

# Perceived risk of COVID-19 infection and associated protective behaviours during the early phase of the pandemic in Uganda: A cross-sectional online survey

Josephine Namayanja<sup>1,2,4</sup>, Elizabeth Katana<sup>1</sup>, Immaculate Akusekera<sup>1</sup>, Patricia Thiwe Okumu<sup>1</sup>, Steven Ndugwa Kabwama<sup>1</sup>, Alex Riolerus Ario<sup>1,3</sup>

<sup>1</sup>Uganda National Institute of Public Health, Kampala, Uganda, <sup>2</sup>Ministry of Agriculture, Animal Industry and Fisheries, Kampala, Uganda, <sup>3</sup>Ministry of Health, Kampala, Uganda

## ABSTRACT

**Introduction:** Since the first confirmed SARS-CoV-2 infection in Uganda on March 21, 2020, government efforts emphasized individual protective behaviours. However, the extent to which perceived risk of infection influenced adoption of such behaviours remains unclear. We assessed individual risk perception of COVID-19 infection and protective behavioural responses early in the outbreak to inform interventions to reduce COVID-19 spread. **Methods:** We conducted a cross-sectional online survey from April 27 to May 2, 2020, distributed via social media. Respondents reported on their perceived risk of contracting COVID-19 and preventive behaviours adopted since March 21. We used descriptive statistics, bivariate and multivariate analyses through modified Poisson regression to identify factors associated with perceived risk. **Results:** Amongst 430 respondents, mean age=37 years (SD = 9.6years), 217 (51%) were males, 344 (80%) were university-educated, and 199 (46%) had >5 household members. Nearly all (97%) self-reported washing their hands regularly, and 412 (96%) believed that regular handwashing prevented COVID-19 spread; 244 (57%) reported that regular handwashing was easy for them. Although 352 (82%) believed face masks prevented spread of COVID-19, only 106(25%) reported wearing them in public; 371 (86%) said they could not easily access masks. Additionally, 400 (93%)believed that using alcohol-based hand sanitizers would prevent COVID-19 spread but only 324 (75%) said they used them. Three hundred and forty-eight (81%) reported being worried about contracting COVID-19. Being worried about contracting COVID-19 was more frequent among participants who washed their hands with soap and water regularly (adjusted prevalence ratio: 4.22, 95%CI: 1.34–13.7). **Conclusion:** Perceived risk of COVID-19 infection was high and positively associated with regular handwashing behaviour. While nearly all respondents reported regular handwashing, only half found it easy, suggesting that access may have been a challenge for some. Similarly, despite high awareness, mask use was low due to limited access. Efforts should focus on improving mask availability and ensuring that existing handwashing infrastructure remains accessible and sustainable.

**KEYWORDS:** COVID-19, Perceived risk, Protective behaviour, cross-sectional study, Uganda

## \*CORRESPONDING AUTHOR

Josephine Namayanja, Uganda National Institute of Public Health, Kampala, Uganda, **Email:** [namayanjajosephine@gmail.com](mailto:namayanjajosephine@gmail.com), **ORCID:** <https://orcid.org/0000-0002-8848-8754>

## RECEIVED

13/03/25

## ACCEPTED

16/09/25

## PUBLISHED

17/09/25

## LINK

<https://afenet-journal.org/perceived-risk-of-covid-19-infection-and-associated-protective-behaviours-during-the-early-phase-of-the-pandemic-in-uganda-a-cross-sectional-online-survey/>

© Josephine Namayanja et al. Journal of Interventional Epidemiology and Public Health [Internet]. This is an Open Access article distributed under the terms of the Creative Commons Attribution International 4.0 License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## CITATION

Josephine Namayanja et al. Perceived risk of COVID-19 infection and associated protective behaviours during the early phase of the pandemic in Uganda: A cross-sectional online survey. J Interv Epidemiol Public Health. 2025 Sep; 8(3): 76.  
DOI: <https://doi.org/10.37432/jieph-d-25-00066>

