Research Articles

Factors associated with the myth about 5G network during COVID-19 pandemic in sub-Saharan Africa

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Background

Globally, the conspiracy theory claiming 5G technology can spread the coronavirus disease (COVID-19) is making the rounds on social media and this could have a significant effect in tackling the spread of the pandemic. This study investigated the impact of the myth that 5G technology is linked to COVID-19 pandemic among sub-Saharan Africans (SSA).

Methods

A cross-sectional survey was administered on 2032 participants between April 18 - May 16, 2020, corresponding to the mandatory lockdown period in some SSA countries (April 18 - May 16, 2020). Participants were recruited via Facebook, WhatsApp, and authors' emails. The outcome measure was whether respondent believed that 5G technology was the cause of the coronavirus outbreak or not. Multiple logistic regression analyses using backward stepwise were used to examine the associated factors.

Results

About 7.3% of the participants believed that 5G technology was behind the COVID-19 pandemic. Participants from Central Africa reported the highest proportion (14.4%) while the lowest proportion (5.4%) was among those from Southern Africa. After adjusting for potential covariates in the multivariate analysis, Central Africans (adjusted odds ratio, AOR 2.12; 95% confidence interval, CI=1.20-3.75), females (AOR 1.86; 95% CI=1.20-2.84) and those who were unemployed at the time of this study (AOR 1.91; 95% CI=1.08-3.36) were more likely to believe in the myth that 5G technology was linked to the COVID-19 pandemic. Participants who felt that COVID-19 pandemic will not continue in their country were 1.59 times (95% CI=1.04-2.45) more likely to associate the 5G technology with COVID-19 compared to those who thought that the disease will remain after the lockdown. Participants who were younger were more likely to believe in the 5G technology myth but the association between level of education and belief that 5G technology was associated with COVID-19 which was significant in the univariate analysis (unadjusted odds ratio OR 1.69; 95CI =1.02, 2.80), was nullified after adjustments for all potential confounders.

Conclusions

This study found that 7.4% of adult participants from SSA held the belief that 5G technology was linked to COVID-19 pandemic. Public health interventions including

health education strategies to address the myth that 5G was linked COVID-19 pandemic in SSA are needed and such intervention should target participants who do not believe that COVID-19 pandemic will continue in their country, females, those that are unemployed and those from Central African countries in order to minimize further spread of the disease in the region.

During the outbreak of the novel coronavirus disease (COVID-19) and the subsequent global spread of the pandemic, there arose a myth that the outbreak was associated with the fifth generation mobile telecommunication technology, known as 5G.¹ Holding such myths could have implications for compliance with non-pharmaceutical preventive strategies prescribed for the control of the novel coronavirus.² These myths include that 5G was the cause of the novel coronavirus; that the electromagnetic radiation from the 5G technology was responsible for the mutation of the coronavirus; and that the 5G technology was a strategy of the industrialized nations to control the population of the less industrialized nations among others.^{2–4} This is because of the fact that radiofrequency radiation (RF) is increasingly being identified as a new form of environmental pollution.³

The fifth generation mobile telecommunication is the new, high-speed wireless communications technology, promising faster bandwidth speeds of 1 – 10 Gbps, wider coverage, reduced congestion and improved latency.⁴ The technology is expected to be transformative, fueling innovation across every industry and every aspect of our lives. The combination of its high-speed and potential to transform the human way of life by fully supporting the implementation of Internet-of-things (IoT) solutions generated various myths about 5G.

Whereas myths are usually associated with individuals who may be unlearned in the subject matter, the myths of the harmful effects of 5G have been promoted by some scientists.¹ The evidence for the biological effects of mobile phone technology and non-ionizing radiofrequency used in the 5G technology are inconclusive at present.^{4–9} While available research till date, do not reveal any adverse health effect being causally linked with exposure to wireless technologies,¹⁰ further health related studies need to be carried out at the frequencies to be used by 5G. Notwithstanding the lack of evidence to support the link between the 5G technology and the pandemic, the myth has continued to grow globally. Besides the myth linking 5G technology with coronavirus, several other myths have been held regarding COVID-19.¹¹

