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Dear Reader,

We take great pleasure in welcoming you to Issue 3, Volume 5 of the Uganda National Institute of Public Health (UNIPH) Quarterly Epidemiological Bulletin.

We aim to inform the district, national, and global stakeholders on disease outbreak investigations, public health surveillance, and interventions undertaken in detecting, preventing, and responding to public health events in Uganda.

In this issue, we present a variety of articles including; adherence to COVID-19 preventive measures, violence during COVID-19 lockdown, access to social and essential health services during the COVID-19 lockdown, COVID-19 surveillance data daily reporting. We also present articles on Yellow Fever Outbreaks in Buliisa, Moyo, and Maracha Districts, Policy Brief on Hepatitis B vaccination, and Training of District Health Teams on Malaria Normal Channels.

Should you have any questions or require additional information related to articles in this bulletin please contact us on: jmorukileng@musph.ac.ug, iakusekera@musph.ac.ug, demong@musph.ac.ug OR lbulage@musph.ac.ug

We hope you find this information valuable and we shall appreciate any feedback from you.

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UPCOMING EVENTS

1. World Diabetes Day

World Diabetes Day was coined together by the World Health Organisation (WHO) and the International Diabetes Federation (IDF) in 2006, it is celebrated every year on November 14, co-sponsored by the World Health Organisation across 130 countries. The day is dedicated to the spread of awareness, risks, and management of diabetes through campaigns and the theme for 2020 is '*The Family and Diabetes*'

2. World Pneumonia Day

Established in 2009, World Pneumonia Day is marked every year on November 12, to raise awareness of pneumonia as a public health issue and help prevent millions of avoidable child deaths from pneumonia that occur each year. It is organized by the Global Coalition against Child Pneumonia to bring much-needed attention to pneumonia among donors, policy makers, health care professionals, and the public.

3. World AIDS Day

Every year, on 1 December, the world commemorates World AIDS Day. People around the world unite to show support for people living with and affected by HIV and to remember those who lost their lives to HIV/AIDS.

The theme of World AIDS Day 2020 is "*Global Solidarity, Shared Responsibility*". COVID-19 has demonstrated that, during a pandemic, no one is safe until everyone is safe. Leaving people behind is not an option if we are to succeed.

4. International Day of the Persons with Disability

Celebrated every year on December 3. this year (2020), the theme is '*Not all Disabilities are Visible*' the theme focuses on spreading awareness and understanding of **disabilities** that are not immediately apparent, such as mental illness, chronic pain or fatigue, etc. According to the WHO World Report on Disability, of more than 1 billion people living with disability. an estimated 450 million are living with a mental or neurological condition - and two-thirds of these people will not seek professional medical help, largely due to stigma, discrimination and neglect.

5. Uganda National Field Epidemiology Conference

Scheduled to take place on the 4 November 2020, this conference is organised annually by the Ministry of Health in collaboration with Makerere University School of Public Health and US Centers for Disease Control and Prevention (US CDC). During this conference, the advanced field epidemiology fellows showcase their various experiences and projects on investigation and response to public health emergencies, analysis of surveillance data, evaluation of surveillance systems, applied epidemiological studies, cost analysis of outbreaks and quality improvement approaches to health service delivery in the country. This year, the 6th Uganda National Field Epidemiology Conference will be held under the theme "Building a Resilient Workforce to Strengthen Global Health Security" under a virtual platform for the first time because of COVID-19 pandemic.

LEVEL AND DETERMINANTS OF ADHERENCE TO COVID-19 PREVENTIVE MEASURES IN THE FIRST STAGE OF THE OUTBREAK IN UGANDA

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Summary

On 18 March 2020, the President of Uganda banned public gatherings, and encouraged the public to observe physical distancing, use of masks, and personal hygiene. We conducted a survey in the first two months of the COVID-19 epidemic in Uganda to assess the level of adherence and determinants of adherence and satisfaction with the COVID-19 preventive measures recommended by government.

We conducted an online national cross-sectional survey between 16-30 April 2020 to collect socio-demographic, daily personal, and professional information on adherence and satisfaction with COVID-19 preventive measures. We generated two composite outcome variables; 4-item and 5-item Likert scales for level of adherence and satisfaction, respectively using the four major variables: hand washing, wearing face masks, physical distancing, and coughing/sneezing hygiene. Adherence to all the four major preventive measures was categorized as high adherence. Similarly, satisfaction with all the four major preventive measures categorized as very satisfied. We used ordinal logistic regression to identify determinants of adherence and satisfaction to preventive measures.

We had 1,726 respondents (mean age: 36 years (range of 12 to 72); 1,015 (59%) males). Only 495 (29%) reported high adherence to the COVID-19 preventive measures. Overall, 1,555 (90%) observed physical distancing and 566 (33%) always used face masks when going out. Determinants of high adherence to preventive measures included: living in Kampala City Centre (AOR: 1.7, 95% CI: 1.1-2.6), receiving COVID-19 information from health workers (AOR: 1.2, 95% CI: 1.01-1.5) and receiving COVID-19 information from village leaders (AOR: 1.4, 95% CI: 1.02-1.9). Staying with siblings reduced the odds for high adherence (AOR: 0.75, 95%CI: 0.61-0.93).

Overall, 545/1,726 (32%) of the participants were very satisfied with the preventive measures. Satisfaction was highest with cough hygiene [1,251/1,726 (73%)], followed by hand washing [1,180/1,726 (68%)], and wearing face masks [520/1,726 (30%)]. Determinants of satisfaction with preventive measures included: being female (AOR: 1.3, 95%CI: 1.1-1.6), being a health worker (AOR: 1.2, 95%CI: 1.0-1.5) and being in second wealth quintile (AOR: 1.4, 95%CI: 1.02-1.9). Participants who reported violence or discrimination at home during the lockdown period (AOR: 0.25, 95%CI: 0.09-0.67) were less likely to be very satisfied with the COVID-19 preventive measures.

The overall level of adherence to and satisfaction with COVID-19 preventive measures was generally low, especially for face masks. Targeted behavioral change programs using health workers and community leaders are needed and especially need to target men, large families and communities outside Kampala.

Background

The Coronavirus Disease 2019 (COVID-19) caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) was declared to be a pandemic by the World Health Organization (WHO) in March 2020 [1]. Countries were urged to institute preventive strategies to minimize viral transmission. In Uganda, the government progressively instituted several stringent public health measures to prevent and contain any local COVID-19 epidemic. On March 18th 2020, the President banned all public gatherings, and encouraged the public to observe physical distance, not to cough, sneeze or spit in public, and to observe strict hygienic rules (hand washing with soap and water or using sanitizers, regularly disinfecting surfaces such as tables and door handles among others) [2]. On March 20th 2020, all institutions of learning were closed and, on March 25th 2020, a ban on public transport was instituted. A 14-day total lockdown started on March 30th 2020 with a nationwide curfew from 7pm to 6.30am; the use of private cars was equally banned, except for essential staff. The lockdown was later extended until on June 2nd 2020 when a phased easing of the restrictions commenced.

So far, the adherence to these measures has not been evaluated. Understanding the acceptability by the population and the adherence to the preventive measures is essential for the containment of the COVID-19 epidemic in the long-term. We investigated to estimate the level and identify the determinants of adherence, as well as the population's satisfaction with respect to the COVID-19 preventive measures recommended by government.

Methods

We conducted an online national cross-sectional survey between 16-30 April 2020 as part of the International citizen project (ICP) to assess adherence to preventive measures and their impact on the COVID-19 outbreak. The questionnaire collected information about socio-demographic characteristics; the impact of COVID-19 and associated restrictions on daily life, professional life, and personal well-being; adherence to personal and community preventive measures; and acceptability of these measures. People with access to internet either on smart phones or computers were able to voluntarily participate in the study by clicking on the link and anonymously submitting their *responses.*

To determine the overall level and determinants of adherence to the preventive measures, we generated a composite outcome variable called "overall level of adherence" using a 4-item Likert scale (1=very poor adherence to 4=high adherence). We generated this composite adherence outcome using the following four variables, each having a weight of 1: frequent hand washing (Many times in a day after contact with persons or surfaces), wearing face masks, physical distancing, and covering mouth or nose with tissue paper or fabric when coughing/sneezing. These four variables were selected since they were considered the most effective COVID-19 prevention measures [3]. Very

poor adherence, which is represented by score 1 of the Likert scale, meant that the person did not adhered to more than one of the four preventive measures. Poor adherence, score 2 of the meant that

the person was extremely satisfied with only one of the four preventive measures. Neutral, score 3 of the Likert scale meant that the person was extremely satisfied with only two of the four preventive measures. Satisfied, score 4 of the Likert scale meant that the person was extremely satisfied with only three of the four preventive measures. Extreme satisfaction with all the four preventive measures was categorized as very satisfied.

We generated a composite variable on wealth index quintiles using household-item possession variables like; possession of car, television set, radio, mobile phones, and bicycle.

