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Predictors of Covid-19 vaccination intention among oral health professionals in South Africa

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ABSTRACT

Background

Dentistry is regarded as a high-risk profession due to increased levels of exposure to oral secretions, aerosols and fomites that harbour infectious microorganism. Yet evidence indicates poor uptake of vaccines against HBV and, most recently, Covid-19. This study sought to investigate the predictors of Covid-19 vaccination intention among oral health professionals in South Africa.

Methodology

In 2022, a representative national sample of oral health professionals was surveyed using an online questionnaire. Consenting practitioners provided demographic data, information on vaccination history and five psychological antecedents of Covid-19 vaccine. Data analysis was undertaken using SPSS ver. 29.0

Results

Our findings indicate high vaccination intention rate among the OHPs (77.9%), especially those with history of influenza vaccination (OR=2.65, p=0.003). The was a positive correlation between the 5C psychological antecedents (confidence and collective benefit) and intention to vaccinate. Positive Covid-19 diagnosis did not affect vaccination intention.

Conclusion

Most oral health professionals intended to get the Covid-19 vaccination. For those showing low willingness to vaccinate, psychological antecedent factors such as complacency and calculation should be addressed to improve vaccination intention and uptake.

Keywords

Covid-19, vaccination intention, oral health professionals, 5C psychological antecedents

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INTRODUCTION

Vaccines are regarded among the most effective public health interventions against infectious diseases.[1] However, there has been a worldwide rejection, refusal and hesitancy to take up this preventative intervention.[2] Unlike the general population, health professionals understand the benefits and risks associated with immunisations. Consequently, a significantly higher proportion of health professionals should vaccinate and advocate for mass immunisation. However, studies suggest that health professionals are hesitant to immunise.[3] A study in Turkey showed that only 6.7% of healthcare workers were immunised, while 55% never vaccinated.[4] Oral health professionals (OHPs) are at increased risk of contracting Covid-19 virus due to exposure to aerosols, oral secretions and other occupational hazards.[5,6] Effective vaccines against Covid-19 became available in South Africa in May 2020, during which healthcare professionals were prioritised as frontlines workers to be immunised.[7] Despite the effective vaccination campaigns, the uptake of the Covid-19 vaccination among health workers was not commensurate. Vaccine hesitancy was unproportionally higher among health professionals during this early phase of the pandemic. Vaccine hesitancy is defined as delay in acceptance or refusal to vaccinate despite the availability of vaccination services.[8] Numerous factors such as age, gender, income, education, race and psychological states affect the intention to vaccinate. The SAGE[8] working group on vaccine hesitancy and, recently, Bestch et al[9] proposed five psychological factors that are antecedent to vaccination including against Covid-19. The 5C antecedent factors include confidence, complacency, confidence, calculation and collective responsibility. Collectively, these factors provide an in-depth exploration of reasons why an individual vaccinates or hesitates to immunise.[10]

Confidence scale assesses an individual's trust in vaccines and the systems that provide it.[9] To vaccinate is to take a risk, it is hence reasonable that the individual's agency prevails on whether to vaccinate or not.[11] The individual must trust that the vaccine is effective and safe; and that the systems that deliver the vaccines are authentic. Lack of confidence is associated with negative attitude or low intention to vaccinate, or high levels of hesitancy.

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Complacency measures the lack of perception of diseases as high risk, hence there is no urgency or necessity to prevent disease.[11] The consequence of complacency is low vaccine coverage, poor herd immunity and resurgence of infections.[12]

Constraints are the structural and psychological barriers that impede the implementation of vaccination.[11] These factors include, among others, geographical access, availability, affordability and ability to understand information relating to vaccines.[13]

Calculation signifies the efforts placed in search of information and its eventual use in reaching a decision.[9] Lack of information, misleading information and misinformation may hamper vaccination efforts.

Collective responsibility evaluates the willingness to protect others by developing group immunity.[9] Community beneficence and nonmaleficence drive the desire to vaccinate.[14]

Confidence and collective responsibility are positive antecedent factors, while the other psychological antecedents are indicative of negative attitude and unwillingness to be vaccinated. Vaccine hesitancy is one of 10 major threats to global health and a huge risk to susceptible professions like dentistry.[15] To our knowledge no research has been conducted in South Africa among oral health professionals to appraise the factors contributing Covid-19 vaccination intention. This study will provide critical data on this phenomenon and recommendations on how to improve vaccine coverage among oral health professionals.

METHODS

Study design

This descriptive cross-sectional survey was undertaken using an internet-based Google form sent to oral health professionals in South Africa.

Study population

Study participants consisted of all the cadres of oral health professionals who had current registration with the Health Professional Council of South Africa (HPCSA).

Sampling and sample size determination

The sample size was estimated to be a total of 367 participants based on the following assumptions: (i) 5% margin of error, (ii) level of precision of 95%, (iii) 50% of dentists willing to be vaccinated against Covid-19. An additional 20% (n=73) was added to control for nonresponse, giving a final sample size of (n=440). The weighted proportion for each cadre was determined based on the total number of licensed practitioners South Africa (n=8056). Dentists and dental specialists constitute 75% of the 8,056 registered OHPs, which translates into (n=330). The number of dental therapists and oral hygienists equalled (n=40) and (n=70) respectively. Using a proportionate stratified convenience sampling technique, eligible participants were recruited independently from organisational databases until the requisite samples were achieved.

