China, and Singapore, and many of them died in the process of seeking the best medical treatments [Kazeem (2017), Molosankwe (2019)]. Similarly, a study by Texila American University at Iselin in New Jersey analyzed the number of doctors per person in Africa. In the general overview of the healthcare sectors in Africa, the study emphasized the growing demand for medical professions, government initiatives in the healthcare sectors to meet the demand, and the salary range and social status of doctors in Africa. The study pointed out that "a robust medical sector is the backbone of any country, and now, only students who have passion for medical studies can help resolve the issue plaguing the continent."

Muggeridge (2015) identified HIV/AIDS, diarrhea diseases, malaria, ischemic heart disease, meningitis, tuberculosis, diabetes mellitus, neonatal sepsis and infections, cirrhosis of the liver and epilepsy as the 10 infectious diseases that caused the most deaths in Africa in 2012. Elflein (2021) also identified some of these diseases as among Africa's top 10 causes of death in 2019. According to Fenollar and Mediannikov (2018), many infectious diseases have emerged and reemerged in Africa in the 21st century due to poverty and poor health care that exacerbate the health problems, lowest per capita spending on health, and the availability of physicians. Furthermore, they pointed out that infectious diseases continued to account for half (50 percent) of all deaths in Africa compared to only 2 percent in Europe.

Swerdlow *et al.* (1997) showed that mortality was higher among children less than four years old in the 1,931 cases due to the epidemic of cholera that affected Mozambican refugees in Malawi and that improved access to treatment, pediatric care, and increased use of oral rehydration therapy could decrease mortality. They argued that preventing future outbreaks in Africa will depend on interrupting both waterborne and foodborne pathogen transmissions. Mboussou *et al.* (2019) conducted a retrospective descriptive analysis based on records of all infectious disease outbreaks formally reported to the World Health Organization in 2018. They found cholera, measles, and yellow fever to be the commonly reported disease outbreaks, and they concluded that the largest infectious disease burden in the world characterizes the Africa.

The Human Rights Watch conducted a study in April and May 2020 in which several African health experts, including epidemiologists, pathologists, nurses, and public health officials, were interviewed to shed light on the extent to which COVID-19 exposes the healthcare shortfalls in Africa. The health experts and representatives of human rights organizations came up with some highlights and conclusions. First, they highlighted that the chronic lack of investment in healthcare infrastructures and equipment made it harder for African countries to retain skilled healthcare workers, provide essential medicines, and reduce the mortality rates linked to perennial diseases like malaria. Second, they acknowledged that the right to health is a fundamental right under international human rights law, which is considered a critical component of the United Nations Sustainable Development Goals (SDGs) and is also recognized in many constitutions worldwide, including the 54 African countries. Third, they reiterated the fact that African leaders' responses to previous outbreaks of diseases such as measles, HIV, and malaria suggest that African governments will not recognize the need to prioritize investment in the health sectors after the COVID-19 pandemic. This observation or conclusion is premised on the fact that African countries have experienced these perennial infectious diseases for more than half a century without any concrete infectious diseases eradication plan or the provision of easy access to health care facilities or adequate hospital care in Sub-Saharan Africa (Geldstzer *et al.* 2020).

Ebatamehi (2020) used the Health Care Index (HCI), derived from a collation of data provided by the World Health Organization, health ministries, and independent watchdogs in the health sectors to identify and orderly rank South Africa, Tunisia, Kenya, Algeria, Nigeria, Egypt, Morocco, Rwanda, Tanzania, and Zambia as the top 10 African countries with improved health care systems in the African continent in 2020. Galal (2021) provided a country-by-country update of the Coronavirus cases in Africa as of March 8, 2021. According to Galal (2021), South Africa's reported cases and fatalities account for more than 25 percent of the 4,003,008 total cases and 109,000 deaths due to COVID-19 in Africa.

Lee *et al.* (2010) analyzed Singapore's program to eliminate malaria in the military training facility of Tekong Island, located to the North-East of Singapore, which remained malaria-receptive even though Singapore was declared malaria-free in 1982. According to Lee *et al.* (2010), Singapore's four rings of malaria prevention at Tekong Island included: (1) preventing the importation of malaria by properly screening visitors, (2) preventing human-to-mosquito transmission through early case detections and surveillance plan, (3) preventing mosquito to human transmission through personal protection, and (4) arresting the cycle of transmission. These four rings of prevention at Tekong Island aligned with the five categories with which the World Health Organization assessed Singapore in 1982. These included (i) a comprehensive and productive case detection mechanism, (ii) reliable microscopic diagnosis of blood smears, (iii) thorough epidemiological investigations and a satisfactory epidemiological situation, (iv) adequate preventive and remedial health actions upon detection of cases, and (v) adequate general health services, effective system of case notification, and epidemiological follow-up for prevention of re-establishment of malaria [Gok (1983)].

