University Lecturers and Students Could Help in Community Education About SARS-CoV-2 Infection in Uganda

Health Services Insights
Volume 13: 1–7

DOI: 10.1177/1178632920944167
SAGE

Isaac Echoru[1], Keneth Iceland Kasozi[2], Ibe Michael Usman[3], Irene Mukenya Mutuku[1], Robinson Ssebuufu[4], Patricia Decanar Ajambo[4], Fred Ssempijja[3], Regan Mujinya[3], Kevin Matama[5], Grace Henry Musoke[6], Emmanuel Tiyo Ayikobua[7], Herbert Izo Ninsiima[1], Samuel Sunday Dare[1,2], Ejike Daniel Eze[1,2], Edmund Eriya Bukenya[1], Grace Keyune Nambatya[8], Ewan MacLeod[2] and Susan Christina Welburn[2,9]

[1]School of Medicine, Kabale University, Kabale, Uganda. [2]Infection Medicine, Deanery of Biomedical Sciences, and College of Medicine & Veterinary Medicine, The University of Edinburgh, Edinburgh, UK. [3]Faculty of Biomedical Sciences, Kampala International University Western, Bushenyi, Uganda. [4]Faculty of Clinical Medicine and Dentistry, Kampala International University Teaching Hospital, Bushenyi, Uganda. [5]School of Pharmacy, Kampala International University Western Campus, Bushenyi, Uganda. [6]Faculty of Science and Technology, Cavendish University, Kampala, Uganda. [7]School of Health Sciences, Soroti University, Soroti, Uganda. [8]Directorate of Research, Natural Chemotherapeutics Research Institute, Ministry of Health, Kampala, Uganda. [9]Zhejiang University-University of Edinburgh Institute, Zhejiang University School of Medicine, International Campus, Zhejiang University, Haining, Peoples Republic of China.

ABSTRACT

BACKGROUND: The World Health Organization has placed a lot of attention on vulnerable communities of Africa due to their chronically weak health care systems. Recent findings from Uganda show that medical staff members have sufficient knowledge but poor attitudes toward coronavirus disease 2019 (COVID-19) pandemic.

AIM: The aim of this study was to determine the knowledge, attitudes, and preparedness/practices of lecturers and students in the fight against COVID-19.

METHOD: This was a descriptive cross-sectional study of 103 lecturers and students both men and women of age group 18 to 69 years in western Uganda. Data were obtained through a pretested questionnaire availed online.

RESULTS: Knowledge on COVID-19 symptoms was highest in this order: fever > dry cough > difficulty breathing > fatigue > headache with no significant differences between lecturers and students. Knowledge of participants on transmission of COVID-19 was highest in the order of cough drops > contaminated surfaces > person-to-person contact > asymptomatic persons > airborne > zoonotic with no significant differences among lecturers and students. Lecturers and students were all willing to continue using personal protective equipment like masks, and personal practices such as covering the mouth while sneezing and coughing, no handshaking, and washing of hands with no significant differences in the responses. The positive attitudes that COVID-19 could kill, anyone can get COVID-19, and willing to abide by the set regulations against the pandemic showed personal concerns and desired efforts against COVID-19.

CONCLUSION: The study identifies lecturers and students as potential stakeholders in the fight against community transmission of COVID-19.

KEYWORDS: COVID-19, SARS-CoV-2, coronavirus, community education, lecturers, students, western Uganda

RECEIVED: April 17, 2020. **ACCEPTED:** July 1, 2020.

TYPE: Original Research

FUNDING: The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The authors are grateful to Zhejiang University Education Foundation Emergency Research Fund (S.C.W.); Global Challenges Research Fund and the University of Edinburgh for funding this study.