South Africa and Lesotho are the only countries in sub-Saharan Africa that have launched the 5G technology with limited coverage.¹² Notwithstanding, the myths about the association of the technology with the outbreak of COVID-19 continue to be held in sub-Saharan Africa. Myths (unsubstantiated beliefs)^{13,14} held by individuals have played a significant role in public health interventions including acceptance of immunization and use of preventive health strategies.^{15–18}

As the novel coronavirus outbreak assumed pandemic proportion, and as a result of lack of treatment and vaccine for the disease several community directed strategies are recommended to contain and mitigate the outbreak. Some of the recommended strategies include international and local travel restrictions, quarantine and self-isolation of

suspected cases for a period equivalent to the incubation period of the disease (maximum 14 days), lockdown of commercial activities in major cities, closure of schools, restriction of movement, frequent hand washing, use of face masks and social distancing.¹⁹ It is widely believed that the spread of the virus in the community can be minimized if citizens follow these recommendations and practices.

There have been concerns with the level of compliance with these preventive strategies in sub-Saharan African (SSA) countries. Using the health belief model (HBM) it has been postulated that behavior and perception influence the development of preventive health behavior.²⁰ This study was designed to examine factors associated with the myth that 5G technology was linked to COVID-19 pandemic. Findings from this research will enable researchers and policy makers target sub-population who will not comply with preventive measures proposed for the mitigation of the present pandemic and any other outbreaks when myths held by these sub-populations are the reasons for non-compliance.

METHODS

A cross-sectional descriptive study was conducted between April 18 and May 16, 2020 when most of the countries surveyed were under mandatory lockdown and restriction of movement. As it was not feasible to perform nationwide community-based sample survey during this period, the data were obtained electronically via survey monkey. Only participants who had access to the internet, were on the respective social media platforms and used them, may have participated. An e-link of the structured synchronized questionnaire was posted on social media platforms (Facebook and WhatsApp) which were commonly used by the locals in the participating countries, and was sent via emails by the researchers to facilitate response. The questionnaire included a brief overview of the context, purpose, procedures, nature of participation, privacy and confidentiality statements and notes to be filled out.

STUDY POPULATION

The participants were sub-Saharan African nationals from different African countries either living abroad or in their countries of origin including Ghana, Cameroun (only distributed to the English speaking regions), Nigeria, South Africa, Tanzania, Kenya, Uganda etc. To be eligible for participation, participants had to be 18 years and over, and should be able to provide online consent.

SURVEY QUESTIONNAIRE

The survey tool for the COVID-19 knowledge questionnaire was developed based on the guidelines from the World Health Organization (WHO) for clinical and community management of COVID-19. The questionnaire was adapted

Table 1. Covariates used in the multiple logistic regression

Model 1	Model 2	Model 3	Model 4
Region*and Socio-demographic	Region*and Socio-demographic ^P	Region*and Socio-demographic and attitude ^P	Region*and Socio-demographic and attitude and Compliance ^P
Place of residence	Attitude towards Covid-19	Compliance during lockdown during Covid -19	Covid-19 risk perception ^S
Age in years	Self-Isolation	Attended crowded religious events	Risk of becoming infected
Sex	Home quarantined due to Covid-19	Wore mask when going out	Risk of becoming severely infected
Marital Status		Practiced regular Hand washing	Risk of dying from the infection
Highest level of Education			How much worried are you about COVID-19
Employment status			How likely do you think Covid-19 will continue in your country
Religion			Concern for self and family if COVID-19 continues
Occupation			
Number living together			

* West Africa, East Africa, Central Africa & Southern Africa;

^S High/ very worried/very concerned/very likely for "High/ Concerned/worried & Very High/ Extremely Concerned/extremely worried" & Low/ not worried/ not concerned/no very likely for "Very low/Not at all/ Very unlikely/ Extremely unconcerned; Unlikely/Unconcerned/ A little & Neither likely nor unlikely/moderate/ Neither Concerned nor Unconcerned

^P = only significant variables were added.

with some modifications to suit this study's objective, namely to explore the potential impact of the myth about the 5G technology on compliance with strategies to control the spread of the novel coronavirus.

Prior to launching of the survey, a pilot study was conducted to ensure clarity and understanding as well as to determine the duration for completing the questionnaire. Participants (n=10) who took part in the pilot were not part of the research team and did not participate in the final survey as well. This self-administered online questionnaire consisted of 58 items divided into four sections (demographic characteristics, knowledge, attitude, perception and practice). **Online Supplementary Document Table S1** is a sample of the tables showing the items used in the data analysis.