## Introduction

---

Early in the COVID-19 pandemic, global evidence pointed to rapid human-to-human transmission of the novel coronavirus, with serious health outcomes including hospitalization and death, particularly among older adults and individuals with underlying conditions [1,2]. By March 2020, the World Health Organization (WHO) had declared COVID-19 a global pandemic, urging countries to implement non-pharmaceutical interventions to reduce transmission [1]. These recommendations were based on emerging data from affected countries, including China and Italy, showing that preventive behaviours could reduce community spread [1,3]. In response, the Government of Uganda adopted a series of urgent preventive measures. These were communicated through Presidential addresses and Ministry of Health guidelines starting in mid-March 2020. The measures included school closures, bans on public gatherings, transport restrictions, curfews, and mandatory quarantine for travelers [4,5]. Specific individual-level behaviours were emphasised, such as frequent handwashing with soap, use of alcohol-based hand sanitisers, wearing face masks in public, and keeping a 2-meter distance in public spaces [4,5].

Since the confirmation of the first case of COVID-19 on March 21, 2020, the Uganda Ministry of Health (MoH) instituted and encouraged various preventive measures to reduce the spread of the disease [4]. However, the public's risk perception of the disease and the extent of implementation or uptake of the recommended preventive measures were not clearly understood. While this study did not apply a specific behavioural theory, such as the Health Belief Model, it aimed to provide rapid insights into the relationship between perceived risk and self-reported protective behaviours during the early phase of the pandemic in Uganda to inform public health response.

At the time the survey was launched on April 27, 2020, Uganda had reported 79 confirmed COVID-19 cases and no deaths. By the survey end date (May 2, 2020), the total had risen slightly to 83 confirmed cases with no deaths [5].

## Methods

---

### Study design and setting

We conducted a cross-sectional survey from April 27 to May 2, 2020, targeting the general adult population ( $\geq 18$  years) residing in Uganda. We designed a self-administered online survey using Google Forms (Google LLC, Mountain View, CA, USA), a free web-based data collection tool.

### Study participants and data collection

We used a convenience sampling approach by distributing a survey link via social networking platforms, specifically: WhatsApp and Facebook. The link was seeded through personal contacts (friends, family, and colleagues), who were encouraged to share it within their networks. All respondents were required to confirm that they were 18 years or older before proceeding with the questionnaire through a yes/no prompt that automatically exited those who were under 18. The invitation message and the introduction to the online survey explained the purpose of the survey to the participants, requested participation, and explained confidentiality of the collected information and that no payment was to be made for participation.

Participants were considered eligible if they were adults ( $\geq 18$  years), resided in Uganda at the time of the survey, and provided informed consent by agreeing to participate after reading the online introduction. No formal stratification by region, sex, or age group was performed, and we did not apply quotas to ensure representativeness. The rapid nature of data collection during the emerging pandemic did not allow for pre-calculated sample size targets or formal response rate estimation. The survey leveraged social media's broad reach to recruit participants given the global nature of the COVID-19 pandemic, while foregoing traditional data collection methods that typically require lengthy processes such as survey design, funding acquisition and ethical approvals or reviews.

### Survey tool

We designed the survey questionnaire for rapid assessment of the risk perception for COVID-19 and protective behavioural response of the general public towards the pandemic. We developed the questionnaire based on documented literature about the risk perception of similar past outbreaks related to other infections. The questionnaire included information about socio-demographic

characteristics of the participants, their knowledge and concern about COVID-19, and their preventive behavioural responses against COVID-19, including frequency and ease of handwashing and use of sanitizers, access to and ease of using masks, and practices around and ease of social distancing. They were also asked whether or not they believed that practicing all these preventive behaviours would help prevent the spread of COVID-19.

