



**UNIVERSITY OF CAPE TOWN**

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**Socio-economic factors associated with the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa: An internet-based cross-sectional study**

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## **Dedication**

First and foremost, I thank the Almighty for giving me the courage to pursue this undertaking in a very challenging time in my life. To my beloved Mother – this is for you! I have always wanted to make you proud and seek knowledge from cradle to grave the same way you did. You are my biggest inspiration in life. To my children, my I inspire you the way my mother inspired me. I praise the Almighty for granting me a son and husband who held things together while I pursued for this achievement. To the rest of my family – Shukran!

# Thesis Abstract

## Background

At the beginning of the COVID-19 outbreak, preventive measures seemed the most appropriate method to control its spread. Thus, understanding of the socio-economic factors associated with the knowledge, attitude, and practice in response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa is crucial. This study adapted the WHO Europe Covid KAP questionnaire on “knowledge, risk perceptions, preventive behaviours and trust to inform pandemic outbreak response” (World Health Organisation, 2020) to the South Africa context.

## Methods

This study assessed the knowledge, attitudes, and practices relative to the socio-economic factors associated with health in Western Cape, South Africa in relation to the covid-19 pandemic by conducting an online survey in the Western Cape. Participants were invited to complete a questionnaire online.

This study used a Likert scale using various ranges, such as ,“extremely likely” to “extremely unlikely ” in combination with point scale to assess the relationship among the knowledge, attitudes, and practices -KAP- of the South African public regarding response to the 2019 novel coronavirus (COVID-19) and socioeconomic factors associated with KAP. To describe the Knowledge, Attitude and Practice profile, a score was designed for each index. Each index had varying score ranges as the number of questions in each domain was not the same. The KAP score was computed as the row total of all the questions that are in that domain and then recoded into a range which reflected if it was poor, fair or good. Ordered logistics regressions were then run for KAP to see the association between each dimension to socioeconomic factors.

## Results

The scale showed excellent psychometric properties across knowledge, attitude, and practice. The findings from the regression models across knowledge, attitude, and practice showed that age, residence status, household size and income source were significant socioeconomic factors associated with knowledge, attitude, and practice in response to the 2019 novel coronavirus (COVID-19) in the Western Cape, South Africa.

## Conclusion

The results suggest that ‘practices’ in response to covid-19 are significantly associated with socioeconomic status (SES), residence status, household size and income. During pandemics as experienced during COVID-19, socio-economic status has shown to influence the practices of the general public.

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# 1. PART A: Research Protocol

## 1.1 Introduction

Pandemics existed long before humans were aware of them, dating back to 165 AD, with plagues like the *Antoninian plague* (165 AD), *Justinian's plague* (541-542), and the *Black Death* (1346-1353), in which infections spread across countries and killing millions (Hays, 2005). Years before scientists classified disease events as pandemics, people labelled them “acts of the angry gods,” prompting people to react with caution, leading to economic paralysis (Hays, 2005). To give just a perspective of some of the pandemics man-kind has struggled with to date, cholera origins date back as far as 1817 with its origin in Asia, but today it still problematic in modern today (Ryan, 2011). Cholera is known to spread through food and water contaminated with the bacterium (Azman *et al.*, 2013). The 5<sup>th</sup> cholera pandemic in 1818 killed more than 1.5 million people globally (Jamison, 2018).

The last outbreak of cholera was reported in 2017 in Yemen and was classified by WHO as the worst cholera outbreak in the world (Kennedy, Harmer and McCoy, 2017). Cholera is still endemic in 50 countries worldwide and infecting anywhere between 3 to 5 million people annually (Ryan, 2011). With years of experience with outbreaks of cholera, many medical experts fear it, knowing that an outbreak can severely impact not only the health system but also the economy. A 2013 study conducted in Bangladesh found that those at high risk of contracting the disease had poor knowledge of the disease resulting in poor prevention practices (Wahed *et al.*, 2013).

The worst pandemic of the 19<sup>th</sup> century was the influenza pandemic called the “*Spanish Flu*” which killed between 20 to 50 million people between 1918 and 1919 worldwide (Taubenberger and Morens, 2006). Knowledge about the 1918 flu at the time was limited, no one knew why it was so dangerous, there was not any cure for it and thus peopled at the time believed that the best cure was bed rest (Edition, 2002). The 1918 Spanish flu presented itself in many cases as pneumonia, and medical professionals at the time thought it to be something much more dangerous than the “flu” and associated it with pneumonic plague (Edition, 2002). Many cities in America during the pandemic doubted and the havoc Spanish flu could present until the city experienced it themselves (Edition, 2002). Households tried their home remedies to try and fight the *Spanish flu* with these remedies showing no positive results against the virus (*The Story of Influenza - The Threat of Pandemic Influenza - NCBI Bookshelf*, no date). The presence of war at the time prompted governments later, especially in the USA and

Europe, to take action and schools, theatres, churches, taverns and markets were all closed down (Hays, 2005). The USA further demanded that the public wear masks that covered their mouth, this instruction was received with resistance from the public as some referred to it as an “infringements of civil liberty” and others donned it as a civic joke (Hays, 2005).

Rumours by the boards of health in California further encouraged resistance of mask-wearing, claiming that masks were infected, and in places like Pittsburg and London, the closure of theatres and cinemas was condemned(Hays, 2005). Mass campaigns such as anti-spitting and fumigation took place to reduce infections and the implementation of quarantines, without geographical isolation, often seemed ineffective as the influenza virus infected so many people so quickly (Hays, 2005). Many Asian and African countries did not implement the drastic preventative measures of the US and Europe based on its involvement in the world war and that their countries simply did not have the resources or the money to combat the virus (Hays, 2005). In South Africa, 60 percent of the deaths were between the ages of 20 and 60 year olds (*The Story of Influenza - The Threat of Pandemic Influenza - NCBI Bookshelf*, no date). The health system was unable to cope with the number of deaths that occurred daily and the biggest problem that seemed to contribute to the number of deaths, particularly in Cape Town, seemed to be overcrowding (Ross-gillespie, 2014). The effects of *Spanish Flu* were later known in South Africa as “*Black October*”(Ross-gillespie, 2014). Knowledge and understanding of how grave the situation was and, thus, people knowing how dangerous it is still came out to help to try and limit the number of deaths seen in the country to the extent that new papers published articles on the comradery between different races and status (Ross-gillespie, 2014).

In the modern era, the severe acute respiratory syndrome (SARS) virus of 2003 affected 37 countries and resulted in 744 deaths even though it only lasted a few months, but because of the misconception and the attitude associated with the virus the Chinese public resisted compliance with preventive measures which led to the rapid spread of the virus in the country (Lin *et al.*, 2011; Jamison, 2018). The experiences in China of the SARS virus proved the importance of monitoring not only public perception but also the economic impact of the disease since it has a direct effect on compliance by the public to precautionary interventions (Lin *et al.*, 2011). The 2009 swine flu (H1N1) pandemic also caused havoc globally, with between 151 700 to 575 500 fatalities (Jamison, 2018). The virus was first detected in Mexico at the end of March 2009 and spread globally, and by the 11 June 2009 the World health organization declared it a pandemic (Lin *et al.*, 2011). This disease caused severe illness and death among healthy young adults (Lin *et al.*, 2011).

## **Background to the study**

From the aforementioned, one can easily deduce that the interactions of pathogens with humans determine the probability of a pandemic threat. Some pathogens have long asymptomatic infectious periods causing undetected infections and has asymptomatic profile that causes difficulty in diagnosis (Jamison *et al.*, 2017). This is the case with the current outbreak of the coronavirus disease as infection presents itself as pneumonia with unknown cause(WHO, 2020b). On the 31<sup>st</sup> December 2019, Wuhan City in China informed the World Health Organization (WHO) of cases of pneumonia that had an unknown cause(World Health Organization (WHO), 2020). By the 3<sup>rd</sup> of January 2020, 44 cases of patients with pneumonia were reported (World Health Organization (WHO), 2020). On the 11<sup>th</sup> February 2020, the WHO named the disease COVID-19 short for coronavirus disease 2019 (World Health Organization, 2020c). COVID-19 is an infectious disease that confronts individuals with symptoms mainly affecting the respiratory systems(WHO, 2020a). These symptoms include a dry cough, fever, body aches, and difficulty breathing, with most infected patients recovering with no special treatment required (World Health Organization, 2020b). Vulnerable populations include the elderly and people who presented with underlying medical conditions (World Health Organization, 2020b), but reports from around the world indicate that no one is immune to the virus (WHO, 2020a).

On the 5<sup>th</sup> March 2020 the South African government announced its first COVID-19 case and simultaneously the National Institute for Communicable disease in South Africa had warned against the stigmatization of those affected by coronavirus (National Institute For Communicable Diseases (NICD), 2020). Initially, all reports indicated that those affected by the disease were linked to countries that had an outbreak of the virus. By the 11<sup>th</sup> March 2020 the COVID- 19 was characterized as a pandemic by WHO (World health Organization, 2020). Since then, 215 countries reported cases, with over 25 million cases reported and over 855 thousand deaths reported by 1st September 2020 (Worldometer, 2020). On the 1st September 2020, South Africa recorded an estimated 627 thousand cases and about 14 thousand deaths attributed to COVID-19 (National Institute For Communicable Diseases (NICD), 2020).

As part of a comprehensive response for COVID-19 prevention and control, South Africa, as well as many other countries, implemented extensive health and hygiene interventions to curb the spread of the disease. Interventions led by WHO included hand washing campaigns, guidance on social distancing, practising respiratory hygiene, awareness on refraining from touching eye, nose and mouth, and informing people on when to seek medical attention

(WHO, 2020a). South Africa also implemented various lock down levels, prohibiting various movement by the general public in an attempt to curb the spread of the disease, this lockdown was followed by social restrictions such as the ban on the sale of alcohol and tobacco (Agency, 2020a). As of 2020, there was no treatment for COVID-19, thus WHO recommends that the best practice for prevention of the spread of disease is through education(WHO, 2020a). Extensive educational campaigns on all social media platforms as well as government agencies were implemented in South Africa, however, adherence to these interventions, is affected by people's knowledge, attitude and practice (KAP) as well as the economic status for the given information to be effective. The main purpose of this KAP study was to examine changes in knowledge, attitudes and practices and socio-economic factors associated with the knowledge, attitude, and practice response to COVID-19 and preventive measures of COVID-19 in South Africa.

### **Problem statement**

From the earlier literature presented in this thesis it can be deduced that pandemics can cause widespread morbidity and mortality. Lower and middle-income countries (LMIC) are usually impacted harder since LMIC have less capacity to deal medically with the widespread outbreaks (Jamison *et al.*, 2017). Studies reviewed have shown that most of the data on the impact of pandemics and the behavioural changes associated to risk were mainly based on high-income countries (de Francisco *et al.*, 2015; Jamison, 2018). Data also shows that in countries with history of political instability and weak institutions, such as South Africa (the history of Apartheid and governments history of corruption), that outbreak response measures such as quarantines can induce violence and tension between governments and its citizens (Jamison *et al.*, 2017).

Coronavirus resulted in a pandemic in 2020, and thus it was essential to promote precautionary behaviour amongst the public. These precautionary measures success was ,however, highly dependent on the correct accepted knowledge of the pandemic and appropriate response from society. Therefore there was an urgent need to understand public awareness of COVID-19 to assist in the management of COVID -19 outbreak in South Africa. By using the Knowledge Attitude and Practices (KAP) approach, information can be obtained to ascertain the success of intervention implementation, inform knowledge gaps for further public health interventions, as well as provide the likelihood of vaccination use in the future. Hence, the aim of this study was to investigate the knowledge, attitudes, and practices of the South African public toward COVID-19 preventive measures as indicated by the government and assess the socio-economic impact of the pandemic.

## **Study rationale**

Despite the unprecedented measures taken by WHO and authorities around the world, it is without doubt that the COVID-19 pandemic has continued to affect millions of people around the world daily (Alves *et al.*, 2021). Death toll from COVID-19 remains high worldwide. As of (June 21, 2021), the COVID-19 pandemic was reported to have already affected an estimated 178 million people, with over 3 million people having died from the disease (World Health Organization, 2020a). Since the beginning of the COVID-19 pandemic, South African authorities like any other countries in the world implemented several measures to control the spread of the disease in the country. Some of the strategies implemented to control the spread of the COVID-19 virus were based on educational campaigns. However, adherence was inconsistent over the course of the pandemic and varied across provinces mainly because of the COVID-19 waves occurring in different times. Zhong *et al.* (2020) argued that people's adherence to prevention and control measures can be greatly influenced by the population's knowledge, attitudes and practices regarding COVID-19 (Zhong *et al.*, 2020a).

Given the latter, the understanding of people's attitudes, beliefs and behaviours is therefore important and relevant. Encouraging the public to engage in these behaviours encourages continued use of these and other recommended personal protective measures to normalize safe practices and reduce the further spread of COVID-19 (Czeisler *et al.*, 2020). The South African literature reviewed showed limited evidence on knowledge, attitude, and practice (KAP), and its socioeconomic determinants. Knowledge, attitude, and practice (KAP) models have been cited to be more often used by researchers in the field of public health to explore people's healthy behaviours (Luo *et al.*, 2022). Therefore, this study primarily examined the relationship between participants' sociodemographic status, COVID-19 knowledge, emotional attitudes, and preventive behaviours as well as the socioeconomic factors associated with knowledge, attitudes, and practices toward COVID-19 and COVID-19 preventive measures.

## **Research objectives**

### **1.2.1 Primary objective**

- ✓ To investigate the knowledge, attitudes, and practices of the South African public toward COVID-19 preventive measures as indicated by the government and assess the associated socio-economic factors.

### **1.2.2 Secondary objectives**

- ✓ To assess the impact knowledge has on COVID-19 preventative practices in the face of socio-economic changes.

- ✓ To assess if attitude changes with high knowledge towards COVID-19 preventative practices.
- ✓ To examine the socio-economic factors associated with knowledge, attitudes, and practices toward COVID-19 and COVID-19 preventive measures.

### **Brief literature review**

Many studies have been conducted using the KAP approach for outbreaks of infectious diseases such as *SARS* and *H1N1* viruses (Deng *et al.*, 2006; Zhong *et al.*, 2020a). Most studies conducted on the *H1N1* virus is community-based. A Chinese study of KAP in the 2009 *H1N1* outbreak reported that most residents understood the risk of infection from coughing and sneezing in close proximity and passed on this knowledge to *SARS* and *Avian influenza* outbreaks (Lin *et al.*, 2011). Furthermore, a Chinese study on the KAP of the *H1N1* virus found differences in knowledge related to educational level and recommended that information should be disseminated based on the understanding and acceptance of people at different socioeconomic levels (Lin *et al.*, 2011). The same study also reported that people overlooked transmission routes such as handshakes and direct contact, and that one-third of the population was aware of food-borne transmission (Lin *et al.*, 2011). This was also related to knowledge and experience with bird flu. The study also found that the more time people were exposed to information about the virus, the more knowledge they gained.

Another study carried out in United Kingdom (UK) assessing perception, anxiety and behaviour changes in the face of *N1H1* pandemic found that even with major government advertising campaigns and media coverage, people in the UK were still not very responsive to preventative measures or behavioural change (Rubin *et al.*, 2009). In a cross-sectional survey conducted in Saudi Arabia on the *Coronavirus MERS*, it was found that woman demonstrated a higher knowledge of the risk and preventative methods of the disease than men (Alnakli, 2016). The study further found, similar to studies conducted in China, that different geographical areas displayed different degrees of knowledge of the virus, highlighting the need for targeted education programs with the country.

A study conducted in Wuhan City in China, using a KAP COVID-19 survey tool which was distributed via various social media platforms, found that among well-educated individuals and predominantly females that the knowledge on the Coronavirus was high (90% of participants) (Zhong *et al.*, 2020a). This study however, like the *H1N1* study in China, also found that residents with lower educational levels and different geographical areas, were less likely to

abide by the recommendations to control the spread of the disease and that the risk-taking behaviour was predominately found among the male gender (Lin *et al.*, 2011).

A survey of the COVID-19 KAP was also conducted on the Iranian general population via an online cross-sectional questionnaire with similar results to the Chinese KAP on COVID-19. An Iranian study found KAP score significantly higher among women, married persons, and those with higher education levels (Erfani *et al.*, 2020a). Between the Iranian (Erfani *et al.*, 2020a) and Chinese KAP of COVID-19 (Zhong *et al.*, 2020a), the Iranian sample displayed less knowledge on transmission route. Similar to the studies conducted in China and Iran using the KAP on COVID-19, a Thailand cross-sectional survey (Srichan *et al.*, 2020) found that among people with worsening economic conditions, lower levels of education lead to significantly different outcomes compared to a study conducted in Iran (Erfani *et al.*, 2020a) and China (Zhong *et al.*, 2020a). This study was conducted differently to that of the Chinese and Iranian study, in that data was collected by trained researchers who requested participants to partake in the study verbally vs the online survey methods of China and Iran (Srichan *et al.*, 2020).

The different economic setting of Thailand survey population produced results that indicated that people with lower income and education levels had less knowledge of COVID-19 and thus displayed different attitude and practices towards the virus (Srichan *et al.*, 2020). Thus, recommendation in Thailand was to drastically improve knowledge amongst residents living close to the northern border of Thailand since they were close to the COVID-19 hotspot areas in which the outbreak had occurred (Srichan *et al.*, 2020). The survey conducted in Thailand (Srichan *et al.*, 2020) was however conducted in the early days of the outbreak, with 57% of participants receiving their information on COVID-19 via television in comparison to Iranian (Erfani *et al.*, 2020a) participants where 82.9% of participants received their information on COVID-19 through social media and internet. Iranian participants, however, produced lower scores in precautionary behaviour compared to Chinese (Zhong *et al.*, 2020a) participants, with 25% of Iranian (Erfani *et al.*, 2020a) participants not wearing masks when in public places and 10% of participants not avoiding crowded place.

The results of these above studies, however, indicate that people respond differently to risk based on culture and location. From the literature reviewed it appears that they are little to none KAP studies on pandemics specifically on the COVID-19 pandemic using the general

population as sample in South Africa, but there are studies in greater Africa and other non-African countries. The response to these outbreaks in South Africa may be different based on the different economic contexts as well as the experience and narratives of those most vulnerable during a pandemic. Given the level of COVID-19 preventive measures information circulating, evidence generated through this study has the potential to provide information that can assist policy with regards to adherence.

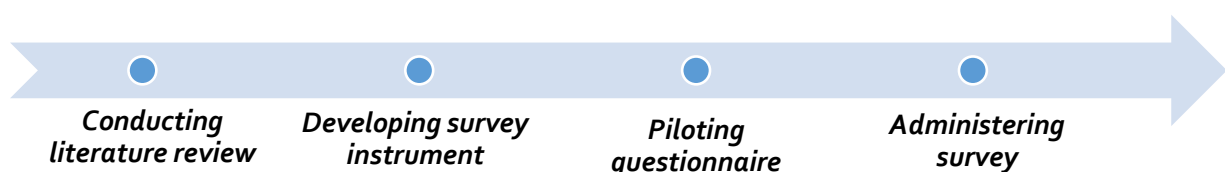
## Methods

KAP studies consist of surveys conducted on population samples to assess levels of knowledge, attitudes, and practices about specific social phenomena. (Memon *et al.*, 2015). The methodology dates back to the early 1950s, initially applied to the area of family planning. They are studies with a simple design that are easy to apply and interpret, capable of producing generalizable quantitative data in short periods. These data, in turn, can serve as a starting point for exploratory qualitative analyses of social norms and other determinants of behaviour (Memon *et al.*, 2015).

### 1.2.3 Study Design

The study used a cross-sectional design and it was conducted in South Africa. At the time of the study it was impossible to do community-based surveys due to the COVID-19 pandemic, hence, data was collected online. Data was collected using an online electronic survey where participants completed the online questionnaire once. The survey was drawn up using *REDCap software*. The process of recruiting participants adopted a non-probability method, as the survey was done through convenience sampling. Supplementary to convenience sampling, snowball sampling was then used where the authors' network was then requested to extend the survey onto their respective contacts which allowed for the available population to partake in the study voluntarily. The author sent a link via online platforms such as "WhatsApp" and "Facebook" to the author's contacts and requests that the link be forwarded on.

#### Part A: Figure 1: Stepwise process of designing and conducting the research



### 1.2.4 Sample and sample size

The targeted sample size was 385 participants which was calculated using a 95% confidence interval and a 50% anticipated internet user's population proportion and a 5% precision. However, due to low response rates the survey ended up with a total sample of 188 participants after data cleaning. Data was collected from South African participants who were 18 years and older. Participants were all from the online community.

### 1.2.5 Conduct literature review

A scoping literature review on the KAP of COVID-19 studies conducted in other countries was done to identify characteristics and differences that were relevant to South Africa and also guide the discussion on why South Africa possibly could have a different outcome than what is reported in literature.

### 1.2.6 Description of tool

A KAP questionnaire developed by WHO – Europe as training material for the detection, prevention, response, and control of COVID-19 was adapted to suit the South African context. Consent to use and adjust the questionnaire was obtained from WHO Europe.

#### Part A : Table 1 ; Questionnaire variables

- Socio-demography and socio-economic
- personal experience with COVID-19
- Health literacy
- COVID-19 risk perception:
- Probability and Severity
- Preparedness and Perceived self-efficacy
- Prevention – own behaviours
- Affect
- Trust in sources of information
- Use of sources of information
- Frequency of Information
- perceptions
- Testing and tracing
- Lifting restrictions (pandemic transition phase)
- Unwanted behaviour
- Wellbeing
- Trust in sources of information

Source : (WHO, 2020c)

The questionnaire consisted of multiple-choice questions and open-ended questions. The questionnaire was only available in the English. The questionnaire was adapted and validated by researcher and was pilot tested before rolling out the survey to ensure that it fitted within the country context.

### **1.2.7 Piloting questionnaire**

The Pilot test of the questionnaire assessed the reliability and validity of the questionnaire in achieving the aims of the research. The piloting of the study was done as a quality checkpoint to gauge respondent understanding of the questionnaire and assess the suitability of the layout and structure of the questionnaire. For the pilot testing of the questionnaire the researcher employed convenience sampling. The pilot questionnaire was given to participants from the researchers' network. Ten participants were selected to partake in the pilot survey. The pilot questionnaire was sent to participants via a website link. Any discrepancies and errors found during the data collection phase and assessment of results in the pilot questionnaire, was then corrected before the administration of the final questionnaire.

### **1.2.8 Data Collection**

Data collection was done using the *REDCap* software. The survey was completed on a voluntary basis. Demographic variables as well as variables on knowledge, attitude and practices regarding COVID-19 were assessed.

### **1.2.9 Data Safety and monitoring**

*REDCap* was used to control access to data collected. Data collected was password protected and saved to an encrypted hard drive. A secondary encrypted hard drive was used for backing up data. The data collected is the intellectual property of The University of Cape Town (UCT) and continues to be handled in accordance with UCT Data Management policy.

### **1.2.10 Statistical analysis**

For data management, data exploration and analysis, this study will use Stata version 17.0 (Stata Corp, Texas, United States).

### **1.2.11 Research limitations**

It was impossible to conduct face to face interviews and collect data during the COVID-19 pandemic due to COVID-19 lockdowns and COVID-19 restrictions. The latter had a huge strain on the study response rate as a result the study only manage to recruit about 75% of the targeted sample size and losing about 10% of the participants during data cleaning mainly

because of missing data. As a result the analysis was based on about 65% of the targeted sample size. A 65% sampling rate is considered an acceptable response rate for online surveys, as only 25% to 30% without follow-up is expected for surveys sent via e-mail (Cook, Heath and Thompson, 2000). In a paper by Schaefer and Dillman, it was highlighted that the average response rate for email surveys was 42.6% with the maximum being 63% which was attributed to the fact that respondents examined their emails thoroughly with less “junk” email at the time (Schaefer and Dillman, 1998). Ethical considerations were associated with follow up emails because some considered this approach as badgering the sample population to complete the survey (Schaefer and Dillman, 1998). KAP surveys are based on opinion and statements provided by respondents, but respondents actual behaviour may prove different. As a result the findings of the study must be taken with caution as the actual respondents behaviour might vary with how they have portrayed their behaviour in the survey.

Since the survey is mainly completed online, participants who had no access to internet or participants from underprivileged backgrounds might have been excluded from the survey. Another limitation is the method used to obtain participants, convenience and snowball sampling may have impacted on the representativeness of the sample. Due to limited time and funding, the survey was available in English and thus a limitation as those whose first language was not English might have had difficulties in understanding and answering the questions. It should be noted that the cross-sectional design did not allow the assessment of actual causal relations and only revealed snapshots of the current state of the public perceptions and behaviours at the point in time when data was collected.

