COVID-19 vaccine hesitancy in South Africa

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DECLARATION

I, Kwabena Afari-Twumasi, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Kwabena Afari-Twumasi

Signed at …….. Midrand……

On the ……29th…….. day of ……March…… 2022.

DEDICATION

Firstly, this research study is dedicated to my parents, Doctors Kwame and Lucy Afari-Twumasi, who encouraged me to do this MBA and provided all kinds of support to assist me to complete it. I am truly grateful to you both.

Secondly, I dedicate this to my wife, Annette, and my children, Amanda & Michael. Doing this study has meant time away from you, I thank you for your patience and your loving support. I love you all; everything I do, I do for you.

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SUPPLEMENTARY INFORMATION

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† Including abstract references, etc.

ABSTRACT

The purpose of this research was to examine why the level of COVID-19 vaccine hesitancy in South Africa is relatively high compared to the global average, despite more reassuring information being known about the safety and efficacy of the vaccines. This study zoned in on what factors most influence the decision to not get vaccinated against COVID-19 and what may influence the unvaccinated to change their mind. The overarching research problem was to develop effective strategies to move COVID-19 vaccine hesitants across the vaccine acceptance/rejection spectrum to the end where they are willing to get vaccinated. "Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services." (MacDonald, 2015)

The research looked at adults whose primary residency or occupation was in the Republic of South Africa. The entire survey was done via an anonymous online, largely Likert scale type, questionnaire. Most respondents were between the ages of 25 and 44 and had at least an undergraduate degree. There was an even balance between male and female respondents in the sample.

Some of the key highlights revealed in the study were:

- There is a fair level of distrust over government's motives when it comes to the handling of the COVID-19 pandemic
- About a third of respondents do not have conviction in the efficacy of the COVID-19 vaccines
- Over half of respondents believe that mainstream media is unreliable or biased
- Almost a quarter of all respondents have not been vaccinated
- Common methods of encouraging the hesitant to vaccinate (e.g., Prohibiting travel to other countries) are unlikely to work in South Africa

To improve COVID-19 vaccine uptake, the following recommendations were made:

- Health authorities should keep educating people about why the vaccines are safe for human beings and how they can offer protection from serious illness or death
- Health authorities should collaborate with mainstream media to build public trust. They should pay more attention to how the media portrays the pandemic to the public – the language used in reporting, the subject matter experts invited to speak, signs of bias, etc
- Government should try to improve public trust in how they are handling the pandemic. One way to do this would be to make the decision making of the National Coronavirus Command Council (NCCC) more transparent to the public

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CHAPTER 1: INTRODUCTION

1.1 Purpose of the study

The purpose of this research is to examine why the level of COVID-19 vaccine hesitancy in South Africa is relatively high compared to the global average and appears to be on an upward trend despite more reassuring information being known about the safety and efficacy of the vaccines. Specifically, this research will zone in on what factors most influence the decision to not get vaccinated against COVID-19 and what may influence the unvaccinated to change their mind. This research will build on the existing body of knowledge, relying on prior research done in South Africa as well as globally.

1.2 Context of the study

COVID-19 is currently the most topical issue globally due to the significant and far-reaching effects it has had – and continues to have – on the human way of living. At the time of writing (September 2021), globally there have been over 224.7 million coronavirus cases recorded and 4.63 million reported deaths attributed to the virus (Worldometer, 2021b). In South Africa these figures stand at over 2.8 million and 84,608 respectively. Both, by far, the largest officially recorded figures on the African continent. In fact, the COVID-19 related deaths reported in South Africa is about 41% of the total deaths in Africa number of 202,620 (Worldometer, 2021b). Globally, South Africa has the 17th highest number of reported COVID-19 cases and the 16th largest number of confirmed coronavirus related deaths (Worldometer, 2021b). On the positive side, most people infected globally have made a full recovery.

A word of caution must be made here as countries have different rates of testing and not every infected person gets tested. South Africa has conducted almost 17 million COVID-19 tests to date (Worldometer, 2021b), which is almost twice as many as the next highest testing country in Africa, Morocco. The most populous country in Africa, Nigeria, which is more than three times the size of South Africa's 59 million population (Worldometer, 2021a), has conducted less than 3 million tests – a fraction of South Africa's (Worldometer, 2021b). Furthermore, an asymptomatic person may not even realise that s/he has been infected and thus has no need to get tested. This must be kept in mind whilst examining any country COVID-19 data in general. However, these statistics still provide a meaningful base upon which to examine the severity of the COVID-19 situation in South Africa.

COVID-19 vaccines have been available for mass vaccinations since early December 2020 (World Health Organization, 2020). After much criticism of the pace at which the South African government

acquired vaccines, the country's vaccination program got off to a rocky start in early February 2021 as the rollout of one million doses of Oxford-AstraZeneca vaccines acquired from India was prematurely halted. This followed a study which found the efficacy of the vaccine against a new strain of COVID-19 predominant in South Africa to be unsatisfactory. (Mwai, 2021) However, later that month, with an initial 80,000 doses of Johnson & Johnson's single dose vaccine in hand, the vaccination program resumed (Mwai, 2021).

Given the well documented threat to human life, as well as the restrictions placed on many daily liberties directly because of this virus, one would expect World Health Organization (WHO) sanctioned vaccines to be eagerly embraced by everyone. However, the reality has been far from it. Not globally, and certainly not in South Africa.

1.3 Research problem

The overarching research problem is to develop effective strategies to move COVID-19 vaccine refusers and hesitants across the vaccine acceptance/rejection spectrum to the end where they are willing to get vaccinated. To get to this point, there first needs to be an understanding of why people are vaccine hesitant. This will ensure that the actual problem is tackled and not just symptoms. This research will contribute towards the current literature and understanding of COVID-19 vaccine hesitancy by zoning in on the factors influencing the vaccination decision of people within South Africa and how they may be persuaded to change their mind.

1.4 Research objectives

The objectives of this research are:

a) To explore the relationship between COVID-19 vaccine efficacy perception and vaccine hesitancy in South Africa;
b) To explore the relationship between mainstream media perception and COVID-19 vaccine hesitancy in South Africa;
c) To explore the relationship between government distrust and COVID-19 vaccine hesitancy in South Africa; and
d) To identify potential actions or incentives that will motivate COVID-19 vaccine hesitants in South Africa to get vaccinated.

1.5 Research questions

The following research questions will frame this study:

1) Do South African vaccine hesitants believe in the efficacy of the COVID-19 vaccines?
2) Does mainstream media perception influence vaccine hesitancy in South Africa?
3) Does distrust in government handling of the pandemic influence vaccine hesitancy in South Africa?
4) What can be done to motivate South African COVID-19 vaccine hesitants to get vaccinated?

1.6 Significance of the study

Since the start of the pandemic there has been substantial research conducted globally on intentions to receive a safe COVID-19 vaccine when available and to understand why people would be reluctant to take it. Vaccine hesitancy is "a top 10 priority" of the WHO as it "poses a substantial threat to global health" (World Health Organization, 2019a). Most of the research has been done before any formally approved vaccines became available for mass distribution, thereby effectively measuring the intention to vaccinate. However, intention does not always translate into action. Furthermore, with each passing month since COVID-19 vaccines have been taken by the public, scientists have more data to analyse and more information to disseminate to the public. This information can influence a person's intent to vaccinate – positively or negatively. Therefore, there is value in tracking the actual uptake of vaccines since becoming publicly available. Whilst actual vaccination numbers are available, there is little research on why some people still choose not to get vaccinated.

There is little research on vaccine hesitancy in South Africa. Cooper, van Rooyen, and Wiysonge (2021) have consolidated most of the available research on South Africa and highlight a concerning trend in the country: There are relatively high levels of vaccine hesitancy in South Africa compared to global estimates (Cooper et al., 2021) and "despite ample evidence of the safety and efficacy of COVID-19 vaccines" (Cooper et al., 2021, p. 930), "beliefs in the serious health side effects of vaccines and preferences for infection-acquired immunity have increased significantly since the COVID-19 national lockdown." (Cooper et al., 2021, p. 929) This is an apparent contradiction that this study will attempt to analyse and understand.

1.7 Delimitations of the study

The delimitations of this research study are:

a) The respondents are over the age of 18 years (adults)
b) The respondents' primary residency or occupation is in the Republic of South Africa
c) The respondents have been exposed to COVID-19 vaccine related information
d) The respondents have access to the internet

1.8 Keywords

COVID-19; vaccines; vaccine hesitancy; vaccine non-adopter; vaccine safety, vaccine efficacy; South Africa; "3 Cs" model; Vaccine Hesitancy Determinants Matrix; misinformation; adjusted snowball sampling; mainstream media trust; government distrust; correlation

1.9 Assumptions

The following research assumptions will be made:

a) The respondents' primary residency is in the Republic of South Africa;
b) The respondents are exposed to information about COVID-19 via multiple potential platforms such as television, radio, social media and personal physicians;
c) The number and mix of respondents will be sufficient to gain acceptable data; and
d) The respondents will provide truthful and accurate perspectives based on their lived experience.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature review shall cover two broad themes. Firstly, it shall cover the COVID-19 pandemic with a focus on the topic of vaccines. Then it shall look at Management Theories on employees in the workplace. The first part explores what vaccine hesitancy is, why some people are COVID-19 vaccine hesitant, the socio-demographic profile of vaccine hesitants, and potential strategies or tactics to reduce vaccine hesitancy. Global research as well as domestic (South African) research shall be examined. Lessons shall be drawn from the research to answer the four research questions that framed this study:

Question 1: Do South African vaccine hesitants believe in the efficacy of the COVID-19 vaccines?

Question 2: Does mainstream media perception influence vaccine hesitancy in South Africa?

Question 3: Does distrust in government handling of the pandemic influence vaccine hesitancy in South Africa?

Question 4: What can be done to motivate South African COVID-19 vaccine hesitants to get vaccinated?

The Management Theory section shall focus on the idea of mandatory COVID-19 vaccination at the workplace. It shall look at what motivates employees and the potential impact on morale, productivity, and absenteeism if mandatory COVID-19 vaccination was to be introduced.

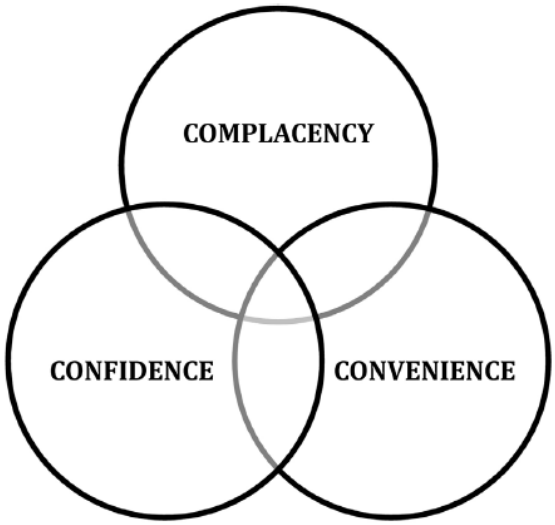
2.2 Definition of topic: COVID-19 vaccine hesitancy

The three research questions above all revolve around the concept of "vaccine hesitancy". In this section, this term will be defined, laying the foundation for the understanding of the research examined in the literature review and for data collected as part of this study. Whilst the broad topic of vaccine hesitancy will be covered, COVID-19 vaccine hesitancy, in particular, is the focus of this literature review. For the purposes of this study, the SAGE Working Group (SWG) definition of 'vaccine hesitancy' shall be used:

"Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience and confidence." (MacDonald, 2015)

The SWG expands on the definition by explaining that hesitancy is "set on a continuum between those that accept all vaccines with no doubts, to complete refusal with no doubts, with vaccine hesitant individuals the heterogeneous group between these two extremes." (MacDonald, 2015) However, the SWG cautions that whilst high levels of hesitancy translates to low vaccine demand, low levels of hesitancy does not guarantee higher demand for vaccines (MacDonald, 2015).

