

# Knowledge, attitudes, practices, and the effects of COVID-19 on health seeking behaviors among young people in Kenya

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## Research article

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# Abstract

**Background:** The cases of Corona Virus Disease of 2019 (COVID-19) in Kenya have been increasing rapidly, since the first case was confirmed in early March, 2020. In the wake of the crisis around COVID-19, the health and socio-economic challenges experienced by Kenya's largest demography, the youth, are likely to be elevated. This study sought to establish knowledge levels, gaps and attitude of the youth with regards to COVID-19 and identify the effects of the pandemic on health seeking behaviour and socio-economic status of youth.

**Methods:** A cross sectional descriptive study was conducted among 2,153 youth across 47 counties in Kenya, through a combined online survey and phone interviews. All survey responses analyzed using STATA v15 were tabulated by gender, age, education level to generate basic descriptive tables and tested for differences by category using chi-square tests with a significance level of 0.05. Where applicable linear and logistic regression analysis model was conducted with covariates such as employment status, gender and education level were used.

**Results:** Knowledge on symptoms of COVID-19 was generally high. Female respondents were more likely to name more symptoms correctly compared to men;  $p < 0.001$ . However, youth reported very low levels of anyone being at risk of infection (7%). Since they started receiving messaging on COVID-19, most youth have adopted behavior necessary to slow down the infection. There were generally very low reported levels of inability to access health services related to sexual and reproductive health. About 50% of respondents reported significant decline in income during the pandemic period, while nearly a third reported living in fear while 27% reported feeling stressed.

**Conclusion:** Our study revealed considerably high knowledge of COVID-19 symptoms, preventive strategies and most commonly sources of information that are instructive for the pandemic response. Findings suggest messaging campaigns should focus on reaching clarifying risk groups. The need to track health service use among youth is essential to lay longer term strategies towards minimizing potential long-term consequences of the pandemic. Strategies to sustain behaviors positively adopted and leverage the vast network of youth as champions of behavior change will be critical to reduce the spread of COVID-19.

## Background

Coronaviruses are a family of respiratory viruses that cause common cold, Middle-East Respiratory Syndrome (MERS) and the Severe Acute Respiratory Syndrome (SARS) [1-5]. The coronavirus disease (COVID-19), was isolated and referenced as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)[6], which has since become a global pandemic [6-8]. Countries have since put up various measures to slow down the spread of COVID-19 pandemic that has impacted global economies[9]. In Africa, the virus has quickly spread to several countries causing hundreds of infections within a few weeks[10], and is

likely to overwhelm health systems and increase mortality from conditions such as malaria, HIV/AIDS, and tuberculosis [11, 12].

Kenya has not been spared by the ravage of this disease. Since the announcement of its first case of COVID-19 in early March[13], there has been a rise in the COVID-19 cases. The pandemic is likely to displace use of essential health services including sexual reproductive health services (SRH) especially among the young people who comprise the largest population in many parts of the developing world [14, 15]. For example, 66% of Kenya's population is under 25 years [16], and are at risk of SRH morbidity and mortality [17-20]. The pandemic is likely to cause strain on access to youth friendly health services and SRH information. Shortages of medications such as contraceptives, antiretroviral drugs for HIV/AIDS and antibiotics to treat Sexually transmitted infections (STIs), due to disruptions in supply chains is more likely to affect women and girls[21]. As governments provide solutions to fight the pandemics, its impact on SRH services needs to be considered from the outset to avoid disruption. To guide immediate pandemic response, we conducted a study to establish knowledge, practices, perceived risk, adoption of recommended behavior and the effect of COVID-19 on health seeking behavior for SRH services and other social economic effects of the pandemic among the youth.

## Methods

This was a cross sectional descriptive study conducted among 2,153 youth across 47 counties in Kenya. We used a combined online survey and phone interviews with respondents drawn from Amref Health Africa's Y-ACT, *Youth in Action* platform, other stakeholders' youth platforms, and youth-referrals via SMS messaging and social media. The study was conducted under the umbrella project Y-ACT, Youth in Action's national network of youth. Y-ACT is an initiative of Amref Health Africa established in 2017. Y-ACT represents the voice of the young people aged 18-35 years, advocating for policy changes on SRH and Gender Equality. Over the last three years, Y-ACT has created and mobilized an online advocacy movement of over 3,414 youth advocates (49% female, 46% male 5% gender non-conforming). All the 47 counties are represented in Y-ACT's network. Y-ACT has catalyzed key policies in Kenya including the adolescent, sexual and reproductive health policy in Nairobi, gender protection policy in Kilifi, adoption of meaningful youth engagement with national policy makers and prioritization of youth SRH priorities with the County First Ladies Network. Since the survey was not assessing issues of impact, we targeted all the 3,414 and any other eligible youth aged 18-35 years who consented to participate in the survey.

### Data collection activities

A set of 40 questions were adopted from previous COVID-19 related studies in Kenya [22]. A total of six Kenyan enumerators were trained remotely on the survey instrument using Zoom. The survey instrument was piloted with young people who were not part of the Y-ACT platform. The questionnaire was self-administered among the networks of youth in the Y-ACT. Before administering the questionnaires, the content of the study and the eligibility criteria was explained through online engagement with the platform and SMS, emails, and online discussions. Thereafter a link with the tool was sent out to all

participants in the platform and beyond using social media platforms. A written online consent to participate in the study was included on the survey link, for participants to give consent prior to responding to the questions. Once the online link was circulated to all the youth on the platform, a team of five research assistants (RA) followed up with phone-based interviews to urge the youth to complete the survey and interview those who were not able to complete the online tool on their own. All the RA were required to take an online research ethics course. The enumerators were also selected from a team that had extensive experience working with vulnerable populations.