DECLARATION OF CONFLICTING INTERESTS: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

CORRESPONDING AUTHORS: Isaac Echoru, School of Medicine, Kabale University, Box 317, Kabale, Uganda. Email: echoruisaac@gmail.com

Keneth Iceland Kasozi, Infection Medicine, Deanery of Biomedical Sciences, and College of Medicine & Veterinary Medicine, The University of Edinburgh, 1 George Square, Edinburgh EH8 9JZ, UK. Email: kicelandy@gmail.com

Introduction

Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[1] The disease was discovered in Wuhan, Hubei Province in China, and it has spread across China to the rest of the World.1,2 It was suggested that COVID-19 is likely to be of zoonotic origin because of the large number of infected people who were exposed at a wet animal market in Wuhan city.[3] The

spread of the virus is now from person-to-person transmission; however, extensive measures to reduce transmission of COVID-19 designed by the World Health Organization (WHO) remain to be adopted by developing countries.[3,4]

Many African countries have registered COVID-19 cases; however, there is anxiety that pandemic preparedness may be compromised by the high burden of infectious diseases including malaria, HIV, tuberculosis, and other tropical diseases.[4,5] Adoption of the WHO policies in Africa continues to be haphazard, thus making regional collaborative efforts to control COVID-19 challenging, especially after lockdown.[6] This is important because the WHO has placed a lot of attention on vulnerable communities of Africa because these are ill equipped to handle the disease due to chronically weak health care systems.[5]

In Uganda, high-risk persons have been identified as children, health care providers, immune-compromised persons, and the elderly[7,8]; however, recent findings from Uganda show that medical staff members have sufficient knowledge but poor attitudes toward COVID-19,[9] demonstrating a need to identify novel drivers to supplement COVID-19 control measures currently in place. This created a rationale to conduct a community-based survey among academics living in Uganda to assess their preparedness to support WHO COVID-19 guidelines. Therefore, plasticity in knowledge, attitudes, and practices of community members, especially academics, remains to be established, especially from a developing country like Uganda. Health resources, intensified surveillance, and capacity building have been prioritized in Uganda with an agenda of limiting transmission[5]; however, studies involving role of academicians have not been conducted. The aim of this study was to determine relevance of lecturers and students in the fight against COVID-19 by looking at their knowledge, attitudes, and preparedness/practices toward the pandemic.

Materials and Methods

Study design

This was a descriptive cross-sectional study that comprised 103 respondents both men and women of age group 18 to 69 years in southwestern Uganda. This was among undergraduate medical students and lecturers at Kampala International University Western Campus who had consented to the study. Sample size was determined using Raosoft sample size calculator (http://www.raosoft.com/samplesize.html) with an error margin of 9.4%, 95% confidence interval, population size of 2000, and a response distribution of 50%. We approximated the number to 103.

Data collection tool and procedure

The questionnaire had 4 components: sociodemographic features (age, sex, and occupation), knowledge about COVID-19 (symptoms and mode of transmission), attitude, and readiness to combat COVID-19 (risk reduction approaches). The initial draft of the questionnaire was sent to different experts (epidemiologist, sociologist, and statistician) for face and content validity. The questionnaire was pretested among 10 respondents and remolded to a final tool that was availed online from April 3 to 10, 2020, using Q-survey (https://www.qsurvey.qa/home/en) online resource.

Study variables

Dependent variables. Sociodemographic features include age, sex, and occupation

Independent variables

Knowledge about COVID-19. Our questions on knowledge on symptoms and mode of transmission of COVID-19 were developed in line with WHO guidelines[10] and modified to suit the target population. The questions on the symptoms contained the following options: fever, dry cough, shortness of breath, fatigue, sore throat, and headache. The question on the mode of transmission contains the following questions: coughing drops or sneezing, contaminated surfaces, airborne, eating of wild meat, person to person, and nonsymptomatic person.

Attitude. The questions on attitude were framed after a diligent study of the WHO International Health Regulations framework and WHO COVID-19 technical guidance on infection prevention and control,[10] and contained the following questions: COVID-19 is dangerous and can kill; I will adhere to all COVID-19 regulations set by government; I know how to protect myself from getting COVID-19; If I got COVID-19 symptoms, I would be afraid of going to a treatment center; I am ready to self-quarantine in case of contact with suspects; Anyone can get COVID-19; I fear getting close to any former victim of COVID-19; Staying at home is hard for me; and Avoiding person-to-person contact is hard at home.[11]

Readiness to combat COVID-19 (risk reduction approaches). This segment contained the following questions: I know the right sanitizers for COVID-19 while at university, I know when and how to wear masks while at university, I will cover my mouth and nose when sneezing while at university, I know where to throw used tissue after sneezing while at university, I wash my hands with soap and water after sneezing while at university, I will observe social distancing of at least 2 m while at university, I will avoid crowds and social gatherings at university, I will stay at my accommodation on weekends to avoid COVID-19 spread while at university, I will not shake hands or hug anyone even at home and while at university, and I know risk communication contact for COVID-19. These questions were developed in line with the WHO International Health Regulations framework and WHO COVID-19 technical guidance on infection prevention and control.[10]

Statistical analysis

We analyzed responses and compared them against lecturers and students. Descriptive statistics where conducted, and information was presented as frequency and percentages. While

Table 1. Description of the study population in Uganda.

