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The impact of the COVID-19 pandemic on general dental practitioners in New Zealand

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Abstract

Introduction: The extent to which COVID-19 affected NZ general dental practitioners' (GDPs) ability and willingness to work during the pandemic is unclear. We investigated the pandemic's impact on the practices and occupational health of NZ GDPs.

Methods: A survey was conducted in May-August 2022 using RedCap software, in which an online questionnaire was emailed to 1035 GDPs.

Results: A total of 216 responses were returned (response rate approximately 21%). Males comprised 55% of respondents. Approximately half found working during the COVID-19 pandemic difficult. Overall, the biggest current COVID-19-related challenge to dental practice faced by GDPs was financial losses to the dental practice (reported by 53%). About a third of dentists were concerned about the impact of the pandemic on their general health, safety and well-being, and fewer than a quarter of dentists have had to change the treatments provided to patients as a result of the pandemic. About half felt that the pandemic might adversely influence their efficiency in performing dental procedures. Fewer than a quarter were not confident that safety precautions and PPE could protect them, and about a quarter had had to lose staff who refused to comply with COVID-19 safety requirements. Fewer than half of dentists had tested positive for COVID-19.

Conclusion: The ongoing COVID-19 pandemic has continued to have a substantial and multifaceted impact on dental practice and the professional lives of NZ dentists. Although some challenges persist, the ongoing easing of restrictions should improve matters.

Introduction

The pneumonia outbreak that started in Wuhan (China) in December 2019 spread rapidly worldwide, resulting in the World Health Organization (WHO) declaring it a Coronavirus Disease (COVID-19) pandemic on the 11th of March, 2020 (Chaudhary et al, 2022). This led to many countries enforcing public health orders and restrictions which limited the healthcare services that can be provided to the public (Tabari et al, 2020). There have been many challenges faced by dental professionals worldwide, which has impacted their ability to work efficiently. For example, more than three-quarters of Welsh dentists in 2021 reported higher stress levels within the dental workforce due to working conditions and financial difficulties, with about three-quarters still working despite those stressors (Owen et al, 2022).

A U.S. study in 2020 found that more than half of Texan dentists found working during the COVID-19 pandemic difficult, with about three-quarters concerned about the impact of the pandemic on their health, safety, and well-being, and nearly all concerned about the impact to their dental practice (Bsoul et al, 2022).

The extent to which COVID-19 has affected NZ general dental practitioners' (GDPs) ability and willingness to work during the pandemic is unclear, as does whether the difficulties and stresses reported in overseas studies hold in NZ. Accordingly, the aim of this study was to investigate the pandemic's impact on the practices and occupational health of NZ GDPs.

Methods

Category B ethical approval was obtained from the Human Ethics Committee at the University of Otago prior to distribution of the questionnaire. An email survey of actively-practising general dental practitioners was conducted from May to August in 2022. Initially, we intended to take a random sample of dentists from the 2022 Dental Register, but we were unable to get access to that. The New Zealand Dental Association then agreed to put a link to the survey in one of its regular emails to members. When that resulted in only 52 responses after three weeks, we decided to use an existing copy of the 2019 Dental Register, sending an emailed link to all dentists with contactable email addresses (N = 1029). Those without a current annual practising certificate or a registration in an additional scope were excluded. A specifically-designed online questionnaire was designed and hosted using RedCap survey software. Data collection ceased at the beginning of August 2022.

Of the 1029 dentists who were contacted, 46 had non-valid email addresses and "bounced" immediately, leaving 983 in the sample. Of those, 164 responded to the survey, giving it a response rate of 16.7% to that emailed survey (no subsequent reminder was sent). Adding the initial 52 responses gave a total of 216 responses. Comparison of the demographic and practising characteristics of those 216 with data in the most recent DCNZ workforce report¹ shows that the sample did not differ significantly in the proportion of females (45% and 43% respectively), but that it did with respect to the proportion of Otago BDS graduates (80% and 67% respectively).