We summarized the number of times of hand washing in a day and the extent of adoption of the preventive measures using mean and SD.

We used ordinal logistic regression to determine the factors associated with adherence and satisfaction with preventive measures. We considered p-value of <0.05 to determine the level of significance and a stepwise approach to ascertain the best fitting model.

Results

A total of 1,726 persons participated in the study, mean age of 36 years (range of 12 to 72). The majority of respondents (59%) were males; only 47 (3%) of participants were non-Ugandans. 51% were from Kampala, 40% were from other urban residences except Kampala, and 11% were from Kampala, 40% were from other urban residences except Kampala, and 11% were from rural communities. Most [706/1,726 (41%)] of the respondents were in the age-group of 29-39 years and 215/1,726 (13%) were 50 years and above.

Level of adherence to the COVID-19 preventive measures in first stage of the outbreak, Uganda

Only 495 (29%) of participants were very adherent to the preventive measures. The least observed preventive measures were disinfecting phone (42%), Laptop (26%), bag (20%) and TV remote (18%). Mask use was also low (reported by only 33% of respondents); meanwhile, high adherence rates of 96% and 86% were noted for frequent hand washing and coughing hygiene, respectively (Table 1).

Determinants of adherence to the COVID-19 preventive measures in first stage of the outbreak, Uganda

In multivariable analysis, participants living in Kampala City Centre (AOR: 1.7, 95%CI: 1.1-2.6), those who obtained COVID-19 information from healthcare workers (AOR: 1.2, 95% CI: 1.01-1.5), those who obtained COVID-19 information from village leaders (AOR: 1.4, 95% CI: 1.02-1.9) or those worried of their own health (AOR: 1.5, 95% CI: 1.1-1.9) were more likely to highly adhere to the preventive measures. Staying with siblings reduced the odds for high adherence (AOR: 0.75, 95%CI: 0.61-0.93).

All other factors assessed including: being female, obtaining

COVID-19 information from television, being in any religion, living as a couple, being health worker, working in a closed indoor space alone, and being in a highest wealth index quintile were not statistically associated with adherence to the COVID-19 preventive measures.

Table 1: Level of adherence to the COVID-19 preventive measures

Variables (N=1,726)	Response	Frequency (Percentage)
Observe physical distance restriction	No	171 (9.9)
	More than 1 meter	1,555 (90)
Wear face mask when going outside	No	1,160 (67)
	Yes	566 (33)
Cover mouth when cough or sneeze	No	248 (14)
	Yes	1,478 (86)
Disinfect hands after sneezing or coughing	No	415 (24)
	Yes	1,311 (76)
Frequent hand washing	No	64 (3.7)
	Yes	1,662 (96)
Stay home when feel flu-like symptoms	No	293 (17)
	Yes	1,433 (83)
Shaking hands, giving a kiss or having any form of physical contact with someone other than a housemate	No contacts with persons outside my household in last two weeks	1,048 (61)
	At least everyday	678 (39)
Adaptation of people's behaviours to comply to government instructions, on a10-point Likert score: Median (IQR)		7 (5-8)
Approximate number of times hands were washed or hand sanitizer used during the past day, median (IQR)		6 (5-10)
Overall score of adherence to preventive measures*	Very poor adherence	66 (3.8)
	Poor adherence	274 (16)
	Low adherence	891 (52)
	High adherence	495 (29)

*It is a composite variable generated from the four selected COVID-19 preventive measures

Level of satisfaction with the COVID-19 preventive health measures in first stage of the outbreak, Uganda

Overall, 545/1,726 (32%) of the participants were very satisfied with the preventive measures. Whereas observing cough hygiene was the most [1,251/1,726 (73%)] extremely satisfying preventive measure and followed by hand washing with [1,180/1,726 (68%)], wearing face masks was the least [520/1,726 (30%)] (Table 2).

Determinants of level of satisfaction with the COVID-19 preventive measures in first stage of the outbreak, Uganda

In multivariable analysis, females (AOR: 1.3, 95%CI: 1.1-1.6), health care workers (AOR: 1.2, 95%CI: 1.02-1.5), and those in second wealth quintile (AOR: 1.4, 95%CI: 1.02-1.9) were very satisfied with the preventive measures. Participants who reported violence or discrimination at home during the lockdown period were less

likely to be very satisfied with the COVID-19 the preventive measures.

All other factors assessed including: being worried about own health, never suffering violence, and working in a closed indoor space with several people were not statistically associated with satisfaction with the COVID-19 preventive measures.

Table 2: Level of satisfaction with the COVID-19 preventive health measures in first stage of the outbreak, Uganda

Variables	Response	No. (percentage)
Stay at home	Extremely dissatisfied	134 (7.8)
	Dissatisfied	133 (7.7)
	Satisfied	348 (20)
	Moderate satisfied	403 (23)
	Extremely satisfied	708 (41)
Frequent hand washing with soap	Extremely dissatisfied	42 (2.4)
	Dissatisfied	40 (2.3)
	Satisfied	133 (7.7)
	Moderate satisfied	331 (19)
	Extremely satisfied	1,180 (68)
Physical distancing	Extremely dissatisfied	58 (3.4)
	Dissatisfied	76 (4.4)
	Satisfied	237 (14)
	Moderate satisfied	393 (23)
	Extremely satisfied	962 (56)
Wear a face masks	Extremely dissatisfied	240 (14)
	Dissatisfied	217 (13)
	Satisfied	420 (24)
	Moderate satisfied	329 (19)
	Extremely satisfied	520 (30)
Cover mouth or nose with tissue paper or fabric when coughing/ sneezing	Extremely dissatisfied	59 (3.4)
	Dissatisfied	39 (2.3)
	Satisfied	138 (8.0)
	Moderate satisfied	239 (14)
	Extremely satisfied	1,251 (73)
**Overall satisfaction	Very dissatisfied	289 (17)
	Dissatisfied	298 (17)
	Neutral	283 (16)
	Satisfied	311 (18)
	Very satisfied	545 (32)

** It is a composite variable generated from satisfaction level of each of the four major variables

Discussion

This study assessed the adherence to and satisfaction with COVID-19 prevention measures in the early phase of the outbreak in Uganda. Only 29% adhered to all adherence measures although adherence to some measures was very high. Nearly all participants (96%) reported frequent hand

washing with soap, but only 33% reported wearing a face mask when going out. It has been estimated that proper masks use with a coverage of 80% would halt the

transmission of the virus [4]. However, like other countries in Africa, masking is not commonly done and was only introduced in response to the COVID-19 pandemic. Low usage of masks could also be a result of the initial inconsistency in information about the value of mask use by the general population to prevent COVID-19 transmission [5]. Additionally, there was information that the threat of COVID-19 posed to Africa and Uganda will be mild given tropical environmental context and the largely young population structure [6]. Furthermore, many poor people may not be able to buy masks since the Uganda's economy has been affected by COVID-19 [7]. More sensitization regarding the importance of face masks use in containing the COVID-19 pandemic is clearly needed as well as subsidies and free masks for those who may not be able to afford them.

Living in Kampala City Centre was associated with high adherence to preventive measures. This is probably explained by the fact that the first cases appeared in Kampala, and that people in Kampala were more exposed to information about COVID-19 than elsewhere. Respondents who reported living in a household with other siblings were less likely to adhere to the preventive measures. This could be because young people have a low risk perception to COVID-19 [8], and for them physical distancing may be difficult. In addition, larger families may have more financial and space constraints.

Receiving COVID-19 related information from health workers was also associated with good preventive behavior. The country's Ministry of Health through its decentralized systems used health workers to sensitize the public on COVID-19 through various fora, including community outreaches. The population is more likely to trust information from health workers and other trusted source [9].

Worry about one's health was also associated with high adherence to the preventive measures. This concurs with findings from a Canadian study, which described how concerns about health status may be associated with adherence to disease preventive measures [10]. Risk perception is indeed an important determinant of adoption of health promotion and preventive measures generally but has been a major challenge in COVID-19 due to widespread misinformation and disinformation, which downplays the risk of COVID-19 [8].

Satisfaction with the preventive measures was associated with adherence to the measures. This is not only surprising, but also highlights the need to ensure that trust and satisfaction is maintained to sustain the adherence to prevention [11]. This, coupled with perception of the effectiveness of preventive COVID-19 prevention measures should be integrated within the COVID-19 risk communication and community engagement especially for the men who had lower satisfaction and adherence levels than the women [11, 12]. Men generally have more challenges and poorer health seeking behaviors and less contact with the healthcare system [13]. Of note, is that the participants who experienced violence had lower satisfaction, perhaps because the violence could have been related to enforcement of the preventive measures [14]. Punitive measures in ensuring adherence to COVID-19 measures

is an emerging area of concern that has not been fully explored and requires more research.

Conclusion

Relatively low proportions of respondents adhered to all the recommended preventive measures, and adherence was especially low concerning the use of masks. The proportion of respondents who were very satisfied with preventive measures was also low. Behavior change programs need to be intensified to improve the level of adherence and satisfaction with preventive measures, especially use of masks. Special messages and efforts should target men, large families and people living outside Kampala city Centre and popularized at community level by health workers and community leaders.