PARAMETERS	VARIABLES	FREQUENCY	PERCENTAGE	95% CI
Age (years)	18-29	58	56.31	46.62-65.65
	30-39	31	30.09	21.83-39.46
	40-49	12	11.65	6.47-18.97
	50-59	1	0.97	0.05-4.52
	60-69	1	0.97	0.05-4.69
	Total	103	100	97.13-100
Sex	Male	60	58.25	48.56-67.48
	Female	43	41.74	32.52-51.44
	Total	103	100	97.13-100
Occupation	Lecturers	51	49.51	39.94-59.12
	Students	52	50.48	40.88-60.06
	Total	103	100	97.13-100

odds ratios (ORs) were conducted to measure risks in the population at 95% confidence interval (CI), a value of $P < .05$ was considered statistically significant.

Results

Description of the study population in Uganda

A majority (56%, 95% CI: 46.62-65.65) of participants were aged between 18 and 29 years and 30% were 30 to 39 years. There were more male participants (58%, 95% CI: 48.56-67.48) as compared with female participants (42%, 95% CI: 32.52-51.44). Lecturers were 49.51%, 95% CI: 39.94-59.12, while students were 51%, 95% CI: 40.88-60.06 (Table 1).

Description of knowledge on symptoms of COVID-19 and transmission among lecturers and students in western Uganda

The study showed that majority who were 98% lecturers and 94.2% students knew that COVID-19 presents with fever; majority who were 96.6% lecturers and 93.3% students knew that COVID-19 presents with dry cough, while 94.7% of the lecturers and 84.8% of the students knew that difficulty in breathing was associated with COVID-19. It was also shown that only 72.9% of the lecturers and 70.5% of the students knew that fatigue was a symptom of COVID-19. In addition, 78.7% of the lecturers and 64.3% of the students knew that headache was a symptom of COVID-19. Statistical analysis showed no significant difference for each of the responses above ($P > .05$) as shown in Table 2.

Assessment of the knowledge on transmission of COVID-19 showed that most lecturers (96%) and students (92.5%) knew about transmission of COVID-19 through cough drops. About 94% of the lecturers and 86.8% of the students knew that COVID-19 could be transmitted through contaminated surfaces. It was also shown that only 47.1% of the lecturers and 67.3% of the students agreed that COVID-19 was airborne. Minority who were 23% students and 36% lecturers knew that COVID-19 was zoonotic, while 84.9% of the lecturers and 84% of the students knew of person-to-person transmission of COVID-19. Majority who were lecturers (66%) knew that asymptomatic persons could transmit the virus. We analyzed the data and found no significant difference in these responses ($P > .05$) as shown in Table 2.

Description of preparedness/risk reduction approaches to minimize COVID-19 transmission

Assessment on preparedness and readiness to fight COVID-19 among the respondents showed that majority of lecturers (90%) were using sanitizers. In addition, 89.1% of the lecturers and 86% of the students were wearing masks. It was also found that 95.7% of the lecturers and 87.7% of the students agreed that they covered their mouth while coughing and sneezing. Seemingly, 96.2% of the lecturers and 82% of the students washed their hands with soap and water to prevent COVID-19 transmission. The majority of lecturers (86%) and students (80.8%) agreed that they observed proper social distancing of at least 2 m. In addition, 96.2% of the lecturers and 86.3% of the students said they avoided large crowds. Furthermore, 90.5% of the lecturers and 83.6% of the students accepted that they do not shake hands during this season of COVID-19. Only 77.8% of the lecturers and 69% of the students knew of the risk communication channel/contact for COVID-19 set up by the Ministry of Health for any emergency calls. Statistical analysis showed a significant difference on use of sanitizers (OR = 0.13, 95% CI: 0.04-0.41, $P = .00015$), whereas no statistical differences were found in the rest of the responses as shown in Table 3.