1 <https://www.dcnz.org.nz/assets/Uploads/Publications/workforce-analysis/Workforce-Analysis-2018-2019.pdf>



The survey questionnaire (available from the corresponding author on request) combined questions for a number of separate studies, including occupational health, local anaesthetic use, and dentists' management of dental anxiety. Those for the current study covered the impact of the pandemic on NZ GDPs, as well as the challenges they encountered while working during the COVID-19 pandemic. This included questions about whether they found working during the pandemic difficult, whether they were concerned about the impact of the pandemic on themselves, whether the pandemic affected the treatment they provide, staff compliance with COVID-19 safety requirements, confidence in PPE protection, and prevalence of COVID-19 transmission within dentists and their household members and staff members.

Data were analysed using the Statistical Package for the Social Sciences (SPSS). Analyses used cross-tabulations and Chi-square tests for categorical dependent variables, and ANOVA for continuous dependent variables. The level of significance was set at $p < 0.05$.

Results

An overview of the characteristics of the responding sample is presented in Table 1.

A total of 216 responses were returned and under half of respondents were female, and just over half were male. Males predominated among those who had graduated before 1990. A lower proportion of females were working in single dentist practices. More than three-quarters of respondents were Otago University graduates, and more than half were dentists working in large cities. About three-quarters of dentists worked in group practices and in private practice.

Data on practice ownership and on those who have found it difficult to work during the pandemic are presented in Table 2. About half were practice owners, with that proportion greater among males. Practice ownership was lower among recent graduates and dentists working in provincial cities. More than half of those working in private practice were practice owners. Approximately half of respondents found working during the COVID-19 pandemic difficult. This was more common among Otago University graduates than overseas-trained dentists, and among dentists working in a single dentist practice and in private practice.

Overall, 22 participants (10.2%; data missing for 2 respondents) would not recommend studying dentistry to others in light of the COVID-19 pandemic and its associated challenges. In order of frequency, the biggest current COVID-19-related challenges to dental practice

Table 1. Overview of characteristics of the responding sample (brackets contain percentages)

	Sex		All combined
	Female	Male	
Graduation cohort			
Before 1990	19 (21.8)	68 (78.2) ^a	87 (40.3)
1990-1999	31 (58.5)	22 (41.5)	53 (24.5)
2000-2009	15 (57.7)	11 (42.3)	26 (12.0)
2010 or later	33 (66.0)	17 (34.0)	50 (23.1)
Otago graduate			
No	23 (53.5)	20 (46.5)	43 (19.9)
Yes	75 (43.4)	98 (56.6)	173 (80.1)
Location^b			
Large city	63 (46.7)	72 (53.3)	135 (62.5)
Provincial city	20 (46.5)	23 (53.5)	43 (19.9)
Town	15 (39.5)	23 (60.5)	38 (17.6)
Practice type			
Single dentist	13 (33.3)	26 (66.7) ^a	39 (18.1)
Group	70 (45.2)	85 (54.8)	155 (71.8)
Other ^c	15 (68.2)	7 (31.8)	22 (10.2)
Practice ownership			
Private	69 (42.1)	95 (57.9)	164 (75.9)
Corporate	13 (46.4)	15 (53.6)	28 (13.0)
Other ^c	16 (66.7)	8 (33.3)	24 (11.1)
All combined	98 (45.4)	118 (54.6)	216 (100.0)

^a $P < 0.05$

^b Large city examples are Auckland, Wellington, Christchurch; provincial cities include Palmerston North, Nelson; towns include communities such as Huntly, Kaitia, etc

^c This category includes institution-based and iwi-run clinics

were: financial losses to the dental practice (reported by 114, or 52.8%); having a COVID-19 outbreak or spikes (95, or 44.0%); financial resources of patients (69, or 31.9%); patients not complying with safety requirements (69, or 31.9%); getting patients willing to come in for treatment (65, or 30.1%); fear and anxiety (53, or 24.5%); Personal Protective Equipment (PPE) availability (50, or 23.1%); keeping social distancing (30, or 13.9%); testing of dental staff (13, or 6.0%); and testing of patients (11, or 5.1%).

