

REVIEW ARTICLE

The multi-level factors influencing the development and impact of COVID-19 response in a university community: A review of the experiences of Kabale University in southwestern Uganda.

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Abstract:

The index case of COVID-19 in Uganda was reported on 20th March 2020. The first confirmed imported case of COVID-19 in Kigezi sub- region South Western Uganda, where Kabale University is located, was reported on April 24th 2020. On August 2nd 2020 the first COVID-19 community case was recorded in the Kigezi Sub-region. Right from the early days of the threat of COVID-19 spread in Uganda, Kabale University put in place multiple mechanisms and interventions to contain the pandemic including:

- **A COVID-19 Study Group:** set up in February 2020 to study the disease, carry out risk assessment and advise the University on how to be prepared to handle cases if the disease were to reach the environment of the University.
- **A multidisciplinary Kabale University COVID-19 Task Force:** set up on 30th March 2020 to advise the University on preparations to ensure safe continuity of business at the university during a possible outbreak of COVID-2019 by designing and implementing appropriate infection prevention and control (IPC) measures, the Standard Operating Procedures (SOPs), for the University community.
- **COVID-19 Knowledge Attitudes & Practice (KAP) Study** –to inform planning for safe maintenance of business continuity at the university in the face of the COVID-19 outbreak. Following a national lockdown, the purpose of the study was to guide development of necessary measures to be undertaken to minimize the spread of COVID-19 among students, staff and visitors when re-opening of the University became imminent. The study revealed high levels of knowledge (84% correct rate of response); an overall positive attitude (77% positive rate of response); but only **moderate COVID-19 preventive practices** (68.8% correct rate of preventive practice). Knowledge was higher among male students ($p=0.033$); students older than 20 years ($p=0.000$); and students taking health related courses such as Medicine or Nursing ($p=0.019$). Attitudes about COVID-19 were better among female students ($p=0.034$); and in students older than 20 years ($p=0.000$). Age and sex are significant predictors of COVID-19 prevention practices ($p=0.001$, $p=0.000$ respectively).

These findings informed the need for:

- **Effective behavioral change communication:** to alert the university and the neighboring communities about COVID-19. The strategies to be used to achieve this were; **Internal memos** to the university community through e-mail, social media and written notices placed in strategic areas, **Radio talk shows** through several FM radio stations in Kabale town and, **Branded health literacy print-outs** in form of posters, leaflets and brochures.
- **Promotion of good respiratory and oral and hand hygiene** – to discourage; haphazard spitting, ejecting or smearing nasal mucus on public places, sneezing or coughing in public without protection, and promotion of frequent handwashing.
- Random COVID-19 testing – One such test in June 2021 revealed positivity rate of 17.8%
- **Development of the Kabale University COVID-19 Standard Operating Procedures.**

The order of personal prevention priorities emphasized in the SOPs were; face masking, hand washing with running water and soap or disinfectant, hand sanitizing with 70% alcohol and, keeping a physical distance of at least 2 meters from one another etc. With vaccination, this order has now been revised to give top priority to vaccination, although we still equally emphasize maintenance of the previous strategies.

Introduction:

Outbreaks of infectious diseases in university communities are probable and actually quite common among students and staff due to sharing common facilities and space like offices, lecture rooms, eating places and entertainment areas [1]. Prevention strategies against such disease outbreaks often include screening, isolation of cases and suspects, contact tracing, and immunization. However, the COVID-19 outbreak has stretched the limits of possible practices to include community sequestration, wearing face masks, social distancing and regular washing and sanitization of hands. Such measures often require the maximum cooperation of the community at risk. However, this is often lacking and the measures must be enforced. University communities are particularly slow at adopting disease prevention measures. They are very diverse, with student and faculty having differences in perception of risk and motivation to adopt preventive behavior. As a result, they question the motives of preventive interventions more than the general public, and tend to be more hesitant to take up innovations.

Kabale University (KAB) is strategically located geopolitically, to be able to serve the needs of Uganda and several neighboring countries (Rwanda, Burundi, Tanzania, and the Republic of Congo) in the Great Lakes Region of East Africa. However, this strategic location can, also, become a disadvantage in terms of disease spread, putting the university community and the neighboring community at high risk for outbreaks of infectious diseases such as the current outbreak of Novel Coronavirus Disease 2019 (COVID-19).