The survey aimed to provide information on the level of knowledge on signs and symptoms of COVID-19, commonly used channels of information about COVID-19, adoption of preventive practices, and the effects of COVID-19 on health seeking behavior for SRH services and other social and economic effects of the pandemic among the youth. The tool also covered their perceived risk, fears or concerns regarding the outbreak. We received expedited ethical approval for the rapid survey due to the urgent nature of the pandemic and need for information to guide community engagement activities. The survey was approved by AMREF-ESRC P798/2020.

### **Data processing and analysis**

The survey was collected using online google survey and the data exported to STATA v15 for analysis. Participants were told they could terminate the study at any time. No financial or other incentives were given for taking part in the study, and participants were also told they would not lose any benefit by refusing to take part. The final survey was merged and cleaned in preparation for descriptive analysis. All survey responses were tabulated by gender, age, education level to generate basic descriptive tables and tested for differences by category using chi-square tests with a significance level of 0.05. Where applicable linear and logistic regression analysis model was conducted with covariates such as employment status, gender and education level were used.

## **Results**

### **Characteristics of study participants**

A total of 2,153 youth completed the online survey. The average age of participating youth was 26 years. Most of the respondents were aged between 25-29 years and 74% had completed higher education. 70% were single and nearly 50% were not employed.

### **Knowledge of COVID-19 symptoms and preventive measures**

Knowledge on symptoms of COVID-19 was generally high with most respondents being able to identify correctly an average five symptoms of COVID-19 out of the ten examined. Female respondents were more likely to name more symptoms correctly compared to men;  $p < 0.001$ . High fever (96%), difficulty in breathing (91%) and dry cough (84%) were the symptoms commonly mentioned with the least being loss of taste at 18%, loss of smell (15%) and diarrhea (12%). A linear regression analysis examining whether

gender, education level and employment status predicts ability to identify the symptoms correctly was conducted. There were positive associations between gender (Coeff: 0.35;  $p < 0.001$ , CI (0.19, 0.51), education (Coeff: 0.29;  $p = 0.03$ , CI (0.10, 0.49) and being in formal employment (Coeff: 0.34,  $p = 0.001$ , CI (0.14, 0.54) and the number of COVID-19 symptoms correctly identified. There was a negative association between those who were in self-employment (Coeff: -0.15,  $p = 0.172$ , CI (-0.37, 0.07).

In terms of preventive measures, the most common preventive measures mentioned were washing hands with soap and running (98.1%), use of hand sanitizers (95.6%), use of mask (93.1%), maintaining social distance of 1-2 meters away (88%), and staying home unless urgent (87.5%). On average the youth mentioned at least 11 measures correctly of the 15 examined with no significant differences by gender. There were no associations between gender, education, and employment status except self-employment: (Coeff: 0.021,  $p = 0.036$  CI (0.02 0.74).

### **Perception of Risk of COVID-19**

Among the young people, knowledge on who is at risk of infection of COVID-19 indicates variations. Despite nearly 64% and 60% correctly identifying that the elderly and those with weak immune are at risk of infection, the young people reported very low levels of anyone being at risk of infection (7%). When asked what the chances were of getting infected with Corona virus, about 29% perceived themselves being at low risk, 39% at medium risk, less than 3% reported no risk at all. Overall, 32% reported low or no risk at all with no differences between gender. Logistic regression analysis showed no associations between the level of perceived risk -no or low risk with gender, education, and employment status. Among those who reported no or low risk, reasons for their response were: they had not travelled 43% or that God protects them 24%.

When asked how concerned they were if they or members of their household became infected with Corona virus, figure 1 shows that over 90% of the youth responded that they were very concerned if they or any member of their household were infected with the virus.

### **Sources of information about COVID-19**

Young people were asked how often they used various sources of information to stay informed about the COVID-19 virus. The response was in a scale of 1-4 with 1 being none, 2-rarely, 3-sometimes and 4-all the times. Table 4 shows the proportion that mentioned using each of the channels all the time as sources of information about COVID-19. The most mentioned sources used all the times were social media (67%) followed by television programs (62%) and friends and internet at 49% percent each. The least were community health workers (8%), church (5%), pharmacy and community meetings at 5% and 3% respectively.

### **Adoption of preventive behaviors**

To assess adoption of preventive behaviors, young people were asked what they're doing differently since they started receiving messages about COVID-19. Figure 2 shows that most young people were adopting behavior necessary to slow down the infection. For example, nearly all 99% avoided unnecessary travel, 98% wash hands more frequently and 97% avoid crowded places. Among those that reported that they do not always wash hands with soap and water more frequently n=397, the main barriers were no water in house 13.1%, cannot afford extra water (21.4%), or there was no water in community 16.4% or in the house 16.1%. Apparently 192 of them reported no barrier at all representing 48%.

The other important preventive measure was use of masks, with 98% reported wearing masks while going out. When asked the type of mask they owned, 42% reported using surgical mask with more female reporting using such mask compared to men  $p=0.009$  while majority 67% use cloth masks. The key barriers to wearing of mask among those who mentioned they do not own any were ranged from ability to afford 51%, not knowing where to get one 36% and discomfort 29%. Only 7% reported that they do not think it works or they were not allowed to wear one (2%)

The third preventive measure was use of hand sanitizer if respondents cannot access water and soap which was reported among 80% of the youth. Among those who did not n=420, 87% reported that they do not use it because it is very expensive, 20% said they were not available in shops and less than 2% said they do not think it works.

### **COVID-19 effects on health care seeking behaviors and other social economic effects**

Young people were asked what health care services or medicines they were not able to access due to the current COVID-19 pandemic. There were generally very low reported levels of inability to access certain services linked to SRH. For example, only 4% of the female reported being unable to access E-pills and other contraceptives, 5% were not able to access sanitary towels while 8% were not able to access condoms. Additionally, only less than 5% were not able to access ARV while 8% were not able to access drugs to relieve anxiety or depression.