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INCIDENCE AND FACTORS ASSOCIATED WITH EXPERIENCING VIOLENCE OR DISCRIMINATION AMONG UGANDANS DURING THE COVID-19 LOCKDOWN, APRIL 2020

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Summary

Many countries in Sub-Saharan Africa, including Uganda, implemented nationwide lockdowns to minimize COVID-19 spread. Media reports suggested that violence and discrimination subsequently increased. We evaluated incidence and factors associated with experiencing violence or discrimination during the lockdown in April 2020 to inform prevention measures.

We analyzed cross-sectional data collected through the International Citizen Project survey targeting all Ugandans via online platforms to assess social factors associated with the COVID-19 outbreak. Data collected included socio-demographic characteristics, home and work activities, and key events during the epidemic, including experiences of any form of violence or discrimination. We performed descriptive statistics and created a single binary outcome variable for experiencing violence or discrimination and used logistic regression to identify associated factors.

Among 1,726 participants, mean age was 36 years (range, 12-72 years); 1,051 (59%) were male, 145 (8%) had experienced violence or discrimination; of these, the largest proportion (32%) reported that it was perpetrated by a law enforcement officer. Associated factors included being male (Adjusted Odds Ratio (AOR)= 1.60 CI:1.10-2.33), attending work physically for >3 days in the past week (AOR=1.52 CI:1.03-2.23), and inability to access social or essential health services (AOR=3.10 CI:2.14-4.50).

A substantial proportion of Ugandan residents experienced violence and/or discrimination during the COVID-19 lockdown, mostly perpetrated by law enforcement officers. Being male, physically attending work, and difficulty accessing essential services were associated with experiencing violence or discrimination. Although results may not be generalizable due to the online nature of the questionnaire, we recommended that authorities develop strategies to address community safety and law enforcement violence during similar epidemics.

Introduction

In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. Of all the 46 countries in Sub Saharan Africa, 13 countries implemented lockdowns, Uganda inclusive, along with other recommended public health measures nationwide, while 10 more countries instigated partial lockdowns in hotspots.

The lockdown strategies required Uganda's citizens to adjust and spent rather more time in their respective homesteads, communities or neighbor hoods. Media reports indicated that cases of domestic violence increased in Uganda's communities following the institution of most of the lockdown directives that required citizens to stay at home. We estimated the incidence and identified factors associated with experiencing violence or discrimination among Ugandans during the COVID-19 epidemic to inform control and prevention measures.

Methods

We conducted a cross-sectional study based on data collected by the International Citizen Project (ICP) to assess adherence to public health measures and their impact on the COVID-19 outbreak. The ICP was initiated by an international group of researchers from Asian, African, South American, and European countries. The protocol and questionnaire for the ICP survey is largely based on the citizen science Corona survey first launched in Belgium by the university of Antwerp on march 17 2020, it was adopted by 21 countries globally including Uganda in April 2020 (1).

The questionnaire was deployed on April 16, 2020, day 22 of Uganda's total lockdown, and circulated widely via email, WhatsApp, Facebook, and Twitter platforms. The survey collected responses from Ugandans nationwide from 1,726 participants.

For this study, we abstracted data from the ICP study data-Uganda on key socio-demographics, professional life during the COVID-19 lock down (including ability to continue work, transportation means, and working conditions). We also considered data from participants' responses on daily life during the COVID-19 lock down including access to food, talking to other people, experiencing violence or discrimination, being worried about their health, having underlying disease or condition, and access to essential medications.

We performed multivariate logistic regression analysis using STATA 14 to identify the factors associated with experiencing violence or discrimination at a level of significance of 0.05.

Results

Socio-demographic characteristics of study participants

Our study considered all the 1,726 ICP study respondents whose mean age was 36 years ranging from 12 to 72 years. Forty one percent (706/1,726) belong to age-group- 29-39. Twenty two percent (376/1,726) had physically attended work for more than 3 days in the past week; 59% (1,015/1,726) were males, 97% (1679/1,726) were Ugandans; and 50% (864/1,726) had tertiary maximum level of education. Forty four percent (754/1,726) were legally married and 49% (841/1,726) were currently living with a spouse or partner. Forty percent (688/1,726) resided in Kampala suburbs and 40% (697/1,726) resided in a house or apartment with a garden. Forty two percent (731/1,726) worked for a person, institution or company and 38% (663/1,726) were working from home. Twenty eight percent (481/1,726) belonged to the 4th wealth quintile. Forty one percent

(708/1,726) were very satisfied with staying at home. Fifty seven percent (992/1,726) did not have any difficulty obtaining food.

Incidence of violence or discrimination among Ugandans during the COVID-19 lockdown, April 2020

A total of 167 events of violence/discrimination were reported in our study. Overall, only 8% (145/1,726) of the respondents experienced any form of violence or discrimination by any perpetrator during the COVID-19 epidemic in April 2020. One

percent (21/1,726) had experienced physical violence at home, 2% (41/1,726) had experienced physical violence outside of home, 5% (82/1,726) had experienced discrimination because of their social or economic status while 1% (23/1,726) had experienced discrimination because of their ethnicity, race or nationality. Thirty two percent (46/145) of the respondents who had experienced violence or discrimination reported that it was perpetrated by an enforcement officer, 11% (16/145) reported that it was perpetrated by other community members unknown to them, 20% (29/145) reported community members known to them, 18% (26/145) reported a family member within the household while 6% (9/145) reported a relative outside of the household, and 13% (19/145) reported more than one perpetrator.

Factors associated with experiencing violence or discrimination among Ugandans during the COVID-19 lockdown, April 2020

At multivariate analysis, after adjusting for covariates, the odds of experiencing domestic violence were 1.62 times higher for males compared to the females (Adjusted OR= 1.60 CI:1.10-2.33). The odds of experiencing any form of violence or discrimination were 1.52 higher for participants who had physically attended work for more than 3 days in the past week compared to those who had spent less 3 days or were unemployed (Adjusted OR=1.52 CI:1.03-2.23). Participants who reported that they had failed to access social or essential health services since the epidemic started were 3.10 times more likely to experience any form of violence or discrimination (Adjusted OR=3.10 CI:2.14-4.50). All other factors assessed including age, maximum education level, housing conditions, residence, marital status, occupation and wealth index were not statistically significant.

Discussion

Overall, 8.4% experienced any form of violence and discrimination during the one-month period of the lockdown. While this figure is lower than the 20% reported in the UDHS, it represents a high incidence of violence since the UDHS includes reports over a one-year period compared to the 8% in a period of one month in this study. Although not assessed in this study, this high level of violence and discrimination could be attributed to stressors including long stay at home duration, frustration, boredom, inadequate supply of essential goods, and fear of infection due to the epidemic and the control measures with resultant job and income losses as well as law enforcement encounters (2).

This high incidence of violence and discrimination from this survey agrees with the patterns reported around the world. In China, it was reported that domestic violence more than tripled during the lockdown in February, and 90% was related to the COVID-19 epidemic. Brazil reported a 40-50% rise in domestic violence and a 30% increase was observed in Cyprus during their COVID-19 lockdowns (3)

Our findings show that law enforcement officers perpetrated more than one third of the reported violence and discrimination. To ensure compliance with COVID-19 preventive measures, strategies such as curfews, banning of gatherings, and unnecessary movements were backed by heavy deployment of law enforcement officers such as police and local defense forces country-wide. Scuffles between the enforcement officers and the public more especially during the curfew hours were frequently cited in the local media reports during the COVID-19 epidemic.

The odds of experiencing any form of violence and discrimination were higher for those who were unable to access social or essential services compared to those who were able to access them. These findings are in agreement with findings from quarantine experiences during a SARS outbreak in Canada in 2003 which indicated that having inadequate essential supplies such as food, water, clothes, accommodation and medicines was a major source of agitation and frustration in the communities(4). The COVID-19 lockdown resulted in unanticipated and prolonged forced co-existence in the Ugandan homes and communities amidst the economic and financial frustration with struggles to access essential services and supplies which could have resulted in encounters with law enforcement in the curfew hours as well as disputes at household level.

Conclusion

The incidence of violence and discrimination among Ugandan residents during the COVID-19 lockdown was high and mostly perpetrated by law enforcement officers due to the strict lockdown measures. Males, individuals who had attended to work physically for more than 3 days in the past week and those who had difficulties accessing social or essential health services were more likely to experience violence/discrimination. Mitigation of violence should be integrated among the control measures in large-scale public health emergencies. More research is needed to explore alternative models of ensuring compliance to prevention measures in epidemics including models of risk communication and community mobilization.