### Data analysis

We extracted the data and used Stata/SE 14.0 (StataCorp LLC, College Station, TX, USA) for statistical analysis. We performed descriptive statistics for all the participants' characteristics. The dependent variable was perceived risk for COVID-19, which was determined and categorised into 'not worried' and 'worried'. We conducted bivariate and multivariate analyses between covariates and perceived risk of COVID-19 infection using modified Poisson regression analysis to identify associated factors. Variables with a p-value <0.2 in bivariate analysis were included in the multivariable model. We used modified Poisson regression to estimate adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs) for factors independently associated with being worried about contracting COVID-19.

### Ethics approval and consent to participate

This survey was conducted as part of the activities of the Ministry of Health in response to and control of COVID-19. The survey protocol was additionally reviewed and approved as non-research by the Centre for Global Health at the United States of America Centres for Disease Control and Prevention (US CDC). We obtained participants' informed consent before completing the survey. We informed all participants about the voluntary nature of their participation, anonymity, and confidentiality of information collected.

### Results

A total of 430 individuals participated in this survey, with a mean age of 37 (SD = 9.6; range, 20-67) years and 51% of respondents were male. The majority 80% had completed university education, and 33% were residents of Kampala District (Table 1).

Three hundred forty-eight (81%) said they were worried about contracting COVID-19. Nearly

everyone (97%) washed their hands regularly, 106 (25%) reported that they wore face masks in public, 324 (75%) said they used alcohol-based hand sanitizers, and 328 (76%) said they kept  $\leq 2$  meters from other people when in public. Nearly all participants (412/430; 96%) believed that regular hand washing prevented the spread of COVID-19, and 352 (82%) believed that wearing a face mask could prevent the spread of the disease. Four hundred (93%) believed that using alcohol-based sanitisers would prevent the spread of COVID-19, and 388 (90%) believed that if they kept at least 2 meters distance from other people, it would prevent the spread of the disease (Table 2).

Two hundred forty-four (57%) respondents said it was easy for them to practice regular handwashing. In contrast, 59 (14%) said they could easily access face masks, 75 (17%) found it easy to access sanitizers, and 44 (10%) said it was easy to keep at least 2 meters distance from other people (Table 3). In bivariate analysis, respondents who regularly washed their hands with soap and water were significantly more likely to report being worried about contracting COVID-19 (Crude PR: 4.20; 95% CI: 1.33–12.95). However, other protective behaviors—such as wearing a face mask (Crude PR: 1.15; 95% CI: 0.91–1.45), using hand sanitizer (Crude PR: 1.13; 95% CI: 0.88–1.46), or maintaining  $\geq 2$  meters distance in public (Crude PR: 1.20; 95% CI: 0.92–1.55) were not significantly associated with higher risk perception. These crude associations are presented in Table 4.

In multivariate analysis, the odds of being worried about contracting COVID-19 were 4.22 times higher among participants who washed their hands with soap and water regularly compared with those who did not (99% (APR: 4.22, 95%CI: 1.34–13.7). This could also imply reverse causality; those more worried about contracting COVID-19 were more likely to engage in preventive behaviour. (Table 4).

### Discussion

We found that the perceived risk of COVID-19 infection was high among participants in Uganda during the early phase of the COVID-19 pandemic. Knowledge about preventive measures was high, indicating that messaging was available to our study participants. These findings are consistent with studies from Kenya, Somalia and Rwanda, which

also reported high levels of risk awareness and belief in preventive measures during similar periods [6].

High risk perception is known to drive health-seeking and protective behaviours in outbreaks, as shown in prior research [2,7,8]. Despite high knowledge, access to preventive measures was poor; more than four in ten couldn't easily perform regular handwashing, and fewer than one in five said they could easily access face masks, maintain social distance, or access hand sanitizer. Even regular handwashing, despite being widely practised, was only reported as "easy" by just over half of participants. These gaps suggest structural and logistical challenges, not just knowledge deficits, hindered behaviour adoption. Importantly, although 82% believed in the effectiveness of face masks, only 25% wore them in public. This discrepancy may reflect accessibility issues, affordability, stigma, or discomfort—factors not fully explored in our survey. Including open-ended or qualitative follow-up questions in future studies could provide a richer understanding of such behavioural gaps.