Figure 1. “3 Cs” model of vaccine hesitancy (MacDonald, 2015)



The SWG developed the “3 Cs” model to explain vaccine hesitancy. The “3 Cs” represent three intertwined categories, namely: Complacency, Convenience and Confidence (Figure 1) (MacDonald, 2015). These three categories are each defined as follows:

Complacency *“exists where perceived risks of vaccine-preventable diseases are low and vaccination is not deemed a necessary preventive action. Complacency about a particular vaccine or about vaccination in general is influenced by many factors, including other life/health responsibilities that may be seen to be more important at that point in time.” (MacDonald, 2015, p. 4162)*

Convenience *“is a significant factor when physical availability, affordability and willingness-to-pay, geographical accessibility, ability to understand (language and health literacy) and appeal of immunization services affect uptake. The quality of the service (real and/or perceived) and the degree to which vaccination services are delivered at a time and place and in a cultural context that is convenient and comfortable also affect the decision to be vaccinated and could lead to vaccine hesitancy.” (MacDonald, 2015, p. 4163)*

Confidence is *“trust in*

(i) the effectiveness and safety of vaccines;

(ii) the system that delivers them, including the reliability and competence of the health services and health professionals; and

(iii) the motivations of policy-makers who decide on the needed vaccines.” (MacDonald, 2015, p. 4162)

Su et al. (2020) make an important contribution to the definition of "vaccine hesitancy" by making the following observation:

"Vaccine hesitancy in fact covers myriad distinctive reasons for vaccine non-adoption, ranging from delay to indecision to reluctance to refusal. In other words, the term can be used to represent a considerable proportion of vaccine non-adopters without paying mind to these potential consumers' distinct traits. Therefore, the effectiveness of this definition is questionable in terms of helping health experts better understand vaccine non-adopters' unique concerns about COVID-19 vaccines to address these anxieties accordingly." (Su et al., 2020, p. 2) They propose that people who do not adopt vaccines should be called "vaccine non-adopters" and that these "are not one group of individuals but rather encompass many groups who possess distinct reasons for vaccine non-adoption." (Su et al., 2020, p. 2) Going forward, this study will differentiate between vaccine hesitants, and vaccine non-adopters as suggested.

2.3 Examining COVID-19 vaccine hesitancy

In this section, research on COVID-19 vaccine hesitancy is reviewed. The research will be divided into three broad categories. Firstly, inquisitive research to understand how vaccine hesitancy is formed. Secondly, research specifically focusing on misinformation, and then lastly, potential strategies to overcome vaccine hesitancy.

2.3.1 Factors influencing COVID-19 vaccine hesitancy or non-adoption

According to the WHO, vaccines prevent 2–3 million deaths annually (World Health Organization, 2019b) and COVID-19 vaccines are expected to "save a markedly greater number of lives amid and beyond the pandemic" (Su et al., 2020, p. 2). Yet, many people still refuse to take vaccines of any sort. This is not a surprise to Wood and Schulman (2021) as they note that throughout history, human beings have been slow to adopt innovations, including vaccines. For example, in the United States (US), less than half of the adult population took the influenza vaccinate in 2019 (Malik, McFadden, Elharake, & Omer, 2020).

Solís Arce et al. (2021) argue that no matter which country you live in, understanding the drivers of COVID-19 vaccine acceptance in other countries should be your concern. The reason being that "a lag in vaccination in any country may result in the emergence and spread of new variants that can overcome immunity conferred by vaccines and prior disease." (Solís Arce et al., 2021, p. 2) The question of why people choose not to get vaccinated is a difficult one to answer as it appears completely illogical or unjustified to many. "Anti-vaxxers" have been around long before the COVID-

19 pandemic started, with some parents refusing for their children to receive any of the vaccines commonly administered throughout the world. It is not merely a lack of information, with Su et al. (2020, p. 2) observing that "some vaccine non-adopters may be highly informed about vaccine efficacy and safety, such as the efficacy of established vaccines like the flu vaccine, and decide not to get vaccinated." A particularly vulnerable group to COVID-19 infection are those with low socio-economic status. However, their relatively high non-adoption rate betrays a lack of appreciation for this fact. (Su et al., 2020)

COVID-19 vaccine hesitancy may be influenced by several factors, the weight of each often varying from country to country, and even within different regions of the same country.

Legitimate health concerns: In some cases, the decision to not get some vaccines may be based on valid concerns. For example, the individual may be allergic to an ingredient within the vaccine such as egg proteins. (Su et al., 2020)

Safety concerns: Unsafe vaccines is a frequently expressed justification given by vaccine hesitants and non-adopters. Whether their concerns are justified continues to a contentious point of debate. Chou and Budenz (2020) express understanding for the existence of COVID-19 vaccine hesitancy as the vaccine was developed with "unusually rapid speed" and that some groups already had "mistrust in science and health experts." In fact, the "rapid pace of vaccine development" has been identified as the "primary reason for hesitancy" within "higher-income" countries (Solís Arce et al., 2021, p. 3).

Efficacy concerns: Does the vaccine actually work? Is there really a material benefit to a person who has vaccinated against COVID-19 over a person who has not? Many vaccine hesitants are unconvinced that the answer to these questions is "yes". This is often based upon anecdotal evidence of somebody dying despite being vaccinated.

Misinformation: Looking at vaccine hesitants, they often choose not to vaccinate for non-scientific reasons such as conspiracy theories – beliefs shaped by deliberate misinformation (Su et al., 2020) and re-enforced by confirmation bias.

Political influence: Political affiliation has been found to play a role in vaccine hesitancy, with varying levels of significance across countries. Numerous research on Americans have found evidence linking people's response to the COVID-19 pandemic with their political identity (Solís Arce et al., 2021; Wood & Schulman, 2021); with Democrats likely to share similar views on issues like the wearing of masks and likewise, Republicans sharing a similar view to each other. In fact, Democrats have been found to be less vaccine hesitant than Republicans (Loomba, de Figueiredo, Piatek, de Graaf, & Larson, 2020). The act of wearing a mask is supposed to reduce the spread of the virus through the

air. However, some groups of people have interpreted it as a sign of weakness or an attack on constitution guaranteed liberty (Wood & Schulman, 2021). In the UK, those who do not affiliate with any of the four major parties (Conservative, Labour, Liberal Democrats, and Scottish National Party) have been found to be significantly more likely to be COVID-19 vaccine non-adopters. Similar results have been found in Ireland. (Loomba et al., 2020)

In South Africa, political affiliation was also found to be "a significant issue, with supporters of the (ruling) African National Congress (ANC) party" being less COVID-19 vaccine hesitant compared to supporters of the opposition political parties (Cooper et al., 2021, p. 926). Furthermore, people who expressed a negative perception of the President and national government were more likely to be vaccine hesitant (Cooper et al., 2021).

The SAGE Working Group Vaccine Hesitancy Determinants Matrix (MacDonald, 2015): The SWG developed a table which summarises all the above factors and more (Figure 2). The factors are grouped in three categories: "Contextual, Individual and Group & vaccine/vaccination-specific influences" (MacDonald, 2015, p. 4163).

Figure 2. Vaccine Hesitancy Determinants Matrix (MacDonald, 2015)

Working Group on Vaccine Hesitancy Determinants Matrix.

Contextual influences Influences arising due to historic, socio-cultural, environmental, health system/institutional, economic or political factors	a. Communication and media environment b. Influential leaders, immunization programme gatekeepers and anti- or pro-vaccination lobbies c. Historical influences d. Religion/culture/gender/socio-economic e. Politics/policies f. Geographic barriers g. Perception of the pharmaceutical industry
Individual and group influences Influences arising from personal perception of the vaccine or influences of the social/peer environment	a. Personal, family and/or community members' experience with vaccination, including pain b. Beliefs, attitudes about health and prevention c. Knowledge/awareness d. Health system and providers – trust and personal experience e. Risk/benefit (perceived, heuristic) f. Immunization as a social norm vs. not needed/harmful
Vaccine/vaccination – specific issues Directly related to vaccine or vaccination	a. Risk/benefit (epidemiological and scientific evidence) b. Introduction of a new vaccine or new formulation or a new recommendation for an existing vaccine c. Mode of administration d. Design of vaccination programme/Mode of delivery (e.g., routine programme or mass vaccination campaign) e. Reliability and/or source of supply of vaccine and/or vaccination equipment f. Vaccination schedule g. Costs h. The strength of the recommendation and/or knowledge base and/or attitude of healthcare professionals

Concluding remarks

The SWG emphasize that there should be a clear distinction in the minds of policy makers between trying to achieve social health outcomes and trying to increase vaccine uptake as determinants that apply to both can give different outcomes. For example, education and socio-economic status are both social determinants of health as well as of vaccine hesitancy. (MacDonald, 2015) However, "higher education may be associated with both lower and higher levels of vaccine acceptance. In

contrast, as a social determinant of health, education drives in one direction – more education leads to better health outcomes." (MacDonald, 2015, p. 4163)

Su et al. (2020, p. 1) note that in order "to ensure satisfactory vaccination rates and to safeguard society at large", public health professionals must "thoroughly understand" the people they wish to vaccinate; as if they are "customers" (Su et al., 2020, p. 1). They articulate that COVID-19 vaccines are "essentially consumer health products" (Su et al., 2020, p. 1) but few are looking at the vaccine through the eyes of the consumer, who form the demand side of the vaccine equation. Rather, most of the attention has been on the supply side which is the development of vaccines. (Su et al., 2020) It is important to focus on the end users (customers) because "their attitudes, knowledge, and intentions to adopt a COVID-19 vaccine vary greatly" (Su et al., 2020, p. 2).

2.3.2 Who is most likely to be COVID-19 vaccine hesitant or non-adopting?

In this section socio-economic and geographic factors shall be examined to see if any specific category of people appears more likely to be vaccine hesitant.

Gender: Worldwide, females have generally been found to be more COVID-19 vaccine hesitant than males (Loomba et al., 2020; Malik et al., 2020; Solís Arce et al., 2021). However, in South Africa, males have contrastingly been found to be less embracing of COVID-19 vaccination than females (Cooper et al., 2021).

Age: In the UK those above 55 years of age are less vaccine hesitant than those 18–24-year-old. This contrasts with the US where the 18–24-year-old age group were found to be the most open to receive COVID-19 vaccines. (Loomba et al., 2020) Studies in LMIC have yielded mixed results on the relationship between age and COVID-19 vaccine hesitancy or non-adoption. For example, in India and Nigeria, people younger than 25 years of age are significantly more vaccine hesitant than those in the 25–54 years old category, whilst the opposite is true in Mozambique, Pakistan and Rwanda (Solís Arce et al., 2021).

Race: Ethnic minority groups have generally been found to be more COVID-19 vaccine hesitant in the United Kingdom (UK) and US (Loomba et al., 2020). Malik et al. (2020) found that Black Americans were more influenza and COVID-19 vaccine hesitant than all other racial groups.

Education: Those without university degrees have generally been found to be more COVID-19 vaccine hesitant in the United Kingdom (UK) and US (Loomba et al., 2020; Malik et al., 2020).

Income: Low-income groups have generally been found to be more COVID-19 vaccine hesitant in both the UK and US (Loomba et al., 2020).

Geography: Acceptance of childhood vaccinations for common diseases such as measles and tetanus is substantially higher in low- and middle-income countries (LMICs) when compared to Russia and the US (Solís Arce et al., 2021). This trend is reflected in the willingness to take the COVID-19 vaccine *in comparison to* Russia and the US. However, this does not translate into a broad acceptance for COVID-19 vaccines within LMICs (Solís Arce et al., 2021). Not only are there differences in vaccine hesitancy dynamics from country to country, but these exist even within countries. Numerous research reports have noted disparities in vaccine hesitancy within a country, with different regions reporting material differences in vaccination attitudes (Malik et al., 2020). For example, Malik et al. (2020) polled noticeable differences between the intended COVID-19 vaccine acceptance of people in New York compared to Chicago, within the US.

2.4 Examining trusted sources of COVID-19 related information of vaccine hesitants

In order to win the fight against COVID-19, we need to know if people are open to take the vaccines; the reasons why they may or may not accept the vaccines, and their "most trusted sources of information" that informed their decision (MacDonald, 2015; Solís Arce et al., 2021). This assertion is unanimous across almost all literature about COVID-19 vaccination – whether stated explicitly, or implied.)

2.4.1 Potential sources of (mis)information

Social media: The rise of social media has completely transformed the information landscape, with literally anybody with an account being able to be a source of news and information. Or misinformation. In the US, it was found that individuals who did not use social media are more vaccine hesitant than individuals who use social media. (Loomba et al., 2020)

Mainstream media: Given the adage "bad news sells", media outlets are incentivised to run with dramatic events. However, in the interest of public health, the media should avoid extensive coverage of COVID-19 events that in reality have a very low probability of happening. (Solís Arce et al., 2021) Like the headline grabbing blood clotting episode where the J&J vaccine distribution was halted due to 6 incidents. Such media coverage may exacerbate concerns about vaccine side effects. (Solís Arce et al., 2021)

Healthcare workers: Healthcare workers have been consistently found to be one of the most trusted sources of guidance on COVID-19 (Solís Arce et al., 2021).

