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Knowledge, attitudes and practices of South African oral healthcare workers regarding COVID-19 and its vaccine

By

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Magister Scientiae Dentistry

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DECLARATION

I declare that the work in this dissertation entitled “Knowledge, Attitudes and Practices of South African Oral Healthcare Workers Regarding COVID-19 and Its Vaccine” was undertaken by me. It has not been submitted for any degree or examination at any university, and all the resource materials used and quoted have been duly acknowledged.

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DEDICATION

I would like to dedicate this dissertation to my late mother, who I unfortunately lost while I was halfway through completion of my thesis. Thank you for your endless love, guidance and encouragement. Although you are no longer in this world your memories continue to regulate my life. I am truly honoured and thankful to have had you as my mum.

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ABSTRACT

Introduction

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is a recently discovered virus, responsible for causing Coronavirus disease 19 (COVID-19). COVID-19 is an infectious disease that emerged in December 2019. The virus has infected millions of people globally and continues to affect dental communities worldwide.

This study aims to evaluate the level of knowledge and attitudes around COVID-19 and its vaccine among South African oral healthcare workers (OHCWs) and also assess their practices around COVID-19. It also assesses the willingness of OHCWs to administer the COVID-19 vaccines in their practices.

Materials and Methods

An online survey was designed and distributed to OHCWs across South Africa (SA). It consisted of four sections and the questions were designed to assess the participants' demographics, knowledge of COVID-19 and its vaccine, attitudes towards COVID-19 and its vaccine and practices regarding COVID-19. The link to the questionnaire was sent out via email and social media platforms.

Results

A total of 327 OHCWs participated in the study and the mean age of the participants was 43 (SD= ±12.23; 20-76) years. Majority of the participants (60%) were general dentists. Of the entire sample, 136 individuals had additional postgraduate qualifications and of these, 32% held a Master's degree and 13% had a recognised specialisation. The private sector employed 57% of study participants and 24% were employed by the academic sector.

The knowledge of COVID-19 and its vaccine was combined and then scored. This study found that 60% of the respondents had good knowledge score while 40% had an average score. No one scored poorly regarding COVID-19 and the vaccines.

There was no statistically significant difference in the mean age between the knowledge categories (p=0.165).

Those with good knowledge had graduated more recently than those with average knowledge. The OHCWs with good knowledge tended to have more diplomas, Master's and specialties compared to those with average knowledge.

Overall, OHCWs displayed positives attitudes towards COVID-19 and the vast majority implemented appropriate infection control protocols at their place of work.

Attitudes towards the COVID-19 vaccine varied as some of the participants displayed concerns around the adverse side effects, among other factors, which led to vaccine hesitancy. More than half of the respondents said they would treat a symptomatic patient prior to referring them for a COVID-19 test.

This study included those individuals who were not willing to receive the COVID-19 vaccination. There were also participants who were qualified to administer vaccines but were not willing to vaccinate the public if authorised to do so.

Conclusion

Majority of the OHCWs demonstrated ''good'' knowledge around COVID-19 and the vaccine and an overall positive attitude towards COVID-19 was displayed. The study reported a vaccination rate of 87% with side effects experienced by 58% of participants. The results of the study reported that vaccination hesitancy was prevalent among some of the participants. Preventative measures against the virus have been implemented by most of the respondents. The vast majority of the participants who were qualified to administer vaccines were not willing to vaccinate the public if allowed to do so.

Taking the above into account, there were gaps that need to be addressed. Hence, health officials and policy makers should develop interventions to improve these gaps.

Keywords:

Knowledge, attitudes, practices, oral healthcare workers, dentists, COVID-19, COVID-19 vaccine, vaccine hesitancy, dentists administering COVID-19 vaccines, SARS-CoV-2, Africa

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LIST OF ABBREVIATIONS AND ACRONYMS

CEO: Chief executive officer
CDC: Centre for Disease Control and Prevention
COVID-19: Coronavirus disease 19
CoVs: Coronaviruses
HCoV: Human coronavirus
HCWs: Healthcare workers
HPCSA: Health Professions Council of South Africa
KZN: KwaZulu-Natal
MERS: Middle East respiratory syndrome
MERS-CoV: Middle East respiratory syndrome coronavirus
mRNA: Messenger RNA
OHASA: Oral Hygienists' Association of South Africa
OHCWs: Oral healthcare workers
PEG: Polyethylene glycol
POPI: Protection of personal information
POPIA: Protection of Personal Information Act
PPE: Personal protective equipment
SA: South Africa
SADTA: South African Dental Therapy Association
SARS: Severe acute respiratory syndrome
SARS-CoV: Severe acute respiratory syndrome coronavirus
SD: Standard deviation
UK: United Kingdom
US: United States
WHO: World Health Organisation

CHAPTER 1: INTRODUCTION AND STUDY RATIONALE

The discovery of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes a communicable disease called Coronavirus disease 19 (COVID-19), was officially announced by the Chinese Centre for Disease Control and Prevention (CDC) on 8th January 2020.[1-2] Since then, it has spread across the globe and is considered a worldwide pandemic. As SARS-CoV-2 has recently been discovered, there are many uncertainties that exist regarding the knowledge and attitudes of oral healthcare workers (OHCWs) around this virus. The upsurge of the novel coronavirus has constituted a public health emergency of international concern.[3]

Many questions were posed on how to eliminate the detrimental effects in infected patients.[4] Scientists and researchers have been working around the clock to develop an effective vaccine. Subsequently, they have managed to gain significant knowledge on the genetic code for COVID-19 which led to the development of the COVID-19 vaccine.[5] On 2nd December 2020, the drug giant, Pfizer, together with German biotech firm, BioNTech, developed the first fully approved vaccine which was authorised for emergency use.[6] However, studies have reported that there are still many unknowns around the virus and potential vaccines and there are five important questions surrounding the coronavirus vaccines which still need answers – How quickly and safely will the vaccines be distributed? What side effects will individuals present with – will there be any long term or rare side effects? Does the vaccine halt viral transmission and what will be the duration of immunity? How do we overcome vaccine hesitancy to achieve herd immunity? Is the vaccine safe for children and pregnant women?[7] A considerable amount of scientific evidence needs to be gathered to provide good management and treatment that will work.

In order to know when and how to start treating the disease, we need to obtain a considerable amount of accurate and relevant information. Due to the nature of the spread of this virus, OHCWs are considered high risk for the spread of the virus. Therefore, it is essential to determine the knowledge of these health workers regarding the transmission, spread and prevention of the virus in their daily practices as well as their attitudes and practices around the virus and its recently discovered vaccines.

It is especially important for OHCWs to have a fair understanding and appropriate knowledge of this novel virus, and to be aware of the potential benefits and risks of

the vaccines so that they able to hold reasonable conversation among their peers. OHCWs should be able to educate their patients and convey their understanding of the virus, and vaccine, to their anxious and doubtful patients. In doing so, they are capable of preventing and hopefully controlling the spread of the disease. It is documented that healthcare workers (HCWs) who have a lack of confidence, disinclination, or an unfavourable attitude towards the vaccine will transmit attitudes characterised by argument or controversy and will tend to infrequently recommend vaccination.[8] It is understandable that there are unanswered questions around the virus and its vaccine and there are gaps which need to be filled as deeper scientific detail may be beyond us without further study.

There has been a roll-out of vaccines, globally, with the first fully trialled and tested vaccinations administered in the United Kingdom (UK) on 8th December, 2020. Vaccination programmes soon followed in several other nations.[9]

South Africa (SA) was one of the first countries in Africa to receive COVID-19 vaccines - the first vaccine was administered on 1st February 2021. The three vaccines secured by SA were the AstraZeneca/Oxford, Johnson and Johnson and Pfizer/BioNTech COVID-19 vaccines. The country received a million doses of the AstraZeneca/Oxford vaccine which they started rolling out but had to discontinue after results showed that the vaccine did not adequately cover the 501Y.V2 variant, which was most common among the South African population. On 17th February 2021, the country started rolling out the Johnson and Johnson vaccine of which they had secured nine million vaccines. The Johnson and Johnson vaccine not only proved to be more effective against the common SA 501Y.V2 variant, but also cheaper and easier to store – as it requires usual refrigeration. SA also secured 20 million doses of the Pfizer/BioNTech vaccines which were expected by the end of March 2021.[10]

It is necessary to gauge OHCWs' perceptions of this vaccine and the possible side effects in order to create awareness amongst HCWs on possible reasons for either their willingness or reluctance towards the vaccine.

Thus this study sought to evaluate the levels of knowledge, attitudes and practices around COVID-19 and the COVID-19 vaccine(s) among the South African OHCWs. The study also determined whether South African OHCWs were willing to receive the vaccine and administer the vaccine.

In this study, an OHCW is defined as those personnel who are involved in providing direct face-to-face delivery of dental treatment to patients. It includes dental specialists, general dentists, dental therapists, dental hygienists as well as dental assistants.

Research in this area is significant as OHCWs are soldiers on the forefront of a battlefield, fighting an invisible war against coronavirus as they are vulnerable to infection in many direct and indirect ways. Routine dental treatment, being aerosol generating, poses a great risk of transmitting infection within the dental setting. Their knowledge and attitudes on the virus, viral transmission and latest research findings (including perceptions towards the vaccine) are considered vital as they need to gain insight on the virus that has landed on their doorstep. Public perception and uptake of the vaccine rests greatly on OHCWs' opinions on vaccine safety and efficacy.

The impacts of COVID-19 in dentistry, both long-term and short-term have not yet been completely understood. This study will provide baseline information regarding the knowledge, attitudes and practices of OHCWs towards COVID-19 and its vaccines.

If necessary, workshops will be presented to OHCWs to improve their knowledge regarding the virus and its vaccine. It is important to ascertain what levels of understanding are reflected among the OHCWs in SA.

CHAPTER 2: LITERATURE REVIEW

On 12th March 2020, the World Health Organisation (WHO) declared the novel coronavirus a global pandemic and called on countries to take aggressive actions to curb the progression of the virus.[11]

Public health experts were baffled, and no one was prepared for the challenges that lay ahead. A progression of intermittent lockdowns progressed throughout the world – not to end the pandemic but to protect the health systems from being burdened by infected and ill patients requiring medical treatment. However, lockdown restrictions had their own consequences – widened the inequality gap, mental health issues and intensified poor medical outcomes which were not COVID-19 related.[10] Widespread social and economic disruption ensued with some countries hit harder than others and many lives were lost.[10]

Whilst the spread of COVID-19 was reported in developed and developing countries, SA was not spared. The first recorded COVID-19 case in SA was reported on 5th March 2020.[2]

The WHO stated that as of 14th June 2021, there have been 175 686 814 confirmed cases of COVID-19, and 3 803 592 deaths, worldwide. As of 10th June 2021, there have been a total of 2 156 550 767 vaccine doses administered. As of 30th March 2021, Africa has seen 3 074 086 reported cases and 77 688 deaths. In SA, from 3rd January 2020 to 14th June 2021 there have been 1 747 082 confirmed cases and 57 731 deaths reported to WHO and as of 10th June 2021, 182 983 vaccines have been administered.[12]

SARS-CoV-2 is primarily transmitted from close person-to-person contact through respiratory droplets.[13] Research shows that the virus spreads from person-to-person in several direct and indirect ways:

Droplets or aerosols: when an infected individual coughs, talks or sneezes, very small particles are released into the air and anyone within six feet of the infected person is able to inhale these particles – which contain the virus. This type of transmission may also occur during dental procedures which are aerosol generating.