DEPENDENT VARIABLE

The dependent variable for this study was Myth about the 5G technology which was categorized as "Yes" (1 = if COVID-19 is associated with 5G communication) or "No" (0 = if COVID-19 is not associated with 5G communication).

INDEPENDENT VARIABLES

The independent variables were: a) demographic characteristics of the participants which included age, country of origin, country of residence, sex, religion, educational, marital and occupational status; b) attitude towards COVID-19 which included practice of self-isolation, home quarantine, number of people living together in the household; c) compliance during COVID-19 lockdown which included whether they attended a crowded event, used face mask when going

out, practiced regular hand-washing, used hand sanitizers; and d) risk perception which included whether participants think they were at risk of becoming infected, at risk of dying from the infection, if they were worried about contracting COVID-19, and thought the infection will continue in their country ([Table 1](#)).

DATA ANALYSIS

Demographic, compliance during lockdown, attitude and perception variables were summarized as counts and percentages for categorical variables. A two-way frequency table was used to obtain the proportion estimates of those who reported that 5G technology was linked to COVID-19. In the univariate and bivariate analyses, Odds ratios with 95% confidence intervals were calculated in order to assess the unadjusted risk of independent variables on selected covariates.

In the univariate logistic regression analysis, variables with a p-value <0.20 were retained and used to build a multivariable logistic regression model which examined the factors associated with the myth about 5G technology during COVID-19 pandemic. Similarly, we performed a stage modeling technique employed by Dibley et al.,²¹ and a four-staged modeling technique was employed. In the first stage, regions and demographic factors were entered into a baseline multivariable model. We then conducted a manually executed elimination method to determine factors associated with the myth about 5G technology during COVID-19 pandemic at P <0.05. The significant factors in the first stage were added to attitude towards COVID-19 variables in

the second staged model; this was then followed by manually executed elimination procedure and variables that were associated with the study outcomes at $P < 0.05$ were retained in the model. We used a similar approach for compliance to public health measures and COVID-19 risk perception factors in the third and fourth stages, respectively. The odds ratios with 95% confidence intervals were also calculated to assess the adjusted factors. All analyses were performed in Stata version 14.1 (Stata Corp, College Station, Texas, USA).

ETHICAL CONSIDERATION

Ethical approval for the study was sought and obtained from the Human Research Ethics Committee of the Cross River State Ministry of Health (CRSMOH/HRP/HREC/2020/117). The study was carried out in accordance with the Helsinki Declaration for Human Research. The confidentiality of participants was assured in that no identifying information was obtained from participants and informed consent was obtained from all participants prior to completing the survey. Participants were required to answer a 'yes' or 'no' to the consent question during survey completion to indicate their willingness to participate in this study.

RESULTS

DEMOGRAPHY OF PARTICIPANTS

[Table 2](#) shows the descriptive data of the participants. Of the 1969 participants that indicated their country of residence, majority ($n=1,108$, 56.3%) were from West Africa and few from East Africa ($n = 209$, 10.6%). Over 65% of the participants were aged 38 years or younger and 55.2% were males. More than two-third of the participants (79.2%) had at least a Bachelor degree while 20.8% had either a secondary or primary (basic) school education. About 52% were living with 4 – 6 persons during the study period while 18.6% lived alone.

PERSPECTIVE OF SUB-SAHARAN AFRICANS ON 5G TECHNOLOGY AND COVID-19

The belief that 5G technology was linked to the COVID-19 pandemic was upheld by 7.4% of the participants in this study, and some participants (31.3%) stated that they practiced self-isolation while 39.3% practiced home quarantine during the pandemic. Responding to the question of how worried they were about COVID-19, over 57% of the participants stated that they were either very worried or somehow worried about the disease ([Table 2](#)). During the COVID-19 lockdown in SSA, nearly half (46%) of the participants in the study attended crowded religious events and a majority (76.1%) wore a mask when going out.

[Figure 1](#) shows the regional proportion and 95% confidence intervals of the proportion of participants in this study who believed 5G technology was behind the COVID-19 pandemic in Sub-Saharan Africa. According to the figure, Central Africa had the highest proportion (14.4%) of participants that believed in the 5G technology myth while few participants (5.4%) from Southern Africa believed in the 5G technology myth.

