COVID-19 lockdown: changes in perceptions and use of mobile technology and health communication in South Africa

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Abstract

Background: In late March 2020, South Africa implemented a 5-stage COVID-19 Risk Adjusted Strategy, which included a lockdown that required all residents to remain home to prevent the spread of SARS-CoV-2. Due to this lockdown, individuals have been forced to find and use alternatives for accomplishing tasks including shopping, socializing, working and information, and many have turned to the internet and their mobile devices.

Objective: This study aimed to describe how South Africans consume and internalize information surrounding the SARS-CoV-2 outbreak in order to determine whether the SARS-CoV-2 lockdown and social isolation has influenced technology behaviour, particularly for health communication and information.

Methods: From 24 June to 24 August 2020, South Africans were invited to complete a survey through the online data collection resource, UPINION. The survey examined demographic information, technology use during the lockdown and SARS-CoV-2 knowledge.

Results: There were 405 participants, 296(73.06%) females, 320(79.01%) participants had tertiary school education, 242(59.75%) were single and 173(42.72%) participants had full-time employment. The lockdown forced 363(89.63%) participants to use more technology, especially with work (140;24.05%) and social media/communication (133;22.85%). Security/privacy issues (46;38.98%) and unfamiliarity with technology (32;27.12%) were identified as the most common concerns by the 127(31.36%) participants that were unsure about using technology before the lockdown, and almost all (392; 96.79%) participants stated that they would continue using technology after the lockdown. Multimedia (215;53.09%), mobile phone content (99;24.44%) and health organizations/professionals (91;22.47%), were the main source of SARS-CoV-2 information, and 282 (69.63%) felt that they had enough information. Two-thirds (275; 67.90%) of participants stated that they had used their mobile phones for health information before the lockdown, with web searches (109;26.91%), social media (58;14.32%) and government/institutional websites (52; 12.84%) as their main sources. Overall, the mean SARS-CoV-2 knowledge score was 8.8/10, and 335 (82.72%) had adequate knowledge (scored 8/10 or higher). Logistic regression identified relationships between demographics and four technology use variables, and four COVID-19 knowledge variables.

Conclusions: This study has shown that the SARS-CoV-2 lockdown has forced people to increase technology use, and people plan to continue using technology after the lockdown is lifted. Increased technology use was seen across a variety of fields, however barriers including privacy, unfamiliarity and data costs were identified. This population showed high SARS-CoV-2 knowledge, however the use of web-searches and social media, instead of government/institutional websites provides the potential for health misinformation to be spread.

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Abstract

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Conclusion: This study has shown that the COVID-19 lockdown has forced people to increase technology use, and people plan to continue using technology after the lockdown is lifted. Increased technology use was seen across a variety of fields, however barriers including privacy, unfamiliarity and data costs were identified. This population showed high COVID-19 knowledge, however the use of web-searches and social media, instead of government/institutional websites provides the potential for health misinformation to be spread.

Key words: Coronavirus; SARS-CoV-2; COVID-19; technology; mHealth; app

Background

On March 11, 2020, the World Health Organization's declared the COVID-19 outbreak a pandemic, with and many countries have followed China's "lockdown" approach to reduce new cases. In March 2020, South Africa began a 21 day level 5 lockdown as part of a 5-stage COVID-19 Risk Adjusted Strategy, During this period, only hospitals, clinics, food-stores and pharmacies remained open, and only essential personnel (such as doctors, nurses, police) were permitted to leave their homes, however there were some controlled exceptions for medical care, or essential supplies like food and medicine [2].

During the lockdown, cases and preventative measures have been well documented and investigated, both globally and in South Africa [3,4], however the behavioural effects of the lockdown are not as well known. With social distancing, individuals have been forced to find and use alternatives to accomplish tasks such as shopping, work, school and keep themselves informed, and many have turned to their mobile devices. In China there was a 30% increase in application (app) use during their lockdown [5-7], while a global analysis of five popular social media platforms (Twitter, Instagram, YouTube, Reddit and Gab) identified 8 million COVID-19-related posts and comments over the first 45 days of 2020 [8].