Airborne transmission: when an infected person breathes out into the air, the particles remain airborne for up to three hours and can infect an uninfected person if they inhale that air.

Fomite transmission: coming into contact with a contaminated surface directly or indirectly.

Faecal-Oral: studies show that the virus may be present in an infected individual's stool however experts are not certain whether the infection can be transmitted through contact with the stool of an infected individual.[14]

All of the above-mentioned modes are potential sources of transmission of SARS-CoV-2. The dental professionals are at high risk of contracting COVID-19 due to the very close proximity with their patients. The virus can spread via airborne transmission when aerosols are generated during dental procedures or indirectly through saliva.[15] The use of dental equipment such as the high-speed handpiece, air and water syringes, ultrasonic scalers and polishing devices result in viral particles being aerosolised.[16] The spread and transmission of coronavirus in dental practices are a concern around the world.[17]

A study that was carried out in the UK and United States (US) showed that frontline HCWs are more likely to contract COVID-19 than the general population.[2]

A study performed by van Doremalen et al, reported that once the virus is aerosolised, it can linger in the air for up to three hours, and more so when there is poor ventilation.[18]

The frequently displayed symptoms of COVID-19, exhibited by patients who are infected by the virus ranges from mild symptoms such as fatigue, fever, sore throat a reduction of smell and/or taste, cough and muscle pain, to moderate-to-severe symptoms, such as severe acute respiratory distress which may progressively lead to respiratory failure and death.[19-20]

The population group most at risk of contracting COVID-19 are individuals above 60 years of age, and individuals with certain immuno-compromised conditions such as diabetes, heart or lung disease or other medical conditions weakening their immune system.[21]

According to the CDC, one can develop symptoms between two and fourteen days of coming into contact with an infected person.[22]

At the time of writing this study, there were no approved curative therapies available for COVID-19, therefore deeming it necessary to provide palliative care to all patients with COVID-19 and to follow preventative measures to curb the spread of infection.[23] A review by the South African Department of Health, titled: Remdesivir for COVID-19: evidence review of the clinical benefit and harm (15th February 2022) concluded that Remdesivir reduced the risk of hospitalisation but has not proven to show a significant effect on mortality or any other clinically important benefits or harms in hospitalised patients.[24]

Covid-19 and dentistry

Dentistry is by nature, a vulnerable profession, as there is a high risk of transmission within the dental space and between the dental team and patients. Therefore OHCWs urgently need to adhere to protocols for infection control and prevention, to curb the spread of the COVID-19 virus in dental settings.[19] OHCWs and their staff are accustomed to the use of standard precautionary measures to prevent the spread of cross infections on a daily basis. However, since the spread of the COVID-19 pandemic, there has been uncertainty as to what is the most appropriate personal protective equipment (PPE), and the best suited manner of treating patients under these circumstances. It has been the responsibility of each country in the world to upscale policies and rapidly counter COVID-19 and to align with scientific evidence from the WHO. This interpretation as well as the guidance published for providing safe and effective dental care varies among and within countries. A possible reason for this could be due to insufficient supported research on the efficiency of the suggested guidelines.[17]

COVID-19 is regarded to be more infectious than Middle East respiratory syndrome coronavirus (MERS-CoV) and severe acute respiratory syndrome coronavirus (SARS-CoV) due to the rapidly escalating number of worldwide cases.[23] As the infection rates in humans soar at an astonishing speed, necessary precautions have to be in place to protect HCWs from falling victims to this virus. It is important for HCWs to be well-versed and kept up to date with the latest advances and research about COVID-19 and the COVID-19 vaccines so that they are able to relay this information to their

patients. HCWs should be a reliable source of information on vaccination and if they have any concerns regarding COVID-19 or the COVID-19 vaccine, this may spread to the general public. They may tend to recommend vaccines less frequently to their patients thereby reducing vaccine confidence and uptake by their patients.[8]

Several SARS-CoV-2 variants have been found to be circulating globally hence new discoveries about the virologic, epidemiologic and clinical characteristics of the virus are rapidly emerging.[25] Coronaviruses (CoVs) belong to a large family of viruses of which there are many variants and their hosts include humans and animals.[26]
There are various coronaviruses identified in animals but only a few of these have the ability to transmit the disease in humans.
CoVs are members of a subfamily, *Coronavirinae*, and this subfamily has four categories: Alphacoronavirus, Betacoronavirus, Gammacoronavirus and Deltacoronavirus.
The alphacoronavirus and betacoronavirus infect mammals only whereas the gammacoronavirus and deltacoronavirus mainly cause infection in birds with some of them also infecting mammals. Human coronaviruses were first discovered in the mid-1960s. There are seven variants of the human coronavirus causing respiratory infections in humans, ranging from the common cold (upper respiratory tract infection) to more severe respiratory conditions.[20]
The seven variants of the human coronaviruses are:
1. HCoV-229E: virus causing mild upper tract respiratory disease.
2. HCoV-NL63: virus causing mild upper tract respiratory disease.
3. HCoV-OC43: virus causing mild upper tract respiratory disease.
4. HKU1: virus causing mild upper tract respiratory disease.
5. MERS-CoV: virus responsible for causing MERS, discovered in 2012; and responsible for causing severe respiratory illness and fatalities.
6. SARS-CoV: virus responsible for causing SARS, identified in 2003; and causes severe respiratory illness and fatalities.
7. SARS-CoV-2: virus responsible for causing COVID-19, identified in 2019; and causes acute respiratory disease.[26-27]

Several variants of SARS-CoV-2 have been found to be spreading rapidly in SA, UK and other countries.[28-29] At this stage, three variants have been identified – Alpha,

Beta and Delta, with the Beta variant first being discovered circulating in SA at the end of 2020.[30]

The reason why there are different variants of the COVID-19 virus that have been reported, is because the majority of the global population have not been vaccinated.[25] These variants have multiple mutations in their spike glycoproteins which are the main targets of virus neutralising antibodies. The emerged spike mutations have dampened optimism around the world and raised concerns of vaccine efficacy against the new strains. The continuing evolution of SARS-CoV-2 necessitates ongoing monitoring of the viral mutations for vaccine efficacy. Medical experts and scientists should also be prepared for future mutations of the pathogen which might require changes to vaccine strains.[31]

In spite of the incredible attempts made in developing promising COVID-19 vaccines, vaccine hesitancy is considered to be a major hindrance towards the approved COVID-19 vaccination.[32] The national vaccination roll out for HCWs in SA started on the 17th of February 2021.[10]

Currently there are 13 COVID-19 vaccines which have been authorised for use, with each having the ability to cause side effects. The messenger RNA (mRNA) vaccines are a type of vaccine which includes Pfizer-BioNTech and Moderna vaccines.[33]

The breakthrough development of the mRNA vaccine for the prevention of COVID-19 has been successful so far with no significant concerns in the on-going phase three of the clinical trials. There have been minor systemic side effects experienced during the first 24-48 hours after the vaccination. Common side effects of a COVID-19 vaccine are minor, such as pain at injection site, redness and swelling and other mild forms of irritation – this is sometimes referred to as Covid arm. However, patients may also experience systemic side effects including symptoms such as fever, fatigue, headache, muscle and joint pain.[33-34]

Anaphylaxis is a rare side effect of vaccinations and occurs when a person has an allergic reaction to one or more ingredients of the vaccine. Allergic reactions to the mRNA and Janssen (Johnson and Johnson) vaccines have been a concern as they contain a chemical ingredient known as polyethylene glycol (PEG) or an ingredient that is structurally similar to PEG - in the case of the Janssen vaccine. This is the first time the ingredient is being used in a vaccine. A study on the allergic reactions of the mRNA vaccine revealed that most individuals who experienced anaphylaxis had a history of allergies and presented with severe reactions. Data also suggests that there

is a low risk of anaphylaxis as a result of mRNA vaccines. However, the CDC recommends that pre-screening be performed for specific allergic reactions.[33]

A study by Rubin reported that in the absence of immune correlates of protection, at most only real-life encounters with the COVID-19 vaccines can provide answers about the vaccines' efficacy against symptoms, complications and fatalities attributable to the SARS-CoV-2 variants.[25] However, other authors stated that there is no conclusive evidence that the mRNA-1273 vaccine provides protection against the P.1, B.1.427/B.1.429, and B.1.351 variants. Their findings highlight the importance of continued monitoring of the virus and evaluating vaccine efficacy against new variants.[35]

If a significant proportion of the population has been vaccinated, herd immunity is achieved, and this makes it difficult for the disease to spread. This provides indirect protection to the population who are vulnerable and unable to receive certain vaccines, curbing the spread of the virus. While the confirmed levels of herd immunity have not been established, scientists predicted SA will reach herd immunity once 67% (40 million) of the population have been immunised.[32,36]

Regarding vaccine hesitancy, studies done in SA and Nigeria reported acceptance rates of 81.6% and 65,2% respectively.[32] A study in North-Central Nigeria reported an acceptance rate of almost 29% and this emphasises the need for more studies to clearly depict COVID-19 vaccine hesitancy in Africa (possibly due to regional and sub-regional variations). On this account, it has been recommended that the African continent should undertake more studies to address COVID-19 vaccine hesitancy.[32]

It would be valuable to investigate the correlation between age and vaccine hesitancy. There appears to be a gap in research regarding this connection, however a study carried out by Lazarus (2020) showed that old age (<50 vs. ≥50) was a significant factor in Canada, Poland, Sweden, and the UK. In China, a reverse trend was observed, with vaccine acceptance reported among the younger individuals. There was no significant difference when comparing respondents aged less than 40 years versus those who were 40 years and older.[37]

Another survey performed in Hong Kong, on the uptake of the influenza vaccine, COVID-19 vaccination intention and vaccine hesitancy among nurses, showed that an older age, among other factors, was associated with a higher influenza vaccine uptake.[38]

CHAPTER 3: METHODOLOGY

3.1 AIMS

The aim of the study was to assess the knowledge and attitudes of South African OHCWs regarding COVID-19, the COVID-19 vaccine, and their related practices.

