



Level and determinants of adherence to and satisfaction with use of face masks as one of the COVID-19 preventive measures in the first stage of the outbreak, Uganda

Authors: Bob O. Amodan¹, Lilian Bulage¹, Elizabeth Katana¹, Alex Riolexus Ario^{1,2}

Affiliations;

¹Uganda Public Health Fellowship Program, Kampala, Uganda

²Uganda National Institute of Public Health, Kampala, Uganda

Summary

Before confirmation of the first case of COVID-19 in Uganda, the President banned all public gatherings, and encouraged the public to use masks, observe physical distancing, and strict hygienic rules. We assessed the level of adherence and determinants of adherence to and satisfaction with masks use. We abstracted data from the International Citizen Project (ICP) survey that assessed adherence to preventive measures and their impact on the COVID-19 outbreak conducted between 16th and 30th April 2020. Of the 1,726 respondents (mean age: 36 years) 59% were males. Only 566/1,726 (33%) adhered to face masks use. Determinants of adherence to face masks use included: Worrying about own health (Adj.PR: 1.1, 95%CI: 1.02-1.1) and being satisfied with face masks use as an appropriate COVID-19 preventive measure (Adj.PR: 1.4, 95%CI: 1.3-1.5). Staying with siblings (Adj.PR: 0.94, 95%CI: 0.91-0.97), and Living in cities/towns other than Kampala (Adj.PR: 0.94, 95%CI: 0.91-0.97) reduced the likelihood of adherence to mask use (AOR: 0.75, 95%CI: 0.61-0.93). Only 520/1,726 (30%) were very satisfied with masks use. Being female (AOR: 1.2, 95%CI: 1.1-1.5) increased satisfaction likelihood, while experiencing violence or discrimination at home (AOR: 0.47, 95%CI: 0.23-0.99) was associated with lower mask use satisfaction.

Relatively low proportions of respondents adhered to or were very satisfied with face masks use. Behavior change programs targeting men, those who experienced violence or discrimination, families with siblings, and people living outside Kampala City Centre need to be intensified to improve the level of adherence to and satisfaction with use of masks.



Introduction

The Coronavirus Disease 2019 (COVID-19) caused by the Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) was declared a pandemic by the World Health Organization (WHO) on March 11 2020 [1]. Countries were urged to institute preventive strategies including personal protective, environmental and social distancing interventions to minimize viral transmission [2].

The Ugandan government progressively implemented several stringent public health measures to prevent and contain local COVID-19 epidemic. On March 18th 2020, the government banned all public gatherings, closed the airport and points of entry, closed schools and all learning institutions and encouraged the public to use masks, observe physical distance, not to cough, sneeze without covering 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) [3].

Uganda's first case of COVID-19 was reported on 21th March, 2020, and on 25th March, 2020, a partial lockdown was instituted following a ban on public transport.

A 14-day total lockdown was instituted on March 30th 2020 with a nationwide curfew from 7pm to 6.30am; the use of private cars was equally banned, except for essential services. The total lockdown was later extended until on June 2nd 2020 when a phased easing of the restrictions commenced. At the start of the phased lifting, there were fewer than 300 confirmed COVID-19 cases in Uganda, very low community transmission and no deaths had been recorded due to COVID-19 [4]. Due the economic hardships and collateral impact of the total lockdown, there was strong public pressure on the government to lift some of the lockdown restrictions [5]. However, the level of adherence to key recommended preventive measures for COVID-19 including public use of face masks had not been evaluated.

Understanding the level of adherence to and satisfaction with face mask use was essential for the containment of the COVID-19 epidemic in the long-term. There was need to determine if the public adherence to face mask use was good or bad, and subsequently devise ways to ensure it is maintained or improved as its level of adherence influences the effectiveness of containing the spread of COVID-19. Face mask usage by the public has remained controversial and hotly



contested in most countries including Uganda with researchers questioning its potential for protection on both the public and individual levels [6]. Early in the epidemic some experts advised against community wide use of face masks citing their risk for self-contamination and depletion of stocks for the health workers and symptomatic cases who may have needed them most [7]. We assessed the level and determinants of adherence as well as the population's satisfaction with respect to the use of face masks as one of the key recommended COVID-19 preventive measures.