In a sense, this is all forced use of technology because people have very limited alternatives to meet their needs, and to engage with this captive audience, many governments and institutions have introduced mobile health (mHealth) interventions to disseminate information during the pandemic [9-12]. Specifically, the South African government has implemented a website that provides information on COVID-19, the Risk Adjusted Strategy, preventative measures, news and updates and links to other resources [13]. These additional resources include a WhatsApp support line, an emergency telehealth hotline, social media message campaigns, and updates from the South African Government and National Department of Health (NDOH) websites [3,13,14].

With all of this electronic communication resulting from COVID-19, researchers have taken the opportunity to investigate how it has influenced digital health', and a variety of studies have already been conducted. Some studies have harnessed big data to predict outbreak hotspots with algorithm-based web mining [8,16-18], while others have looked at how individuals share and consume COVID-19-related content [19]. A study from India showed that the majority of participants (58;56.3%) had adequate information regarding COVID-19, however their primary source of information was from multimedia (radio, TV, newspaper) (57;55.3%) and only 22 (21.4%) relied on the internet as their main source for information [20].

Despite high mobile penetration in low- and middle-income countries [21,22], there are still individuals that have not embraced technology for various reasons, including security/privacy concerns, data costs and an inability to understand modern electronics [23]. With the limitations set by the lockdown, increased exposure to technology may have altered some people's perceptions and use of technology. This study aimed to describe how South Africans consume and internalize information surrounding the COVID-19 outbreak to assess whether the COVID-19 lockdown and social isolation has influenced technology behaviour, particularly for health communication and information.

Methods

Study Design

This South African cross-sectional study was conducted electronically, administered through the UPINION mobile app, an online data collection resource. Participants were included if they were an existing or new UPINION user with current access to surveys on the app, 18 years and older and able to provide online consent. Individuals were excluded if they were not able to access the UPINION app, were younger than 18 years or refused to participate

.

Data collection

From 24 June to 24 August 2020, existing and new UPINION users were invited to complete a survey through UPINION notifications and advertisements on social media platforms, respectively. Once an individual agreed to participate in the current study, they were able to provide informed consent through the app, then register for the survey group [24]. The participant was then given access to the survey which was completed through their mobile phone. During the survey, all answers were recorded electronically in the backend of the app.

A mobile app was used to collect data as this was deemed the easiest way to gather responses, while obeying the lockdown restrictions and ensuring the safety of both participants and data collectors. This method of online distribution of a survey and accompanying electronic consent has been used with increasing frequency, particularly during the COVID-19 pandemic for studies with similar methodologies [20,25-28].

UPINION app

The UPINION messaging and data collection app was developed in 2014 by Upinion (The Hague, Netherlands), a people-centric research technology company, and its use in Southern African Development Community (SADC) countries is licensed to Opinion Solutions (Johannesburg, South Africa). The app was developed as a way to collect feedback from affected communities in any response effort in order to provide better and more efficient support. It serves as an outlet for those affected by crisis to share their unique problems, needs and solutions, so that non-government organizations have a grass-roots understanding of the situation on the ground, allowing for tailored interventions. This has been used by non-profit organizations like OXFAM to identify the needs of refugee communities [24], and research institutes like Wits Reproductive Health and HIV institute (Wits RHI), to administer health-related surveys directly via participants' mobile phones' [29]. UPINION does not collect personal data, but rather personal data is collected through survey questions and the participant shares it voluntarily. UPINION encrypts all mobile phone numbers and IP addresses in compliance with General Data Protection Regulation (GDRP) and is also ISO/IEC 27001 certified. Screenshots of the UPINION app are presented in Figure 1.

Figure 1. UPINION screenshots

Survey Development

This survey was adapted from the *Demographic data and Structure Knowledge Questionnaire regarding prevention of COVID-19* survey, used in a similar study from India [20]. The original questionnaire consists of two sections- the first comprising eight questions to explore demographic information and the second 10 questions that focused on COVID-19 knowledge. Our survey has revised the demographic information and the COVID-19 questions to reflect the South African context, and a third section was added to explore participants' technology use during the COVID-19 outbreak.