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LEVEL OF AND FACTORS ASSOCIATED WITH FAILURE TO ACCESS SOCIAL AND ESSENTIAL HEALTH SERVICES AMONG UGANDANS DURING THE COVID-19 LOCKDOWN, APRIL 2020

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Summary

On 11 March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. Many Sub-Saharan Africa countries, including Uganda, implemented curfews and lockdown, resulting in potential challenges to the continuity of essential social and health services. We documented the level of and factors associated with failure to access social and essential health services during the COVID-19 outbreak in Uganda to generate evidence-based interventions.

We evaluated data collected through the International Citizen Project online survey targeting all Ugandans about public health measures and their impact on the COVID-19 outbreak. We abstracted data on socio-demographics and key daily life aspects during the epidemic, including ability to access social or essential services and worry for health (Scale: 1 -5; 5='extremely worried'). We performed descriptive analysis and created a single binary outcome variable called 'failure to access essential health or social services such as food and medicines'. We used modified Poisson regression to identify factors associated with the outcome.

Among 1,726 participants, mean age was 36 years (range, 12-72 years) and 1,015 (59%) were male. Seven hundred seventy-nine (45%) reported being unable to access social and essential health services. Factors associated with failure to access social and essential health services included being worried about health at all levels: Scale 5 (Adjusted Prevalence Ratio (APR)=52.3 CI:1.9-2.2), Scale 4 (APR=1.6 CI:1.3-2.1), Scale 3 (APR=1.6 CI:1.3-2.0), Scale 2 (APR=1.3 CI:1.0-1.6), and experiencing reported violence or discrimination during the lockdown (APR=1.4 CI:1.1-1.7).

Nearly half of respondents reported being unable to access social and essential health services during lockdown, associated with health fears and experiencing violence or discrimination during the lockdown. While results may not be broadly generalizable due to the online nature of the survey, government and public health officials might consider developing operational strategies that ensure continuity of essential services while balancing the challenges of an epidemic response.

Introduction

On 11 March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. At the time, there were more than 4,000 deaths due to COVID 19 and about 118,000 confirmed cases, and the disease had reached every continent except the Antarctica. Much as Uganda instituted the recommended public health responses and strategies for the containment and mitigation of the epidemic, the continuity of other essential social and health services during the lockdown was of great concern.

The lockdown directives allowed food markets, cargo drivers, food delivery systems and restaurants to continue operating with observance of the preventive measures, in addition to supply of some food and relief items to households in Kampala, the capital city of Uganda and its surrounding districts. However, there were frequently observed and reported requests by the public for food and relief items through local media.

We documented the level of and identified factors associated with failure to access social services (food) and essential health services (cancer care, hypertension, tuberculosis, HIV/AIDS, and other health care) needs during the COVID-19 epidemic to generate evidence-based control and prevention measures during similar public health emergencies.

Methods

We conducted a cross-sectional study based on data collected by the International Citizen Project (ICP) to assess adherence to public health measures and their impact on the COVID-19 outbreak, initiated by an international group of researchers. The protocol and questionnaire for the ICP survey is largely based on the citizen science Corona survey first launched in Belgium by the university of Antwerp on march 17 2020, it was adopted by 21 countries globally including Uganda in April 2020 (1).

The questionnaire was deployed on April 16, 2020, day 22 of Uganda's total lockdown, and circulated widely via email, WhatsApp, Facebook, and Twitter platforms.

For this study, we abstracted data from the ICP project data set-Uganda on key socio-demographics, data on professional life during the COVID-19 lock down (including ability to continue work, transportation means, and working conditions). We also considered data from participants' responses on daily life during the COVID-19 lock down including (access to food, talking to other people, experiencing violence or discrimination and being worried about their health), and personal health questions (including smoking habits, having underlying disease or condition and access to essential medications).

Participants who had difficulty accessing food and those who failed to access essential health services were qualified as individuals who had failed to access social and essential services during the epidemic.

We performed multivariate modified Poisson regression analysis using STATA 14 to identify the factors that were associated with failure to access to social or essential health services at level of significance of 0.05. Age was considered at multivariate analysis as it is commonly perceived that older age groups are expected to face challenges.

Results

Socio-demographic characteristics of Ugandans during the COVID-19 epidemic, April 2020

Our study considered all the 1,726 ICP study respondents whose mean age was 36 years ranging from 12 to 72 years. Majority of the respondents 59% (1,015/1,726) were males, 97% (1,679/1,726) were Ugandans and majority (864/1,726) had tertiary maximum level of education (50%). Forty four percent (754/1,726) were legally married, majority (49%) were currently living with a spouse or partner (841/1,726), 62% (1,070/1,726) were living with housemates under 12 years while those with housemates above 70 years were 10% (179/1,726). Forty percent (688/1,726) resided in Kampala suburbs, 17% (300/1,726) had an underlying disease, 40% (697/1,726) resided in a house or apartment with a garden, 20% (481/1,726) belonged to the 4th wealth quintile, and 8% (145/1726) reported to have experi-

enced any form of violence or discrimination since the start of the epidemic.

Level of failure to access social and essential health services among Ugandans during the COVID-19 lockdown, April 2020

Overall, 45% (779/1,726) of the respondents were not able to access social and essential health services during the epidemic. Forty three percent (734/1,726) reported that they had difficulty obtaining food in the last week with the major reasons for difficult to obtain food being not having had no money as reported by 47% (348/734), food being expensive as reported by 35% (255/734) while 12% (90/734) of them felt like it was unsafe to go out and buy food.

On a scale of 5, only 17% (297/1,726) reported that they were extremely worried about their health in the past week. Thirty six percent (107/300) of those who had an underlying or chronic condition reported that they had experienced difficulties in accessing medication since the epidemic started and 13% (40/300) had completely discontinued medication in the past week. Fifty five percent of those (22/40) who had completely discontinued medication in the past week cited failure to get transport means to the health facilities, 15% (6/40) reported there was no medication at health facilities while 3% (1/40) reported no health workers at the health facilities as the major reasons for discontinuing medication use.

Factors associated with failure to access social and essential health services among Ugandans during the COVID-19 lockdown, April 2020

At multivariate analysis, after adjusting for covariates, the prevalence odds of failure to access social and essential health services were higher for participants who were worried about their heath in the past week of the epidemic, (measured on a scale of 5); Extremely worried Scale 5 (Adjusted PR=52.27 CI:1.88-2.176), Scale 4 (Adjusted PR=1.63 CI:1.26-2.11), Scale 3 (Adjusted PR=1.62 CI: 1.32-1.99) and Scale 2 (Adjusted PR=1.27 CI:1.01-1.61). The prevalence odds of failure to access social or essential health services were 1.39 higher for participants who reported that they had experienced any form of violence or discrimination (Adjusted PR=1.39 CI:1.13-1.72). All other factors assessed including, maximum education level, housing conditions, residence, marital status, occupation and wealth index were not statistically significant.

Discussion

Almost fifty percent of the accessed participants were not able to access social and essential health services during the COVID-19 epidemic lock down. Forty three percent of the participants reported that they had difficulty obtaining food in the past week. This survey reported a high level of difficulty to access food compared with the average of 11 percent of the Ugandan population that was reported to be food insecure in 2014 according to the Food and Agriculture Organization of the United Nations (FAO)(2).

According to FAO, food availability and access is not considered a limiting factor in most of the regions of Uganda except in Karamoja, East Central and West Nile where prolonged dry spells frequently affect production(2). Given our study design, only a certain group of people was reached as 50% of the respondents in this study where residents of Kampala district who are generally expected not to have any food security issues in terms of prices and availability and only 10% of the participants resided in a rural area or village. This relative-

ly high level of failure to access social and essential services by individuals in a region that is presumed considerably food secure indicates that the lockdown had an impact on the availability and prices of food in the central region.

This survey reported a lower level of failure to access health services compared to more than half (67%) of the urban respondents in a survey done to assess the level of health care access during the large Ebola virus epidemic in Liberia in 2013. This difference between our findings and this survey in Liberia could be explained by the fact that they targeted and enrolled participants from all households countrywide (3). Experiences from previous epidemics including Ebola, Zika, and SARS have shown that Public Health Emergencies tend to exacerbate existing health or related problems such as weaknesses in health system strengthening and access to routine care and other essential social services(4). This further highlights the need to monitor the level of failure to access social and essential health services and associated factors among Ugandans during COVID-19 epidemic and future similar outbreaks.

Conclusion

The overall level of failure to access social and essential health services was relatively high associated with being worried about health and experiencing any form of violence or discrimination. We recommend consideration of all aspects of essential social and health care services while putting in place control and prevention measures during large scale public health emergencies.

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FACTORS AFFECTING COVID19 SURVEILLANCE DATA DAILY REPORTING IN UGANDA DURING THE FIRST PHASE OF THE EPIDEMIC

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Summary

COVID-19 has spread rapidly around the world, affecting every community directly or indirectly. In Uganda, surveillance of COVID-9 required districts to report daily; however by June 16th 2020 only 56% of districts were reporting. We conducted a rapid assessment through phone calls to district surveillance focal persons to ascertain and document the data collection processes and flow and assessed

challenges affecting daily reporting for COVID-19. Seventy percent of districts in Uganda were reached. Majority of the districts (99%) reported that they collected data on indicators using the ODK daily while only 20% of the districts collected the Institutional quarantine data daily.85% (81/95) of the districts used ODK for reporting to the national level and 55% (52/95) of the districts reported heavy workload as the main challenge affecting daily surveillance reporting. We recommended assignment of more personnel to the surveillance teams to reduce on workload. The multiple reports were merged following the dissemination of this report.