In a recent study in the wake of the current COVID-19 pandemic, Kuguyo *et al.* (2020) analyzed how Singapore responded to handling the coronavirus disease. The authors listed some of the salient factors which they viewed as contributing to Singapore's success in handling COVID-19, and they compared the lessons learned in Singapore with those in African countries. Kuguyo *et al.* (2020) pointed out different ways in which Singapore handled the pandemic when compared to African countries: (1) Singapore has public health preparedness clinics based on their experience of handling malaria in the early 1980s, (2) Singapore's early response and disease surveillance entailed unparalleled extensive testing at the regional and international levels coupled with vigorous contact tracing, (3) Singapore's knowledge and awareness enabled proper dissemination of pertinent information to the public and recommendations for prevention and seeking medical attention for COVID-19, (4) national lockdown was not immediately enforced at the national level but social distancing was recommended, (5) penalties for defiance to ensure compliance and accurate dissemination of medical information, and (6) political and sociological aspects.

Kuguyo *et al.* (2020) concluded that African countries need a paradigm shift in policies and priorities around their healthcare systems to achieve sustainable development goals associated with healthcare. In a related study, Roger (2020) pointed out that Singapore, Hong Kong, Taiwan, and South Korea all share the

characteristics of using their experiences with prior infectious disease outbreaks to build a firewall system and sustaining it to curtail future outbreaks in contrast to African countries where there are no plans despite their experiences with Ebola, HIV, malaria, measles, yellow fever, and now the ongoing COVID-19 pandemic.

METHODOLOGY

Indubitably, adequate public funding of health care sectors and infrastructures is vital for improving the quality of and access to health care. Therefore, we derive and compute the Compliance with Abuja Declaration (CAD) Index to gauge the degree to which African governments complied with their pledge to allocate at least 15 percent of their annual budgets to the improvements of their health care sectors and related health infrastructures. We assess compliance within the following framework:

$$CAD\ Index = \frac{NCP}{NCC} \quad (1)$$

$$HEPG = AHEP - PHEP \quad (2)$$

$$WAGHEP = AHEP - WAHEP \quad (3)$$

and

$$SDPR = CDPR - EDPR \quad (4)$$

where *NCP* is the number of countries that complied with the pledge each year, *NCC* captures the 54 African countries covered under the 2001 Abuja Declaration, *HEPG* is the health expenditure gap that measures the difference between *AHEP*, which is the actual health expenditures (*HEP*) by each African government and the pledged 15 percent *HEP* (*PHEP*) in the 2001 Abuja Declaration, *WAGHEP* is the world average gap in *HEP* that measures the difference between *AHEP* and the world average health expenditure (*WAHEP*), as a percentage of GDP, reported by the World Bank, and *SDPR* measures the shortage of doctor per people ratio, which is the difference between the current doctor per people ratio (*CDPR*) and the expected doctor per people ratio (*EDPR*) projected by the 2030 SDGs.

Equations (2) and (3) provide two dimensions to measure the gaps in health expenditures in African countries. While *HEPG* can be considered as the measure of the continental gap, *WAGHEP* gauges the international gap. Both measures would indicate whether both gaps are positive or negative for the 54 African countries. The variables in both equations are measured as percentage of gross domestic product (GDP in purchasing power parity). Equation (4) is specified to show the extent of the shortage in the number of doctors per people ratio (*SDPR*) that African countries face. During the period, countries experienced negative *HEPG* because their *AHEP* was less than *PHEP*, or *HEPG* was zero because their *AHEP* equaled *PHEP*.

The *CAD Index* in equation (1) provides the metrics to measure the yearly compliance by all African countries in the continent. The *CAD Index* is 1 when all African countries complied with the Abuja Declaration and 0 when none of the countries complied. We also use the *CAD Index* to assess the degrees of compliance in cases where some countries may have opted for $HEP \geq 10\%$ or $HEP \geq 5\%$ instead of the 15 percent pledge. As Table 1 shows, the *CAD Index* was 0 for 15 years after the Abuja Declaration. It was not until 2014 through 2018 that we see at least one compliance from one country. When we considered $HEP \geq 10\%$, the highest *CAD Index* was 0.07 in 2004, 2005, 2007, and 2010. Similarly, when we considered $HEP \geq 5\%$, half of the countries met this 5% funding threshold in 2011, 2014, 2016, 2017, and 2020.