[Table 3](#) reports the proportion and unadjusted odds ratio

(OR) as well as the 95% confidence interval of the odds ratio that 5G technology was associated with COVID-19. The unadjusted odd ratios revealed that participants from Central African countries, female participants, those who were not married and unemployed, and participants with primary/secondary education qualification, were more likely to believe that 5G technology was linked to the COVID-19 disease. Compared with the younger age group (age 18-28 years), older participants (29 to 48 years) were less likely to believe that 5G technology was linked to the COVID-19 pandemic while, those who perceived that COVID-19 was less likely to continue in their country were 1.50 times (95% confidence interval of unadjusted odds ratio 1.05 - 2.15) more likely to believe that 5G technology was linked to COVID-19 pandemic (see [Table 3](#)).

[Table 4](#) shows the independent predictors of the association between 5G technology and COVID-19 disease. Participants who were living in Central Africa, females, and those who were unemployed at the time of this study were more likely to associate 5G technology with COVID-19. Also, belief in the 5G technology myth was associated with participants' level of risk perception, such that those who felt that the disease was not going to continue in their various countries after the lockdown were more likely to associate 5G technology with COVID-19 disease (adjusted odds ratio (aOR) 1.57, 95% confidence interval, CI=1.07 - 2.31) compared with those who felt that the disease was more likely to remain in their respective countries after the lockdown. Participants with low risk perception of contracting the infection, and those who were aged 39-48 years were less likely to associate 5G technology with COVID-19 compared with those who had high risk perception of contracting the infection and younger participants, respectively.

DISCUSSION

To the best of our knowledge, this is the first study from SSA to examine key factors associated with the myth about 5G technology and COVID-19 as well as how this myth influences compliance with prescribed behavioral measures to control the spread of the disease. The study found that, irrespective of whether participants were living within the sub-region or in the diaspora, nearly 7.4% of participants from SSA believed that 5G technology was linked with the outbreak of COVID-19. This was more among those from Central African and East African countries, where the proportions were 14% and 8%, respectively. After adjusting for all potential cofounders, participants from Central Africa, females, those that were unemployed and individuals in this study who thought that COVID-19 was not going to continue in their countries after the lockdown, were more likely to hold this myth. There was a consistent strong association between older age (39-48yrs) and the lower likelihood of believing in the 5G myth. Perception of risk of contracting the infection was associated with the belief in the 5G myth.

The findings of this study were in concordance with a study conducted in England which reported that about 10 – 15% of the participants showed constant and very high levels of endorsements of the myth and those who believed that 5G technology was linked with the COVID-19 pandemic were less likely to comply with government preventive

Table 2: Respondent characteristics and study variables

Variables	N (%)
Demography	
<i>Region</i>	
West Africa	1,108 (56.3)
East Africa	209 (10.6)
Central Africa	251 (12.7)
Southern Africa	401 (20.4)
<i>Place of residence</i>	
Locally (Africa)	1855(92.5)
Diaspora	150 (7.5)
<i>Age category</i>	
18-28 years	775 (39.0)
29-38 years	530 (26.7)
39-48 years	441 (22.2)
49+years	242 (12.1)
<i>Sex</i>	
Males	1099 (55.2)
Females	892 (44.8)
<i>Marital status</i>	
Married	879(44.1)
Not married	1116 (55.9)
<i>Highest level of Education</i>	
Postgraduate Degree (Masters /PhD)	642 (32.2)
Bachelor's degree	(939) 47.0
Secondary/Primary	416 (20.8)
<i>Employment status</i>	
Employed	1321 (66.0)
Unemployed	679 (34.0)
<i>Religion</i>	
Christianity	1763 (88.4)
Others	232 (11.6)
<i>Occupation</i>	
Non-health care sector	1,471 (77.3)
Health care sector	433 (22.7)
<i>Number living together</i>	
<3 people	506(28.8)
4-6 people	908 (51.7)
6+ people	341 (19.4)
Attitude towards Covid-19	
<i>Self-Isolation</i>	
No	1237 (66.7)
Yes	564 (31.3)
<i>Home quarantined due to Covid-19</i>	
No	1091 (60.7)
Yes	707 (39.3)
<i>Do you live alone during COVID-19</i>	
No	1,624 (81.4)
Yes	372 (18.6)