In terms of social effects, 41% reported seeing friends less or family less 39%. Nearly a third reported living in fear while 27% reported feeling stressed. Less than 3% reported experiencing a form of stigma. However, COVID-19 was reported to have affected the youth economically with half of them reporting significant reduction in income with more male reporting that compared to female  $p<0.001$ . About a third reported increased expense in their house or increased food prices and less than 23% reported loss of job. Those with no form of employment, 23% were more likely to report complete loss of job compared to those with any form of employment (15%),  $p<0.001$ .

## **Discussions**

Young people are a critical driver of economic and social change. Regardless of the nomenclature used, young people comprise the largest population in many parts of the developing world and comprise 27 % of the world's population [14, 15]. Despite being considered a healthy group, young people are at higher

risk of sexual and reproductive morbidity and mortality [17-20]. They are also more likely to experience difficulties in obtaining specific and timely SRH services and sexuality education, limiting their ability to realize SRH benefits. In Kenya, young people below the age of 25 constitute 66% of the total population [16] and exhibit poor reproductive health outcomes such as teenage pregnancies, unmet needs for contraceptive and early sexual debut [23]. To facilitate mechanisms of engaging young people in the COVID-19 response, we conducted a survey to provide information on the level of knowledge on symptoms, commonly used channels of information about COVID-19, adoption of preventive practices, and the effects of COVID-19 on health seeking behavior for SRH services and other social and economic effects of the pandemic.

The survey showed high levels of knowledge on COVID-19 symptoms and prevention practices. Close to 90% of youth can correctly identify at least three symptoms of COVID-19. Of the 15 infection prevention methods listed, females were able to correctly identify 71% of them and males identified 73%, with no significant differences in the methods mentioned. High levels of knowledge on symptoms and prevention strategies could be linked to two main reasons. First, the survey was conducted four weeks into the pandemic where the youth had been exposed to various messages on the Y-ACT and other online platforms. The second reason could be linked to use of social media platforms with 66% reporting always using the media to access COVID-19 related information. Although information sources such as social media and television were the most used sources of COVID-19 related information, response teams need to ensure that such platforms provide accurate information. Use of influencers and experts on these platforms would provide the accurate information on COVID-19 and help shape the behavior of young people. This would have spiral effects as nearly half also mentioned using friends a sources of information.

Another important area of focus for the response teams is messaging around perceived risks. Our survey shows that 31% of the youth (1 in every 3) perceive themselves as being at low or no risk of getting infected with COVID-19. These levels varied with a previous study conducted in the informal settlement of Nairobi where about a third of participants felt they were at high risk of infection[22]. The low risk was associated with having no history of travel and the believe that God will protect them. Although history of travel still potential risk factor, continued community transmission would require strengthening messaging to address myths and misconceptions on risk of infection and community transmission.

In terms of practice, majority of the youth have begun adopting positive behavior practices to avoid infection since they started receiving messages on COVID-19. For example, avoiding unnecessary travel (99%) and washing hands more frequently (98%) and use of masks (98%). The few who were not practicing such behaviors reported lack of water or soap, cost of masks and discomfort while wearing mask and costs of sanitizers as deterrent to practicing preventive behaviors. A previous survey conducted two weeks prior to this, showed that households are already performing risk reduction behaviors including increased hand washing with soap where possible, use of hand sanitizer, and staying home more[22]. Although these behaviors are practiced, additional focus should be how to sustain these

behaviors on hygiene and social distancing. The response team should focus on ensuring that during the earlier period of the pandemic and as it evolves, the teams should continue to ensure quality assurance of preventive equipment such as cloth masks (that are being used widely) and provide guidance on proper use and re-use of cloth masks, including cloth specifications to ensure effectiveness of the masks in infection prevention.

Finally, our study has illustrated the effect of COVID-19 on the health seeking patterns, social and economic effects. Four main emerging considerations are important. First, there were low proportions of respondents reported inability to access contraceptives during the pandemic period (4.1%) and condoms at (8.4%). This could be associated with perhaps government restrictions on mobility reflected in about 98% who reporting avoiding unnecessary travel, while 12% reporting being unable to access health care and about 29% who reported avoiding public transport. Access to Anti-retroviral treatment and HIV/AIDS counselling was relatively low at 2.3% and 4.7% respectively indicating that perhaps minimum disruption of HIV/AIDS related services over that period. However, there is need for continued effective response innovative platforms to ensure delivery of health services especially SRH services to the youth. Government guidelines and protocols on continuity of health services need to be disseminated to assure youth of their safety and continuity of services in health facilities. The need to track use of SRH services in different population segments are key to ensuring targeted strategies are deployed to support dissemination and messaging around continuity of services. This is more important especially among vulnerable populations such as young girls. This will enable deploying measures early to avoid long term consequences such as increased incidence of HIV infections and unwanted pregnancies.

The second consideration is associated with other social effects. The youth reported seeing friends and family less, but more importantly is about a third that reported living in fear and a quarter feeling more stressed. This, compounded with the fact that only 8% reported inability to access stress related medicines means that appropriate measures are needed to invest more in mental health programmes and psychosocial support during this time of the pandemic. Stakeholders need to explore the value of digital platforms to ensure that people stay connected with their families and friends. Reporting and tracking of emerging mental health issues and responses being offered to the youth is critical.

The third consideration that requires strategic intervention is the youth reporting loss of income, increased house expenses, cost of food and loss of jobs. Government and partners need to develop policies for resilience and recovery of small and medium sized enterprises, many of which are income channels for majority of the youth. Additionally, expanding digital job opportunities for the youth. Further, there is need for inclusion mechanisms within social protection programs, which align skills development to income generation for the youth.

Several limitations and opportunities are worth mentioning. First our study was among the first that examined the effect of COVID-19 among the young people. This provided us with an opportunity to assess the trajectory needed to advance interventions to support the national response. Although we do not have data disaggregated by urban or rural and the fact that most of the respondents included

responded online, a sizable percentage were interviewed on phone after indicating inability to complete the survey online. Secondly, our survey included all 47 counties which could include young people who would have been disenfranchised by online access.