Data analysis

UPINION has a built-in dashboard to monitor responses in real-time, however the final dataset was exported to Excel (Microsoft; Seattle, USA) for cleaning and coding, then exported to Stata V.15 (StataCorp; College Station, USA) for analysis. The demographic information, technology use and COVID-19 knowledge questions were all described as frequency and percentages. A mean knowledge score (with standard deviation) was also calculated across all ten knowledge questions, with a score below 6 considered inadequate knowledge, 6-8 considered moderately adequate knowledge and a score above 8 considered adequate knowledge [20].

The Pearson Chi-square test was used to assess trends of association between outcome variables (COVID-19 knowledge and technology use) and demographic characteristics. Logistic regression models (bivariate (not

included in this paper) and multivariable models) were constructed for the outcome variables to control for confounders and identify independent predictors. These predictors were reported as crude (not included in this paper) and adjusted odds ratios (AOR), with 95% confidence interval and *P* values (less .05 were considered significant).

Ethical consideration and approval

Ethics approval was obtained from the University of the Witwatersrand Human Research Ethics Committee (non-medical) (reference number 200512). Survey respondents did not receive any compensation for participation.

Results

Demographics

The following demographic data is presented in Table 1.

Of the 405 participants, 84 (20.74%) were 28 years or younger, 165 (40.74%) were between the ages of 29 and 42 years, 110 (27.16%) were between the ages of 43 and 56 years, while 46 (11.36%) were 57 years or older. There were 296 (73.06%) females, 320 (79.01%) participants had tertiary school education and 242 (59.75%) were single. One hundred and seventy-three (42.72%) participants had full-time employment, 74 (18.27%) were casually employed, 29 (7.16%) were students and 129 (32.85%) were unemployed.

Table 1. Demographic characteristics.

Demographic (n=405)	Frequency	Percentage (%)*
Age		
18-28 years old	84	20.74
29-42 years old	165	40.74
43-56 years old	110	27.16
57 years or older	46	11.36
Sex		
Female	296	73.09
Male	109	26.91
Education		
Primary school or less	1	0.25
Secondary school	84	20.74
Tertiary school (any)	320	79.01
Marital status		
Married	163	40.25
Single	242	59.75
Employment status		
Casually employed	74	18.27
Full-time employment	173	42.72
Student	29	7.16
Unemployed	129	31.85

*Percentages may not add up to 100.0% due to rounding.

Technology use

A total of 363 (89.63%) participants stated that the lockdown had forced them to use more technology, and the greatest increases in use were for work (140; 24.05%), social media/communication (133; 22.85%), shopping (78; 13.4%) and news and information (70; 12.03%). Nearly one-third (127; 31.36%) of participants stated that they were unsure about using technology before the lockdown, with security/privacy issues (46;38.98%) and unfamiliarity with technology (32; 27.12%) identified as the most common concerns. More than half (209;51.60%) the participants had positive feelings about the increased forced technology use, while almost all (392; 96.79%) participants stated that they would continue using technology after the lockdown. When asked about information regarding COVID-19, 282 (69.63%) felt that they had enough information and knowledge, with multimedia (215;53.09%), mobile phone content (99;24.44%) and health organizations and professionals (91;22.47%), as their main source of COVID-19 information. Two-thirds (275; 67.90%) of participants stated that they had used their mobile phones for health information before the COVID-19 outbreak, with web searches (109;26.91%), social media posts (58;14.32%) government/institutional websites (52; 12.84%) and mobile apps (58;14.32%) as their main sources of health information (Table 2).

Table 2. Technology use

Technology questions (n=405)	Frequency	Percentage (%)*
Has the lock down forced you to use more technology?		
Yes	363	89.63
No	42	10.37
If yes, what do you use technology for?		
Job searching	33	5.67
Social media/communication	133	22.85
Education	58	9.97
Shopping	78	13.40
Entertainment	48	8.25
Work	140	24.05
News and information	70	12.03
Banking	16	2.75
Religion	6	1.03
Where you unsure about using technology/ online methods before?		
Yes	127	31.36
No	278	68.64
If yes, what made you feel uncomfortable?		
Security/privacy issues	46	38.98
Unfamiliar with technology	32	27.12
Lack of personal connection/accountability	16	13.56
Cost of data and devices	10	8.47
Reliability issues	14	11.86
How do you feel about the increased forced use of technology?		
Positive feelings	209	51.60
Neutral/mixed feelings	129	31.85
Negative feelings	67	16.54
Will you continue to use technology after the lock down?		