Variables	N (%)
Compliance during Covid-19 lockdown	
<i>Attended crowded religious events</i>	
No	1097 (54.0)
Yes	935 (46.0)
<i>Wore mask when going out</i>	
No	485 (23.9)
Yes	1547 (76.1)
<i>Practiced regular Handwashing</i>	
No	762 (37.5)
Yes	1270 (62.5)
Covid-19 Risk Perception	
<i>Risk of becoming infected</i>	
High	669 (37.2)
Low	1128 (62.8)
<i>Risk of becoming severely infected</i>	
High	466 (25.9)
Low	1333 (74.1)
<i>Risk of dying from the infection</i>	
High	349 (19.5)
Low	1445 (80.6)
<i>How worried are you because of COVID-19</i>	
worried	1037 (57.5)
not worried	766 (42.5)
<i>How likely do you think COVID-19 will continue in your country</i>	
Very likely	1152 (64.0)
not very likely	649 (36.0)
<i>Concern for self and family if COVID-19 continues</i>	
Concerned	1667 (94.2)
Not concerned	102 (5.8)
Outcome measure	
<i>COVID caused by 5G</i>	
No	1723 (92.6)
Yes	137 (7.4)

measures.² In a new study conducted in Australia,²² researchers found that men and people aged 18-25 were more likely to believe COVID-19 myths particularly, those who were from a non-English speaking background. We found similar associations with young people indicating that significant proportion of younger people (18-28 years) reported that 5G technology was associated with COVID-19 pandemic while those aged between 39 and 48 years were less likely to believe in the 5G technology myth after adjusting for all potential cofounders. This preponderance of young people may be due to the fact that younger people (aged 18 – 29 years) in SSA are more likely to own smartphones compared to older ones aged 50 and older.²³ There is need to reach young people with health messages particularly, since they are less likely to have symptoms, and as such may not meet testing criteria such as having a sore throat, fever or cough; more likely to have more social contacts through

seeing friends more often, which increases their potential for spreading COVID-19, and can potentially be hospitalized with COVID-19 with severe complications in some despite their age.

The study conducted in England observed that endorsement of the coronavirus conspiracy belief was associated with less compliance to government preventive measures.² Although the proportion of participants who held the 5G myth was less than those who held similar belief in the England study,² it should not be treated lightly especially for the fact that currently there is no end in sight for a medication or vaccine for COVID-19 and the fear of a second wave is staggering. Such myths or conspiracy beliefs in the midst of a pandemic crisis can have far-reaching consequences for the introduction of a vaccine in this region, with belief in anti-vaccine myths being linked to potential non-compliance.^{21,24}

Table 3. Proportion and unadjusted odds ratio (95%Confidence intervals, CI) of factors associated with 5G technology and COVID-19

Variables	Proportion	Odds Ratio	[95%CI]	P value
Demography				
<i>Country of origin</i>				
West Africa	6.3	1.00		
East Africa	8.4	1.38	[0.78, 2.44]	0.271
Central Africa	14.4	2.51	[1.61, 3.93]	<0.001
Southern Africa	5.4	0.85	[0.51, 1.42]	0.531
<i>Place of residence</i>				
Local	7.4	1.00		
Diaspora	8.3	1.15	[0.60, 2.00]	0.678
<i>Age category</i>				
18-28 years	10.7	1.00		
29-38 years	5.6	0.50	[0.32, 0.79]	<0.001
39-48 years	3.7	0.32	[0.18, 0.57]	<0.001
49+years	7.8	0.70	[0.41, 1.21]	0.202
<i>Sex</i>				
Males	5.5	1.00		
Females	9.5	1.80	[1.26, 2.57]	<0.001
<i>Marital Status</i>				
Married	5.7	1.00		
Not married	8.7	1.56	[1.08, 2.25]	0.017
<i>Highest level of Education</i>				
Postgraduate Degree	5.4	1.00		
Bachelor's degree	8.1	1.53	[1.00, 2.35]	0.051
Secondary/Primary	8.8	1.69	[1.02, 2.80]	0.041
<i>Employment status</i>				
Employed	5.6	1.00		
Unemployed	10.9	2.08	[1.46, 2.96]	<0.001
<i>Religion</i>				
Christianity	7.5	1.00		
Others	6.1	0.80	[0.45, 1.45]	0.470
<i>Occupation</i>				
Non-health care sector	7.6	1.00		
Health care sector	7.4	0.96	[0.63, 1.47]	0.856
<i>Number living together</i>				
<3 people	6.3			
4-6 people	8.6	1.41	[0.90, 2.21]	0.133
6+ people	7.8	1.27	[0.73, 2.20]	0.406
Attitude				
<i>Self-Isolation</i>				
No	6.7	1.00		
Yes	8.4	1.29	[0.89, 1.87]	0.186
<i>Home quarantined due to Covid-19</i>				
No	6.3	1.00		
Yes	8.7	1.43	[0.99, 2.05]	0.054
Compliance with mitigation practices				
<i>Attended crowded religious events</i>				