Uganda's early COVID-19 response involved strict lockdowns and rapid messaging through national television, radio, and social media [4,5]. However, these efforts may not have been matched with adequate distribution of protective supplies, particularly in lower-income communities. Supporting local mask production, subsidizing preventive items, and distributing them through health facilities and community structures could help close the gap between knowledge and practice [4]. It is important to note that our findings could have been affected by social desirability bias. This might have resulted in situations where self-reported behaviours did not match other measures of the behaviours. In addition, the risk perception might appear high or low due to increased reporting of a socially desirable behaviour, when in fact, the behaviour may not have changed. Finally, due to the lockdown in place at the time the study was conducted, social media was one of few options for conducting the survey. However, capturing the data in a more representative fashion might have provided a more representative picture of the situation inside and outside of Kampala.

## **Conclusion**

---

The perception of individual COVID-19 risk was high and associated with regular self-reported handwashing with water and soap. However, a substantial proportion of respondents faced difficulties in accessing preventive supplies or practising protective behaviours. Few people easily accessed face masks and sanitizers, or easily practiced social distancing. We recommended that public health authorities improve coverage of public handwashing facilities and increase mask access. Practical strategies may include supporting local production of cloth masks, subsidizing essential supplies, and distributing protective equipment through community-based channels. Future risk communication should also address behavioural barriers and emphasize how and where to access these items. Increased access to alcohol-based hand sanitizers in public places, as well as increasing awareness about the implementation of individual protective behaviours was also critical. This study should be repeated in other settings/populations and with alternate response methods to enhance representativeness.

### **What is already known about the topic**

- It was widely understood that in the absence of a vaccine or specific treatment, public health measures and individual protective behaviours were the primary means of controlling the spread of COVID-19.
- The World Health Organization (WHO) and other health agencies had already issued guidelines emphasizing key behaviours like frequent handwashing, social distancing, and wearing face masks.
- A number of early-phase surveys had already been undertaken to assess the public's awareness, knowledge, attitudes, and practices (KAP) regarding COVID-19. They had indicated that the vast majority of people were aware of the COVID-19 pandemic and that many people had a good understanding of the disease and the recommended preventive measures.

### **What this study adds**

- Our findings provided valuable insights for public health officials in understanding the individual risk perception of infection and protective behavioural responses early in the

outbreak to inform interventions to reduce spread.

### Competing Interest

---

The authors of this work declare no competing interests.

### Funding

This project was supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the US Centers for Disease Control and Prevention Cooperative Agreement number GH001353-01 through Makerere University School of Public Health to the Uganda Public Health Fellowship Program, MoH. The contents of this manuscript are solely the responsibility of the authors and do not necessarily represent the official views of the organisations involved. The staff of the funding body provided technical guidance in the design of the study, ethical clearance and collection, analysis, and interpretation of data and in writing the manuscript, but did not have any contact with participants or access to data with identifiers.

### Acknowledgements

---

We thank the US-CDC for the support through the Uganda Public Health Fellowship Program. We also acknowledge the Uganda Public Health Fellowship Secretariat for all the technical support and guidance during the time when we conducted the study. We acknowledge the use of Google Forms (Google LLC) for survey administration and Stata/SE 14.0 (StataCorp LLC) for data analysis. Special thanks go to Ms. Lilian Bulage for the time taken while reviewing this work.

### Availability of data and materials

The datasets used and analysed during this study belong to the Uganda Public Health Program and are not publicly available. However, the datasets could be made available by the corresponding author upon reasonable request and with permission from the Uganda Public Health Fellowship Program.

### Authors' contributions

---

JN and EK were involved in the design, implementation of the study and data analysis. All authors participated in the writing and proofreading

of the manuscript. SNK and ARA supervised the study.