Data on the number of GDPs who were concerned about the impact of the COVID-19 pandemic on their general health, safety and well-being and who have had to change the type of dental treatments they provide to patients as a result of the pandemic are presented in Table 3. Overall, about a third were very or moderately concerned, with that proportion greater among those working in a single dentist practice. Some 31.8% were slightly concerned, and 34.1% were not concerned (data not tabulated). Fewer than a quarter of dentists had had

to change the type of treatments provided, with that proportion lower in those working in large cities.

Data on the number of GDPs who felt that the COVID-19 pandemic might adversely influence their efficiency in performing dental procedures are presented in Table 4. About half felt that the COVID-19 pandemic might adversely influence their efficiency, with that proportion greater among dentists working in hospitals, iwi-based clinics or University clinics.

Data pertaining to the number of GDPs who were not confident that safety precautions and Personal Protective Equipment (PPE) could protect them while performing aerosol-generating dental procedures and who have had to lose staff because they refused to comply with COVID-19 safety requirements are presented in Table 5.

Fewer than a quarter of respondents did not feel confident that safety precautions and PPE could protect them. About a quarter have had to lose staff because they refused to comply with COVID-19 safety requirements, and this was more common among

Table 2. Number of GDPs who are practice owners and who have found it difficult to work during the pandemic (brackets contain percentages)

	Practice owner	Difficult to work during pandemic
Sex		
Female	38 (38.8) ^a	45 (47.4)
Male	64 (54.7)	52 (45.2)
Graduation cohort		
Before 1990	48 (55.2) ^a	44 (53.0)
1990-1999	33 (62.3)	20 (37.7)
2000-2009	14 (53.8)	15 (57.7)
2010 or later	7 (14.3)	18 (37.5)
Otago graduate		
No	22 (51.2)	13 (31.0) ^a
Yes	80 (46.5)	84 (50.0)
Location		
Large city	72 (53.3) ^a	66 (50.0)
Provincial city	13 (30.2)	13 (30.2)
Town	17 (45.9)	18 (51.4)
Practice type		
Single dentist	30 (76.9) ^a	23 (60.5) ^a
Group	69 (44.8)	68 (45.3)
Other	3 (13.6)	6 (27.3)
Practice ownership		
Private	101 (62.0) ^a	82 (51.6) ^a
Corporate	0 (0.0)	8 (28.6)
Other	1 (4.2)	7 (30.4)
All combined	102 (47.4)	97 (46.2)

^a P<0.05

Table 3. Number of GDPs who were concerned about the pandemic's impact on their general health, safety and well-being, and who as a result of the COVID-19 pandemic have had to change the type of dental treatments they provide to patients (brackets contain percentages)

	Very or moderately concerned about the pandemic's impact on self ^a	Pandemic caused them to change the type of dental treatments provided to patients ^a
Sex		
Female	33 (34.0)	24 (24.7)
Male	40 (34.2)	24 (20.5)
Graduation cohort		
Before 1990	35 (40.7)	19 (22.1)
1990-1999	19 (36.5)	10 (19.2)
2000-2009	5 (19.2)	9 (34.6)
2010 or later	14 (28.0)	10 (20.0)
Otago graduate		
No	15 (34.9)	11 (25.6)
Yes	58 (33.9)	37 (21.6)
Location		
Large city	50 (37.6)	22 (16.5) ^b
Provincial city	13 (30.2)	14 (32.6)
Town	10 (26.3)	12 (31.6)
Practice type		
Single dentist	19 (50.0) ^b	10 (26.3)
Group	50 (32.5)	31 (20.1)
Other	4 (18.2)	7 (31.8)
Practice ownership		
Private	61 (37.7)	35 (21.6)
Corporate	9 (32.1)	5 (17.9)
Other	3 (12.5)	8 (33.3)
All combined	73 (34.1)	48 (22.4)

^a Data missing for 2 respondents ^b P<0.05



Table 4. Number of GDPs who felt that the COVID-19 pandemic might adversely influence their efficiency in performing dental procedures (brackets contain percentages)