2.5 Examining strategies to combat COVID-19 vaccine hesitancy

Solís Arce et al. (2021, p. 2) note that "trust in vaccines as well as the institutions that administer them are key determinants of the success of any vaccination campaign." In this section we shall look at some recommended strategies by researchers who have studied COVID-19 vaccine hesitancy. MacDonald (2015, p. 4164) warns that low vaccine uptake is not necessarily because of hesitancy and so policy makers should ensure that they have a true understanding of a situation before implementing interventions to improve uptake.

2.5.1 Recommended strategies to combat COVID-19 vaccine hesitancy

Timely communication of information: Su et al. (2020, p. 2) appeal that health experts are speedy in the delivery of truthful, "evidence-based" messages to the public before anti-vaxxers are able to spread misinformation. The longer there is silence, the more time speculation is given to seize the narrative. In their research, Motta, Sylvester, Callaghan, and Lunz-Trujillo (2021) "found that messages emphasizing the personal health risks and collective health consequences of not vaccinating significantly increase Americans' intentions to vaccinate."

Focused attention: Stating that one intends to vaccinate does not automatically mean that it will happen. Health authorities should make it as easy as possible for people who intend to be vaccinated, to get access to vaccines (Solís Arce et al., 2021). This may "require investment in local supply chains and delivery" (Solís Arce et al., 2021, p. 3). Prioritising single-dose vaccines in difficult to reach areas is another way to make things easier. (Solís Arce et al., 2021)

Target trusted sources of information: Health workers should be empowered and encouraged to deliver (correct) vaccine information and ease the concerns of hesitants (Solís Arce et al., 2021). To illustrate the power of utilising healthcare workers, "two large-scale studies in the US found that vaccination appointment reminder messages from healthcare providers increased influenza vaccine uptake. Similar interventions have proven effective in increasing immunization in LMIC contexts." (Solís Arce et al., 2021, p. 9)

Offer incentives: Cash, as well as in-kind, incentive programs have been proven effective in Ghana, Kenya, Nigeria and India (Solís Arce et al., 2021).

Be more thoughtful about labels: Su et al. (2020, p. 2) suggest that "rather than using the terms 'vaccine non-adopters' and 'vaccine hesitants' interchangeably, health experts can consider adopting a more precise classification of vaccine non-adopters… Educating three groups of vaccine non-adopters with unique traits, rather than a single large group of vaccine non-adopters with

overlapping features, may be more cost-effective in terms of educational materials design, communication between interventionists and their audiences, and evaluation of intervention outcomes."

2.6 Management Theory

In this section we shall look at some academic journals containing theories on how to get the best out of employees through improved morale and productivity, as well as less absenteeism. The aim being to understand the potential impact of making vaccination mandatory for all employees within an organisation. In so doing, employers are well equipped to make an informed vaccine mandate decision.

Corporate restructuring and its effect on employee morale and performance

Looking at Indian companies, Chaddha (2016) examines the impact of corporate restructuring – including mergers and demergers – on employee morale pre and post restructuring; identifying numerous factors that contribute to the change in morale. The author notes that companies typically restructure in a bid to improve operational performance (I.e., Become more efficient), which in turn leads to an improvement in financial performance – the ultimate end goal. (Chaddha, 2016) Restructuring a company is synonymous with cutting costs; and labour is the easy target as wages/salaries are usually one of, if not, the highest operational cost of a company. Looking at other literature on the subject of employee morale, Chaddha (2016) reveals that many studies show that layoffs or retrenchment have a significant impact on not just those no longer employed, but on those remaining as well; with the vast majority of retained employees experiencing a drop in morale, with varying levels of significance. The strength of the drop in employee morale has been found to be linked to the perception of the relative fairness of the retrenchments and the conditions of the workplace after the restructuring. (Chaddha, 2016) These findings are a concern to managers and business owners as it's common cause that low employee morale is bad for productivity, which is ultimately bad for the bottom-line. Generally speaking, the more consideration management paid to employee morale during a restructuring, the more likely the restructuring process would be perceived to be a success. One of the key ways that managers can show employees that their morale is being considered is through transparent communication throughout the restructuring process. (Chaddha, 2016)

Employee Engagement and Wellbeing in Times of COVID-19: A Proposal of the 5Cs Model

De-la-Calle-Durán and Rodríguez-Sánchez (2021, p. 1) also identify communication as key, observing that there is a "predictive relationship between employee engagement and wellbeing." The COVID-19 pandemic has created "numerous challenges and obstacles" for the handling of employee engagement, with lockdowns and various safety measures such as social distancing having a negative impact on people's wellbeing. (De-la-Calle-Durán & Rodríguez-Sánchez, 2021, p. 5)

The authors identify five things (factors) that "influence and reinforce employee engagement" that they propose should be used as a complementary approach to organizational health and wellbeing (De-la-Calle-Durán & Rodríguez-Sánchez, 2021, p. 5). This '5Cs model' is:

"(1) Conciliation: reconciling work and home life, with remote working and flexibility acquiring considerable importance;

(2) Cultivation: development schemes for employees;

(3) Confidence: through the health and safety of employees, as well as through hands-on leadership;

(4) Compensation: rewarding employees' efforts and covering the additional costs of these difficult times; and

(5) Communication: achieving employee participation and engagement." (De-la-Calle-Durán & Rodríguez-Sánchez, 2021, p. 5)

All 5 factors listed above have been found to be "positively related to employee engagement and wellbeing." (De-la-Calle-Durán & Rodríguez-Sánchez, 2021, pp. 7-11) The authors emphasise that a high score on one of the 5Cs cannot compensate for a low score on another – all 5 must be performed well. (De-la-Calle-Durán & Rodríguez-Sánchez, 2021, p. 5)

Generational differences in workplace motivation

Heyns and Kerr (2018) explore an aspect of workplace motivation that is rarely considered – how the age group (generation) of employees may influence what motivates them, and therefore, what techniques are most effective to maximise productivity. With younger employees often believed to have very different values and priorities than the generations of their parents and grandparents, a one size fits all approach may be inappropriate for a multigenerationally diverse workforce. (Heyns & Kerr, 2018) For their research, Heyns and Kerr (2018) engaged employees at a South African state-owned entity, Rand Water, on their work values and motivators. The employees were divided into

cohorts based on their age – "Veterans, Baby Boomers, Generation Xers and Generation Y (also known as the Millennials)." (Heyns & Kerr, 2018, p. 2) The authors' research concludes that, contrary to stereotypical beliefs, there isn't a significant difference between generations when it comes to what motivates them in the workplace. This means that management should "focus on specific known individual motivational preferences that may exist within groups rather than approaching generational cohorts as homogenous groups." (Heyns & Kerr, 2018, p. 1)

Self-determination theory (SDT)

SDT identifies two types of motivation – intrinsic (internally driven) and extrinsic (externally driven). The latter "occurs when individuals partake in activities not because they have a particular interest in them but because those activities function as a means to an end. The actions undertaken by individuals driven by intrinsic motivation, on the other hand, are fuelled by the want to do the activity and the satisfaction derived from the successful completion of the task; thus, intrinsic motivation can be said to be autonomous motivation." (Heyns & Kerr, 2018, p. 3) Autonomous motivation is derived from a human being's psychological need for autonomy, competence, and relatedness. "Autonomy is the need to feel that you have a choice in the decision to be made; competency is a belief in one's ability to complete a task, and relatedness is the need for relationships that are supportive and meaningful in nature." (Heyns & Kerr, 2018, p. 3) Studies show that organisations that create an environment supportive of employee autonomy consequently promote intrinsic motivation, which in turn improves staff satisfaction and performance. Overall, both intrinsic and extrinsic forms of motivation were found to be effective as they interact in a "synergistic relationship" rather than in competition. (Heyns & Kerr, 2018, p. 8)

Doing Well by Making Well: The Impact of Corporate Wellness Programs on Employee Productivity

Gubler, Larkin, and Pierce (2018) note that there is an abundance of research that shows that the return on investing in employee wellness programs far exceeds the cost to employers; as absenteeism rates are lower and healthier employees are more productive. Furthermore, employer-sponsored health insurance costs also fall. These benefits translate into higher business profitability. (Gubler et al., 2018) The authors' own empirical work "suggests that the ability of an employer to enjoy a productivity-based return on investment (ROI) from the (employee wellness) program crucially depends on two factors: the participation rate and employee turnover." (Gubler et al., 2018, p. 22) The higher the former and lower the latter, the higher the ROI. Gubler et al. (2018, p.

23) do caution that two "boundary conditions" must be met to reap the benefits of wellness programs:

1) Employee participation must not be compulsory or "heavily coerced." Coercion occurs when the potential consequences of not participating in the wellness program are so severe that employees effectively have no choice but to comply. For example, through financial penalties. This heavy coercion may provoke "psychological reactance" from affected employees. (Gubler et al., 2018, p. 23) Psychological reactance theory proposes that people react strongly to any external influence that is perceived to restrict their autonomy. People will attempt to reassert their autonomy by either resisting the wellness program or by reducing their productivity.
2) Employees must trust that their organisation will respect the privacy of their health data and not use it for other purposes such as to make employment decisions. (Gubler et al., 2018, p. 24) Without this trust, employees may view the wellness program as a devious means of violating an implicit contract between employer and employee that governs their mutually respectful relationship. This perceived violation could "reduce overall job motivation, satisfaction, and retention among those who strongly value health privacy." (Gubler et al., 2018, p. 24)

Employer-Mandated Vaccination Policies: Different Employers, New Vaccines, and Hidden Risks

Modern science has shown many vaccines to be safe and highly effective. Despite this there are still many vaccine opponents, including some healthcare workers. In the United States, healthcare services have struggled to achieve "high vaccination rates among their employees" (Baxter, 2017, p. 907), despite the clear benefit to patients. One such benefit is that it protects workers who interact with infected patients before they are symptomatic or formally diagnosed. With even healthcare workers unable to agree on the necessity of vaccines, conflicting views can be found amongst employees across other professions and sectors of society. (Baxter, 2017, p. 907) This creates a challenge for employers who are incentivised to prefer vaccinated employees as healthier employees take less sick time and are more productive. There are legal as well as ethical assessments to make before an organisation can attempt to introduce compulsory vaccination for its employees. In the United States the influenza ("flu") vaccine is compulsory for healthcare workers, and as a result, many legal opinions and studies have been done on it. "However, influenza is not the only disease that threatens communities… (and) healthcare facilities are not the only employers affected by outbreaks." (Baxter, 2017, p. 885) Outside of healthcare, the idea of mandatory vaccination in the workplace has received relatively little attention from authorities. Furthermore, Baxter (2017, p. 885) notes that most debates concerning flu vaccination policies are focused on the

impact on employees and do not consider whether employers could be legally liable "if they do *not* require employees to be vaccinated."

In the United States, vaccine mandate laws are different, based upon whether the employer is a private or public entity. However, "several federal and state laws may impact whether and how a private employer may impose a vaccination requirement." (Baxter, 2017, p. 888) Mandatory vaccination policies raise concerns about intrusion on personal and/or religious liberties. The decision making process must weigh "the burden of imposing requirements on reluctant or unwilling employees against the risks and costs associated with vaccine-preventable diseases." (Baxter, 2017, p. 914) For example, "since school attendance is mandatory and many parents do not have the option of home schooling or sending their children to private schools, public school districts could be found to have a heightened duty to ensure that teachers and other school employees do not present an unnecessary health risk… Businesses that cater to or have high numbers of customers who are pregnant, parents or caregivers, or children (e.g., Disneyland, Babies 'R Us) may consider mandatory vaccination of employees for the benefit of their customers." (Baxter, 2017, p. 918) In order to justify a mandatory vaccine mandate, employers must believe that their "employees pose a greater risk than the public" (Baxter, 2017, p. 923), and therefore it would be acting to protect its customers. The severity of the symptoms of both the disease as well as its vaccine would also have to be considered. An alternative to mandatory vaccination would be for employers to "strongly encourage" high risk employees (e.g., pregnant women) to get vaccinated. (Baxter, 2017, p. 928)

Vaccine Politics and the Management of Public Reason

Opposition to compulsory vaccination is not a new occurrence. When smallpox vaccines were introduced in the late nineteenth century, lobby groups opposed efforts by the United States' legislatures to make smallpox vaccination compulsory (Lakoff, 2015) Today, mass vaccination is a testimony of the great success of public health policy in the United States; with "over 90 percent of children between nineteen and thirty-five months of age" (Lakoff, 2015, p. 420) fully immunized. This high acceptance rate has held firm, even as the physical number of injections given to infants and children has steadily risen over time. (Lakoff, 2015) The success of mass vaccination programs has been attributed to "at least tacit public agreement" (Lakoff, 2015, p. 420) on three principles:

1) "Individual citizens share collective responsibility for preventing the reappearance of avoidable scourges such as measles or whooping cough."