#### **1.2.12 Ethical considerations**

While the study may be considered a minimal risk study, involving only a questionnaire, some ethical considerations were still needed. This study conformed to the World Medical Association Declaration of Helsinki on Ethical Principles for Medical Research Involving Human Subjects (World Medical Association, 2013). Informed consent for the survey were obtained from the respondents. For this study ethics approval was sought and approved (HREC 724/2020) by the University of Cape Town’s Human Research Ethics Committee (HREC).

#### **1.2.13 Potential risks/discomforts**

The questionnaire did ask participants several questions which could in some circumstances cause them some degree of distress thus several support mechanisms were set in place to reduce the risk of distress:

- Potential participants had the right to withdraw at any point while completing the questionnaire should they feel the need to do so.
- Participants were assured their privacy when completing the survey and contact details of breach of confidentiality will be provided to participants in the information page.
- At the end of the questionnaire participants will be given links that included details of useful websites that provided advice and information on COVID-19.

The information obtained from the questionnaire was kept completely confidential and was accessed by the research team only. The survey did not include any data that might have risked the confidentiality of respondents. The benefits of this study were expected to accrue to both individual and the society. This study may help respondents clarify their own thought processes and interrogate their values regarding their behaviour and attitude during COVID-19 pandemic. It may provide participants with an opportunity to think about the pandemic holistically process and clarify their own choices and may introduce variables they had previously not thought about. Participants may feel a sense of contribution for being able to participate in the survey and shaping the country's pandemic response. The information obtained from this research will be used for academic purposes only.

## **Budget**

### **Part A : Table 2; Budget for this study**

<b>Item</b>	<b>Details</b>	<b>Amount</b>
<b>Stationary</b>	Inclusive of data storage; the bindings of various study sections; it also includes other supplies such as paper and pens.	R 2 500
<b>Transport</b>	Domestic travel (transportation, accommodation, meals)	R 2 000
<b>Communication</b>	Internet and phone call costs	R 800
<b>Overhead cost</b>	@10% of all other costs	R 530
<b>Total</b>		R 5 830

## References

- About alert system | South African Government* (no date). Available at: <https://www.gov.za/covid-19/about/about-alert-system#> (Accessed: 14 October 2023).
- Agency, S.A.N. (2020) *NICD warns against Coronavirus stigma | SANews*, 3 March 2020. Available at: <https://www.sanews.gov.za/south-africa/nicd-warns-against-coronavirus-stigma> (Accessed: 29 March 2020).
- Al-Dmour, H. *et al.* (2020) 'Influence of Social Media Platforms on Public Health Protection Against the COVID-19 Pandemic via the Mediating Effects of Public Health Awareness and Behavioral Changes: Integrated Model', *Journal of Medical Internet Research*, 22(8). Available at: <https://doi.org/10.2196/19996>.
- Alahdal, H., Basingab, F. and Alotaibi, R. (2020) 'An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia', *Journal of infection and public health*, 13(10), pp. 1446–1452. Available at: <https://doi.org/10.1016/J.JIPH.2020.06.015>.
- Allegrante, J.P., Auld, M.E. and Natarajan, S. (2020) 'Preventing COVID-19 and Its Sequela: "There Is No Magic Bullet... It's Just Behaviors"', *American Journal of Preventive Medicine*, 59(2), p. 288. Available at: <https://doi.org/10.1016/J.AMEPRE.2020.05.004>.
- Alshareef, N., Yunusa, I. and Al-Hanawi, M.K. (2021) 'The influence of COVID-19 information sources on the attitudes and practices toward COVID-19 among the general public of Saudi Arabia: Cross-sectional online survey study', *JMIR Public Health and Surveillance*, 7(7), p. e28888. Available at: <https://doi.org/10.2196/28888>.
- Azlan, A.A. *et al.* (2020) 'Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia', *PloS one*, 15(5). Available at: <https://doi.org/10.1371/JOURNAL.PONE.0233668>.
- Baig, M. *et al.* (2020) 'Predictors of misconceptions, knowledge, attitudes, and practices of COVID-19 pandemic among a sample of Saudi population', *PloS one*, 15(12). Available at: <https://doi.org/10.1371/JOURNAL.PONE.0243526>.
- Bureau, U.R. (2021) 'Analysing long-term socio-economic impacts of COVID-19 across diverse African contexts'.
- Cook, C., Heath, F. and Thompson, R.L. (2000) 'A meta-analysis of response rates in Web- or internet-based surveys', *Educational and Psychological Measurement*, 60(6), pp. 821–836. Available at: <https://doi.org/10.1177/00131640021970934>.
- COVID-19 Risk Adjusted Strategy - SA Corona Virus Online Portal* (no date). Available at: <https://sacoronavirus.co.za/covid-19-risk-adjusted-strategy/> (Accessed: 14 October 2023).
- Department Health Republic of South Africa (2020) 'Medical Certification of Deaths Due to COVID-19'.
- Erfani, A. *et al.* (2020) 'Knowledge, Attitude and Practice toward the Novel Coronavirus (COVID-19) Outbreak: A Population-Based Survey in Iran', (March). Available at: <https://doi.org/http://dx.doi.org/10.2471/BLT.20.256651>.
- First Covid-19 deaths in South Africa announced as infection toll reaches 1,000* (no date). Available at: <https://www.dailymaverick.co.za/article/2020-03-27-first-covid-19-deaths-in-south-africa-announced-as-infection-toll-reaches-1000/> (Accessed: 15 October 2023).
- Freimuth, V.S. *et al.* (2017) 'The Role of Risk Perception in Flu Vaccine Behavior among African-

American and White Adults in the United States', *Risk Analysis*, 37(11), pp. 2150–2163. Available at: <https://doi.org/10.1111/risa.12790>.

Hassan, A. *et al.* (2021) 'Public Knowledge, Attitudes, and Practice towards COVID-19 Pandemic in Saudi Arabia: A Web-Based Cross-Sectional Survey', *Medical Sciences 2021, Vol. 9, Page 11*, 9(1), p. 11. Available at: <https://doi.org/10.3390/MEDSCI9010011>.

Hays, J.. (2005) *Epidemics and Pandemics: Their Impact on Human History*. Edited by S. Danver, L. Esterman, and A. Martinez. ABC-CLIO, Inc.

*How to end tobacco use for good: What SA's COVID tobacco ban has taught us - Bhekisisa* (no date). Available at: <https://bhekisisa.org/article/2021-07-23-how-to-end-tobacco-use-for-good-what-sas-covid-tobacco-ban-has-taught-us/> (Accessed: 15 October 2023).

Huynh, G. *et al.* (2020) 'Knowledge, Attitude, and Practices Regarding COVID-19 Among Chronic Illness Patients at Outpatient Departments in Ho Chi Minh City, Vietnam', *Risk Management and Healthcare Policy*, 13, p. 1571. Available at: <https://doi.org/10.2147/RMHP.S268876>.

Jamison, D.T. *et al.* (2017) *Disease Control Priorities, Third Edition (Volume 9): Improving Health and Reducing Poverty*. Third Edit, *Disease Control Priorities, Third Edition (Volume 9): Improving Health and Reducing Poverty*. Third Edit. © 2018 International Bank for Reconstruction and Development / The World Bank. Available at: <https://doi.org/10.1596/978-1-4648-0527-1>.

Kasemy, Z.A. *et al.* (2020) 'Knowledge, Attitude and Practice toward COVID-19 among Egyptians', *Journal of epidemiology and global health*, 10(4), pp. 378–385. Available at: <https://doi.org/10.2991/JEGH.K.200909.001>.

Ladan, A. *et al.* (2020) 'COVID-19 Pandemic and Social Media News in Nigeria: The Role of Libraries and Library Associations in Information Dissemination Bala Haruna COVID-19 Pandemic and Social Media News in Nigeria: The Role of Libraries and Library Associations in Information Dissemination', *International Journal of Innovation and Research in Educational Sciences*, 7(2), pp. 2349–5219. Available at: <https://www.researchgate.net/publication/341575045> (Accessed: 16 October 2023).

Lin, Y. *et al.* (2011) 'Knowledge, Attitudes and Practices (KAP) related to the Pandemic (H1N1) 2009 among Chinese General Population: A Telephone Survey', *BMC Infectious Diseases*, 11(1), pp. 1–9. Available at: <https://doi.org/10.1186/1471-2334-11-128>.

Made, F. *et al.* (2021) 'Impact of level five lockdown on the incidence of COVID-19: lessons learned from South Africa', *The Pan African Medical Journal*, 39(144). Available at: <https://doi.org/10.11604/PAMJ.2021.39.144.28201>.

Mofijur, M. *et al.* (2021) 'Impact of COVID-19 on the social, economic, environmental and energy domains: Lessons learnt from a global pandemic', *Sustainable Production and Consumption*, 26, p. 343. Available at: <https://doi.org/10.1016/J.SPC.2020.10.016>.

Schaefer, D.R. and Dillman, D.A. (1998) 'Development of a Standard E-Mail Methodology: Results of an Experiment', *Source: The Public Opinion Quarterly*, 62(3), pp. 378–397.

Singh, A., Ahuja, R. and Student, M.P.H. (2020) 'Knowledge, Attitude, and Practice of General Public Towards COVID-19 in India: An Online Cross-Sectional Study', *International Journal of Innovative Research in Science, Engineering and Technology* [Preprint]. Available at: <https://doi.org/10.15680/IJIRSET.2020.0906009>.

South African Government (2020) 'Summary of Alert Levels', (0800), p. 999. Available at: <https://www.gov.za/covid-19/about/about-alert-system#:~:text=Adjusted alert level 1 is,June to 25 July 2021>.

Taubenberger, J.K. and Morens, D.M. (2006) '1918 Influenza: The mother of all pandemics', *Emerging Infectious Diseases*. Centers for Disease Control and Prevention (CDC), pp. 15–22. Available at: <https://doi.org/10.3201/eid1209.05-0979>.

*Technical guidance* (no date). Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance> (Accessed: 15 October 2023).

*Timeline | A look back at the past two years of lockdown | City Press* (no date). Available at: <https://www.news24.com/citypress/news/timeline-a-look-back-at-the-past-two-years-of-lockdown-20220323> (Accessed: 13 October 2023).

WHO (2020) 'Advice for public', *WHO*. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public> (Accessed: 29 March 2020).

Zhong, B.L. *et al.* (2020) 'Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey', *International journal of biological sciences*, 16(10), pp. 1745–1752. Available at: <https://doi.org/10.7150/ijbs.45221>.

## **2. PART B: Literature Review**

### **Introduction**

This section describes: 1) relevant evidence of community knowledge, attitudes and practices related to COVID-19; 2) Knowledge, Attitudes and Practices (KAP) theoretical framework. 4) theoretical problems with the KAP on the 2019 novel coronavirus (COVID-19), 5) socioeconomic factors related to KAP on COVID-19 and COVID-19 precautions. The purpose of this section was to review research on factors associated with the 2019 novel coronavirus (COVID-19) and COVID-19 precautions knowledge, attitudes, and practices. The studies included in the review are from the following databases: GOOGLE SCHOLAR, ECONLIT, MEDLINE, AFRICA WIDE INFORMATION, PUBMED, CINAHL. Included search terms (Knowledge, Attitude, Practice, KAP, Novel Coronavirus, COVID-19, Coronavirus). A manual search of the references of the included articles was also performed to complement the review.

### **Theoretical literature review**

Various factors can lead to the inappropriate use or lack of use of Covid-19 health guidelines in communities. Lack of knowledge, people's perceptions and financial benefits or losses have been reported as reasons for not following health protocols. This section aims to display relevant evidence of community knowledge, attitudes and practice in relation to COVID-19. Further, factors contributing to non-compliance of Covid-19 protocols studies in community will be discussed, highlighting the current research gaps that will be explored through the study. The theoretical review examines the main concepts of this thesis – Knowledge, Attitude and practices. The theoretical literature review section will be composed of: 1) description of the knowledge, attitude, and practice (KAP) theoretical frameworks; 2) theoretical issues on the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19); 3) theoretical explanations for socioeconomic factors associated with knowledge, attitudes, and practices toward COVID-19 and COVID-19 preventive measures. The literature included in this section was obtained from electronic database' searches including google scholar, PubMed, Medline, ECONLIT and Google.

### **Programmes implemented to influence KAP**

Due to a wide variation of channels used to provide information on health topics, specifically COVID-19, it is difficult to determine what works and how, and efforts to compare approaches

are complicated. The WHO, regulatory authorities and health care professionals made use of social media platforms to inform on public health issues during COVID-19 pandemic. Scholars have reported that evidence of the impact of social media on health knowledge, behaviour, and outcomes show that these tools can be effective in meeting individual and population health needs.

The Jordanian government undertook targeted national disease control initiatives, utilizing a number of media campaigns such as posters, and television commercials and printed media, government websites and social media, to raise public awareness of COVID-19 pandemic (Al-Dmour *et al.*, 2020). Saudi Arabia in Ministry of Health (MoH) acted as the key and official source responsible for communicating information so that they could maintain a reliable and consistent flow of information relating to COVID-19. The MoH used traditional media including television, radio, and text messages as well as technology and high quality digital health programs such as videos were used to distribute information to the public (Alshareef, Yunusa and Al-Hanawi, 2021). In Nigeria it was found that because Government did not respond immediately to their first COVID-19 cases, it was found that fake news disseminated through the public social media platforms creating doubt confusion in the minds of the public (Ladan *et al.*, 2020).

In a study published by Marivate and Combrink (2020) it was found that South Africa government did not prioritise the dissemination of data to the general public (Al-Dmour *et al.*, 2020). Marivate and Combrink (2020) found that the two most popular platforms used by the general public was the National Institute for Communicable Disease (NICD), which provided limited information on COVID-19 that was specific to South Africa, and the Department of Health Website that was updated regularly but not user friendly to the public (Al-Dmour *et al.*, 2020).

### **The knowledge, attitude, and practice (KAP) theoretical frameworks**

KAP studies measure community knowledge, attitudes and practices and serve as an educational diagnostic of communities. The World Health Organisation (WHO) (World Health Organisation, 2014), reported that using knowledge, attitude, and practice (KAP) models in conducting research aids in collecting information on the knowledge, opinion, attitude, and behavioural practice of relevant specific groups. As a result this could be more useful for more relevant specific groups to collect and understand the relationships between knowledge, attitudes and behaviours which can be further used as criteria for evaluating relevant programs and interventions.

Knowledge, attitudes, and practices are key components of behaviour change models (Liao, Nguyen and Sasaki, 2022). Knowledge is the comprehension of information, the conscious, non-symbolic perception of meaning (Wessman, 2006). Knowledge can be subdivided into four categories: (i) scientific and social scientific knowledge; (ii) local knowledge; (iii) tacit knowledge; and (iv) self-reflective knowledge (Hulme, 2018). While attitude has been defined as a positive or negative evaluation of an objective (Ajzen and Fishbein, 2000). Practice refers to regular activities that are influenced by widely shared social norms and beliefs (Cislaghi and Heise, 2018).

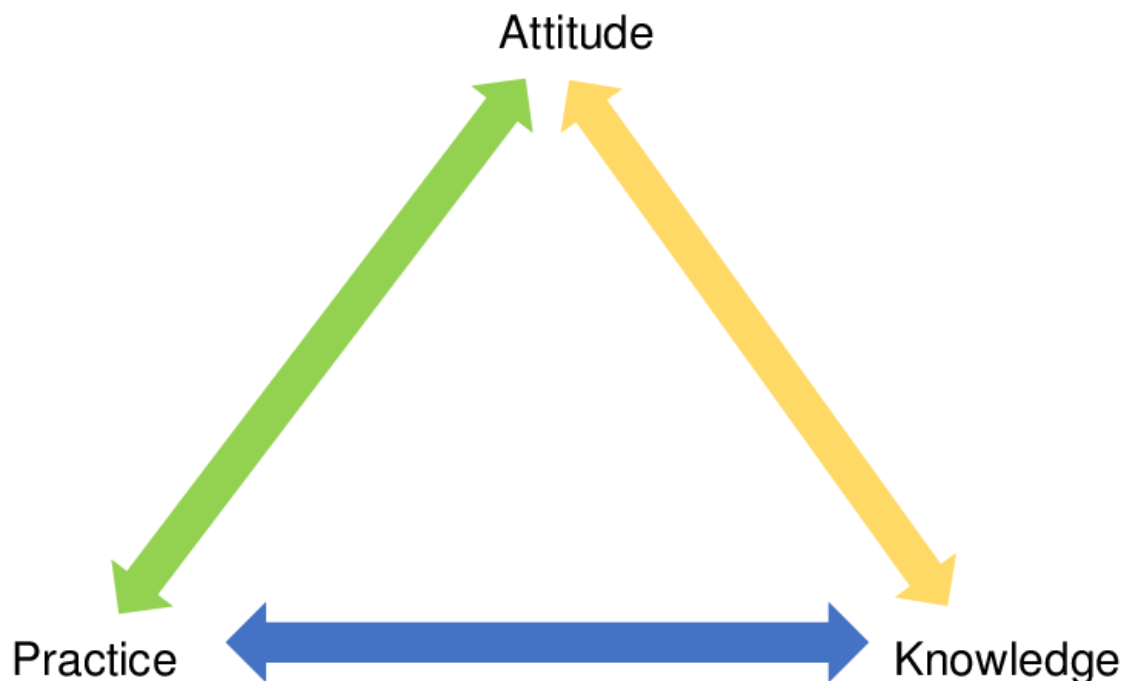
The process of the KAP model stems from learning theory (Bandura and Walters, 1977) and dissemination of innovation theory (Rogers, 1995). Members of social systems have been cited to embrace innovation through four stages over time (Rogers, 1995). The phases include knowledge acquisition, persuasion, decision, and confirmation. Individual behaviour has been argued to be learned through social context (Bandura and Walters, 1977). Another perspective used to look at behavioural change is Ajzen's (1991) planned behaviour theory, which provides a framework for understanding the relationship between behavioural intentions and behavioural attitudes (Ajzen, 1991). Regarding the relationship between knowledge and practice, Hungerford and Volk (1990) suggested that knowledge of a problem and possession of skills are necessary for behavioural change (Hungerford and Volk, 1990).

Based on family planning and census studies of the 1950s, the KAP model was developed and recognized as a common research tool in social research. The KAP model can be used to assess relationships between knowledge, attitudes, and practices (Vandamme, 2009). A KAP model is a structured, standardized questionnaire completed by a target group that enables quantification and analysis of knowledge (knowledge), beliefs (attitudes), and behaviours (practices) related to a topic of interest (Nguyen, Seddaiu and Roggero, 2019; Andrade, Menon, Ameen and Kumar Praharaj, 2020). KAP model data can therefore help identify knowledge gaps, attitude barriers, and behavioural patterns that drive understanding and action on specific issues (World Health Organisation, 2008).

KAP measures measure the scale of a situation and are often used in cross-sectional studies when planning public health interventions (Andrade et al., 2020). KAP tools are typically used to provide a snapshot of a particular time and place based on what people know, how they are feeling, and what they are doing in a given situation. It is a tool of choice over other means

of understanding society. The results are used to guide the implementation of public health interventions with outcomes that produce desirable social behavioural changes (Muleme *et al.*, 2017). This model has been used in health research for decades and continues to serve as a potentially valuable resource. Data from KAP studies can be used to identify the behaviors, attitudes, and desires of different demographic groups on social issues (Andrade *et al.*, 2020).

**Part B: Figure 1 Knowledge, Attitude & Practice model**



Source : (Bano *et al.*, 2013)

**Error! Reference source not found.** is a model by Bano *et al.* summarizes the KAP model and captures three aspects: Knowledge (what respondents know), attitudes (what respondents think and believe), and practices (what they do).

### 2.2.1 Knowledge and Behaviour

The provision of disease knowledge to educate the public is seen as a strategy to help people adopt preventive health behaviours (Lunsford *et al.*, 2018). Therefore, knowledge about disease and health is considered to be the key to whether a person behaves in a healthy way, and the more knowledge about health, the better healthy behaviour they will adopt (Siddiquea *et al.*, 2021; Teng *et al.*, 2021). From a health literacy perspective, acquiring knowledge and understanding of health and disease is essential for effective self-management of health and disease (Collins *et al.*, 2012). Also, people's health literacy plays an important role in

understanding specific health knowledge. It is evident in literature that public knowledge is important in tackling the pandemics (Ajilore, Atakiti and Onyenankeya, 2017; Podder *et al.*, 2019). Assessing public perceptions and knowledge of the virus will provide greater insight into existing public perceptions and practices and attributes that influence them in adopting healthy practices and response behaviours (Person *et al.*, 2004).

### **2.2.2 Attitude and Behaviour**

Liu, Teng, and Han (Liu, Teng and Han, 2020) stated that knowledge alone is insufficient or may be the only factor influencing behaviour. The effects of knowledge on relevant behaviours were cited as indirect, with other moderator variables among them. Attitude was one of them. Along with knowledge, attitudes also have been reported as motivations that guide individual behaviour and stimulate an individual's intention to take a particular action (Rucker, 2021a). Attitudes are a person's general and ongoing appraisals of objects, and these appraisals are multidimensional and usually divided into two dimensions: cognitive and emotional (Eagly and Chaiken, 1993). Cognitive attitude (i.e., instrumental attitude) refers to values and beliefs associated with objects, or beliefs about the costs and benefits of actions, while affective attitudes refer to emotional experiences about objects based on emotions (van den Berg *et al.*, 2006; Phipps *et al.*, 2021; Vanney and Sáenz, 2021). Emotions includes mood, can be both positive and negative and the emotional state is positive when the individual feels good, otherwise it is negative (Harmon-Jones and Harmon-Jones, 2021; Kim, Han and Ariza-Montes, 2021; Seryczynska *et al.*, 2021).

### **2.2.3 Theoretical issues on KAP to the 2019 novel coronavirus (COVID-19)**

Considering that even to date the COVID-19 pandemic is still a public health menace in some countries the individuals' knowledge, attitudes, and practices regarding this COVID-19 pandemic may therefore play an important role in their acceptance of, and willingness to seek and comply with, the measures put in place to contain its spread. Given the continuous rise in the number of cases, resurgence of outbreaks and the overall good knowledge, attitude, and practice (Ngwewondo *et al.*, 2020). The further investigation to determine the effectiveness of the measures put in place to control the spread of this disease is therefore justified. The knowledge-attitude-behaviour model is argued to modify human health-related behaviours by dividing changes into three continuous processes: knowledge acquisition, belief generation and behaviour formation (Rahbar *et al.*, 2007; Liu *et al.*, 2016). Knowledge, attitude, and practice (KAP) models have been cited to be more often used by researchers in the field of public health to explore people's healthy behaviours (Luo *et al.*, 2022).

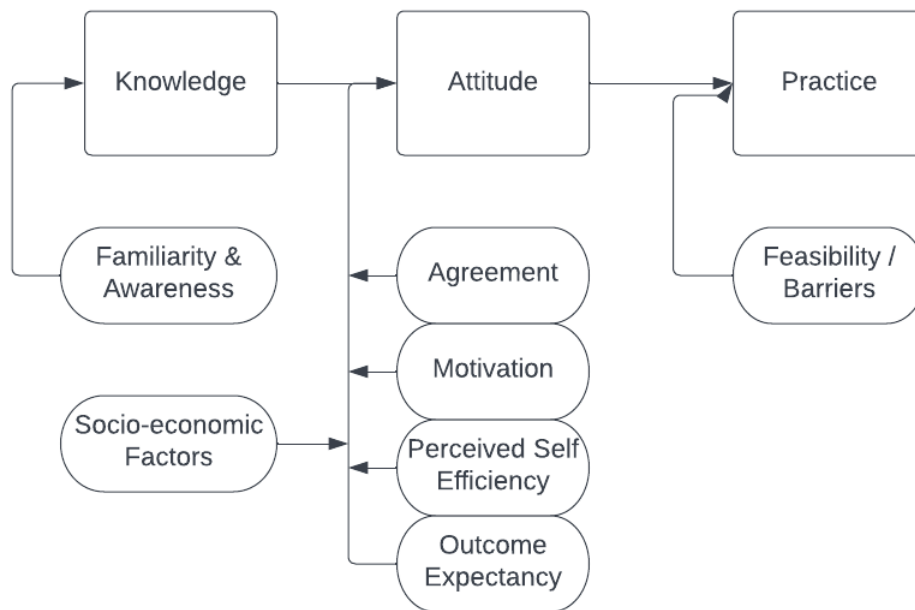
Therefore, many studies have also investigated public perceptions and behaviours towards COVID-19 using KAP-based models (Al-Hanawi *et al.*, 2020; Pal *et al.*, 2020; Zhong *et al.*, 2020b). The KAP model is now widely used in public health research to study people's health behaviours and explain their changes, which can be divided into three aspects: acquiring correct knowledge, generating attitude, and adopting behaviour. Furthermore, advocacy of knowledge is the basis of action, while attitude is the urge to act, prompting individuals to take action to achieve their goals (Hesaraki *et al.*, 2021; Lee, Kang and You, 2021). The understanding is that, as people become more aware of the facts of COVID-19, they will translate what they learn into practical health-promoting actions to improve or maintain their health (Gautam *et al.*, 2021). However, knowledge does not necessarily provoke behavioural responses; Allegrante, Auld, and Natarajan (Allegrante, Auld and Natarajan, 2020a), noted that there was a large gap between respondents' knowledge and actions regarding COVID-19, respondents were not adopting preventive health behaviours against COVID-19 and argued that it was not due to insufficient knowledge about COVID-19, but due to other factors.