Two, Our survey did not explore reasons barriers to use of SRH health services during this period of the pandemic and potential solutions. Further studies that reach a wider demography of youth in Kenya are needed as well as qualitative experience of barriers and opportunities to improve access to SRH services during this period. The utility of these findings has however been around providing evidence on guidance on appropriate information channels to reach the young people, information gaps the population segment. By using quantitative online survey, the study was able to rapidly generate data for the pandemic response. The study is however limited to youth in the platform whose interaction with the project may have improved their knowledge levels on various issues on SRH. However, three aspects of this study will enhance the external validity of the results for wider application. By examining having varied geographical and demographic profiles, results are limited to one region but rather a broader set of similar experiences with different challenges.

## Conclusion

Our study revealed considerably high knowledge of COVID-19 symptoms, preventive strategies and most commonly sources of information that are instructive for the pandemic response. Findings suggest messaging campaigns should focus on reaching risk groups. The need to track SRH service use among the youth is essential to lay longer term strategies towards minimizing potential long-term consequences of the pandemic. Strategies to sustain behaviors positively adopted among young people will be critical to reduce the spread of COVID-19. Lastly, we recommend tapping into the young people's network to be ambassadors of behavior change and support dissemination of COVID-19 related information as they are a huge population segment spread across the country. Armed with proper personal protective equipment (masks, gloves) and information, young people can support home based care and ensure health facilities, are not overwhelmed.

## Tables

Table 1: Characteristics of respondents interviewed

| Characteristics             | Female      |        | Male        |        | Total       |        | P values |
|-----------------------------|-------------|--------|-------------|--------|-------------|--------|----------|
|                             | 1081 (%)    |        | 1072 (%)    |        | 2153 (%)    |        |          |
| Average age (SD)            | 25.4        | (3.6)  | 26.8        | (3.7)  | 26.1        | (3.7)  | <0.001   |
| <b>Age distribution</b>     | <b>1081</b> |        | <b>1072</b> |        | <b>2153</b> |        |          |
| 16-19                       | 40          | (3.7)  | 15          | (1.4)  | 55          | (2.6)  |          |
| 20-24                       | 445         | (41.2) | 293         | (27.3) | 738         | (34.2) |          |
| 25-29                       | 439         | (40.6) | 485         | (45.2) | 924         | (42.9) | <0.001   |
| 30-35                       | 156         | (14.3) | 279         | (26.0) | 435         | (20.2) |          |
| <b>University</b>           | <b>1083</b> |        | <b>1073</b> |        | <b>2156</b> |        |          |
| Completed Primary School    | 14          | (1.3)  | 7           | (0.7)  | 21          | (1.0)  |          |
| Completed Secondary School  | 111         | (10.2) | 73          | (6.7)  | 184         | (8.5)  |          |
| Incomplete Higher Education | 172         | (15.9) | 179         | (16.5) | 351         | (16.3) | 0.013    |
| Completed Higher Education  | 786         | (72.6) | 814         | (75.2) | 1600        | (74.2) |          |
| <b>Marital status</b>       | <b>1078</b> |        | <b>1059</b> |        | <b>2137</b> |        |          |
| Married                     | 220         | (20.4) | 349         | (33.0) | 569         | (26.6) |          |
| Separated                   | 14          | (1.3)  | 13          | (1.2)  | 27          | (1.3)  |          |
| Single                      | 823         | (76.3) | 685         | (64.7) | 1508        | (70.6) | <0.001   |
| No response                 | 21          | (1.9)  | 12          | (1.1)  | 33          | (1.5)  |          |
| <b>Employment status</b>    | <b>1083</b> |        | <b>1073</b> |        | <b>2156</b> |        |          |
| No employment               | 606         | (56.0) | 465         | (43.3) | 1071        | (49.7) |          |
| Self employed               | 285         | (26.3) | 327         | (30.5) | 612         | (28.4) |          |
| Formal employment           | 160         | (14.8) | 257         | (24.0) | 417         | (19.3) | <0.001   |
| No response                 | 32          | (3.0)  | 24          | (2.2)  | 56          | (2.6)  |          |