Table 2. Description of knowledge on major symptoms of COVID-19 and transmission among lecturers and students in western Uganda.

SIGNS AND SYMPTOMS		NO	YES	TOTAL	ODDS RATIO (OR)	95% CONFIDENCE INTERVAL (CI)	*P* VALUE
Fever	Lecturer	1 (2)	50 (98)	51	0.32	0.006-4.270	.6176
	Student	3 (5.8)	49 (94.2)	52			
Dry cough	Lecturer	2 (3.4)	56 (96.6)	58	0.50	0.040-4.599	.6511
	Student	3 (6.7)	42 (93.3)	45			
Difficult breathing	Lecturer	3 (5.3)	54 (94.7)	57	0.31	0.049-1.477	.1062
	Student	7 (15.2)	39 (84.8)	46			
Fatigue	Lecturer	16 (27.1)	43 (72.9)	59	0.88	0.343-2.325	.8271
	Student	13 (29.5)	31 (70.5)	44			
Headache	Lecturer	10 (21.3)	37 (78.7)	47	0.48	0.178-1.276	.1304
	Student	20 (35.7)	36 (64.3)	56			
TRANSMISSION		NO	YES	TOTAL	ODDS RATIO (OR)	95% CONFIDENCE INTERVAL (CI)	*P* VALUE
Cough drops	Lecturer	2 (4)	48 (96)	50	0.51	0.04-3.78	.6789
	Student	4 (7.5)	49 (92.5)	53			
Contaminated surface	Lecturer	3 (6)	47 (94)	50	0.42	0.066-1.993	.3209
	Student	7 (13.2)	46 (86.8)	53			
Airborne	Lecturer	27 (52.9)	24 (47.1)	51	2.29	0.969-5.572	.047
	Student	17 (32.7)	35 (67.3)	52			
Zoonotic	Lecturer	30 (63.8)	17 (36.2)	47	0.53	0.205-1.372	.1924
	Student	43 (76.8)	13 (23.2)	56			
Person to person	Lecturer	8 (15.1)	45 (84.9)	53	0.93	0.277-3.142	1
	Student	8 (16)	42 (84)	50			
Asymptomatic person	Lecturer	17 (34)	33 (66)	50	0.49	0.206-1.180	.111
	Student	27 (50.9)	26 (49.1)	53			

Abbreviation: COVID-19, coronavirus disease 2019.

Further assessment showed that more than 98% of the respondents believed that COVID-19 was dangerous and could kill with no significant differences in the response. About 91.4% of the lecturers and 73.3% of the students agreed on the use of personal protective equipment like masks and gloves where necessary, and significant differences in the responses were found between the study participants (OR = 0.26, 95% CI: 0.07-0.89, *P* = .0175). Only 67% of the lecturers and 20% of the students were positive about self-quarantine incase of exposure to victims with statistical difference (OR = 0.07, 95% CI: 0.01-0.29, *P* = .000). Most lecturers (93%) were positive that anyone could get COVID-19 (OR = 0.12, 95% CI: 0.03-0.46, *P* = .0002), while 74.6% of the students were negative about staying at home (OR = 0.26, 95% CI: 0.10-0.67, *P* = .0027) with statistical difference in the responses. It was also shown that 92% of the lecturers and 74.3% of the students were willing to adhere to set rules against COVID-19 pandemic with statistical difference in their response (OR = 0.23, 95% CI: 0.06-0.86, *P* = .0149). Majority who were students (72.3%) were not in agreement with visiting the hospital for other illnesses during this pandemic as well as 20.4% of that were lecturers, and 35% students were not willing to intermingle with former COVID-19 patients with no significant difference in the response. Only 67% of the lecturers and 60.8% of the students were positive about avoiding person-to-person contact like greeting and hugging with no statistical significance as shown in Table 3.

Table 3. Preparedness and risk reduction approaches toward COVID-19.