Variables	Proportion	Odds Ratio	[95%CI]	P value
No	6.5	1.00		
Yes	8.6	1.37	[0.96, 1.93]	0.080
Wore mask when going out				
No	7.3	1.00		
Yes	7.4	1.01	[0.68, 1.50]	0.978
Practiced regular Hand washing				
No	9	1.00		
Yes	6.6	0.71	[0.50, 1.01]	0.060
Risk Perception				
<i>Risk of becoming infected</i>				
High	8.50	1.00		
Low	6.50	0.74	[0.52, 1.07]	0.106
<i>Risk of becoming severely infected</i>				
High	9.00	1.00		
Low	6.60	0.71	[0.49, 1.05]	0.085
<i>Risk of dying from the infection</i>				
High	8.00	1.00		
Low	7.10	0.87	[0.56, 1.35]	0.533
<i>Worried are you because of COVID-19</i>				
Very worried	7.00			
not very worried	7.40	1.05	[0.73, 1.50]	0.805
<i>Concern for self and family if COVID-19 continues</i>				
Very concerned	7.00			
Not very concerned	10.80	1.60	[0.83, 3.08]	0.158
<i>Likelihood of COVID-19 continuing in your country</i>				
Very likely	6.30	1.00		
not very likely	9.10	1.50	[1.05, 2.15]	0.027

Variables with confidence intervals CI that include '1' were not statistically significant in the model.

However, the present study could not corroborate these fears as participants, who held the myth that 5G was linked to the coronavirus pandemic had similar rate of compliance with the precautionary measures put in place to minimize the spread of the infection compared with those who did not hold the belief. A study conducted in England observed that endorsement of the coronavirus conspiracy belief was associated with non-compliance with government preventive measures,² with another worrying phenomenon being that, myths are never benign and people who hold one myth are more likely to believe other unrelated ones.^{2,25} In this study, participants who thought the infection will not continue after the lockdown were more likely to associate it with the 5G myth. Our suggestion therefore is that there must be concerted regional and global educational campaigns to recondition the minds of the populace before the introduction of a vaccine. Freeman et al.² did not only observe a significant association between the myths and non-compliance with preventive guidelines but also the participants' skepticism to undertake future tests and vaccinations.

The differing levels of belief in the 5G myth among participants across the SSA sub-region as well as between other

studies may reflect varying degrees of drivers of the myths such as mistrust²⁶ and other related consequences. Social identity including religion and nationality are known to promote the belief of myths.²⁷ Surveys in the USA and the United Kingdom found strong association between holding the myth and national narcissism (the trust in the greatness of one's country) such that people who scored high in national narcissism were more likely to believe and disseminate myths about COVID-19.²⁸ Unlike a previous study,² the current study did not find any significant association between the 5G myth and the different religious groups. This is probably due to the disproportionate over-representation of Christians over other religious groups in this study.

Factors such as lower income and education levels,²⁹ low social standing³⁰ and less ability to analyze³¹ have all been linked to holding to myths. It was therefore not surprising that in the present study, with everything held equal, participants who have a bachelor's degree or less and those who were unemployed were more likely to believe that the 5G technology was associated with the outbreak of the coronavirus infection. Further ramifications are that the worsening economic conditions resulting from the coron-

Table 4. Predictors of the association between belief in 5G technology and COVID-19.