Methods

Study design and population

We abstracted data from an online cross-sectional national survey conducted as part of the International Citizen Project (ICP) to assess adherence to preventive measures and their impact on the COVID-19 outbreak. The ICP consortium created a generic questionnaire to investigate the impact of COVID-19 and associated restrictions on populations living in low and middle-income countries. The questionnaire was modified based on the local situation in Uganda. 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 and satisfaction with personal and community preventive measures; and acceptability of these measures. The questionnaire was hosted securely on the study website (<https://www.icpcovid.com>), and the web-link widely shared during the lockdown period via emails and social media platforms from April 16th to 30th, 2020. 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.

Study variables, data abstraction, and data analysis

We abstracted data on socio-demographics (including, age, marital status, sex, education, religion, residence, among others), daily personal health, and professional factors were abstracted as independent determinants of adherence to and level of satisfaction with mask use.



We extracted and cleaned the data using Microsoft Excel 2019, and used STATA 14/SE for analysis. We generated a composite variable on wealth index quintiles using household-item possession variables such as; possession of car, television set, radio, bicycle, mobile phone and motorcycle.

We generated descriptive statistics using means with standard deviation (SD) for continuous variables (Age), and percentages (%) for categorical variables (sex, education level, religion, marital status, residence, occupation, wealth quintiles and underlying disease conditions).

Specifically, to determine the level of adherence to and satisfaction with use of face masks as one of the preventive measures against COVID-19, we generated frequency tables and calculated the percentages.

To find the determinants of adherence to use of face masks as one of the preventive measures against COVID-19, we used modified Poisson regression because prevalence of adherence to mask use was more than 10%. In addition, we used ordinal logistic regression to find the determinants of satisfaction with use of face masks as a preventive measure against COVID-19.

We considered p-value of <0.05 to determine the level of significance and a stepwise approach to ascertain the best fitting model.

Results

Characteristics of study participants

A total of 1,726 persons participated in the study; mean age of 36 years (range = 12 to 72). Less than half (41%) of respondents in the category 29-39 years participated in the survey. Majority of the respondents [59%, (1,015/1,726)] were males. Only [47/1,726 (3%)] respondents were non-Ugandans. Half (50%) of the respondents had attained tertiary education. Kampala suburb had the highest number [40%, (688/1,726)] of respondents. Seventeen percent of the respondents had known underlying conditions.



Level of adherence to use of face masks as one of the COVID-19 preventive measures in first stage of the outbreak, Uganda

Of 1,726 respondents, only 566 (33%) adhered to face mask use. Face mask use was similar by sex [52% for males versus 48% for females). Thirty nine percent (219/566) of those who used face masks were in the age group of 29-39 years. Of the 566 who adhered to face mask use, 80 (86%) did not live alone. Adherence to mask use among those who lived as a couple was 30% (14/566). Level of adherence to face mask use decreased with low level of education i.e. those who had no education or studied up to primary level (3/566, 0.53%) versus those with tertiary level education (281/566, 50%) adhered to face mask use. Face mask use was highest [45% (253/566)] among Kampala suburbs. Nineteen percent (107/566) of those with underlying conditions adhered to mask use (Table 1).

Table 1: Level of adherence to use of face masks as one of the COVID-19 preventive measures in first stage of the outbreak, Uganda

Characteristic	Wore face masks (n=566)
Age groups	
<18 years, n (%)	5 (0.88)
18-28 years, n (%)	158 (28)
29-39 years, n (%)	219 (39)
40-49 years, n (%)	110 (19)
50+ years, n (%)	74 (13)
Sex	
Female, n (%)	270 (48)
Male, n (%)	296 (52)
Nationality (n=566)	
Ugandan, n (%)	542 (96)
Foreigner, n (%)	24 (4)
Religion	
Muslim, n (%)	35 (6)
Catholic, n (%)	172 (30)
Protestant, n (%)	211 (37)
Pentecostal, n (%)	99 (17)
Seventh Day Adventist & others, n (%)	39 (7)
Non-religious, n (%)	10 (2)
Education level	