Table 2: Knowledge of symptoms and preventive measures

| <b>% reporting the following symptoms</b>                    | <b>Female<br/>N=1083</b> | <b>(%)</b>   | <b>Male<br/>N=1073</b> | <b>(%)</b>   | <b>Total<br/>N=2156</b> | <b>(%)</b>   | <b>p value</b>   |
|--|--------------------------|--------------|------------------------|--------------|-------------------------|--------------|------------------|
| High Fever above 38  | 1053                     | (97.2)       | 1014                   | (94.5)       | 2067                    | (95.9)       | 0.001            |
| Difficulty breathing   | 988                      | (91.2)       | 969                    | (90.3)       | 1957                    | (90.8)       | 0.13             |
| Dry cough  | <b>915</b>               | (84.5)       | <b>885</b>             | (82.5)       | 1800                    | (83.5)       | 0.209            |
| Headache   | 703                      | (64.9)       | 678                    | (63.2)       | 1381                    | (64.1)       | 0.404            |
| Sore Throat  | 652                      | (60.2)       | 578                    | (53.9)       | 1230                    | (57.1)       | 0.003            |
| Tiredness/fatigue  | <b>558</b>               | (51.5)       | <b>480</b>             | (44.7)       | 1038                    | (48.1)       | 0.002            |
| Body Ache  | 343                      | (31.7)       | <b>324</b>             | (30.2)       | 667                     | (30.9)       | 0.459            |
| Loss of taste  | 218                      | (20.1)       | <b>160</b>             | (14.9)       | 378                     | (17.5)       | 0.001            |
| Loss of smell  | 186                      | (17.2)       | <b>143</b>             | (13.3)       | 329                     | (15.3)       | 0.013            |
| Diarrhea   | 143                      | (13.2)       | 118                    | (11.0)       | 261                     | (12.1)       | 0.116            |
| <b>Average no of signs (0-10)<br/>(SD)</b>                   | <b>5.3</b>               | <b>(1.9)</b> | <b>4.9</b>             | <b>(1.9)</b> | <b>5</b>                | <b>(1.9)</b> | <b>&lt;0.001</b> |
| <b>% reporting the following ways of preventing COVID-19</b> | <b>1083</b>              | <b>(%)</b>   | <b>1073</b>            | <b>(%)</b>   | <b>2156</b>             | <b>(%)</b>   |                  |
| Wash hands with soap and running water                       | 1069                     | (98.7)       | 1046                   | (97.5)       | 2115                    | (98.1)       | 0.038            |
| Use hand sanitizer   | 1042                     | (96.2)       | 1020                   | (95.1)       | 2062                    | (95.6)       | 0.19             |
| Wear masks   | 1018                     | (94.0)       | 989                    | (92.2)       | 2007                    | (93.1)       | 0.095            |
| Stand 1-2 meters away from people                            | 946                      | (87.3)       | 952                    | (88.7)       | 1898                    | (88.0)       | 0.326            |
| Stay home unless urgent                                      | 961                      | (88.7)       | 925                    | (86.2)       | 1886                    | (87.5)       | 0.076            |
| Do not touch face  | 956                      | (88.3)       | 921                    | (85.8)       | 1877                    | (87.1)       | 0.092            |
| Do not shake hands   | 955                      | (88.2)       | 935                    | (87.1)       | 1890                    | (87.7)       | 0.462            |
| Use digital money  | 867                      | (80.1)       | 838                    | (78.1)       | 1705                    | (79.1)       | 0.264            |
| Do not go to weddings/funerals                               | 771                      | (71.2)       | 739                    | (68.9)       | 1510                    | (70.0)       | 0.24             |
| Do not go to church/mosque                                   | 763                      | (70.5)       | 730                    | (68.0)       | 1493                    | (69.2)       | 0.224            |
| Reduce the number of people they come to contact with        | 723                      | (66.8)       | 713                    | (66.4)       | 1436                    | (66.6)       | 0.879            |

|   |                                 |              |                       |                       |                            |                          |              |
|---|---------------------------------|--------------|-----------------------|-----------------------|----------------------------|--------------------------|--------------|
| Avoid public transport/travelling           | 690                             | (63.7)       | 645                   | (60.1)                | 1335                       | (61.9)                   | 0.085        |
| Scrub/clean surfaces                        | 711                             | (65.7)       | 584                   | (54.4)                | 1295                       | (60.1)                   | <0.001       |
| Get tested for coronavirus                  | 459                             | (42.4)       | 527                   | (49.1)                | 986                        | (45.7)                   | 0.002        |
| <b>Average scores (0-15) (SD)</b>           | <b>11</b>                       | <b>(3.3)</b> | <b>10.7</b>           | <b>(3.5)</b>          | <b>10.9</b>                | <b>(3.4)</b>             | <b>0.104</b> |
| <b>Linear regression model</b>              | <b>No of observations =2156</b> |              |                       | <b>P&gt;F =0.0000</b> |                            | <b>R Squared= 0.0238</b> |              |
| <b>Number of signs &amp; symptoms</b>       | <b>Coefficient</b>              |              | <b>P value</b>        |                       | <b>Confidence interval</b> |                          |              |
| Gender (ref: Female)                        | 0.35                            |              | <0.001                |                       | 0.19, 0.51                 |                          |              |
| Education; (ref: College education)         | 0.29                            |              | 0.003                 |                       | 0.10, 0.49                 |                          |              |
| Employment status: ref: no employment       |                                 |              |                       |                       |                            |                          |              |
| Formal employment                           | 0.34                            |              | 0.001                 |                       | 0.14, 0.54                 |                          |              |
| Self-employed                               | -0.15                           |              | 0.172                 |                       | -0.37, 0.07                |                          |              |
| No response                                 | 0.09                            |              | 0.719                 |                       | -0.41 0.61                 |                          |              |
| <b>No of preventive measures identified</b> | <b>No of observations =2156</b> |              | <b>P&gt;F =0.0655</b> |                       | <b>R Squared= 0.0048</b>   |                          |              |
| Gender (ref: Female)                        | 0.26.                           |              | 0.076                 |                       | -0.023, 0.55               |                          |              |
| Education; (ref: College education)         | 0.10                            |              | 0.560                 |                       | -0.24, 0.45                |                          |              |
| Employment status: ref: no employment       |                                 |              |                       |                       |                            |                          |              |
| Formal employment                           | 0.38                            |              | 0.036                 |                       | 0.02 0.74                  |                          |              |
| Self-employed                               | 0.021                           |              | 0.915                 |                       | -0.37, 0.41                |                          |              |
| No response                                 | -0.38                           |              | 0.409                 |                       | -1.30, 0.53                |                          |              |

