

Risk perception, public health interventions, and Covid-19 pandemic control in sub-saharan Africa

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Abstract

Coronavirus disease 2019 (COVID 19) has had serious social, economic, and health effects globally. The pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first announced in December 2019 has resulted in more than 24 million infections. There is paucity of knowledge on the role of risk perception in the adoption of public health interventions needed to control the spread of COVID 19 infections within communities. This was a scoping review and documents how risk perception may be a major challenge for populations to adopt and implement different behavioral changes recommended to curtail the spread COVID-19 pandemic in sub-Saharan Africa; and seeks to proffer solutions on how the identified challenges can be addressed drawing from lessons learnt from previous epidemics within the region. Database search of Google Scholar, PubMed, Research Gate among others were performed using related keywords to identify relevant journals and lists of primary articles. Culture, religious beliefs and poverty may influence how populations respond to infectious disease outbreaks. Risk strategies that focus only on biomedical approaches to control the COVID-19 pandemic may not mobilize the needed behavioral change. Lessons learnt from HIV and Ebola epidemics showed that involvement of communities could help transform weak adoption of public health measures when measures were framed in the relevant cultural context. An understanding of the factors influencing risk perception is needed to design appropriate risk communication strategies. Community engagement and reliance on local communication networks could promote mutual trust and increase the uptake of public-health interventions.

Introduction

The global pandemic caused by a new coronavirus – severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) – was reported in December 2019. The pandemic is in its seventh month, and the number of reported infections has reached >24 million and > 800,000 deaths globally as of 28 August 2020. Africa is the least-affected region globally, with 1,222,154 cases and 28,871 deaths, representing 4.2% of the world’s reported COVID-19 cases and a 2.4% case fatality rate [1]. Reasons proffered for this low prevalence of COVID-19 in sub-Saharan Africa: the high proportion of young persons with relatively low risk for severe infection and a low proportion of persons over 60 years of age [2, 3]; protection because of the high prevalence of BCG vaccination; [4-6] and exposure to sunlight, resulting in high levels of vitamin D [7, 8]. Other possible reasons are the hot tropical weather [9]; low prevalence of comorbidities [10]; possible immunity due to recurrent exposure to pathogens [11]; and being the last continent affected by COVID-19, with the advantage of having had time to learn lessons from other affected countries [12].

Nonetheless, the relatively low COVID-19 prevalence in sub-Saharan Africa [13] is surprising since the region is fraught with huge political, health, and capacity challenges that seem inconsistent with the low figures reported. The challenges include a high proportion of citizens living in absolute poverty, with inadequate housing, overcrowded conditions, and poor water supply and sanitation. Thirty-one countries in sub-Saharan Africa are classified by the United Nations as “Least Developed” [14]. In addition, 18 countries - half of all countries classified as

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such worldwide - are classified by the World Bank as fragile and/or conflict-affected states. Moreover, 41 countries are in the bottom 5th of countries worldwide ranked by healthcare access and quality, a result of poor investment in healthcare and universal health coverage [14-16]. The region also has a shortage of trained staff needed for diagnostics and intensive-care units; inadequate number of ventilators and facilities needed to manage severe cases of COVID-19; and lack of personal protective equipment for healthcare workers [12]. The high prevalence of anemia, hepatitis B and C, HIV/AIDS, malaria, malnutrition, and tuberculosis, and the high burden of non-communicable diseases, such as cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, coupled with poor economic discipline, further compromise the body's immunity and should, otherwise, increase the risk of the population to infection [17].

Off setting these circumstances, still other factors likely contribute to the relatively low reported COVID-19 prevalence in the region: under-reporting due to stigmatization [19]; self-medication for management COVID-19 [20]; and under-diagnosis of infection due to the limited testing in the region because of poor access to testing kits [12, 18]. The average testing for the region as of July 25, 2020, is 5869 tests per million population, ranging from as low as 7 tests per million population to as high as 22,392 tests per million population, as reflected in Table 1.. The test-per-case ratio, which is opined a better measure of epidemic size, is 9 tests per case for the region, ranging from 3 tests per case to as high as 597 tests per case. Whatever the explanations for the low severity of the pandemic in the region, the number of cases in Africa is predicted to rise markedly in the coming months due to poor compliance with public-health intervention measures [21] and the early easing of lockdown in several countries [22].