The novel Coronavirus (2019-nCoV, officially known as SARS-CoV-2 or COVID-19) was first reported in December 2019, as a cluster of acute pneumonia of unknown etiology in Wuhan, Hubei Province, China

[2,3]. Since then, COVID-19 has spread to all countries of the world. On 30 January 2020, the Director-General of the World Health Organization (WHO) declared the coronavirus disease (COVID-19) outbreak to be a global public health emergency of international concern under the International Health Regulations (2005) [4] and on 11th March 2020 it was declared a pandemic [5] with destructive human, economic, and social effects.

The index case of COVID-19 in Uganda was reported on 20th March 2020 [6,7]. The first confirmed imported case of COVID-19 in Kigezi sub- region South Western Uganda, where Kabale University is located, was reported on April 24, 2020 at the Chanika border crossing point between Uganda and Rwanda, in Kisoro District [8]. The truck driver was immediately admitted at Kabale Regional Referral Hospital (RRH); which also serves as the main teaching site for Kabale University School of Medicine. On August 2nd 2020 the first COVID-19 community case [9] was recorded in the Kigezi Sub-region, and was subsequently managed at Kabale RRH.

This review paper re-traces the COVID-19 response at National level and at Kabale University over the period between March 2020 and December 2021. It describes the approaches adopted to prevent the spread of COVID-19 in the university community and the Kigezi sub-region at large; and the contribution of the university to strengthening COVID-19 management capacity in the region.

At national level, increasing threat of COVID-19 spreading to the country, influenced Government of Uganda to declare sweeping measures against coronavirus [10] including a national lockdown. Government suspended public and private transport other than emergency vehicles, closed educational

institutions and other public gathering places like churches, markets etc. Other COVID-19 prevention measures put in place were; educating the public to intensify wearing face masks, frequent hand-washing with running water and soap for not less than 20 seconds and/or with disinfectant solutions such as dilute chlorine and sanitizing hands with 70% alcohol based hand sanitizers. The others were avoiding crowding, COVID-19 screening at points of entry to public spaces using non-contact thermal detectors for unexplained febrile illness, disinfecting frequently touched surfaces, and keeping physical distance from one another of at least 2 meters. Kabale University quickly contextualized this national guidance to specific local conditions in the University community and the region

2.0 Materials and Methods

This review is primarily based on the physical and electronic records of the Kabale

University Taskforce on COVID-19. The Taskforce was set up by the University Management on 30th March, 2020; to (brief quote for the letter of establishment on purpose and roles.

Three main categories of records were reviewed: (i) Minutes of meetings of the Taskforce and its respective Sub-Committees; (ii) Reports and recommendation notes of the Taskforce to University Management; and (iii) Research and other data collection exercises commissioned by the Taskforce.

3.0 Review Findings

1. Kabale University is in a context of high risk and potentially severe socio-economic impact of communicable disease outbreak. The University is located in Kabale Municipality in the Kigezi Region, South Western Uganda.



Source; Wikipedia

Situated on a major trans-Africa transit route, Kabale Municipality is only 26 km away from the Katuna border crossing point to Rwanda and 90 km from the Bunagana border crossing point to the Democratic Republic of Congo. Kabale is the main access point for both Rwanda and the Eastern DRC to Kenya and its port city

of Mombasa, through the Busia and Malaba border crossing points, respectively 604 Km and 622 Km from Kabale. There is a very high volume of human and vehicular traffic from and to the three countries passing through Kabale town daily. These could bring the disease to the town or pick it from the town as they

pass through. Kabale is also a regional trading center for 7¹ Ugandan districts (see footnote) and several border districts of Rwanda and Democratic Republic of Congo (DRC).

For a period of 60 years, the Kigezi region has also been a source of emigrants for close to 30 host districts in Uganda, most of who have maintained relations in the region, with regular visits between the families. Thus, as learnt from previous infectious disease outbreaks in the region [11], an infectious disease could easily spread either from any of those districts to Kabale town or from Kabale town to those host districts.

Kabale town is also on the transit route for migrants and refugees from Rwanda and DR Congo. That aside, Kabale town is the main town for the tourists visiting **Bwindi Impenetrable National Park (BINP)** and Mgahinga Gorilla National Park(MGNP) for **Gorilla trekking**, and those visiting Lake Bunyonyi, the deepest lake in Uganda, second deepest lake in Africa after Lake Tanganyika and the **third deepest in the world**. Kabale town is the crossing point for people visiting the Virunga regions of Rwanda and DR Congo. These areas attract many international tourists from all over the world, some of who come from countries with high prevalence of COVID-19 and could, potentially, bring the disease to the town and in turn to the University.