Furthermore, the importance of assessing KAP levels in relation to COVID-19 is that knowledge, attitudes, and practices are interrelated (Wake, 2020). They influence each other and their influence can be positive or negative. This was supported by research that reported that knowledge was positively correlated with attitudes and practices (Afzal *et al.*, 2021a). Research also reported that knowledge was significantly associated with both attitudes and practices. This indicates that people with higher knowledge scores have a more positive perception of preventive measures and practice more preventative measures (Papagiannis *et al.*, 2020). Therefore, understanding the relationship between knowledge, attitudes and practices regarding the COVID-19 pandemic is important and essential for improving the strategies needed to manage and control this pandemic.

### **Socioeconomic factors associated with KAP toward COVID-19 and COVID-19 preventive measures**

A Malaysian study showed that attitudes to successfully control COVID-19 significantly associated with age, region, and occupation (Azlan *et al.*, 2020), on the other hand, older age, higher education, employment, monthly income (>30,000 BDT), and more frequent preventive practices were key factors associated with positive attitudes (Ferdous *et al.*, 2020). However, in China research evidence showed that the attitude towards a final success in controlling COVID-19 significantly differed across gender, educational levels, occupation categories, and residence places (Zhong *et al.*, 2020b).

**Part B: Figure 2 Proposed theoretical framework between KAP and socioeconomic factors**



*Source : designed by author*

**Error! Reference source not found.** was designed based on insights from a South Korean study on KAP towards Covid-19 which argued that knowledge directly affects both attitude and practice (Lee, Kang and You, 2021). The study found that belief mediated the relationship between knowledge and preventative behaviours and also that knowledge varied by socio economic circumstances with females and those with high levels of education displayed the highest level of knowledge (Lee, Kang and You, 2021).

### **Conclusion**

Knowledge, Attitude and Practices (KAP) surveys are quantitative methods (defined questions formatted in standardized questionnaires) that provide access to both quantitative and qualitative information. KAP research uncovers misconceptions and misconceptions that can hinder the actions we want to take, as well as potential obstacles to behavioural change. Note that the KAP survey is essentially an “opinion” recording and is based on “declarations” (i.e. statements). In other words, the KAP survey reveals what was said, but there may be considerable gaps between what is said and what is done.

## **Empirical literature review**

The purpose of this section was to review research on factors associated with the 2019 novel coronavirus (COVID-19) and COVID-19 precautions knowledge, attitudes, and practices. The studies included in the review are from the following databases: GOOGLE SCHOLAR, ECONLIT, MEDLINE, AFRICA WIDE INFORMATION, PUBMED, CINAHL. Included search terms (Knowledge, Attitude, Practice, KAP, Novel Coronavirus, COVID-19, Coronavirus). A manual search of the references of the included articles was performed to complement the review. Research included in the review used the Knowledge, Attitudes and Practices (KAP) model or framework. The included studies were published from 2019 to 2022. Excluded research was any article not written in English, if the full article was not accessible, and if the paper does not focus on knowledge, attitudes, and practical responses to the 2019 novel coronavirus (COVID-19). A total of eleven out of the thirty-two studies were reviewed, and all studies included in the review used the Knowledge, Attitudes and Practices (KAP) model or framework.

### **2.2.4 Empirical findings**

Majority of research literature reviewed on attitudes and behavior focused on the cognitive aspects of attitudes, but less on the emotional aspects (Moon *et al.*, 2018). For example, Alahdal, Basingab, and Alotaibi (Alahdal, Basingab and Alotaibi, 2020) reported a significant positive correlation between participants' cognitive attitudes and COVID-19 preventive behaviors (i.e., the belief that taking certain precautions could reduce the spread of the disease). In KAP studies done in Saudi Arabia, India and China on COVID-19, attitude ratings focused primarily on beliefs about anti-pandemic behavior, such as the belief that the pandemic would be brought under control and that handwashing is essential to prevent infection (Al-Hanawi *et al.*, 2020; Pal *et al.*, 2020; Zhong *et al.*, 2020b). Pal *et al.* (Pal *et al.*, 2020) in an Indian study also explored the attitude aspects of COVID-19, they not only assessed individuals' cognitive beliefs about anti-pandemic behavior, but also included emotional assessments such as COVID-19 fear.

While a survey of 559 participants in Egypt showed a satisfactory level of knowledge, with an average knowledge score of 16.39 out of 23 (Abdelhafiz *et al.*, 2020). However, researcher in

Pakistan found that 50.1% were aware of human-to-human transmission and 46.6% had seen a COVID-19 patient and 45.3% were aware of the spread of infection (Afzal *et al.*, 2021b). Meanwhile in Ethiopia a study among chronically ill patients reported that only 33.9% knew enough about the pandemic (Akalu, Ayelign and Molla, 2020). From the studies reviewed one would argue that in the early times of the COVID-19 pandemic there was little to no adequate knowledge about COVID-19.

However, as the COVID-19 pandemic progressed it seemed like communities had a better understanding of COVID-19. For instance, in Saudi Arabia a survey of 1767 participants showed that 95% of participants had high attitudes, with about 99.77% agreed to stay home to limit the spread of the virus, 99.89% having agreed that isolating infected people would help reduce the spread of the disease, and 97.51% having agreed that the spread of infection could be reduced closing of schools and colleges. In the same study about 96.38% agreed that closing malls could aid in slowing the spread of the virus, and 96.49% agreed that halting travel between cities could also slow the spread of the disease (Alahdal, Basingab and Alotaibi, 2020). It is important to note there was a growing significant difference between knowledge levels at the beginning of the COVID-19 pandemic and later times when communities had more exposure to information regarding COVID-19.

Another study conducted in Saudi Arabia among 3,388 participants showed an optimistic attitude towards COVID-19, with a mean score of 28.23 (SD=2.76, range=6–30) (Al-Hanawi *et al.*, 2020). A Malaysian study showed that 83.1% agreed that COVID-19 was well controlled (Azlan *et al.*, 2020). In Bangladesh, a survey of participants in 2017 found that 62.3% of participants had a positive attitude towards COVID-19 (Bhagavathula *et al.*, 2020). A survey conducted among 327 health workers in Vietnam showed that most of them had a positive

attitude towards COVID-19, with an average score of  $1.86 \pm 0.43$  (range = 1-5) (Huynh *et al.*, 2020).

Overall, the results of studies showed that most participants had sufficient knowledge, positive attitudes, and good practices. A small percentage of articles, reflecting a small number of participants, results indicated that some participants had poor knowledge, negative attitudes, and bad habits. In addition, several studies found that most participants in various countries around the world reported inadequate knowledge, negative attitudes, and practices towards COVID-19, as briefly described above. reporting. These reflect the existence of gaps in knowledge, attitudes, and practices regarding the COVID-19 pandemic in various countries around the world. Thus, improvements are still needed to manage and control this pandemic.

### **Conclusion**

From the current literature reviewed it is evident that discrepancies among reported studies regarding knowledge, attitudes, and practices regarding COVID-19 exist across countries. Surveys in Egypt, Pakistan, Saudi Arabia, Malaysia, Vietnam, Jordan, Pakistan, China, Iran, Bangladesh, and Uganda revealed that most respondents had a good knowledge of COVID-19. However, studies from Ethiopia and Bangladesh reported significantly low levels of knowledge about COVID-19. This provides important insights into the relevance of understanding knowledge, attitudes and practices regarding COVID-19 in South Africa. This study therefore provides excellent insight into the KAPs associated with COVID-19 in South Africa and better informs the Ministry of Health on how to better respond to future pandemics.

**Part B: Table 1; Summary of studies that factors associated with the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19**

Author and year	Title of the study	Country of study	Analytical methods	Type of study	Key explanatory variables	Results
Alahdal H, Basingab F, Alotaibi R (2020)	An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia	Saudi Arabia	KAP knowledge, attitude, and practice	A cross-sectional survey	Gender Age Education level Employment status Marital status Family size Income	Among all participants, 58% showed moderate awareness, 95% high attitude and 81% good practice regarding COVID-19. A significant positive correlation was found between postural adjustment ( $r = 0.132$ , $p$ -value $< 0.001$ ) and adjustment practice ( $r = 0.149$ , $p$ -value $< 0.001$ ). Participant gender was the only common feature significantly associated with awareness and practice. However, the study found that male participants (60%) had slightly increased awareness of their practice compared to female participants (57%). In COVID-19, women (82%) performed slightly better than men (80%). The main sources of information were the World Health Organization (WHO) and the Ministry of Health (MOH).
Bao-Liang Zhong <sup>1</sup> , Wei Luo, Hai-Mei Li, Qian-Qian Zhang, Xiao-Ge Liu, Wen-Tian Li <sup>1</sup> , Yi Li <sup>1</sup> , (2020)	Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey	China	KAP knowledge, attitude, and practice	A cross-sectional survey	Age, Gender Marital status Education Occupation Place of current residence	Of those who completed the survey ( $n=6910$ ), 65.7% were female, 63.5% had a bachelor's degree or higher, and 56.2% engaged in intellectual work. The overall accuracy rate for the knowledge questionnaire was 90%. A majority of respondents (97.1%) were confident China could win her fight against COVID-19. Almost everyone (98.0%) wore a mask when going out in the past few days. For multiple logistic regression analysis, the COVID-19 knowledge score (or: 0.75-0.90, $P<0.001$ ) were significantly associated with negative attitudes towards COVID-2019 and less likely precautions.
Pal R, Yadav U, Grover S, Saboo B, Verma A, Bhadada SK. (2020)	Knowledge, attitudes and practices towards COVID-19 among young adults with Type 1	India	KAP knowledge, attitude, and practice	A cross-sectional survey	Age Gender Residence Highest educational status Employment status Monthly family income Marital status	After exclusion, 212 participants were included (mean age = 25.1–4.3 years, M: F = 10:11). The overall percentage of knowledge questionnaires was 83% (overall average knowledge score = 12.4 – 1.9). Most (74%) had an average level of knowledge (average – 1 SD). Higher education, urban residence, and marriage were associated with better knowledge scores. However, only urban dwelling was found to be statistically significant using multinomial logistic regression. Most (88%) felt she was at high risk of

	Diabetes Mellitus amid the nationwide lockdown in India: A cross-sectional survey					contracting COVID-19 as a type 1 diabetic. At the same time, 98% were convinced of self-defence. Her 51% of respondents had left home during the lockdown, mainly to get insulin/needles/syringes/glucometer strips from the pharmacy. However, all maintained good hand hygiene and the majority followed routine dietary advice (95%) and administered insulin as prescribed (99%). Since lockdown began, 72 participants (34%) had had one or more episodes of hypoglycaemia.
Mohammed K. Al-Hanawi, Khadijah Angawi, Noor Alshareef, Ameerah M. N. Qattan, Hoda Z. Helmy, Yasmin Abudawood, Mohammed Alqurashi, Waleed M. Kattan, Nasser Akeil Kadasah, Gowokani Chijere Chirwa and Omar Alsharqi (2020)	Knowledge, Attitude and Practice Toward COVID-19 Among the Public in the Kingdom of Saudi Arabia: A Cross-Sectional Study	Saudi Arabia	KAP knowledge, attitude, and practice	A cross-sectional survey	Age Gender Marital status Education level Work status Region of residence Income level	The majority of study participants were aware of COVID-19. The mean COVID-19 knowledge score was 17.96 (SD = 2.24, range: 3–22), indicating a high level of knowledge. The average setting is 28.23 (SD = 2.76, range: 6–30), showing an optimistic attitude. The practice mean is 4.34 (SD = 0.87, range: 0-5), showing best practices. However, the results showed that men were less knowledgeable about COVID-19 and had less optimistic attitudes and good practices than women. We also found that older people were more likely to have better knowledge and practice than younger people.
Ahmed Samir Abdelhafiz, Zeinab Mohammed, Maha Emad Ibrahim, Hany H. Ziady, Mohamed Alorabi, Mohamed Ayyad & Eman A. Sultan (2020)	Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Coronavirus Disease (COVID-19)	Egypt	KAP knowledge, attitude, and practice	A cross-sectional survey	Age Gender Education level Work status Region of residence Income level	Five hundred and fifty nine persons completed the survey. The mean knowledge score was 16.39 out of 23, gained mainly through social media (66.9%), and the internet (58.3%). Knowledge was significantly lower among older, less educated, lower income participants, and rural residents. Most participants (86.9%) were concerned about the risk of infection. While 37.6% thought that their salary will be continued if they become isolated, 68.5% believed that it should be continued during this period. About 73.0% were looking forward to get the vaccine when available.
Afzal MS, Khan A, Qureshi UUR, Saleem S, Saqib MAN, Shabbir RMK, et al. (2021)	Community-Based Assessment of Knowledge, Attitude, Practices and	Pakistan	KAP knowledge, attitude, and practice	A cross-sectional survey	Education Occupation Gender Age Marital status Ethnicity	A total of 1060 surveys were received. 1004 were included and 56 were excluded. The highest representatives were Punjab (65.6%), female (63%), age group 21-30 (62.1%). Most of the participants were single (85%), Muslim (99.4%), Urdu-speaking (45.6%) and college educated (51.5%). Most of the participants were students (52.9%) and from

	Risk Factors Regarding COVID-19 Among Pakistanis Residents During a Recent Outbreak: A Cross-Sectional Survey					economically middle-class families (40.8%). Knowledge was positively correlated with attitudes and practices, but negatively correlated with risk factors ( $P<0.05$ ). Attitude was negatively correlated with risk factors and positively with practice. Risk factors and practices were positively correlated with each other.
Akalu Y, Ayelign B, Molla MD. (2020)	Knowledge, attitude and practice towards COVID-19 among chronic disease patients at Addis Zemen Hospital, Northwest Ethiopia	Ethiopia	KAP knowledge, attitude, and practice	A cross-sectional survey	Education Occupation Gender Age Marital status	The mean age of participants was $56.5 \pm 13.5$ years. The prevalence of poor knowledge and poor practice was 33.9% and 47.3%, respectively. 41% of participants found it very difficult to avoid crowded populations. Age (AOR=1.05, 95% CI (1.01-1.08)), Literacy (AOR=7.1, 95% CI (1.58-31.93)), Rural (AOR=19.0, 95% CI (6.87-52.66)), and monthly income (AOR=0.8, 95% CI (0.79-0.89)) were significantly associated with lack of knowledge. AOR=3.5, 95% CI (1.48-8.38)), rural residence (AOR=2.7, 95% CI (1.09-6.70)), income less than 7252 Ethiopian birr (AOR=2.3, 95% CI (1.20-4, 15)) and low knowledge (AOR=8.6, 95% CI (3.81-19.45)) were significantly associated with poor practice.
Azlan AA, Hamzah MR, Sern TJ, Ayub SH, Mohamad E. (2020)	Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia	Malaysia	KAP knowledge, attitude, and practice	A cross-sectional survey	Gender Age State of residence Occupation Household income	The overall accuracy rate for the knowledge questionnaire was 80.5%. Most participants were positive about the success of controlling COVID-19 (83.1%), Malaysia's ability to beat the disease (95.9%) and how the Malaysian government is handling the crisis (89.9%). Most participants also took precautions such as avoiding crowds (83.4%) and practicing good hand hygiene (87.8%) the week before the movement restriction order began. However, wearing a face mask was less common (51.2%).
Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi MA, Bandari DK. (2020)	Novel coronavirus (COVID-19) knowledge and perceptions: a survey on	Global	KAP knowledge, attitude, and practice	A cross-sectional survey	Gender Age Residence Occupation	Of the 529 participants, a total of 453 HCWs participated in the survey (response rate: 85.6%); 51.6% were male, 32.1% were between the ages of 25 and 34, and most were physicians (30.2%) and medical students (29.6%). Regarding COVID-19, most participants used social media Media for information (61%) and a significant proportion of healthcare workers had a bad experience showed

	healthcare workers					knowledge and positivity of its infection (61%) and symptom onset (63.6%). Awareness of COVID-19 prevention and control. Factors such as age and occupation were related to inadequate knowledge and awareness of COVID-19.
Huynh G, Nguyen TNH, Vo KN, Pham LA. (2020)	Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City	Vietnam	KAP knowledge, attitude, and practice	A cross-sectional survey	Age Gender Marital status Education level Work status Region of residence Income level	Mean knowledge and attitude scores for a total of 327 qualified HCPs were $8.17 \pm 1.3$ (range 4 to 10) and $1.86 \pm 0.43$ (range 1 to 5), respectively. They showed good knowledge and positive attitude. However, approximately two-thirds of participants were aware of transmission routes, isolation time, and treatment (67.0%, 65.8%, and 58.4%, respectively), and 82.3% and 79.8% were positive about personal risk and family. showed an attitude. member is sick. There was a negative correlation between knowledge score and attitude score ( $r=-0.21$ , $P<0.001$ ). Additionally, the HCW primarily used social media to learn about her COVID-19 (91.1%).

## References

- Abdelhafiz, A.S. *et al.* (2020) 'Knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19)', *Journal of community health*, 45(5), pp. 881–890.
- Afzal, M.S. *et al.* (2021a) 'Community-based assessment of knowledge, attitude, practices and risk factors regarding COVID-19 among Pakistanis residents during a recent outbreak: a cross-sectional survey', *Journal of Community Health*, 46(3), pp. 476–486.
- Agency, S.A.N. (2020) *President Ramaphosa announces a nationwide lockdown | SANews, South African News Agency*. Available at: <https://www.sanews.gov.za/south-africa/president-ramaphosa-announces-nationwide-lockdown> (Accessed: 29 March 2020).
- Ajilore, K., Atakiti, I. and Onyenankeya, K. (2017) 'College students' knowledge, attitudes and adherence to public service announcements on Ebola in Nigeria: Suggestions for improving future Ebola prevention education programmes', *Health Education Journal*, 76(6), pp. 648–660.
- Ajzen, I. (1991) 'The theory of planned behavior', *Organizational behavior and human decision processes*, 50(2), pp. 179–211.
- Ajzen, I. and Fishbein, M. (2000) 'Attitudes and the attitude-behavior relation: Reasoned and automatic processes', *European review of social psychology*, 11(1), pp. 1–33.
- Akalu, Y., Ayelign, B. and Molla, M.D. (2020) 'Knowledge, attitude and practice towards COVID-19 among chronic disease patients at Addis Zemen Hospital, Northwest Ethiopia', *Infection and drug resistance*, 13, p. 1949.
- Alahdal, H., Basingab, F. and Alotaibi, R. (2020) 'An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia', *Journal of infection and public health*, 13(10), pp. 1446–1452.
- Al-Dmour H, Masa'deh R, Salman A, Abuhashesh M, Al-Dmour R. Influence of Social Media Platforms on Public Health Protection Against the COVID-19 Pandemic via the Mediating Effects of Public Health Awareness and Behavioral Changes: Integrated Model. *J Med Internet Res* [Internet]. 2020 Aug 1 [cited 2023 Oct 16];22(8). Available from: [/pmc/articles/PMC7439806/](https://pubmed.ncbi.nlm.nih.gov/35439806/)
- Al-Hanawi, M.K. *et al.* (2020) 'Knowledge, attitude and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: a cross-sectional study', *Frontiers in public health*, 8, p. 217.
- Allegrante, J.P., Auld, M.E. and Natarajan, S. (2020a) 'Preventing COVID-19 and its sequela: "There is no magic bullet... It's just behaviors"', *American journal of preventive medicine*, 59(2), pp. 288–292.
- Alnakli, Z. (2016) *Saudi Arabians' Health Beliefs Pertaining to Middle East Respiratory Syndrome-Coronavirus (MERS-CoV): Knowledge, Attitudes, and Practices (KAP) Assessment*.
- Alshareef N, Yunusa I, Al-Hanawi MK. The influence of COVID-19 information sources on the attitudes and practices toward COVID-19 among the general public of Saudi Arabia: Cross-

- sectional online survey study. JMIR Public Heal Surveill [Internet]. 2021 Jul 1 [cited 2023 Oct 16];7(7):e28888. Available from: <https://publichealth.jmir.org/2021/7/e28888>
- Alves, M. de F.C. *et al.* (2021) 'Knowledge, attitudes and practices towards COVID-19: a cross-sectional study in the resident cape-verdean population', *Social Sciences & Humanities Open*, 4(1), p. 100184.
- Andrade, C., Menon, V., Ameen, S. and Kumar Praharaj, S. (2020) 'Designing and conducting knowledge, attitude, and practice surveys in psychiatry: practical guidance', *Indian Journal of Psychological Medicine*, 42(5), pp. 478–481.
- Azlan, A.A. *et al.* (2020) 'Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia', *Plos one*, 15(5), p. e0233668.
- Azman, A.S. *et al.* (2013) 'The incubation period of cholera: A systematic review', *Journal of Infection*, 66(5), pp. 432–438. Available at: <https://doi.org/10.1016/j.jinf.2012.11.013>.
- Baig, M. *et al.* (2020) 'Predictors of misconceptions, knowledge, attitudes, and practices of COVID-19 pandemic among a sample of Saudi population', *PloS one*, 15(12), p. e0243526.
- Bandura, A. and Walters, R.H. (1977) *Social learning theory*. Englewood cliffs Prentice Hall.
- Bano, R. *et al.* (2013) 'A comparative study of knowledge, attitude, practice of nutrition and non-nutrition student towards a balanced diet in Hail University', *Journal of Nursing and Health Science*, 2(3), pp. 29–36.
- van den Berg, H. *et al.* (2006) 'The impact of affective and cognitive focus on attitude formation', *Journal of Experimental Social Psychology*, 42(3), pp. 373–379.
- Bhagavathula, A.S. *et al.* (2020) 'Novel coronavirus (COVID-19) knowledge and perceptions: a survey on healthcare workers', *MedRxiv*, pp. 2020–2023.
- Cislaghi, B. and Heise, L. (2018) 'Theory and practice of social norms interventions: eight common pitfalls', *Globalization and health*, 14(1), pp. 1–10.
- Collins, S.A. *et al.* (2012) 'Health literacy screening instruments for eHealth applications: a systematic review', *Journal of biomedical informatics*, 45(3), pp. 598–607.
- Czeisler, M.É. *et al.* (2020) 'Public attitudes, behaviors, and beliefs related to COVID-19, stay-at-home orders, nonessential business closures, and public health guidance—United States, New York City, and Los Angeles, May 5–12, 2020', *Morbidity and Mortality Weekly Report*, 69(24), p. 751.
- Deng, J.-F. *et al.* (2006) 'Severe acute respiratory syndrome (SARS): Knowledge, attitudes, practices and sources of information among physicians answering a SARS fever hotline service', *Public health*, 120(1), pp. 15–19.
- Eagly, A.H. and Chaiken, S. (1993) *The psychology of attitudes*. Harcourt brace Jovanovich college publishers.
- Edition, S. (2002) 'America ' s Forgotten Pandemic', 1600(March 1919), pp. 1250–1600.