Yes	392	96.79
No	13	3.21
Do you have enough information/knowledge regarding COVID-19?		
Yes	282	69.63
No	123	30.37
What is your main source of information for COVID-19?		
Health organizations and professionals	91	22.47
Mobile phone content	99	24.44
Multimedia (Radio, television, newspaper)	215	53.09
Have you used your mobile phone for health information before the COVID-19 outbreak?		
Yes	275	67.90
No	130	32.10
If yes, what was your main source of health information?		
Email	1	0.25
Government/institutional websites	52	12.84
Messaging platforms (WhatsApp, SMS)	17	4.20
Mobile apps	38	9.38
Social media posts	58	14.32
Web searches (Google)	109	26.91

*Percentages may not add up to 100.0% due to rounding.

Logistic regression analysis identified relationships between demographics and four technology use variables (Multimedia appendix: Table 3). Logistic regression of Technology use). When asked if the lockdown had forced participants to use more technology, participants with a tertiary school education were 2.5 times more likely to increase their technology use than those with a primary or secondary school education (AOR=2.580;CI=1.212-5.489,*P*=.01) and full-time employees were also less likely to increase their technology use compared to those casually employed (AOR=0.275; CI=0.078-0.966,*P*=.04).

Regarding the main source of COVID-19 information, multimedia, health organizations and professionals and mobile phone content all had demographic associations. Tertiary school graduates were less likely to use multimedia as their main source of COVID-19 information compared to those with primary or secondary school education (AOR=0.536;CI=0.319-0.900,*P*=.02). Multimedia was almost two times more likely to be the main source of information in respondents 29-42 years old, when compared to those younger than 29 years old (AOR=1.862;CI=1.062-3.378,*P*=.04). Single participants were less likely to use health organizations and professionals (AOR=0.537;CI=0.318-0.906,*P*=.02) as their main source of COVID-19 information. Mobile phone content was also associated with age, with the 57–70 year old group being least likely (AOR=0.339;CI=0.128-0.896,*P*=.03) to use their mobile as the main source of health information compared to those younger than 29 years old.

The associations seen among participants who responded that they had enough information/knowledge about COVID-19 included: age, being male, being single and having a tertiary education.
The 57–70 year old group were approximately 6 times (AOR=5.661;CI=1.894-16.925,*P*=.002) more like to have adequate information compared to those younger than 29 years old. Males were almost twice as likely (AOR=1.892; CI=1.094-3.272,*P*=.02) than females to have enough COVID-19 information as were those having a tertiary school education (AOR=1.885;CI=1.111-3.198,*P*=.02) over those with a secondary education or lower, while single participants were less likely (AOR=0.509;CI=0.297-0.873,*P*=.01) to have adequate information.

The oldest age group were the least likely (AOR= 0.184; CI=0.075-0.449, *P*<.001) to use their phone for health information prior to the pandemic as were students (AOR=0.277; CI=0.103-0.740, *P*=0.01).

1. Delete the word ‘and’. Start new sentence here: ’when asked……..participants’

COVID-19 knowledge

When asked about COVID-19, 358 (88.40%) participants correctly identified it as a contagious respiratory virus and 392 (96.79%) correctly stated that it was transmitted through respiratory droplets. Over three-quarters (319;78.77%) of participants correctly chose all ways that the virus could be spread, while 52 (18.84%), 17 (4.2%) and 16 (3.95%) thought it was only spread by coughing or sneezing, only spread by touching objects that have COVID-19 droplets on it, or only spread through close contact with an infected individual, respectively. All of the common COVID-19 symptoms (cough/sore throat, fever and shortness of breath) were correctly identified by 379 (93.58%) participants, while 379 (93.58%) correctly identified all encouraged prevention techniques (avoid touching face, avoiding contact with sick people and washing hands thoroughly).When asked how long handwashing should take, 20 seconds was correctly selected by 340 (83.95%) participants. For the question on how to stop the spread of COVID-19, 368 (90.86%) correctly chose social distancing, self-isolation and regular handwashing as their response, and when asked how to stop the chance of spreading the virus, 383 (94.57%) correctly chose coughing and sneezing into their elbow, social distancing and self-isolation, and regular handwashing as their response. Most participants (308;76.05%) correctly stated that they would call the emergency hotline or WhatsApp support line if they thought they had COVID-19 symptoms, however 79 (19.51%) incorrectly stated that they would rush to nearest hospital for testing. Lastly, practicing social distancing, self-isolation and washing hands thoroughly, were all correctly identified by 369 (91.11%) participants as the important key to prevent the spread of COVID-19 (Table 4).