2.Kabale University constituted an early and evidence-based response to COVID-19, in line with Uganda government guidelines. A COVID-19 Study Group was set up in February 2020 to study the disease and advise the University on how to be prepared to handle

cases if the disease were to reach the environment of the University. A multidisciplinary Kabale University COVID-19 Taskforce: set up on 30th March 2020 to advise the University on preparations to ensure safe continuity of business at the university during a possible outbreak of COVID-2019 by designing and implementing appropriate infection prevention and control (IPC) measures, the Standard Operating Procedures (SOPs), for the University community.

The University instituted COVID-19 SOPs in line with global guidance from WHO, national MOH guidelines, and emerging evidence from global research and experiences. Examples are; face masking, frequent hand washing with soap and running water or disinfectant solution, observing physical distance from one another of at least 2 meters, staying home when with common cold like symptoms and signs, avoiding crowds, minimizing physical meetings and promotion of online meetings and classes.

Effective communication: to alert the university and the neighboring communities about COVID-19. The strategies to be used to achieve this were; (i) Internal memos to the university community through e-mail, social media and written notices placed in strategic areas; (ii) Radio talk shows through several FM radio stations in Kabale town; and (iii) Branded health literacy print-outs in form of posters, leaflets and brochures.

The University complied with major government policies and pronouncements: (i) First lockdown (start date March 18th 2020, end date 21st Sept. 2020); (ii) evolving policy positions on COVID-19

¹ Kabale, Rubanda, Rukiga, Kisoro, Rukungiri, Kanungu, Ntungamo,

vaccination; and (iii) second lockdown (start date 19th June 2021, end date 10th January 2022).

3. Kabale University commissioned a COVID-19 Knowledge, Attitudes and Practice (KAP) study in the university community; to inform planning for re-opening of the University after the first lockdown. The study was anchored on the “KAP theory”[12] and the “Health belief model”[13], and it covered a sample of 571 students and 56 staff in an online self-completed survey. It found high levels of knowledge (84% correct rate of response); an overall positive attitude (77% positive rate of response); and moderate COVID-19 preventive practices (68.8% correct rate of preventive practice) [14]. Knowledge was higher among male students ($p=0.033$); students older than 20 years ($p=0.000$); and students taking health related courses such as Medicine or Nursing ($p=0.019$). Attitudes about COVID-19 were better among female students ($p=0.034$); and in students older than 20 years ($p=0.000$). Age and sex are significant predictors of COVID-19 prevention practices ($p=0.001$, $p=0.000$ respectively).

Based on these findings, the University COVID-19 Task Force recommended:

- **Continued frequent sensitization** of the University Community conducted through all channels of communication in order to greatly increase the level of COVID-19 **prevention practices**. Younger students, male students, and students taking Arts-based courses should particularly be reached with targeted Behavioral Change Communication (BCC) messages. The university could utilize the knowledgeable health program students as peer educators and monitors for their fellow students. Teams of

students from a broader selection of programs were to be created and trained, but with health program students as core nuclei of the teams.

- **Promotion and enforcing face masking** by all persons entering the University and while within the University premises.
- **COVID-19 Screening:** The university procured and strategically situated non-contact thermal detectors at all official entry/exit points into/from the university to screen all people entering the university premises for unexplained febrile illness. This was to help identify suspects cases of COVID-19, isolate them for further evaluation and management in order to minimize the resources that could be spent on many more people if the disease was to spread to members of the university or the neighboring communities.
- **Provision of hand-washing facilities** at all points of entry to the University and at strategic points within the university premises. The recommended hand-washing solution was dilute chlorine at a concentration of at least 1000 ppm. Hand-washing was made mandatory for all people entering and leaving the university premises. To ensure mandatory hand-washing, the university deployed personnel at all the designated points entry and instructed them to oblige all entrants and leavers of their responsibility to hand wash.
- **Provision of hand sanitizers** at strategic positions within the University such as entrances to buildings.
- **Promotion and enforcing physical distancing** of not less than 2 meters between individuals. This was supported by the active introduction and strengthening of Blended Teaching & Learning (the Open Distance E-Learning (ODEL)) model.