- Erfani, A. *et al.* (2020a) 'Knowledge, Attitude and Practice toward the Novel Coronavirus (COVID-19) Outbreak: A Population-Based Survey in Iran', (March). Available at: <https://doi.org/http://dx.doi.org/10.2471/BLT.20.256651>.
- Ferdous, M.Z. *et al.* (2020) 'Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh: An online-based cross-sectional study', *PloS one*, 15(10), p. e0239254.
- de Francisco, N. *et al.* (2015) 'A systematic review of the social and economic burden of influenza in low-and middle-income countries', *Vaccine*, 33(48), pp. 6537–6544.
- Gautam, V. *et al.* (2021) 'Health literacy, preventive COVID 19 behaviour and adherence to chronic disease treatment during lockdown among patients registered at primary health facility in urban Jodhpur, Rajasthan', *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 15(1), pp. 205–211.
- Harmon-Jones, E. and Harmon-Jones, C. (2021) 'On defining positive affect (PA): Considering attitudes toward emotions, measures of PA, and approach motivation', *Current Opinion in Behavioral Sciences*, 39, pp. 46–51.
- Hays, J.N. (2005) *Epidemics and Pandemics: Their Impact on Human History*. Edited by S. Danver, L. Esterman, and A. Martinez. ABC-CLIO, Inc.
- Hesaraki, M. *et al.* (2021) 'Knowledge, attitude, practice and clinical recommendations of health care workers towards COVID-19: a systematic review', *Reviews on Environmental Health*, 36(3), pp. 345–357.
- Hulme, M. (2018) "Gaps" in climate change knowledge: Do they exist? Can they be filled?', *Environmental Humanities*, 10(1), pp. 330–337.
- Hungerford, H.R. and Volk, T.L. (1990) 'Changing learner behavior through environmental education', *The journal of environmental education*, 21(3), pp. 8–21.
- Huynh, G. *et al.* (2020) 'Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City', *Asian Pacific Journal of Tropical Medicine*, 13(6), p. 260.
- Jamison, D.T. *et al.* (2017) *Disease Control Priorities, Third Edition (Volume 9): Improving Health and Reducing Poverty*. Third Edit, *Disease Control Priorities, Third Edition (Volume 9): Improving Health and Reducing Poverty*. Third Edit. © 2018 International Bank for Reconstruction and Development / The World Bank. Available at: <https://doi.org/10.1596/978-1-4648-0527-1>.
- Jamison, D.T. (2018) 'Disease control priorities: improving health and reducing poverty', *The Lancet*, 391(10125), pp. e11–e14.
- Kasemy, Z.A. *et al.* (2020) 'Knowledge, attitude and practice toward COVID-19 among Egyptians', *Journal of epidemiology and global health*, 10(4), p. 378.
- Kennedy, J., Harmer, A. and McCoy, D. (2017) 'The political determinants of the cholera outbreak in Yemen', *The Lancet Global Health*. Elsevier Ltd, pp. e970–e971. Available at: [https://doi.org/10.1016/S2214-109X\(17\)30332-7](https://doi.org/10.1016/S2214-109X(17)30332-7).

Kim, J.J., Han, H. and Ariza-Montes, A. (2021) 'The impact of hotel attributes, well-being perception, and attitudes on brand loyalty: Examining the moderating role of COVID-19 pandemic', *Journal of Retailing and Consumer Services*, 62, p. 102634.

Ladan A, Musa Yar' U, Madu A, Haruna B, Madu AU. COVID-19 Pandemic and Social Media News in Nigeria: The Role of Libraries and Library Associations in Information Dissemination Bala Haruna COVID-19 Pandemic and Social Media News in Nigeria: The Role of Libraries and

Lee, M., Kang, B.-A. and You, M. (2021) 'Knowledge, attitudes, and practices (KAP) toward COVID-19: a cross-sectional study in South Korea', *BMC public health*, 21(1), pp. 1–10.

Liao, X., Nguyen, T.P.L. and Sasaki, N. (2022) 'Use of the knowledge, attitude, and practice (KAP) model to examine sustainable agriculture in Thailand', *Regional Sustainability*, 3(1), pp. 41–52.

Lin, Y. *et al.* (2011) 'Knowledge, attitudes and practices (KAP) related to the pandemic (H1N1) 2009 among Chinese general population: a telephone survey', *BMC infectious diseases*, 11(1), pp. 1–9.

Liu, L. *et al.* (2016) 'Use of a knowledge-attitude-behaviour education programme for Chinese adults undergoing maintenance haemodialysis: Randomized controlled trial', *Journal of International Medical Research*, 44(3), pp. 557–568.

Liu, P., Teng, M. and Han, C. (2020) 'How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions', *Science of the total environment*, 728, p. 138126.

Lunsford, N.B. *et al.* (2018) 'Skin cancer knowledge, awareness, beliefs and preventive behaviors among black and hispanic men and women', *Preventive medicine reports*, 12, pp. 203–209.

Luo, Y.-F. *et al.* (2022) 'Knowledge, Attitude, and Practice (KAP) toward COVID-19 Pandemic among the Public in Taiwan: A Cross-Sectional Study', *International Journal of Environmental Research and Public Health*, 19(5), p. 2784.

Memon, M.S. *et al.* (2015) 'An assessment of knowledge, attitude and practices (KAP) towards diabetes and diabetic retinopathy in a suburban town of Karachi', *Pakistan journal of medical sciences*, 31(1), p. 183.

Moon, M.A. *et al.* (2018) 'Consumer perceptions of counterfeit clothing and apparel products attributes', *Marketing Intelligence & Planning* [Preprint].

Muleme, J. *et al.* (2017) 'A Framework for Integrating Qualitative and Quantitative Data in Knowledge, Attitude, and Practice Studies: A Case Study of Pesticide Usage in Eastern Uganda', *Frontiers in Public Health*, 0(DEC), p. 318. Available at: <https://doi.org/10.3389/FPUBH.2017.00318>.

National Institute For Communicable Diseases (NICD) (2020) *FIRST CASE OF COVID-19 CORONAVIRUS REPORTED IN SA*, <https://www.nicd.ac.za/first-case-of-covid-19-coronavirus-reported-in-sa/>.

- Nguyen, T.P.L., Seddaiu, G. and Roggero, P.P. (2019) 'Declarative or procedural knowledge? Knowledge for enhancing farmers' mitigation and adaptation behaviour to climate change', *Journal of Rural Studies*, 67, pp. 46–56.
- Ngwewondo, A. *et al.* (2020) 'Knowledge, attitudes, practices of/towards COVID 19 preventive measures and symptoms: A cross-sectional study during the exponential rise of the outbreak in Cameroon', *PLoS neglected tropical diseases*, 14(9), p. e0008700.
- Pal, R. *et al.* (2020) 'Knowledge, attitudes and practices towards COVID-19 among young adults with Type 1 Diabetes Mellitus amid the nationwide lockdown in India: A cross-sectional survey', *Diabetes research and clinical practice*, 166, p. 108344.
- Papagiannis, D. *et al.* (2020) 'Assessment of knowledge, attitudes, and practices towards new coronavirus (SARS-CoV-2) of health care professionals in Greece before the outbreak period', *International journal of environmental research and public health*, 17(14), p. 4925.
- Person, B. *et al.* (2004) 'Fear and stigma: the epidemic within the SARS outbreak', *Emerging infectious diseases*, 10(2), p. 358.
- Phipps, D.J. *et al.* (2021) 'A dual-process model of affective and instrumental attitudes in predicting physical activity', *Psychology of Sport and Exercise*, 54, p. 101899.
- Podder, D. *et al.* (2019) 'Community perception and risk reduction practices toward malaria and dengue: A mixed-method study in slums of Chetla, Kolkata', *Indian journal of public health*, 63(3), p. 178.
- Rahbar, T. *et al.* (2007) " Knowledge, attitude, behavior and practice (KABP) regarding HIV/AIDS among pregnant women attending PPTCT programme in New Delhi".', *The Journal of communicable diseases*, 39(3), pp. 179–184.
- Rogers, E.M. (1995) 'Diffusion of innovations, The Free Press, New York, NY'.
- Ross-gillespie, V. (2014) 'insects ve rs ity of e To w ve rs ity e To w'.
- Rubin, G.J. *et al.* (2009) 'Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: Cross sectional telephone survey', *BMJ (Online)*, 339(7713), p. 156. Available at: <https://doi.org/10.1136/bmj.b2651>.
- Rucker, D.D. (2021a) 'Attitudes and attitude strength as precursors to object attachment', *Current opinion in psychology*, 39, pp. 38–42.
- Ryan, E.T. (2011) 'The cholera pandemic, still with us after half a century: Time to rethink', *PLoS Neglected Tropical Diseases*, 5(1). Available at: <https://doi.org/10.1371/journal.pntd.0001003>.
- Seryczynska, B. *et al.* (2021) 'Religious capital as a central factor in coping with the Covid-19: Clues from an international survey', *European Journal of Science and Theology*, 17(2), pp. 67–81.
- Siddiquea, B.N. *et al.* (2021) 'Global epidemiology of COVID-19 knowledge, attitude and practice: A systematic review and meta-analysis', *BMJ open*, 11(9), p. e051447.

Singh, A. and Ahuja, R. (2020) 'Knowledge, attitude, and practice of general public towards COVID-19 in India: An online cross-sectional study', *Int. J. Innov. Res. Sci. Eng. Technol*, 9(6), pp. 5005–5012.

Srichan, P. *et al.* (2020) 'Knowledge, Attitude and Preparedness to Respond to the 2019 Novel Coronavirus (COVID-19) Among the Bordered Population of Northern Thailand in the Early Period of the Outbreak: A Cross-Sectional Study', *SSRN Electronic Journal* [Preprint]. Available at: <https://doi.org/10.2139/ssrn.3546046>.

Taubenberger, J.K. and Morens, D.M. (2006) '1918 Influenza: The mother of all pandemics', *Emerging Infectious Diseases*. Centers for Disease Control and Prevention (CDC), pp. 15–22. Available at: <https://doi.org/10.3201/eid1209.05-0979>.

Teng, Y.-M. *et al.* (2021) 'Assessing the knowledge, attitudes and practices of COVID-19 among quarantine hotel workers in China', in *Healthcare*. MDPI, p. 772.

*The Story of Influenza - The Threat of Pandemic Influenza - NCBI Bookshelf* (no date). Available at: <https://www.ncbi.nlm.nih.gov/books/NBK22148/> (Accessed: 2 June 2020).

Vandamme, E. (2009) 'Concepts and challenges in the use of knowledge-attitude-practice surveys: Literature review', *Department of Animal Health. Institute of Tropical Medicine*, 1, pp. 1–7.

Vanney, C.E. and Sáenz, J.I.A. (2021) 'Second-person perspective in interdisciplinary research: A cognitive approach for understanding and improving the dynamics of collaborative research teams', *Scientia et Fides*, 9(2), pp. 155–178.

Wahed, T. *et al.* (2013) 'Knowledge of, attitudes toward, and preventive practices relating to cholera and oral cholera vaccine among urban high-risk groups: Findings of a cross-sectional study in Dhaka, Bangladesh', *BMC Public Health*, 13(1), p. 242. Available at: <https://doi.org/10.1186/1471-2458-13-242>.

Wake, A.D. (2020) 'Knowledge, attitude, practice, and associated factors regarding the novel coronavirus disease 2019 (COVID-19) pandemic', *Infection and Drug Resistance*, 13, p. 3817.

Wessman, W.L. (2006) 'The Nature of Thought: Maturity of Mind'.

WHO (2020a) 'Advice for public', *WHO*.

WHO (2020b) *Events as they happen. Rolling updates on coronavirus disease (COVID-19)*, *WHO*. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen> (Accessed: 11 April 2020).

WHO (2020c) *Survey Tool and Guidance*.

World Health Organisation (2008) *Advocacy, communication and social mobilization for TB control: a guide to developing knowledge, attitude and practice surveys*. World Health Organization.

World Health Organisation (2014) *KNOWLEDGE, ATTITUDES, AND PRACTICES (KAP) SURVEYS DURING CHOLERA VACCINATION CAMPAIGNS: Guidance for Oral Cholera Vaccine Stockpile Campaigns 'WORKING COPY'*.

World Health Organisation (2020) *Survey tool and guidance: rapid, simple, flexible behavioural insights on COVID-19: 29 July 2020.*

World Health Organization (2020a) *World health organization coronavirus disease (COVID-19) dashboard, <https://covid19.who.int/>.*

World Health Organization (2020b) *Coronavirus, WHO.* Available at: [https://www.who.int/health-topics/coronavirus#tab=tab\\_1](https://www.who.int/health-topics/coronavirus#tab=tab_1) (Accessed: 29 March 2020).

World Health Organization (2020c) *Novel Coronavirus(2019-nCoV) Situation Report – 22.*

World health Organization (2020) *Situation Report-60 SITUATION IN NUMBERS total (new) cases in last 24 hours WHO RISK ASSESSMENT Global Level Very High, Coronavirus disease 2019 (COVID-19).*

World Health Organization (WHO) (2020) *Novel Coronavirus ( 2019-nCoV ) Situation Report - 1 21 January 2020, WHO Bulletin.*

Worldometer (2020) *Coronavirus Cases, Worldometer.* Available at: <https://doi.org/10.1101/2020.01.23.20018549V2>.

Zhong, B.-L. *et al.* (2020a) 'Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey', *International journal of biological sciences*, 16(10), p. 1745.

### 3. PART C: JOURNAL MANUSCRIPT

Proposed Journal: BioMed Central (BMC), Public Health

**Socio-economic factors associated with the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa: An internet-based cross-sectional study**

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#### 3.1 Abstract

<b>Background</b>
As part of a comprehensive response for COVID-19 prevention and control, South Africa, as well as many other countries, implemented extensive health and hygiene interventions to curb the spread of the disease. Extensive educational campaigns on all social media platforms as well as government agencies have been implemented in South Africa, however, adherence to these interventions, is affected by people’s knowledge, attitude, and practice (KAP) as well as the economic status for the given information to be effective. This KAP study was to examine changes in knowledge, attitudes and practices and socio-economic factors associated with the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa: an internet-based cross-sectional study. Surveys in Egypt, Pakistan, Saudi Arabia, Malaysia, Vietnam, Jordan, Pakistan, China, Iran, Bangladesh, and Uganda revealed that most respondents had a good knowledge of COVID-19.
<b>Methods</b>
The study used an analytical cross-sectional design, and it was conducted in South Africa. At the time of the study, it was impossible to do community-based surveys due to the COVID-19

pandemic, hence, data was collected online. Data was collected using an online electronic survey where participants completed the online questionnaire once. The survey was drawn up using *REDCap* software. The KAP results were analyzed as proportions and then the association between KAP and demographic characteristics was done using ordered logit regression models for knowledge, attitude, and practice scores.

## **Results**

Of the 188 study participants, majority were females (57%) and about (43%) were males. For age and income, the means and standard deviations were [(36.84;10.89) & (R13 344.50; R14 765.23)]. A greater proportion of the participants resided in formal residents (74%), had at least attained matric education (74%), also resided in the Western Cape province (97%) and were employed full time (60%). Income was a significant predictor of knowledge and practices with a unit increase in income increasing the ordered log-odds scale of knowledge by 5.13, while reducing ordered log-odds (OLO) scale for practices by 1.28. While a unit increase in age increased the OLO of knowledge (0.02), attitudes (0.02) and practices (0.03). Having matric education increased the OLO of knowledge (0.75) and practices (1.06) compared to participants with less than grade 11 education, while for attitudes it reduced the OLO of attitudes by 1.12. Additionally, staying in an informal house reduced the OLO of knowledge (15.55), attitudes (0.08) and practices (44.97) compared to staying in flat or house. However, having access to water [knowledge (16.40) and practices (30.31)] and electricity [knowledge (1.80) and practices (49.96)] increased the OLO of knowledge and practices compared to not having access. While being full-time and part-time employed increased the OLO of attitudes and practices [full-time; attitudes(1.16) & practices (1.57)] ; [part-time; attitudes(0.25) & practices (0.44)]. Lastly, staying in formal residence area increased the OLO of knowledge (0.21), attitudes (1.67) and practices (0.02), compared to staying in informal residences. Regarding the knowledge dimension participants showed that they were knowledgeable [(65%;Good knowledge), (9%;Fair knowledge), (26%;Poor knowledge)]. While for attitudes participants generally reported poor attitudes [42%;(Poor attitudes), (35%;Fair attitudes) (23%;Good attitudes)]. Lastly, participants had fairly good practices [(62%;Good practices), (13%; Fair practices), (25%;Poor practices)].

## **Conclusion**

This study showed significantly higher proportions of people with good knowledge and good practices, however, it also recorded a greater proportion of the participants who had poor attitudes. This information would be useful in the formulation of policy for community projects

addressing behavioural change and adds to the global data on the same subject. The personal responsibility narrative was used during the pandemic, however people found it difficult to adhere to lockdown restrictions thus multipronged action will be needed to address the factors that affect KAP.

**Keywords:** knowledge, attitude, and practice (KAP); COVID-19 knowledge; affective attitude; preventive behavior

### 3.2 Background

On the 5<sup>th</sup> March 2020 the South African government announced its first COVID-19 case and simultaneously the National Institute for Communicable disease in South Africa had warned against the stigmatization of those affected by coronavirus (Agency, 2020). On the 15<sup>th</sup> March 2020 the President of South Africa declared COVID-19 outbreak as a National State of disaster (Made *et al.*, 2021). PILOT th March 2020, South Africa went into lockdown and the same day the announcement of the first COVID-19 deaths was made (*First Covid-19 deaths in South Africa announced as infection toll reaches 1,000*, no date). A COVID-19 death was defined by the National Department of Health, as a death resulting from an illness which is compatible with COVID-19 (based on laboratory confirmation or on clinical features only) (Department Health Republic of South Africa, 2020). The first level of restrictions was known to South Africans as 'Lockdown Level 5' (*Timeline | A look back at the past two years of lockdown | City Press*, no date), which indicated that the country was experiencing a high COVID-19 spread with a low health system readiness (*About alert system | South African Government*, no date). Level 5 restrictions required all COVID-19 health and safety protocols to be observed, which included the use of appropriate personal protective equipment, such as wearing of masks, social distancing and the restriction of movement (*COVID-19 Risk Adjusted Strategy - SA Corona Virus Online Portal*, no date). Initially these restrictions were based on WHO country guidelines when dealing with COVID-19 pandemic (*Technical guidance*, no date). Level 5 restrictions was the basis for the adjustments that would later follow during level 4 and below. Movement restrictions meant that only essential workers were permitted 'movement' and non-essential workers were only allowed if to obtain essential goods such as food, medical products, cleaning and hygiene requirement and items for winter season readiness such as blankets and heaters (South African Government, 2020). The level 5 restrictions banned the selling of alcohol, hot foods, no restaurants and accommodation

were permitted(*About alert system | South African Government*, no date). The services of bus, taxi and motor vehicles had restricted operating times and the restrictions on the capacity of the transport vehicle were also implemented (*COVID-19 Risk Adjusted Strategy - SA Corona Virus Online Portal*, no date). All social gatherings were prohibited, and interprovincial travelling were allowed only for the transportation of goods and in exceptional circumstances such as funerals(*COVID-19 Risk Adjusted Strategy - SA Corona Virus Online Portal*, no date). South Africa introduced a four month ban on the trade of tobacco products during COVID-19 pandemic to curb the spread of disease and although this decreased the number of smokers at the time, the market for illicit cigarettes trade increased(*How to end tobacco use for good: What SA's COVID tobacco ban has taught us - Bhekisisa*, no date).

These stringent measures were taken to reduce the spread of COVID-19 infections and proved effective in decreasing the number of COVID-19 cases(Mofijur *et al.*, 2021). In a study by Made *et al.*, it was found that the number positive COVID-19 cases decreased in South Africa from pre-lockdown until the last day of level 5 implementation(Made *et al.*, 2021). Although it is possible to control COVID-19 infections with collective engagement in preventative behaviours such as social distancing , practicing personal hygiene, many individuals have experienced loss of employment and suppression of freedom(Mofijur *et al.*, 2021). We argue that these factors could affect knowledge, attitude and practice behaviours amongst individuals.

In previous pandemics, such as the “*Spanish Flu*” which killed between 20 to 50 million people between 1918 and 1919 worldwide(Taubenberger and Morens, 2006), knowledge about the flu was limited, and the presence of war during the Spanish flu pandemic prompted governments, to take action similar to COVID-19. Governments closed schools, theatres, churches, taverns and markets(Hays, 2005) and required the public to wear masks that covered their mouth, but this instruction was received with resistance from the public as some referred to it as an “infringements of civil liberty” and others donned it as a civic joke(Hays, 2005).

Similarly with the severe acute respiratory syndrome (SARS) virus of 2003 that affected 37 countries and resulted in 744 deaths was received by the public with misconception and attitude and the Chinese public resisted compliance with preventive measures which led to the rapid spread of the virus in the country(Lin *et al.*, 2011)(Freimuth *et al.*, 2017). The experiences in China of the SARS virus proved the importance of monitoring not only public perception but also the

economic impact of the disease since it has a direct effect on compliance by the public to precautionary interventions(Lin *et al.*, 2011).

Evidence on the social, cognitive, and psychological factors associated with the behaviors is limited and thus necessary in the South African setting.

Prior studies on the subject assessed KAP towards COVID-19, but limited studies on the association of KAP and the socio-economic factors in response to the 2019 COVID-19 preventative measures were found, specifically for South Africa.

Many studies focused on the direct effects of knowledge on adopting preventive behaviors or attitudes without considering the indirect effects of knowledge on practices that are facilitated by attitudes towards the response to health knowledge.

Studies on KAP during COVID-19 presented with conflicting results across different countries. Knowledge scores on COVID-19 varied between 58% and 90% amongst like Saudi Arabia and China(Alahdal, Basingab and Alotaibi, 2020)(Zhong *et al.*, 2020). Allegrante *et al.* found that knowledge does not always lead to individual preventive behavior(Allegrante, Auld and Natarajan, 2020), while a study conducted by Rucker found that attitudes about COVID-19 may be the key to driving individuals' actions(Jamison *et al.*, 2017).

WHO recommended that the best practice for prevention of the spread of COVID-19 disease was through education(WHO, 2020).

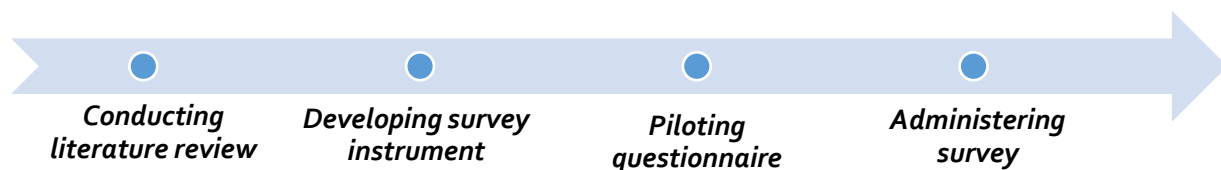
Extensive educational campaigns on all social media platforms as well as government agencies were implemented in South Africa, however, adherence to these interventions, may have been affected by people's knowledge, attitude and practice (KAP) the economic status for the given information to be effective. The main purpose of this KAP study was to examine changes in knowledge, attitudes and practices and socio-economic factors associated with the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa.

### **3.3 Methods**

This study adapted the WHO Europe Covid KAP questionnaire on "knowledge, risk perceptions, preventive behaviours and trust to inform pandemic outbreak response" (World Health

Organisation, 2020) to the South Africa context. The study used an analytical cross-sectional design. Data was collected using an online electronic survey where participants complete the online questionnaire once. The process of recruiting participants adopted a non-probability method, as the survey was done through convenience sampling. Supplementary to convenience sampling, snowball sampling was then used where the researchers' network was then requested to extend the survey onto their respective contacts which allowed for the available population to partake in the study. The researcher sent a link via online platforms such as "WhatsApp" and "Facebook" to the researcher's contacts and requested that the link be forwarded on.

Figure 1 - Sequence of events



The targeted sample size 385 participants which was calculated using a 95% confidence interval and a 50% anticipated internet user's population and a 5% precision. Low response resulted in a total sample of 188 participants after data cleaning. Data was collected from South African participants who were 18 years and older.

The questionnaire was adapted and validated by the researcher and was pilot tested to ensure adaptability to country context. The Pilot test questionnaire assessed the reliability and validity of the questionnaire in achieving the aims of the research. For the pilot testing of the questionnaire the researcher employed convenience sampling. The questionnaire was made available in the English only. The final tool had several modules; 1)Socio-demography; 2)Knowledge [*symptoms, treatment, Knowledge incubation, COVID-19 risk perception: probability and Severity, Knowledge and self-assessed adherence to prevention measures, prevention – own behaviours*]; Attitudes [*trust in sources of information, use of sources of information, trust in institutions (perceptions), policies, interventions (perceptions), lifting restrictions (pandemic transition phase)*]; 3)Practices [*behaviour and worry*]. The definitive survey questions used are presented in **Part E: Appendix 4**. To describe the KAP profile, a likert scale was designed for each dimension of KAP. Each index had varying score ranges as the number of questions in each domain was not the same (Part C: Table 1 **Error! Reference source not found.**). A composite KAP rating score was computed as the row total of all the questions that are in that domain and then recoded into range which

reflected if it was; poor, fair or good. The psychometric properties of the scale were evaluated and any items that may affect its validity were removed. Reliability was assessed using Cronbach's alpha, and internal consistency and power were assessed using Spearman's rank correlation. For data management, data exploration and analysis, this study will use Stata version 17.0 (Stata Corp, Texas, United States). Ordered logistic regression was used to test the association between KAP and socioeconomic factors.

The survey development and data collection was done using *REDCap*. Data collected was password protected and saved to an encrypted hard drive. A secondary encrypted hard drive was used for backing up data. The data collected is the intellectual property of The University of Cape Town (UCT) and continues to be handled in accordance with UCT Data Management policy. The survey was completed on a voluntary basis.