PREPAREDNESS/RISK REDUCTION APPROACHES		NO	YES	TOTAL	ODDS RATIO (OR)	95% CONFIDENCE INTERVAL (CI)	*P* VALUE
Use sanitizers	Lecturers	7 (10)	63 (90)	70	0.13	0.04-0.41	.00015
	Students	15 (45.5)	18 (54.5)	33			
Wear face masks	Lecturers	5 (10.9)	41 (89.1)	46	0.75	0.18-2.83	.7686
	Students	8 (14)	49 (86)	57			
Cover mouth when coughing	Lecturers	2 (4.3)	44 (95.7)	46	0.33	0.32-1.84	.1833
	Students	7 (12.3)	50 (87.7)	57			
Wash hands	Lecturers	2 (3.8)	51 (96.2)	53	0.18	0.02-0.95	.0255
	Students	9 (18)	41 (82)	50			
To continue with social distancing (at least 2 m)	Lecturers	7 (13.7)	44 (86.3)	51	0.67	0.2-2.2	.5969
	Students	10 (19.2)	42 (80.8)	52			
Avoid crowds	Lecturers	2 (3.8)	50 (96.2)	52	0.25	0.02-1.43	.9233
	Students	7 (13.7)	44 (86.3)	51			
No handshake	Lecturers	4 (9.5)	38 (90.5)	42	0.54	0.11-2.05	.3901
	Students	10 (16.4)	51 (83.6)	61			
Risk communication contact	Lecturers	12 (22.2)	42 (77.8)	54	0.65	0.24-1.72	.3752
	Students	15 (30.6)	34 (69.4)	49			
ATTITUDES		NEGATIVE	POSITIVE	TOTAL	ODDS RATIO (OR)	95% CONFIDENCE INTERVAL (CI)	*P* VALUE
COVID-19 is dangerous and can kill anyone	Lecturer	1 (2)	49 (98)	50	1.06	0.01-84.83	1
	Student	1 (1.9)	52 (98.1)	53			
Use of PPE	Lecturer	5 (8.6)	53 (91.4)	58	0.26	0.07-0.89	.0175
	Student	12 (26.7)	33 (73.3)	45			
Self-quarantine	Lecturer	3 (4.3)	67 (95.7)	70	0.07	0.01-0.29	1.4 e−05
	Student	13 (39.4)	20 (60.6)	33			
Anyone can get COVID-19	Lecturer	4 (6.6)	57 (93.4)	61	0.12	0.03-0.46	.0002
	Student	15 (35.7)	27 (64.3)	42			
Staying home	Lecturer	17 (44.7)	21 (55.3)	38	0.26	0.10-0.67	.0027
	Student	47 (74.6)	16 (25.4)	63			
Adhering to set rules	Lecturer	5 (7.4)	63 (92.6)	68	0.23	0.06-0.86	.0149
	Student	9 (25.7)	26 (74.3)	35			
Visiting hospital	Lecturer	47 (72.3)	18 (27.7)	65	0.81	0.28-2.21	.8169
	Student	29 (20.4)	9 (23.7)	38			
Getting in touch with former COVID-19 victims	Lecturer	10 (20.4)	39 (79.6)	49	0.47	0.17-1.25	.1255
	Student	19 (35.2)	35 (64.8)	54			
Avoiding person to person	Lecturer	17 (32.7)	35 (67.3)	52	0.75	0.31-1.82	.5416
	Student	20 (39.2)	31 (60.8)	51			

Abbreviations: COVID-19, coronavirus disease 2019; PPE, personal protective equipment.

Discussion

In Uganda, the government through the Ministry of Health has put up measures to curb the spread of coronavirus; however these efforts might get compromised in academic institutions once the lockdown is lifted if students or lecturers are non-compliant.

In this study, knowledge on COVID-19 was highest in this order: fever > dry cough > difficulty breathing > fatigue > headache and no significant differences were found between lecturers and undergraduate students. A recent study among health care workers in Uganda showed that knowledge was highest among those with a higher education than the least educated.[9] Society often expects lecturers to be more knowledgeable than students; however, that was not the case in this study. This might be related to knowledge gained through government public health messaging, news reports, or participants actively seeking out information through the Internet. Knowledge of participants on transmission of COVID-19 was highest in the order of cough drops > contaminated surfaces > person-to-person contact > asymptomatic persons > airborne > zoonotic with no significant differences among lecturers and students. Students and lecturers are both an educated portion of the community whom we believed could equally access health information about COVID-19 pandemic over different media platforms such as the Internet where WHO directives and national guidelines are always published.[9] The WHO has established guidelines for developing countries to prevent and minimize community transmission of COVID-19.[10] Findings in the study highlight equal strength among lecturers and students of western Uganda, and thus, these can be vital in community education on the current health pandemic. This is actually important because Uganda is in the process of lifting the national lockdown against COVID-19 following directives from the WHO Director General Tedros Adhanom.[12] There is need for continuous community education after the lockdown.