Table 2 provides a breakdown to show the number of times each African country complied under the three categories of the funding assessments. For $HEP \geq 15\%$ pledge, only Sierra Leone out of the 54 African countries complied with the 2001 Abuja Declaration for five years. This shows that Sierra Leone was the

only African country that had *HEPG* > 0 for five years, while the remaining 53 African countries had *HEPG* < 0 because their healthcare funding did not meet the Abuja Declaration. If all 54 African countries complied with the pledge each year over the past two decades that would have yielded 1,080 (100 percent) compliances. The five compliances by Sierra Leone translates to a derisory 0.46 percent compliance in two decades. We found that nine African countries complied 38 times when we considered two-thirds (10%) of the original pledge, which translates to a measly 3.5 percent compliance. Further, we found that 42 African countries complied 427 times when we considered one-third (5%) of the original pledge. This translates to 39.5 percent compliance over the entire period. These figures suggest that African governments did not take their 15 percent pledge seriously even when we lowered the pledge to 10 percent or 5 percent instead of the original annual pledge. These results indicate that African governments do not comply with their policy declarations, which could be attributed to inept leadership, dishonesty, lack of accountability and transparency, and the absence of governance ethical standards.

TABLE 1
CAD INDEX FOR AFRICAN COUNTRIES, 2001-2020

Year	<i>CAD Index</i>		
	<i>HEP</i> ≥ 15%	<i>HEP</i> ≥ 10%	<i>HEP</i> ≥ 5%
2001	0	0.04	0.33
2002	0	0.04	0.37
2003	0	0.06	0.42
2004	0	0.07	0.41
2005	0	0.07	0.37
2006	0	0.06	0.39
2007	0	0.07	0.41
2008	0	0.02	0.43
2009	0	0.04	0.46
2010	0	0.07	0.44
2011	0	0.04	0.50
2012	0	0.02	0.48
2013	0	0.04	0.43
2014	0.02	0	0.50
2015	0.02	0.02	0.48
2016	0.02	0	0.52
2017	0.02	0	0.50
2018	0.02	0.02	0.44
2019	0	0	0.43
2020	0	0	0.52

Source: Computed based on 2023 World Bank database on health expenditures as percentage of GDP.

TABLE 2
ASSESSMENT OF COMPLIANCE TO 2001 ABUJA DECLARATION

Countries	HEP ≥ 15% Pledge	HEP ≥ 10%	HEP ≥ 5%
1. Algeria	0	0	12
2. Angola	0	0	0
3. Benin	0	0	0
4. Botswana	0	0	19
5. Burkina Faso	0	0	11
6. Burundi	0	4	16
7. Cabo Verde	0	0	7
8. Cameroon	0	0	0
9. Central African Republic	0	1	5
10. Chad	0	0	7
11. Comoros	0	0	15
12. Congo, Democratic Republic	0	0	0
13. Congo, Republic of the	0	0	0
14. Cote d'Ivoire	0	0	5
15. Djibouti	0	0	0
16. Egypt	0	0	7
17. Equatorial Guinea	0	0	0
18. Eritrea	0	0	10
19. Eswatini (formerly Swaziland)	0	0	20
20. Ethiopia	0	0	1
21. Gabon	0	0	0
22. Gambia, The	0	0	7
23. Ghana	0	0	0
24. Guinea	0	0	2
25. Guinea-Bissau	0	0	21
26. Kenya	0	0	4
27. Lesotho	0	0	18
28. Liberia	0	1	16
29. Libya	0	0	1
30. Madagascar	0	0	3
31. Malawi	0	1	13
32. Mali	0	0	9
33. Mauritania	0	0	0
34. Mauritius	0	0	7
35. Morocco	0	0	14
36. Mozambique	0	0	12
37. Namibia	0	4	17
38. Niger	0	0	10
39. Nigeria	0	0	1
40. Rwanda	0	0	18
41. Sao Tome and Principe	0	6	14
42. Senegal	0	0	1
43. Seychelles	0	0	5
44. Sierra Leone	5	13	3
45. Somalia	0	0	0
46. South Africa	0	0	21
47. South Sudan	0	0	3

Countries	HEP ≥ 15% Pledge	HEP ≥ 10%	HEP ≥ 5%
48. Sudan	0	0	11
49. Tanzania	0	0	10
50. Togo	0	0	6
51. Tunisia	0	0	19
52. Uganda	0	6	13
53. Zambia	0	0	10
54. Zimbabwe	0	1	7

Source: Compiled by the authors from World Bank: <https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS>