2) "Expert techniques such as risk assessment and cost-benefit analysis should be used to determine which disease threats to protect against and the most efficient and effective means of doing so." The risk posed by the disease to an unvaccinated population should be compared to the risk posed by side effects of the vaccine.
3) Institutional mechanisms must be established "that can enforce the implementation of these expert recommendations. In the United States, the main enforcement mechanism is the requirement of proof of immunization as a prerequisite to school enrolment." (Lakoff, 2015, p. 420)

In December 2014 there was an outbreak of measles in California which was traced back to unvaccinated children's exposure at Disneyland. The heavy collective criticism of parents who didn't vaccinate their children brought to light two characteristics of vaccine hesitants: i) their "distrust (or ignorance) of the science that demonstrates the safety and efficacy of childhood vaccines" and ii) "their disavowal of the social responsibility to manage collective risk." (Lakoff, 2015, p. 421) One might think that this is a result of a lack of education, however, many of the hesitant parents were observed to be "well-educated liberals from wealthy enclaves like Malibu and Marin County who cannot easily be assimilated to contemporary anti-science and anti-government movements." (Lakoff, 2015, p. 421)

Social science research on vaccine hesitant parents challenges characteristic ii) by positing that it is "not a disavowal of collective responsibility so much as a pressing feeling of ethical obligation to properly care for one's child, and meeting this obligation requires, in turn, becoming an expert on the child's developing immune system." (Lakoff, 2015, p. 422) In other words, these parents seek out as much information as possible, from as many sources as possible. With the modern internet, this often leads to conflicting information, which in turn plants doubt in the parents' mind. Where there is doubt, the natural aversion to the worse case outcome determines the decision to delay or flat out refuse the vaccine. This way of weighing risk by parents is different from the way public health authorities view risk -which is through the lens of statistical probability. Therefore, the challenge for public health experts is to ensure that the most scientifically accurate information 'speaks the loudest' to influence public opinion. (Lakoff, 2015)

To vaccinate or not to vaccinate: Mandatory COVID-19 vaccination in the workplace

Like the rest of the world, the highly emotive topic of mandatory vaccination in the workplace is on the South African agenda. This journal article looks at the legal situation in South Africa as far as the right of employers to implement mandatory vaccination policies.

According to a June 11, 2021, "gazetted directive on COVID-19 vaccination in certain workplaces", if employees should "refuse COVID-19 vaccinations on medical and Constitutional grounds", employers must come up with reasonable resolutions so that all parties are accommodated. (Dhai, 2021, p. 42) To achieve this, employers must consider "public health imperatives, employees' constitutional rights and efficient business operations." (Dhai, 2021, p. 42) The relevant Constitutional rights of employees in this directive are the right to bodily integrity and the right to freedom of religion, belief and opinion. (Dhai, 2021) Notably, the directive does not explicitly state that employers can make COVID-19 vaccination mandatory. However, the South African Constitution does allow for rights to be limited, "provided the limitation is of general application, and is 'reasonable and justifiable' – which means that it is rational, proportional and least restrictive in terms of achieving its objective." (Dhai, 2021, p. 42) The author notes that "it could be argued that backed by scientific evidence and the rights of all people to a safe environment, it would be 'reasonable and justifiable' to compel workers in certain workplaces to take a vaccine that is available and approved for use by the SA Health Products Regulatory Authority." (Dhai, 2021, p. 42)

2.7 Conclusion of literature review

This literature review has examined the complex issue of why people are resistant to COVID-19 vaccination despite health authorities insisting that the vaccines are safe and effective. It has also offered insight into the idea of mandatory vaccination in the workplace, and the potential impact on an organisation that should choose to do so. With frequent mutations and large numbers of people still unvaccinated worldwide, the COVID-19 virus looks set to stay with us for the foreseeable future. It is an appropriate time to study people's attitudes towards vaccines and find some creative ways to get more people vaccinated.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research design

This was an online descriptive research survey designed to collect information for statistical inference purposes on a given population. (Nayak & K A, 2019) The 'population' in this case is adults living or working primarily in the Republic of South Africa. An online method of data collection was chosen due to the challenges presented by COVID-19 inspired government regulations like social distancing, mask wearing, and limits on public gatherings. Furthermore, many people have been working from home, greatly limiting physical access to respondents.

3.2 Adjusted snowball sampling

The online survey was distributed to the target population using an 'adjusted snowball sampling' method. This was done via the use of social media and networking platforms Facebook, WhatsApp, Twitter, and LinkedIn. In traditional snowball sampling "one interviewee gives the researcher the name of at least one more potential interviewee. That interviewee, in turn, provides the name of at least one more potential interviewee, and so on, with the sample growing like a rolling snowball if more than one referral per interviewee is provided." (Kirchherr & Charles, 2018, p. 1) For this research an adjusted snowball sampling method was used, where respondents were asked to forward the online survey to other people; without revealing to the researcher who they forwarded the survey to. The main risks to snowball sampling are that the sample may not be diverse enough and may exclude those least keen to be interviewed. If this is the case then the survey results will be based only on anecdotal evidence, which will lead to the subsequent recommendations being based on coincidence. (Kirchherr & Charles, 2018) Enhancing the diversity of the sample is therefore crucial.

3.3 The challenge of poor response rate

Included in the consent document ('Invitation to respondents') was an expected (average) survey completion time. This was done to manage respondents' expectations about the time commitment required to participate in the survey. Furthermore, the survey was designed to be as short as possible to obtain the desired information. Careful thought was put into each question, ensuring that any ambiguity and repetition was eliminated. These steps were taken to overcome the challenge of poor response rate – when respondents feel like the survey is taking "too long", the risk of not completing it rises substantially. In fact, Nayak and K A (2019) note that "a significant issue of

online surveys is the participation rate. Generally, response rates are extremely poor compared to the offline survey method."

3.4 Question types and structure

All survey questions were multiple choice, with the vast majority being statements utilizing a Likert scale response with the five-options range going from "strongly disagree" to "strongly agree". The remaining questions were "Yes" or "No" types. The questions were developed with the research hypotheses in mind, and can be split into six categories:

1) Views on the COVID-19 pandemic

These set of questions examine the respondents' perception of the seriousness of the pandemic and the appropriateness of the government's response to it.

2) Efficacy

These set of questions examine the respondents' perception of the efficacy of the COVID-19 vaccines.

3) Trusted news sources

These set of questions examine where the respondents get their COVID-19 news from and their trust in media.

4) Mandatory vaccination

These set of questions examine the respondents' view on mandatory vaccination.

5) Motivation to vaccinate

These questions were only presented to respondents who indicated that they are unvaccinated (I.e., the vaccine hesitant). They seek to find out what – if anything – may motivate an unvaccinated person to take a COVID-19 vaccine.

6) Demographic information.

These set of questions examine the demographic profile of respondents. Only three demographic categories are focussed on here – age, gender, and educational level.

3.5 Method of data collection

The data was collected using web-based survey software Qualtrics (https://www.qualtrics.com). All questions were compulsory for respondents to answer but designed on a logic system dependent upon the answer given to a previous question. Depending on the answer given for certain questions, the survey would end immediately or more questions would be asked. Questions pertaining to demographic information were asked at the end of the survey. Unvaccinated respondents had eight extra questions to answer. A respondent is considered unvaccinated if that person has not had at least one dose of a WHO approved vaccine. I.e., If the answer to the question "I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine" is "No". This question statement is considered the key question of this survey; because its answers reveal which respondents have not been vaccinated – which is the central theme of the research. Given the amount of time that has passed since COVID-19 vaccines became freely available to the South African public, as well as the concerted effort from government to encourage people to take the vaccines, it is fair to conclude that those who have still not been vaccinated are vaccine hesitant. Sometimes, understanding why a person took a certain action can be just as valuable as understanding why another person did not take the same action under what, at face value, appears to be the same conditions. The information obtained from those vaccinated is just as important as it allows us to determine if there are any inferences to be made regarding certain factors and the likelihood of taking the vaccine.

Once the survey was closed off to further responses, the data was exported from Qualtrics to IBM SPSS Statistics (Version 27) predictive analytics software for analysis.

3.6 Validity and reliability

The following steps were taken to ensure that the data obtained is valid and reliable:

- Deliberate effort was made to ensure that the initial set of respondents were sufficiently diverse. This was achieved by asking friends, acquaintances, and colleagues of the researcher across various social media platforms to pass on the survey to some of their contacts. Furthermore, the researcher reached out (sent private messages or 'dm') to a few famous South Africans with large Twitter following to like or retweet the survey. One actor with over 35,000 followers did oblige and retweet. This exposed the survey to a very large and diverse number of people.

- The survey was designed in a way that nobody under the age of 18 years nor persons living or working primarily outside South Africa were allowed to proceed with the survey.
- Every respondent was asked the same initial questions and the question logic was applied consistently where applicable.
- Repeat responses were managed by Qualtrics software's technology that prevents the same device from being used to complete a survey more than once.
- No incentives or compensation were given for referrals from participants.

3.7 Ethical considerations

Web-based (online) research is not without challenges. Just like any other research methods, online research must comply with ethical standards, of which informed consent and anonymity are an essential part. Challenges with sampling and low response rates are often an issue for web-based research. (Nayak & K A, 2019)

The researcher addressed the challenges in the following ways:

- Once the link to the survey was clicked, the first question to potential respondents was a Yes/No question asking if they consent to participating in the study. To obtain informed consent before the main survey (see appendix), an 'Invitation to respondents' was presented as a separate attachment to this question; as per recommendation of Nayak and K A (2019).
- To preserve the anonymity of respondents, no participant names and contact information were requested or recorded.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

4.1 Preliminary data analysis

286 respondents attempted the survey; however, only 230 successfully completed it. The survey was considered complete if all non-demographic related questions are answered. As explained in the research methodology section, the number of questions answered may vary depending on whether a respondent had been vaccinated or not. Two respondents answered all survey questions but did not answer all the demographic questions. They have been included in the 230 successful completions as demographic information is not considered vital to the purpose of this research. The remaining 56 answered various questions but all failed to answer the key question regarding their vaccination status.

Below are tabular summaries of the answers to all the survey questions, along with brief commentaries:

4.1.1 Questions regarding views on the COVID-19 pandemic

The COVID-19 pandemic is not nearly as bad as the mainstream media are making it out to be.		
	N	%
Strongly disagree	61	26,5%
Disagree	80	34,8%
Neither agree nor disagree	22	9,6%
Somewhat agree	41	17,8%
Strongly agree	26	11,3%
Total	230	100,0%

Source: Primary data

A fair majority of respondents do not believe that the mainstream media are over dramatizing the seriousness of the COVID-19 pandemic. However, a sizable number are at the very least unsure (39%).

I personally know at least one person who has fallen seriously ill or died from contracting COVID-19.		
	N	%
No	24	10,4%
Yes	206	89,6%
Total	230	100,0%

Source: Primary data

The vast majority of respondents have experienced the seriousness of the pandemic “close to home”. It stands to reason that seeing somebody you personally know seriously ill after catching COVID-19 would make one more likely to believe media reports of COVID-19 related deaths.

Lockdowns, curfews and other restrictions imposed on citizens are actually just a way for government to exercise more control over the country.		
	N	%
Strongly disagree	63	27,4%
Disagree	73	31,7%
Neither agree nor disagree	20	8,7%
Somewhat agree	49	21,3%
Strongly agree	25	10,9%
Total	230	100,0%

Source: Primary data

With 32% of respondents agreeing with the statement, it is an indication that there is a fair level of distrust over government's motives when it comes to the handling of the pandemic. In the face of a deadly pandemic, this is an uncomfortably high number.

Private interest groups and/or individuals with self-serving motives are the ones actually controlling South Africa's response to the COVID-19 pandemic		
	N	%
Strongly disagree	46	20,0%
Disagree	54	23,5%
Neither agree nor disagree	46	20,0%
Somewhat agree	58	25,2%
Strongly agree	26	11,3%
Total	230	100,0%

Source: Primary data

This question received a noticeably high number of neutral responses compared to the other questions, with a fifth of respondents saying they neither agree nor disagree. This may be an indication that the operations of the National Coronavirus Command Council (NCCC), the body led by state president Cyril Ramaphosa that makes decisions on the response to the pandemic, may not be transparent enough for many South Africans.