**Part C: Table 1 Summary statistics of knowledge, attitudes, and practice scores**

<b>Variable</b>	<b>Mean</b>	<b>Std. dev.</b>	<b>Min</b>	<b>Max</b>	<b>Total Score</b>
<b>Knowledge</b>	46,15	27,32	0	78	79
<b>Attitudes</b>	87,93	58,35	0	188	202
<b>Practice</b>	34,17	20,58	0	59	60

### 3.3 Results

#### 3.3.1 Descriptive statistics

**Part C: Table 2 Demographic characteristics of participants (n=188)**

<b>Variable</b>	<b>Category</b>	<b>N (%)</b>
Sex	Females	107 (57)
	Males	81 (43)
Marital Status	Unmarried	84 (45)
	Married	104 (55)
Residence Status	Informal Areas	36 (20)
	Formal Residence	137 (74)
	Small Holding	12 (6)
Education	<11 Grade	48 (26)
	Matric	136 (74)
Province	Eastern Cape	4 (2)
	Limpopo	2 (1)
	Western Cape	182 (97)
	Less than 4	84 (46)

Household size	More than 4	98 (54)		
Employment Status	Unemployed	34 (20)		
	Employed-full-time	104 (60)		
	Employed-part-time	19 (11)		
	Self-employed	16 (9)		
Income Source	Salary or wage	133 (74)		
	Government grants	18 (10)		
	Pension	6 (3)		
	Family support	23 (13)		
	<b>Mean</b>	<b>Standard Dev</b>	<b>Min</b>	<b>Max</b>
Age	36.84	10.89	18	68
Income	13 344.50	14 765.23	0	70 000

For age and income, the means and standard deviations were [(36.84;10.89) & (R13 344.50; R14 765.23)]. Majority of the study participants were females (57%) and about (43%) were males. A greater proportion of the participants were residing in formal residents (74%), had at least attained matric education (74%), also resided in the Western Cape province (97%) and were employed full time (60%) [Part C: Table 2 **Error! Reference source not found.**].

### 3.3.2 Psychometric properties of the KAP scale

Part C:Table 3 Analysis of the psychometric properties of the KAP scale

	Knowledge	Attitudes	Practices
<b>Cronbach's alpha</b>	0.9329	0.9146	0.7901
<b>Average inter-item correlation</b>	0.5167	0.1994	0.2388

The scales for knowledge, attitudes and practices relative to the COVID-19 pandemic had excellent reliability as the test for reliability (Cronbach's alpha) was more than 70% **Error! Reference source not found.** However, the average inter-item correlation of the knowledge dimension was significant high more than 50% [Part C:Table 3] **Error! Reference source not found.**

### 3.3.3 Knowledge responses to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa

The study participants reported that it was generally easy to find and understand the information they needed related to COVID-19 [Part C: Figure 1] **Error! Reference source not found.** The study participants also showed that they understood the restrictions and recommendations and followed most of the recommendations and regulations that had been put in place to try and reduce the spread of COVID-19 [Part C: Figure 1] **Error! Reference source not found.**

### **3.3.4 Attitude responses to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa**

Responses to attitudes towards COVID-19 in South Africa indicated that participants were more likely to seek information about COVID-19 from the community than from health sources such as the World Health Organization website or COVID-19 hotline or national COVID-19 information Part C: Figure 2 **Error! Reference source not found..** The same trend was observed when it came to media use, participants were more confident and more trusting to communities than institutions of authority such as the department of health, minister of health, WHO, COVID-19 hotline and national COVID-19 information Part C: Figure 3**Error! Reference source not found..** The trend continued as is even on perceptions on whom the society believed could handle the COVID-19 pandemic, with a significantly higher proportion citing that they believed religious entities (places of worship) had a better chance of handling the COVID-19 pandemicPart C: Figure 4 **Error! Reference source not found..**

### **3.3.5 Practice responses to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa**

Participants showed that they practiced most of the recommended mitigations aimed at reducing COVID-19 transmission in South Africa. 47% of the participants reported frequently washing of hands with soap and water for at least 20 seconds, avoided touching eyes, nose, and mouth with unwashed hands and used disinfectants or hand sanitizers to clean hands when soap and water were not available Part C: Figure 5.

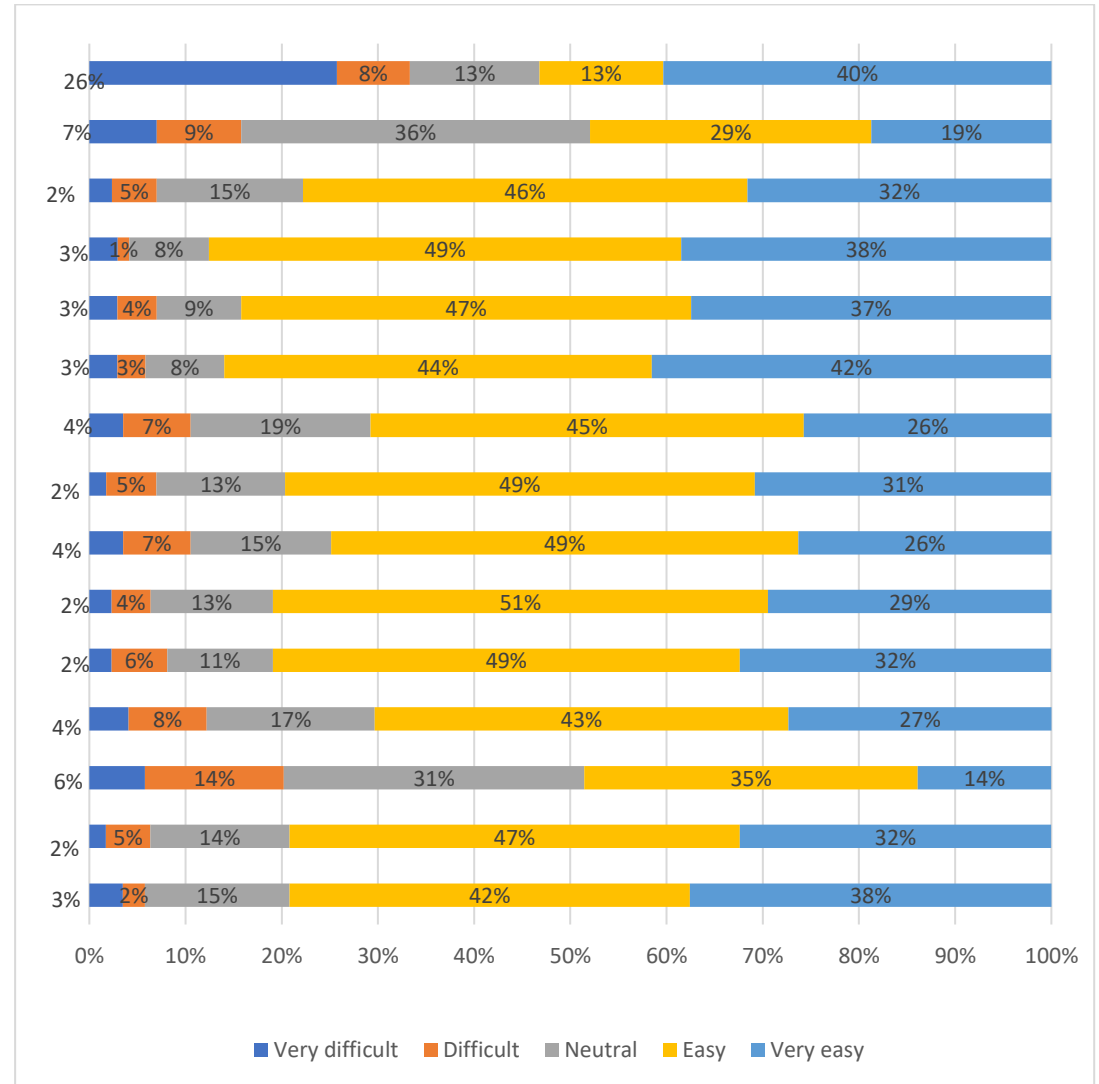
### **3.3.6 Knowledge, attitude, and practice responses to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa**

Regarding the knowledge dimension participants showed that they were knowledgeable [(65%; Good knowledge), (9%; Fair knowledge), (26%; Poor knowledge)]. While for attitudes participants reported poor attitudes [42%;(Poor attitudes), (35%; Fair attitudes) (23%; Good attitudes)]. Lastly, participants had fairly good practices [(62%; Good practices), (13%; Fair practices), (25%; Poor practices)] Part C: Figure 5 **Error! Reference source not found..**

**Part C: Figure 1 Response to statements regarding knowledge of COVID-19**

How easy or difficult would you say it is to...

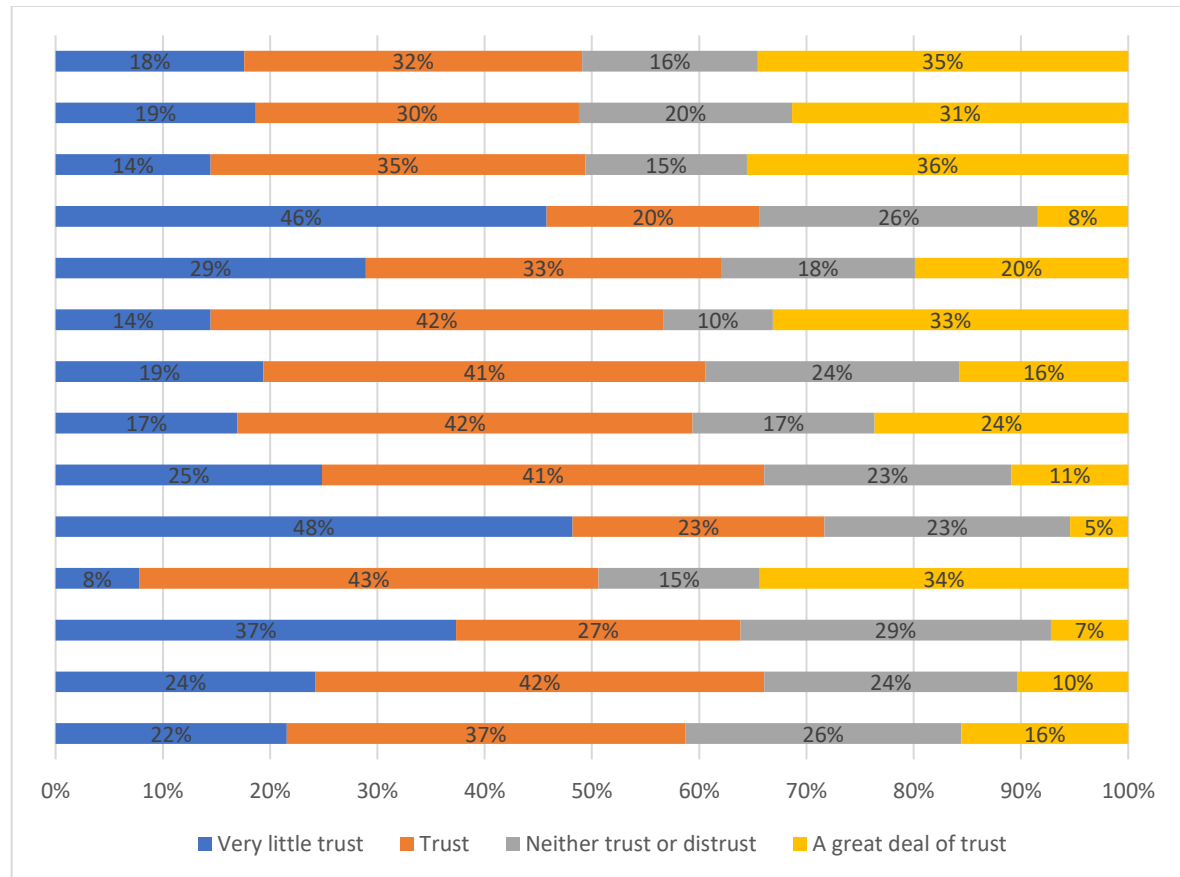
- ...find the information you need related to COVID-19?
- ...understand information about what to do if you think you have COVID-19?
- ...judge if the information about COVID-19 in the media is reliable?
- ...understand restrictions and recommendations of authorities regarding COVID-19?
- ...follow the recommendations on how to protect yourself from COVID-19?
- ...understand recommendations about when to stay at home from work/school, and when not to?
- ...follow recommendations about when to stay at home from work/school, and when not to?
- ...understand recommendations about when to engage in social activities, and when not to?
- ...follow recommendations about when to engage in social activities, and when not to?
- ...understand recommendations about wearing a mask?
- ...follow recommendations about wearing a mask?
- ...understand recommendations about the 1.5m social distancing?
- ...follow recommendations about the 1.5m social distancing?
- How likely do you think you are to get infected with COVID-19?
- How severe would contracting COVID-19 be for you (how seriously ill do you think you will be)?



**Part C: Figure 2 Response to statements regarding trusting information relative to COVID-19.**

How much do you TRUST information about COVID-19 from the following sources:

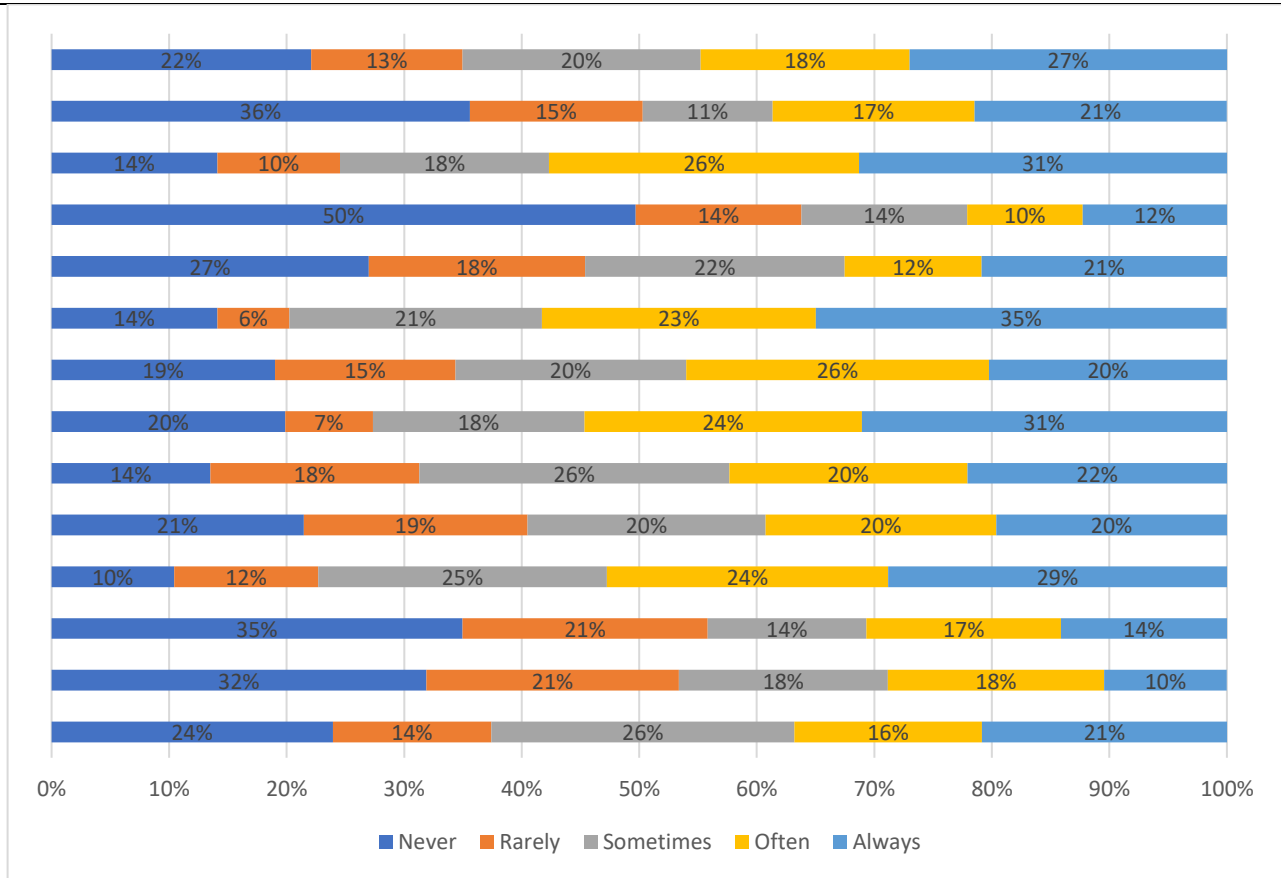
- Television
- Newspapers
- Telephone
- Health workers
- Social media
- Family and friends
- Work
- Radio
- Department of Health
- Government Ministers
- Celebrities and social media influencers
- World Health Organization
- COVID-19 Hotlines
- National COVID-19 information website



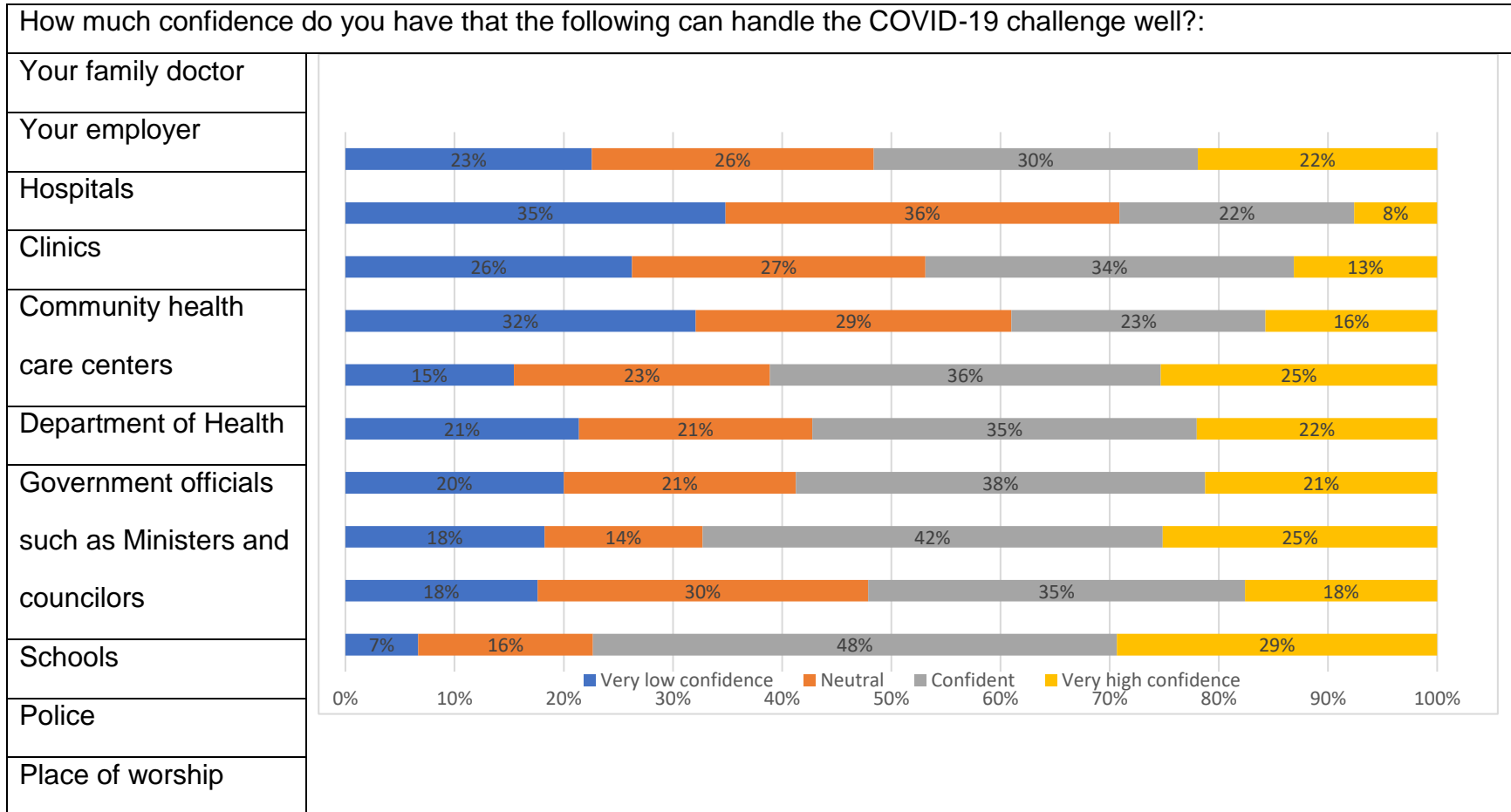
**Part C: Figure 3 Response to statements regarding media use relative to COVID-19.**

How often do you USE the following sources for information about COVID-19?:

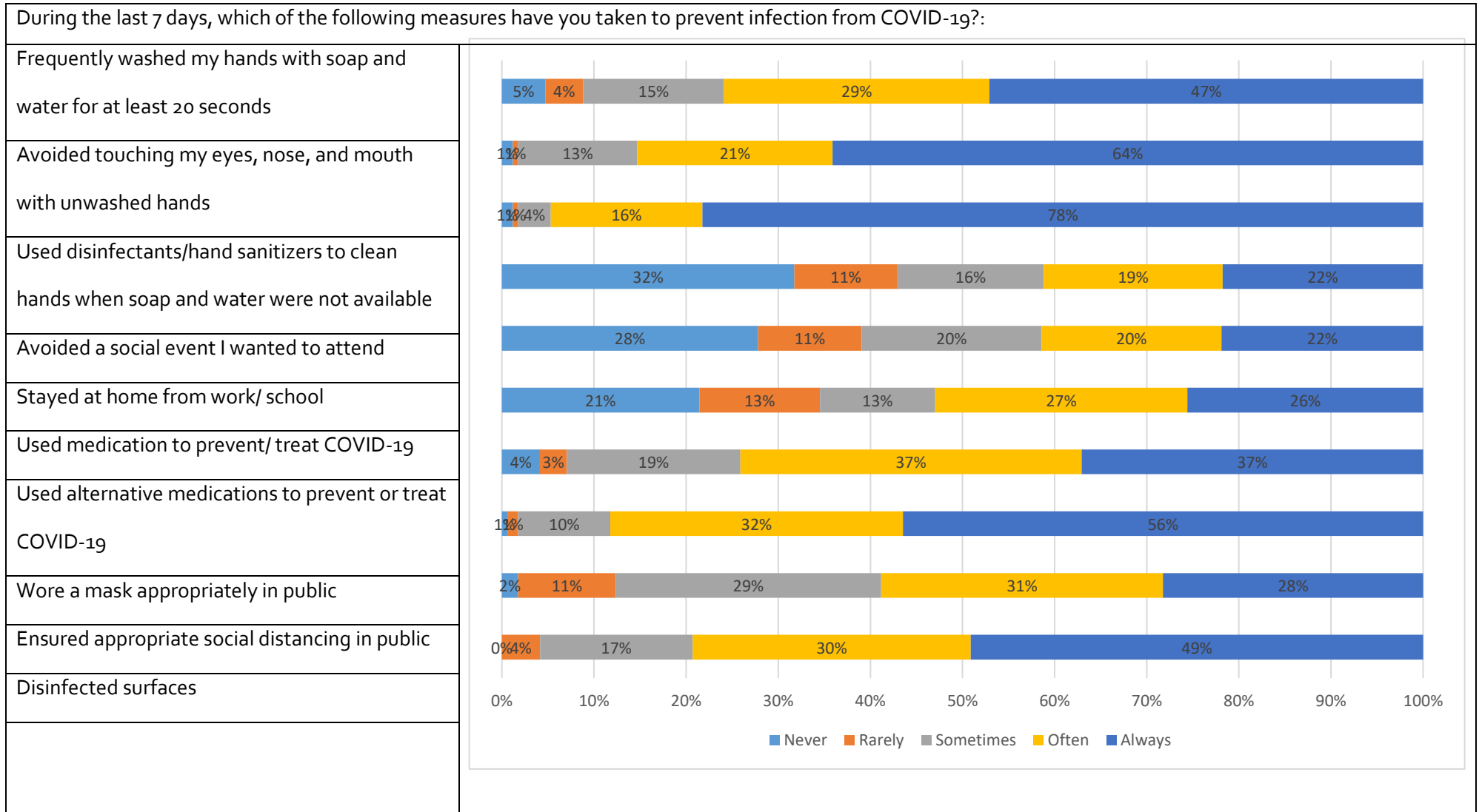
Television
Newspapers
Telephone
Health workers
Social media
Family and friends
Work
Radio
Department of Health
Government Ministers
Celebrities and social media influencers
World Health Organization
COVID-19 Hotlines
National COVID-19 information website