At the early phase of an infectious disease pandemic, when there is no vaccination or effective treatment, control is dependent on compliance with precautionary measures and behavior change. Compliance at the population level to precautionary measures is dependent on realistic risk perception. [23, 24]. The precautionary measures and behavior recommended for populations are respiratory hygiene, hand sanitation, physical distancing, and the wearing of facemasks in public [25]. Infected persons will also need to isolate for 14 days, and most -- who likely will have mild or moderately severe disease (81%) -- will be managed at home [26]. Contacts of persons infected who are traced are quarantined for 14 days [27].

There are however, multiple reasons for poor behavioral compliance to public-health measures: poor perception of risk, anxiety, and doubt of the efficacy [28] of control efforts. Little is known about risk perception of infectious disease control, even though information about the role of risk perception is vital for effective control of newly emerging infectious diseases; risk perception significantly affects the ability to change health-protective behavior [23]. This paper reviews how risk perception may be a major challenge for compliance with COVID-19 preventive behavior in sub-Saharan Africa, and how this challenge can be addressed, drawing on lessons learned from the control of other epidemics in the region.

Risk perceptions and uptake of COVID-19 prevention strategies in sub-Saharan Africa

The study of risk perception in control of epidemics is gaining prominence and relevance with increasing awareness that it can directly affect exposure of people to hazards. [29, 30]. Risk perception refers to individuals' judgments about and evaluations of hazards to which they may be exposed, including the social phenomena related to exposure, the risk of disease, and how the

perceived risk influences health behavior [31]. Risk perception is an inherently subjective judgment, especially when objective information is lacking [32]. Perceived risk is an important factor in understanding why and how a population adopts health-prevention interventions. When epidemic diseases are perceived as low-risk, motivation to use and adhere to prevention interventions is low [33], which can aid the spread of disease such as COVID-19 [29].

The perception of risk for a disease should otherwise help individuals weigh the costs of infection against the benefits of prevention of infection in the future and therefore increase demand for prevention [34]. Individuals who are risk-averse increase the demand for prevention when there is an absence of vaccines and, even more, when treatments are lacking, inadequate, or unaffordable [35], as in the COVID-19 pandemic. Multiple factors affect risk perception and influence the decisions of whether to take preventive actions, ranging from cultural to psychological and societal factors [36-38]. These factors influence risk perceptions in multiple ways: access to factual information about the diseases; susceptibility to fear; and concerns and interest in self-preservation. High risk perception translates into the take up of more preventive measures, as the more fearful people are, the more they protect themselves. However, high-level knowledge about a disease does not necessarily lead to an increase in uptake of preventive services, especially when the perception of risk for the disease is low [39].

Culture influences how individuals choose what to be concerned about, the interpretation and evaluation of any change, and the decision to attend to or ignore the changes. Culture also influences recognition and labelling of symptoms and help-seeking behaviour [24]. For most cultures in sub-Saharan Africa, illness is attributed to the wrath of supernatural forces, which is synonymous to the conceptions of natural causes of illness, such as infection [40, 41]. Most cultures in sub-Saharan Africa also have been subsumed into a religion culture, resulting in a nature-spirit reverence and connection for maintaining health [41].

Purely secular biomedical approaches to disease control limits uptake to only secular preventive measures. In contrast, belief in supernatural attributes to disease promotes the uptake of unproven ‘spiritual prevention therapies,’ which are often poorly accounted for in discussions on risk perception and uptake of prevention services. For individuals who perceive ailments as a connection between the spiritual and natural causes, the uptake of public-health preventive behavior is likely to be higher.