4.1.2 Questions on the perception of vaccine efficacy

COVID-19 vaccines have been proven safe for human use.		
	N	%
Strongly disagree	23	10,0%
Somewhat disagree	24	10,4%
Neither agree nor disagree	39	17,0%
Somewhat agree	70	30,4%
Strongly agree	74	32,2%
Total	230	100,0%

Source: Primary data

This is a question where health authorities would desire for all respondents to strongly agree with. There has been a concerted effort and resources used to educate the public on the efficacy of vaccines. So, to see 37% of respondents without conviction that the COVID-19 vaccines are safe for human use will be very concerning to them.

The vaccine significantly improves your chances of not getting severely ill or dying when infected with COVID-19.		
	N	%
Strongly disagree	25	10,9%
Somewhat disagree	17	7,4%
Neither agree nor disagree	27	11,7%
Somewhat agree	64	27,8%
Strongly agree	97	42,2%
Total	230	100,0%

Source: Primary data

Again, this is a statement that health authorities would expect to see strong agreement with. 30% of respondents are either unsure or outright disagree.

If a large enough proportion of the population get vaccinated, the threat of COVID-19 to society will substantially diminish.		
	N	%
Strongly disagree	19	8,3%
Somewhat disagree	14	6,1%
Neither agree nor disagree	38	16,5%
Somewhat agree	63	27,4%
Strongly agree	96	41,7%
Total	230	100,0%

Source: Primary data

The spread of responses to this question continue to expose the assertion that many South Africans are still unconvinced about the efficacy of the COVID-19 vaccines.

Technically speaking, the COVID-19 "vaccines" are not actual vaccines as they do not prevent transmission to others, nor provide immunity.		
	N	%
Strongly disagree	54	23,5%
Somewhat disagree	42	18,3%
Neither agree nor disagree	42	18,3%
Somewhat agree	45	19,6%
Strongly agree	47	20,4%
Total	230	100,0%

Source: Primary data

The minority of respondents (42%) disagree with the statement. This may be an indication of a widespread mismatch between lay people's understanding of what a vaccine is, and the Centre for Disease Control and Prevention's (CDC) definition of what a vaccine is. Many people understand the word "vaccine" to refer to something that will provide immunity to contracting and transmission of the disease being vaccinated against. The fact that the Messenger RNA (mRNA) COVID-19 vaccines do not provide immunity to infection and that one can still pass on the virus to others, goes directly against this common understanding of what a vaccine is. In this case, the respondents may be

justified in their doubts as (Camero, 2021, para. 2) noted that the CDC modified "its definition of the words 'vaccine' and 'vaccination' on its website. Before the change, the definition for 'vaccination' read, 'the act of introducing a vaccine into the body to produce immunity to a specific disease.' Now, the word 'immunity' has been switched to 'protection.' The term 'vaccine' also got a makeover. The CDC's definition changed from 'a product that stimulates a person's immune system to produce immunity to a specific disease' to the current 'a preparation that is used to stimulate the body's immune response against diseases.'" (Camero, 2021, para. 3) In response, the CDC explain: "The previous definitions could have been 'interpreted to mean that vaccines were 100% effective, which has never been the case for any vaccine, so the current definition is more transparent, and also describes the ways in which vaccines can be administered.'" (Camero, 2021)

4.1.3 Questions regarding trusted news sources

My personal views on COVID-19 vaccines are similar to most of the people I interact with on a daily basis.

	N	%
Strongly disagree	10	4,3%
Somewhat disagree	48	20,9%
Neither agree nor disagree	28	12,2%
Somewhat agree	92	40,0%
Strongly agree	52	22,6%
Total	230	100,0%

Source: Primary data

The large number of agreements with this statement suggest that "birds of a feather flock together". In other words, communities of people tend to hold similar views on issues. This observation is important as it supports the assertion that a larger sample size would likely yield similar findings.

I get most of my COVID-19 related information from social media (Twitter, Facebook, WhatsApp, Snapchat, etc)		
	N	%
Strongly disagree	90	39,1%
Somewhat disagree	46	20,0%
Neither agree nor disagree	22	9,6%
Somewhat agree	40	17,4%
Strongly agree	32	13,9%
Total	230	100,0%

Source: Primary data

The responses to this statement suggest that a majority of people (60%) do not rely on social media as their primary source of information about COVID-19. This may mean that they appreciate the value of professional, official (mainstream) news sources over unregulated or informal sources on social media.

Mainstream media are a reliable and unbiased source of information on the COVID-19 pandemic.		
	N	%
Strongly disagree	56	24,3%
Somewhat disagree	73	31,7%
Neither agree nor disagree	41	17,8%
Somewhat agree	43	18,7%
Strongly agree	17	7,4%
Total	230	100,0%

Source: Primary data

The answers to this statement go against the idea that mainstream media is valued for its reporting on the COVID-19 pandemic, with over half (56%) of respondents expressing the belief that mainstream media is unreliable or biased.

COVID-19 related information is more reliable coming from my trusted social media source(s) than from the government.		
	N	%
Strongly disagree	80	34,8%
Somewhat disagree	52	22,6%
Neither agree nor disagree	54	23,5%
Somewhat agree	29	12,6%
Strongly agree	15	6,5%
Total	230	100,0%

Source: Primary data

The responses to this statement suggest that when it comes to the subject of COVID-19, official government communication on the pandemic is received with more credibility than communication from social media sources. This could be an indication that people recognize the fact that government are consulting many experts, including infectious disease experts, whilst, say, a famous Instagram model has no qualifications to support her anti-vaccination statements on the pandemic.

A person with lots of followers on social media is more reliable for getting the truth or correct information on COVID-19 than a person with relatively few followers.		
	N	%
Strongly disagree	167	72,6%
Somewhat disagree	35	15,2%
Neither agree nor disagree	17	7,4%
Somewhat agree	8	3,5%
Strongly agree	3	1,3%
Total	230	100,0%

Source: Primary data

To carry on with the Instagram model analogy above, this model could have tens of thousands of 'followers' whilst an infectious disease expert who is also on Instagram has less than a hundred followers. The latter is clearly more qualified to give advice on the COVID-19 pandemic than the model. The overwhelming proportion of disagreement (88%) with the statement may be an indication that people do not blindly follow the ideas or believe the message of social media 'influencers'.

It is important to seek out as many alternative sources of information on the COVID-19 pandemic as possible, in order to decide for yourself what makes sense.		
	N	%
Strongly disagree	7	3,0%
Somewhat disagree	11	4,8%
Neither agree nor disagree	14	6,1%
Somewhat agree	60	26,1%
Strongly agree	138	60,0%
Total	230	100,0%

Source: Primary data

With the above questions in this category placing doubt on the reliability of social media as well as mainstream media, it is perhaps not surprising that most respondents (86%) feel that it is necessary to diversify sources of information about the COVID-19 pandemic.

4.1.4 Questions regarding mandatory vaccination

Workers in professions that interact with a large number of people and/or vulnerable groups of people (e.g. Healthcare workers, Taxi drivers, Retirement home workers) should be subject to mandatory/compulsory vaccination.		
	N	%
Strongly disagree	57	24,8%
Somewhat disagree	26	11,3%
Neither agree nor disagree	26	11,3%
Somewhat agree	46	20,0%
Strongly agree	75	32,6%
Total	230	100,0%

Source: Primary data

Just over half the respondents are in support of mandatory vaccination for workers that interact with large numbers of people or with the vulnerable, with a notable 33% in strong agreement. However, the second largest response category was “strongly disagree” (chosen by 25% of

respondents). This suggests that mandatory vaccination in the workplace is a topic where people tend to feel strongly about, irrespective of which side of the argument they support.

Making vaccination mandatory/compulsory, irrespective of context, is unfair.		
	N	%
Strongly disagree	33	14,3%
Somewhat disagree	34	14,8%
Neither agree nor disagree	19	8,3%
Somewhat agree	45	19,6%
Strongly agree	99	43,0%
Total	230	100,0%

Source: Primary data

This question looking at mandatory vaccination more broadly than just at the workplace reveals a clear view that most respondents (63%) think that it is unfair. Comparing this to the previous question, it suggests that even though they feel that it is unfair to those impacted, some people still support mandatory vaccination in the workplace.

4.1.5 Key question on vaccine hesitancy

I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.		
	N	%
No	53	23,0%
Yes	177	77,0%
Total	230	100,0%

Source: Primary data

The key question of this survey reveals that almost a fourth (23%) of the respondents are vaccine hesitant. At this point the survey logic took respondents in two different directions, dependent on their answer to the key question. Those who answered “Yes” were asked a follow-up question on the reason(s) they took the vaccine. This was the only question in the survey where respondents

were allowed to choose more than one answer. The three demographic questions would then follow, after which the survey closed with a thank you message. For those that responded “No”, the survey logic presented them with a further eight ‘motivation to vaccinate’ questions before being routed back to the closing demographic questions.

4.1.6 Reasons for vaccination

I took the COVID-19 vaccine for the following reason(s): (select all applicable answers)				
		Responses		Percent of Cases
		N	Percent	
Reasons for taking	To protect myself from getting seriously ill or dying from COVID-19	147	40,6%	83,1%
	I have a co-morbidity or underlying illness which puts me at higher risk if unvaccinated	19	5,2%	10,7%
	To ensure that I can travel to countries or places where entry is denied to the unvaccinated	89	24,6%	50,3%
	My place of work or employer required me to be vaccinated	41	11,3%	23,2%
	My trusted news source(s) convinced me that it's good to get vaccinated	37	10,2%	20,9%
	Other	29	8,0%	16,4%
Total		362	100,0%	204,5%

Source: Primary data

The table above summarizes the reasons for vaccination of the 177 people who have taken at least one dose of a WHO approved COVID-19 vaccine. Due to it being a multiple response question, the cumulative totals can be above 177 or 100%. The most popular reason for taking a vaccine is to protect against serious illness or death, with 83% of (177) respondents selecting this as a reason for vaccinating. This translated into 41% of the cumulative total responses. This could be interpreted as a testament of strong belief in the efficacy of the vaccines. The next most popular reason is to mitigate against travel restrictions, with 50% of respondents selecting this as a reason for vaccinating. This represents 25% of the cumulative total responses.

4.1.7 Questions regarding potential motivation to vaccinate

The 53 vaccine hesitant respondents were asked some questions with the aim of firstly, better understanding if they are not vaccinated by choice or effectively by force. The first two questions on health and religion address the latter. Secondly, they were offered various proposals or incentives for vaccinating to see if they may be persuaded to vaccinate.

I am unable to take a COVID-19 vaccine for health reasons. E.g. Due to an allergy to a vaccine ingredient.

	N	%
No	41	77,4%
Yes	12	22,6%
Total	53	100,0%

Source: Primary data

Just over a fifth of the respondents stated that they were unable to take vaccines for health reasons. It is possible that some of them would have been vaccinated if this wasn't the case.

I am not taking the COVID-19 vaccine for religious reasons.

	N	%
Strongly disagree	28	52,8%
Somewhat disagree	3	5,7%
Neither agree nor disagree	11	20,8%
Somewhat agree	2	3,8%
Strongly agree	9	17,0%
Total	53	100,0%

Source: Primary data

The majority of vaccine hesitants are not influenced by religion, with only a fifth of respondents indicating this as the reason. For what appears to be a straightforward question, the number of neutral responses is noteworthy. For 20% of respondents to be non-committal on whether their religious beliefs (or lack thereof) are influencing their decision to vaccinate is surprising.

Restricting unvaccinated people from entering public places like sport stadiums, pubs and clubs would be a motivator for me to get vaccinated.		
	N	%
Strongly disagree	38	71,7%
Somewhat disagree	3	5,7%
Neither agree nor disagree	3	5,7%
Somewhat agree	8	15,1%
Strongly agree	1	1,9%
Total	53	100,0%

Source: Primary data

There appears to be a strong rejection of the idea that prohibiting the unvaccinated from experiencing public events will incentivise them to vaccinate, with 72% of respondents expressing unequivocal disagreement.

If the World Health Organization (WHO) say that the current COVID-19 vaccines are, for all intents and purposes, vitamin supplements that help your immune system, rather than actual vaccines, I would be more likely to take the "vaccine" (vitamin).		
	N	%
Strongly disagree	21	39,6%
Somewhat disagree	3	5,7%
Neither agree nor disagree	16	30,2%
Somewhat agree	8	15,1%
Strongly agree	5	9,4%
Total	53	100,0%

Source: Primary data

This is another question with a notably high number of neutral responses (30%). A sizable 40% of respondents indicated strong disagreement that this concession by the WHO would make a difference to their current position on vaccination.