Background

In March 2020, the World Health Organization (WHO) declared Coronavirus Disease 2019 (COVID-19) as a new pandemic caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). The virus spread globally at an alarming rate, with 8,385,440 confirmed infections and 450,686 deaths as of June 19, 2020. In Uganda, the first case was reported on the 21st of March. By the 19th of June 2020, a total of 763 confirmed cases had been reported with 65% of these cases being imported cases. Most of the new cases were mainly among truck drivers intercepted at the major point of entries in the country.

In Uganda, COVID-19 surveillance data as of June 2020 was reported, compiled, and analyzed daily at the national level. All districts in the country were expected to report to the national level on defined COVID-19 standard indicators on a daily basis.

District surveillance focal persons were responsible for responding to alerts in the community, collecting data from the different sources and submitting on a daily basis to the national level. Data was collected from the community through Village Health Teams and other community members and health facilities through health workers. The data was compiled at the district and submitted to the national level, surveillance team on a daily basis.

The data collected and submitted include; the daily COVID-19 situational report which summarizes the progress on the different COVID19 response sub committees at the district; the Open Data Kit (ODK) report which summarized the daily situation in the districts and contained data on number of calls, alerts, health worker information, specimen collected and cases, among others; the institutional quarantine report which summarizes data on alerts, contacts, persons in quarantine and isolation and samples collected among others; and the point of entry (PoE) report which summarizes the total number of persons screened at the borders.

Only 56% (75/135) of the districts were reporting on a daily basis as reported on 16th June 2020 in the COVID19 surveillance subcommittee meeting. We ascertained and documented the data collection processes and flow and assessed challenges affecting daily reporting for COVID-19 in the districts to inform the national task force on evidence-based recommendations to improve reporting.

Methods

We conducted a rapid assessment through phone calls to the District Surveillance Focal Persons (DSFP) for the 135 districts in Uganda using an assessment tool. We obtained data on the type of COVID19 data, source of data, how data is collected, where and how data is submitted, challenges faced during data collection and submission. The assessment was done for 5 days from 22nd to 26th June.

Findings

Surveillance focal persons from 70% (95/135) districts were reached for the assessment. Districts obtained their data for reporting from the following sources: community members, VHTs, health facilities, and local leaders. All the districts 100% (95/95) reported to obtain their data from community, VHTs and health facilities; 32% of these districts also obtained their data from other sources, which included the Local Council leaders, the Police, UPDF, and other politicians. Majority of the districts (99%) reported that they collected data on indicators using the ODK daily, while 35% of districts collected data for situational reports daily, and only 20% of the districts collected the Institutional quarantine data daily. All the districts (100%) reported using phone calls when collecting data and 55/95 (58%) used SMS to collect data.

Districts were required to submit daily reports to the Ministry of Health. 100% of the districts submitted the reports to the Ministry of Health. Additionally, 31% of the districts also submitted the same reports to Regional Referral Hospitals and 6.3% to the WHO Regional Offices (WRO).

The main method of data submission was by use of ODK 91% (86/95), while 48% (46/95) submitted the daily situation reports by use of emails, and 16.8% (16/95) submitted their reports to regions using the WhatsApp platform.

The major challenges experienced by the district teams in COVID-19 surveillance data reporting were: lack of internet data bundles to submit reports, poor network connectivity in some areas, lack of facilitation for the district teams and heavy workload for surveillance team who had to respond to all alerts in the district and also compile reports daily. (Figure 1). Additionally, each report type was associated with specific challenges (Table 1).

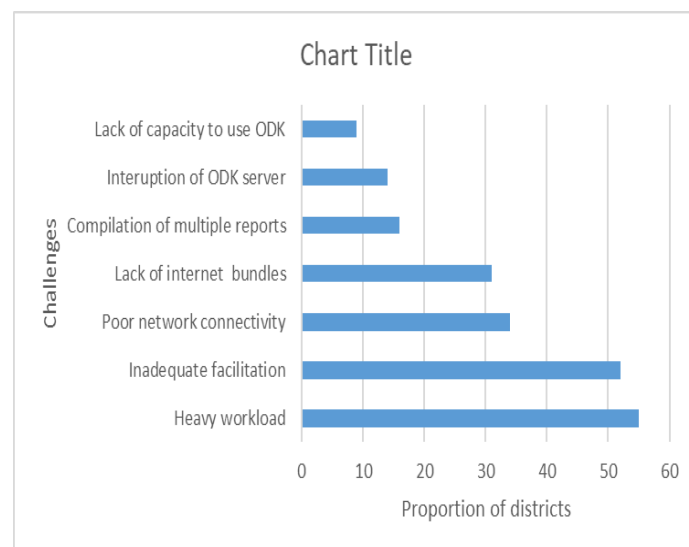*Figure 1: Challenges faced by districts in submitting reports*

Table 1: Specific challenge associated with each report type

Report type	Report-ing method	Challenges associated with report type
Situational Reports	Email	Heavy workload Lack of internet bundles Inadequate facilitation
Daily situa-tional reports on ODK	ODK	Heavy workload Inadequate facilitation Poor network connectivity Lack of internet bundles Compilation of multiple reports Interruption of ODK server Capacity to use ODK
Point of en-try data	ODK	Heavy work load Lack of internet bundles Compilation of multiple reports Interruption of ODK server Lack of capacity to use ODK
Institutional quarantine data	ODK	Heavy work load Lack of internet bundles Compilation of multiple reports Interruption of ODK server Capacity to use ODK

Discussion

Few studies on Covid-19 surveillance system have evaluated daily Covid-19 surveillance reporting rates within and among countries. In many of the papers published on Covid-19 surveillance reporting, the focus was on the burden of the disease in terms of cumulative number of cases, incidence, and deaths by country and region. A more robust public health surveillance system study should actually focus on both the disease burden and the completeness and timeliness of the reporting because the reporting rate effects the caseloads reported.

This study ascertained and documented the data collection processes and flow from the community to the national level and assessed challenges affecting daily reporting for COVID-19 from the districts to the national level. Most districts collected their data using phone calls and SMS from the community and used ODK to submit reports. The main challenges experienced were work load and inadequate facilitation for surveillance focal persons. The surveillance focal persons were expected to respond to all alerts in the district and compile all the reports required on a daily basis at the end of the day. Furthermore, there was limited facilitation in terms of allowances and transport to enable the surveillance team carry out their duties effectively. In absence of allowances the surveillance focal persons were left to work either alone or with one or two more people since it was considered their responsibility. Many organizations and partners required districts to report to them using different templates and this also increased the work load. Poor network connectivity and lack of internet bundles were also cited as key challenges in some districts especially districts bordering other countries. Most focal persons thought that they should be provided with internet bundles if they were to report daily.

Conclusion

Most of the districts were aware of the data flow process, when and where they were supposed to submit reports though there were multiple challenges affecting reporting. We recommended district COVID-19 response budgets to adequately cover reporting teams including allowances and internet bundles, assignment of more personnel to the surveillance teams to reduce on workload, re-orient districts on ODK use in reporting and streamlining reporting channels to avoid submission of multiple reports.

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HIGH-RISK EXPOSURES AMONG TRUCK DRIVERS TESTING POSITIVE FOR COVID-19 AT UGANDA BORDERS: A QUALITATIVE STUDY-2020

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Introduction

On January 30, 2020, the World Health Organization (WHO) declared COVID-19 a public health emergency of international concern (1). Uganda reported its first case of COVID-19 on March 21 (2), the outbreak proceeded in stages, initially comprising incoming travelers and their contacts before cases declined in early April. The successive case resurgence primarily involved truck drivers, and by May 8th truck drivers constituted more than half of Uganda's cases.

As of May 2020, Uganda had 43 border districts sharing with the neighbouring countries. Other than South Sudan, these neighbouring countries had reported more COVID-19 cases than Uganda. It became clear that interventions were needed to target and protect truck drivers from Uganda and neighbouring countries from COVID-19. We investigated potential exposures of truck drivers to COVID-19 and recommended immediate interventions to the Uganda Ministry of Health (MOH).

Methods

For this investigation, a case was laboratory-confirmed SARS-CoV-2 infection during May 13–June 4, 2020, in a commercial truck driver. We conducted 28 in-depth interviews with truck drivers who were diagnosed and being treated with COVID-19 at four COVID-19 isolation and treatment units with large volumes that included Entebbe RRH (10), Lira RRH (9), Gulu RRH (6) and Arua RRH (3). The respondents had entered Uganda from South Sudan via Elegu POE (25), Kenya via Malaba POE(2), and Tanzania via Mutukula POE(1).