As with HIV infection, where charlatans thrive on promulgating spiritual healing for the infection, this practice is occurring with COVID-19 [42]. The retails of spiritual prevention for diseases often offer faith as the preventive tool, and infection is the evidence of a lack of faith. In these environments, the poor uptake of public-health prescribed prevention measures should not be assumed as low-risk perception, but rather a belief response to a ‘spiritual preventive therapy.’ This spiritual reponse has huge implications for the uptake of public-health preventive measures for COVID-19: respiratory hygiene, hand sanitation, social and physical distancing, and wearing of face masks in public. To many, these public-health measures are unacceptable and discomforting, as the measures have had negative economic, social, and psychological effects [43]. Prescribed social distancing to curb the spread of the disease also is culturally and socially unacceptable for many [44-46]. These negative responses lead to more convenient ‘spiritual preventive therapy,’ which are ineffective public health measures for control of the COVID-19 pandemic, but nonetheless are accepted.

Discussion

It is important to keep the COVID-19 pandemic under control in sub-Saharan Africa because of the humongous challenges the region will face in managing infections, especially among population groups at high risk, such as frontline healthcare workers [47], cross-border truck drivers [48], internally displaced populations, and persons in refugee camps [49]. Uptake of preventive behavior is enhanced when individuals understand the disease and when the perceived vulnerability to the disease is high [30]. Major investment has been made in public education about the COVID-19 pandemic control measures in many countries in sub-Saharan Africa [50, 51], although the promulgation of conspiracy theories and mass social-media misinformation has resulted in confused messages and misbeliefs about COVID-19 [51]. Consequently, many people have managed their perceived risk through an alternative mechanism – their spiritual beliefs. Many communities in sub-Saharan Africa, through spiritual therapy, manifest optimism bias during the pandemic -- the belief that bad things are less likely to befall oneself than to others [52, 53] – which is amplified by religious inclination [54].

The impact of religion on health behaviour in Africa has been studied by many authors, and many have assessed how fatalism affects health behaviors. Fatalism is associated with the reluctance to participate in health-promotion programs and health-care utilization because of the belief that participation will have no positive impact [55-58]. However, the combination of fatalism, religiosity, and race/ethnicity has affected the way that fatalism operates. Most populations in sub-Saharan Africa, endorse religious fatalism [59], and the fatalism does not inhibit healthy behaviors, nor is it disempowering [60, 61]. Fatalism is, however, a complicated construct that is more a coping response and acceptance of what is beyond individual control than an inhibitor of healthy behaviors [62]. Understanding the role that religious fatalism plays in COVID-19 response in the region may help in designing effective community responses to diseases of such magnitude.

Communication about risk is virtually impossible to achieve without a thorough understanding of people's perception of hazards and risks [63]; the 2014 West Africa Ebola epidemic response is a study of this phenomenon. While the biomedical response was concerned about burial rites that required touching the dead before lowering the body into the grave, as contact with the dead body was a route of transmission of infection [64], community rites required this contact as an essential burial practice for the peaceful departure of the their loved one. Also, dead persons needed to be buried with the community for the genealogy of the dead to retain identity with the community. Thus, mass-grave burial of persons who died from Ebola was not welcome, which led to keeping sick and dead persons away from the Ebola treatment units [64]. A change in burial practice was only instituted when community leaders, working with the frontline healthcare workers, identified safe burial practices that facilitated respect of the culture [64]. The failure to appreciate the socio-cultural context of the region was one of the reasons for the huge delay in curtailing the West Africa Ebola epidemic [65, 66]. A similar lesson was learnt late in the HIV epidemic [67].

We think that most residents in sub-Saharan Africa have a high perception of their risk for COVID-19, but they take ineffective alternative preventive measures. The socio-economic context of the region may constrain the population from adopting protective behaviors for COVID-19, like it did for the HIV epidemic, because people are constrained by social, economic, and cultural/religious factors [macro- and meso-level factors] from adopting protective behaviors, despite having high perception of their risk [68].