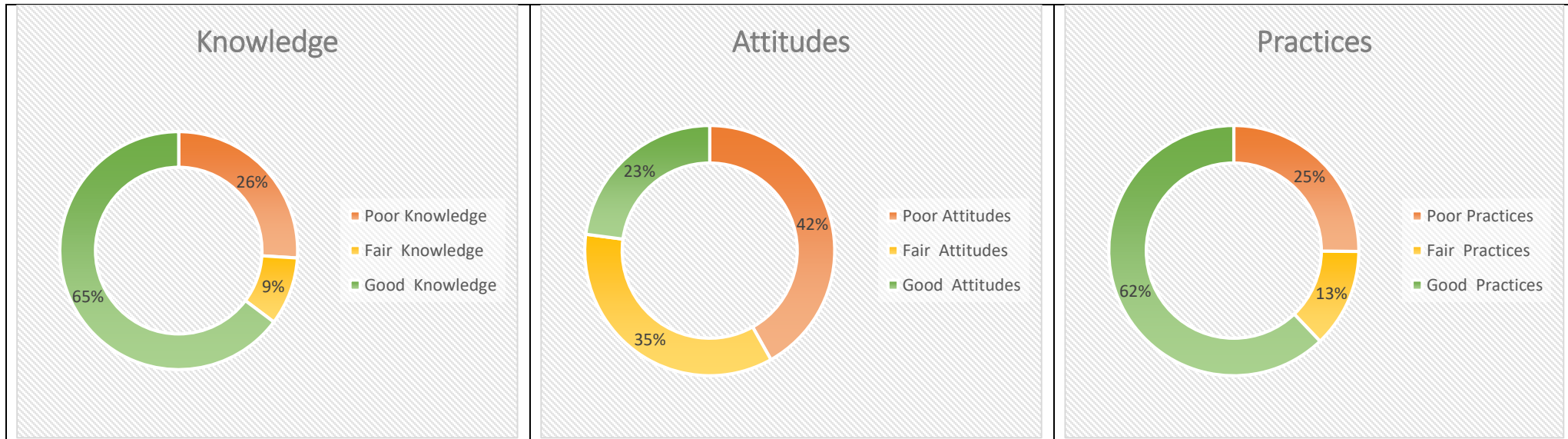
**Part C: Figure 4 Response to statements regarding confidence in handling COVID-19.**



**Part C: Figure 5 Response to statements regarding practices in handling COVID-19**



**Part C: Figure 6 The distribution of knowledge, attitude and practice scores with the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa (n=188).**



### 3.3.7 Socio-economic factors associated with KAP response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa

Part C:Table 4 Ordered logistic regression output

Socioeconomic determinants		Knowledge	Attitudes	Practices
Income	Income	5.13**	1.80	-1.28**
		(3.56)	(1.43)	(2.18)
Age	Age	0.03**	0.02**	0.05**
		(0.03)	(0.02)	(0.03)
Education (ref= Grade<11)	Matric	0.75**	-1.12**	1.06**
		(0.61)	(0.46)	(0.88)
Sex (ref=Females)	Males	0.58	-0.58	-1.12*
		(0.64)	(0.36)	(0.59)
Marital Status (ref=Unmarried)	Married	-0.348	-0.361	0.02
		(0.60)	(0.36)	(0.58)
Dwelling type (ref=Flat or House)	Informal house	-15.55**	-0.08**	-44.97**
		(1.18)	(1.02)	(3.92)
Access to water (ref=No)	(Yes)	16.40**	-0.302**	30.31**
		(1.18)	(1.20)	(3.32)
Access to electricity (ref=No)	(Yes)	1.84**	-0.137**	47.96**
		(1.72)	(1.32)	(3.29)
Household size (ref=Less than 4)	More than 4	-0.36	0.00	-0.28
		(0.59)	(0.36)	(0.55)
Employment status (ref=not employed)	Employed full time	0.37	1.16**	1.57**
		(0.82)	(0.56)	(0.90)
	Employed part-time	0.32	0.25**	0.44**
		(0.86)	(0.68)	(1.79)
Self-employed	-0.60	0.83	-0.77	
	(0.96)	(0.71)	(0.97)	
Residence status (ref= Informal Areas)	Formal Residence	0.21***	1.67***	0.02***
		(0.798)	(0.572)	(0.86)
	Small Holding	-0.09	-0.62	17.42
		(1.06)	(0.79)	(6.28)
	/cut1	16.86	-1.43	77.19
		(1.18)	(1.76)	(5.32)
	/cut2	18.64	0.90	-
		(1.18)	(1.76)	-

Standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Income was a significant predictor of knowledge and practices at 95% confidence interval **Part C:Table 4Error! Reference source not found.** A unit increase in income in this case is expected to increase the ordered log-odds scale of knowledge by 5.13, while for practices a unit increase in income would reduce the ordered log-odds scale of practices reduce by 1.28 **Part C:Table 4 Error! Reference source not found.**, holding all other variables in the regression model constant. While a unit increase in age would increase the ordered log-odds scale knowledge (0.02), attitudes (0.02) and practices (0.03) **Part C:Table 4 Error! Reference source not found.** Additionally, having a matric education would increase the ordered log-odds scale of knowledge (0.75) and practices (1.06) compared to participants with less than grade 11 education, while for attitudes it would reduce the ordered log-odds scale of attitudes by 1.12, holding all other things constant **Part C:Table 4Error! Reference source not found.** While staying in an informal

house would reduce the ordered log-odds scale of knowledge (15.55), attitudes (0.08) and practices (44.97) compared to staying in flat or house **Part C:Table 4 Error! Reference source not found..** Having access to water [knowledge (16.40) and practices (30.31)] and electricity [knowledge (1.80) and practices (49.96)] increased the ordered log-odds scale of knowledge and practices compared to not having access **Part C:Table 4.** While being full-time and part-time employed increased the ordered log-odds scale of attitudes and practices [full-time; attitudes(1.16) & practices (1.57)] ; [part-time; attitudes(0.25) & practices (0.44)] **Part C:Table 4 Error! Reference source not found..** Lastly, staying in formal residence area increased the ordered log-odds scale of knowledge (0.21), attitudes (1.67) and practices (0.02), compared to staying in informal residences.

### 3.4 Discussion

This KAP study delved into the interplay between knowledge, attitudes, and practices related to COVID-19 and the influence of socio-economic factors on these components in South Africa. Participants demonstrated a significant understanding of COVID-19, contrasting with early pandemic findings of limited disease transmission awareness (Baig *et al.*, 2020)(Erfani *et al.*, 2020)(Singh, Ahuja and Student, 2020), but in line with Kasemy et al.(Kasemy *et al.*, 2020) . The sample predominantly consisted of females from the Western Cape, living in formal residences, and engaged in full-time employment. Age and income diversity were evident, spanning from 18 to 68 years old and earnings of up to R70,000. The reliability of the KAP scale was substantial, with the knowledge dimension showing a high average inter-item correlation, underscoring the tool's validity.

Concerning participants' perspectives on COVID-19, a clear trend emerged. Participants felt well-informed about COVID-19. However, their trust inclined more towards community and religious entities rather than formal health channels. This trust in local sources suggests an avenue for authorities: strengthening community outreach and capitalizing on local influencers and religious platforms to disseminate accurate information. Our study demonstrated substantial COVID-19 understanding, but as Allegrante, Auld, and Natarajan (Allegrante, Auld and Natarajan, 2020) suggest, knowledge doesn't necessarily lead to preventive action. Attitudes, as Rucker (Jamison *et al.*, 2017) asserts, might be the real driver of behavior. Such variations between our findings and prior studies beg the question: what influences these shifts in knowledge and attitudes? Our results echo an Egyptian study with an average knowledge score of 16.39 out of 23(Alahdal, Basingab and Alotaibi, 2020). Conversely, an Ethiopian research showed only 33.9% of chronically ill patients were adequately informed about the pandemic(Bureau, 2021), suggesting changing dynamics in knowledge access over time.

Participants' adherence to COVID-19 preventive practices, such as regular hand washing, using sanitizers, and mask-wearing, was commendable. While their knowledge about the virus appeared substantial, their attitudes present a concern. Compared to the optimistic viewpoints from Saudi Arabia(Hassan *et al.*, 2021)

and Vietnam(Huynh *et al.*, 2020), South African participants demonstrated more reserved attitudes towards COVID-19. Moreover, their trust in community structures to handle the pandemic, though existent, lagged behind the confidence levels observed in Malaysia(Azlan *et al.*, 2020). This varied attitude across regions calls for deeper exploration into what shapes public sentiment on the pandemic.

Socio-economic factors significantly influenced participants' knowledge, attitudes, and practices (KAP) towards COVID-19. Income was a strong determinant, emphasizing societal disparities. Age and education were also influential, particularly in shaping attitudes and practices. Notably, our study revealed a shift from early pandemic findings where males dominated household KAP dynamics (Hassan *et al.*, 2021), to females now taking a lead role. Middle-income families with better education typically showed more proactive COVID-19 preventive behaviors, underscoring the link between socio-economic status and pandemic awareness. Furthermore, those in informal living situations displayed less positive KAPs than their counterparts in formal housing. Access to basic amenities, like water and electricity, and employment, especially in structured settings, were correlated with better attitudes and practices, possibly due to workplace sensitization initiatives.

The study's participants demonstrated strong knowledge and practices related to COVID-19. However, the data underscores a crucial need for official entities to intensify community engagement, particularly within varied socio-economic sectors. Leveraging community platforms, notably religious institutions, could be instrumental in disseminating accurate information and fostering more positive attitudes. This rich understanding of demographics and KAP responses offers a blueprint for future interventions and communication tactics. Despite global endeavours to address COVID-19, disparities persist. Our findings emphasize the importance of evolving strategies to address these gaps, fostering a more cohesive and potent pandemic response.

### **3.5 Study strengths and limitations**

This study had several limitations. Firstly, COVID-19 preventive actions in this context are the result of subjective self-reporting of participants and reported behavior may not match actual behavior. Secondly, it was impossible to conduct face to face interviews and collect data during the COVID-19 pandemic due to COVID-19 lockdowns and COVID-19 restrictions. The latter had a huge strain on the study response rate as a result the study only manage to recruit about 75% of the targeted sample size and losing about 10% of the participants during data cleaning mainly because of missing data. As a result, the analysis was based on about 65% of the targeted sample size. KAP surveys are based on opinion and statements provided by respondents, but respondents actual behavior may prove different. As a result, the findings of the study must be

taken with caution as the actual respondent's behavior might vary with how they have portrayed their behavior in the survey.

### **Conclusion**

This paper suggests that while knowledge plays a more important function in encouraging individuals to engage in specific practices, attitudes towards COVID-19 on the other hand were less likely to influence individuals to engage in preventive behaviors and other positive impacts.

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### **Availability of data and materials**

All data sets are available from the author and will be provided for reasonable requests.

### **Authors' contributions**

NO designed the study, wrote the paper, analysed results, reviewed the paper and submitted it for publication and OA reviewed the paper.

### **Ethics approval and consent to participate**

Ethics approval was obtained from the Human Research Ethics Committee (HREC) at the University of Cape Town (HREC: REF; 724/2020).

### **Competing interests**

No competing interests between the authors

## References

- Abdelhafiz, A.S. *et al.* (2020) 'Knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19)', *Journal of community health*, 45(5), pp. 881–890.
- Afzal, M.S. *et al.* (2021a) 'Community-based assessment of knowledge, attitude, practices and risk factors regarding COVID-19 among Pakistanis residents during a recent outbreak: a cross-sectional survey', *Journal of Community Health*, 46(3), pp. 476–486.
- Agency, S.A.N. (2020) *President Ramaphosa announces a nationwide lockdown | SANews, South African News Agency*. Available at: <https://www.sanews.gov.za/south-africa/president-ramaphosa-announces-nationwide-lockdown> (Accessed: 29 March 2020).
- Ajilore, K., Atakiti, I. and Onyenankya, K. (2017) 'College students' knowledge, attitudes and adherence to public service announcements on Ebola in Nigeria: Suggestions for improving future Ebola prevention education programmes', *Health Education Journal*, 76(6), pp. 648–660.
- Ajzen, I. (1991) 'The theory of planned behavior', *Organizational behavior and human decision processes*, 50(2), pp. 179–211.
- Ajzen, I. and Fishbein, M. (2000) 'Attitudes and the attitude-behavior relation: Reasoned and automatic processes', *European review of social psychology*, 11(1), pp. 1–33.
- Akalu, Y., Ayelign, B. and Molla, M.D. (2020) 'Knowledge, attitude and practice towards COVID-19 among chronic disease patients at Addis Zemen Hospital, Northwest Ethiopia', *Infection and drug resistance*, 13, p. 1949.
- Alahdal, H., Basingab, F. and Alotaibi, R. (2020) 'An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia', *Journal of infection and public health*, 13(10), pp. 1446–1452.
- Al-Hanawi, M.K. *et al.* (2020) 'Knowledge, attitude and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: a cross-sectional study', *Frontiers in public health*, 8, p. 217.
- Allegrante, J.P., Auld, M.E. and Natarajan, S. (2020a) 'Preventing COVID-19 and its sequela: "There is no magic bullet... It's just behaviors"', *American journal of preventive medicine*, 59(2), pp. 288–292.
- Alnakli, Z. (2016) *Saudi Arabians' Health Beliefs Pertaining to Middle East Respiratory Syndrome-Coronavirus (MERS-CoV): Knowledge, Attitudes, and Practices (KAP) Assessment*.
- Alves, M. de F.C. *et al.* (2021) 'Knowledge, attitudes and practices towards COVID-19: a cross-sectional study in the resident cape-verdean population', *Social Sciences & Humanities Open*, 4(1), p. 100184.
- Andrade, C., Menon, V., Ameen, S. and Kumar Praharaj, S. (2020) 'Designing and conducting knowledge, attitude, and practice surveys in psychiatry: practical guidance', *Indian Journal of Psychological Medicine*, 42(5), pp. 478–481.
- Andrade, C., Menon, V., Ameen, S. and Praharaj, S.K. (2020) 'Designing and Conducting Knowledge, Attitude, and Practice Surveys in Psychiatry: Practical Guidance', <https://doi.org/10.1177/0253717620946111>, 42(5), pp. 478–481. Available at: <https://doi.org/10.1177/0253717620946111>.
- Azlan, A.A. *et al.* (2020) 'Public knowledge, attitudes and practices towards COVID-19: A cross-sectional study in Malaysia', *Plos one*, 15(5), p. e0233668.
- Azman, A.S. *et al.* (2013) 'The incubation period of cholera: A systematic review', *Journal of Infection*, 66(5), pp. 432–438. Available at: <https://doi.org/10.1016/j.jinf.2012.11.013>.

- Baig, M. *et al.* (2020) 'Predictors of misconceptions, knowledge, attitudes, and practices of COVID-19 pandemic among a sample of Saudi population', *PloS one*, 15(12), p. e0243526.
- Bandura, A. and Walters, R.H. (1977) *Social learning theory*. Englewood cliffs Prentice Hall.
- Bano, R. *et al.* (2013) 'A comparative study of knowledge, attitude, practice of nutrition and non-nutrition student towards a balanced diet in Hail University', *Journal of Nursing and Health Science*, 2(3), pp. 29–36.
- van den Berg, H. *et al.* (2006) 'The impact of affective and cognitive focus on attitude formation', *Journal of Experimental Social Psychology*, 42(3), pp. 373–379.
- Bhagavathula, A.S. *et al.* (2020) 'Novel coronavirus (COVID-19) knowledge and perceptions: a survey on healthcare workers', *MedRxiv*, pp. 2020–2023.
- Cislaghi, B. and Heise, L. (2018) 'Theory and practice of social norms interventions: eight common pitfalls', *Globalization and health*, 14(1), pp. 1–10.
- Collins, S.A. *et al.* (2012) 'Health literacy screening instruments for eHealth applications: a systematic review', *Journal of biomedical informatics*, 45(3), pp. 598–607.
- Czeisler, M.É. *et al.* (2020) 'Public attitudes, behaviors, and beliefs related to COVID-19, stay-at-home orders, nonessential business closures, and public health guidance—United States, New York City, and Los Angeles, May 5–12, 2020', *Morbidity and Mortality Weekly Report*, 69(24), p. 751.
- Deng, J.-F. *et al.* (2006) 'Severe acute respiratory syndrome (SARS): Knowledge, attitudes, practices and sources of information among physicians answering a SARS fever hotline service', *Public health*, 120(1), pp. 15–19.
- Eagly, A.H. and Chaiken, S. (1993) *The psychology of attitudes*. Harcourt brace Jovanovich college publishers.
- Edition, S. (2002) 'America ' s Forgotten Pandemic', 1600(March 1919), pp. 1250–1600.
- Erfani, A. *et al.* (2020a) 'Knowledge, Attitude and Practice toward the Novel Coronavirus (COVID-19) Outbreak: A Population-Based Survey in Iran', (March). Available at: <https://doi.org/http://dx.doi.org/10.2471/BLT.20.256651>.
- Ferdous, M.Z. *et al.* (2020) 'Knowledge, attitude, and practice regarding COVID-19 outbreak in Bangladesh: An online-based cross-sectional study', *PloS one*, 15(10), p. e0239254.
- de Francisco, N. *et al.* (2015) 'A systematic review of the social and economic burden of influenza in low- and middle-income countries', *Vaccine*, 33(48), pp. 6537–6544.
- Gautam, V. *et al.* (2021) 'Health literacy, preventive COVID 19 behaviour and adherence to chronic disease treatment during lockdown among patients registered at primary health facility in urban Jodhpur, Rajasthan', *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 15(1), pp. 205–211.
- Harmon-Jones, E. and Harmon-Jones, C. (2021) 'On defining positive affect (PA): Considering attitudes toward emotions, measures of PA, and approach motivation', *Current Opinion in Behavioral Sciences*, 39, pp. 46–51.
- Hays, J.N. (2005) *Epidemics and Pandemics: Thier Impact on Human History*. Edited by S. Danver, L. Esterman, and A. Martinez. ABC-CLIO, Inc.
- Hesaraki, M. *et al.* (2021) 'Knowledge, attitude, practice and clinical recommendations of health care workers towards COVID-19: a systematic review', *Reviews on Environmental Health*, 36(3), pp. 345–357.
- Hulme, M. (2018) "'Gaps" in climate change knowledge: Do they exist? Can they be filled?', *Environmental Humanities*, 10(1), pp. 330–337.

- Hungerford, H.R. and Volk, T.L. (1990) 'Changing learner behavior through environmental education', *The journal of environmental education*, 21(3), pp. 8–21.
- Huynh, G. *et al.* (2020) 'Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City', *Asian Pacific Journal of Tropical Medicine*, 13(6), p. 260.
- Jamison, D.T. *et al.* (2017) *Disease Control Priorities, Third Edition (Volume 9): Improving Health and Reducing Poverty*. Third Edit, *Disease Control Priorities, Third Edition (Volume 9): Improving Health and Reducing Poverty*. Third Edit. © 2018 International Bank for Reconstruction and Development / The World Bank. Available at: <https://doi.org/10.1596/978-1-4648-0527-1>.
- Jamison, D.T. (2018) 'Disease control priorities: improving health and reducing poverty', *The Lancet*, 391(10125), pp. e11–e14.
- Kasemy, Z.A. *et al.* (2020) 'Knowledge, attitude and practice toward COVID-19 among Egyptians', *Journal of epidemiology and global health*, 10(4), p. 378.
- Kennedy, J., Harmer, A. and McCoy, D. (2017) 'The political determinants of the cholera outbreak in Yemen', *The Lancet Global Health*. Elsevier Ltd, pp. e970–e971. Available at: [https://doi.org/10.1016/S2214-109X\(17\)30332-7](https://doi.org/10.1016/S2214-109X(17)30332-7).
- Kim, J.J., Han, H. and Ariza-Montes, A. (2021) 'The impact of hotel attributes, well-being perception, and attitudes on brand loyalty: Examining the moderating role of COVID-19 pandemic', *Journal of Retailing and Consumer Services*, 62, p. 102634.
- Lee, M., Kang, B.-A. and You, M. (2021) 'Knowledge, attitudes, and practices (KAP) toward COVID-19: a cross-sectional study in South Korea', *BMC public health*, 21(1), pp. 1–10.
- Liao, X., Nguyen, T.P.L. and Sasaki, N. (2022) 'Use of the knowledge, attitude, and practice (KAP) model to examine sustainable agriculture in Thailand', *Regional Sustainability*, 3(1), pp. 41–52.
- Lin, Y. *et al.* (2011) 'Knowledge, attitudes and practices (KAP) related to the pandemic (H1N1) 2009 among Chinese general population: a telephone survey', *BMC infectious diseases*, 11(1), pp. 1–9.
- Liu, L. *et al.* (2016) 'Use of a knowledge-attitude-behaviour education programme for Chinese adults undergoing maintenance haemodialysis: Randomized controlled trial', *Journal of International Medical Research*, 44(3), pp. 557–568.
- Liu, P., Teng, M. and Han, C. (2020) 'How does environmental knowledge translate into pro-environmental behaviors?: The mediating role of environmental attitudes and behavioral intentions', *Science of the total environment*, 728, p. 138126.
- Lunsford, N.B. *et al.* (2018) 'Skin cancer knowledge, awareness, beliefs and preventive behaviors among black and hispanic men and women', *Preventive medicine reports*, 12, pp. 203–209.
- Luo, Y.-F. *et al.* (2022) 'Knowledge, Attitude, and Practice (KAP) toward COVID-19 Pandemic among the Public in Taiwan: A Cross-Sectional Study', *International Journal of Environmental Research and Public Health*, 19(5), p. 2784.
- Memon, M.S. *et al.* (2015) 'An assessment of knowledge, attitude and practices (KAP) towards diabetes and diabetic retinopathy in a suburban town of Karachi', *Pakistan journal of medical sciences*, 31(1), p. 183.
- Moon, M.A. *et al.* (2018) 'Consumer perceptions of counterfeit clothing and apparel products attributes', *Marketing Intelligence & Planning* [Preprint].
- Muleme, J. *et al.* (2017) 'A Framework for Integrating Qualitative and Quantitative Data in Knowledge, Attitude, and Practice Studies: A Case Study of Pesticide Usage in Eastern Uganda', *Frontiers in Public Health*, 0(DEC), p. 318. Available at: <https://doi.org/10.3389/FPUBH.2017.00318>.

- National Institute For Communicable Diseases (NICD) (2020) *FIRST CASE OF COVID-19 CORONAVIRUS REPORTED IN SA*, <https://www.nicd.ac.za/first-case-of-covid-19-coronavirus-reported-in-sa/>.
- Nguyen, T.P.L., Seddaiu, G. and Roggero, P.P. (2019) 'Declarative or procedural knowledge? Knowledge for enhancing farmers' mitigation and adaptation behaviour to climate change', *Journal of Rural Studies*, 67, pp. 46–56.
- Ngwewondo, A. *et al.* (2020) 'Knowledge, attitudes, practices of/towards COVID 19 preventive measures and symptoms: A cross-sectional study during the exponential rise of the outbreak in Cameroon', *PLoS neglected tropical diseases*, 14(9), p. e0008700.
- Pal, R. *et al.* (2020) 'Knowledge, attitudes and practices towards COVID-19 among young adults with Type 1 Diabetes Mellitus amid the nationwide lockdown in India: A cross-sectional survey', *Diabetes research and clinical practice*, 166, p. 108344.
- Papagiannis, D. *et al.* (2020) 'Assessment of knowledge, attitudes, and practices towards new coronavirus (SARS-CoV-2) of health care professionals in Greece before the outbreak period', *International journal of environmental research and public health*, 17(14), p. 4925.
- Person, B. *et al.* (2004) 'Fear and stigma: the epidemic within the SARS outbreak', *Emerging infectious diseases*, 10(2), p. 358.
- Phipps, D.J. *et al.* (2021) 'A dual-process model of affective and instrumental attitudes in predicting physical activity', *Psychology of Sport and Exercise*, 54, p. 101899.
- Podder, D. *et al.* (2019) 'Community perception and risk reduction practices toward malaria and dengue: A mixed-method study in slums of Chetla, Kolkata', *Indian journal of public health*, 63(3), p. 178.
- Rahbar, T. *et al.* (2007) "' Knowledge, attitude, behavior and practice (KABP) regarding HIV/AIDS among pregnant women attending PPTCT programme in New Delhi".', *The Journal of communicable diseases*, 39(3), pp. 179–184.
- Rogers, E.M. (1995) 'Diffusion of innovations, The Free Press, New York, NY'.
- Ross-gillespie, V. (2014) 'insects ve rs ity of e To w ve rs ity e To w'.
- Rubin, G.J. *et al.* (2009) 'Public perceptions, anxiety, and behaviour change in relation to the swine flu outbreak: Cross sectional telephone survey', *BMJ (Online)*, 339(7713), p. 156. Available at: <https://doi.org/10.1136/bmj.b2651>.
- Rucker, D.D. (2021a) 'Attitudes and attitude strength as precursors to object attachment', *Current opinion in psychology*, 39, pp. 38–42.
- Ryan, E.T. (2011) 'The cholera pandemic, still with us after half a century: Time to rethink', *PLoS Neglected Tropical Diseases*, 5(1). Available at: <https://doi.org/10.1371/journal.pntd.0001003>.
- Seryczynska, B. *et al.* (2021) 'Religious capital as a central factor in coping with the Covid-19: Clues from an international survey', *European Journal of Science and Theology*, 17(2), pp. 67–81.
- Siddiquea, B.N. *et al.* (2021) 'Global epidemiology of COVID-19 knowledge, attitude and practice: A systematic review and meta-analysis', *BMJ open*, 11(9), p. e051447.
- Singh, A. and Ahuja, R. (2020) 'Knowledge, attitude, and practice of general public towards COVID-19 in India: An online cross-sectional study', *Int. J. Innov. Res. Sci. Eng. Technol*, 9(6), pp. 5005–5012.
- Srichan, P. *et al.* (2020) 'Knowledge, Attitude and Preparedness to Respond to the 2019 Novel Coronavirus (COVID-19) Among the Bordered Population of Northern Thailand in the Early Period of the Outbreak: A Cross-Sectional Study', *SSRN Electronic Journal [Preprint]*. Available at: <https://doi.org/10.2139/ssrn.3546046>.