3.2 OBJECTIVES

The objectives were to:

1. Determine the knowledge, attitudes and practices of OHCWs with regard to COVID-19, and how the virus impacts on their safety.
2. Determine the knowledge and attitudes of OHCWs regarding the COVID-19 vaccines.
3. Determine the willingness of OHCWs (those OHCWs who are trained and qualified to administer vaccinations) to administer the COVID-19 vaccines in their practices.
4. Compare the knowledge of the OHCWs in relation to their age, year of qualification and highest qualification.

3.3 METHOD

3.3.1 Study Design

A cross-sectional analytical online survey was used. It contained various sections which assessed the knowledge, attitudes and practices of OHCWs regarding COVID-19 and its vaccine.

3.3.2 Study Population

All South African OHCWs registered with the Health Professions Council of South Africa (HPCSA) in 2022.

3.3.3 Study Setting

The study was conducted among OHCWs who are currently in practice in the private and public sectors, the military sector and those employed in the dental teaching hospitals, within all nine provinces of SA.

3.3.4 Inclusion Criteria

- OHCWs who were registered with the HPCSA in 2022. This included dental specialists, general dentists, dental therapists, dental hygienists as well as dental assistants.

3.3.5 Exclusion Criteria

- OHCWs who did not have access to electronic media.

3.4 SAMPLING

Data was collected during June and July 2022. All OHCWs registered on the Med-Bay data base were invited to participate. Participants received the survey via Med-Bay. The first e-mail was sent out on the 23rd of June 2022 and two reminder emails followed approximately three weeks apart.

When contacting individual organizations and colleagues, those who were registered on Med-Bay were excluded to avoid duplication. Those employed at dental teaching hospitals were contacted personally through the chief executive officer (CEO) and heads of departments.

The person in charge of the dental military wing was contacted and was asked to share the survey with all OHCWs employed within the military.

The administrators of various dental, oral hygiene and dental therapy WhatsApp groups were contacted and asked to share the questionnaire on their respective platforms. Based on the number of OHCWs registered with Med-Bay, the Oral Hygienists' Association of South Africa (OHASA), the South African Dental Therapy Association (SADTA) and those received from the various oral healthcare places of work, associations and social media groups, there was a total of 3949 individuals.

With the confidence interval of 5%, the minimum sample size required was 197.

3.5 DATA COLLECTION TOOLS

An English, custom modified survey instrument was developed. It was an anonymised online survey which included questions from existing questionnaires, which were relevant to this study, and also questions adapted from a few previous studies to fit the purpose of this study.[23,39-42]

The survey was a structured multiple-choice questionnaire of 48 closed questions. It required approximately ten minutes to complete. It consisted of four sections: Sections A, B, C, and D. Section A (questions 1 to 8) collected demographic data. Section B (questions 9 to 21) assessed the knowledge of COVID-19 and its vaccine. Section C (questions 22 to 38) assessed the attitudes towards COVID-19 and its vaccine. Section D (questions 39 to 48) recorded the practices regarding COVID-19.
There were 14 multiple choice and true/false questions on general knowledge about COVID-19. The 14 questions had 18 correct answers. Some of these 14 questions had two correct answers. In the questions with two correct answers, OHCWs were scored two points for marking both correct options and one point for marking one correctly.

Med-Bay was contacted and briefed about the study. They could not disclose their member's personal information but agreed to circulate the survey to the OHCWs that were registered with them.
The dental departments of the following institutions were contacted - University of the Western Cape, University of the Witwatersrand, University of Pretoria, Sefako Makgatho Health Sciences University and the University of KwaZulu-Natal. They were requested to distribute the survey within their dental departments. In addition, OHASA and SADTA were contacted and asked to distribute the survey on their platforms.
Dentists and allied dental practitioners belong to many dental WhatsApp groups. The administrators of these WhatsApp groups were contacted and also informed about this study. They were kindly asked to circulate the brief about this study with their group members. This study complied with the Protection of Personal Information Act (POPIA). Participants decided if they wanted to accept or decline the invitation.

Qualtrics data capturing system was used which ensured anonymity and a link to the electronic questionnaire was distributed via e-mail and WhatsApp. For participants not responding, e-mail or WhatsApp links were resent – in order to achieve an adequate response rate. To ensure compliance with POPIA, all participants were informed that their personal information would not be saved on any server that could be accessed through the internet and all personal data would be saved on a password protected hard-drive locked in a filing cabinet which required a key or an access code, thereby ensuring security and no sharing of personal information.

3.6 DATA ANALYSIS

Each questionnaire was assigned a unique serial number. Since Qualtrics was used to collect data, it was then exported to Statistical Package for the Social Sciences (SPSS) version 28 for analysis. Quantitative variables were summarized as proportions, frequencies, and means with their standard deviations, ranges and percentages. The Chi-square test was used to evaluate the association between variables. Analysis of variance (ANOVA) and Kruskal–Wallis tests was used to compare the continuous data and mean age score. The level of significance was set at $p<0.05$.

3.7 ETHICAL CONSIDERATION

Ethical clearance and permission to conduct the study was obtained from the University of Pretoria, Research Ethics Committee of the Faculty of Health Sciences, ethics reference number 699/2021 (Appendix C). The participant consent form (Appendix B) and permission form from the CEO of the Oral and Dental Hospital received ethical clearance. All information was strictly confidential.

CHAPTER 4: RESULTS

The response rate, demographic characteristics and results alluding to the objectives are presented in this chapter.

4.1 RESPONSE RATE AND DEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS

A total sample of 3949 OHCWs met the criteria and were invited to participate in the study. Of these, 327 (8.3%) responded and were included in the study. The mean age of the participants was 43 years (SD= ±12.23; 20-76). The sample size varies as not all respondents answered all the questions.

The demographic information is summarized in table 1.

TABLE 1: DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS (N=327)	
VARIABLE	**n (%)**
Age group (n=321)	
20-29	46(14)
30-39	114(36)
40-49	70(22)
50-59	54(17)
60+	37(11)
Total	**321(100)**
Obtained latest qualification (n=324)	
1975-1984	15(4.6)
1985-1994	36(11.1)
1995-2004	43(13.3)
2005-2014	112(34.6)
2015-2021	112(34.6)
2022	6(1.9)
Total	**324(100)**
Province(s) in which currently employed (n=325)	
Eastern Cape	19(6)
Free State	0(0)
Gauteng	**179(55)**
KZN	28(8)
Limpopo	3(1)
Mpumalanga	5(2)
Northern Cape	4(1)
Northern West	6(2)
Western Cape	**77(24)**
Not practicing in SA	4(1)
Total	**325(100)**
Post-graduate qualification(s) (n=136)	
Diploma	75(55)
Master's	43(32)
Recognised specialisation	18(13)
Total	**136(100)**

The majority of participants received their latest qualification between 2005 and 2021 with only 1.9% who completed in 2022.

The majority of participants (60%) were general dentists, 16% oral hygienists, 11% dental assistants, 9% dental specialists and 4% dental therapists (Figure 1).

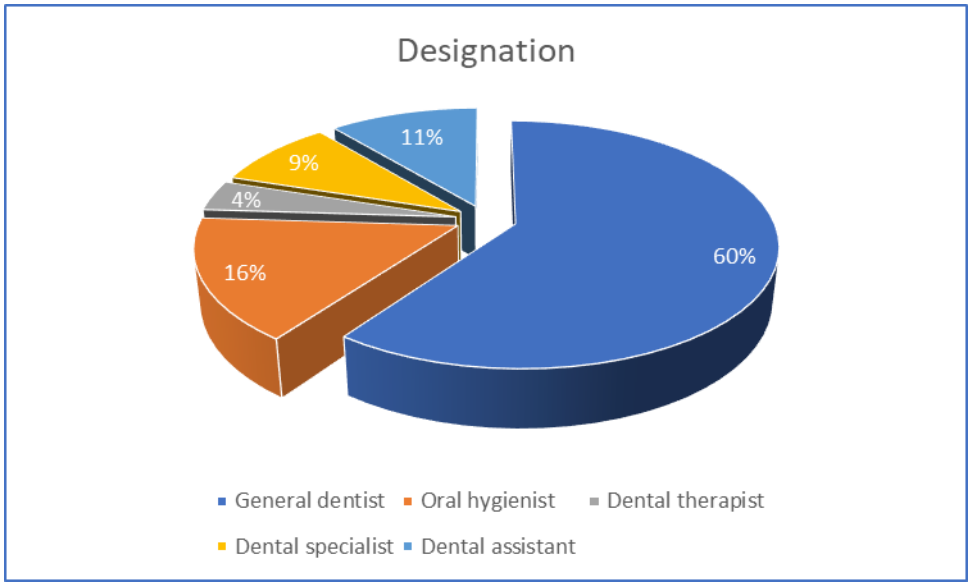

FIGURE 1: Designation

More than half (55%) of the respondents were from Gauteng followed by 24% from the Western Cape respectively.

From the total sample, 136 reported to have additional postgraduate qualifications. Of these, 55% had a diploma, 32% a Master's and 13% had a recognised specialisation (Figure 2).

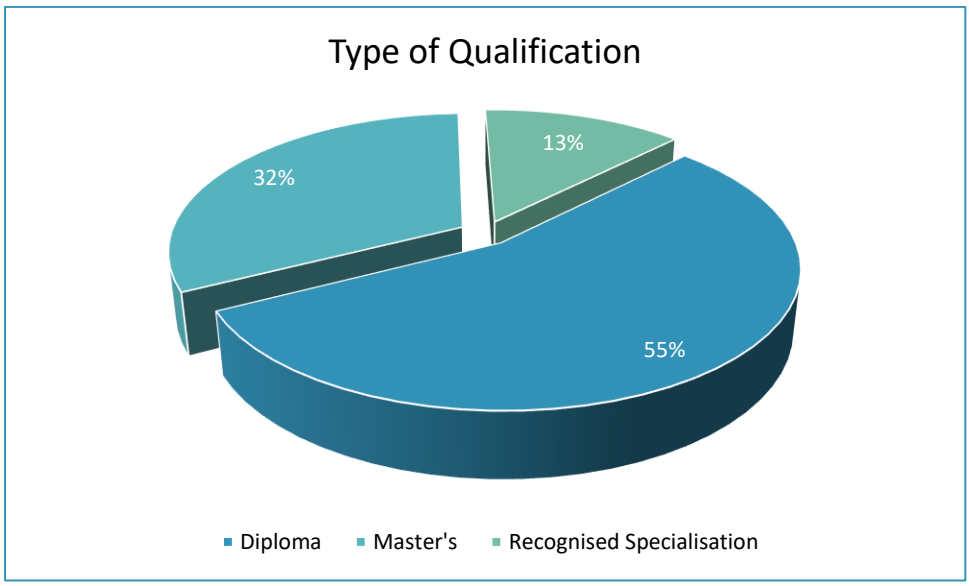

FIGURE 2: Type of qualification

The breakdown of the various working sectors is displayed below. The majority of participants were employed in the private (57%) and academic (24%) sectors (Figure 3).