- **Periodic COVID-19 testing** to detect prevalence and potential spread of the disease at the University. In July 2020, the University organized a mass screening exercise for all the skeleton staff present during the first lockdown. A total of 54 staff were screened and all were found negative.

Mass screening of students in June 2021: When it was observed that the number of COVID-19 cases in the country was rising, signaling the 2nd wave of the pandemic in Uganda, and that some students had already tested positive, the University organized random mass screening of students of the Faculty of Engineering and Kabale University School of Medicine (KABSOM). A total of 180 students (87% males) were tested on Sunday 6 June 2021, using the RDT Antigen approach. A total of 32 (18%) students among these tested positive [15], 30 males (16.7% positivity rate) and 2 of them females (1.1% positivity rate). This positivity rate was similar to the National Positivity rate of 17% on 10th

June 2021 [16]. This level of positivity rate was an indicator of a need for the University to intensify its COVID-19 preventive measures. A few of the affected students experienced minor symptoms; but all of them recovered.

4. Kabale University promoted development and diffusion of innovations related to COVID-19 and its control, as an integral element in the teaching, learning and research in the university.

The University Task Force and Management supported COVID-19 related innovations at the University during this period. Examples include:

- a) Students of the Faculty of Engineering developed a solar-powered non-touch hand-washing facility (see figure below). This facility is used at entrances to Kabale University. Several businesses in Kabale town also bought some pieces of the facility.



b) In September 2021, the University Department of Chemistry started production of liquid soap as a direct contribution to COVID-19 prevention

efforts. Over 7,000 liters of the soap have been donated to health facilities, government offices and other service institutions in the region.



Kabale University Manufactures Detergent in an effort to fight COVID-19
Kabale University Vice Chancellor (Lady in Red) launches a detergent called KABS SAFE Liquid Soap to be used in preventing the spread of COVID-19 in the community. Over 7000litres of KABS SAFE Liquid soap were distributed free. September 7, 2021

c) The Management also made some managerial innovations by making flexible plans to keep the University running during the tightest periods of the lockdown. These included shift-based duty rosters for staff, days off-duty for staff to minimize the risk of infection, a quick shift to online meetings and training members of their team on use of online facilities. It also included opening the University for physical activities in a

staggered manner. For example, whereas finalists students of Health related courses were permitted to report in November 2020 phase 1, fresh students were permitted to report in December 2020, phase 2 and other continuing students reported in February 2021, phase 3. An example of justification of space allocation for phase 1 students is as indicated in table 1 below.

Table 1: Allocation of Lecture space by program by permissible max number of students, Phase 1

| Program | Lecture space allocated | Available space (m ²) | Max. students (allowing for 2 m physical Distance) | Actual students on the program |
|---|-------------------------------------|-----------------------------------|--|--------------------------------|
| Bachelor of Nursing Science (BNS) Direct Entrants from High School | Tutorial Room 3, Makanga Campus | 17.85 | 09 | 07 |
| Bachelor of Nursing Science (BNSC) Upgrading Nurses (Diploma holders) | Main Lecture Hall, Makanga Campus | 57.68 | 29 | 19 |
| Bachelor of Environmental Health Science (BEHS) | Lecture Hall 2 Kikungiri Campus | 94.08 | 47 | 09 |
| Diploma in Health Science Management (DHSM) | Main Lecture Hall, Kikungiri Campus | 272.16 | 136 | 60 |
| Masters in Public Health (MPH) | Lecture Hall 1 | 91.84 | 46 | 08 |
| Master of Medicine Obstetrics & Gynecology (MMED OG) | Tutorial Room 2, Makanga Campus | 12.58 | 6 | 02 |
| Master of Medicine Pediatrics & Child Health (MMED Ped.) | Tutorial Room 1, Makanga Campus | 12.58 | 6 | 01 |
| TOTAL | | 558.77 | 279 | 106 |

5. Kabale University contributed to the overall COVID-19 preparedness and response in the Kigezi subregion. A total of 25 medical specialists on the staff of Kabale University School of Medicine (KABSOM) were deployed to support the COVID-19 response activities of Kabale RRH over the last two years. Two senior doctors were specifically deployed to the COVID-19 Taskforce of the hospital; while two other senior doctors were deployed to be part of the

District COVID-19 Taskforce of Kabale District.