The high level of poverty and the disruption in income from the shutdown for much of the population, with little or no financial and food relief, has made people willing to take risk with COVID-19 infection rather than go hungry [69]. Living in the crowded urban slum settlements also makes social and physical distancing a challenge, just as is hand hygiene, where most do not have access to running water [70, 71]. Strategies to contain COVID-19 in Africa need to go beyond biomedical interventions; lessons need to be learnt from the Ebola response, and measures must be adapted to the peculiarities of the communitarian sub-Saharan Africans, who believe more in the spiritual dimension of health and trust less in government institutions [64]. The COVID-19 response in sub-Saharan Africa needs to take an enlightened approach [72]. In addition to adapting biomedical interventions to contain the COVID-19 pandemic, as proposed by Afolabi et al [73], engagement of communities to tailor COVID-19 public health prevention messages suitable as ‘spiritual therapy’ will be needed, as was done for the Ebola response in West Africa. Sadly, the COVID-19 response in West Africa has been limited largely to risk communication, with little emphasis on community engagement -- which is the very system and structure that can bring about the needed changes for COVID-19 natural disease prevention. Lessons learnt from the HIV/AIDS pandemic showed how culture affected the ways that HIV/AIDS impacted the African population, and similar lessons were learnt with the Ebola pandemic. Neglecting culture in public health measures reduces their effectiveness [1].

Conclusion

Appropriate risk communication is important in enabling people to understand their risks. Information and perception about the risk for COVID-19 is not low in sub-Saharan Africa. However, the approach to mitigating the risk for COVID-19 – what we refer to as the ‘spiritual therapy’ - is not being accompanied by needed public health measures to keep COVID-19 in control, with dire consequences. Risk communication about COVID-19 in the region must incorporate the ‘spiritual therapy’ for the populace. So far, the COVID-19 response in sub-Saharan Africa has been driven by a biomedical model adopted from Western, resource-rich, individualistic societies, with little emphasis on community engagement to contextualize the public-health prevention message, as was done with the Ebola response. When framed in relevant cultural context, involvement of communities can transform weak public health measures. Community engagement will promote mutual trust and reliance on local communication networks between peers and increase the uptake of public-health instituted measures.

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Table 1: Number of tests conducted per million population in Sub-Saharan Africa

Country	Population	Total cases reported	total tests	% positive	% test contribution	% contribution for cases	test per case ratio	Tests /Mil Population	6/6/2020	13/6/2020	20/6/2020	27/6/2020	4/7/2020	11/7/2020	18/7/2020	25/7/2020	Tests /Mil Population 25/7/200
Algeria*	43,851,044	27,357	100,241	27.3	1.3	3.2	4	2286	23541	39,079	44,542	49,556	56,531	64,865	78,376	98,462	2245
Angola	32,866,272	932	58,323	1.6	0.7	0.1	63	1775	10,000	11,128	13,708	19,981	20,005	28,864	33,834	51,409	1564
Benin	12,123,200	1,770	49,587	3.6	0.6	0.2	28	4090	14,762	16,032	17,433	19,413	20,337	31,346	36,556	44,251	3650
Botswana	2,351,627	686	62,296	1.1	0.8	0.1	91	2649	24,006	26,800	33,919	36,868	45,440	47,860	51,748	62,296	2649
Burkina Faso	20,903,273	1,100	16,731	6.6	0.2	0.1	15	800	7602	7,950	8,299	9,374	9,659	12,253	14,722	16,545	792
Burundi*	11,890,784	361	13,105	2.8	0.2	0.0	36	1102	771	801	1551	2044	2537	6077	7,469	13,105	1102
Cabo Verde	555,987	2,307	45,859	5.0	0.6	0.3	20	8248	4,024	5,280	6,264	7,197	7,389	39,746	43,349	45,531	8189
Cameroon*	26,545,863	16,708	58,389	28.6	0.7	2.0	3	2200	31417	43,505	44,206	46,765	49,764	50,536	56,332	58,389	2200
CAR	4,829,767	4,599	29,353	15.7	0.4	0.5	6	6078	17466	18,921	21,235	23,208	25,185	26,949	28,211	29,265	6059
Chad	16,425,864	915	5,692	16.1	0.1	0.1	6	347	3666	4,195	4,449	4,672	4,804	5,320	5,524	5,692	347
Comoros*	869,601	354	1588	22.3	0.0	0.0	4	1826	680	785	1098	1173	1276	1386	1,419	1588	1826

