The implications of COVID-19 enhanced personal protective equipment for aerosol generating procedures on UK dental practices. A qualitative study

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AIM

To investigate dental professionals' experiences of using enhanced personal protective equipment for the provision of care

LEARNING OBJECTIVE

Capture and analyse qualitative data to present a snapshot in time of how enforced requirement to wear enhanced personal protective equipment impacted dental professionals' experiences in the provision of care

LEARNING OUTCOMES

- Understanding of the background of COVID-19 on the provision of dental care
- Identification of various practices and procedures with which dental professionals were enforced to comply
- Insight into how enforced practices and policies impacted day to day practice for members of the dental team

Aligned with GDC learning outcomes: *C, D*

ABSTRACT

Aim
To explore the implications of COVID-19 mandatory wearing of enhanced personal protective equipment on dental professionals, their patients and their practices.

Method
Face-to-face interviews of up to 30 minutes duration were conducted with three dentists, two dental hygienists and three dental nurses. Each participant was asked eight semi-structured questions which ranged in subject from how COVID-19 impacted the participants' everyday practice, to how the participants felt about having to use enhanced personal protective equipment long-term. Thematic analysis was undertaken using Braun and Clarke's six stages of thematic analyses.

Results
Nine themes and eighteen sub-themes were identified from the data. The findings of the study suggest the majority of the participants did not favour enhanced personal protective equipment, and many questioned the reasons and evidence for COVID-19 UK dental Standard Operating Procedures. The COVID-19 pandemic drastically escalated the levels of personal protective equipment required in dentistry which impacted various team members in different ways.

Conclusion
The analysis of the data reflect a sample of dental professionals' real-life experiences of a fundamental shift-change in the mandatory requirements to alter the way in which they treated patients.

KEY WORDS
COVID-19, enhanced personal protection, impact, dental professionals

Introduction

Coronavirus, also known as COVID-19, is an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2].[1] SARS-CoV-2 is a single-chain RNA virus that primarily affects the respiratory system and can affect other biological systems within the human body. The majority of people infected with COVID-19 experience mild to moderate respiratory illness and recover without requiring any specialist treatment. However, a significant number of people do become seriously ill and require short-term or long-term medical attention. Globally, an alarming number of people have died from the disease.[2]

COVID-19 generated a worldwide pandemic and the first cases of the disease in the United Kingdom [UK] were reported on 29 January 2020.[3] Two patients, both of whom had travelled to the UK from Hubei province, China, were medically fit and healthy individuals but had developed fever symptoms. They were admitted to the infectious diseases unit at Castle Hill Hospital in Hull.[4] Each patient was isolated and healthcare teams treating them wore personal protective equipment [PPE] as advised in the 15 January 2020 Public Health England [PHE] guidance document.[5]

As COVID-19 cases in the UK soared, and a rapid increase in hospital admissions began to negatively impact the National Health Service [NHS] and on the evening of Monday 23 March 2020 a national lockdown was declared by Prime Minister Boris Johnson with only essential shops and services allowed to remain open. This forced all UK NHS and private dental practices to close and urgent dental care [UDC] was provided only in designated hubs, one of which was King's College Hospital in London.

Between 30 March 2020 and 20 June 2020, 7,448 patients called the service at King's College Hospital: 1,978 patients were offered a clinical assessment; dental extraction was the most common treatment provided.[6]

Prior to dental practices reopening on Monday 8 June 2020[7], PPE - gloves, fluid-resistant surgical masks, protective eyewear and aprons - were reassessed for their safety. Guidance from the Health and Social Care Board in combination with UK government policy instructed that enhanced PPE must be worn, particularly for aerosol generating procedures [AGPs], to protect patients, dentists and dental care professionals [DCPs] from cross-infection.[8] In England, Sara Hurley, the Chief Dental Officer [CDO] for England, documented the key principles and protocols for delivering safe and effective face-to-face care.[9] This included PPE protocols for non-AGP and AGP care, and outlined the Infection Prevention and Control Guidance on high, medium and low COVID-19 care pathways published by the UK government.[10] PHE provided guidance on the donning and doffing of PPE for both AGP[11] and non-AGP[12] procedures to supplement COVID-19 protocols. Dental practices were advised to resume their services and undertake a phased approach to providing dental care by risk assessing and prioritising urgent and non-urgent dental cases.[13]