We initiated in-person in-depth interviews in the isolation and treatment units with full Personal Protection Equipment (PPE). The truck driver cases were sorted by date of isolation into the

treatment unit with the most newly-diagnosed cases prioritized for interview. The Uganda National Drivers' Association called the case-patients to explain the approach when the investigation team arrived. All the case-persons interviewed were either asymptomatic or had mild disease. We summarized qualitative data into pre-determined categories and analyzed the data by thematic content.

Results

COVID-19 awareness and prevention

All 28 interviewed truck drivers reported being aware of COVID-19 since the outbreak started in December 2019 in China. They learned about COVID-19 through televisions, radios, newspapers, friends, and fellow truck drivers. All reported concern about getting infected with COVID-19. They reported always wearing locally-manufactured face masks; however, they mentioned the lack of widespread mask use at seclusion places and POEs. They reported usually using hand sanitizer and washing hands with water and soap. They noted some colleagues did not employ prevention measures, and some noted that people in South Sudan were aware of COVID-19 but not concerned about getting infected:

"I was concerned about getting COVID-19, although I was aware of the disease and the preventive measures such as hand washing, use of face masks and hand sanitizers. I heard about COVID-19 ever since the beginning of the outbreak from radios, televisions, colleagues, newspapers and friends. I was concerned about contracting the disease in Elegu and Nimule because measures such as masks were enforced later. It was rare to see drivers putting on face masks especially those from other countries." (SG, Elegu POE)

Delays and overcrowding at points of entry and seclusion places

Truck drivers reported spending an average of 3 days (ranging 2—7 days) at POEs, waiting to be tested and cleared to enter Uganda. They also reported spending at least one day at seclusion places. They all reported overcrowding, lack of social distancing, and interacting with other truck drivers at POEs and seclusion places. The long waiting periods led to chaos, protests and demonstrations the POEs.

"We waited for 5 days at Elegu border to cross to Uganda from South Sudan. The truck drivers even held a demonstration protesting the delay. This led to chaos at the border, and there was no social distancing completely. The majority of the truck drivers were not even using face masks at that time." (BW, Elegu POE)

Suspected exposures

All the 28 truck drivers noted delays, overcrowding and interactions with authorities including the traffic police while on the road, the police and military at the customs and immigration at POEs and seclusion places. Most (75%, n=21) suspected the multiple used of the biometric fingerprint machines without disinfection. All the truck drivers who entered from South Sudan (n=25, 89%), mentioned that traffic police and military in South Sudan forced them to carry passengers from check points.

"Yes, the police in South Sudan ask us to carry passengers while on the road. The passengers are usually coughing and do not use face masks. The worst thing is that in South Sudan, people do not believe in COVID-19. They believe that their temperature is hotter than everywhere in East Africa and that the heat is enough to kill the virus." (ESJ, Elegu POE)

Concerns and Stigma

All the 28 truck drivers interviewed noted that the manner in which the police evacuates persons who test positive for COVID-19 from the community to isolation and treatments units is very traumatizing and stigmatizing.

"When the police is taking you to the treatment units, it is like you have committed a crime! And yet COVID-19 is a disease that is spread through the air and you don't choose to get infected." (BF, Elegu POE)

They also feared interactions with members of the community because they felt stigmatized as people at risk of COVID-19.

"[Our families avoid us…. Even the community members can hurt you because if you stop with your truck and at resting place, they think you are going to infect them with coronavirus." (ESJ, Elegu POE)

Discussion

Study results suggest that exposures to COVID-19 among truck drivers were due to delays at the points of entry. Despite employing preventive measures such as social distancing, use of face masks, and hand washing facilities. Truck drivers spent an average of three days waiting to be tested by the Port Health Authority and to be cleared by the immigration and customs. During these delays, truck drivers interacted with fellow truck drivers, leading to overcrowding and compromised social distancing hence enhancing the spread of the corona virus. Delays and overcrowding have been associated with increased transmission of respiratory infection (3). In our study, truck drivers also reported overcrowding at seclusion places as they interacted with fellow truck drivers. Overcrowding is a risk to the transmission of the corona virus because there is proximity between persons. This leads to the spread of the virus when one talks, coughs or breaths (4).

Our study also found out that the truck drivers used the same biometric fingerprint machine at POEs without disinfecting hands before or after use. This could also be a source of infection. The use of biometric fingerprint machines enhances the spread of contagious diseases if used without disinfection of either the machine or hands (5).

The truck drivers also reported being forced passengers in their trucks while in transit in South Sudan. This is a risk to infection by coronavirus since the truck drivers also reported that the passengers were symptomatic and not using face masks. Coronavirus can be transmitted by symptomatic

persons of unknown status (6) and pre-symptomatic persons (7).

Conclusion and recommendations

Multiple exposures specific to truck drivers likely put them at elevated risk of SARS-CoV-2 infection. We recommended that MOH expedite sample collection, testing, and result return by enacting point-of-care testing and intensify behavioural change communication.

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YELLOW FEVER OUTBREAKS IN BULIISA, MOYO, AND MARACHA DISTRICTS, UGANDA, NOVEMBER 2019-FEBRUARY 2020

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Summary

On 10 December 2019, the Ministry of Health received an alert from the Uganda Virus Research Institute (UVRI) of a PCR confirmed case of Yellow fever from Buliisa District, Mid-Eastern Uganda. During January and February 2020, UVRI confirmed more yellow fever cases in Moyo and Maracha Districts, both located in West Nile. We investigated to determine the scope of the outbreak, identify exposures for transmission, and recommend evidence-based control and prevention measures. We line listed 13 case-patients, 7 confirmed, and 6 probable. The median age of case-patients was 32 years with a range of 3 to 59 years. Moyo District had the highest attack rate of 5.7(9/158,600), followed by Buliisa, 2(3/149,300), and Maracha, 0.48 (1/208,300). The overall case fatality rate was 54%. Men had the highest attack rate of 3.9/100,000 compared to women 1.2/100,000. Common symptoms reported were fever (100%), headache (77%), unexplained bleeding (54%), and jaundice, vomiting, joint pain, chest pain each at 31%. Majority (92%) lived or worked within 500 metres of a forested area with monkeys and standing water. All case-patients had not been vaccinated against Yellow Fever. There was very close interaction of humans with sylvatic monkeys in 54% of the case-patients who lived within 10 meters of monkey inhabited forested areas and hunted them for food. These outbreaks were possibly sylvatic, affecting unvaccinated individuals. We recommended mass vaccination campaigns in the affected districts and subsequent inclusion of Yellow Fever Vaccine in Uganda's routine vaccination schedule. We also recommended controlled interaction of humans with wild animals and their habitats and removal of potential mosquito breeding sites.

Background

Yellow fever is an acute viral hemorrhagic disease caused by the yellow fever virus. The virus is a single-stranded RNA virus that belongs to the genus *Flavivirus, Flaviviridae family.* It is transmitted from humans to humans or from animals to humans or humans to animals primarily by the Aedes aegypti, a type of mosquito found throughout the tropics and subtropics. The disease is endemic in tropical areas; in Africa, South America, and Central America. The virus is transmitted when humans go to the jungle (1). Yellow fever virus has three transmission cycles: jungle (sylvatic), inter-mediate (savannah), and urban(2). The incubation period for yellow fever is 3 to 6 days. However, many people do not experience symptoms. When the symptoms occur, in most cases, they disappear after 3 to 4 days. The clinical disease varies from mild febrile illness to severe disease with jaundice and un-explained bleeding. About 15% of patients get severe disease within 24 hours of recovering from initial symptoms. Several body systems are affected in this phase, usually the liver and the kidneys. Death occurs in 20-50% of those with severe disease within 7 - 10 days (2,3). Worldwide, the number of yellow fever cases has increased over the past 20 years. This might be attributable to multiple factors, including declining population immunity to infection, increased human activities such as deforestation, urbanization, population movements, low vaccination coverage, and climate change which increases habitats for mosquitoes(4). According to the World Health Organization, Uganda is one of the 32 countries in Africa with a high potential for Yellow Fever transmission; also located within the Yellow Fever belt. Since the identification of the first outbreak in 1941, several outbreaks have occurred in Uganda, the largest of which affected 181 people and resulted in 45 deaths in northern Uganda in 2010. On 10 December 2019, the Ministry of Health received an alert from the Uganda Virus Research Institute (UVRI) of a PCR confirmed case of Yellow fever from Buliisa District, Mid-Eastern Uganda. During January and February 2020, UVRI confirmed more yellow fever cases in Moyo and Maracha Districts, both located in West Nile. We investigated to determine the scope of the outbreak, identify exposures for transmission, and recommend evidence-based control and prevention measures.