### Tables

---

**Table 1:** Socio-demographic characteristics of the participants during the online survey to assess risk perception of COVID-19 and protective behaviour, May 2020

**Table 2:** Protective behavioural responses towards COVID-19 and their perceived effectiveness among participants, May 2020

**Table 3:** Ease of engaging in protective behaviour by participants, May 2020

**Table 4:** Factors associated with perceived risk for COVID-19 among participants during the survey to assess risk perception of COVID-19 and protective behaviour, May 2020 (N=430)

### References

---

1. WHO. Advice for the public: Coronavirus disease (COVID-19) [Internet]. Geneva (Switzerland): WHO; 2023 Mar 18 [cited 2025 Sep 11]; [about 20 screens]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
2. Dryhurst S, Schneider CR, Kerr J, Freeman ALJ, Recchia G, Van Der Bles AM, Spiegelhalter D, Van Der Linden S. Risk perceptions of COVID-19 around the world. *Journal of Risk Research* [Internet]. 2020 May 5 [cited 2025 Sep 17];23(7-8):994-1006. Available from: <https://www.tandfonline.com/doi/full/10.1080/13669877.2020.1758193> <https://doi.org/10.1080/13669877.2020.1758193>
3. Ding Y, Du X, Li Q, Zhang M, Zhang Q, Tan X, Liu Q. Risk perception of coronavirus disease 2019 (COVID-19) and its related factors among college students in China during quarantine. Yi S, editor. *PLoS ONE* [Internet]. 2020 Aug 13 [cited 2025 Sep 17];15(8):e0237626. Available from: <https://dx.plos.org/10.1371/journal.pone.0237626> <https://doi.org/10.1371/journal.pone.0237626>
4. MoH Uganda. Guidelines on Preventive Measures Against Corona Virus [Internet]. Kampala (Uganda): MoH; 2020 [cited 2025

- Sep 17]; 6p. Available from: [https://mcc-covid.crc.pitt.edu/COVID19\\_official\\_websites/Uganda/moh\\_situation\\_updates/2020-04-08\\_06191586341147.pdf?utm](https://mcc-covid.crc.pitt.edu/COVID19_official_websites/Uganda/moh_situation_updates/2020-04-08_06191586341147.pdf?utm) Download PDF to view full text
5. Kitara DL, Ikoona EN. COVID-19 pandemic, Uganda's story. *Pan Afr Med J* [Internet]. 2020 May 27 [cited 2025 Sep 17];35(Suppl 2):51. Available from: <https://www.panafrican-med-journal.com/content/series/35/2/51/full> <https://doi.org/10.11604/pamj.supp.2020.35.2.23433>
  6. Ahmed MAM, Siewe Fodjo JN, Gele AA, Farah AA, Osman S, Guled IA, Ali AM, Colebunders R. Covid-19 in Somalia: adherence to preventive measures and evolution of the disease burden. *Pathogens* [Internet]. 2020 Sep 6 [cited 2025 Sep 17];9(9):735. Available from: <https://www.mdpi.com/2076-0817/9/9/735> <https://doi.org/10.3390/pathogens9090735>
  7. Cowling BJ, Ng DMW, Ip DKM, Liao Q, Lam WWT, Wu JT, Lau JTF, Griffiths SM, Fielding R. Community psychological and behavioral responses through the first wave of the 2009 influenza A(H1N1) pandemic in Hong Kong. *J Infect Dis* [Internet]. 2010 Sep 15 [cited 2025 Sep 17];202(6):867–76. Available from: <https://academic.oup.com/jid/article-lookup/doi/10.1086/655811> <https://doi.org/10.1086/655811>
  8. Aerts C, Revilla M, Duval L, Paaijmans K, Chandrabose J, Cox H, Sicuri E. Understanding the role of disease knowledge and risk perception in shaping preventive behavior for selected vector-borne diseases in Guyana. Lenhart A, editor. *PLoS Negl Trop Dis* [Internet]. 2020 Apr 6 [cited 2025 Sep 17];14(4):e0008149. Available from: <https://dx.plos.org/10.1371/journal.pntd.0008149> <https://doi.org/10.1371/journal.pntd.0008149>
  9. Baltar F, Brunet I. Social research 2.0: virtual snowball sampling method using Facebook. *Internet Research* [Internet]. 2012 Jan 27 [cited 2025 Sep 17];22(1):57–74. Available from: <http://www.emerald.com/intr/article/22/1/57-74/186772> <https://doi.org/10.1108/10662241211199960> Subscription or purchase required to view full text