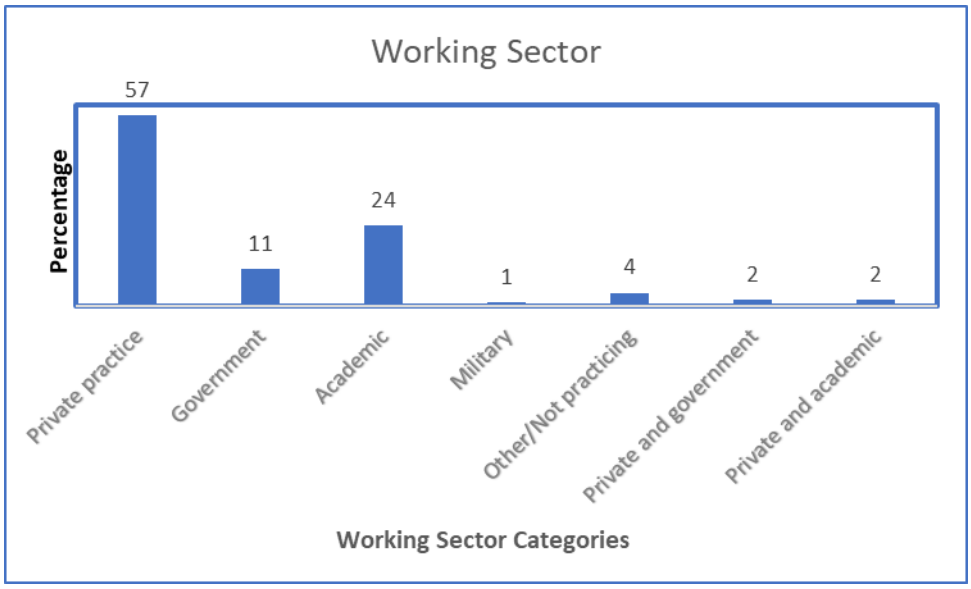

FIGURE 3: Working sector

4.2 KNOWLEDGE OF OHCWS REGARDING COVID-19 AND ITS VACCINE

4.2.1 Knowledge regarding COVID-19

The first research objective in this study was to determine the level of knowledge of OHCWs regarding COVID-19. ‘’Poor’’ knowledge was defined as a score of zero to seven or less, ‘’average’’ as eight to eleven and ‘’excellent’’, more than twelve. The possible range was zero to eighteen. The mean score was 13 (SD= ±2.11) and the median was 14.0. None of the respondents answered all 13 questions correctly. The majority (79.8%) had ‘’excellent’’ knowledge scores and less than 2% had a ‘’poor’’ knowledge score. Given this, only 19% of participants answered correctly when asked about the types of human coronaviruses that have been identified.

4.2.2 Knowledge regarding COVID-19 vaccine

There were four questions related to the knowledge of COVID-19 vaccines. Each of the four questions had one correct answer. The minimum score was zero and the maximum a possible of four. The mean score was 2.6 (SD= ±0.76) with the majority (63%) having a score of three and 20% a score of two.

The distribution of answers to the knowledge questions are displayed below (Table 2).

TABLE 2: KNOWLEDGE OF OHCWS REGARDING COVID-19 AND ITS VACCINE N (%)				
VARIABLE	**Correct**	**Incorrect**	**Unsure**	**Total**
How many types of human coronaviruses were identified?	61(19)	147(45)	117(36)	325(100)
What is the official name of the virus responsible for causing COVID-19?	275(85)	24(7)	25(8)	324(100)
Experts believe that the original COVID-19 strain originated from bats	255(79)	27(8)	42(13)	324(100)
COVID-19 is primarily spread from person-to-person through respiratory droplets and close person-to-person contact	315(97)	4(1)	7(2)	326(100)
The population group most at risk of contracting COVID-19 are:				
Elderly	224(69)	103(31)		327(100)
Individuals with immunocompromised conditions-cancer, diabetes, chronic kidney disease, heart conditions, COPD	262(80)	65(20)		327(100)
Children	47(14)	280(86)		327(100)
Medical personnel	131(40)	196(60)		327(100)
Young adults	48(15)	279(85)		327(100)
The most common symptoms of COVID-19 are:				
Fever, chills and dry cough	297(91)	30(9)		327(100)
Conjunctivitis	27(8)	300(92)		327(100)
Diarrhoea	131(40)	196(60)		327(100)
Skin rashes	30(9)	297(91)		327(100)
Shortness of breath and difficulty breathing	284(87)	43(13)		327(100)
Headaches and nausea	192(59)	135(41)		327(100)

Loss of taste and/or smell	287(88)	40(12)		327(100)
Loss of appetite	100(31)	227(69)		327(100)
One may develop symptoms between 1 and 14 days after coming into contact with an infected person	59(18)	250(77)	15(5)	324(100)
How would you manage yourself or a COVID-19 positive family member?				
Take a course of antibiotics	43(96)	2(4)		45(100)
Make use of traditional remedies	38(12)	289(88)		327(100)
Supportive at home care such as drinking fluids, taking over the counter medication for fever, taking multivitamins	287(88)	40(12)		327(100)
Take the COVID-19 vaccine	85(26)	242(74)		327(100)
Consult a GP	199(61)	128(39)		327(100)
Not sure	1(0)	326(100)		327(100)
	Yes	**No**	**Maybe**	**Total**
Do you know about the COVID-19 vaccines?	322(99)	3(1)		325(100)
Do you think the COVID-19 vaccines will benefit the general population?	241(74)	27(8)	57(18)	325(100)
Do you think the COVID-19 vaccines are vital in preventing the spread of the virus?	219(67)	52(16)	54(17)	325(100)
	Yes	**No**	**I don't know**	**Total**
Do vaccinations increase risk of allergic reactions?	61(19)	152(47)	111(34)	324(100)

The various manners in which COVID-19 transmission can be prevented is displayed below (Figure 4).

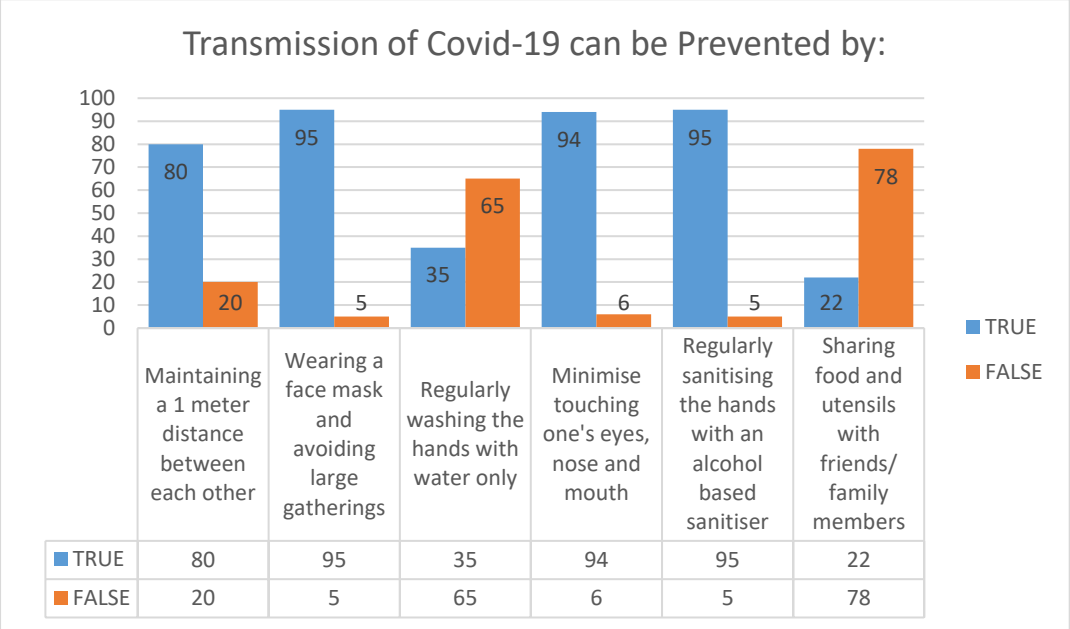

FIGURE 4: Preventative measures of COVID-19

The knowledge score was combined and calculated by adding the COVID-19 knowledge score to the vaccine score. The minimum total score was zero and the maximum was twenty-two. These scores were categorised as “poor”, ‘’average’’ and ‘’good’’. ‘’Poor’’ was defined as a score of zero to seven, ‘’average’’ between eight and fifteen and ‘’good’’, above sixteen. No one (0%) scored poorly, while 40% scored ‘’average’’ and 60% recorded a score of ‘’good’’ (Table 2.1).

TABLE 2.1: KNOWLEDGE SCORES OF OHCWS

Knowledge category	Score	N (%)
Poor	1-7	0 (0%)
Average	8-15	125(40%)
Good	16+	187(60%)
Total		**312(100%)**

4.2.3 The correlation of the knowledge of OHCWs with their age

There was no statistically significant difference between the knowledge categories and the ages of the participants (p=0.165). The mean age of the participants who were in the “average” and “good” categories was 43 and 42 years respectively.

4.2.4 The correlation of the knowledge of OHCWs with their year of qualification

The year of qualification was calculated by subtracting the year they graduated from 2022, which was the year in which the study was conducted. On average, the participants have qualified for 14 years (SD= ±11.41) with the maximum being 47 years. The mean number of years of qualification for those with an ‘’average’’ score was 15.6 years (SD= ± 12.03) and for those with ‘’good’’ knowledge was 12.76 (SD= ± 10.5) and this was statistically significant (p=0.029). Those participants who had a ‘’good’’ knowledge score tended to graduate more recently than those with an ‘’average’’ score (Table 2.2).

TABLE 2.2: KNOWLEDGE SCORES OF OHCWS COMPARED TO THEIR YEAR OF QUALIFICATION n(%)

		Knowledge category		Total	P value*
		Average	Good		
Year of qualification	1975-1984	6(50)	6(50)	12(100)	0.029
	1985-1994	20(56)	16(44)	36(100)	
	1995-2004	18(45)	22(55)	40(100)	
	2005-2014	39(36)	68(64)	107(100)	
	2015-2021	41(38)	67(62)	108(100)	
Total		**124(100)**	**179(100)**	**303(100)**	

*Chi-Square test

4.2.5 The correlation of the knowledge of OHCWs with highest qualification

Irrespective of the postgraduate qualification or lack thereof, the majority of respondents had “good” scores compared to ‘’poor’’ scores (p=0.041). However, those with recognised specialities had a significant number of “good” scores compared to “average” scores (Table 2.3).