If government offered a free cash reward or voucher to everyone who gets vaccinated against COVID-19, I would be more likely to get vaccinated.		
	N	%
Strongly disagree	39	73,6%
Somewhat disagree	6	11,3%
Neither agree nor disagree	1	1,9%
Somewhat agree	1	1,9%
Strongly agree	6	11,3%
Total	53	100,0%

Source: Primary data

There is a strong rejection (74%) by respondents to what many vaccine hesitants would likely see as a bribe or coercion by government for them to get vaccinated. Despite success in some countries (Solís Arce et al., 2021), incentive programs appear unlikely to be effective in South Africa.

A guarantee of the lifting of mask wearing, sanitizing, and social distancing policies would be a motivator for me to get vaccinated.		
	N	%
Strongly disagree	33	62,3%
Somewhat disagree	5	9,4%
Neither agree nor disagree	7	13,2%
Somewhat agree	7	13,2%
Strongly agree	1	1,9%
Total	53	100,0%

Source: Primary data

Guaranteeing the removal of COVID-19 transmission preventative practices does not appear to motivate vaccine hesitants to get the jab, with over 70% of respondents expressing disagreement.

Unvaccinated people being denied entry into other countries is a motivator for me to get vaccinated		
	N	%
Strongly disagree	27	50,9%
Somewhat disagree	12	22,6%
Neither agree nor disagree	4	7,5%
Somewhat agree	6	11,3%
Strongly agree	4	7,5%
Total	53	100,0%

Source: Primary data

Not being denied entry into other countries or places was a popular reason why many of the survey respondents got vaccinated. However, the vaccine hesitant appear largely unmoved by this threat, with only just under a fifth of respondents indicating that it would be a motivator to get vaccinated.

If my trusted source(s) of news endorsed the use of COVID-19 vaccines, I would be more likely/willing to get vaccinated.		
	N	%
Strongly disagree	30	56,6%
Somewhat disagree	9	17,0%
Neither agree nor disagree	8	15,1%
Somewhat agree	6	11,3%
Total	53	100,0%

Source: Primary data

It appears that utilizing people whom vaccine hesitants get news from will make little difference to their stance, with almost three-quarters (74%) of respondents disagreeing with the question statement.

4.1.8 Questions on demographic information

How old are you?		
	N	%
18 - 24	20	8,7%
25 - 34	80	34,9%
35 - 44	103	45,0%
45 - 54	10	4,4%
55 - 64	6	2,6%
65 - 74	9	3,9%
75 - 84	1	0,4%
Total	229	100,0%

Source: Primary data

Most of the respondents (80%) are between 25 and 44 years old. There are no respondents older than 84 years and none below 18 due to the survey only being open to adults.

To which gender identity do you most identify?		
	N	%
Male	105	45,9%
Female	117	51,1%
Non-binary / third gender	0	0,0%
Prefer not to say	7	3,1%
Total	229	100,0%

Source: Primary data

There were slightly more female respondents than male. No respondent who successfully completed the survey identified as non-binary / third gender. A small proportion (3%) of respondents did not give their gender identity.

What is your highest level of educational attainment?		
	N	%
Pre-Matric	0	0,0%
Matric	11	4,8%
Post-matric diploma or certificate	13	5,7%
Undergraduate degree	62	27,2%
Postgraduate degree	136	59,6%
Doctorate	6	2,6%
Total	228	100,0%

Source: Primary data

All respondents who successfully completed the survey had, at the very least, completed high school, with most of them (60%) having a postgraduate degree.

Below we look at the key question and reason for vaccination responses breakdown by demographic information.

4.1.9 Key question on vaccine hesitancy by gender

I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine. * To which gender identity do you most identify? Crosstabulation									
		To which gender identity do you most identify?							
		Male		Female		Prefer not to say		Total	
		N	%	N	%	N	%	N	%
I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.	No	24	22,9%	25	21,4%	4	57,1%	53	23,1%
	Yes	81	77,1%	92	78,6%	3	42,9%	176	76,9%
Total		105	100,0%	117	100,0%	7	100,0%	229	100,0%

Source: Primary data

Contrary to prior research locally (Cooper et al., 2021) as well as worldwide (Loomba et al., 2020; Solís Arce et al., 2021), this research study data suggests that there is no material difference between males and females when it comes to vaccine hesitancy in South Africa; with the answer split of both genders being almost identical (about 22% answering “No” and 78% “Yes”).

4.1.10 Key question on vaccine hesitancy by age

How old are you? * I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine. Crosstabulation							
		I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.					
		No		Yes		Total	
		N	%	N	%	N	%
How old are you?	18 - 24	1	1,9%	19	10,8%	20	8,7%
	25 - 34	23	43,4%	57	32,4%	80	34,9%
	35 - 44	25	47,2%	78	44,3%	103	45,0%
	45 - 54	2	3,8%	8	4,5%	10	4,4%
	55 - 64	1	1,9%	5	2,8%	6	2,6%
	65 - 74	1	1,9%	8	4,5%	9	3,9%
	75 - 84	0	0,0%	1	0,6%	1	0,4%
Total		53	100,0%	176	100,0%	229	100,0%

Source: Primary data

Due to the relative over-representation of the 25-44 age group, drawing conclusions from this table may be misleading. However, the data suggests that people within that age range are less likely to be vaccine hesitant.

4.1.11 Key question on vaccine hesitancy by education

What is your highest level of educational attainment? * I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine. Crosstabulation							
		I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.					
		No		Yes		Total	
		N	%	N	%	N	%
What is your highest level of educational attainment?	Matric	1	1,9%	10	5,7%	11	4,8%
	Post-matric diploma or certificate	5	9,4%	8	4,6%	13	5,7%
	Undergraduate degree	17	32,1%	45	25,7%	62	27,2%
	Postgraduate degree	29	54,7%	107	61,1%	136	59,6%
	Doctorate	1	1,9%	5	2,9%	6	2,6%
Total		53	100,0%	175	100,0%	228	100,0%

Source: Primary data

Intuitively speaking, one would expect that the more educated one is, the more likely one is to vaccinate. The above table appears to support this assertion. However, it also reveals that education does not necessarily translate to acceptance of COVID-19 vaccination. For example, 27% (17 out of 62) of undergraduate degree holders and 21% (29 out of 136) of postgraduate degree holders in the sample had not been vaccinated. This is in line with Lakoff (2015)'s observation that the problem is not a lack of education.

4.1.12 Reason for vaccination by gender

I took the COVID-19 vaccine for the following reason(s): (select all applicable answers)*Gender Crosstabulation						
			To which gender identity do you most identify?			
			Male	Female	Prefer not to say	Total
Reasons for taking	To protect myself from getting seriously ill or dying from COVID-19	Count	71	74	1	146
		% within Gender	87,7%	80,4%	33,3%	
	I have a co-morbidity or underlying illness which puts me at higher risk if unvaccinated	Count	10	9	0	19
		% within Gender	12,3%	9,8%	0,0%	
	To ensure that I can travel to countries or places where entry is denied to the unvaccinated	Count	40	48	0	88
		% within Gender	49,4%	52,2%	0,0%	
	My place of work or employer required me to be vaccinated	Count	19	22	0	41
		% within Gender	23,5%	23,9%	0,0%	
	My trusted news source(s) convinced me that it's good to get vaccinated	Count	19	18	0	37
		% within Gender	23,5%	19,6%	0,0%	
	Other	Count	17	10	2	29
		% within Gender	21,0%	10,9%	66,7%	
Total		Count	81	92	3	176

Source: Primary data

There does not appear to be any gender specific influences in the responses.

4.1.13 Reason for vaccination by age

I took the COVID-19 vaccine for the following reason(s): (select all applicable answers)*Age Crosstabulation									
			How old are you?						
			18 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75 - 84	Total
Reasons for taking	To protect myself from getting seriously ill or dying from COVID-19	Count	16	44	67	6	4	8	1	146
		% within Age	84,2%	77,2%	85,9%	75,0%	80,0%	100,0%	100,0%	
	I have a co-morbidity or underlying illness which puts me at higher risk if unvaccinated	Count	0	4	10	1	2	2	0	19
		% within Age	0,0%	7,0%	12,8%	12,5%	40,0%	25,0%	0,0%	
	To ensure that I can travel to countries or places where entry is denied to the unvaccinated	Count	9	28	40	3	3	4	1	88
		% within Age	47,4%	49,1%	51,3%	37,5%	60,0%	50,0%	100,0%	
	My place of work or employer required me to be vaccinated	Count	5	19	13	2	2	0	0	41
		% within Age	26,3%	33,3%	16,7%	25,0%	40,0%	0,0%	0,0%	
	My trusted news source(s) convinced me that it's good to get vaccinated	Count	5	10	16	3	2	0	1	37
		% within Age	26,3%	17,5%	20,5%	37,5%	40,0%	0,0%	100,0%	
	Other	Count	4	8	9	2	2	4	0	29
		% within Age	21,1%	14,0%	11,5%	25,0%	40,0%	50,0%	0,0%	
Total		Count	19	57	78	8	5	8	1	176

Source: Primary data

From the above table it appears that older respondents are more likely to take the vaccine due to having a co-morbidity or underlying illness, with respondents aged 55-74 having the highest proportion selecting that as a reason. Furthermore, no respondent below the age of 24 chose co-

morbidity as a reason. This is not surprising as the elderly are more likely to have underlying conditions. The elderly also appears to be much more likely to have other reason(s) for getting vaccinated against COVID-19 than those explicitly stated in the survey.

4.1.14 Reason for vaccination by education

I took the COVID-19 vaccine for the following reason(s): (select all applicable answers)*Education Crosstabulation

			What is your highest level of educational attainment?					
			Matric	Post-matric diploma or certificate	Undergraduate degree	Postgraduate degree	Doctorate	Total
Reasons for taking	To protect myself from getting seriously ill or dying from COVID-19	Count	10	1	34	95	5	145
		% within Education	100,0%	12,5%	75,6%	88,8%	100,0%	
	I have a co-morbidity or underlying illness which puts me at higher risk if unvaccinated	Count	0	0	5	14	0	19
		% within Education	0,0%	0,0%	11,1%	13,1%	0,0%	
	To ensure that I can travel to countries or places where entry is denied to the unvaccinated	Count	5	2	18	61	2	88
		% within Education	50,0%	25,0%	40,0%	57,0%	40,0%	
	My place of work or employer required me to be vaccinated	Count	2	4	10	24	1	41
		% within Education	20,0%	50,0%	22,2%	22,4%	20,0%	
	My trusted news source(s) convinced me that it's good to get vaccinated	Count	4	1	7	23	2	37
		% within Education	40,0%	12,5%	15,6%	21,5%	40,0%	
	Other	Count	0	2	11	16	0	29
		% within Education	0,0%	25,0%	24,4%	15,0%	0,0%	
Total		Count	10	8	45	107	5	175

Source: Primary data

There does not appear to be any material influence of educational attainment on the reasons for taking the COVID-19 vaccines. However, it must be noted that those with little or no formal education are not represented in the survey, with zero respondents indicating that they have less than matric.

4.2 Conclusion of preliminary data analysis

There is enough evidence to suggest that some of the factors highlighted in the survey questionnaire have some bearing on a person's decision to vaccinate or not vaccinate against COVID-19. In particular, questions related to vaccine efficacy, mainstream media trust, and government distrust require a closer look. There is sufficient foundation to perform hypothesis testing and present the results.

CHAPTER 5: HYPOTHESIS TESTING

The research survey had 18 – 26 questions, depending on if a respondent is vaccinated or not. Plus, a further 3 demographic questions. However, as explained earlier, the questions are based on the research hypotheses and can be split into topical categories. Categorising allows for more efficient analysis to draw meaningful conclusions. There are five hypotheses presented, focusing on the categories: vaccine efficacy, mainstream media trust, and government distrust.

5.1 Combined variable creation based on category

In the software program SPSS, a combined variable called “Vaccine Efficacy” was created as a transformation (combination) of the following survey questions:

- COVID-19 vaccines have been proven safe for human use.
- The vaccine significantly improves your chances of not getting severely ill or dying when infected with COVID-19.
- If a large enough proportion of the population get vaccinated, the threat of COVID-19 to society will substantially diminish.
- Technically speaking, the COVID-19 "vaccines" are not actual vaccines as they do not prevent transmission to others, nor provide immunity.