Table 3: Perception of Who is at risk of COVID-19 infections

| <b>% reporting the following are at risk</b> | <b>Female n=1083</b> | <b>(%)</b> | <b>Male n=1073</b> | <b>(%)</b> | <b>Total n=2156</b> | <b>(%)</b> | <b>P value</b> |
|--|----------------------|------------|--------------------|------------|---------------------|------------|----------------|
| Elderly/over 50/over 60                      | 681                  | (62.9)     | 692                | (64.5)     | 1373                | (63.7)     | 0.437          |
| Sick/weak immune systems                     | 657                  | (60.7)     | 631                | (58.8)     | 1288                | (59.7)     | 0.379          |
| People with TB                               | 438                  | (40.4)     | 444                | (41.4)     | 882                 | (40.9)     | 0.658          |
| People with HIV                              | 424                  | (39.2)     | 438                | (40.8)     | 862                 | (40.0)     | 0.429          |
| Pregnant women                               | 383                  | (35.4)     | 302                | (28.1)     | 685                 | (31.8)     | <0.001         |
| Children                                     | 278                  | (25.7)     | 252                | (23.5)     | 530                 | (24.6)     | 0.239          |
| Men  | 125                  | (11.5)     | 127                | (11.8)     | 252                 | (11.7)     | 0.832          |
| People in cold countries                     | 114                  | (10.5)     | 131                | (12.2)     | 245                 | (11.4)     | 0.218          |
| Adolescents and youth                        | 109                  | (10.1)     | 122                | (11.4)     | 231                 | (10.7)     | 0.327          |
| Women  | 93                   | (8.6)      | 88                 | (8.2)      | 181                 | (8.4)      | 0.747          |
| Everyone                                     | 77                   | (7.1)      | 76                 | (7.1)      | 153                 | (7.1)      | 0.981          |
| Dot know/ no response                        | 6                    | (0.6)      | 10                 | (0.9)      | 16                  | (0.7)      | 0.307          |
| <b>% reporting that they are at</b>          | <b>1062</b>          |            | <b>1048</b>        |            | <b>2110</b>         |            |                |
| Low risk                                     | 322                  | (30.3)     | 289                | (27.6)     | 611                 | (29.0)     |                |
| Medium risk                                  | 406                  | (38.2)     | 414                | (39.5)     | 820                 | (38.9)     |                |
| High risk                                    | 267                  | (25.1)     | 288                | (27.5)     | 555                 | (26.3)     |                |
| No Risk                                      | 29                   | (2.7)      | 27                 | (2.6)      | 56                  | (2.7)      | 0.467          |
| Do not know, no response                     | 38                   | (3.6)      | 30                 | (2.9)      | 68                  | (3.2)      |                |
| Low or no risk                               | 351                  | (33.1)     | 316                | (30.2)     | 667                 | (31.6)     | 0.137          |
| <b>Reason for perceived low risk</b>         | <b>351</b>           | <b>(%)</b> | <b>316</b>         | <b>(%)</b> | <b>667</b>          | <b>(%)</b> |                |
| I am young                                   | 25                   | (7.1)      | 38                 | (12.0)     | 63                  | (9.4)      | 0.031          |
| God protects me                              | 74                   | (21.1)     | 89                 | (28.2)     | 163                 | (24.4)     | 0.034          |
| The hot weather/climate                      | 16                   | (4.6)      | 28                 | (8.9)      | 44                  | (6.6)      | 0.025          |
| COVID is not in Africa/Kenya                 | 1                    | (0.3)      | 1                  | (0.3)      | 2                   | (0.3)      | 0.941          |
| I have not travelled                         | 154                  | (43.9)     | 135                | (42.7)     | 289                 | (43.3)     | 0.764          |

|                          |    |        |    |       |    |       |       |
|--------------------------|----|--------|----|-------|----|-------|-------|
| I am not a Caucasian     | 1  | (0.3)  | 4  | (1.3) | 5  | (0.7) | 0.143 |
| COVID is a lie           | 0  | (0.0)  | 1  | (0.3) | 1  | (0.1) | 0.292 |
| Do not know, no response | 35 | (10.0) | 28 | (8.9) | 63 | (9.4) | 0.624 |

Table 4: Use of various channels as source of COVID-19 information

| <b>% of reporting always using the following sources of information about COVID-19</b> | <b>Female n=1074</b> | <b>(%)</b> | <b>Male n=1066</b> | <b>(%)</b> | <b>Total N=2140</b> | <b>(%)</b> | <b>P values</b> |
|--|----------------------|------------|--------------------|------------|---------------------|------------|-----------------|
| Social media   | 728                  | (67.8)     | 692                | (64.9)     | 1420                | (66.4)     | 0.164           |
| Television programs/shows  | 719                  | (66.9)     | 613                | (57.5)     | 1332                | (62.2)     | <0.001          |
| Friends  | 567                  | (52.8)     | 499                | (46.8)     | 1066                | (49.8)     | 0.011           |
| Internet   | 537                  | (50.0)     | 517                | (48.5)     | 1054                | (49.3)     | 0.018           |
| Radio programs/shows   | 444                  | (41.3)     | 393                | (36.9)     | 837                 | (39.1)     | 0.006           |
| Spouse   | 270                  | (25.1)     | 365                | (34.2)     | 635                 | (29.7)     | <0.001          |
| Government SMS's   | 284                  | (26.4)     | 282                | (26.5)     | 566                 | (26.4)     | 0.884           |
| Work colleagues  | 182                  | (16.9)     | 234                | (22.0)     | 416                 | (19.4)     | <0.001          |
| Acquaintances / neighbors  | 134                  | (12.5)     | 156                | (14.6)     | 290                 | (13.6)     | <0.001          |
| Posters/print advert   | 163                  | (15.2)     | 124                | (11.6)     | 287                 | (13.4)     | <0.001          |
| Books/magazines  | 151                  | (14.1)     | 111                | (10.4)     | 262                 | (12.2)     | 0.008           |
| Public health facility   | 116                  | (10.8)     | 135                | (12.7)     | 251                 | (11.7)     | <0.001          |
| NGO provider   | 126                  | (11.7)     | 121                | (11.4)     | 247                 | (11.5)     | 0.15            |
| Public announcement with megaphone   | 116                  | (10.8)     | 90                 | (8.4)      | 206                 | (9.6)      | <0.001          |
| Private health clinic  | 70                   | (6.5)      | 90                 | (8.4)      | 160                 | (7.5)      | 0.001           |
| Community health worker  | 75                   | (7.0)      | 101                | (9.5)      | 176                 | (8.2)      | <0.001          |
| Church   | 67                   | (6.2)      | 57                 | (5.3)      | 124                 | (5.8)      | 0.016           |
| Pharmacy   | 45                   | (4.2)      | 61                 | (5.7)      | 106                 | (5.0)      | 0.055           |
| Community meetings/spaces  | 36                   | (3.4)      | 37                 | (3.5)      | 73                  | (3.4)      | 0.013           |