TABLE 2.3: KNOWLEDGE OF OHCWS COMPARED TO THEIR TYPE OF QUALIFICATION							
		No postgraduate qualification	**Diploma**	**Master's**	**Recognised specialisation**	**Total**	**P value***
Knowledge Category	Average	77(42%)	27(40%)	19(44%)	2(11%)	125	0.041
	Good	107(58%)	40(60%)	24(56%)	16(89%)	187	
Total		**184 (59%)**	**67(21%)**	**43(14%)**	**18(6%)**	**312**	

*Chi-Square test

4.3 ATTITUDES OF OHCWS REGARDING COVID-19 AND ITS VACCINE

Out of the 325 responses, over half (57%) of the participants perceived COVID-19 as moderately dangerous, 26% perceived it as very dangerous and 38% believed it was not a serious public health issue.

Almost half (41%) of participants perceived COVID-19 to be as dangerous as SARS and MERS. Over 90% of participants believed that educating people around COVID-19 was important in preventing the spread of the virus. More than two-thirds (68%) of participants preferred to avoid working with a COVID-19 positive patient. Nearly 90% of respondents were vaccinated against COVID-19. Many of the respondents who chose not to vaccinate did so as they were worried about the possible adverse effects of the vaccines and felt there is not sufficient knowledge about the vaccines. Out of the 87% of OHCWs who received the vaccine, more than half (58%) experienced side effects – the common side effects being pain at the injection site and fatigue.

4.3.1. The willingness of OHCWs to administer COVID-19 vaccines

By expanding the scope of practice to include vaccinations as part of dental services will reduce the burden on state facilities. However, it is important to ascertain the willingness of OHCWs to administer the vaccines and willingness of patients to receive vaccines administered by OHCWs.

With regards to willingness to administer COVID-19 vaccines, if allowed, 65 participants were willing to administer the vaccines, and of these, 20% cited it would help to increase the public vaccination rate. For the 19% not willing to administer the vaccines, their reason was that it was not within their scope of practice or work and they are not and/or not willing to be trained in administering vaccines extra-orally. Only

36% felt that their patients would be willing to receive a COVID-19 vaccine administered by them.

Over 70% of respondents felt that the vaccines administered in SA (Pfizer and Johnson and Johnson) were safe and the vaccines were essential for OHCWs, 77% would encourage their family and friends to be vaccinated and close to 90% felt that the vaccines should be fairly distributed to the population.

The distribution of answers for the attitude questions are displayed below (Table 3).

TABLE 3: ATTITUDES OF OHCWS REGARDING COVID-19 AND ITS VACCINE N(%)

VARIABLE	TOTAL
How do you perceive COVID-19? (n=325)	
Very dangerous	85(26)
Moderately dangerous	185(57)
Not dangerous	55(17)
Total	**325(100)**
How do you perceive COVID-19 compared to Severe Acute Respiratory Syndrome (SARS)? (n=320)	
Less dangerous	90(28)
More dangerous	102(32)
The same	128(40)
Total	**320(100)**
How do you perceive COVID-19 compared to Middle East Respiratory Syndrome (MERS)? (n=318)	
Less dangerous	93(29)
More dangerous	94(30)
The same	131(41)
Total	**318(100)**
I believe COVID-19 is not currently a serious public health issue (n=325)	
Yes	123(38)
No	175(54)
I don't know	27(8)
Total	**325(100)**
Educating people about COVID-19 is important to prevent the spread of the disease (n=326)	
Yes	311(95)
No	13(4)
I don't know	2(1)
Total	**326(100)**

I prefer to avoid working with a patient who is suspect of having COVID-19 (n=324)	
Yes	221(68)
No	103(32)
Total	**324(100)**
Are you vaccinated against COVID-19? (n=326)	
Yes	283(87)
No	43(13)
Total	**326(100)**
If not, why? (n=259)	
There isn't sufficient knowledge about the vaccines	36(14)
Mistrust in elected officials	17(7)
Vaccines developed and rolled out in record time	23(9)
Conspiracy theories	10(4)
Religious reasons	12(5)
Worried about the possible side effects of the vaccines	40(15)
Uniqueness of the virus	9(3)
Inconvenience	5(2)
I am vaccinated	107(41)
Total	**259(100)**
If you have been vaccinated against COVID-19, did you experience any side effects? (n=318)	
Yes	186(58)
No	89(28)
Not applicable	43(14)
Total	**318(100)**
If yes, what side effects did you experience? (N=186)	
Pain at injection site	159(48.6)
Fever	87(46.7)
Headaches	100(53.8)
Fatigue	103(55.4)
Body aches	97(52.2)
Not applicable	77(23.5)
Are you qualified to administer COVID-19 vaccines? (n=322)	
Yes	44(14)
No	278(86)
Total	**322(100)**
If yes, would you be willing to vaccinate the public if allowed? (n=244)	
Yes	65(27)
No	46(19)
Maybe	15(6)
Not applicable	118(48)

Total	**244(100)**
If yes to above, why? (n=284)	
It will help to increase the public vaccination rate	58(20)
I believe I am successfully trained/am willing to be trained to administer vaccines extra-orally	36(13)
I would like to be an integral part of curbing the spread of COVID-19	38(13)
It will alleviate some of the burden on current vaccination networks	35(12)
Extra income	16(6)
All of the above	15(5)
Not applicable as I am not in practice	86(31)
Total	**284(100)**
If no, why? (n=298)	
I am not sufficiently trained to administer vaccines extra-orally/am not willing to be trained	87(29)
It is not within my scope of work	96(32)
It takes up too much valuable time	19(6)
Don't want my practice to be a place of risk	17(6)
Not monetarily worth it	12(4)
Not applicable as I am not in practice	67(23)
Total	**298(100)**
Do you think your patients would be willing to receive a COVID-19 vaccine administered by you? (n=322)	
Yes	116(36)
No	34(11)
Maybe	107(33)
Not applicable	65(20)
Total	**322(100)**
Do you feel that the following vaccines used in SA are safe?	
Johnson and Johnson (n=323)	
Yes	230(71)
No	36(11)
Unsure	57(18)
Total	**323(100)**
Pfizer (n=317)	
Yes	227(72)
No	34(11)
Unsure	56(17)
Total	**317(100)**
Is the COVID-19 vaccine essential for OHCWs? (n=324)	
Yes	248(77)
No	49(15)
Undecided	27(8)
Total	**324(100)**

I will encourage my family/friends/patients to get vaccinated (n=324)	
Yes	249(77)
No	47(15)
Undecided	28(8)
Total	**324(100)**
The COVID-19 vaccine should be fairly distributed to everyone (n=321)	
Agree	285(89)
Disagree	14(4)
Undecided	22(7)
Total	**321(100)**

4.4 PRACTICES OF OHCWS REGARDING COVID-19

The majority (96%) of the respondents, reported to follow the recommended infection control policies in their practices and had various infection control measures at their workplace to reduce viral transmission. The most common practices were to wear masks at all times up until the time of consulting and making use of PPE and waterless alcohol sanitiser. Of the respondents, 82.3% reported to implement PPE, with 88.1% stating that they ensured their staff and patients were masked up until the time of consulting. With regard to challenges in implementing infection control methods and creating awareness about COVID-19 only 17% of respondents stated that they experienced resistance from their patients and/or staff regarding infection control methods. Nearly 60% of respondents said that they would continue with treatment if a patient was sneezing or coughing in their clinic and then refer the patient for COVID-19 testing.

More than 90% of respondents believed that asking patients to practice social distancing, to wear masks while in the waiting room and to practice hand hygiene prior to receiving dental treatment was required and helped reduce disease transmission.

If dental staff presented with flu-like symptoms, 80% stated that they would not allow those staff members to work.

Almost two-thirds (60%) of participants believed that the role of the dentist in teaching others about COVID-19 is very significant and only two percent believe it is not significant at all.

This distribution of answers for the practice questions are shown below (Table 4).

TABLE 4: PRACTICES REGARDING COVID-19 N(%)	
VARIABLE	**TOTAL**
Do you follow the recommended infection control protocol in your practice? (n=321)	
Yes	308(96)
No	6(2)
Sometimes	7(2)
Total	**321(100)**
What infection control measures have you implemented at your workplace to reduce the transmission of COVID-19? (n=327)	
Barriers and personal protective equipment (PPE)	269(82.3)
Staff and patients to wear masks at all times up until time of consulting	288(88.1)
UV light	33(10.1
Air purifiers	94(28.7)
Redesign of waiting room to encourage social distancing	226(69.1)
Completing a screening tool prior to their appointment	210(64.2)
Temperature check on arrival	181(55.4)
70% waterless alcohol sanitiser	265(81)
All of the above	58(17.7)
Do your patients and/or staff create challenges for you when it comes to implementing infection control methods and creating awareness about COVID-19? E.g. Are they reluctant to wear masks and sanitise or negligent about the severity of the disease? (n=317)	
Yes	53(17)
No	200(63)
Sometimes	64(20)
Total	**317(100)**
In case a patient was sneezing or coughing in your clinic, what would you do? (n=310)	
Refuse to treat the patient and ask him/her to leave the clinic and have themselves tested for COVID-19 before coming for treatment	128(41)
Treat the patient and ask him/her to go for a COVID-19 test after being treated	182(59)
Total	**310(100)**
I believe that asking patients to sit far from each other, to wear masks while in the waiting room and wash hands before getting into the dental chair is: (n=317)	
Necessary and helps to decrease disease transmission	294(93)
Not necessary and could cause panic	23(7)
Total	**317(100)**
Would you allow any of your dental staff to work with patients if they present with flu-like symptoms? (n=320)	
Yes	65(20)
No	255(80)
Total	**320(100)**

The role of the dentist in teaching others about COVID-19 is: (n=321)	
Very significant	193(60)
Moderately significant	83(26)
Mildly significant	40(12)
Not significant at all	5(2)
Total	**321(100)**

CHAPTER 5: DISCUSSION

This was a cross-sectional study that was carried out during the COVID-19 outbreak and provides insight into the knowledge and attitudes regarding COVID-19 and its vaccine among South African OHCWs and also assess their practices around COVID-19 and their willingness to administer the vaccines at their workplace.

5.1 RESPONSE RATE AND DEMOGRAPHIC CHARACTERISTICS OF THE STUDY PARTICIPANTS

Of the 3949 OHCWs who were invited to participate, the response rate was 8.3%.

The reason for this low response rate may be as a result of survey fatigue as OHCWs may have had increased requests to complete COVID-19 related surveys during a short span as data needed to be collected and analysed within a limited period in order to keep the topic relevant.

This declining response rate was found to be similar to COVID-19 studies performed in Jordan (2020), Saudi Arabia (2020) and Turkey (2020), which also showed low response rates and a reason mentioned was also the short period for data collection.[23,40,43]

Another reason for the limited response rate in this study could be that the length of the questionnaire was too long, influencing respondent fatigue and also the lack of time available due to increased workloads which includes administrative responsibilities. The on-going loadshedding crisis in SA could have also contributed to the small sample size since the survey required to be completed online and many may have not had internet access when they had spared the time to complete the survey.