Many UK dental practices faced challenges in obtaining PPE, such as gloves and fluid-resistant surgical masks, before the March 2020 lockdown and prior to reopening, due to the high demand in the healthcare sector and from the public, resulting in supply issues and shortages.[14] Since the reopening of practices, dental teams have found wearing enhanced PPE to be challenging, particularly filtering facepiece [FFP] respirator masks.[15] The masks impact negatively on the wearer's breathing and are a barrier to communication between patients and staff.[16] The British Association of Private Dentistry [BAPD] and the British Dental Association [BDA] independently urged for changes to be made to COVID-19 dental Standard Operating Procedures [SOPs] and suggested that dental SOPs should be reviewed and decided on locally. Furthermore, guidance should be driven by the reproduction or R-number, the average number of secondary infections produced by a single infected person.[17]

The swift implementation of the UK-wide vaccination programme enabled COVID-19 dental SOPs to be regularly reviewed across the four nations, including the need for enhanced PPE and AGP measures to be reassessed in regard to efficiency, necessity, infection prevention and control.

Methodology

A qualitative approach using one-to-one interviews was employed to gain personal insight and experience of how a sample of dental professionals and their patients and practices were affected. Ethical approval was gained from the University of Portsmouth Dental Academy [UPDA] Ethics Committee in September 2021 and the interviews took place in late December 2021.

Participants included some of the author's previous colleagues: three dentists, two dental hygienists and three dental nurses. All participants had been, and were still actively working, in four private general dental practices since the pandemic began, and after the reopening of dental practices in England on 8 June 2020. Each participant was provided with a participant information sheet [PIS] and consent form so they were fully aware of how the information they provided would be used, that the information would be kept confidential and whom to contact if they had any questions or concerns.

The interviews were conducted face-to-face and each participant was asked eight semi-structured questions, which ranged in subject from how COVID-19 impacted the participants' everyday practice, to how the participants felt about having to use enhanced PPE for AGPs long-term. The interviews lasted between nine and seventeen minutes and were audio recorded on a mobile device. Each recording was anonymised by means of a code for each participant and transferred onto a password protected laptop. The data were manually transcribed and participants were given the opportunity of checking the accuracy of the transcripts prior to thematic analysis [TA] commencing. Thematic analysis was undertaken using Braun and Clarke's six stages of thematic analyses. Nine themes and eighteen sub-themes were identified from the data.

Results

Themes and Sub-themes		
	Themes	**Sub-themes**
1	Dental Care Professional Patient Health	Mental Physical
2	Financial implications	General Personal
3	Modifications	Patients Practice
4	Variations in guidance	UK Worldwide
5	PPE Levels	Standard Enhanced
6	Taking Precedence	SOPs Safety (patient and personal)
7	Communication	Dental team Patients
8	Environment	Impact Consequences
9	Adaptation and Incorporation	Now Then

Theme 1: Dental care professional /patient health

Participants described changes they had noticed in their own personal and/or in their patients' general health and recognised that these were a mental and/or physical change apparently impacted by COVID-19.

"Anxiety; patients' anxiety, staff anxiety [was apparent]." Participant A

"...wearing those FFP3 masks I found that my blood pressure was getting low." Participant E

Theme 2: Financial implications

Participants responses ranged from not being personally affected at one extreme to business or financial targets being affected at the other. Half of the participants reported they were not affected personally, for example, Participant B stated: *"I have not been affected at all."* This starkly contrasted with Participant H who stated: *"My income was almost halved!"*

Theme 3: Modifications

The responses reflected how modifications had been made and their impact on several operating procedures in the respondents' various practices. These included appointment times, diary management and ventilation systems. Participant A described how the practice had to: *"Modify our day-list to accommodate fallow time and allow more time generally for disinfecting the room."* This comment is likely to be reflective of many UK dental practices having no choice but to alter patient appointments to comply with COVID-19 dental SOPs.

Theme 4: Variations in guidance

This was an issue that the majority of participants found exasperating and obstructive. The sub-themes were classified into 'UK' and 'Worldwide' as a result of participants comments regarding the differences that they were, or had been made aware of, between the UK and other countries concerning the COVID-19 response and dental SOPs.

Participant C stated: *"I read about different countries and what different countries are doing and I know that Great Britain is really the only country that do all these restrictions in dentistry."* Participant A commented on the fact that: *"Politically, or scientifically, different UK nations have adopted different rules at different times"* thus highlighting frustration with the disparity between the four home nations of England, Northern Ireland, Scotland and Wales.