Methods

We defined a suspected case as onset of fever (negative for malaria, non-responsive to malaria treatment, and not explained by any other known reasons) in a resident or visitor of Buliisa, Moyo or Maracha Districts from 1 October 2019 to March 2020, plus two or more of the following symptoms that are not explained by other causes: abdominal pain, diarrhoea and headache. A probable case was onset of unexplained fever, plus one or more of the following unexplained symptoms: jaundice, unexplained bleeding, or liver function abnormalities (e.g., elevated levels of transaminases). A confirmed case was a suspected or probable case with positive IgM or PCR tests for yellow fever. We conducted active case-finding to generate a line list at health facilities and in the affected villages

health facilities and in the affected villages. We collected and took blood specimens to UVRI for laboratory testing. Three techniques were used to confirm Yellow fever at UVRI; 1) A screening test for IgM antibodies for presumptive diagnosis, 2) Plaque Reduction Neutralization Test (PRNT); employed when IgM is positive, as a confirmatory test; and 3) Polymerase Chain Reaction (PCR), a confirmatory test. We developed a line-list of case-patients with data on age, sex, residence, exposure information, presenting symptoms, date of onset of symptoms, laboratory tests and results, treatment received, and the disease outcomes. We also conduced environmental assessment to observe for possible exposures to Yellow Fever.

Results

We line listed 13 case-patients, of which seven were confirmed, and six were probable. The mean age of the case-patients was 32 years with a range of 3 to 59 years. Moyo District was the most affected (attack rate [AR=5.7(9/158,600)], followed by Buliisa, [AR=2(3/149,300)], and Maracha [AR=0.48(1/208,300)]. The overall case fatality rate was 54%. Males were more affected (AR=3.9/100,000) compare to females (AR=3/100,000). All case-patients had fever and fatigue. Other symptoms included; headache (80%), abdominal pain (70%), joint pains (70%), Jaundice (70%), vomiting (60%) vomiting blood (50%), nose bleeding (40%), diarrhea (30%), confusion (20%), Difficulty in Breathing (30%), Cheat pain (20%), convulsions (10%). All case-patients had not been vaccinated against Yellow Fever.

The first case was registered on the 25th of October. More cases were reported thereafter from both Buliisa, Moyo, and Maracha districts until the 11th of February 2020 (Figure 1, 2, and 3).

Majority (92%) of the case-patients lived or worked within 500 metres of a forested area inhabited by monkeys and with standing water. Sylvatic monkeys were frequently seen around the homes and agriculture fields where the case-observed massive deforestation. There was massive encroachments on the forests where monkeys lived through agricultural activities and deforestation in the affected sub-counties patients lived or worked. There was a very close interaction of humans with sylvatic monkeys in 54% of the cases who lived within 10 metres of monkeys and hunted them for food. We also observed massive deforestation. There was massive encroachments on the forests where monkeys lived through agricultural activities and deforestation in the affected sub-counties.

A home built after deforestation, in the middle of a forest inhabited by monkeys in Buliisa Town Council

Figure 1: Overall epi-curve showing the distribution of all cases by date of onset
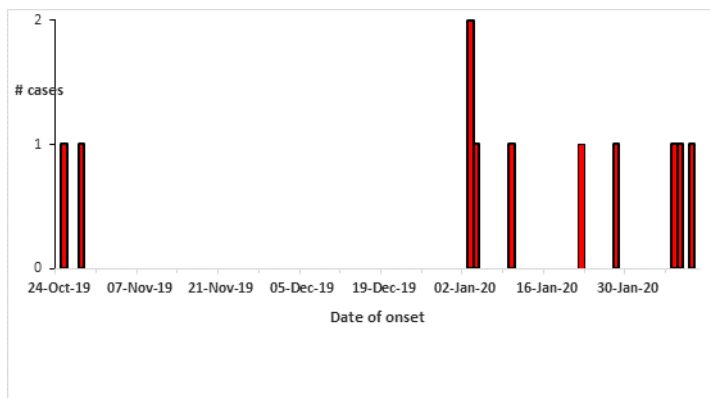

Figure 2: Epi-Curve showing distribution of cases by date of onset in Moyo District
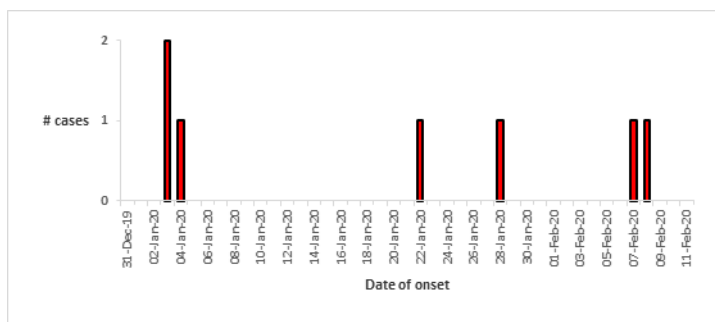

Figure 3: Epi-Curve showing distribution of cases by date of onset in Buliisa District
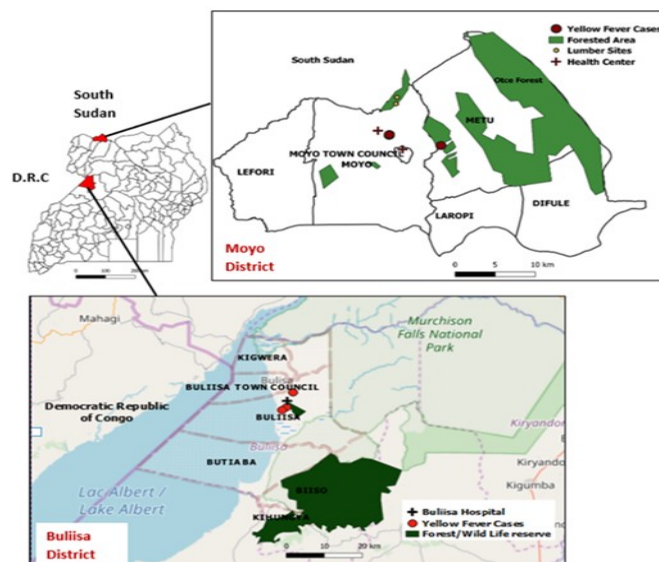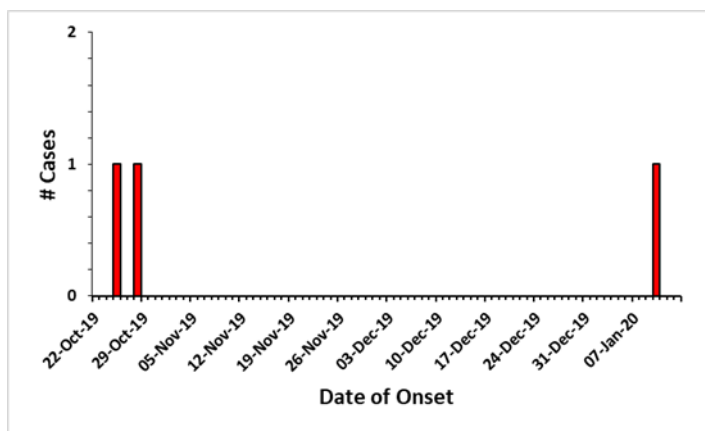
Figure 4: Yellow Fever cases in Moyo and Buliisa Districts, Uganda, 2019-2020

Note: Because of logistical reasons we were unable to get the coordinates for the actual location of the Maracha case

Discussion

Results from our investigation revealed that these outbreaks were possibly all sylvatic, affecting unvaccinated individuals. Environmental investigation showed presence of sylvatic monkeys, and mosquito breeding sites around farmlands and homesteads of case-patients. Majority of the case-patients lived or worked within 500 metres of a forested area with monkeys and standing water. There was close interaction of humans with sylvatic monkeys

in 54% of the cases who lived within 10 metres of monkey fields and hunted them for food. This transmission form of yellow fever (sylvatic/jungle cycle) has been identified in other yellow fever outbreak investigations where transmission involves transmission of the virus between non-human primates and mosquitoes. Studies have shown that humans working or travelling in the forest are bitten by infected mosquitoes and develop yellow fever(5–7). In this investigation, massive deforestation was observed. Areas experiencing yellow fever outbreaks have been observed to practice deforestation, resulting in increased contact with sylvatic monkeys (8). Monkeys were hunted for food in Buliisa and Moyo Districts. This practice greatly increased the risk of human exposure to yellow fever due to the close human-monkey interactions (4). These outbreaks occurred in different districts that do not share boarders, they could have occurred spontaneously and independently due to transmission of the virus from sylvatic monkeys to humans via mosquito bites. However, this could not be ascertained due to logistical limitations to do genetic sequencing of the viruses from different districts. The affected districts experienced rains in the period between October and February in which the outbreaks occurred. This increased breading sites for mosquitoes and facilitated the

outbreaks. In this outbreak, all case-patients reported no history of yellow fever vaccination yet vaccination is the single most important measure to contain yellow fever outbreaks (9). In Uganda, yellow fever vaccination is not part of the routine immunisation schedule. Only those seeking international travel access this vaccine at a cost. This implies the immunity against yellow fever is low and majority of Ugandans are at risk (4). At the end of this outbreak, ministry of health organised a mass vaccination campaign in the affected districts.