Congo *	5,518,087	3,038	14,460	21.0	0.2	0.4	5	2620	3,662	4,055	5,367	6,863	6,863	8,276	12,245	14,460	2620
Cote d'Ivoire	26,378,274	15,596	95,105	16.4	1.2	1.8	6	3605	29856	35,935	44,230	52,261	62,205	74,880	82,616	93,659	3551
Djibouti	988,000	5,050	55,983	9.0	0.7	0.6	11	56663	35165	40,855	44,200	45,998	47,491	50,542	53,305	55,726	56403
DRC	89,561,403	8,844	44,546	19.9	0.6	1.0	5	497	14723	17,477	21,008	25,826	27,612	35,747	39,306	43,740	488
Egypt *	102,334,404	92,062	456,904	20.1	5.7	10.9	5	4465	176680	218,703	306,488	389,042	407,139	424,615	442,876	455,467	4451
Equatorial Guinea	1,402,985	3,071	26,658	11.5	0.3	0.4	9	19001	8462	9,536	10,547	16,000	18,547	18,547	26,658	26,658	19001
Eritrea *	3,546,421	263	8568	3.1	0.1	0.0	33	2416	4,769	5,110	7943	8084	8240	8291	8,348	8568	2416
Eswatini	1,160,164	2,207	23,356	9.4	0.3	0.3	11	20132	6,990	8,123	9,588	11,496	14,247	17,075	20,307	22,957	19788
Ethiopia	114,963,588	13,968	382,339	3.7	4.8	1.6	27	3326	136868	176,504	211,871	243,016	262,340	281,069	323,932	372,812	3243
Gabon	2,225,734	6,984	67,767	10.3	0.8	0.8	10	30447	16730	19,517	27,030	34,774	39,668	46,725	57,095	67,767	30447
Gambia	2,416,668	277	5,159	5.4	0.1	0.0	19	2135	1982	1992	2,629	2,934	3,066	3,728	4099	5,159	2135
Ghana	31,072,940	32,969	374,612	8.8	4.7	3.9	11	12056	229093	245,448	267,286	288,465	307,133	327,009	344,137	369,180	11881
Guinea	13,132,795	7,008	53,354	13.1	0.7	0.8	8	4063	22229	26,585	31,550	35,000	38,164	41,578	46,011	52,634	4008
Guinea-Bissau *	1,968,001	1,981	11,090	17.9	0.1	0.2	6	5635	7312	7,488	8,056	8,230	8,679	8,935	9,446	10,230	5198

Kenya	53,771,296	17,603	269,288	6.5	3.4	2.1	15	5008	94507	112,171	136,361	162,478	185,035	207,987	238,163	267,602	4977
Lesotho	2,142,249	505	7,865	6.4	0.1	0.1	16	3671	1515	1515	2,020	3,072	3,106	5,306	7432	7,612	3553
Liberia*	5,057,681	1,162	11,377	10.2	0.1	0.1	10	2249	2,270	3,573	5938	6317	6,777	8,734	10,332	11,363	2247
Libya	6,871,292	2,669	47,773	5.6	0.6	0.3	18	6953	9,259	11,792	19,133	23,162	29,175	33,875	38,534	47,407	6899
Madagascar	27,691,018	9,295	37,921	24.5	0.5	1.1	4	1369	13,230	15,495	17,905	20,315	23,976	28,388	32,491	37,145	1341
Malawi	19,129,952	3,664	27,147	13.5	0.3	0.4	7	1419	6,260	8,003	10,790	12,677	16,281	20,098	23,733	26,602	1391
Mali	20,250,833	2,510	21,425	11.7	0.3	0.3	9	1058	8613	10,183	11,810	14,432	16,075	17,714	19,919	21,143	1044
Mauritania	4,649,658	6,171	58,159	10.6	0.7	0.7	9	12508	8,745	12,418	17,605	36,455	40,195	47,571	53,258	58,099	12495
Mauritius	1,271,768	344	205,285	0.2	2.6	0.0	57	1614	131516	137,789	152,194	171,792	186,845	193,561	193,561	205,285	161417
Morocco	36,910,560	20,278	1,147,173	1.8	14.4	2.4	57	31080	289457	405,898	522,166	633,494	748,449	864,594	990,514	1,126,213	30512
Mozambique	31,255,435	1,669	52,422	3.2	0.7	0.2	31	1677	13,398	18,061	23,104	27,956	33,125	39,091	45,189	51,444	1646
Namibia	2,540,905	1,775	21,806	8.1	0.3	0.2	12	8582	4588	5,682	6,837	8,428	10,682	12,789	17,041	20,887	8220
Niger	24,206,644	1,132	10,104	11.2	0.1	0.1	9	417	6187	6,275	6,342	6,802	7,240	8,394	9,067	9,900	409
Nigeria	206,139,589	40,532	262,579	15.4	3.3	4.8	6	1274	74999	90,464	110,531	128,716	148,188	178,265	209,446	259,516	1259