Table 4. Structured COVID-19 questionnaire

COVID-19 questions (n=405)	Frequency	Percentage (%)*
What is Novel Coronavirus (COVID-19)?		
It is a bioweapon	11	2.72
It is a sexually transmitted infection	4	0.99
It is a very contagious respiratory virus	358	88.40
It is just another term for the common cold	22	5.43
It is transmitted through respiratory droplets	10	2.47
What are transmission routes of COVID-19?		
It is transmitted by eating Chinese food	4	0.99
It is transmitted through direct blood contact	6	1.48
It is transmitted through respiratory droplets	392	96.79
It is transmitted through sexual intercourse	3	0.74
How COVID-19 can be spread?		
By touching objects that have COVID respiratory droplets	17	4.20
Through close contact with an infected individual	16	3.95
Through coughing or sneezing	52	12.84
All of the above	319	78.77
(blank)	1	0.25
What are the signs and symptoms of COVID-19?		
Cough and sore throat	11	2.72
Fever	15	3.70
Shortness of breath	12	2.96

All of the above	367	90.62
Corona virus can be prevented by		
Avoid touching your face	8	1.98
Avoiding contact with sick people	7	1.73
Wash your hands thoroughly	11	2.72
All of the above	379	93.58
Wash your hands with soap or sanitizer for at least		
5 seconds	5	1.23
10 seconds	17	4.20
20 seconds	340	83.95
1 minute	43	10.62
To stop spread corona virus you should		
Practice social distancing	17	4.20
Practice social distancing, Wash your hands thoroughly	1	0.25
Self-isolate	16	3.95
Self-isolate, Practice social distancing	1	0.25
Wash your hands thoroughly	2	0.49
All of the above	368	90.86
How can you stop the chance of spreading corona virus?		
Cough or sneeze into a tissue or your elbow	4	0.99
Self-isolate and practice social distancing	13	3.21
Wash your hands thoroughly	5	1.23
All of the above	383	94.57
What you will do when suspected that you have symptoms of COVID-19?		
Call emergency hotline or WhatsApp support line	308	76.05
Go to the pharmacy to get medication	9	2.22
Rush to nearest hospital for testing	79	19.51
Stay in close physical contact with friends/family for	8	1.98
(blank)	1	0.25
Important key to prevent from spreading of COVID-19 is?		
Practice social distancing	10	2.47
Self-isolate	18	4.44
Wash your hands thoroughly	7	1.73
All of the above	369	91.11
Total knowledge score		
Inadequate (scores 5 and below)	19	4.69
Moderately adequate (scores 6 and 7)	51	12.59
Adequate (scores 8 and above)	335	82.72

*Percentages may not add up to 100.0% due to rounding.

Overall, the mean knowledge score was 8.8 (standard deviation=1.53). There were only 19 (4.69%) participants with inadequate knowledge, 51 (12.59%) had moderately adequate knowledge and 335 (82.72%) had adequate knowledge (Table 4).

Logistic regression analysis identified relationships between demographics and four COVID-19 knowledge variables. Males were less likely to identify the correct transmission routes of COVID-19 (AOR=0.216;CI=0.063-0.744,*P*=.02) than females, while those with a tertiary education were four times more likely to correctly identify the routes (AOR=4.414;CI=1.308-14.900,*P*=.02) than those with only primary or secondary education. Tertiary school graduates were also two times more likely to identify how to stop the spread of the virus (AOR=2.215;CI=1.041-4.714,*P*=.04), compared to participants with only primary or secondary education. Single participants were less likely to identify the signs and symptoms of COVID-19 (AOR=0.182;CI=0.052-0.631,*P*=.01) than married participants. The age band 43-56 years old was four times more likely to identify how the COVID-19 can be prevented (AOR=3.987;CI=1.011-15.718,*P*=0.048) compared to those under 29 years of age (Multimedia appendix: Table 5. Logistic regression of COVID-19 knowledge).