The University committed an estimated total of UGX 100 million (US\$ 30,000 equivalent) for physical renovation of an old building at Kabale RRH and converting it into a modern Intensive Care Unit (ICU) Pictures of the renovation process are shown below – a) the VC Kabale University offers UGX 72m to renovate regional hospital ICU, b), c) & d); old building before, during and after renovation.



For the initial six months of the first COVID-19 lockdown, the University management deployed a chauffeured and fueled University van at Kabale Regional Referral Hospital on 24-hour standby, transporting health workers to and from the hospital since they were not permitted to drive their personal vehicles or to walk on foot.

Members of the Kabale University COVID-19 Taskforce have been advocates and lobbyists for support for the response to COVID-19 in the Kigezi sub-region through various networks. Their efforts contributed to the following improvements at Kabale RRH: 15 hospital beds, 3 ambulances, 1 pickup truck, 10 respirators and over 20 oxygen cylinders; at a time of severe shortage in the country.

6. Kabale University has attained high COVID-19 vaccination coverage among staff and students, and enabled access to COVID-19 vaccination services by the

neighbouring general community. COVID-19 vaccination was introduced in Uganda¹² in March 2021. Initially, because of inadequate availability, vaccination was reserved for priority groups like health workers, security personnel, the elderly (60+ years) and persons with comorbidities. As more vaccines became available in the country, COVID-19 vaccination was extended to teachers, students of health training institutions before being extended to all students and eventually to all persons above 18 years.

When the government made vaccines available and prioritised health workers and adults aged over 50 years, University staff led by the Vice Chancellor were the first people to receive the vaccine in Kabale District. Community members picked the courage to take it and followed suit. Due to good collaboration with the District Health Office, vaccines were even made available at the

University premises. Senior University administration and Governing Council members obtained the chance to get vaccinated, too.

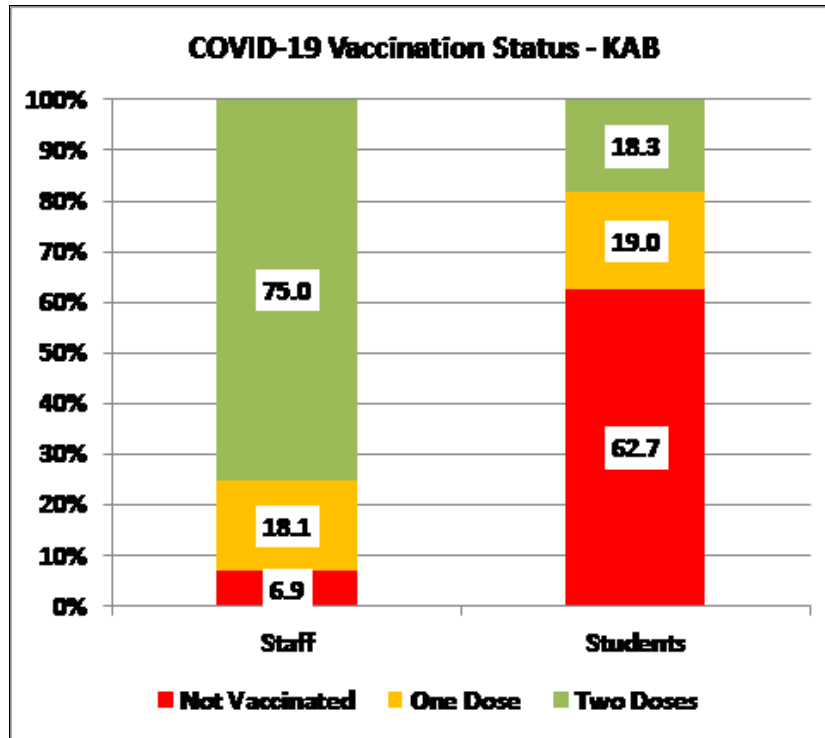


Kabale University News

Kabale University Vice Chancellor Launches COVID-19 Vaccination at Kabale Regional Referral Hospital - Kabale University News

In Mid-October 2021, Kabale University COVID-19 Task Force conducted a rapid online survey to establish the vaccination status among staff and continuing students of Kabale University. As shown in the Figure

below, the majority (93%) of staff were vaccinated (75% with two doses); while only 37% of students were vaccinated (18% with two doses).