There have been reports from previous studies among health professionals regarding their low response rates for online surveys.[44] The above-mentioned reasons for the small sample size in turn may have resulted in biased results and limited generalised findings.

This low response rate was addressed by sending reminder emails and communicating with academics directly.

The mean age of the participants was 42 (SD= ±12) years. In another similar study, on HCWs in SA, the mean age was 39 years, which is comparable to the mean age in

this study.[2] These ages are considered to be relatively older, compared to a study carried out in Nepal where the mean age was 28.24 (SD= ±6.11) years.[39] This could be due to the fact that the authors had access to academic institutions – where most of the participants are of a younger age. In SA, possibly the older OHCWs are registered with Med-Bay – the database through which the sample size was calculated from.

Majority of the participants received their latest qualification between 2005 and 2021, with only 1.9% who completed in 2022.

With regard to professional designation, only 9% of our sample were dental specialists and the majority (60%) were general dentists. The percentage of specialists in this study was much smaller than was reported in two other similar published literature of which one of these studies was conducted in Lebanon and the other was a multi-country survey. The percentage of dental specialists in these two studies were 61.2% and 84.8% respectively.[13,20] A possible reason could be as this study included all OHCWs whereas the Lebanese study and the multi-country survey were carried out among dentists only.

In relation to the province in which OHCWs were employed, more than half (55%) of the respondents were from Gauteng followed by 24% from the Western Cape and 9% from KZN respectively. This can be explained as all four of the institutions where dentistry is offered in SA is located in either Gauteng or the Western Cape. Oral hygiene is offered at all four institutions where dentistry can be studied, as well as in KZN. Dental therapy is offered in KZN and Gauteng. The Western Cape and KZN are of the higher populated provinces in SA and also more urbanised resulting in the reason why more OHCWs reside in theses provinces.

More than half (57%) of the participants were in private practice, 2% in private and government and 2% in private and academic. There was only 1% working in the military sector.

This is a depiction of the maldistribution of the OHCWs in SA as the public sector has employed approximately only 20% of dentists in the country who cater to almost 80% of the total South African population.[45]

About 60% of the participants in this study were working in private practice. There was only 1% working in the military sector. This was contrary to a study performed in Saudi Arabia among dentists where 11.2% of OHCWs were in private practice and 13.8% in military.[23] The reason could be that this study included dental therapists and oral hygienists of which most of them are in private practice. This is based on a study conducted in 2015 on job satisfaction and working practices of South African dental therapists and oral hygienists where 41.6% of dental therapists were self-employed and 36% in the public sector, whereas among the oral hygienists, 41.7% were in general practice, 33.8% in specialist practice and only 9.8% in the public sector.[46]

Postgraduate qualifications

In our study 55% of OHCWs have a diploma, 32% a Master's degree and 13% a recognised specialisation. A study conducted in Jordan reported that 30.4% of their study participants had completed a Master's or residency program which is on par with this current study.[40] In today's competitive job market, OHCWs in SA are also not spared and many feel the pressure to further their education in order to secure jobs which could explain why over half of the respondents have a diploma. Although our sample targeted OHCWs, most (60%) of our participants were general dentists and in SA, according to a study published in 2017 only 20% of general dentists were employed in the public sector.[45] This study conveys similar results where only 11% of participants were employed in the public sector. Over half (57%) were employed in the private sector and 24% in academics (taken into consideration that this study included other OHCWs). A Master's degree is most often required for jobs in the academic sector as opposed to the private and public sectors and this could explain why there is a low percentage of participants who hold a Master's degree – as the percentage employed in the academic sector is relatively low. The limited number of training posts and insufficient funding may also play a role as to why there are not many participants who hold a Master's or speciality degree.[45]

5.2 KNOWLEDGE OF OHCWS REGARDING COVID-19 AND ITS VACCINE

Knowledge regarding COVID-19

This study evaluated the level of knowledge of OHCWs by allocating them a score out of 18. There were 14 questions on knowledge of COVID-19 and 18 correct answers as some of these 14 questions had 2 correct answers. The majority (79.8%) of OHCWs had excellent knowledge scores. This is comparable to studies in Nepal and China

which reported that 81.5% and 89% of respondents demonstrated sufficient knowledge scores around COVID-19.[39,47] Since this current study was conducted in 2021, by this time, OHCWs were aware about most of the information related to COVID-19, as they had to prepare to respond to the pandemic which was ongoing at the time.

Knowledge regarding COVID-19 Vaccine

There were four questions related to the knowledge of COVID-19 vaccines with each of the four questions having one correct answer. The minimum score was zero and the maximum a possible of four. The results of this study showed that the vaccine knowledge among OHCWs was above average.

Of our respondents, 99% were aware of the vaccine, 74% believed that the COVID-19 vaccines would benefit the general population and 67% thought that the COVID-19 vaccines were vital in preventing the spread of the virus. This is similar to an Indonesian study, which reported that all dental respondents were aware and wanted to learn about the vaccines for themselves and to educate their patients.[48] Less than 20% of our respondents believed that vaccinations increase the risk of allergic reactions. There were participants in both the current study as well as in the Indonesian study, who were concerned about the vaccines having side effects.[48] The scepticism and negative perceptions towards the vaccines may have been related to clinical trials of the vaccines which provided conflicting results in some countries resulting in confusion and public distrust.[49]

5.3 ATTITUDES OF OHCWS REGARDING COVID-19 AND ITS VACCINE

More than half (57%) of the study participants perceived COVID-19 as moderately dangerous. About a quarter (26%) of our respondents perceived COVID-19 as very dangerous and a similar percentage of participants believed that it is less dangerous than SARS and MERS. Over a third (38%) considered it not to be a serious public health issue.

These findings can be compared to two similar studies carried out in Jordan (2020) and Saudi Arabia (2020) on COVID-19 among dentists, where in the Jordanian study, 71.7% of their participants viewed COVID-19 as moderately dangerous and almost one-third believed COVID-19 was not a serious public health issue whereas in the

Saudi Arabian study, 57% of respondents perceived COVID-19 to be a very dangerous disease and 89% considered COVID-19 as a serious public health issue.[23,40]

This could be due to the fact that when data was collected in this study, vaccines were readily available which could have resulted in participants being less concerned about the seriousness and severity of the disease as opposed to when the Saudi Arabian study was conducted (2020). At that time, antiviral treatment was explicitly lacking and there were not any vaccines developed for the disease.[23]

In this study, 95% of OHCWs believed that educating people about COVID-19 is important to prevent the spread of the disease. Moreover, 68% of our participants prefer to avoid working with a patient who is suspect of having COVID-19. This was contrary to a study conducted in a Jordan where 82.6% of dentists reported that they prefer to avoid working with a patient who is suspected of being COVID positive.[40]

This study displayed a vaccination rate of 87%. This result can be compared to the findings in an English study conducted on COVID-19 vaccine coverage among HCWs where 89% of the participants were vaccinated.[50]

However, the above results differed from a 2022 study conducted in Cameroon, comparing the COVID-19 vaccination coverage between OHCWs and other HCWs, where a vaccination coverage rate of 34.2% was reported with no substantial discrepancy between the two groups.[51] These findings were similar to the results documented by two studies carried out in 2021, one in Nigeria and the other in China who reported respective vaccination coverage rates of 33% and 34.9% respectively among HCWs.[52-53]

This suggests that among HCWs, which includes OHCWs, the COVID-19 vaccination rates varies across geographic location. The increased mortality and morbidity rates within Europe as well as the implementation of vaccination passes could explain the greater mobilisation for vaccination within European countries.[51]

Among the unvaccinated, contributing factors for vaccine refusal were concerns about possible side effects of the vaccines (15%), insufficient knowledge about the vaccines (14%) and vaccines developed and rolled out in record time (9%). A worldwide study was conducted on COVID-19 vaccine refusal among dentists where similar reasons for vaccine refusal were given, such as lack of scientific literature on the vaccine, concerns about vaccine safety and the speedy development of the vaccine.[54] In another COVID-19 study carried out in the US on vaccine hesitancy among medical

students, the contributing factors to vaccine hesitancy included concerns about serious side effects, lack of trust in the information received from public health experts, politicisation of the vaccine and concerns about the speed of vaccine development impacting the safety of the vaccine.[41]
These above-mentioned reasons for vaccination refusal are in line with the reasons found in this current study.

A systematic review conducted among HCWs worldwide, reported the vaccine acceptance rates to vary between 78% in Israeli doctors to 27% in the Democratic republic of Congo.[32]

More than half (58%) of respondents reported an adverse reaction post vaccination. This result is consistent to a study carried out in Cameroon which reported that adverse events were experienced by 57% of the oral practitioners included in the study.[51]
The most common side effects in the current study were fatigue, followed by headaches, body aches and pain at injection site whereas in the above-mentioned study, the most common adverse event was fever.[51]

Willingness of OHCWs to administer COVID-19 vaccines

The burden on state facilities will be reduced by broadening the confines of practice to include administration of vaccines as part of dental health services, but it is important to ascertain the willingness of OHCWs to administer the vaccines and willingness of patients to receive vaccines administered by OHCWs.
Only 14% of the respondents in this study were qualified to administer COVID-19 vaccines. This could be as this study included dental assistants, who are generally not trained to administer vaccines. The two studies that were analysed regarding dentists administering the COVID-19 vaccine, focused on dentists and nurses but did not include dental assistants.[55-56]
Of the 14% of respondents who are qualified to administer vaccines, 27% said they would be willing to vaccinate the public if allowed to do so. The main reason given was that it would increase the public vaccination rate. For those respondents not willing to vaccinate the public if allowed, their main reason was that it does not fall within their scope of work and that they were not sufficiently trained to administer vaccines extra-

orally and/or were not willing to be trained. This fact varies from the findings reported in an online survey assessing the willingness of dentists in the state of Indiana, US, to administer vaccines – where 58% responded positively when asked if they would consider offering vaccinations in their office. More than half (55%) of the respondents in the Indianian survey agreed that dental providers were competent in administering vaccines and did not require further training.[57] It would be beneficial to all countries if OHCWs could serve as access points for providing COVID-19 vaccines to ensure continued immunity against the virus.