Rwanda	12,952,218	1,821	242,129	0.8	3.0	0.2	133	18694	75,013	87,656	108,005	134,749	157,271	180,320	207,022	238,007	18376
Sahrawi Republic*	597,339	14	245	5.7	0.0	0.0	18	410	4	18	124	124	124	124	124	245	410
Sao Tome	219,159	863	5,949	14.5	0.1	0.1	7	27145	1,948	2,740	4,439	4,491	4,491	5,601	5,732	5,949	27145
Senegal	16,743,927	9,681	108,779	8.9	1.4	1.1	11	6497	54,162	62,592	71,308	78,409	85,922	93,938	100,361	107,412	6415
Seychelles	98,347	114	3294	3.5	0.0	0.0	29	33494	598	604	704	1106	1252	1456	3,276	3294	33494
Sierra Leone	7,976,983	1,783	16,780	10.6	0.2	0.2	9	2104	6469	7,761	9,066	10,221	13,484	14,648	15,623	15,882	1991
Somalia*	15,893,222	3,178	18,983	16.7	0.2	0.4	6	1194	4,578	8,852	11,492	11,936	12,185	12,545	14,838	18,983	1194
South Africa	59,308,690	445,433	2,773,778	16.1	34.8	52.6	6	46768	891668	1,087,887	1,293,608	1,529,009	1,792,078	2,108,570	2,422,741	2,730,812	46044
South Sudan	11,193,725	2,286	12,582	18.2	0.2	0.3	6	1124	5,697	6,833	9,984	10,276	10,824	11,582	12,306	12,582	1124
Sudan*	43,849,260	11,385	32,249	35.3	0.4	1.3	3	735	12,162	18934	24,653	26,684	26,918	29,060	30,140	32,249	735
Tanzania*	59,734,218	509	3,880	13.1	0.0	0.1	8	65	2,680	2,680	3,880	3,880	3,880	3,880	3,880	3,880	65
Togo	8,278,724	868	40,763	2.1	0.5	0.1	47	4924	22,427	25,401	27,824	29,347	32,758	34,610	37,727	40,389	4879
Tunisia	11,818,619	1,452	89,848	1.6	1.1	0.2	62	7602	54653	58,770	65,515	68,880	71,689	77,593	83,054	89,318	7557
Uganda	45,741,007	1,115	260,465	0.4	3.3	0.1	24	5694	103,719	142,819	160,773	183,640	210,446	224,111	240,810	258,528	5652

Zambia	18,383,955	4,481	76,518	5.9	1.0	0.5	17	4162	28236	44,126	47,968	53,370	56,825	59,499	69,296	76,072	4138
Zimbabwe	14,862,924	2,512	53,346	4.7	0.7	0.3	21	3589	21,354	24,010	26,117	29,641	32,845	36,399	40,636	52,007	3499
Total	1,339,423,943	847211	7,980,977	10.6	100.0	100.0	9	5959	2782368	3412806	4,102,693	4,820,099	5,462,462	6,222,522	7,004,167	7,861,377	5869