The latter was computed as a reverse variable due to its answer order being different to the other questions. I.e., One would expect a person who believes in the efficacy of the vaccines to answer with agreement for the first three but disagreement for the fourth. It was reversed to make the answers consistent.

Similarly, a combined variable called “Mainstream Media Trust” was created as a transformation of the following survey questions:

- The COVID-19 pandemic is not nearly as bad as the mainstream media are making it out to be
- Mainstream media are a reliable and unbiased source of information on the COVID-19 pandemic.

The former was computed as a reverse variable for the same reason as the prior categorization.

Finally, a combined variable called “Government Distrust” was created as a transformation of the following survey questions:

- Lockdowns, curfews and other restrictions imposed on citizens are actually just a way for government to exercise more control over the country.
- Private interest groups and/or individuals with self-serving motives are the ones actually controlling South Africa's response to the COVID-19 pandemic.
- COVID-19 related information is more reliable coming from my trusted social media source(s) than from the government.

The hypotheses testing is based upon research questions 1 to 3 stated in the introduction of the literature review section. For hypothesis tests 1 to 3, the three combined variables shall be assessed for a relationship with the key question. Hypothesis tests 4 and 5 are postulated based on the results of the prior hypothesis tests. Research question 4 shall be addressed from the conclusions drawn from the hypothesis tests.

5.2 Pearson correlation analysis

The hypothesis tests shall be conducted using Pearson correlation analysis. The Pearson correlation coefficient is used “to examine the strength and direction of the linear relationship between two continuous variables… The correlation coefficient can range in value from −1 to +1. The larger the absolute value of the coefficient, the stronger the relationship between the variables. The sign of the coefficient indicates the direction of the relationship. If both variables tend to increase or decrease together, the coefficient is positive… If one variable tends to increase as the other decreases, the coefficient is negative.” (Minitab, 2022, "Step 2" section)

5.2.1 Hypothesis one

$H1_0$: There is no relationship between doubt in the efficacy of COVID-19 vaccines and vaccine hesitancy in South Africa

$H1_a$: There is a relationship between doubt in the efficacy of COVID-19 vaccines and vaccine hesitancy in South Africa

Correlations			
		I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.	Vaccine Efficacy
I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.	Pearson Correlation	1	.587**
	Sig. (2-tailed)		0,000
	N	230	230
Vaccine Efficacy	Pearson Correlation	.587**	1
	Sig. (2-tailed)	0,000	
	N	230	230
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary data

The Pearson correlation figure of .587 indicates a moderately strong positive correlation. The more people doubt the efficacy of COVID-19 vaccines, the more likely they are to not get vaccinated (be vaccine hesitant). The 2-tailed significance value of 0.00 is less than an alpha value (α) of 0.01. This means that the correlation is highly significant, not just a product of chance. An α of 0.01 indicates that the risk of concluding that a correlation exists – when none actually does – is 1%. (Minitab, 2022, "Step 2" section) Therefore, we must reject the null hypothesis ($H1_0$) in favour of the alternate hypothesis ($H1_a$) and conclude that there is a relationship between doubt in the efficacy of COVID-19 vaccines and vaccine hesitancy in South Africa.

5.2.2 Hypothesis two

$H2_0$: There is no relationship between mainstream media perception and vaccine hesitancy in South Africa

$H2_a$: There is a relationship between mainstream media perception and vaccine hesitancy in South Africa

Correlations			
		I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.	Mainstream Media Trust
I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.	Pearson Correlation	1	-.385**
	Sig. (2-tailed)		0,000
	N	230	230
Mainstream Media Trust	Pearson Correlation	-.385**	1
	Sig. (2-tailed)	0,000	
	N	230	230
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary data

The Pearson correlation figure of -.385 indicates a weak negative correlation. The more people distrust mainstream media reporting on COVID-19, the less likely they are to get vaccinated. However, the effect is small. The 2-tailed significance value of 0.00 is less than an α of 0.01. This means that the correlation is highly significant. Therefore, we must reject the null hypothesis ($H2_0$) in favour of the alternate hypothesis ($H2_a$) and conclude that there is a relationship between mainstream media perception and vaccine hesitancy in South Africa.

5.2.3 Hypothesis three

$H3_0$: There is no relationship between the perception of government handling of the pandemic and vaccine hesitancy in South Africa

$H3_a$: There is a relationship between the perception of government handling of the pandemic and vaccine hesitancy in South Africa

The Pearson correlation figure of -.374 in the table below indicates a weak negative correlation. The more people are critical of government handling of the pandemic, the less likely they are to get vaccinated. However, the effect is small. The 2-tailed significance value of 0.00 is less than an α of 0.01. This means that the correlation is highly significant. Therefore, we must reject the null hypothesis ($H3_0$) in favour of the alternate hypothesis ($H3_a$) and conclude that there is a relationship between the perception of government handling of the pandemic and vaccine hesitancy in South Africa.

Correlations			
		I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.	Government Distrust
I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.	Pearson Correlation	1	-.374**
	Sig. (2-tailed)		0,000
	N	230	230
Government Distrust	Pearson Correlation	-.374**	1
	Sig. (2-tailed)	0,000	
	N	230	230
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary data

Conclusion of hypothesis tests 1 to 3

The Pearson correlation tests have revealed that there is a relationship between people being vaccine hesitant and each of the following: their views on COVID-19 vaccine efficacy, mainstream media reporting on COVID-19, and government handling of the pandemic, with the former appearing to be the most influential factor. In terms of the literature, the "Confidence" portion of the 3 Cs vaccine hesitancy model, in particular points *(i) the effectiveness and safety of vaccines* and *(iii) the motivations of policy-makers who decide on the needed vaccines*, explains the situation in South Africa. (MacDonald, 2015, p. 4162) These results support Solís Arce et al. (2021, p. 2)'s findings that "trust in vaccines as well as the institutions that administer them are key determinants of the success of any vaccination campaign." Similarly, Cooper et al. (2021)'s observation that people who expressed a negative perception of the national government were more likely to be vaccine hesitant is supported by the hypothesis tests.

Introduction to hypothesis tests 4 and 5

The next two hypothesis tests build on this conclusion by examining the relationship between doubt in COVID-19 vaccine efficacy and the perceptions of mainstream media and government handling of the pandemic. Using the preliminary data analysis as a basis, Pearson correlation tests are run between some specific questions to reveal correlations. The specific questions chosen are:

For vaccine efficacy:

- COVID-19 vaccines have been proven safe for human use
- The vaccine significantly improves your chances of not getting severely ill or dying when infected with COVID-19

For mainstream media perception:

- Mainstream media are a reliable and unbiased source of information on the COVID-19 pandemic

For the perception of government's response to the pandemic:

- Private interest groups and/or individuals with self-serving motives are the ones actually controlling South Africa's response to the COVID-19 pandemic
- Lockdowns, curfews and other restrictions imposed on citizens are actually just a way for government to exercise more control over the country

5.2.4 Hypothesis four

$H4_0$: There is no relationship between doubt in the efficacy of COVID-19 vaccines and mainstream media perception in South Africa

$H4_a$: There is a relationship between doubt in the efficacy of COVID-19 vaccines and mainstream media perception in South Africa

Correlations

		COVID-19 vaccines have been proven safe for human use.	Mainstream media are a reliable and unbiased source of information on the COVID-19 pandemic.
COVID-19 vaccines have been proven safe for human use.	Pearson Correlation	1	.284**
	Sig. (2-tailed)		0,000
	N	230	230
Mainstream media are a reliable and unbiased source of information on the COVID-19 pandemic.	Pearson Correlation	.284**	1
	Sig. (2-tailed)	0,000	
	N	230	230

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations			
		The vaccine significantly improves your chances of not getting severely ill or dying when infected with COVID-19.	Mainstream media are a reliable and unbiased source of information on the COVID-19 pandemic.
The vaccine significantly improves your chances of not getting severely ill or dying when infected with COVID-19.	Pearson Correlation	1	.234**
	Sig. (2-tailed)		0,000
	N	230	230
Mainstream media are a reliable and unbiased source of information on the COVID-19 pandemic.	Pearson Correlation	.234**	1
	Sig. (2-tailed)	0,000	
	N	230	230
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary data

The Pearson correlation figures of .284 and .234 indicate weak positive correlation. The more reliable and unbiased they find mainstream media, the more likely they are to believe in the efficacy of the vaccines. However, the effect is small. The 2-tailed significance values of 0.00 are less than an α of 0.01. This means that the correlation is highly significant.

Therefore, we must reject the null hypothesis ($H4_0$) in favour of the alternate hypothesis ($H4_a$) and conclude that there is a relationship between doubt in the efficacy of COVID-19 vaccines and mainstream media perception in South Africa.

5.2.5 Hypothesis five

H5₀: There is no relationship between doubt in the efficacy of COVID-19 vaccines and the perception of government handling of the pandemic in South Africa

H5ₐ: There is a relationship between doubt in the efficacy of COVID-19 vaccines and the perception of government handling of the pandemic in South Africa

Correlations			
		COVID-19 vaccines have been proven safe for human use.	Private interest groups and/or individuals with self-serving motives are the ones actually controlling South Africa's response to the COVID-19 pandemic
COVID-19 vaccines have been proven safe for human use.	Pearson Correlation	1	-.450**
	Sig. (2-tailed)		0,000
	N	230	230
Private interest groups and/or individuals with self-serving motives are the ones actually controlling South Africa's response to the COVID-19 pandemic	Pearson Correlation	-.450**	1
	Sig. (2-tailed)	0,000	
	N	230	230
**. Correlation is significant at the 0.01 level (2-tailed).			

Correlations			
		The vaccine significantly improves your chances of not getting severely ill or dying when infected with COVID-19.	Lockdowns, curfews and other restrictions imposed on citizens are actually just a way for government to exercise more control over the country.
The vaccine significantly improves your chances of not getting severely ill or dying when infected with COVID-19.	Pearson Correlation	1	-.423**
	Sig. (2-tailed)		0,000
	N	230	230
Lockdowns, curfews and other restrictions imposed on citizens are actually just a way for government to exercise more control over the country.	Pearson Correlation	-.423**	1
	Sig. (2-tailed)	0,000	
	N	230	230
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary data

The Pearson correlation figures of -.450 and -.423 indicate moderately strong negative correlation. The more people believe that government's actions are selfish or influenced by third parties, the less likely they are to believe in the efficacy of the vaccines. The 2-tailed significance values of 0.00 are less than an α of 0.01. This means that the correlation is highly significant.

Therefore, we must reject the null hypothesis ($H5_0$) in favour of the alternate hypothesis ($H5_a$) and conclude that there is a relationship between doubt in the efficacy of COVID-19 vaccines and the perception of government handling of the pandemic in South Africa.

Conclusion of hypothesis tests 4 and 5

The Pearson correlation tests have revealed that there is a relationship between doubt in the efficacy of COVID-19 vaccines and each of the following: the perception of mainstream media, and the perception of government handling of the pandemic in South Africa, with the latter appearing to be the most influential factor.

CHAPTER 6: DISCUSSION OF THE FINDINGS

Looking at the survey results, it appears unlikely that a significant proportion of people who are currently unvaccinated will change their minds and take a vaccine; at least not in the short-to-medium term. In this section we shall discuss the significance of the survey findings for the media, government, and workplace management.

6.1 Significance for the media

This study has revealed that the mainstream media have an important role to play in the drive to improve the uptake of COVID-19 vaccines. Media houses should not be dismissive of accusations of bias by people who may not even be in their target market. Rather, they should engage content consumers on why they feel that way and how the media can do things differently to ease their concerns. Maintaining impartiality, making clear distinctions between what is fact and what is opinion, and allowing opinions to be debated, is of critical importance amid the pandemic. How the media reports on government handling of COVID-19 is also critically important as public perception of their actions also influences belief in the efficacy of vaccines. There is a popular saying in media that "bad news sells"; however, consistent negative news about how badly government is managing

the pandemic is detrimental to efforts to fight COVID-19 vaccine hesitancy. Naturally, the media will defend itself by saying that they have a duty to report the news as is, good or bad. However, with the understanding of what is at stake, more deliberate thought can be put into headline choice of words, reporting tone, the inclusion or exclusion of speculation, and any other quality check considerations.