Lastly, association analyses conducted separately between demographics and the outcome variables (COVID-19 knowledge scores and technology use) only identified a significant relationship in participants 57 years and older being 2.6 times more likely to obtain a knowledge score of 10 (AOR=2.60;CI=1.1-6.0,*P*=.03) when compared to participants 28 years and under.

Discussion

This study is the first to describe how South Africans interact with technology and consume health information during the current COVID-19 outbreak, and our findings were in-line with a similar study from India [20]. Multimedia was the main source of COVID-19 information for both countries (India:57;55.4% vs South Africa:215;53.09%), followed by the internet in India (22;21.4%) and mobile phone content in South Africa (99;24.44%). Despite more people in India stating that they had adequate COVID-19 information (India:98;95.1% vs South Africa:282;69.63%), the South African mean knowledge score of 8.8 was slightly higher than that of India (8.01). The South African study also showed that the lockdown has forced the majority of participants to increase their technology use and these findings are in-line with similar increases in technology use from around the world [5-7,30-32]. Participants with a tertiary school education were more likely to increase their technology use than those with less education, who were less likely to use multimedia as their main source of COVID-19 information. This is in-line with a study from sub-Saharan Africa, which showed that the positive effects of mobile phone use is diminished by poor primary education [33]. However, in addition, these findings may be explained by socioeconomic factors associated with more education, as college graduates earn higher wages and are better equipped to cope with economic shocks [34]. Full-time employees were less likely to increase their technology use compared to causally employed, however this may just be due to a higher baseline of technology use for full-time employees, due to the growing demands of the knowledge economy [35].

The rise in South African technology use has also been validated by the nation's data usage, which increased by more than one-third over the first few days of the lockdown [33]. This increase in technology use led the government to quickly digitize education through a combination of free electronic readers and zero-rated educational apps and websites. This has allowed schools to move to an online curriculum, which has facilitated the return to studies via home-based schooling for many students, by mid-March 2020 [30]. Similarly, apps and websites are also being used by the National Department of Health to relay COVID-19 information to the public [3,13,14], however there are many other online sources for COVID-19 information.

Government or institutional websites [3,4,13,14] publish evidence-based information and fact-check their findings, however more participants stated that their main mobile source of health information was web searches or social media posts. Unfortunately, web searches and social media posts are not regulated, and the sharing of misinformation has created an infodemic surrounding COVID-19 [8,26]. This misinformation includes false news articles, conspiracy theories surrounding the virus creation, ineffective home remedies for treatment, and downplaying the need for prevention control, such as social distancing and mask use. The propagation of this misinformation can actually present a health risk and may undermine the countermeasures implemented by governments and credible institutions [8,34]. Despite a high overall knowledge score,

misinformation may have played a role in this study, as two questions (*How COVID-19 can be spread* and *What you will do when suspected that you have symptoms of COVID-19)* scored below adequate. These questions may identify knowledge gaps where increased outreach is needed to educate the population, especially for the second question, where 79 (19.51%) participants stated that they would rush to the nearest hospital for testing, instead of calling the emergency hotline or WhatsApp support line for further instructions. There are a number of documented ways to engage users on mobile platforms, and the government can use them to dispel misinformation by guiding people to accurate information sources. Social media outreach, with dialogue loops, is a particularly effective way to engage with individuals, and this type of social media outreach can be tailored with specific messages that target specific sub-populations [36,37].

Misinformation may have disproportionately affected participants under the age of 29 years old, especially when compared to those above 57 years old. The older group was less likely to use their mobile as the main source of health information, yet they were 6 times more likely to have enough COVID-19 information, and 2.6 times more likely to obtain a knowledge score of 10. In South Africa, youth under 30 are almost 20% more likely to use their phone to access the internet than their parents, which would expose the younger age group to more online misinformation than the oldest age group [35]. Single participants were less likely to use health organizations and professionals as their source of COVID-19 information, and not using a trusted source may have also led to misinformation, as they were less likely to have enough COVID-19 information, and less likely to correctly identify COVID-19 signs and symptoms. Having enough COVID-19 information may not be a true indicator of knowledge though, as males were twice as likely to say they had enough COVID-19 information, however they were less likely to identify the correct routes of COVID-19 transmission.