We also established that sanitizers were used by the majority of lecturers with a statistical difference in the responses as compared with students. This was due to an abnormal increase in the prices of sanitizers all over the country as a result of their increased demand. Following the outbreak of the coronavirus in the country, the cost of sanitizers has risen from 30 000 UGX (USD 9) to a range of 60 000 to 160 000 Ug.SHS per liter (USD 18-44) depending on the brand of the sanitizer[13] despite the gross per capita income of USD 800 as per the 2019 record.[14]

Lecturers and students were all willing to continue using personal protective equipment like masks, and personal practices such as covering the mouth while sneezing and coughing, no handshaking, and washing of hands. This showed a personal concern and desired efforts toward ending of this pandemic. This indicated further that the respondents were concerned about the virus and all its negative impact in case was to spread in the community.

In this period of the COVID-19 pandemic, some of the lecturers and students showed no interest of visiting hospitals for any other medical illness and some of them expressed fear for self-quarantine in case of exposure to patients with COVID-19. These findings communicate a situation of fear and panic among the respondents. This was genuine and as it has also been seen in Boston (USA), where non-COVID-19 patients were shunning hospitals which impacted on increased mortalities from non-COVID-19 infections.[15] This also communicates a level of mounting stigma against former COVID-19 patients, and in Uganda, community hostility against those who have been discharged after COVID-19 treatment continues to be a major public policy challenge.[16,17]

Conclusions

From the level of knowledge, attitude, and preparedness shown, this study generally identifies lecturers and students as potential stakeholders in the fight against community transmission of COVID-19. The National Council of Higher Education would work in collaboration with the Ministry of Education and the Ministry of Health in Uganda to develop practical models which can be used for community education. This is in line with our previous suggestions on "One Health" where interinstitutional and ministerial collaborations have to be promoted to combat COVID-19 in Africa.[4] We recommend further measures on how the creeping stigma about COVID-19 could be handled in Uganda.

Study limitations

Findings in this study are limited to lecturers and students in a university setting, and there may not be such situations in secondary and lower levels of education within Uganda.

Sampling for the study was conducted via a convenience sample using social media platform (WhatsApp), with bias possibilities as underprivileged students who do not have phones with Internet access and lecturers who are not akin to social media may be denied the opportunity to participate in the survey.

This study used self-reported data, as such it is possible that participants may have answered attitude and readiness questions positively based on what they perceive to be expected of them, therefore could influence the outcome of the study.

Author Contributions

IE and KIK conceptualized the study; IE, IMM, PDA, KIK, FS, and RS designed the study; and IE, KIK, FS, IMU, and EEB conducted data collection and analysis, while IMM, RS, PDA, IMU, RM, FS, HIN, KM, SSD, GHM, GKN, SCW, EML, and KIK conducted data interpretation. IE and KIK drafted the manuscript, while IMM, ETA, RS, PDA, IMU, RM, FS, HIN, KM, SSD, EDE, GHM, GKN, ETA, EML, SCW, and KIK critically revised it for important intellectual content. All authors

approved the final version for publication and remain in agreement to be accountable for all aspects of the work.

Data Availability Statement

Datasets used can be found at https://figshare.com/s/27693e33c479bbfd41ad.

Ethical Approval

Expedited ethical clearance was sought from the Kampala International University ethical clearance committee (Nr. UG-REC-023/201914). Consent to participate was acquired through online submission of the questionnaire by the participants.

ORCID iDs

Isaac Echoru https://orcid.org/0000-0002-8339-8303

Keneth Iceland Kasozi https://orcid.org/0000-0002-5763-7964

Ibe Michael Usman https://orcid.org/0000-0001-6624-1286

Robinson Ssebuufu https://orcid.org/0000-0003-2053-1696

Regan Mujinya https://orcid.org/0000-0002-6673-6817

Grace Henry Musoke https://orcid.org/0000-0003-2392-4997

Emmanuel Tiyo Ayikobua https://orcid.org/0000-0002-4743-9622

Supplemental Material

Supplemental material for this article is available online.