Conclusions & Recommendations

We recommended Mass Vaccination in the affected districts and subsequent inclusion of Yellow Fever Vaccine in Uganda's routine vaccination schedule. We also recommended avoidance of very close interaction of humans with wild animals and their habitats and removal of potential mosquito breeding sites.

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POLICY BRIEF: THE HEPATITIS B VACCINE BIRTH DOSE SHOULD BE PART OF UGANDA'S ROUTINE IMMUNIZATION SCHEDULE

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Executive summary

Hepatitis B remains a public health issue that has not been adequately addressed, despite being endemic in Uganda. Most of the burden of Hepatitis B Virus (HBV)-related disease results from infections acquired in infancy through perinatal or early childhood. The WHO recommends that all infants should receive their first dose of vaccine as soon as possible after birth, followed by 2 or 3 doses However, according to Uganda's immunization policy, vaccination against Hepatitis B is given as part of the pentavalent vaccine, at 6, 10, and 14 weeks. `

The birth dose has not been included. In the absence of the universal HBV vaccine birth dose, the transmission of HBV infection from mother to child remains a major source of chronic liver disease when infected children become adults. Ministry of Health needs to introduce a birth dose for HBV vaccine to further reduce hepatitis B transmission in Uganda. This is as a cost-effective strategy to reduce maternal-to-child transmission (MTCT) of Hepatitis B.

Introduction

Hepatitis B virus (HBV) is a significant public health issue that has not been adequately addressed, especially in the high-prevalence regions of Africa (1). Uganda is endemic for hepatitis B with a prevalence of 4.3% among adults (15 to 64 years) and the prevalence varies across the country with the highest rates in Northern region with 4.6% in mid North, 4.4% in North East, and 3.8% in West Nile (2). HBV infection occurs mainly during infancy and early childhood, with MTCT accounting for approximately half of the transmission routes of chronic HBV infections (3).

Despite the incorporation of HBV vaccines into the Expanded Program on Immunization, children continue to be infected with HBV through maternal-to-child transmission (MTCT), a common route of acquisition of HBV(1). Unfortunately, up to 90% of infants infected via MTCT will go on to develop chronic infection by adulthood (4). More so, HBV infection often times goes undetected in childhood, as those infected are typically asymptomatic until they present with liver complications later in life (5).

The HBV vaccine can provide >95% protection to the individual if appropriately given. In 1992, the World Health Organization (WHO) recommended universal HBV vaccination starting at 6 weeks. Upon adoption of this policy, many countries experienced drastic reductions in rates of chronic HBV infection. In 2005 the birth dose of HBV vaccine strategy was further introduced in some regions, with assistance from the WHO and the

Global Alliance for Vaccines and Immunizations (GAVI), among others.

However, the birth-dose HBV vaccine policy has not been implemented in Uganda. With appropriate adoption of birth-dose vaccination policies and expansion of PMTCT programs, elimination of HBV MTCT can be achievable.

Context and Importance of the problem

Most of the burden of HBV-related disease results from infections acquired in infancy through perinatal or early childhood exposure to HBV because infection acquired at an early age is more likely to become chronic than infection acquired later in life. In May 2016, the Global Health Sector Strategy on Viral Hepatitis set targets for 2030: to achieve 0.1% prevalence of HBV infection in children aged 5 years by 2030. However, a substantial burden of chronic HBV infection persists because the global coverage with the birth dose is still low, estimated globally at 39% in 2015 (6).

The government of Uganda introduced Hepatitis B vaccination through pentavalent vaccine as part of the National Expanded program on immunization in 2002. The infant three dose Hepatitis B vaccination coverage has been over 90% since 2013. However, the 3-dose series typically begins at 6 weeks of age and provides little protection against HBV MTCT. Vaccination outside of the critical 24-hour period after birth may not protect exposed infants against infection (7).

Timely HBV birth dose vaccination is one of the key interventions identified by the WHO in its Global Health Sector Strategy on Viral Hepatitis, with the target coverage rate of 90% by 2030. The goal is to eliminate viral hepatitis by the year 2030. The WHO recommends that all infants should receive their first dose of vaccine as soon as possible after birth, preferably within 24 hours. The birth dose should be followed by 2 or 3 doses to complete the primary series (6). The execution of this plan mainly relies on political commitments of the individual countries to prioritize administration of the HBV birth dose.

Critique of policy options

Major progress in the global response to viral hepatitis has been achieved through the expansion of routine hepatitis B vaccination, which was facilitated by the introduction of the birth dose (8).

However, according to Uganda's immunization policy (2012), vaccination against Hepatitis B is given as part of the pentavalent vaccine, at 6, 10 and 14 weeks. The birth dose has not been included.

In the absence of the universal birth dose, the transmission of HBV infection from mother to child remains a major source of chronic liver disease when infected children become adults. The failure to administer HBV vaccine within 24 hours of life leaves exposed infants vulnerable to acquiring infection from their mothers. A recent systematic review suggests that 1% of new-borns in sub-Saharan Africa are infected each year through MTCT of HBV (9).

Since immunization services in Uganda are mainly funded by the government with additional support from donors and health development partners, the introduction of HBV vaccine birth dose faces competing priorities. However, with continued advocacy and political will, HBV vaccine birth dose can be prioritized.

Recommendations

Ministry of Health needs to support activities that will further reduce hepatitis B transmission in Uganda. Offering a birth dose of HBV vaccine through the routine immunisation is the best strategy to reduce MTCT of Hepatitis B.

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TRAINING DISTRICT HEALTH TEAMS ON DEVELOPING AND INTERPRETING MALARIA NORMAL CHANNELS TO DETECT MALARIA OUTBREAKS IN JINJA REGION, EASTERN UGANDA

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Background

Malaria remains a major Public Health problem causing 30-50% of outpatient visits, 15-20% of admissions, and up to 20% of all facility deaths in Uganda. It is the most frequently reported disease at both Public and private health facilities. In 2019, there was a malaria upsurge in the majority of districts in Uganda which was detected late due to failure to analyze surveillance data both at the district and national level. We set out to train the district health team,

health facility in-charges, and their respective records focal persons on surveillance and developing and interpreting malaria normal channels in the districts of Kamuli, Buyende, Kaliro, Luuka and Bugweri to build capacity to detect malaria outbreaks in Uganda.

Methods

We used a case study entitled, "Uganda PHFP 2019: Analysis of surveillance data (2014-2019)", developed by Uganda Public Health Fellowship Program in 2019 to train the district teams on surveillance and how to develop and interpret a malaria normal channel. The case study training objectives include; to discuss the importance of routinely analyzing disease surveillance data, conduct a descript analysis of surveillance data, interpret the findings of descriptive analysis of surveillance data, describe the importance of malaria normal channels in detecting malaria outbreaks, draw a malaria normal channel and interpret a malaria normal channel.

The training was a practical session with hands-on sessions on computers/laptops. The practical sessions involved among other things drawing of the malaria normal channels based on real malaria data for Mbale District and national data obtained from the DHIS2 and embedded in the case study. The step by step instructions provided in the participants' guide was followed to construct the malaria normal channel.

Dr. Allan Katamba, DHO of Kaliro District addressing the training team and participants

Dr Immaculate Akusekera, a PHFP fellow, facilitating a training at Kamuli Government Hospital

Achievements

The team trained a total of 49 DHT members from five districts of Kamuli (10), Kaliro (10), Buyende (9), Luuka (10), and Bugweri (10). At the end of the training, all the participants of the five districts trained were able to plot and interpret a normal malaria channel graph.

Of the 49 DHT trained, 04 were District Health Officers, 05 were Assistant District Health Officers-Maternal and Child Health, 03 were Assistant District Health officers-Environmental Health, 05 were Bio-

statisticians, 05 were District Surveillance Focal Persons, 04 were Malaria focal persons, 05 were Health Facility Records focal persons, 07 were Health facility In-Charges, 05 were District HMIS Focal persons, 02 were District laboratory focal persons, 02 were District health inspectors, one was a District drug inspector and one was a District Vector control officer.

Observations

Buyende District noted that it was hectic to use manila paper to plot normal and urged ministry to provide customized charts. All the participants from the five districts had had about the malaria normal channel, however, only one district of Buyende had drawn a malaria normal channel for the previous year 2019 and it was last updated in March 2019. None of the five districts had a malaria normal channel drawn for the year 2020. One of the district biostatisticians had never had a training on developing malaria normal channels during his 10 years of service as a Biostatistician. One of the malaria focal persons reported that it was hectic to use manila paper to plot normal and urged ministry to provide customized charts while another was enthusiastic to draw a malaria normal channel in relation to ACT consumption in the district.

Conclusion

We recommend Ministry of Health to provide customized charts to districts for plotting malaria normal channels. We also recommend scaling up the similar training to other districts that have not been trained to improve detection of outbreaks of malaria in the country.