Of the study participants, only 36% believed that their patients would be willing to receive a COVID-19 vaccine administered by them. This value could possibly be low as many of the participants were dental assistants and the administration of local anaesthetic does not fall within their scope of work. Perhaps patients would feel more comfortable receiving vaccines from nurses and medical doctors as opposed to OHCWs. There has been some questionable media reports from Japan, regarding the safety of vaccine administration by dentists but the results from another Japanese study do not support these claims.[55] There is evidence that suggests that vaccine safety can be compared between dentists and nurses.[55]
The findings of this study were contrary to a study conducted in the US where it is possible for dentists to receive authorisation at a state level to administer vaccines during national emergencies. Dentists in Kentucky, US, were authorised to administer COVID-19 vaccines at an ongoing mass vaccination site thus helping achieve the high immunisation rates needed to reach herd immunity against COVID-19.[56]

Just over 70% of the OHCWs felt that the vaccines administered in SA are safe. This could be explained due to the reasons mentioned earlier in the discussion for OHCWs hesitant to receive the vaccine. These reasons included concerns about possible side effects of the vaccines, insufficient knowledge about the vaccines, vaccines developed and rolled out in record time. Other contributing factors were conspiracy theories, religious reasons and mistrust in elected officials.
These findings are similar to another study conducted in SA on how to maximise the uptake of COVID-19 vaccines which found that around one-third of the adult population were hesitant towards the vaccines.[58] The results of this study showed that

there was not much difference in the findings on vaccine hesitancy between the OHCWs and the general adult population of SA.

About three-quarters (77%) of the study participants believed the COVID-19 vaccines are essential for OHCWs and they would encourage their family/friends/patients to get vaccinated. Possibly, this could be because they feel that they are at higher risk for contracting the virus and transmitting it to vulnerable individuals. The concerning rates of mortality and morbidity could explain the considerable inclination towards vaccinations among OHCWs.[51] It has also been reported that there has been a substantial number of COVID-19 related deaths among HCWs globally.[2] As of 7th September 2021, it was reported that over 1300 South African HCWs died as a result of COVID-19 and it is assumed that the total number of HCW deaths is underestimated as it is based on the reporting by hospitals and they do not always include the deceased person's profession.[59] Almost 90% agree that the COVID-19 vaccine should be fairly distributed to everyone.

5.4 PRACTICES OF OHCWS REGARDING COVID-19

Due to the nature of the profession as OHCWs, there is an increased risk for cross infection with SARS-CoV-2 between OHCWs and their patients. This requires implementation of effective measures for successfully preventing and controlling the infection.[60]

Procedures followed during the COVID-19 outbreak showed extremely good standards where 96% of participants followed the recommended infection control protocols in their practices. This fact is reflected in the responses found in similar studies conducted in Saudi Arabia and Nepal where responses were 96.5%, and 84.5% respectively.[39,61]

OHCWs supported that they follow important infection control protocols. They would ensure their staff and patients wear masks at all times up until time of consulting as this was practiced by 88.1% of the participants, and 81% make use of 70% waterless alcohol sanitiser at their place of work. In a Polish study conducted on knowledge and attitudes of dental healthcare professionals during the COVID-19 pandemic, 96.2% of dentists mentioned they provided hand disinfection to the patients and many of them also provided the following at the entrance to their offices: surgical masks, disposable gloves, shoe covers and disposable aprons.[60] These methods have proven to reduce

the spread of the infection.[62] More than half (63%) of the OHCWs do not believe that their patients and/or staff create challenges for them when it comes to implementing infection control methods and creating awareness about COVID-19. The reason could be that during the time the data was collected for this study, the South African government had already addressed the challenges and protocols were implemented to prevent transmission, of which the public were well aware of.

Regarding a case where a patient was sneezing or coughing in their clinic, 41% of respondents would refuse to treat the patient and ask them to leave the clinic and have themselves tested for COVID-19 before returning for treatment. On the other hand, 59% would treat the patient and ask him/her to go for a COVID-19 test after being treated. During the COVID-19 outbreak, OHCWs were advised to evaluate the risk of transmission for every staff and patient as routine procedure. This was performed by recording temperature measurements, health status and any history of recent contact with COVID-19 positive individuals. These values do not vary much from a study carried out among Jordanian dentists on awareness, perception and attitudes regarding COVID-19 and infection control where 43.8% would refer the patient to the hospital prior to commencing any treatment whereas 49.5% would treat the patient and then refer them to the hospital.[40]

The vast majority (93%) of participants believed that asking patients to sit far from each other, to wear masks while in the waiting room and wash hands before getting into the dental chair was necessary and helped to decrease transmission and 80% would not allow any of their dental staff to work with patients if they presented with flu-like symptoms. This indicated that the OHCWs who participated in this study were well aware of the risks posed by not adhering to strict infection control protocols. This fact was reflected by the response of participants in a COVID-19 study carried out among dentists in Jordan where the majority (82.6%) preferred to avoid working with patients suspected of COVID-19 due to the possibility of the disease being transmitted during incubation periods.

More than half (60%) of the participants agreed that the role of the dentist in educating others about COVID-19 was significant. This value is much lower than that found in a Jordanian study where the vast majority (97.8%) of dentists were of the opinion that it

is important in educating others about COVID-19 to prevent the spread of the disease.[40]

As HCWs, dental providers provide support and care for their patients during times of fear, pain or anxiety. Many have spent years fostering relationships with their patients based on compassion and trust. This could explain the reason why the participants agreed that dentists have a meaningful role in enlightening others about COVID-19.

5.5 CONCLUSION

This study focused on the levels of knowledge and attitudes among OHCWs in SA regarding COVID-19 and its vaccines and their practices around COVID-19. It also assessed the willingness of OHCWs to administer the COVID-19 vaccines.

OHCWs are faced with new responsibilities and challenges since the emergence and spread of COVID-19. Some of the key findings regarding South African OHCWs who participated in this study are mentioned.

The majority of the participants demonstrated a ‘’good’’**,** combined knowledge of COVID-19 and the vaccine and are taking preventative measures against the virus.

In general, a positive attitude towards COVID-19 was displayed, however over a third of participants in this study did not consider it a serious public health issue.

Regarding the vaccine attitudes, a vaccination rate of 87% was depicted in this study. Side effects post vaccination was experienced by 58% of the OHCWs. This study contributed towards filling the gap on the information available on vaccine hesitancy in Africa. Some of the participants displayed concerns around the adverse side effects and insufficient knowledge about the vaccine. Another concern was that the vaccine was developed and administered in record time which led to participants being hesitant to vaccinate.

The vast majority of the participants who are qualified to administer vaccines are not willing to vaccinate the public if allowed. Their main reason was that it does not fall within their scope of work and that they are not sufficiently trained to administer vaccines extra-orally and/or are not willing to be trained.

Almost all the OHCWs in this study have implemented the recommended infection control protocol in their practices.

More than half of the OHCWs that participated in this study said that they would treat a symptomatic patient prior to referring them for a COVID-19 test. This suggests enhancing their knowledge regarding the seriousness of the outbreak.

5.6 RECOMMENDATIONS

It is important that OHCWs are part of future vaccination processes. Efforts should be taken to train OHCWs to administer vaccines during emergency outbreaks as noted during the height of the COVID-19 pandemic when there were not sufficient HCWs to administer the vaccines.

The vaccination hesitancy demonstrated among participants warrants further studies and evaluation into its efficacy and side effects as this could improve vaccination uptake with other similar outbreaks. Perhaps, also developing tailored strategies to address concerns regarding the vaccine will be beneficial.

5.7 LIMITATIONS

This study was subjected to several limitations. A prolonged response rate of the participants was a concern as this reduced the available time left for completion of the study. To overcome this, electronic links to the questionnaire were sent to potential participants on more than one occasion either via e-mail or via WhatsApp. Unique identifiers were assigned to each questionnaire to avoid duplicate entries from the same respondent.

Initially, the HPCSA database of OHCWs was requested but due to the poor response from the HPCSA, Med-Bay was contacted and provided their database.

Although there were many responses around the attitudes and practices of OHCWs, a shortcoming was that this data can be challenging to measure. Therefore, the correlation between the attitudes and practices with knowledge, respectively, could not be calculated. Even though the knowledge scores may be high, the attitudes and practices in this study may be affected by perception, which is immeasurable.

The virus that causes COVID-19, SARS-CoV-2, is changing constantly hence new variants of the virus will continue to emerge.[30,63] Since the beginning of the pandemic, there have been a number of variants including Alpha, Beta, Delta and Omnicron.[30] At the time of compiling the survey for this study, there were no new variants such as Omnicron, however, during data collection it had already started circulating worldwide.[63] The Omnicron variant was first identified in November 2021 and has

many lineages which is spreading globally.[63] The knowledge around COVID-19 and the impact the virus had changed quickly over time and this could have resulted in some of the answers being incorrect at the time the data was collected.

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APPENDIX A: Data Collection sheet

I, Zahra Chothia, am currently enrolled to do my MSc in Community Dentistry, at the University of Pretoria and I am required to do research as part of my MSc fulfilment. I am conducting a study on knowledge, attitudes and practices of South African oral healthcare workers towards COVID-19 and its vaccine. You are invited to volunteer to participate in our research project. We would like you to complete a questionnaire which may take around 5 to 10 minutes. Your questionnaires will be completely confidential and is voluntary and you can refuse to participate or stop at any time without providing reason/s.

	SECTION A: DEMOGRAPHICS / SUBJECT PROFILE **Please tick the appropriate box(es) where required.**		
1.	How old are you in years?	_____	
2.	In which year did you obtain your latest qualification?	_____	
3.	What is your current registration with the Health Professions Council of South Africa (HPCSA)?	❑ General dentist ❑ Oral hygienist ❑ Dental therapist ❑ Dental specialist ❑ Dental assistant	
4.	Province(s) in which you are currently practicing or employed? Mark all that apply.	❑ Eastern Cape ❑ Free State ❑ Gauteng ❑ KZN ❑ Limpopo ❑ Mpumalanga	❑ Northern Cape ❑ North West ❑ Western Cape ❑ Not practicing in SA
5.	Type of current workplace(s)? Mark all that apply.	❑ Private practice/organisation ❑ Government Institution ❑ Academic Institution ❑ Military ❑ Other/Not currently practicing	
6.	Do you have any post-graduation qualification(s)?	❑ Yes ❑ No	
7.	If yes above, please specify.	❑ Diploma ❑ Master's ❑ Recognised specialisation	
8.	Have you ever had a confirmed diagnosis of COVID-19?	❑ Yes ❑ No	

	SECTION B: KNOWLEDGE ABOUT COVID-19 AND ITS VACCINE **Please tick the appropriate box(es) where required.**	
9.	How many types of human coronaviruses have been identified?	❑ 1 ❑ 4 ❑ 7 ❑ Not sure
10.	The official name of the virus responsible for causing COVID-19 is?	❑ SARS-CoV-2 ❑ SARS-CoV ❑ MERS-CoV ❑ HKU1
11.	Where do medical experts believe that the original COVID-19 strain originated from?	❑ Bats ❑ Birds/Chickens ❑ Humans ❑ Cows/Pigs ❑ Not sure
12.	COVID-19 is primarily spread from person to person through?	❑ Respiratory droplets and close person to person contact ❑ Touching contaminated surfaces ❑ Consuming food that has been contaminated by the virus ❑ Not sure
13.	The population group most at risk of contracting COVID-19 are? Mark all that apply.	❑ Elderly ❑ Individuals with certain immunocompromised conditions such as cancer, diabetes, chronic kidney disease, heart conditions or COPD ❑ Children ❑ Medical personnel ❑ Young adults
14.	What are the most common symptoms of COVID-19, displayed by patients who are infected by the virus? Mark all that apply.	❑ Fever/chills, and dry cough ❑ Conjunctivitis ❑ Diarrhoea ❑ Skin rashes ❑ Shortness of breath and difficulty breathing ❑ Headaches and Nausea ❑ Loss of taste or smell ❑ Loss of appetite
15.	According to Centers for Disease Control and Prevention (CDC), after how many days of coming into contact with an infected person can one develop symptoms?	❑ 2 - 5 days ❑ 1 - 10 days ❑ 1 - 14 days ❑ Not sure
16.	How would you manage yourself or a COVID-19 positive family member? Mark all that apply.	❑ Take a course of antibiotics ❑ Make use of traditional remedies