Characteristic	Wore face masks (n=566)
University Postgraduate Degree (Masters & PhD), n (%)	260 (46)
Tertiary (Certificate, diploma and degree), n (%)	281 (50)
Secondary, n (%)	22 (3.4)
Primary and No education, n (%)	3 (0.53)
Marital status	
Living as a couple, n (%)	305 (54)
Not living as couple, n (%)	261 (46)
Place of residence	
Rural area/village, n (%)	66 (12)
Kampala suburb, n (%)	253 (45)
Kampala city center, n (%)	83 (15)
Other town/city suburb, n (%)	82 (11)
Other town/city center, n (%)	82 (12)
Occupation	
Jobless, n (%)	36 (6)
Self-employed, n (%)	100 (18)
Student, n (%)	76 (13)
Work for a person, institution or company, n (%)	229 (40)
Work for the government, n (%)	125 (22)
Being Health worker	
No, n (%)	343 (61)
Yes, n (%)	223 (39)
Living alone	
No, n (%)	486 (86)
Yes, n (%)	80 (14)
Wealth Index quintiles	
Lowest, n (%)	103 (18)
Second, n (%)	98 (17)
Middle, n (%)	111 (20)
Fourth, n (%)	122 (22)
Highest, n (%)	132 (23)
Underlying disease	
Known underlying disease, n (%)	107 (19)
No known underlying diseases, n (%)	459 (81)



Determinants of adherence to use of face masks as one of the COVID-19 preventive measures in first stage of the outbreak, Uganda

In multivariable analysis, respondents who worried about their own health (Adj. PR: 1.1, 95% CI: 1.02-1.1), and those with high satisfaction in use of face masks (Adj. PR: 1.4, 95% CI: 1.3-1.5) were more likely to adhere to use of face masks as one of the preventive measures against COVID-19.

Staying with siblings (Adj. PR: 0.94, 95% CI: 0.91-0.97), and Living in cities/towns other than Kampala (Adj. PR: 0.94, 95% CI: 0.91-0.97) reduced the odds for adherence to mask use (AOR: 0.75, 95% CI: 0.61-0.93).

Sex, age, wealth index, marital status, getting COVID-19 information from leaders or health workers, being a health worker, living with siblings at home and possession of a TV set were not associated with use of face masks.

Level of satisfaction with use of face masks as one of the COVID-19 preventive health measures in first stage of the outbreak, Uganda

Of the 1,726 respondents, 520 (30%) were very satisfied with use of face masks as one of the appropriate COVID-19 preventive measures. Majority (51%) of those who were very satisfied with mask use were males. Fifty-two percent of those who were very satisfied with mask use were living as couples (Table 2).

Table 2: Level of satisfaction with use of face masks as one of the COVID-19 preventive measures

Variables (n=520)	Level of satisfaction on mask use				
	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
Sex					
Male, n (%)	147 (61)	149 (69)	260 (62)	192 (58)	267 (51)
Female, n (%)	93 (39)	68 (31)	160 (38)	137 (42)	253 (49)
Age Group					
<18 years, n (%)	3 (1.3)	2 (0.92)	2 (0.48)	1 (0.3)	5 (0.96)
18-28 years, n (%)	74 (31)	46 (21)	91 (22)	89 (27)	145 (28)
29-39 years, n (%)	107 (45)	84 (39)	182 (43)	125 (38)	208 (40)
40-49 years, n (%)	34 (14)	57 (26)	95 (23)	64 (19)	97 (19)