This study has also reiterated some known barriers to mobile use in South Africa, such as security/privacy issues, unfamiliarity with technology and data costs. Due to an increase in data usage, some local networks have temporarily lowered data costs [33], but long-term affordable data is required to ensure equitable mobile usage for the duration of this lockdown, and in the future [38]. Security and privacy issues have been well documented in South Africa, especially for mHealth platforms [15,23,39], however previous studies have shown that personal identification number (PIN)-protected mobile platforms for delivering sensitive health information are feasible and acceptable in South Africa [39,40]. Furthermore, a Japanese study that investigated online consumption suggests that the process of making online purchases for the first time during the lockdown, has facilitated people becoming familiar with technology, thus alleviating some perceived barriers [41]. This information provides context to 392 (96.8%) participants that stated they will continue to use technology after the pandemic, however follow-up studies must be conducted to quantify this.

Limitations

A selection bias may be present due to the device and data requirements required to access this survey, which was conducted online, via a convenience sample. As this survey was adapted from a pre-existing survey, it was not validated or pilot-tested in South Africa before this study. Furthermore, participants were asked to self-report their technology use, and no measurements were taken to validate these statements.

Conclusion

This study has shown that the COVID-19 lockdown has forced many people to increase technology use, and almost all participants will continue to use technology post lockdown. Increased technology use was seen across a variety of fields, however well-known barriers were cited, including privacy/security concerns, unfamiliarity with technology and data costs. This population showed high COVID-19 knowledge, however the use of web searches and social media posts, instead of government/institutional websites provides the potential for health misinformation to be spread surrounding the COVID-19. This was particularly evident with some sub-demographics, including participants under 29 years of age, single participants and participants without tertiary education and males, and these groups should be targeted with further education and preventative measures.

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Conflicts of interest

All of the authors acknowledge that there are no conflicts of interest.

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Appendix 1. Technology use during the COVID-19 lockdown survey

Section 1. Demographic and mHealth familiarity	
How old are you?	a) 14-28 b) 29-42 c) 43-56 d) 57-70
What gender are you?	a) Male b) Female c) Other
What is your educational status?	a) Primary school or less b) Secondary school c) Tertiary school (any)
What is your marital status?	a) Single b) Married
What is your employment status?	a) Student b) Unemployed c) Casually employed d) Full-time employment
Section 2. Technology use	
Has the lock down forced you to use more technology?	a) Yes b) No
If yes, what do you use technology for?	_____
Where you unsure about using technology/ online methods before?	a) Yes b) No
If yes, what made you feel uncomfortable?	_____
How do you feel about the increased forced use of technology?	_____
Will you continue to use technology after the lock down?	a) Yes b) No
Do you have enough information/knowledge regarding COVID-19?	a) Yes b) No
What is your main source of information for COVID-19?	a) Multimedia (Radio, television, newspaper) b) Health organizations and professionals c) Mobile phone content
Have you used your mobile phone for health information before the COVID-19 outbreak?	a) Yes b) No
If yes, what was your main source of health information?	a) Mobile apps b) Social media posts c) Messaging platforms (WhatsApp, SMS d) Web searches (ex. Google) e) Government/institutional websites (ex. NDOH, WHO, CDC) f) email

Section 3. Structured COVID-19 questionnaire	
What is Novel Coronavirus (COVID-19)?	a) It is a bioweapon b) It is a very contagious respiratory virus c) It is a sexually transmitted infection d) It is just another term for the common cold e) It is transmitted through respiratory droplets
What are transmission routes of COVID-19	a) It is transmitted through respiratory droplets b)It is transmitted through direct blood contact c) It is transmitted through sexual intercourse d) It is transmitted by eating Chinese food
How COVID-19 can be spread?	a) Through coughing or sneezing b) By touching objects that have COVID respiratory droplets c) Through close contact with an infected individual d) All of the above
What are the signs and symptoms of coronavirus?	a) Fever b) Cough and sore throat c) Shortness of breath d) All of the above
Corona virus can be prevented by	a) Avoiding contact with sick people b) avoid touching your face c) Wash your hands thoroughly d) All of the above
Wash your hands with soap or sanitizer for at least	a) 5 seconds b) 10 seconds c) 20 seconds d) 1 minute
To stop spread corona virus you should	a) Self isolate b) Practice social distancing c) Wash your hands thoroughly d) All of the above
How can you stop the chance of spreading corona virus?	a) Self isolate and practice social distancing b) Cough or sneeze into a tissue or your elbow c) Wash your hands thoroughly d) All of the above
What you will do when suspected that you have symptoms of coronavirus?	a) Rush to nearest hospital for testing b) Call emergency hotline or WhatsApp support line c) Stay in close physical contact with friends/family for support d) Go to the pharmacy to get medication
Important key to prevent from spreading of COVID-19 is?	a) Self isolate b) Practice social distancing c) Wash your hands thoroughly d) All of the above