TABLE 3
MEDICAL FACILITIES IN AFRICAN COUNTRIES, 2020

Countries	Population	Medical Facilities	Population Per Medical Facility
1. Algeria	43,851,044	586	74,831
2. Angola	32,866,272	1,575	20,867
3. Benin	12,123,200	819	14,802
4. Botswana	2,351,627	624	3,769
5. Burkina Faso	20,903,273	1,721	12,146
6. Burundi	11,890,784	665	17,881
7. Cabo Verde	555,987	663	839
8. Cameroon	26,545,863	3,061	8,672
9. Central African Republic	4,829,767	555	8,702
10. Chad	16,425,864	1,283	12,803
11. Comoros	869,601	66	13,176
12. Congo, Democratic Republic	89,561,403	14,586	6,140
13. Congo, Republic of the	5,518,087	328	16,823
14. Cote d'Ivoire	26,378,274	1,792	14,720
15. Djibouti	988,000	66	14,970
16. Egypt	102,334,404	5,000	20,467
17. Equatorial Guinea	1,402,985	47	29,851
18. Eritrea	3,546,421	269	13,184
19. Eswatini (formerly Swaziland)	1,160,164	135	8,594
20. Ethiopia	114,963,588	5,125	22,432
21. Gabon	2,225,734	542	4,107
22. Gambia, The	2,416,668	139	17,386
23. Ghana	31,072,940	1,960	15,854
24. Guinea	13,132,795	1,746	7,522
25. Guinea-Bissau	1,968,001	8	246,000
26. Kenya	53,771,296	6,146	8,749
27. Lesotho	2,142,249	117	18,310
28. Liberia	5,057,681	740	6,835
29. Libya	6,871,292	1,355	5,071
30. Madagascar	27,691,018	2,677	10,344
31. Malawi	19,129,952	648	29,522
32. Mali	20,250,833	1,478	13,702
33. Mauritania	4,649,658	648	7,175
34. Mauritius	1,271,768	166	7,661
35. Morocco	36,910,560	2,626	14,056
36. Mozambique	31,255,435	1,579	19,794

Countries	Population	Medical Facilities	Population Per Medical Facility
37. Namibia	2,540,905	369	6,886
38. Niger	24,206,644	2,886	8,388
39. Nigeria	206,139,589	20,807	9,907
40. Rwanda	12,952,218	572	22,644
41. Sao Tome and Principe	219,159	50	4,383
42. Senegal	16,743,927	1,347	12,431
43. Seychelles	98,347	18	5,464
44. Sierra Leone	7,976,983	1,120	7,122
45. Somalia	15,893,222	879	18,081
46. South Africa	59,308,690	4,303	13,783
47. South Sudan	11,193,725	1,747	6,407
48. Sudan	43,849,260	272	161,211
49. Tanzania	89,561,403	8,497	10,540
50. Togo	8,278,724	207	39,994
51. Tunisia	11,818,619	2,000	5,909
52. Uganda	45,741,007	3,792	12,063
53. Zambia	18,383,955	1,263	14,556
54. Zimbabwe	14,862,924	1,236	12,025

Source: Data from CIA World Factbook and <https://www.indexmundi.com/g/r.aspx?v=30>. Population obtained from <https://www.worldometers.info/geography/how-many-countries-in-africa/>

Table 3 provides additional data to show that African countries have fewer medical facilities and inadequate healthcare infrastructures, which could be linked to inadequate funding of their healthcare sectors. Rural areas in African countries are the most vulnerable to deadly infectious diseases such as the COVID-19 pandemic because they lack access to these few medical facilities. The clinics and dispensaries that many African countries inherited from their colonial masters after independence in the 1960s and 1970s have all crumbled or dilapidated due to inadequate financing of their healthcare sectors. These inadequate medical facilities and the dilapidated healthcare infrastructures are why African presidents and state/regional governors prefer medical treatments abroad and why their home-trained medical doctors and nurses emigrate to the United States, Europe, Australia, New Zealand, and Saudi Arabia.

TABLE 4
HEALTH CARE OUTCOMES IN AFRICAN COUNTRIES

Countries	HEP	HEPG	CDPR	DPRG	SDPRs	LEB
1. Algeria	6.22	-8.78	1.79	-2.71	-118,836	77.50
2. Angola	2.55	-12.45	0.21	-4.29	-140,996	62.22
3. Benin	2.49	-12.51	0.05	-4.45	-53,948	62.84
4. Botswana	5.85	-9.15	0.53	-3.97	-9,336	69.86
5. Burkina Faso	5.63	-9.37	0.08	-4.42	-92,392	62.98
6. Burundi	7.74	-7.26	0.10	-4.40	-52,319	62.71
7. Cabo Verde	5.36	-9.64	0.78	-3.72	-2,068	73.58
8. Cameroon	3.53	-11.47	0.09	-4.41	-117,067	60.32
9. Central African Republic	10.99	-4.01	0.07	-4.43	-21,396	54.36
10. Chad	4.09	-10.91	0.04	-4.46	-73,259	55.17
11. Comoros	4.59	-10.41	0.27	-4.23	-3,678	65.03
12. Congo, Democratic Republic	3.30	-11.70	0.07	-4.43	-396,757	61.60
13. Congo, Republic of the	2.13	-12.87	0.16	-4.36	-24,059	65.21
14. Cote d'Ivoire	4.19	-10.81	0.23	-4.27	-112,635	58.75