Table 5: Effect of COVID-19 on health, social and economic

| <b>% of respondents who reporting not able to access the following services</b> | <b>Female<br/>n=1083</b> | <b>(%)</b> | <b>Male<br/>n=1073</b> | <b>(%)</b> | <b>Total<br/>n=2156</b> | <b>(%)</b> | <b>P<br/>values</b> |
|---|--------------------------|------------|------------------------|------------|-------------------------|------------|---------------------|
| E-pills and other contraceptives  | 88                       | (8.1)      | 0                      | (0.0)      | 88                      | (4.1)      | NA                  |
| Sanitary towels   | 117                      | (10.8)     | 0                      | (0.0)      | 117                     | (5.4)      | NA                  |
| Condoms   | 26                       | (2.4)      | 156                    | (14.5)     | 182                     | (8.4)      | <0.001              |
| Anti-retroviral treatment   | 19                       | (1.8)      | 30                     | (2.8)      | 49                      | (2.3)      | 0.105               |
| HIV/AIDS counselling  | 33                       | (3.0)      | 69                     | (6.4)      | 102                     | (4.7)      | <0.001              |
| Medicine for acute illnesses  | 92                       | (8.5)      | 124                    | (11.6)     | 216                     | (10.0)     | 0.018               |
| Medicine for stomach/digestive problems   | 73                       | (6.7)      | 81                     | (7.5)      | 154                     | (7.1)      | 0.466               |
| Medicine for diabetes/Blood pressure  | 30                       | (2.8)      | 39                     | (3.6)      | 69                      | (3.2)      | 0.254               |
| Refills for other regular medications   | 99                       | (9.1)      | 93                     | (8.7)      | 192                     | (8.9)      | 0.699               |
| Immunization/nutrition services for children                                    | 115                      | (10.6)     | 115                    | (10.7)     | 230                     | (10.7)     | 0.941               |
| Medicine for pre-natal care   | 42                       | (3.9)      | 32                     | (3.0)      | 74                      | (3.4)      | 0.253               |
| Medication of mental health/stress depression                                   | 69                       | (6.4)      | 102                    | (9.5)      | 171                     | (7.9)      | 0.007               |
| <b>Other social effects:<br/>% of respondents who reporting</b>                 | <b>1083</b>              | <b>(%)</b> | <b>1073</b>            | <b>(%)</b> | <b>2156</b>             | <b>(%)</b> | <b>P<br/>values</b> |
| See friends less  | 440                      | (40.6)     | 436                    | (40.6)     | 876                     | (40.6)     | 0.998               |
| Seeing family less  | 405                      | (37.4)     | 368                    | (34.3)     | 773                     | (35.9)     | 0.133               |
| Stayed at home  | 391                      | (36.1)     | 319                    | (29.7)     | 710                     | (32.9)     | 0.002               |
| Live in fear  | 326                      | (30.1)     | 321                    | (29.9)     | 647                     | (30.0)     | 0.925               |
| Avoid public transport  | 306                      | (28.3)     | 339                    | (31.6)     | 645                     | (29.9)     | 0.09                |
| Increased housework   | 163                      | (15.1)     | 101                    | (9.4)      | 264                     | (12.2)     | <0.001              |
| More stress   | 314                      | (29.0)     | 257                    | (24.0)     | 571                     | (26.5)     | 0.008               |
| Increased crime in neighborhood   | 108                      | (10.0)     | 149                    | (13.9)     | 257                     | (11.9)     | 0.005               |
| Unable to access health care  | 142                      | (13.1)     | 113                    | (10.5)     | 255                     | (11.8)     | 0.064               |

|   |             |        |             |        |             |        |        |
|---|-------------|--------|-------------|--------|-------------|--------|--------|
| Experienced more violence outside house | 47          | (4.3)  | 61          | (5.7)  | 108         | (5.0)  | 0.152  |
| Stigma                                  | 23          | (2.1)  | 37          | (3.4)  | 60          | (2.8)  | 0.062  |
| Experienced more violence inside house  | 10          | (0.9)  | 27          | (2.5)  | 37          | (1.7)  | 0.004  |
| <b>Economic effects</b>                 | <b>1083</b> |        | <b>1073</b> |        | <b>2156</b> |        |        |
| Significant reduction in income         | 464         | (42.8) | 615         | (57.3) | 1079        | (50.0) | <0.001 |
| Increased expense in house              | 397         | (36.7) | 342         | (31.9) | 739         | (34.3) | 0.019  |
| Increase in food prices                 | 374         | (34.5) | 350         | (32.6) | 724         | (33.6) | 0.357  |
| Complete loss of job                    | 244         | (22.5) | 250         | (23.3) | 494         | (22.9) | 0.671  |
| Unable to purchase sanitary towel       | 44          | (4.1)  | 12          | (1.1)  | 56          | (2.6)  | <0.001 |

## Declarations

**Ethics approval and consent to participate:** We received expedited ethical approval for the rapid survey due to the urgent nature of the pandemic and need for information to guide community engagement activities. The survey was approved by Amref Ethics and Scientific Research Committee. Our approval reference number is: AMREF-ESRC P798/2020. Regarding consent to participate, a written online consent to participate in the study was included on the survey link, for participants to give consent prior to responding to the questions.