6.2 Significance for government

This study has shown the spotlight firmly on the potential consequences of public distrust in government. To improve COVID-19 vaccine intake, government will need to be more transparent regarding how decisions are made on how to handle the pandemic. They must show the public that there is a zero-tolerance approach for people who benefit unduly from COVID-19 related corruption or mismanagement. They must be cognisant of speculation and conspiracy theories that make government look bad. Generally speaking, government would be wise to look at the vaccine through the eyes of the consumer, who form the demand side of the vaccine equation, rather than overly focusing on the supply of vaccines. (Su et al., 2020)

6.3 Significance for workplace management

With many people vaccine hesitant, the most effective instrument of change would be mandatory workplace vaccination; as the threat of not earning an income is very persuasive when one has “got bills to pay” and needs “to put food on the table.” However, given the very strong views many respondents hold against mandatory vaccination, it is not a decision an organisation’s management should take lightly as it would likely have a negative effect on employee morale. Not just those who are unvaccinated but on the vaccinated too – many respondents who have already been vaccinated still expressed strong opposition to mandatory vaccination. This could be interpreted as an expression of support for the sovereignty of human rights; that forcing people to do anything – even if it is supposedly good for them – is a violation of human rights. Furthermore, mandatory workplace vaccination policies violate the two “boundary conditions” of Gubler et al. (2018, p. 23) that are necessary for successful corporate wellness programs. This creates a dilemma for employers: on the one hand, unvaccinated employees pose a loss of productivity threat due to increased absenteeism from increased sick leave days taken. On the other hand, lowered employee morale due to mandatory vaccination policy also impacts negatively on employee productivity. The literature revealed that layoffs that are perceived to be unfair by remaining employees have a significant impact on their morale. (Chaddha, 2016) The study data revealed that 63% of respondents believe

that mandatory vaccination, irrespective of context, is unfair. So, one can conclude that an employee being dismissed for refusing to vaccinate would be viewed as unfair by many colleagues and thus significantly impact the morale of the remaining employees.

The ideal scenario for management then, would be for employees to make the decision to vaccinate on their own, without any coercing from them. As revealed in the prior chapter, this is more likely to happen if employees gain confidence in the efficacy of the COVID-19 vaccines. This in turn is more likely to be achieved if trust in the government and mainstream media improves. This presents an opportunity for businesses to dedicate resources towards the nurturing of public relationships with these two entities.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

This research study looked at some factors that influence the decision of people regarding whether to take a COVID-19 vaccine. It further looked at possible motivators for the vaccine hesitants to move across the spectrum and get vaccinated. The controversial issue of mandatory vaccination was also surveyed. Some of the key highlights revealed in the study were:

- There is a fair level of distrust over government's motives when it comes to the handling of the pandemic
- About a third of respondents do not have conviction that the COVID-19 vaccines are safe for human use or that they will significantly reduce the chances of serious illness or death if infected
- Over half of respondents believe that mainstream media is unreliable or biased
- There is a split in opinion over whether COVID-19 vaccination should be mandatory for workers that interact with large numbers of people or with the vulnerable, with very strong opinions on either side
- Almost a quarter of all respondents have not been vaccinated
- The most popular reason for taking a vaccine is to protect against serious illness or death
- Some respondents are not vaccinated due to health or religious reasons
- Prohibiting the unvaccinated from experiencing public events is unlikely to incentivise them to vaccinate
- Offering a free cash reward or voucher for vaccination also unlikely to stir the vaccine hesitants

The hypothesis tests revealed that:

- There is a relationship between doubt in the efficacy of COVID-19 vaccines and vaccine hesitancy in South Africa
- There is a relationship between mainstream media perception and vaccine hesitancy in South Africa
- There is a relationship between the perception of government handling of the pandemic and vaccine hesitancy in South Africa
- There is a relationship between doubt in the efficacy of COVID-19 vaccines and mainstream media perception in South Africa
- There is a relationship between doubt in the efficacy of COVID-19 vaccines and the perception of government handling of the pandemic in South Africa

In conclusion, vaccine hesitancy is clearly an issue in South African healthcare. It appears to be driven in part by a culture of distrust – of the mainstream media, and of government.

7.2 Recommendations

The recommendations shall address research question 4 – What can be done to motivate South African COVID-19 vaccine hesitants to get vaccinated?

Analysis of the 'motivation to vaccinate' questions revealed that none of the proposed incentives were likely to yield meaningful results in terms of converting vaccine hesitants across the divide to vaccinate. The data, with confirmation from the hypothesis tests, reveals that doubt in the efficacy of vaccines is the biggest contributor to vaccine hesitancy amongst the factors considered in this study. Therefore, the overarching recommendation would be for health authorities to dispel doubts over the efficacy of the vaccines.

7.2.1 Recommendation 1: Education

Health authorities should keep educating people about why the vaccines are safe for human beings and how they can offer protection from serious illness or death. What mRNA vaccines are and how they work should be explained in simple terms that the 'man on the street' can understand. The misunderstanding that a vaccine must provide full immunity and prevent transmission to others must be deliberately addressed. Overall, new, and creative ways must be found to get the desired message across.

7.2.2 Recommendation 2: Collaborate with mainstream media to build trust

Health authorities should pay more attention to how the media portrays the pandemic to the public – the language used in reporting, the subject matter experts invited to speak, signs of bias, etc. Critics of the mainstream media often accuse them of being one-sided, of not giving people with contrarian views to the main narrative a platform to speak. There is understandably a fear of spreading 'fake news' but allowing healthy debates between people with conflicting views would make critics feel less like they are having a particular narrative 'shoved down their throats.' A purposeful collaboration between health authorities and media houses could be mutually beneficial to achieve the aims of all parties – the former would get more readers/listeners/subscribers and the latter, more people to vaccinate as hypothesis four revealed. People who trust media reports on the pandemic would be more likely to take the threat of the coronavirus seriously; and with that, motivate for the adoption of protective measures such as getting vaccinated.

7.2.3 Recommendation 3: Build trust in government

Hypothesis five revealed that there is a relationship between the perception of government's handling of the pandemic and doubts over the efficacy of vaccines. It therefore follows that improving trust in government will dispel doubts on the efficacy of the COVID-19 vaccines, which will in turn boost vaccination numbers. This is clearly the most difficult recommendation to implement; however, taking the following step will likely be impactful:

Make the decision making of the NCCC more transparent to the public. For example, they can be more vocal about why the national state of disaster has been in place for so long whilst many independent experts and opposition politicians have said that it is no longer necessary. The chair of the NCC, President Ramaphosa, is notorious for not taking questions from the media whenever he addresses the nation on the NCCC's decisions. This supports the narrative that the NCCC's decisions are not rational, and that they will be exposed if the president takes questions. Staying to take questions will build more trust and confidence with the public and media alike.

In conclusion, these three recommendations will likely improve confidence of some vaccine hesitants in the efficacy of the vaccines, leading to an uptake in vaccination rates in South Africa.

7.3 Limitations of the study

There are a few limitations to this study:

1) There is a lack of representation of those above the age of 55
2) There is no representation of adults with little or no formal education
3) There is no representation of people who do not identify as male or female
4) The elderly appears to be much more likely to have other reason(s) for getting vaccinated against COVID-19 than those explicitly stated in the survey. This survey made no attempt to find out what these other reasons may be and how material they were to their decision to vaccinate.

7.4 Suggestions for further research

Future research can target people with pre-matric education to see if the survey results are like this one. Research can also look deeper into strategies to build the public's trust in the government and media when it comes to the COVID-19 pandemic.

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Appendix A: Invitation to potential respondents

Dear Respondent

My name is Kwabena Afari-Twumasi. I am currently a 2nd year Master of Business Administration student at Wits Business School (WBS). I am conducting research into COVID-19 vaccine hesitancy in South Africa. The purpose of the research is to better understand why some people do not want to take any of the freely available COVID-19 vaccines.

The research will be conducted by way of an anonymous online survey that should take an average of 4 to 7 minutes to complete. The criteria for participation are:

a) You must currently live or work in South Africa.
b) You must be aware of the COVID-19 pandemic and have a view on whether or not it is good to take a vaccine.
c) You must have data to access the internet as the survey will be conducted online.

Some demographic details will be requested for data analysis purposes; however, your name and contact details will not be taken. Your responses will be confidential – there will be nothing linking you personally to the survey results.

Should you have any questions related to the study, you may contact me at email: 0712195A@students.wits.ac.za or my research supervisor Dr Jacques Totowa at email: jacques.totowa@wits.ac.za.

Thank you for your participation.

Appendix B: Survey questions

Start of Block: Consent

Please click on the link at the end to see information on this research survey. If you agree to participate, please click 'Yes' below to give consent. Invitation to respondents

- ○ No
- ○ Yes

End of Block: Consent

Start of Block: Qualification to participate

I am over 18 years old and live or work primarily within the Republic of South Africa.

- ○ No
- ○ Yes

End of Block: Qualification to participate

Start of Block: First Section of Survey

The COVID-19 pandemic is not nearly as bad as the mainstream media are making it out to be.

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

I personally know at least one person who has fallen seriously ill or died from contracting COVID-19.

- ○ No
- ○ Yes

Lockdowns, curfews and other restrictions imposed on citizens are actually just a way for government to exercise more control over the country.

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Private interest groups and/or individuals with self-serving motives are the ones actually controlling South Africa's response to the COVID-19 pandemic

- ○ Strongly disagree
- ○ Disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

COVID-19 vaccines have been proven safe for human use.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

The vaccine significantly improves your chances of not getting severely ill or dying when infected with COVID-19.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

If a large enough proportion of the population get vaccinated, the threat of COVID-19 to society will substantially diminish.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Technically speaking, the COVID-19 "vaccines" are not actual vaccines as they do not prevent transmission to others, nor provide immunity.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

My personal views on COVID-19 vaccines are similar to most of the people I interact with on a daily basis.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

I get most of my COVID-19 related information from social media (Twitter, Facebook, WhatsApp, Snapchat, etc)

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Mainstream media are a reliable and unbiased source of information on the COVID-19 pandemic.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

COVID-19 related information is more reliable coming from my trusted social media source(s) than from the government.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

A person with lots of followers on social media is more reliable for getting the truth or correct information on COVID-19 than a person with relatively few followers.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

It is important to seek out as many alternative sources of information on the COVID-19 pandemic as possible, in order to decide for yourself what makes sense.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Workers in professions that interact with a large number of people and/or vulnerable groups of people (e.g., Healthcare workers, Taxi drivers, Retirement home workers) should be subject to mandatory/compulsory vaccination.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Making vaccination mandatory/compulsory, irrespective of context, is unfair.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

I have taken at least one dose of a World Health Organization (WHO) approved COVID-19 vaccine.

- ○ No
- ○ Yes

End of Block: First Section of Survey

Start of Block: Reason for vaccination

I took the COVID-19 vaccine for the following reason(s): (select all applicable answers)

- [ ] To protect myself from getting seriously ill or dying from COVID-19
- [ ] I have a co-morbidity or underlying illness which puts me at higher risk if unvaccinated
- [ ] To ensure that I can travel to countries or places where entry is denied to the unvaccinated
- [ ] My place of work or employer required me to be vaccinated
- [ ] My trusted news source(s) convinced me that it's good to get vaccinated
- [ ] Other

End of Block: Reason for vaccination

Start of Block: Demographic Information

To which gender identity do you most identify?

- ○ Male
- ○ Female
- ○ Non-binary / third gender
- ○ Prefer not to say

How old are you?

- ○ 18 - 24
- ○ 25 - 34
- ○ 35 - 44
- ○ 45 - 54
- ○ 55 - 64
- ○ 65 - 74
- ○ 75 - 84
- ○ 85 or older

What is your highest level of educational attainment?

- ○ Pre-matric
- ○ Matric
- ○ Post-matric diploma or certificate
- ○ Undergraduate degree
- ○ Postgraduate degree
- ○ Doctorate

End of Block: Demographic Information

Start of Block: Second Section of Survey

I am unable to take a COVID-19 vaccine for health reasons. E.g., Due to an allergy to a vaccine ingredient.

- ○ No
- ○ Yes

I am not taking the COVID-19 vaccine for religious reasons.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Restricting unvaccinated people from entering public places like sport stadiums, pubs and clubs would be a motivator for me to get vaccinated.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

If the World Health Organization (WHO) say that the current COVID-19 vaccines are, for all intents and purposes, vitamin supplements that help your immune system, rather than actual vaccines, I would be more likely to take the "vaccine" (vitamin).

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

If government offered a free cash reward or voucher to everyone who gets vaccinated against COVID-19, I would be more likely to get vaccinated.

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

A guarantee of the lifting of mask wearing, sanitizing, and social distancing policies would be a motivator for me to get vaccinated.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Unvaccinated people being denied entry into other countries is a motivator for me to get vaccinated

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

If my trusted source(s) of news endorsed the use of COVID-19 vaccines, I would be more likely/willing to get vaccinated.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

End of Block: Second Section of Survey