15.	Djibouti	2.32	-12.68	0.22	-4.28	-4,229	67.87
16.	Egypt	4.95	-10.05	0.45	-4.05	-378,637	55.75
17.	Equatorial Guinea	2.99	-12.01	0.40	-4.10	-5,752	59.82
18.	Eritrea	4.09	-10.91	0.06	-4.44	-15,746	67.48
19.	Eswatini (formerly Swaziland)	6.54	-8.46	0.33	-4.17	-4,838	61.05
20.	Ethiopia	3.29	-11.71	0.10	-4.40	-505,839	67.54
21.	Gabon	2.74	-12.26	0.68	-3.82	-8,502	67.03
22.	Gambia, The	3.09	-11.91	0.10	-4.40	-10,633	63.26
23.	Ghana	3.54	-11.46	0.14	-4.36	-135,478	64.94
24.	Guinea	3.93	-11.07	0.08	-4.42	-58,047	62.84
25.	Guinea-Bissau	6.99	-8.01	0.04	-4.46	-8,777	59.38
26.	Kenya	5.17	-9.83	0.20	-4.30	-231,217	67.47
27.	Lesotho	9.28	-5.72	0.07	-4.43	-9,490	55.65
28.	Liberia	6.74	-8.26	0.04	-4.46	-22,557	65.00
29.	Libya	6.05	-8.95	2.09	-2.41	-16,560	73.44
30.	Madagascar	4.79	-10.21	0.18	-4.32	-119,625	68.21
31.	Malawi	9.33	-5.67	0.02	-4.48	-85,702	63.21
32.	Mali	3.88	-11.12	0.14	-4.36	-88,294	60.54
33.	Mauritania	4.58	-10.42	0.18	-4.32	-20,087	64.50
34.	Mauritius	5.83	-9.17	2.60	-1.90	-2,416	76.45
35.	Morocco	5.31	-9.69	0.73	-3.77	-139,153	77.43
36.	Mozambique	8.17	-6.83	0.08	-4.42	-138,149	62.13
37.	Namibia	7.95	-7.05	0.59	-3.91	-9,935	65.21
38.	Niger	7.33	-7.67	0.04	-4.46	-107,962	63.62
39.	Nigeria	3.89	-11.11	0.45	-4.05	-834,865	55.75
40.	Rwanda	7.54	-7.46	0.14	-4.36	-56,472	70.00
41.	Sao Tome and Principe	6.27	-8.73	0.05	-4.45	-975	71.01
42.	Senegal	3.98	-11.02	0.07	-4.43	-74,176	68.87
43.	Seychelles	5.11	-9.89	2.12	-2.38	-234	73.74
44.	Sierra Leone	16.06	1.06	0.03	-4.47	-35,657	55.92
45.	Somalia	0.10	-14.90	0.02	-4.48	-71,202	58.34
46.	South Africa	8.25	-6.75	0.91	-3.59	-212,918	64.88
47.	South Sudan	6.40	-8.60	0.02	-4.48	-50,148	58.74
48.	Sudan	4.51	-10.49	0.26	-4.24	-185,921	66.50
49.	Tanzania	3.63	-11.37	0.01	-4.49	-402,131	66.39
50.	Togo	6.17	-8.83	0.03	-4.47	-37,006	62.13
51.	Tunisia	7.29	-7.71	1.30	-3.20	-37,819	76.36
52.	Uganda	6.53	-8.47	0.17	-4.33	-198,059	64.38
53.	Zambia	4.93	-10.07	0.16	-4.49	-402,131	66.39
54.	Zimbabwe	4.73	-10.27	0.19	-4.31	-64,059	62.16

Source: Data on Health Expenditures (HEP) as percentage of GDP, Doctors per 1,000 people ratio (DPR), and Life Expectancy at Birth (LEB) from the World Bank <https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS> and <https://data.worldbank.org/indicator/SH.MED.PHYS.ZS?locations=ZG>

Note: *HEPG* = Health expenditure gap based on the 15 percent target in the 2001 Abuja Declaration, *DPRG* = Gap in the 4.5 doctors per 1,000 people ratio expected in order to achieve the SDGs by 2030, and *SDPR* = Shortages in doctors people ratio.