**Consent for publication:** Consent is hereby given for publication of this manuscript

**Availability of data and materials:** All data and materials used in this study are available, and have been safely stored by the Principle Investigator

**Competing interests:** There are no competing interests related to this study

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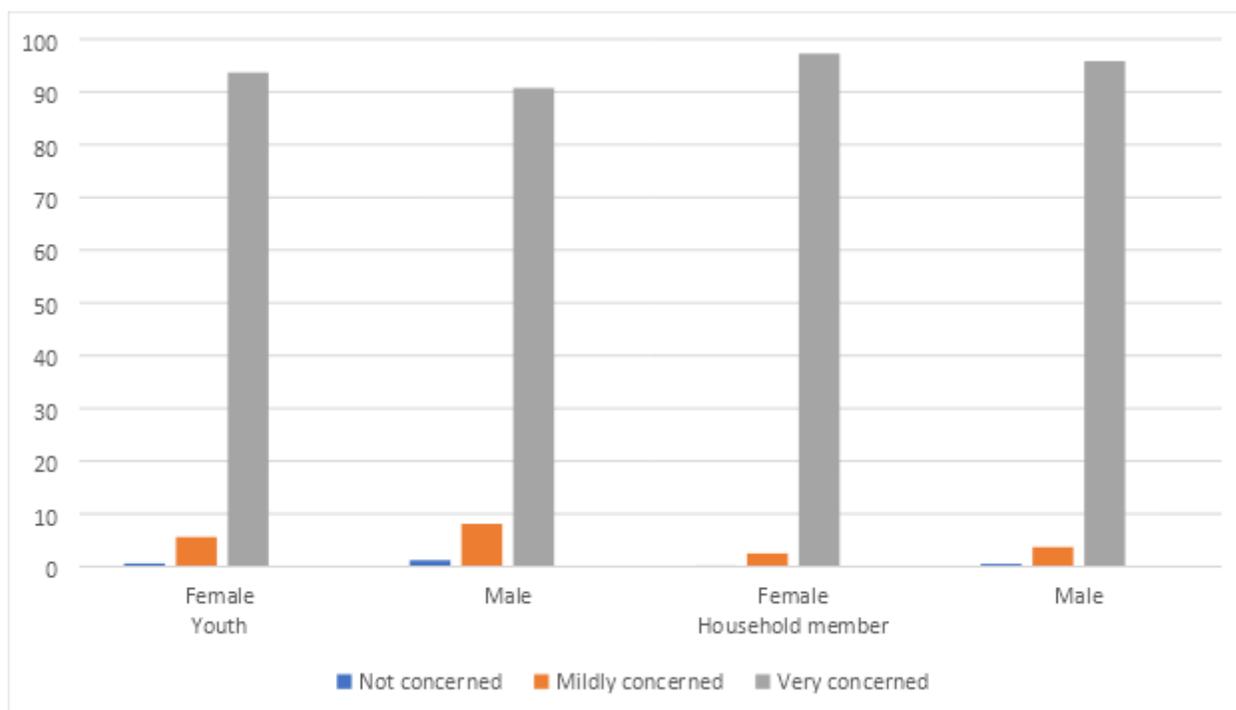
**Authors' information (optional):** Amref Health Africa and Population Council

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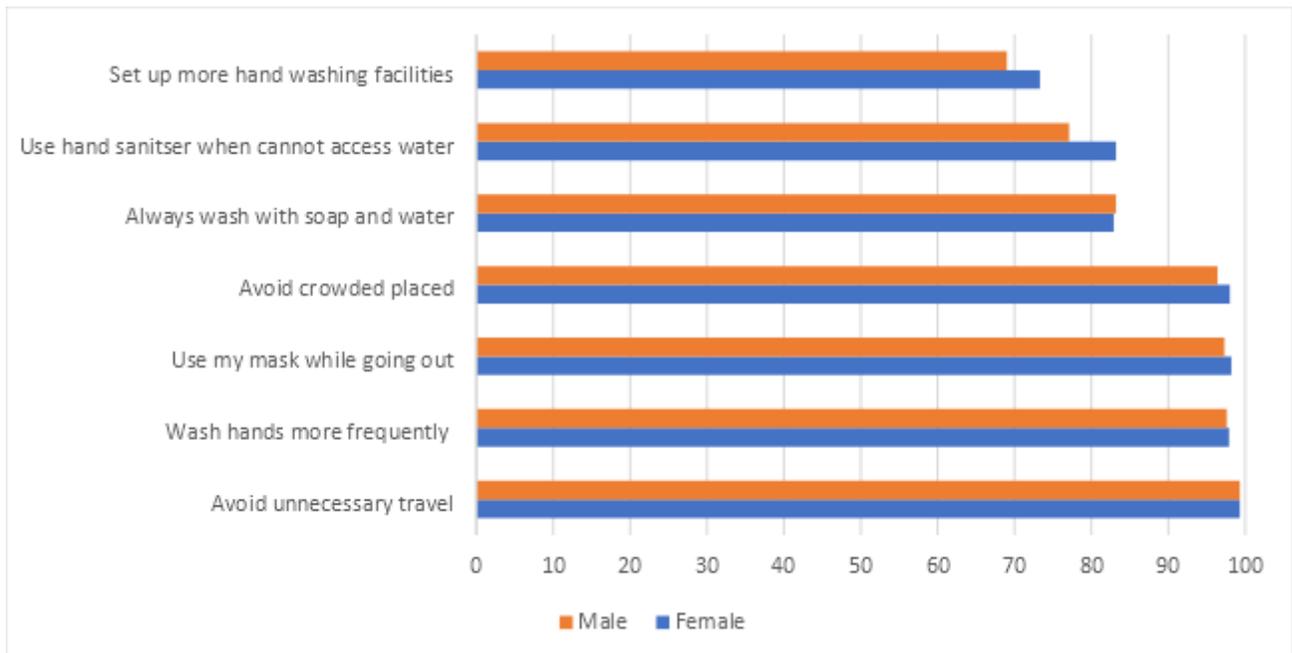
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## Figures



**Figure 1**

Level of concern among young people



**Figure 2**

Effect of messaging on adopting preventive behaviors