REFERENCES

1. Lai C-C, Shih T-P, Ko W-C, Tang H-J, Hsueh P-R. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents*. 2020;55:105924. doi:10.1016/j.ijantimicag.2020.105924.
2. Kannan S, Shaik Syed Ali P, Sheeza A, Hemalatha K. COVID-19 (Novel Coronavirus 2019)—recent trends. *Eur Rev Med Pharmacol Sci*. 2020;24:2006-2011. doi:10.26355/eurrev_202002_20378.
3. Sohrabi C, Alsafi Z, O'Neill N, et al. World Health Organization declares global emergency: a review of the 2019 novel coronavirus (COVID-19). *Int J Surg*. 2020. doi:10.1016/j.ijsu.2020.02.034.
4. Kasozi KI, Mujinya R, Bogere P, et al. Supplement article letter to the editors pandemic panic and anxiety in developing countries. Embracing One Health offers practical strategies in management of COVID-19 for Africa. *Pan AFRIC*. 2020;35:5-7. doi:10.11604/pamj.2020.35.3.22637.
5. Gilbert M, Pullano G, Pinotti F, et al. Preparedness and vulnerability of African countries against importations of COVID-19: a modelling study. *Lancet*. 2020;395:871-877. doi:10.1016/S0140-6736(20)30411-6.
6. Colbourn T. Comment COVID-19: extending or relaxing distancing control measures. *Lancet Public Heal*. 2020;2667:19-20. doi:10.1016/S2468-2667(20)30072-4.
7. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*. 2020;6736:1-9. doi:10.1016/S0140-6736(20)30566-3.
8. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun*. 2020;109:102433. doi:10.1016/j.jaut.2020.102433.
9. Olum R, Chekwech G, Wekha G, Nassozi DR, Bongomin F. Coronavirus disease-2019: knowledge, attitude, and practices of health care workers at Makerere University Teaching Hospitals. *Front Public Health*. 2020;8:181-189. doi:10.3389/fpubh.2020.00181.
10. WHO. Country & Technical Guidance - Coronavirus disease (COVID-19). April 13, 2020. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance
11. Usman IM, Ssempijja F, Ssebuufu R, et al. Community drivers affecting adherence to WHO guidelines against covid-19 amongst rural Ugandan market vendors. *Front Public Heal*. 2020;8:13. doi:10.3389/fpubh.2020.00340.
12. Peter K. Lift COVID-19 measures slowly, carefully, warns WHO chief. *Anadolu Agency*. April 13, 2020. https://www.aa.com.tr/en/latest-on-coronavirus-outbreak/lift-covid-19-measures-slowly-carefully-warns-who-chief/1803473#. Accessed May 1, 2020.
13. Mukhaye D. Hand sanitiser sales surge despite price hike. *Daily Monitor*. March 25, 2020. https://www.monitor.co.ug/News/National/Hand-sanitiser-sales-surge-despite-price-hike/688334-5503926-diyy1m/index.html. Accessed April 2, 2020.
14. *The Independent*. Uganda's per capita income up. *The Independent*. June 6, 2019. https://www.independent.co.ug/ugandas-per-capital-income-increases-museveni/. Accessed June 10, 2020.
15. Erin T. Charlie Baker: non-coronavirus patients avoiding hospitals "out of fear." *Boston Herald*. April 23, 2020. https://www.bostonherald.com/2020/04/23/gov-charlie-baker-non-covid-patients-avoiding-hospitals-out-of-fear/. Updated April 24, 2020. Accessed May 2, 2020.
16. *The Independent*. COVID-19 recovered patient decries hostility, stigma. *The Independent*. April 23, 2020. https://www.independent.co.ug/covid-19-recovered-patient-decries-hostility-stigma/. Accessed May 2, 2020.
17. Lubega M, Ekol JE. Preparing communities to receive persons recently suspected or diagnosed with COVID-19. *Pan African Medical Journal*. 2020;35:21. doi:10.11604/pamj.supp.2020.35.2.23202.