TABLE 5
HEALTH CARE EXPENDITURE GAPS, HDI, AND THE WORLD RANKING OF
AFRICAN COUNTRIES

Countries	WAGHEP	Human Development Index (HDI)	World Rank
1. Mauritius	-4.03	0.804	66
2. Seychelles	-4.75	0.796	67
3. Algeria	-3.64	0.748	91
4. Tunisia	-2.57	0.740	95
5. Botswana	-4.01	0.735	100
6. Libya	-3.81	0.724	105
7. South Africa	-1.61	0.709	114
8. Egypt	-4.91	0.707	116
9. Gabon	-7.12	0.703	119
10. Morocco	-4.58	0.686	121
11. Cabo Verde	-4.50	0.665	126
12. Namibia	-1.91	0.646	130
13. Sao Tome and Principe	-3.59	0.625	135
14. Eswatini (former Swaziland)	-3.32	0.611	138
15. Ghana	-6.32	0.611	138
16. Kenya	-4.69	0.601	143
17. Equatorial Guinea	-6.87	0.592	145
18. Zambia	-4.93	0.584	146
19. Angola	-7.21	0.581	148
20. Congo, Republic of the	-7.73	0.574	149
21. Zimbabwe	-5.13	0.571	150
22. Cameroon	-6.33	0.563	153
23. Comoros	-5.27	0.554	156
24. Mauritania	-5.28	0.546	157
25. Benin	-7.37	0.545	158
26. Uganda	-3.33	0.544	159
27. Rwanda	-2.32	0.543	160
28. Nigeria	-5.97	0.539	161
29. Cote d'Ivoire	-5.67	0.538	162
30. Tanzania	-6.23	0.529	163
31. Madagascar	-5.07	0.528	157
32. Lesotho	-0.58	0.527	165
33. Djibouti	-7.54	0.524	166
34. Togo	-3.59	0.515	167
35. Senegal	-5.88	0.512	168
36. Sudan	-5.35	0.510	170
37. Gambia	-6.77	0.498	172
38. Ethiopia	-6.57	0.485	173
39. Malawi	-0.53	0.483	174
40. Congo, Democratic Republic	-6.56	0.480	175
41. Guinea-Bissau	-2.87	0.480	175
42. Liberia	-3.12	0.480	175
43. Guinea	-5.92	0.477	178
44. Eritrea	-5.77	0.459	180
45. Mozambique	-1.69	0.456	181

High HDI Countries

Medium HDI Countries

Low HDI Countries

46.	Burkina Faso	-4.23	0.452	182
47.	Sierra Leone	6.24	0.452	182
48.	Mali	-5.98	0.434	184
49.	Burundi	-2.12	0.433	185
50.	South Sudan	-3.46	0.433	185
51.	Chad	-5.77	0.433	185
52.	Central African Republic	1.17	0.397	188
53.	Niger	-2.53	0.394	189
54.	Somalia	-9.76	0.285	190

Source: Compiled by the authors from the data on Human Development Index (HDI) and World Rank obtained from the same World Bank database indicated in Table 4.

Note: The authors computed *WAGHEP* as the difference between each country's actual HEP (*AHEP*) and the world average HEP (*WAHEP*), which the World Bank reported to be 9.858 percent of GDP.

Table 4 provides information about healthcare outcomes in African countries. It also shows Sierra Leone as the only African country whose healthcare expenditure as a percentage of GDP exceeded the pledged 15 percent of government budgets to fund the healthcare sectors since 2014. Column 4 shows the *HEPG*, specified in equation (2), to be negative in all African countries except Sierra Leone. Furthermore, based on the World Bank data, column 5 shows only five African countries – Algeria, Libya, Mauritius, Seychelles, and Tunisia – have more doctors or physicians per people ratio (DPR) than one. Based on the estimated data in column 6, all African countries would fall short of the 4.5 doctors per people ratio expected for the 2030 SDGs. Importantly, the calculated numbers reported in column 7 show that all African countries would also experience an acute shortage of **5,787,799 doctors** by 2030 if the governments do not address the high rate of “medical brain drain” plaguing the continent due to inadequate and dilapidated health care infrastructures.

The computed data show that the shortage of doctors (SDPR), specified in equation (4), is the most severe in Nigeria, Ethiopia, Tanzania, Zambia, Democratic Republic of Congo, Egypt, Kenya, and South Africa. This corroborates Krah's (2020) study that highlighted a report released from the Mo Ibrahim Foundation, which “revealed that African countries footed a bill of \$4.6 billion in training doctors who the UK, USA, Canada, and Australia later recruited.” This is consistent with the “African health worker emigration” issue, which Clemens and Pettersson (2008) alluded to in their study.

Furthermore, Table 5 provides supplementary information concerning *WAGHEP* – shown in equation (4), *HDI*, and the world ranking of African countries based on the *HDI*. Economists view *HDI* as an important healthcare outcome because it is a composite measure of life expectancy at birth tied to good health and well-being, income, and education in countries worldwide. While nine African countries (16.7%) fall in the high *HDI* category, 14 African countries (25.9%) are in the medium *HDI* category, and 31 African countries (57.4%) belong to the low *HDI*. What the African countries with high, medium, and low *HDI* have in common, *except* for Sierra Leone and Central African Republic, is that they have negative *WAGHEP*. Interpretatively, this means 52 African countries could not meet the world average of 9.86 percent health expenditure as a percentage of the GDP. This implies that the failure of African countries to finance their healthcare sectors can be viewed at the continental and international levels.