- Taubenberger, J.K. and Morens, D.M. (2006) '1918 Influenza: The mother of all pandemics', *Emerging Infectious Diseases*. Centers for Disease Control and Prevention (CDC), pp. 15–22. Available at: <https://doi.org/10.3201/eid1209.05-0979>.
- Teng, Y.-M. *et al.* (2021) 'Assessing the knowledge, attitudes and practices of COVID-19 among quarantine hotel workers in China', in *Healthcare*. MDPI, p. 772.
- The Story of Influenza - The Threat of Pandemic Influenza - NCBI Bookshelf* (no date). Available at: <https://www.ncbi.nlm.nih.gov/books/NBK22148/> (Accessed: 2 June 2020).
- Vandamme, E. (2009) 'Concepts and challenges in the use of knowledge-attitude-practice surveys: Literature review', *Department of Animal Health. Institute of Tropical Medicine*, 1, pp. 1–7.
- Vanney, C.E. and Sáenz, J.I.A. (2021) 'Second-person perspective in interdisciplinary research: A cognitive approach for understanding and improving the dynamics of collaborative research teams', *Scientia et Fides*, 9(2), pp. 155–178.
- Wahed, T. *et al.* (2013) 'Knowledge of, attitudes toward, and preventive practices relating to cholera and oral cholera vaccine among urban high-risk groups: Findings of a cross-sectional study in Dhaka, Bangladesh', *BMC Public Health*, 13(1), p. 242. Available at: <https://doi.org/10.1186/1471-2458-13-242>.
- Wake, A.D. (2020) 'Knowledge, attitude, practice, and associated factors regarding the novel coronavirus disease 2019 (COVID-19) pandemic', *Infection and Drug Resistance*, 13, p. 3817.
- Wessman, W.L. (2006) 'The Nature of Thought: Maturity of Mind'.
- WHO (2020a) 'Advice for public', *WHO*.
- WHO (2020b) *Events as they happen. Rolling updates on coronavirus disease (COVID-19)*, *WHO*. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen> (Accessed: 11 April 2020).
- WHO (2020c) *Survey Tool and Guidance*.
- World Health Organisation (2008) *Advocacy, communication and social mobilization for TB control: a guide to developing knowledge, attitude and practice surveys*. World Health Organization.
- World Health Organisation (2014) *KNOWLEDGE, ATTITUDES, AND PRACTICES (KAP) SURVEYS DURING CHOLERA VACCINATION CAMPAIGNS: Guidance for Oral Cholera Vaccine Stockpile Campaigns 'WORKING COPY'*.
- World Health Organisation (2020) *Survey tool and guidance: rapid, simple, flexible behavioural insights on COVID-19: 29 July 2020*.
- World Health Organization (2020a) *World health organization coronavirus disease (COVID-19) dashboard*, <https://covid19.who.int/>.
- World Health Organization (2020b) *Coronavirus*, *WHO*. Available at: [https://www.who.int/health-topics/coronavirus#tab=tab\\_1](https://www.who.int/health-topics/coronavirus#tab=tab_1) (Accessed: 29 March 2020).
- World Health Organization (2020c) *Novel Coronavirus(2019-nCoV) Situation Report – 22*.
- World health Organization (2020) *Situation Report-60 SITUATION IN NUMBERS total (new) cases in last 24 hours WHO RISK ASSESSMENT Global Level Very High, Coronavirus disease 2019 (COVID-19)*.
- World Health Organization (WHO) (2020) *Novel Coronavirus ( 2019-nCoV ) Situation Report - 1 21 January 2020, WHO Bulletin*.
- Worldometer (2020) *Coronavirus Cases*, *Worldometer*. Available at: <https://doi.org/10.1101/2020.01.23.20018549V2>.

Zhong, B.-L. *et al.* (2020a) 'Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey', *International journal of biological sciences*, 16(10), p. 1745.

Zhong, B.-L. *et al.* (2020b) 'Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey', *International journal of biological sciences*, 16(10), p. 1745.

## PART D: POLICY BRIEF

# Socio-economic factors associated with knowledge, attitudes, and practices response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa: An internet based cross-sectional study

- **Attitudes do not always influence engagements in preventive behaviour-** attitudes towards COVID-19 were less likely to influence individuals to engage in preventive behaviours.
- **Knowledge is an important driver of practices-** knowledge plays a more important function

### Factors associated with KAP in response to COVID-19

Pandemics existed long before humans were aware of them, dating back to 165 AD, with plagues like the *Antoninian plague* (165 AD), *Justinian's plague* (541-542), and the *Black Death* (1346-1353), with infections spread across countries and killing millions. The worst pandemic of the 19th century was the influenza pandemic called the “*Spanish Flu*” which killed between 20 to 50 million people between 1918 and 1919 worldwide. Knowledge about the 1918 flu at the time was limited, no one knew why it was so dangerous, there was not any cure for it and thus people at the time believed that the best cure was bed rest.

In the modern era, the severe acute respiratory syndrome (SARS) virus of 2003 affected 37 countries and resulted in 744 deaths even though it only lasted a few months. Mortality experiences was mainly driven by misconceptions and the attitudes associated with the virus. The experiences in China of the SARS virus were therefore an important learning point proving the importance of monitoring not only public perception but also the economic impact of the disease since it had a direct effect on compliance by the public to precautionary interventions

This is the case with the current outbreak of the coronavirus disease as infection presents itself as pneumonia with unknown cause. On the 31<sup>st</sup> of December 2019, Wuhan City in China informed the World Health Organization (WHO) of cases of pneumonia that had an unknown cause. By the 3<sup>rd</sup> of January 2020, 44 cases of patients with pneumonia were reported. On the 11th February 2020, the WHO named the disease COVID-19 short for coronavirus disease 2019. On the 5<sup>th</sup> March 2020 the South African government announced its first COVID-19 case and simultaneously the National Institute for

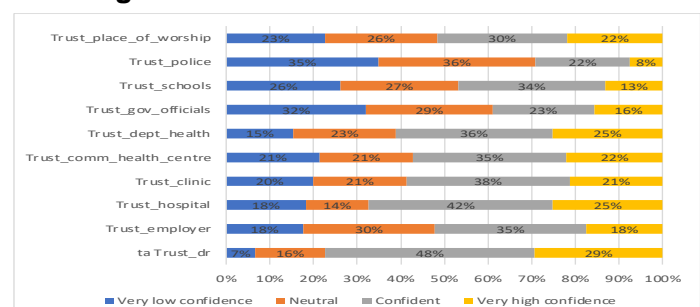
Communicable disease in South Africa had warned against the stigmatization of those affected by coronavirus.

As part of a comprehensive response for COVID-19 prevention and control, South Africa, as well as many other countries, implemented extensive health and hygiene interventions to curb the spread of the disease. Interventions led by WHO included hand washing campaigns, guidance on social distancing, practising respiratory hygiene, awareness on refraining from touching eye, nose and mouth, and informing people on when to seek medical attention.

Extensive educational campaigns on all social media platforms as well as government agencies were implemented in South Africa in response to disrupting the transmission of COVID-19. However, adherence to these interventions was affected by people’s knowledge, attitude and practice (KAP) as well as the economic status for the given information to be effective. The main purpose of this KAP study was to examine changes in knowledge, attitudes and practices and socio-economic factors associated with the knowledge, attitude, and practice response to COVID-19 and preventive measures of COVID-19 in South Africa.

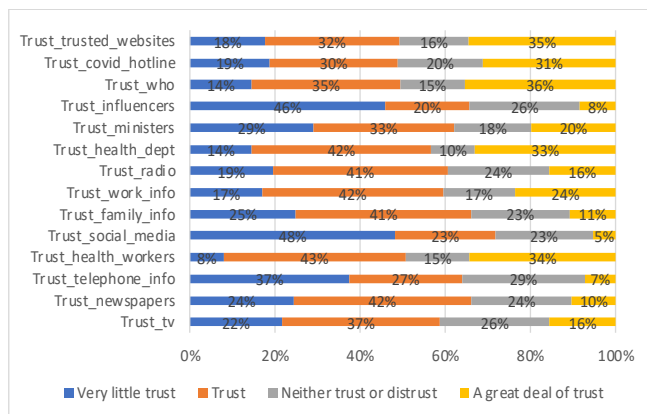
### Research Evidence

#### Part D: Figure 1 How confident people that the following could handle the COVID-19 challenge well



**Error! Reference source not found.** shows that people were more confident that the community structures such as place of worship could better handle the COVID-19 than government officials. This clearly shows that communities now are not confident with the political system even in dire times such as pandemics.

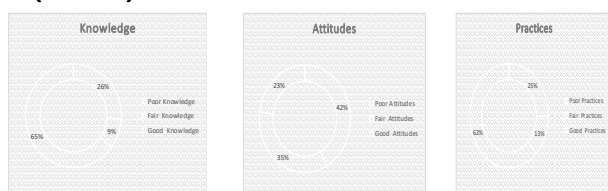
**Part D: Figure 2 Level of trust of information about COVID-19 from the following sources**



Source: Own computations

**Error! Reference source not found.** reported that communities at large had a great deal of trust on information from the department of health, COVID-19 hotline and WHO website. This important to note as these are official mouth pieces of information regarding public health issues.

**Part D: Figure 3 The distribution of KAP response to COVID-19 in South Africa (n=188)**



Source: Own computations

The gathered research evidence showed that communities were knowledgeable and had good practices relative to COVID-19, however, there is evidence of poor attitudes. The evidence of poor attitudes was mainly driven by negative perceptions of the governing institutions.

### Policy recommendations

It is critical to review the policies of governing health and invest more in understanding why people no longer trust governing institutions. One of the reasons might be because of the recent corruption allegations which has characterized health systems in South Africa.

Knowledge of COVID-19 does not necessarily lead people to preventive measures. This does not mean that public knowledge about the disease is not important. It is the basis of action and the reason for action. If competent authorities inform people of COVID-19 related illnesses and infections, there will therefore need to think about how to make a difference from "empty speech" in public to "do it now".



### Bibliography

Agency, S.A.N. (2020) President Ramaphosa announces a nationwide lockdown | SAnews, South African News Agency. Available at: <https://www.sanews.gov.za/south-africa/president-ramaphosa-announces-nationwide-lockdown> (Accessed: 29 March 2020).

Ajilore, K., Atakiti, I. and Onyenankeya, K. (2017) 'College students' knowledge, attitudes and adherence to public service announcements on Ebola in Nigeria: Suggestions for improving future Ebola prevention education programmes', Health Education Journal, 76(6), pp. 648–660.

Ajzen, I. and Fishbein, M. (2000) 'Attitudes and the attitude-behavior relation: Reasoned and automatic processes', European review of social psychology, 11(1), pp. 1–33.

Alahdal, H., Basingab, F. and Alotaibi, R. (2020) 'An analytical study on the awareness, attitude and practice during the COVID-19 pandemic in Riyadh, Saudi Arabia', Journal of infection and public health, 13(10), pp. 1446–1452.

World Health Organisation (2008) Advocacy, communication and social mobilization for TB control: a guide to developing knowledge, attitude and practice surveys. World Health Organization.

World Health Organisation (2014) KNOWLEDGE, ATTITUDES, AND PRACTICES (KAP) SURVEYS DURING CHOLERA VACCINATION CAMPAIGNS: Guidance for Oral Cholera Vaccine Stockpile Campaigns 'WORKING COPY'.

World Health Organization (2020a) World health organization coronavirus disease (COVID-19) dashboard, <https://covid19.who.int/>.

World Health Organization (2020b) Coronavirus, WHO. Available at: [https://www.who.int/health-topics/coronavirus#tab=tab\\_1](https://www.who.int/health-topics/coronavirus#tab=tab_1) (Accessed: 29 March 2020).

World health Organization (2020) Situation Report-60 SITUATION IN NUMBERS total (new) cases in last 24 hours WHO RISK ASSESSMENT Global Level Very High, Coronavirus disease 2019 (COVID-19)

## 5. PART E: APPENDICES

### Part E: Appendix 1; Plagiarism Declaration

#### Plagiarism Declaration

- 1) I know that plagiarism is wrong. Plagiarism is to use another's work and pretend it is one's own.
- 2) I have used the Harvard style for referencing in the research protocol and literature review. The style used by the Vancouver style was applied in the journal manuscript. Each quotation in this thesis from the work(s) of other people has been attributed, has been cited, and referenced.
- 3) This dissertation is my own work. I have not allowed and will not allow anyone to copy my work with the intention of passing it off as his/her own work.

Signature:

Name: Naadiya Orrie

Student Number: ORRNAA001

30<sup>th</sup> January 2023

## Part E: Appendix 2; Ethics approval



**UNIVERSITY OF CAPE TOWN**  
**Faculty of Health Sciences**  
**Human Research Ethics Committee**



**Room G50- Old Main Building**  
**Groote Schuur Hospital**  
**Observatory 7925**  
**Telephone [021] 406 6492**  
**Email: [hrec-submissions@uct.ac.za](mailto:hrec-submissions@uct.ac.za)**  
**Website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms)**

11 March 2021

**HREC REF: 724/2020**

**Dr O Alaba**  
Health Economics Unit  
School of Public Health & Family Medicine  
Email: [olufunke.alaba@uct.ac.za](mailto:olufunke.alaba@uct.ac.za)  
Student: [naadiya.orrie@gmail.com](mailto:naadiya.orrie@gmail.com)

Dear Dr Alaba

**PROJECT TITLE: SOCIO-ECONOMIC FACTORS ASSOCIATED WITH THE KNOWLEDGE, ATTITUDE, AND PRACTICE RESPONSE TO THE 2019 NOVEL CORONAVIRUS (COVID-19) AND PREVENTIVE MEASURES OF COVID-19 IN SOUTH AFRICA: AN INTERNET BASED CROSS-SECTIONAL STUDY (MASTERS CANDIDATE: MRS N ORRIE)**

Thank you for your response letter, addressing the issues raised by the Faculty of Health Sciences Human Research Ethics Committee (HREC).

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

**This approval is subject to strict adherence to the HREC recommendations regarding research involving human participants during COVID -19, dated 17 March 2020 & 06 July 2020.**

**Approval is granted for one year until the 30 March 2022.**

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: [www.health.uct.ac.za/fhs/research/humanethics/forms](http://www.health.uct.ac.za/fhs/research/humanethics/forms))

***The HREC acknowledge that the student: - Mrs N Orrie will also be involved in this study.***

**Please quote the HREC REF 724/2020 in all your correspondence.**

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

HREC/REF 724/2020sa

Yours sincerely

  
PP

**PROFESSOR M BLOCKMAN**

**CHAIRPERSON, FACULTY OF HEALTH SCIENCES HUMAN RESEARCH ETHICS COMMITTEE**

Federal Wide Assurance Number: FWA00001637.

Institutional Review Board (IRB) number: IRB00001938

NHREC-registration number: REC-210208-007

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

HREC/REF 724/2020sa

## Part E: Appendix 3; BMC Public Health - (Guide for authors)

### Submission Guidelines

#### 1. Criteria

Research articles should report on original primary research or new experimental or computational methods, tests or procedures. Manuscripts reporting results of a clinical trial must conform to CONSORT 2010 guidelines. Authors of randomized controlled trials should submit a complete CONSORT checklist alongside their manuscript, available at [www.consort-statement.org](http://www.consort-statement.org). Research articles may also report on systematic reviews of published research provided they adhere to the appropriate reporting guidelines which are detailed in our [editorial policies](#). Please note that non-commissioned pooled analyses of selected published research and bibliometric analyses will not be considered. Studies reporting descriptive results from a single institution or region will only be considered if analogous data have not been previously published in a peer reviewed journal and the conclusions provide distinct insights that are of relevance to a regional or international audience.

#### Data sharing

*BMC Public Health* strongly supports open research, including transparency and openness in reporting. Further details of our [Data availability policy](#) can be found on the journal's About page.

#### Professionally produced Visual Abstracts

*BMC Public Health* will consider visual abstracts. As an author submitting to the journal, you may wish to make use of services provided at Springer Nature for high quality and affordable visual abstracts where you are entitled to a 20% discount. Click [here](#) to find out more about the service, and your discount will be automatically be applied when using this link.

#### 2. Preparing your manuscript

The information below details the section headings that you should include in your manuscript and what information should be within each section.

Please note that your manuscript must include a 'Declarations' section including all the subheadings (please see below for more information).

#### 3. Title page

The title page should:

- present a title that includes, if appropriate, the study design e.g.:
  - "A versus B in the treatment of C: a randomized controlled trial", "X is a risk factor for Y: a case control study", "What is the impact of factor X on subject Y: A systematic review"
  - or for non-clinical or non-research studies a description of what the article reports
- list the full names and institutional addresses for all authors
  - if a collaboration group should be listed as an author, please list the Group name as an author. If you would like the names of the individual members of the Group to be searchable through their individual PubMed records, please include this information in the "Acknowledgements" section in accordance with the instructions below

- Large Language Models (LLMs), such as [ChatGPT](#), do not currently satisfy our [authorship criteria](#). Notably an attribution of authorship carries with it accountability for the work, which cannot be effectively applied to LLMs. Use of an LLM should be properly documented in the Methods section (and if a Methods section is not available, in a suitable alternative part) of the manuscript.
- indicate the corresponding author

#### **4. Abstract**

The Abstract should not exceed 350 words. Please minimize the use of abbreviations and do not cite references in the abstract. Reports of randomized controlled trials should follow the [CONSORT](#) extension for abstracts. The abstract must include the following separate sections:

- Background: the context and purpose of the study
- Methods: how the study was performed and statistical tests used
- Results: the main findings
- Conclusions: brief summary and potential implications
- Trial registration: If your article reports the results of a health care intervention on human participants, it must be registered in an appropriate registry and the registration number and date of registration should be stated in this section. If it was not registered prospectively (before enrollment of the first participant), you should include the words 'retrospectively registered'. See our [editorial policies](#) for more information on trial registration

#### **5. Keywords**

Three to ten keywords representing the main content of the article.

#### **6. Background**

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

#### **7. Methods**

The methods section should include:

- the aim, design and setting of the study
- the characteristics of participants or description of materials
- a clear description of all processes, interventions and comparisons. Generic drug names should generally be used. When proprietary brands are used in research, include the brand names in parentheses
- the type of statistical analysis used, including a power calculation if appropriate

#### **8. Results**

This should include the findings of the study including, if appropriate, results of statistical analysis which must be included either in the text or as tables and figures.

#### **9. Discussion**

This section should discuss the implications of the findings in context of existing research and highlight limitations of the study.

## **10. Conclusions**

This should state clearly the main conclusions and provide an explanation of the importance and relevance of the study reported.

## **11. List of abbreviations**

If abbreviations are used in the text they should be defined in the text at first use, and a list of abbreviations should be provided.

## **12. Declarations**

All manuscripts must contain the following sections under the heading 'Declarations':

- Ethics approval and consent to participate
- Consent for publication
- Availability of data and materials
- Competing interests
- Funding
- Authors' contributions
- Acknowledgements
- Authors' information (optional)

Please see below for details on the information to be included in these sections.

If any of the sections are not relevant to your manuscript, please include the heading and write 'Not applicable' for that section.

## **13. Ethics approval and consent to participate**

Manuscripts reporting studies involving human participants, human data or human tissue must:

- include a statement on ethics approval and consent (even where the need for approval was waived)
- include the name of the ethics committee that approved the study and the committee's reference number if appropriate

Studies involving animals must include a statement on ethics approval and for experimental studies involving client-owned animals, authors must also include a statement on informed consent from the client or owner.

See our [editorial policies](#) for more information.

If your manuscript does not report on or involve the use of any animal or human data or tissue, please state "Not applicable" in this section.

## **14. Consent for publication**

If your manuscript contains any individual person's data in any form (including any individual details, images or videos), consent for publication must be obtained from that person, or in the case of children, their parent or legal guardian. All presentations of case reports must have consent for publication.

You can use your institutional consent form or our [consent form](#) if you prefer. You should not send the form to us on submission, but we may request to see a copy at any stage (including after publication).

See our [editorial policies](#) for more information on consent for publication.

If your manuscript does not contain data from any individual person, please state “Not applicable” in this section.

### **15. Availability of data and materials**

All manuscripts must include an ‘Availability of data and materials’ statement. Data availability statements should include information on where data supporting the results reported in the article can be found including, where applicable, hyperlinks to publicly archived datasets analysed or generated during the study. By data we mean the minimal dataset that would be necessary to interpret, replicate and build upon the findings reported in the article. We recognise it is not always possible to share research data publicly, for instance when individual privacy could be compromised, and in such instances data availability should still be stated in the manuscript along with any conditions for access.

Authors are also encouraged to preserve search strings on searchRxiv <https://searchrxiv.org/>, an archive to support researchers to report, store and share their searches consistently and to enable them to review and re-use existing searches. searchRxiv enables researchers to obtain a digital object identifier (DOI) for their search, allowing it to be cited.

Data availability statements can take one of the following forms (or a combination of more than one if required for multiple datasets):

- The datasets generated and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS]
- The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.
- All data generated or analysed during this study are included in this published article [and its supplementary information files].
- The datasets generated and/or analysed during the current study are not publicly available due [REASON WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
- Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.
- The data that support the findings of this study are available from [third party name] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [third party name].
- Not applicable. If your manuscript does not contain any data, please state 'Not applicable' in this section.

More examples of template data availability statements, which include examples of openly available and restricted access datasets, are available [here](#).

BioMed Central strongly encourages the citation of any publicly available data on which the conclusions of the paper rely in the manuscript. Data citations should include a persistent identifier (such as a DOI) and should ideally be included in the reference list. Citations of

datasets, when they appear in the reference list, should include the minimum information recommended by DataCite and follow journal style. Dataset identifiers including DOIs should be expressed as full URLs. For example:

Hao Z, AghaKouchak A, Nakhjiri N, Farahmand A. Global integrated drought monitoring and prediction system (GIDMaPS) data sets. figshare. 2014. <http://dx.doi.org/10.6084/m9.figshare.853801>

With the corresponding text in the Availability of data and materials statement:

The datasets generated during and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS].<sup>[Reference number]</sup>

If you wish to co-submit a data note describing your data to be published in [BMC Research Notes](#), you can do so by visiting our [submission portal](#). Data notes support [open data](#) and help authors to comply with funder policies on data sharing. Co-published data notes will be linked to the research article the data support ([example](#)).

### **16. Competing interests**

All financial and non-financial competing interests must be declared in this section.

See our [editorial policies](#) for a full explanation of competing interests. If you are unsure whether you or any of your co-authors have a competing interest please contact the editorial office.

Please use the authors initials to refer to each authors' competing interests in this section.

If you do not have any competing interests, please state "The authors declare that they have no competing interests" in this section.

### **17. Funding**

All sources of funding for the research reported should be declared. The role of the funding body in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript should be declared.

### **18. Authors' contributions**

The individual contributions of authors to the manuscript should be specified in this section. Guidance and criteria for authorship can be found in our [editorial policies](#).

Please use initials to refer to each author's contribution in this section, for example: "FC analyzed and interpreted the patient data regarding the hematological disease and the transplant. RH performed the histological examination of the kidney, and was a major contributor in writing the manuscript. All authors read and approved the final manuscript."

### **19. Acknowledgements**

Please acknowledge anyone who contributed towards the article who does not meet the criteria for authorship including anyone who provided professional writing services or materials.

Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements section.

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If you do not have anyone to acknowledge, please write "Not applicable" in this section.

Group authorship (for manuscripts involving a collaboration group): if you would like the names of the individual members of a collaboration Group to be searchable through their individual PubMed records, please ensure that the title of the collaboration Group is included on the title page and in the submission system and also include collaborating author names as the last paragraph of the "Acknowledgements" section. Please add authors in the format First Name, Middle initial(s) (optional), Last Name. You can add institution or country information for each author if you wish, but this should be consistent across all authors.

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This section is optional.