	Felt that COVID-19 might adversely influence their efficiency in performing dental procedures ^a	
Sex		
Female	52	(53.6)
Male	50	(43.1)
Graduation cohort		
Before 1990	43	(50.0)
1990-1999	24	(46.2)
2000-2009	12	(48.0)
2010 or later	23	(46.0)
Otago graduate		
No	20	(47.6)
Yes	82	(48.0)
Location		
Large city	58	(43.6)
Provincial city	27	(62.8)
Town	17	(45.9)
Practice type		
Single dentist	19	(50.0) ^b
Group	67	(43.8)
Other	16	(72.7)
Practice ownership		
Private	73	(45.3)
Corporate	13	(46.4)
Other	16	(66.7)
All combined	102	(47.9)

^a Data missing for 3 respondents ^b P<0.05

overseas-trained dentists than locally-trained dentists and in dentists working in provincial cities.

Analysis of the types of people associated with dentists who tested positive for COVID-19 (their family members, staff members, or the dentists themselves) revealed that 68 dentists (31.5%) had one type of people associated with them test positive, 52 dentists (24.1%) had two types of people associated with them test positive, and 63 dentists (29.2%) had three types of people associated with them test positive. Only 33 dentists (15.3%) did not have any people associated with them test positive for COVID-19.

Data on the number of GDPs with no staff or family members who tested positive for COVID-19 (with and without PCR confirmation) and GDPs who tested positive for COVID-19 themselves are presented in Table 6.

Fewer than half of dentists tested positive for COVID-19. A significantly lower proportion of overseas-trained dentists than Otago graduates had got COVID-19.

Discussion

This study was conducted to investigate the impact of the COVID-19 pandemic on dental practices and the occupational health of NZ GDPs. Approximately half found working during the pandemic difficult, with the biggest COVID-19-related challenge reported to be financial losses to the dental practice. There were

concerns about the pandemic's impact on their general health, safety and well-being, although fewer than half had tested positive for COVID-19. A minority did not feel confident that safety precautions and PPE could protect them while undertaking aerosol-generating dental procedures. One in four dentists have had to lose staff because they refused to comply with COVID-19 safety requirements.

In considering the weaknesses and strengths of this study, the generalisability of the findings would have been enhanced with a higher response rate. Unable to get access to the 2022 Dental Register, we initially resorted to contacting dentists through the New Zealand Dental Association. When a very low response rate arose from this, we instead used an existing copy of the 2019 Dental Register to contact dentists with email addresses available. Despite all the efforts made to increase participation through multiple reminders and the participation incentive (entry into a prize draw), the response rate failed to exceed 50%. It is important to emphasise that, during the time this study was conducted, COVID-19 restrictions were starting to ease in New Zealand, and the findings therefore may not reflect the impact and experience of GDPs in earlier stages of the pandemic. Although the gender distribution of the sample closely resembled that of the New Zealand dental workforce, the proportion of Otago BDS graduates did differ², and so questions remain about the generalisability of our findings. Access to contemporary and complete lists of dentists to use as sampling frames for health services research of this type has become very difficult in recent years, not because of any legislative changes but rather because of changes in the way that bodies such as the DCNZ and the NZDA interpret the existing legislation. Surveys of dentists remain an important source of information on dental practice, and surely it is in the interests of both those bodies to facilitate the conduct of such work.

The many challenges faced in dental practice as a result of the pandemic mean that it is not surprising that about half of NZ dentists found working during it difficult, and about a third were concerned about its impact on their general health, safety and well-being. It was evident that a greater proportion of dentists working in single-dentist practices found working during the pandemic difficult and were concerned about the impact of the pandemic on themselves. This may be explained by the relative lack of support available to those working alone. A higher proportion of Otago University graduates than overseas-trained dentists found working during the pandemic difficult; however, the reason behind this is unknown. On the other hand, a greater proportion of overseas-trained dentists than locally-trained dentists have had to lose staff because they refused to comply with COVID-19 safety requirements. It is unclear whether this is due to a difference in the type of staff attracted and employed by overseas-trained dentists.