UGANDA NATIONAL INSTITUTE OF PUBLIC HEALTH

Quarterly Epidemiological Bulletin: January–March, 2021

Volume 6 / Issue 1/Article No. 4



Variables (n=520)	Level of satisfaction on mask use				
	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied
50+ years, n (%)	22 (9.2)	28 (13)	50 (12)	50 (15)	65 (13)
Residence					
Rural/ village, n (%)	31 (13)	25 (12)	29 (6.9)	36 (11)	68 (13)
Other city/town suburbs, n (%)	34 (14)	44 (20)	103 (25)	67 (20)	86 (17)
Other cities/towns centre, n (%)	58 (24)	43 (20)	74 (18)	68 (21)	86 (17)
Kampala suburbs, n (%)	87 (36)	85 (39)	168 (40)	135 (41)	213 (41)
Kampala city centre, n (%)	30 (13)	20 (9.2)	46 (11)	23 (7)	67 (13)
Education level					
University Postgraduate Degree (Masters & PhD), n (%)	99 (41)	99 (46)	216 (51)	166 (50)	217 (42)
Tertiary (Certificate, diploma and degree), n (%)	131 (55)	109 (50)	194 (46)	157 (48)	272 (52)
Secondary, n (%)	9 (3.8)	8 (3.7)	10 (2.4)	5 (1.5)	31 (6.0)
Primary and No education, n (%)	1 (0.42)	1 (0.46)	0 (0.0)	1 (0.3)	0 (0.0)
Occupation					
Jobless, n (%)	19 (7.9)	13 (6.0)	31 (7.4)	24 (7.3)	37 (7.1)
Self-employed, n (%)	41 (17)	35 (16)	66 (16)	51 (16)	91 (18)
Student, n (%)	32 (13)	20 (9.2)	43 (10)	40 (12)	74 (14)
Work for a person, institution or	105 (44)	106 (49)	181 (43)	142 (43)	197 (38)
Work for the government, n (%)	43 (18)	43 (18)	99 (24)	72 (22)	121 (23)
Wealth Index Quintile					
Lowest, n (%)	72 (30)	53 (24)	70 (17)	59 (18)	96 (18)
Second, n (%)	54 (23)	43 (20)	79 (19)	67 (20)	108 (21)
Middle, n (%)	43 (18)	43 (20)	86 (20)	62 (19)	109 (21)
Fourth, n (%)	37 (15)	43 (20)	101 (24)	73 (22)	107 (21)
Highest, n (%)	34 (14)	35 (16)	84 (20)	68 (21)	100 (19)
Marital status violence					
Not living as a couple, n (%)	103 (43)	78 (36)	151 (36)	143 (43)	250 (48)
Living as a couple, n (%)	137 (57)	139 (64)	269 (64)	186 (57)	270 (52)
Underlying disease					
Known underlying disease, n (%)	198 (83)	189 (87)	350 (83)	270 (82)	412 (79)
No known underlying diseases, n (%)	42 (18)	28 (13)	70 (17)	59 (18)	108 (21)
Live with spouse/ partner					
No	119 (50)	106 (49)	193 (46)	180 (55)	287 (55)
Yes	121 (50)	111 (51)	227 (54)	149 (45)	233 (45)



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

In multivariable analysis, females (AOR: 1.2, 95% CI: 1.1-1.5), and those in highest wealth index quintile (AOR: 1.7, 95% CI: 1.2-2.4) were very satisfied with mask use. Respondents who reported violence or discrimination at home during the lockdown period (AOR: 0.47, 95% CI: 0.23-0.99), and those moderately not worried about loved ones' health (AOR: 0.75, 95% CI: 0.57-0.99) were less likely to be very satisfied with mask use. Age, marital status, living with parents or spouse, possession of a TV set, working condition, worry about one's health or self, working condition and ever suffering violence were not associated with satisfaction to use a mask.

Discussion

This study assessed adherence to and satisfaction with face mask use as an appropriate COVID-19 prevention measure in the early phase of the outbreak in Uganda. Only 33% reported wearing a face mask when going out. Additionally, level of satisfaction with use of face masks has been reported low (30%). It has been estimated that proper face masks use with a coverage of 80% would halt the transmission of the virus [8]. However, like other countries in Africa, mask use is not commonly done, and was only introduced in response to the COVID-19 pandemic [9].

Low usage of face masks could also be a result of the initial inconsistency in information about the value of face mask use by the general population to prevent COVID-19 transmission [9]. Additionally, there was information that the threat of COVID-19 posed to Africa and Uganda will be mild given the tropical environment and the largely young population structure [10]. Furthermore, many Africans do not wear face mask because it is uncomfortable, or because they don't even think that it is necessary [11]. More sensitization regarding the importance of face mask use in containing the COVID-19 pandemic is clearly needed as well as subsidies and free face masks for those who may not be able to afford them.

Worry about one's health was associated with adherence to face mask use. This concurs with findings from a Canadian study, which described how concerns about health status may be associated with adherence to disease preventive measures [12]. Risk perception is an important determinant of adoption of health promotion and preventive measures. However, in Uganda



health promotion to prevent COVID-19 transmission has been a major challenge due to widespread misinformation and disinformation, which downplayed the risk of COVID-19 [13].

Living in cities or towns other than Kampala city centre was associated with reducing adherence to face mask use. This is probably explained by the fact that the first cases of COVID-19 were reported in Kampala, and that congestion was perceived to be low in other cities/ towns.

Respondents who reported living in a household with other siblings were less likely to adhere to face mask use. This could be because some of the siblings were young people, thus have a low risk perception to COVID-19 [13].