Measurement of demographic variables

The following demographic characteristics were self-reported by the participants: age, gender; cadre (profession), clinical experience and employment sector.

Assessment of vaccination history and intent

Vaccination history was evaluated using the following questions: (i) In the past two years I have vaccinated against Hepatitis B virus; (ii) In the past two years I have vaccinated against the influenza virus.

The answers to these questions were either yes or no. Regarding the intention to vaccinate against Covid-19, the participants were asked to indicate how likely they were to vaccinate against Covid-19. The following options were given as possible responses (very likely, somewhat likely or not likely).

Assessment of 5C psychological antecedents of Covid-19 vaccination

A validated 5C scale for psychological antecedents to vaccination tool was used in this study.[9] The instrument comprised five domains (confidence, complacency, constraints, calculation and collective responsibility) and each domain was assessed using three questions, resulting in a total of 15 questions overall. The responses to the questions were based on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The higher values represented the greater levels of the construct.

Data collection

The link to the form was sent through to all the dental associations in the country (SADA, OHASA, DPA and DTASA) who used their databases to source emails and or cellphone numbers. These details were used to circulate the link to participants. The online survey remained open until the required sample size was reached for each professional grouping. Several reminders were sent during the six-month period of data collection.

Data analysis

All statistical analyses were undertaken using IBM SPSS Statistics version 25.0. Descriptive data were presented as frequencies, and measures of central tendencies for different variables. A dichotomous variable was created as a measure of vaccination intention. The responses "somewhat likely" and "very likely" were regarded as positive vaccination intention and depicted as "Yes". The answer "not likely" was recorded as "No", indicating no intention to vaccinate. The chi-square statistic and analysis of variance (ANOVA) were used to assess the differences in Covid-19 vaccination intention across study subgroups. A logistic model was created with vaccination intention as the dichotomous outcome variable (1 = Yes, and 0 = No). The exploratory variables included the five psychological antecedents, demographics and vaccination history. Variables that were significant at$\alpha \leq 10\%$ were simultaneously fitted in the multivariate logistic regression model. Odds ratios (ORs) and their 95% confidence intervals (CIs) were calculated. The significance level for data analysis was set at $p<0.05$.

Ethical considerations

The study was approved by the Sefako Makgatho Health Sciences University Research and Ethics Committee (SMUREC/D/113/2021:PG). Informed consent was obtained from all participants using an online form prior to partaking in the survey.

Results

The demographic characteristics of 462 oral health professionals are depicted in Table 1. Most of the participants were female 326 (70.6%), younger than 35

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years 195 (42.2%), worked as dentists 267 (57.4%), employed in the private sector 265 (57.4%), with working experience spanning 10 year or less 220 (47.6%). According to Table 2, as many as 191 (41.3%) of OHPs tested positive for Covid-19. Vaccination histories reveal that few participants immunised against influenza virus 176 (38.1%) and hepatitis virus 102 (22.1%) in the past two years. A total of 360 (77.9%) of OHPs indicated their intention to vaccinate against Covid-19. Factors associated with the Covid-19 vaccination intention are represented in Tables 1 and 2. Vaccination intention increased with increasing age (0.037), was positively correlated with female gender (0.048), history of flu vaccination (<0.001) and lesser clinical experience (0.04). Table 3 shows the average scores of the five psychological antecedents of Covid-19 vaccination.-The mean values for confidence and collective benefit were significantly higher, and lower for complacency, constraints and calculation among OHPs intending to vaccinate. Table 4 shows the results of logistic regression analysis. Among the 5C antecedent predictors, higher confidence and collective responsibility were associated with higher levels of vaccination intention. On the contrary, the high complacency was associated with low vaccination intention. After adjusting for 5C predictors, gender, age and Covid-19 positive tests, influenza vaccination was positively associated with Covid-19 vaccination intention (AOR = 2.65; 95% CI = 1.40 -5.03; p=0.003). Oral health professionals who were immunised against influenza virus had three times greater odds of vaccinating against Covid-19 than those not immunised. Males were more likely to vaccinate against Covid-19, however the effects size was not significant at p=0.43. Age and positive Covid-19 test were not related to vaccination intention.

DISCUSSION

Our study sought to evaluate potential predictors of vaccination intention among the surveyed OHPs. To achieve this objective, we evaluated the demographic variables, vaccination history and 5C psychological antecedents as potential predictors of the outcome. Our results indicate that vaccine intention was high among the OHPs with history of influenza vaccine, and 5C psychological antecedents (confidence and collective benefit). Positive Covid-19 diagnosis, constraints and were not correlated with vaccine intention.