Supplementary Files

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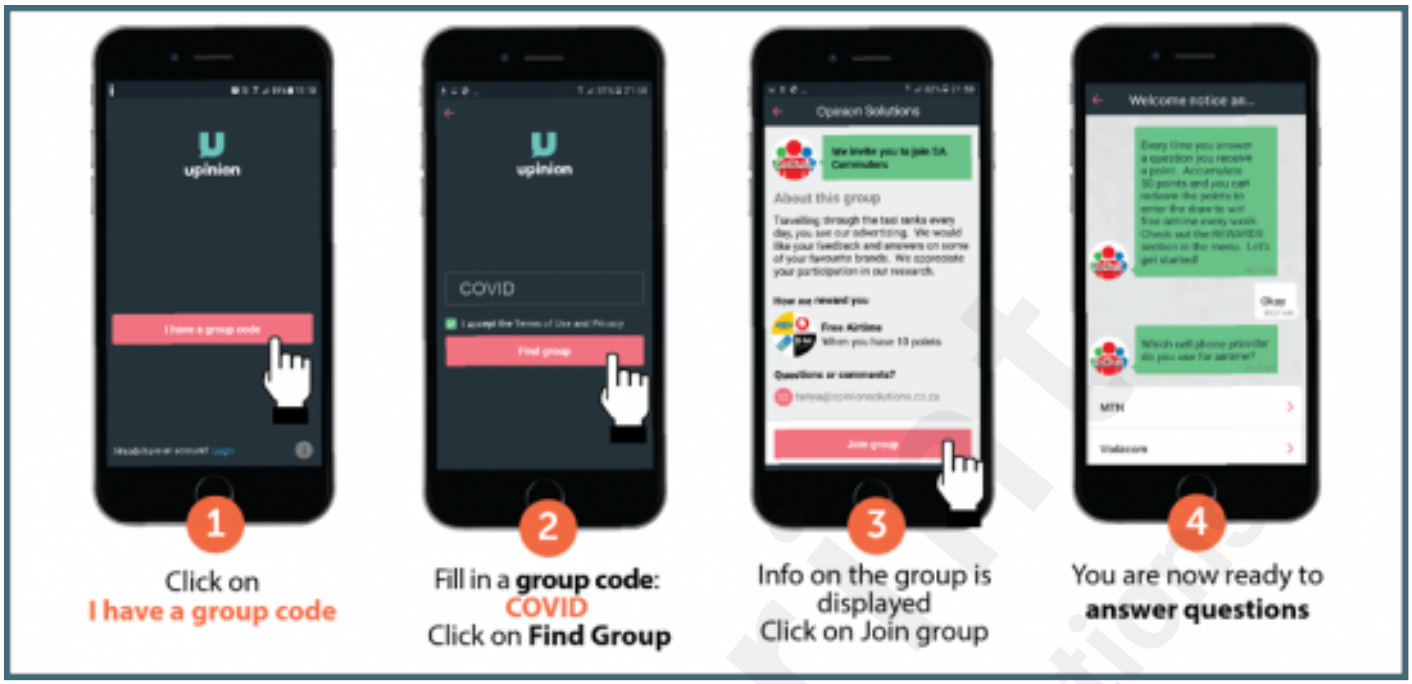
Figures

Upinion screenshots.



Multimedia Appendixes

Table 3. Logistic regression of Technology use.
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Table 5. Logistic regression of COVID-19 knowledge.
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