The failure to honor the minimum 15 percent pledge to invest in the improvements of their healthcare sectors may explain why African countries rank at the bottom of the Healthcare Access and Quality (*HAQ*) Index, have low *HDI* as reported in column 4 of Table 5, which is also tied to life expectancy at birth (*LEB*) reported in column 8 of Table 4, and have the lowest number of doctors per 1,000 people ratio (*DPR* – reported in column 5 in Table 4) in the world as they encounter multifaceted health care challenges in the 21st century. Based on the extant studies of the healthcare sectors in African countries, one can easily deduce that adequate (*HEP*) or inadequate (*HEPG*) funding of healthcare sectors and the availability (*DPR*) or shortage (*DPRG*) of doctors, nurses and health care professionals are existential concerning access to good quality health care in African countries. To show the importance of *HEP* or *HEPG* and *DPR* or *DPRG*

to the health care sectors in African economies, we link the *HAQ Index* with these essential explanatory variables in functional forms as:

$$HAQ\ Index = \varphi + \Omega HEP + \Phi DPR + \varepsilon_t \tag{5}$$

and

$$HAQ\ Index = \delta + \beta HEPG + \lambda DPRG + u_t \tag{6}$$

where the *HAQ Index*, *HEP*, *HEPG*, *DPR*, and *DPRG* are as defined earlier, while ε_t and u_t are random error terms.

Equations (5) and (6) suggest that sufficient investments in the healthcare sectors and infrastructures can improve the *HAQ Index*. Theoretically, we expect *HEP* and *DPR* to have positive effects on the *HAQ Index* (that is, Ω and $\Phi > 0$) and for *HEPG* and *DPRG* to have negative effects on the *HAQ Index* (that is, β and $\lambda < 0$). However, given the failure of African countries to provide adequate funding for investments that would lead to improvements of their health care sectors and health infrastructures, we expect *HEP*, *DPR*, *HEPG*, and *DPRG* to have negative effects (that is, Ω , Φ , β , and $\lambda < 0$) on the *HAQ Index*.

ESTIMATED RESULTS

The data used to compute the *CAD Index* is reported in Table 1 and the country-by-country compliance assessment information provided in Table 2 was obtained from the World Bank. In addition, we also obtained the data for the *HAQ Index*,⁴ which showed low scores for Africa. The estimated results reported in Table 6 for equations (5) and (6) confirm *a priori* expectations that *HEP*, *DPR*, *HEPG*, and *DPRG* will negatively affect the *HAQ Index* for African countries.

TABLE 6
ESTIMATED RESULTS OF THE HAQ INDEX

Equation (5)	Equation (6)
$HAQ\ Index = 43.83 - 0.24HEP - 12.86DPR$ (25.48)* (-0.85) (10.41)*	$HAQ\ Index = 98.39 - 0.21HEPG - 12.85DPRG$ (17.28)* (-0.75) (10.38)*
$R^2 = 0.68$	$R^2 = 0.67$

Note: * indicates the statistically significant *t*-values in parenthesis at $\alpha = 0.05$.

The estimated results reported in Table 6 confirmed the expected negative coefficients (that is, Ω , Φ , β , and $\lambda < 0$); and notably, the actual doctors per 1,000 people ratio (*DPR*) and the gap (*DPRG*) have negative and statistically significant effects on the *HAQ Index*. This is consistent with and lends credence to extant studies that emphasized the shortage of healthcare workers in African countries and further suggests that improvements in the *HAQ Index* would require African countries to have more doctors per people ratio than their current average, which is less than one doctor per 1,000 people ratio – the worst in the world.

To highlight the relationship between sustainable economic growth or development and the health care outcomes in African countries, Table 7 provides the correlation matrix of some important measures of healthcare outcomes: *HDI*, *DPR*, adult mortality rates (*AMR*), and infant mortality rates (*IMR*) and gross domestic product (*GDP*) based on available data for African countries in the sample. Table 7 shows that while *HDI* and *DPR* are highly positively correlated with *GDP* growth rates, *AMR*, and *IMR* show negative

correlations. The importance of *DPR* to health care outcomes is exemplified by the fact that both *AMR* and *IMR* are negatively correlated to *DPR*. Intuitively, this means the current lack of adequate access to medical doctors, especially by infants in African countries, could explain the high negative correlation between *DPR* and *IMR*.

TABLE 7
CORRELATION MATRIX OF GDP GROWTH AND HEALTH CARE OUTCOMES, 2000-2020

	<i>GDP</i>	<i>HDI</i>	<i>DPR</i>	<i>AMR</i>	<i>IMR</i>
<i>GDP</i>	1				
<i>HDI</i>	0.78	1			
<i>DPR</i>	0.84	0.75	1		
<i>AMR</i>	-0.18	-0.48	-0.24	1	
<i>IMR</i>	-0.51	-0.73	-0.61	0.72	1

Note: Data used for computation came from the World Bank database.