Variables	Predictors		
	Odds Ratio	[95%CI]	P value
Demography			
<i>Country of origin</i>			
West Africa	1.00		
East Africa	1.30	[0.70, 2.41]	0.406
Central Africa	2.03	[1.25, 3.30]	0.004
Southern Africa	0.79	[0.46, 1.35]	0.390
<i>Age category</i>			
18-28years	1.00		
29-38	0.59	[0.34, 1.05]	0.073
39-48	0.45	[0.22, 0.94]	0.035
49+years	1.07	[0.55, 2.10]	0.835
<i>Sex</i>			
Males	1.00		
Females	1.59	[1.09, 2.34]	0.017
Employment status			
Employed	1.00		
Unemployed	1.64	[1.00, 2.70]	0.049
Risk perception			
<i>Risk of becoming infected</i>			
High	1.00		
Low	0.64	[0.43, 0.94]	0.023
<i>How likely do you think COVID-19 will continue in your country?</i>			
Very likely			
not very likely	1.57	[1.07, 2.31]	0.022

ORs=adjusted odds ratios; CI: Confidence intervals

Variables with confidence intervals CI that include '1' were not statistically significant in the model. Backward stepwise regression model was conducted.

Figure 1. Regional proportion and 95% Confidence interval of participants who associated 5G with COVID-19 in Sub-Saharan Africa.

avirus counter-measures can trigger or aggravate contiguous myths relating to the pandemic and further derail future efforts towards the introduction of medical interventions through tests and vaccinations.

The finding that that after controlling for all potential cofounders, participants who did not think that the infection will continue after the lockdown despite the lack of vaccine were more likely to associate the infection with the 5G technology validates the propositions of the health belief model (HBM). Constructs of HBM, specifically perceived susceptibility and perceived severity postulate that individuals will take actions to prevent or reduce a health problem if they perceive themselves as susceptible to the health problem or if they perceive the health problem will have serious consequences.²⁰ Perhaps the perception that the pandemic was being engineered by a telecommunication technology also led to their belief that they were less susceptible to the disease or that it would have trivial or minor health consequence.

Since many of the SSA countries still do not have the 5G technology, it is unlikely to accurately predict the impact of such belief on their attitude towards the 5G technology, however, early educational campaigns prior to the launch of the technology is recommended. Ensuring that people understand the benefits of the technology and how this can improve connectivity of people and access to information will facilitate the introduction and dissuade such belief. In addition, further studies targeting SSA populations most affected by this belief are therefore recommended.

In considering the results from this study and the implications, the following limitations in the study should be noted. It is important that researchers interpret the finding that education is linked to the myth of 5G technology with caution, particularly as the participants in this study are biased regarding education. Given the difficulty of obtaining random sample from the study population, a convenient sampling technique was employed and this may affect the generalizability of the study results. However, during the lockdown, this was the only feasible way of collecting data from participants and this study provides an insight on the subject matter in the population surveyed. The data may be skewed towards those who may have access to internet and regularly use the social media platforms used in distributing the survey questionnaire. Being an electronic survey, residents in SSA who do not have access to the internet may have been unduly excluded from the study, which may account for the preponderance of the younger age group (over 65% were 38 years or younger). Furthermore, deploying the questionnaire in English language also excluded the non-English speaking residents in SSA such as the French-speaking people from the Central and West African region. When interpreting the present results, researchers should be cautious especially as non-response is not known most probably because, we do not know who received an invita-

tion to participate. In addition, as this was a cross-sectional study, the estimates reported may have overestimated or underestimated 5G myths linked to COVID-19 in SSA and causality cannot be assumed.

CONCLUSIONS

In summary, this study demonstrated that 7.4% of adult participants associated 5G technology with the outbreak of COVID-19, especially young people, females, those living in Central African countries and participants who were unemployed at the time of this study. Public health interventions including health education strategies to address the myth that 5G was linked COVID-19 pandemic in SSA are needed and such intervention should target these participants including those who do not believe that COVID-19 pandemic will continue in their country, in order to minimize further spread of the disease in the region.

AVAILABILITY OF DATA AND MATERIAL

Additional information such as unidentified raw data can be obtained following reasonable request from the corresponding author.

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AUTHORSHIP CONTRIBUTIONS

All authors contributed to the design and conduct of study, and writing of manuscript.

COMPETING INTERESTS

The authors completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available upon request from the corresponding author), and declare no conflicts of interest.

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SUPPLEMENTARY MATERIALS

Online Supplementary Document

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