**Table 1:** Socio-demographic characteristics of the participants during the online survey to assess risk perception of COVID-19 and protective behaviour, May 2020

<b>Characteristic</b>	<b>Frequency (n=430)</b>	<b>Percentage</b>
<b>Age (years)</b>		
20–29	130	30
30–39	148	34
40–49	82	19
50–59	40	9
≥60	30	7
<b>Sex</b>		
Male	217	51
Female	213	49
<b>Household size</b>		
≤5	231	54
>5	199	46
<b>Highest level of education</b>		
Primary	6	1
Secondary	30	7
Certificate/Diploma	50	12
University	344	80
<b>District of residence</b>		
Kampala	143	33
Wakiso	137	32
Mukono	26	6
Others	124	29

**Table 2:** Protective behavioural responses towards COVID-19 and their perceived effectiveness among participants, May 2020

Characteristic	Frequency (n=430)	Percentage
<b>Washes hands with soap and water regularly</b>		
Yes	415	97
No	15	3
<b>Wearing face mask when in public</b>		
Yes	106	25
No	324	75
<b>Use of alcohol-based hand sanitizer</b>		
Yes	324	75
No	106	25
<b>Keeping a 2m distance from other people</b>		
Yes	328	76
No	102	24
<b>Regular hand washing prevents spread of COVID-19</b>		
Yes	412	96
No	18	4
<b>Wearing face mask prevents spread of COVID-19</b>		
Yes	352	82
No	77	18
<b>Using alcohol-based hand sanitizer prevents spread of COVID-19</b>		
Yes	400	93
No	30	7
<b>Keeping a 2m distance from other people prevents spread of COVID-19</b>		
Yes	388	90
No	42	10

<b>Table 3: Ease of engaging in protective behavior by participants, May 2020</b>		
<b>Characteristic</b>	<b>Frequency (N=430)</b>	<b>Percentage</b>
<b>Ease of regular hand washing</b>		
Easy	244	57
Not easy	186	43
<b>Ease of accessing face mask</b>		
Easy	59	14
Not easy	371	86
<b>Ease of accessing alcohol-based hand sanitizer</b>		
Easy	75	17
Not easy	355	83
<b>Ease of keeping a 2m distance from other people</b>		
Easy	44	10
Not easy	386	90

**Table 4:** Factors associated with perceived risk for COVID-19 among participants during the survey to assess risk perception of COVID-19 and protective behaviour, May 2020 (N=430)

Variable	Not worried n (%)	Worried n (%)	Crude PR (95% CI)	Adjusted PR (95% CI)
<b>Washes hands regularly with soap and water</b>				
No	12 (15)	3 (1)	1.00	1.00
Yes	70 (85)	345 (99)	4.20 (1.33–12.95)	4.22 (1.34–13.7)
<b>Wears a face mask when out of home</b>				
No	71 (87)	253 (73)	1.00	—
Yes	11 (13)	95 (27)	1.15 (0.91–1.45)	—
<b>Uses alcohol-based hand sanitizer</b>				
No	28 (34)	78 (22)	1.00	—
Yes	54 (66)	279 (78)	1.13 (0.88–1.46)	—
<b>Keeps ≥2m distance from others</b>				
No	30 (37)	72 (21)	1.00	—
Yes	52 (63)	276 (79)	1.20 (0.92–1.55)	—