		❑ Supportive at home care such as drinking lots of fluids, taking over the counter medication for fever, taking multivitamins ❑ Take the vaccine ❑ Consult a GP ❑ Not sure
17.	State whether the following statements are true or false (please circle/tick True or False). Transmission of COVID-19 can be prevented by:	
	•Maintaining a 1 meter distance between each other: True / False •Wearing a face mask and avoiding large gatherings: True / False •Regularly washing the hands with water only: True / False •Minimise touching one's eyes, nose and mouth: True / False •Regularly sanitising the hands with an alcohol based sanitiser: True / False •Sharing food and utensils with friends/family members: True / False	
18.	Do you know about the COVID-19 vaccines?	❑ Yes ❑ No
19.	Do you think the COVID-19 vaccines will be beneficial to the general population?	❑ Yes ❑ No ❑ Maybe
20.	Do you think the COVID-19 vaccines are vital in preventing the spread of the virus?	❑ Yes ❑ No ❑ Maybe
21.	Do vaccinations increase risk of allergic reactions?	❑ Yes ❑ No ❑ I don't know

	SECTION C: ATTITUDE TOWARDS COVID-19 AND ITS VACCINE (including willingness to administer vaccines) **Please tick the appropriate box(es).**	
22.	How do you perceive COVID-19?	❑ Very dangerous ❑ Moderately dangerous ❑ Not dangerous
23.	How do you perceive COVID-19 compared to Severe Acute Respiratory Syndrome (SARS)?	❑ Less dangerous ❑ More dangerous ❑ The same
24.	How do you perceive COVID-19 compared to Middle East Respiratory syndrome (MERS)?	❑ Less dangerous ❑ More dangerous ❑ The same
25.	I believe COVID-19 is not currently a serious public health issue.	❑ Yes ❑ No

		❑ I don't know
26.	Educating people about COVID-19 is important to prevent the spread of the disease.	❑ Yes ❑ No ❑ I don't know
27.	I prefer to avoid working with a patient who is suspected of having COVID-19.	❑ Yes ❑ No
28.	Are you vaccinated against COVID-19?	❑ Yes ❑ No
29.	If not, why? Mark all that apply.	❑ There isn't sufficient knowledge about the vaccines ❑ Mistrust in elected officials ❑ Vaccines developed and rolled out in record time ❑ Conspiracy theories ❑ Religious reasons ❑ Worried about the possible side effects of the vaccines ❑ Uniqueness of the virus ❑ Inconvenience ❑ I am vaccinated
	If you are qualified to administer vaccines, please answer questions 30 to 34. If not qualified, continue to question 35.	
30.	Are you qualified to administer COVID-19 vaccines?	❑ Yes ❑ No
31.	If yes, would you be willing to vaccinate the public if allowed?	❑ Yes ❑ No ❑ Maybe
32.	If yes, why? Mark all that apply.	❑ It will help to increase the public vaccination rate ❑ I believe I am successfully trained/am willing to be trained to administer vaccines extra orally ❑ I would like to be an integral part of curbing the spread of COVID-19 ❑ It will alleviate the burden on current vaccination networks ❑ Extra income ❑ All of the above ❑ Not applicable as I'm not in practice
33.	If no, why? Mark all that apply.	❑ I am not sufficiently trained to administer vaccines extra-orally and/or not willing to be trained

		❑ It is not within the scope of my work ❑ It takes up too much of my valuable time ❑ Don't want my practice to be a place of risk ❑ Not monetarily worth it ❑ Not applicable as I'm not in practice
34.	Do you think your patients would be willing to receive a COVID-19 vaccine administered by you?	❑ Yes ❑ No ❑ Maybe ❑ Not Applicable
35.	Do you feel that the following vaccines being used in South Africa are safe?	Johnson and Johnson ❑ Yes ❑ No ❑ Unsure Pfizer ❑ Yes ❑ No ❑ Unsure
36.	Is the COVID-19 vaccine essential for oral health care workers?	❑ Yes ❑ No ❑ Undecided
37.	I will encourage my family/friends/patients to get vaccinated.	❑ Yes ❑ No ❑ Undecided
38.	The COVID-19 vaccine should be distributed fairly to everyone.	❑ Agree ❑ Disagree ❑ Undecided

	SECTION D: PRACTICES REGARDING COVID-19 AND ITS VACCINE **Please tick the appropriate box(es).**
39.	Do you follow the recommended infection control protocol in your practice? ❑ Yes ❑ No ❑ Sometimes
40.	What infection control measures do you have in place at your place of work to reduce the transmission of COVID-19? Mark all that apply. ❑ Barriers and personal protective equipment ❑ Staff and patients to wear masks at all times up until time of consulting ❑ UV light ❑ Air purifiers

		❑ Redesign of the waiting room to encourage social distancing ❑ Completing a screening tool prior to their appointment ❑ Temperature check on arrival ❑ 70% waterless alcohol sanitiser ❑ All of the above
41.	Do your patients and/or staff create challenges for you when it comes to implementing infection control methods and creating awareness about COVID-19? e.g. Are they reluctant to wear masks and sanitise or negligent about the severity of the disease?	❑ Yes ❑ No ❑ Sometimes
42.	In case a patient was sneezing or coughing in your clinic, what would you do?	❑ Refuse treating the patient and ask him/her to leave the clinic and have themselves tested for COVID-19 before coming for treatment ❑ Treat the patient and ask him/her to go for a COVID-19 test after being treated
43.	I believe that asking patients to sit far from each other, wearing masks while in the waiting room, and washing hands before getting in the dental chair is:	❑ Necessary and helps to decrease disease transmission ❑ Not necessary and could cause panic.
44.	Would you allow any of your dental staff to work with patients if they have flu–like symptoms?	❑ Yes ❑ No
45.	The role of the dentist in teaching others about COVID-19 is:	❑ Very significant ❑ Moderately significant ❑ Mildly significant ❑ Not significant at all
46.	Have you been immunised by the COVID-19 vaccine?	❑ Yes ❑ No
47.	If yes, did you experience any side effects?	❑ Yes ❑ No
48.	If yes, what particular side effects did you experience? Mark all that apply.	❑ Pain at injection site ❑ Fever ❑ Headaches ❑ Fatigue ❑ Body aches ❑ Allergic reaction ❑ Other, please specify: _____

Thank you for taking the time to fill in this questionnaire.

APPENDIX B: Consent form

PATIENT OR PARTICIPANT'S INFORMATION & INFORMED CONSENT DOCUMENT

Researcher's name: Zahra Chothia

Personnel Number: 21818887

Department: Community Dentistry, University of Pretoria

Dear Colleague,

I am a dentist in private practice and currently enrolled to do my MSc in Community Dentistry, at the University of Pretoria. You are invited to volunteer to participate in our research project: **Knowledge, Attitudes and Practices of South African Oral Healthcare Workers Regarding COVID-19 and Its Vaccine.**

This letter provides information to help you decide if you would like to participate in this study. Before agreeing, you should fully understand what is involved in relation to your participation. If you do not understand the information or have any other questions, do not hesitate to contact me. You should not agree to participate unless you have complete comfort with what it is expected of you.

Once the data is collected and analysed, the study might be able to identify gaps in knowledge of oral healthcare workers and show us whether they display any hesitation towards being vaccinated.
These issues will need to be addressed and may help inform future planned interventions.
We would like you to complete a questionnaire which may take around 15 minutes. Your questionnaires will be completely confidential. Please do not write your name on the questionnaire to ensure confidentiality and anonymity. We will be available to help you with the questionnaire or to fill it in on your behalf should it be necessary. Your participation in this study is voluntary and you can refuse to participate or stop at any time without providing reason/s. Once you have returned the questionnaire, you cannot recall your consent. We will not be able to trace your information and as such you will also not be identified as a participant in any publication.

Note: It is implied by completing the questionnaire that informed consent has been obtained from you and thus any information derived from your form may be used for e.g. publication, by the researchers.

We sincerely appreciate your help.

Yours truly,
Dr Z Chothia

APPENDIX C: Ethics approval certificate

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Health Sciences

Institution: The Research Ethics Committee, Faculty Health Sciences, University of Pretoria complies with ICH-GCP guidelines and has US Federal wide Assurance.
- FWA 00002567, Approved dd 18 March 2022 and Expires 18 March 2027.
- IORG #: IORG0001762 OMB No. 0990-0278 Approved for use through August 31, 2023

Faculty of Health Sciences **Research Ethics Committee**

19 January 2023

Approval Certificate
Annual Renewal

Dear Dr Z Chothia,

Ethics Reference No.: 699/2021 – Line 2
Title: Knowledge, attitudes and practices of South African oral healthcare workers regarding COVID-19 and its vaccine

The **Annual Renewal** as supported by documents received between 2023-01-05 and 2023-01-18 for your research, was approved by the Faculty of Health Sciences Research Ethics Committee on 2023-01-18 as resolved by its quorate meeting.

Please note the following about your ethics approval:
- Renewal of ethics approval is valid for 1 year, subsequent annual renewal will become due on 2024-01-19.
- Please remember to use your protocol number (699/2021) on any documents or correspondence with the Research Ethics Committee regarding your research.
- Please note that the Research Ethics Committee may ask further questions, seek additional information, require further modification, monitor the conduct of your research, or suspend or withdraw ethics approval.

Ethics approval is subject to the following:
- The ethics approval is conditional on the research being conducted as stipulated by the details of all documents submitted to the Committee. In the event that a further need arises to change who the investigators are, the methods or any other aspect, such changes must be submitted as an Amendment for approval by the Committee.

We wish you the best with your research.

Yours sincerely

On behalf of the FHS REC, Dr R Sommers
MBChB, MMed (Int), MPharmMed, PhD
***Deputy Chairperson** of the Faculty of Health Sciences Research Ethics Committee, University of Pretoria*

The Faculty of Health Sciences Research Ethics Committee complies with the SA National Act 61 of 2003 as it pertains to health research and the United States Code of Federal Regulations Title 46 and 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes, Second Edition 2015 (Department of Health)

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