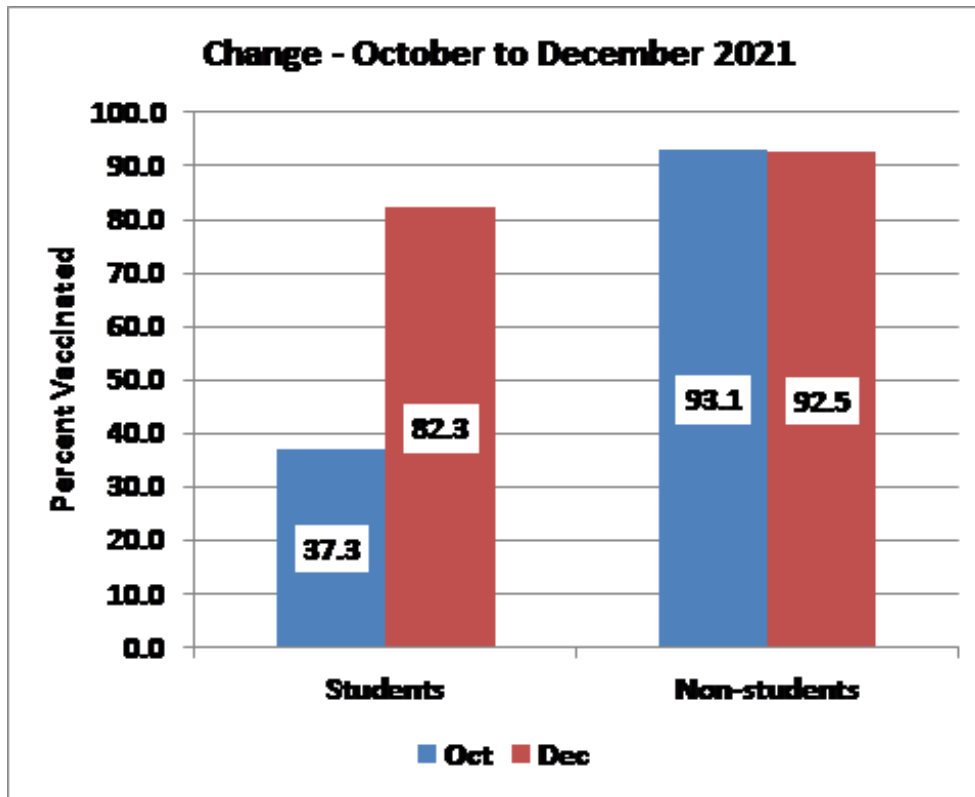
A rapid assessment of the vaccination status of newly admitted students to the University (“freshers”) in late November 2021, revealed that out of a total of 671 students, only 25% were had received any COVID-19 vaccination, and just 2% were fully vaccinated.

Based on these findings, active promotion of vaccination for students was prioritized, based on the following elements:

- a. Arranging for the vaccination teams visit the various University campuses and vaccinate students and staff there instead of waiting for the students and staff to come to the University clinic.

- b. Offering a variety of vaccines so that the students and staff can have a choice.
- c. Providing some edu-entertainment and other incentives at vaccination points during the vaccination exercise to attract more students for the exercise
- d. Working with student leaders to organize vaccination camps in the course of the semester to mop up people who may not have been vaccinated yet (“late adopters”)

Another survey of the University community in December, 2021 found a large increase in the proportion of students that are vaccinated; from 37% to 82%. The rate of vaccination among staff is stable at 93%.



4.0 Discussion and Conclusions

Based on World Health Organization (WHO) guidelines on COVID, the National Task Force on Covid-19, Guidance from the Ministry of Health, and local studies at the University, Kabale University actively implemented multiple strategies to stave off the spread of COVID-19 infection among the University and surrounding communities. At Kabale University the pandemic reached a level of positivity rate of 17.8% in June 2021. This necessitated active promotion, and enforcement of preventive measures at the

University. Prior to the development and introduction of the use of effective of COVID-19 vaccines, the order of personal prevention priorities emphasized in the Kabale Standard Operating Procedures (SOPs) was face masking, hand washing with running water and soap or disinfectant, hand sanitizing with 70% alcohol and, keeping a physical distance of at least 2 meters from one another etc. With vaccination, this order has now been revised to give top priority to vaccination, although we still equally emphasize the previous strategies.

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