Satisfaction with use of face masks was associated with its adherence. This is not surprising, but also highlights the need to ensure that trust and satisfaction is maintained to sustain the adherence to government interventions [14]. This, coupled with perception of the effectiveness of COVID-19 preventive measures should be integrated within the COVID-19 risk communication and community engagement especially for the men who reported lower satisfaction and adherence levels compared to the women [14, 15]. Men generally have more challenges, poorer health seeking behaviors, and less contact with the healthcare system [16]. Of note, respondents who experienced violence reported lower satisfaction, perhaps because the violence could have been related to enforcement of the preventive measures [17]. Punitive measures in ensuring adherence to face mask use is an emerging area of concern that has not been fully explored and requires more research.

Limitations

The study was conducted online, and this required access to smart phones and internet connectivity for participation in the survey. The study could have therefore enrolled only educated people with a certain social standing and thus the findings could have overestimated the level of adherence and satisfaction.

Conclusion

Relatively low proportions of respondents adhered to use of face masks. The proportion of respondents who were very satisfied with use of face masks was also low. Behavior change



programs need to be intensified to improve the level of adherence and satisfaction with use of masks. Special messages and efforts should target men, large families, and people living outside Kampala city Centre.

References

1. WHO, *Technical guidance, in Naming the coronavirus disease (COVID-19) and the virus that causes it*. 2020.
2. WHO, *Responding to community spread of COVID-19: Interim guidance, 7 March 2020* 2020.
3. GoU, *President Museveni COVID-19 Guidelines to the Nation on Corona Virus*, S. House, Editor. 2020: Entebbe.
4. GardaWorld. *Uganda: Lockdown measures to be eased from June 2 /update 7*. 2020 18th July 2020]; Available from: www.garda.com/crisis24/news-alerts/343631/uganda-lockdown-measures-to-be-eased-from-june-2-update-7.
5. Daily Monitor, *Scientists speak out on easing lockdown*, in *Daily Monitor*. 2020.
6. Lyu, W. and G.L. Wehby, *Community Use Of Face Masks And COVID-19: Evidence From A Natural Experiment Of State Mandates In The US*. *Health Aff (Millwood)*, 2020. **39**(8): p. 1419-1425.
7. Schünemann, H.J., et al., *Use of facemasks during the COVID-19 pandemic*. *Lancet Respir Med*, 2020. **8**(10): p. 954-955.
8. Ngonghala, C.N., et al., *Mathematical assessment of the impact of non-pharmaceutical interventions on curtailing the 2019 novel Coronavirus*. *Math Biosci*, 2020. **325**: p. 108364.
9. BRUCE, R., *COVID-19 face masks*, in *The Independent*. 2020.
10. Diop, B.Z., et al., *The relatively young and rural population may limit the spread and severity of COVID-19 in Africa: a modelling study*. *BMJ Global Health*, 2020. **5**(5): p. e002699.
11. Ahmed, M.A., et al., *COVID-19 in Somalia: Adherence to Preventive Measures and Evolution of the Disease Burden*. *Pathogens*, 2020. **9**(9): p. 735.
12. Canadian Mental Health Association. *COVID-19 and Anxiety*. 2020 29th June 2020]; Available from: <https://www.heretohelp.bc.ca/infosheet/covid-19-and-anxiety>.
13. Kasozi, K.I., et al., *Misconceptions on COVID-19 Risk Among Ugandan Men: Results From a Rapid Exploratory Survey, April 2020*. *Frontiers in Public Health*, 2020. **8**(416).
14. Duplaga, M., *Perception of the Effectiveness of Health-related Campaigns among the Adult Population: An Analysis of Determinants*. *International journal of environmental research and public health*, 2019. **16**(5): p. 791.
15. Skinner, C.S., J. Tiro, and V.L. Champion, *The Health Belief Model*, in *Health behavior: Theory, research, and practice, 5th ed.* 2015, Jossey-Bass: San Francisco, CA, US. p. 75-94.
16. Usman, I.M., et al., *Community Drivers Affecting Adherence to WHO Guidelines Against COVID-19 Amongst Rural Ugandan Market Vendors*. *Frontiers in Public Health*, 2020. **8**(340).
17. van Gelder, N., et al., *COVID-19: Reducing the risk of infection might increase the risk of intimate partner violence*. *EclinicalMedicine*, 2020. **21**: p. 100348-100348.