The correlation coefficients reported in Table 7 further suggest the importance of *DPR* and, that inadequate *DPR* is indicative of the lack of access to quality health care, and that this will continue to magnify the adult and infant mortality rates in Africa. Even though correlation does not imply causation, however, these correlations are suggestive that African countries would be well served if they could provide enough doctors, nurses, and other relevant healthcare workers or professionals to treat their adults and children, and this could pave the way for Africans to have easy access to quality health care. A robust health care sector is essential because healthy workers are needed in the labor force for African countries to achieve the highest productivity rates in all sectors of their economies.

CONCLUSIONS AND POLICY IMPLICATIONS

One can deduce that when African governments signed the 2001 Abuja Declaration and pledged to set a target of at least 15 percent of their annual budgets to be allocated to the improvements of their healthcare sectors and to make available resources necessary for the improvements of their health infrastructures, they recognized the health care challenges they face from debilitating infectious diseases heading into the 21st century. They also recognized the need to mitigate the effects of these infectious diseases to achieve sustainable economic growth and development by 2030. However, our detailed assessment of the 2001 Abuja Declaration revealed that African governments continued to fail to provide adequate funding necessary for improvements of their health care sectors and infrastructures.

In the past two decades since African countries pledged at least 15 percent of their annual budget to fund their healthcare sectors, so far, only Sierra Leone, out of 54 countries, complied for five years. Essentially, this is an indication that African countries are plagued with leaders who cannot acknowledge that complying with their pledge to fund their healthcare sectors for the well-being of their citizens was an ethical obligation and that what continued to be unethical or wrong is their noncompliance to the pledge to fund their health care sectors. The noncompliance with the 2001 Abuja Declaration exposes the ethical flaws inherent in Africa's governance structures: lack of transparency and/or accountability, self-centered leadership, and dishonesty, which continued to manifest because African leaders are rarely held accountable for their policy misconducts. The failure of African governments to comply with the 2001 Abuja Declaration is congruent with their failure to meet the Eight Millennium Development Goals, which ended in 2015. Both failures show that African governments are quick at policy formulations and declarations to convince supporters and external donors or to gain the support of their citizens. Still, in the end, there are little or no meaningful implementations of these policy declarations due to the lack of a transparent performance-assessment system.

African leaders and policymakers must recognize that a robust medical or health care sector is the needed backbone of their economies if the overarching objective is to achieve the 2030 Sustainable

Development Goals (SDGs). Given the global COVID-19 pandemic, which led to global lockdowns, it should be evident to governments in African countries that funding and improving the healthcare sector will enhance physical work capacity as well as cognitive and noncognitive development, which will contribute to productivity, economic growth, and poverty or inequality reduction. Medical experts at the World Health Organization and Human Rights Watch have indicated that Africa is an unhealthy continent, especially when gauged by access to “Clean Water and Sanitation,” which is goal number six of the 2030 SDGs.

As one can see from the data computed and reported in column 7 of Table 4, African countries face severe shortages of healthcare workers in the 21st century because most of their home-trained doctors and nurses migrate to foreign countries. In contrast, their healthcare systems and health infrastructures remain dilapidated and grossly underfunded. Furthermore, African countries need to realize that access to good and decent medical care is a fundamental right under international human rights law; therefore, policymakers in African countries need to pay attention now and comply with the 15 percent pledge to improve their health care sectors and health infrastructures if they desire to achieve “Goals #3 and #6” of the 2030 SDGs.

The 2030 SDGs is less than a decade away. However, it is not too late for African governments to wake up and comply with their 2001 pledge to adequately fund their healthcare sectors and health infrastructures to attract and retain the much-needed healthcare professionals. This would strengthen their capacity to deal with pending infectious disease outbreaks in the 21st century. We therefore recommend that policymakers in African countries prioritize the funding of their healthcare sectors and enact carefully conceived policies of “reverse migration” aimed at drawing domestic and foreign-trained professionals back to Africa between now and 2030 (Reesor, 2017). This is an achievable forward-looking policy stance if governments in African countries take their citizens’ good health and well-being seriously.

ENDNOTES

1. See <https://www.un.org/development/desa/disabilities/envision2030.html> for discussions on the proposed goals contained in the 2016-2030 SDGs, which came after the MDGs ended in 2015.
2. See the report on doctor people ratio at <https://qz.com/520230/africa-has-about-one-doctor-for-every-5000-people/>.
3. Aetna International highlighted the quality of health care in Uganda, Nigeria, Tanzania, Zambia, Kenya, Zimbabwe, and South Africa. See <https://www.aetnainternational.com/en/about-us/explore/living-abroad/culture-lifestyle/health-care-quality-in-africa.html>
4. For data on HAQ Index, see: <https://ourworldindata.org/grapher/healthcare-access-and-quality-index>.

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