2 <https://www.dcnz.org.nz/assets/Uploads/Publications/workforce-analysis/Workforce-Analysis-2018-2019.pdf>

Table 5. Number of GDPs who were not confident that PPE could protect them and who have had to lose staff because they refused to comply with COVID-19 safety requirements (brackets contain percentages)

	Not confident that PPE can protect them ^a		Had to lose staff because they refused to comply with COVID-19 requirements ^b	
Sex				
Female	17	(17.5)	25	(25.8)
Male	24	(20.5)	32	(27.6)
Graduation cohort				
Before 1990	21	(24.4)	16	(18.6)
1990-1999	6	(11.5)	17	(33.3)
2000-2009	3	(11.5)	9	(34.6)
2010 or later	11	(22.0)	15	(30.0)
Otago graduate				
No	7	(16.3)	18	(42.9) ^c
Yes	34	(19.9)	39	(22.8)
Location				
Large city	22	(16.5)	28	(21.2) ^c
Provincial city	10	(23.3)	19	(44.2)
Town	9	(23.7)	10	(26.3)
Practice type				
Single dentist	6	(15.8)	4	(10.8)
Group	34	(22.1)	46	(29.9)
Other	1	(4.5)	7	(31.8)
Practice ownership				
Private	33	(20.4)	37	(23.0)
Corporate	6	(21.4)	11	(39.3)
Other	2	(8.3)	9	(37.5)
All combined	41	(19.2)	57	(26.8)

^a Data missing for 2 respondents ^b Data missing for 3 respondents ^c P<0.05

Table 6. Number of GDPs with no staff or family members who tested positive for COVID-19 (with and without PCR confirmation) and GDPs who tested positive for COVID-19 themselves (brackets contain percentages)

	Nobody associated with practitioner got COVID-19		Nobody associated with practitioner got PCR-confirmed COVID-19		Practitioners testing positive for COVID-19	
Sex						
Female	17	(17.3)	68	(69.4)	35	(35.7)
Male	16	(13.6)	82	(69.5)	53	(44.9)
Graduation cohort						
Before 1990	18	(20.7)	59	(67.8)	29	(33.3)
1990-1999	9	(17.0)	37	(69.8)	21	(39.6)
2000-2009	2	(7.7)	21	(80.8)	14	(53.8)
2010 or later	4	(8.0)	33	(66.0)	24	(48.0)
Otago graduate						
No	9	(20.9)	29	(67.4)	11	(25.6) ^a
Yes	24	(13.9)	121	(69.9)	77	(44.5)
Location						
Large city	22	(16.3)	93	(68.9)	53	(39.3)
Provincial city	7	(16.3)	27	(62.8)	16	(37.2)
Town	4	(10.5)	30	(78.9)	19	(50.0)
Practice type						
Single dentist	10	(25.6)	30	(76.9)	14	(35.9)
Group	20	(12.9)	105	(67.7)	65	(41.9)
Other	3	(13.6)	15	(68.2)	9	(40.9)
Practice ownership						
Private	30	(18.3)	114	(69.5)	62	(37.8)
Corporate	1	(3.6)	21	(75.0)	15	(53.6)
Other	2	(8.3)	15	(62.5)	11	(45.8)
All combined	33	(15.3)	150	(69.4)	88	(40.7)

^aP<0.05



A 2021 study found that the most common COVID-related challenge faced by Australian dentists was in relation to issues with public health orders and restrictions, because these led to negative consequences such as practice disruption and lower revenue causing financial distress to dentists (Nahidi et al, 2022). Similarly, a 2021 Welsh study found that about half of practising dentists were 'extremely stressed' about finances (Owen et al, 2022). A scoping review conducted in 2020 found that financial losses were a global concern of oral and dental health workers (Bastani et al, 2021). Similarly, most NZ dentists reported financial losses to dental practice to be their biggest challenge. Just over a quarter of dentists in Australia felt more stressed than usual at work as a result of the COVID-19 pandemic (Sotomayor-Castillo et al, 2022). In a 2020 Texan study, about half of dentists felt that it was difficult working during the pandemic—similar to the NZ findings. The approximately three-quarters of the Texan participants who were concerned about the impact of COVID-19 on their general health, safety, and well-being (Bsoul et al, 2022) was considerably higher than in NZ, where only about a third were concerned. This may be attributed to differences between Texas and NZ in the extent of COVID-19 spread.