You may choose to use this section to include any relevant information about the author(s) that may aid the reader's interpretation of the article, and understand the standpoint of the author(s). This may include details about the authors' qualifications, current positions they hold at institutions or societies, or any other relevant background information. Please refer to authors using their initials. Note this section should not be used to describe any competing interests.

## **21. Footnotes**

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

## Part E: Appendix 4; Study questionnaire

Page 1

### **SURVEY: Socio-economic factors associated with the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa:**

Socio-economic factors associated with the knowledge, attitude, and practice response to the 2019 novel coronavirus (COVID-19) and preventive measures of COVID-19 in South Africa: an internet-based cross-sectional study

You are being invited to participate in a cross-sectional behavioural survey that investigates people's behaviour around COVID-19 in South Africa. This research is conducted by a research team from the University of Cape Town.

The purpose of this study is to obtain insights on the knowledge attitude and practices about the COVID-19 pandemic and any socio-economic changes that may have occurred in your household. Specific attention will be given to understand behaviours and attitudes to COVID-19 recommendations and the willingness to the use of the vaccine. This research will be conducted by completing a questionnaire once and should take you approximately 30 minutes to complete. The survey is best completed on a computer or tablet but can also be completed via a smart phone.

Any insights we can gain from people's participation will be extremely useful for academic purposes and will be used to better inform the public on covid-19 misconceptions obtained during the pandemic.

Participating in this study is entirely voluntary and you do not have to complete this survey. If you want to stop once you have started, you have the right to leave the survey at any point, and we will delete your response from the dataset. There will be no consequences to you for failing to complete the survey. This data collection and research work is for academic use only.

The research has been reviewed and approved by the Human Research Ethics Committee of Faculty of Health Sciences, University of Cape Town, with ethics reference No. ... and permission has been obtained to circulate this survey. Publication of research results will only take place after all the information obtained cannot be linked to anyone who participated in the survey. We will store the information on a computer that is protected with a password that only the researchers know.

If you feel that the ethical standards have not been kept by the researcher, you can contact the Human Research Ethics Committee of Faculty of Health Sciences, University of Cape Town on 021 650 1236 /hrec-enquiries@uct.ac.za

This statement has been developed to protect people who agree to take part in research studies. We understand this is a difficult time which can be very distressing. If you feel particularly anxious or find it distressing to consider the changes that the COVID situation has brought about to you, please do not hesitate to quit this survey, and if needed, you can get mental health and practical support from:

COVID-19 Emergency Hotline: 0800 029 999 COVID-19 WhatsApp support line: 0600-123456 <https://sacoronavirus.co.za> – South African COVID-19 Coronavirus Resource Portal Lifeline crisis line 086 132 2322 / 011 728 1347

Who do I contact if I have any questions about the study?

If you have any questions or you experience any problems during or after this study, please contact Dr. Olufunke A. ALABA

Olufunke Alaba (olufunke.alaba@uct.ac.za)

Health Economics Unit, University of Cape Town

Should you have any concerns about this study, you are also free to contact the Head, University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee.

Telephone (012)406 6338

04.08.2022 15:15

Powered by REDCap

---

The information I give will be anonymous and I will not be identifiable in any report coming from this study.

- Yes
- No

• I agree to participate in this survey.

---

Which of the following can best describe your decision to opt out?

- Not interested
- Interested but too busy with other stuff
- Prefer not to say
- Other reasons

---

**BEGIN SURVEY**

How old are you?

\_\_\_\_\_

---

What is your sex?

- Male
- Female
- Other

---

Marital Status

- Married
- Divorce
- Single
- Never married
- Widowed

---

Where do you live?

- Small Holding
- Farm
- Formal Residential
- Township
- Informal Areas
- Traditional area/ Chieftdom
- Don't Know

---

In which province do you live?

- Eastern Cape
- Free State
- Gauteng
- KwaZulu-Natal
- Limpopo
- Mpumalanga
- Northern Cape
- North West
- Western Cape

---

What is your highest school grade completed?	<input type="radio"/> No schooling <input type="radio"/> Grade R/0 1 <input type="radio"/> Grade 1 (previously Sub A/ class 1) <input type="radio"/> Grade 2 (previously Sub B/ class 2) <input type="radio"/> Grade 3 (Std. 1) <input type="radio"/> Grade 4 (Std. 2) <input type="radio"/> Grade 5 (Std. 3) <input type="radio"/> Grade 6 (Std. 4) <input type="radio"/> Grade 7 (Std. 5) <input type="radio"/> Grade 8 (Std. 6/ Form 1) <input type="radio"/> Grade 9 (Std. 7/ Form 2) <input type="radio"/> Grade 10 (Std. 8/ Form 3) <input type="radio"/> Grade 11 (Std. 9/ Form 4) <input type="radio"/> Grade 12 (Std. 10 / Matric/ Senior Certificate/ Form 5) <input type="radio"/> National Certificate Vocational 2 (NCV 2) <input type="radio"/> National Certificate Vocational 3 (NCV 3) <input type="radio"/> National Certificate Vocational 4 (NCV 4) <input type="radio"/> N1 (NATED)/ NTC 1 <input type="radio"/> N2 (NATED)/ NTC 2 <input type="radio"/> N3 (NATED)/ NTC 3 <input type="radio"/> ABET Level 1 <input type="radio"/> ABET Level 2 <input type="radio"/> ABET Level 3
Have you completed any tertiary qualifications like diplomas, certificates or degrees?	<input type="radio"/> Yes <input type="radio"/> No
What type of dwelling or house do you live in?	<input type="radio"/> A house or a flat <input type="radio"/> A traditional house like a mud hut <input type="radio"/> An informal house like a shack <input type="radio"/> Other <input type="radio"/> Refused <input type="radio"/> Don't know
How many bedrooms does your house / dwelling have?	<input type="radio"/> 0 <input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> more
Do you have piped or tap water inside your dwelling or house or in your yard?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Refused <input type="radio"/> Don't know
Does your dwelling or house have access to electricity?	<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Refused <input type="radio"/> Don't know

---

Who lives in your household besides yourself?  
Choose as many as apply

I live alone  
 I live with children age of 5 years and under  
 I live with children age of 5 years and under with chronic disease.  
 I live with children under 18 but over the age of 5 years  
 I live with children under 18 but over the age of 5 years with chronic disease  
 I live with over 18 years old  
 I live with over 18 years old with chronic disease  
 I live with people over 60  
 I live with people over 60 with chronic disease  
 None of the above

How many people live in your household ?

I live alone  
 ≤ 2 inhabitants  
 3 inhabitants  
 4-6 inhabitants  
 >7 inhabitants

At the time of level 5 lockdown ( complete shut down ), between the period of March and August 2020, please assess your private financial situation compared to before the pandemic.

Improved  
 Remains the same  
 Worse  
 Don't know

Please assess your private financial situation now compared to the period of March to August 2020:

Improved  
 Remains the same  
 Worse  
 Don't know

What is your employment status?

Employee, full time (more than 30 hours/week)  
 Employee, part time (less than 30 hours/week)  
 Self-employed  
 Government-supported training  
 Other training or education  
 Employee on sick leave  
 Not in paid employment due to retirement  
 Not in paid employment for other reasons

What is your main income source?

Salary/Wage  
 Government grants  
 Pension  
 Family support (e.g. from spouse)  
 Other

if government grant, please specify type:

child support grant  
 old age pension grant  
 disability grant  
 care dependency grant  
 foster child grant  
 war veteran grant  
 Grant in aid (if you live on a social grant but need someone to take care of you)

please specify "other"

---

---

What is your total personal income per month from all sources (incl.salary/wage, government benefits, pension, family support etc.) after tax and deduction? (This refers to the amount you actually receive. We are interested only in your income, i.e. exclusive of, if present, your partner's income.) \_\_\_\_\_

---

Are you a health professional?  Yes  
 No

---

Do you have a chronic illness like diabetes, hypertension, etc. ?  Yes  
 No  
 Don't know

---

Was your livelihood impacted in 2020 by the covid-19 pandemic?  
Choose as many options as they apply.

- Losing job / no job
- Reduced working hours
- Family disruptions
- Getting sick
- Disruption of educational institutes
- Not being able to afford housing / rental
- Travel restrictions
- Not being able to pay debts
- Other
- No concerns

---

If other, please specify how? \_\_\_\_\_

---

Has your livelihood improved over the last 5 months?  Yes  
 No  
 Don't Know

---

If yes, how? \_\_\_\_\_

---

During the lockdown level 5 ( Complete Shut down), did you have access to nearby Doctor or Health Facility that could assist you with any health conditions?  Yes  
 No

---

During lockdown level 5 ( Complete Shut down), did you have access to nearby shops which were open that could supply you with your basic needs?  Yes  
 No

---

During the pandemic (March 2020 to March 2021), were you worried about not having enough food to eat?  Yes  
 No

---

During the pandemic (March 2020 to March 2021), has any adults gone hungry in your household because there was no access to food?  Yes  
 No

---

if yes, how often?  Never  
 1 or 2 days  
 3 or 4 days  
 Almost every day  
 Every day  
 Refused  
 Don't know

During the pandemic (March 2020 to March 2021), has any child gone hungry in your household because there was no access to food?	<input type="radio"/> Yes <input type="radio"/> No
if yes, how often?	<input type="radio"/> Never <input type="radio"/> 1 or 2 days <input type="radio"/> 3 or 4 days <input type="radio"/> Almost every day <input type="radio"/> Every day <input type="radio"/> Refused <input type="radio"/> Don't know
To your knowledge, are you, or have you been, infected with COVID-19?	<input type="radio"/> Yes <input type="radio"/> No
if yes, was it	<input type="radio"/> Mild <input type="radio"/> Severe
if yes, was it confirmed by	<input type="radio"/> Confirmed by a test <input type="radio"/> Not confirmed by a test
Do you know people in your immediate social environment who are or have been infected with COVID-19 (suspected or confirmed)?	<input type="radio"/> Yes <input type="radio"/> No
If "yes": Do you know someone who died from COVID-19?	<input type="radio"/> Yes <input type="radio"/> No

HOW EASY OR DIFFICULT WOULD YOU SAY IT IS TO...					
	Very difficult	Difficult	Neutral	Easy	Very easy
...find the information you need related to COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...understand information about what to do if you think you have COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...judge if the information about COVID-19 in the media is reliable?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...understand restrictions and recommendations of authorities regarding COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...follow the recommendations on how to protect yourself from COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...understand recommendations about when to stay at home from work/school, and when not to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

...follow recommendations about when to stay at home from work/school, and when not to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...understand recommendations about when to engage in social activities, and when not to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...follow recommendations about when to engage in social activities, and when not to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
understand recommendations about wearing a mask?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...follow recommendations about wearing a mask?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
understand recommendations about the 1.5m social distancing?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...follow recommendations about the 1.5m social distancing?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Extremely unlikely	unlikely	Neutral	likely	Extremely likely
How likely do you think you are to get infected with COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not at all vulnerable	slightly vulnerable	vulnerable	Very vulnerable
How vulnerable do you consider yourself to an infection with COVID-19?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not severe	slightly severe	severe	moderately severe	Very severe
How severe would contracting COVID-19 be for you (how seriously ill do you think you will be)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**NEXT, WE WOULD LIKE TO KNOW ABOUT YOU OWN PRACTICES RELATED TO COVID-19.**

	not at all	Slightly	Somewhat	Moderately know how	Extremely knowledgeable
I know how to protect myself from coronavirus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Extremely difficult	Very difficult	Difficult	Neutral	Easy	Very easy	Extremely easy
For me avoiding an infection with COVID-19 in the current situation is...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**DURING THE LAST 7 DAYS, WHICH OF THE FOLLOWING MEASURES HAVE YOU TAKEN TO PREVENT INFECTION FROM COVID-19?**

**CHOOSE AS MANY AS APPLY.**

	Never	Rarely	Sometimes	Often	Always
Frequently washed my hands with soap and water for at least 20 seconds	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Avoided touching my eyes, nose and mouth with unwashed hands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Used disinfectants/hand sanitizers to clean hands when soap and water were not available	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Avoided a social event I wanted to attend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stayed at home from work/school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Used medication to prevent or treat COVID-19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Used alternative medications to prevent or treat COVID-19	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wore a mask appropriately in public	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ensured appropriate social distancing in public	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disinfected surfaces	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**PLEASE CHOOSE ONE OPTION PER ROW BELOW.**

In March 2020 at the start of the pandemic, Covid-19 felt ...	<input type="radio"/> close to me <input type="radio"/> far away from me
Now Covid-19 feels ...	<input type="radio"/> close to me <input type="radio"/> far away from me
In March 2020 at the start of the pandemic, Covid-19 felt ...	<input type="radio"/> Spreading slowly <input type="radio"/> Spreading fast
Now COVID-19 to me feels ...	<input type="radio"/> Spreading slowly <input type="radio"/> Spreading fast
In March 2020 at the start of the pandemic, Covid-19 felt ...	<input type="radio"/> Something I think about all the time <input type="radio"/> Think about it some of the time <input type="radio"/> Rarely think about it <input type="radio"/> Something I almost never think about

Now COVID-19 to me feels ...	<input type="radio"/> Something I think about all the time <input type="radio"/> Think about it some of the time <input type="radio"/> Rarely think about it <input type="radio"/> Something I almost never think about
In March 2020 at the start of the pandemic, Covid-19 felt ...	<input type="radio"/> Fear-inducing <input type="radio"/> Not fear-inducing
Now COVID-19 to me feels ...	<input type="radio"/> Fear-inducing <input type="radio"/> Not fear-inducing
In March 2020 at the start of the pandemic, Covid-19 felt ...	<input type="radio"/> Media hyped <input type="radio"/> Not media hyped
Now COVID-19 to me feels ...	<input type="radio"/> Media hyped <input type="radio"/> Not media hyped
In March 2020 at the start of the pandemic, Covid-19 felt ...	<input type="radio"/> Something that makes me feel helpless <input type="radio"/> I have no feelings about it <input type="radio"/> Something I am able to combat with my own action
Now COVID-19 to me feels ...	<input type="radio"/> Something that makes me feel helpless <input type="radio"/> I have no feelings about it <input type="radio"/> Something I am able to combat with my own action
In March 2020 at the start of the pandemic, Covid-19 felt ...	<input type="radio"/> Stressful <input type="radio"/> Slightly stressful <input type="radio"/> Not stressful
Now COVID-19 to me feels ...	<input type="radio"/> Stressful <input type="radio"/> Slightly stressful <input type="radio"/> Not stressful

**How much do you TRUST information about COVID-19 from the following sources:**

	Very little trust	Trust	Neither trust or distrust	A great deal of trust
Television	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Telephone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health workers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family and friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Department of Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government Ministers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Celebrities and social media influencers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

World Health Organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
COVID-19 Hotlines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National COVID-19 information website	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### How often do you USE the following sources for information about COVID-19?

	Never	Rarely	Sometimes	Often	Always
Television	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Newspapers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Telephone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health workers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family and friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Workplace	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radio stations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Department of Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government Ministers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Celebrities and social media influencers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
World Health Organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
COVID-19 Hotlines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National COVID-19 information website	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

At the start of Covid-19 pandemic, from March 2020, how often did you seek information about COVID-19?

- Never  
 Occasionally/Sometimes  
 Often  
 Several times a day

How often do you seek information about COVID-19 now?

- Never  
 Occasionally/Sometimes  
 Often  
 Several times a day

#### HOW MUCH CONFIDENCE DO YOU HAVE THAT THE FOLLOWING CAN HANDLE THE COVID-19 CHALLENGE WELL?

	Very low confidence	Neutral	Confident	Very high confidence	Not applicable
Your family doctor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your employer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospitals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clinics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community health care centres	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Department of Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government officials such as Ministers and councillors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Police	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Place of worship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**PLEASE CONSIDER THE DECISIONS THAT ARE MADE IN SOUTH AFRICA TO REDUCE SPREAD OF COVID- 19:**

**I THINK THAT....**

	Never true	Rarely true	Sometimes but infrequently true	Neutral	Sometimes true	Usually true	Always true
...there are many very important things happen in the world, which the public is never informed about .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... politicians usually do not tell us the true motives for their decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... government closely monitors all citizens'.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... there are secret organizations that greatly influence political decisions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Did you understand ALL the lock down level restrictions in South Africa from level 5 down to level 1?  No  yes  Don't know

**PLEASE CONSIDER YOUR EXPERIENCE DURING COVID-19 PANDEMIC:**

I have a hard time making it through stressful events.  Strongly disagree  Disagree  Neither agree or disagree  Agree  Strongly agree

It does not take me long to recover from a stressful event  Strongly disagree  Disagree  Neither agree or disagree  Agree  Strongly agree

It is hard for me to snap back when something bad happens	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neither agree or disagree <input type="radio"/> Agree <input type="radio"/> Strongly agree
If you have been in contact with someone who tested positive for COVID-19 and have no symptoms yourself - will you get tested if you have the opportunity?	<input type="radio"/> I would get tested for sure <input type="radio"/> I may not get tested
I would get tested for sure because...	<input type="checkbox"/> ... I want to receive the appropriate care in case of a positive test <input type="checkbox"/> ...this is my responsibility as a citizen <input type="checkbox"/> ...I believe this helps stop the spread of COVID-19 <input type="checkbox"/> ...this way I can protect other people <input type="checkbox"/> ...my friends and family would expect me to get tested (choose as many answers as you wish)
I may not get tested because...	<input type="checkbox"/> ... getting tested would cost money (e.g. transportation, taking the test, taking time off work) <input type="checkbox"/> ... I do not know where to go to be tested <input type="checkbox"/> ... it is too time-consuming to get tested <input type="checkbox"/> ... this will result in loss of income for me due to quarantine while waiting to get the results <input type="checkbox"/> ... this would result in loss of income for me if I get a positive test <input type="checkbox"/> ... people might blame me for my actions if I get a positive test <input type="checkbox"/> ... I might face fines or other penalties if I had violated official COVID restrictions <input type="checkbox"/> ... I do not trust authorities with my personal data <input type="checkbox"/> ... I do not believe COVID-19 exists <input type="checkbox"/> ... there is nothing I can do, even if I get a positive test <input type="checkbox"/> ... I am not able to self-isolate in case I get a positive test <input type="checkbox"/> ... I do not think the tests are reliable <input type="checkbox"/> ... I am worried people will treat me badly if I get a positive test <input type="checkbox"/> ... I am worried I will get infected at the testing site <input type="checkbox"/> ... I think testing will be painful <input type="checkbox"/> ... I will assume I am positive
If you test positive for COVID-19 and are asked to share with health authorities, the names of people you have been in contact with - will you share all names?	<input type="radio"/> I would share all names for sure [leads to additional answer options below] <input type="radio"/> I may not share all names [leads to additional answer options below]
Please elaborate on this Choose as many as apply I would share all names for sure because...	<input type="checkbox"/> ... I believe this helps stop spread of COVID-19 <input type="checkbox"/> ... this is my responsibility as a citizen <input type="checkbox"/> ... this way I can protect other people <input type="checkbox"/> ... my friends and family would expect me to do this <input type="checkbox"/> ... I would face penalties if I did not

Please elaborate on this  
Choose as many as apply  
I may not share all names because...

- ... I could contact them myself
- ... I believe this could result in loss of income for those people due to quarantine
- ... I believe people would blame me for having shared their name
- ... I do not trust authorities
- ... my family and friends would expect me not to share names
- ... I would cause inconvenience for the people whose names I share
- ... I do not want others to know I tested positive

**PLEASE CONSIDER THE DECISIONS THAT ARE MADE IN SOUTH AFRICA TO REDUCE SPREAD OF COVID-19:**

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
I think the decisions are fair	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would convince others that the decisions are right	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**PLEASE NOW GIVE YOUR OPINION ON THE FOLLOWING STATEMENTS:**

A COVID-19 vaccine is available and is recommended for me, I would get it.

- Strongly disagree
- Disagree
- Neither agree or disagree
- Agree
- Strongly agree

In the event of an outbreak it's appropriate to avoid certain people on the basis of their ethnicity

- Completely disagree
- Disagree
- Neither agree or disagree
- Agree
- Completely agree

I think that the restrictions implemented are greatly exaggerated.

- Completely disagree
- Disagree
- Neither agree or disagree
- Agree
- Completely agree

The government should be allowed to force people into self-isolation if they have been in contact with someone who was infected

- Completely disagree
- Disagree
- Neither agree or disagree
- Agree
- Completely agree

More tests for coronavirus infection should be carried out in the population

- Completely disagree
- Disagree
- Neither agree or disagree
- Agree
- Completely agree

I am worried that the pandemic will have economic consequences for me in the future

- Completely disagree  
 Disagree  
 Neither agree or disagree  
 Agree  
 Completely agree

**SOME RESTRICTIONS HAVE NOW BEEN CHANGED RELATED TO COVID-19.  
PLEASE INDICATE, TO WHICH DEGREE YOU SUPPORT THE FOLLOWING DECISIONS MADE DURING 2020:**

	Strongly support	Support	Neither support or oppose	Do not support at all
1 Ban on mass gatherings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 Compulsory face masks in closed public spaces with legal consequences	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 Complete restriction of sale of alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Partial restriction on the sale of alcohol (able to buy alcohol from Monday to Thursday)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 Reopening of schools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 Curfew times	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 Closing beaches, public parks, sports grounds and swimming pools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7 Closing borders to countries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8 Ban the sale of cigarettes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 Moving to a level one Lock down inter-provincial travel ban	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**CONSIDER YOUR BEHAVIOUR DURING THE 2020 COVID-19 PANDEMIC.**

- 2 Exercised less than I did before the pandemic
- Yes  
 No  
 Not Applicable
- 
- 3 Drank more alcohol than I did before the pandemic
- Yes  
 No  
 Not Applicable
- 
- 4 Ate more unhealthy food than I did before the pandemic
- Yes  
 No  
 Not Applicable

- 
- 5 Smoked more than I did before the pandemic  Yes  
 No  
 Not Applicable
- 
- 5 Postponed vaccination for myself or my child  Yes  
 No  
 Not Applicable
- 
- 7 Avoided going to the doctor for a non-COVID-19-related problem  Yes  
 No  
 Not Applicable
- 
- 8 Bought drugs that I heard are good for treating COVID-19  Yes  
 No  
 Not Applicable

**WE WOULD NOW LIKE FOR YOU TO INDICATE YOUR GENERAL WELL-BEING:**

**OVER THE PAST 2 WEEKS...**

- 1 ... I have felt cheerful and in good spirits  All of the time  
 Most of the time  
 More than half the time  
 Less than half the time  
 Some of the time  
 At no time
- 
- ... I have felt calm and relaxed  All of the time  
 Most of the time  
 More than half the time  
 Less than half the time  
 Some of the time  
 At no time
- 
- 3 ... I have felt active and vigorous  All of the time  
 Most of the time  
 More than half the time  
 Less than half the time  
 Some of the time  
 At no time
- 
- 5 ... I woke up feeling fresh and rested  All of the time  
 Most of the time  
 More than half the time  
 Less than half the time  
 Some of the time  
 At no time
- 
- 5 ... my daily life has been filled with things that interest me  All of the time  
 Most of the time  
 More than half the time  
 Less than half the time  
 Some of the time  
 At no time

**THERE IS CURRENTLY A VACCINES AVAILABLE TO PREVENT COVID-19.****PLEASE SHARE YOUR POSITION ON THE COVID-19 VACCINE:**

I believe a vaccine can help control the spread of COVID-19

- Strongly disagree  
 Disagree  
 Neither agree or disagree  
 Agree  
 Strongly agree

If I had been infected with COVID-19 before, I would not get the vaccine even if it were available in South Africa

- Strongly disagree  
 Disagree  
 Neither agree or disagree  
 Agree  
 Strongly agree

If everyone else is vaccinated against COVID-19, then I don't have to get vaccinated

- Strongly disagree  
 Disagree  
 Neither agree or disagree  
 Agree  
 Strongly agree

**A COVID-19 VACCINE IS AVAILABLE IN SOUTH AFRICA, MY DECISION OF WHETHER OR NOT TO GET VACCINATED WILL DEPEND ON:**

	not at all influential	slightly influential	somewhat influential	very influential	extremely influential
Country in which the vaccine is produced	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recommendation from my family doctor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recommendation of the Department of Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Whether the vaccine has been in use for a long time with no serious side-effects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Whether the vaccine is used in other countries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Risk of getting infected with COVID-19 at the time when the vaccine is available	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How easy it is to get the vaccine (e.g. available out-of-hours or in pharmacies)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Whether the vaccine is free of charge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Whether a high vaccination uptake would lift restrictions on movement and gathering in groups

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Apart from COVID-19, I think everyone should be vaccinated according to the national vaccination schedule  Yes  
 No  
 Don't know

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Have you been vaccinated for COVID-19  Yes  
 No

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Please feel free to leave a comment on any thoughts you may have.

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