We reported a high Covid-19 vaccination intention rate of (77.9%) in our study, which is comparable to other OHPs worldwide[16] (81%), Italy[6] (82%), Lebanon[17] (86%), Israel[18] (85%) and Greece[19] (82.5%). Comparatively, vaccination intention was lower among other healthcare workers, 76.9%[20], 64%[21] and the general population, 70%[22], 69%[23], 64%[24]. We attribute the high intention to vaccinate among OHPs to perceived and actual risk of contracting Covid-19 given the occupational hazards and practice risks.

The chi-square analysis showed that males were more intentional about vaccination than females. This trend has been observed globally regarding vaccination intention and uptake. The systematic review and meta-analysis by Zintel et al[25] reported a significantly higher likelihood of males intending to vaccinate, OR=1.41 (95% CI 1.28 to 1.55). The study has not evaluated the relationship between vaccination intention and vaccination uptake. However, it is well established that low vaccination intention can seriously undermine any vaccination programme.

The findings of this study confirm a strong and established relationship between receiving influenza vaccine and Covid-19 vaccine.[6,20,26] This result is not surprising because the general attitude towards flu vaccination can act as a significant determinant of vaccination willingness and intention including towards Covid-19 vaccines. We argue that an individual who has overcome structural and psychological constraints related to flu vaccine is more empowered, self-reliant and most adept to receive the Covid-19 vaccine than not. Therefore, taking flu vaccines once or regularly may serve as gateway for other vaccines including the Covid-19 vaccine.

The positive Covid-19 diagnosis among OHPs did not increase vaccination intention among the participants. This association is plausible since infected OHPs would have considered themselves immune or unlikely to develop serious symptoms once reinfected. Additionally, most oral health professionals adhered to infection control measures and safety regulations, including the proper use of PPEs, which lowered the overall work-related perception of risk. There are limited studies among OHPs which have evaluated the association of Covid-19 diagnosis and vaccination intention or uptake.[6]

The concept of confidence incorporates trust regarding the safety and efficacy of the Covid-19 vaccine. Therefore, OHPs willing to vaccinate were reliant on the health system to supply safe and effective Covid-19 vaccines. This positive association has been extensively reported in literature.[6,9,11,16,23] Collective benefit or altruism means that an individual is willing to vaccinate to protect others by building herd immunity. Many OHPs are knowledgeable and understand the significance of building herd immunity, hence the increased level of community benefit in this study. Furthermore, OHPs are morally obligated and expected as health professionals to engage in good clinical practices to protect the wellbeing of their patients, colleagues and families. Therefore, the intention to vaccinate against Covid-19 constitutes for this purpose prima facie professional duty.[6,8-10.]

Complacency was high among OHPs not intending to vaccinate, meaning that perceived OHPs the risk of vaccine preventable disease as inconsequentially low. We argue that OHPs were aware of the inherent risks but believed that the infection control measures and protocols were adequate to mitigate contracting the virus. The early phases of Covid-19 vaccination were marred by logistical and operational challenges which could explain perceived constraints. Overall, South Africa delivered efficient vaccination services, and professionals were the first in line to receive such services. Our results indicate that all OHPs were adequately informed about the Covid-19 vaccines, enabling them to reach a decision to immunise or not. The question is what information was consumed by OHPs not intending to vaccinate? Covid-19 vaccines were rapidly developed and distributed, while the evidence of long-term effects and safety was still indeterminate. This provided an opportunity for antivaxxers to spread misleading information and misinformation about the vaccines. We contend that susceptibility to misinformation contributed to the lower inclination to want to vaccinate, more so that information could not be easily verified during period of hard lockdown. Association of misinformation and low likelihood of vaccination intent and/or uptake is well documented from several global studies.[30-2]

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There are several implications that can be derived from this study: (i) Multiple platforms must be used to convey correct information timeously, and in a user-friendly manner. (ii) Barriers and constraints must be eliminated to improve intention to vaccinate.

Strengths and limitation of the study

This study was adequately powered and employed a stratified proportional sampling technique as a means to obtain representation of various cadres of oral health. The use of multiple databases from several professional associations also contributed to the improved representation of various groups and minimised selection bias. The limitation of this study is that it employed non-probability convenient sampling. The shortcomings of this sampling process were mitigated by large number of participants enrolled in the study. The other limitation is that the 5C psychological antecedents and vaccination intention were assessed at the specific time point and context. Given that Covid-19 vaccination intention and associated predictors change over time, it is conceivable that this study cannot provide a full account of the temporal variations in vaccination intention. Therefore, longitudinal studies will be most appropriate to measure the temporal changes. Despite these limitations, this research represents the first national study undertaken among OHPs during the pandemic, and at the time when the vaccines were available. The findings therefore provide baseline for similar study during future pandemics.

CONCLUSION

Covid-19 vaccination intention was very high among OHPs, attributed to high perceived confidence and collective benefit and less complacency regarding the vaccine. History of influenza vaccine increased the likelihood of intention to vaccinate against Covid-19.

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CPD questionnaire on page 224

The Continuing Professional Development (CPD) section provides for twenty general questions and five ethics questions. The section provides members with a valuable source of CPD points whilst also achieving the objective of CPD, to assure continuing education. The importance of continuing professional development should not be underestimated, it is a career-long obligation for practicing professionals.