Dental practitioners are more likely to have an exposure to COVID-19 because of their close proximity to patients. Moreover, aerosol production from high-speed handpieces, ultrasonic scalers and other dental equipment increases the risk of nosocomial infection (Loch et al, 2021). A very low percentage (4%) of participants in the Texas study were not confident that safety precautions and PPE could protect them during aerosol-generating procedures, which was much lower than in NZ where about one in four dentists did not feel confident. Just under a quarter of dentists in Texas and NZ have had to change the type of dental treatments provided to patients (Bsoul et al, 2022). It is important to

highlight that differences in the timing of the pandemic when these studies were conducted — and the extent of COVID-19 spread of infections in different countries — make it difficult to make direct comparisons.

It is evident that the pandemic has had profound effects on the occupational health and working lives of GDPs in NZ. Further research is needed in this area to monitor its on-going effects in the long-term, and it would be useful to investigate the causes of the observed differences in pandemic working experiences of overseas-trained and locally-trained dentists. Moreover, strategies (such as effective support services) need to be put in place to help ease the impact of the pandemic on dentists and dental practices.

Conclusion

The ongoing COVID-19 pandemic has had a substantial and multifaceted impact on dental practice and the professional lives of NZ dentists. Despite the ongoing challenges, the easing of restrictions should slowly help dental practices to recover financially, and decrease the stress faced by the practising dentists and their staff.

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Conflict of Interests

The authors report no conflicts of interest.

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References

- Bastani P, Mohammadpour M, Ghanbarzadegan A, Kapellas K, Do LG (2021). Global concerns of dental and oral health workers during COVID-19 outbreak: A scope study on the concerns and the coping strategies. *Syst. Rev* 10(1): 1-9.
- Bsoul EA, Challa SN, Loomer PM (2022). Multifaceted impact of COVID-19 on dental practice: American dental care professionals prepared and ready during unprecedented challenges. *J Am Dent Assoc* 153(2): 132-143.
- Chaudhary FA, Fazal A, Ahmad B, Khattak O, Hyder M, Javaid MM, Iqbal A, Issrani R (2022). The impact of COVID-19 pandemic on the psychological health and dental practice of oral healthcare workers: A scoping review. *Risk Manag. Healthc. Policy* 15: 1421.
- Loch C, Kuan IB, Elsalem L, Schwass D, Brunton PA, Jum'ah A (2021). COVID-19 and dental clinical practice: Students and clinical staff perceptions of health risks and educational impact. *J Dent Educ* 85(1): 44-52.
- Nahidi S, Li C, Sotomayor-Castillo C, Kaufman-Francis K, Shaban RZ (2022). "We will have to learn to live with it": Australian dentists' experiences during the COVID-19 pandemic. *Infect Dis Health* 27(2): 96-104.
- Owen C, Seddon C, Clarke K, Bysouth T, Johnson D (2022). The impact of the COVID-19 pandemic on the mental health of dentists in Wales. *Br Dent J* 232(1): 44-54.
- Sotomayor-Castillo C, Li C, Kaufman-Francis K, Nahidi S, Walsh LJ, Liberali SA, Irving E, Holden AC, Shaban RZ (2022). Australian dentists' knowledge, preparedness, and experiences during the COVID-19 pandemic. *Infect Dis Health* 27(1): 49-57.
- Tabari P, Amini M, Moghadami M, Moosavi M (2020). International public health responses to COVID-19 outbreak: A rapid review. *Iran. J. Med. Sci* 45(3): 157.