Theme 5: PPE levels

This was widely discussed by all participants. Five of the eight participants confirmed that wearing enhanced PPE as a result of COVID-19 was not a welcome change. The need to comply with wearing an FFP3 mask was mentioned most frequently - FFP3 masks were the most unpopular item. Participant B stated: *"No-one liked wearing any of it and we still don't!"* They added: *"It wasn't exactly nice wearing it (the FFP3) especially because mine is a Stealth mask so it's chunkier, heavier."* Participant D commented: *"It's a bit more intimidating for kids"*, whilst another said: *"I didn't like the FFP3."*

Participant H stated: *"I do find it hard (wearing the FFP3) when I do back-to-back AGPs"* and *"I did have a patient actually once who came in and said, 'oh you look ridiculous.'"* Participant G pointed out that thankfully they did get a break from wearing the claustrophobic masks: *"A lot of my patients are implant patients, so a lot of them can be reviews and so I'm not doing the AGPs as such."*

Theme 6: Taking precedence

All participants experienced difficulties when making priority decisions regarding themselves, patients and the dental team. In some cases, choices and compromises had to be made, which favoured either SOPs or safety, because these dental professionals felt they could not conform to both.

Participant A was unable to effectively use dental loupes due to wearing an FFP3 mask: *"Then you have to compromise something it's either not seeing as well or adapting the FFP3 mask!"* This is a concern. This clinician had to make a choice between having a clear visual (safe) field when treating the patient and protecting everyone involved in the treatment from possibly contracting COVID-19.

Theme 7: Communication

Participants described how communication processes were impacted wearing FFP3 masks. Some participants spoke of the implementation of new communication procedures as a result of COVID-19 dental SOPs.

Participant C stated: *"Yes, it is very hard, especially with the FFP3 mask because you can't communicate at all!"* Participant H commented: *"It was a real barrier" and "that's when errors occur, like the BPE scores aren't maybe right because people think they're hearing and they're not."* However, for one participant it was not an issue: *"I've not found it too much of a barrier."*

Theme 8: Environment

Surprisingly, with so much focus on sustainability in dentistry, this was the least discussed theme of all, with only half of the participants giving it any consideration. Those that did discuss issues around this theme felt that the main concerns regarding the environmental impact were associated with single use plastics, enhanced PPE and additional clinical waste.

Participant C said: *"Since the pandemic we've used so much more waste, which is not good for Earth."* Participant F commented: *"Everything is thrown, it's just one use only and thrown away, we're not being very good to the environment at all."*

Theme 9: Adaptation and incorporation

This was discussed by all participants. It reflects the differences in COVID-19 related impacts, knowledge and methods since the pandemic first prompted changes in the implementation of UK dentistry up to the time of interview.

The sub-themes were categorised into 'now' and 'then' to differentiate the comments that distinguished separate time periods.

Relative to the first COVID-19 implemented changes in UK dentistry, Participant E stated: *"In the beginning we couldn't see as many patients."* Participant B commented: *"At the initial stages I probably did have anxiety and claustrophobia."*

Eighteen months after UK dental practices reopened and with COVID-19 dental SOPs still in place, Participant F commented: *"At the beginning there was a lot more explaining on why I was wearing everything, but now it's very much the norm."* Participant E added: *"I think probably in the beginning it was worse but now we've been doing it for so long it's part of your working life."*

Discussion

The findings of the study reveal that the majority of the participants did not favour the mandatory wearing of enhanced PPE when carrying out AGPs and they questioned the reasons and evidence for the implementation of COVID-19 UK dental SOPs. However, it should be noted that all the participants had been vaccinated against COVID-19 and this may have influenced their responses.

The COVID-19 pandemic drastically changed the levels of PPE required in dentistry and this impacted various team members in different ways in relation to financial implications and environmental considerations. FFP3 masks were the enhanced PPE item that was largely discussed and the least favoured because of its negative health implications including physical discomfort and dehydration. For many, the FFP3 masks were also a communication barrier. This affected both patients and the dental team, and there was a general perception that wearing these masks may have caused vital issues relating to the gaining of informed consent, the patient's understanding of treatment and clinical note taking.

When there is a significant threat to public health infection control, changes must be implemented quickly. In May 2020, the British Orthodontic Society [BOS] published guidance in line with NHS England and PHE in relation to PPE, AGPs and COVID-19.[18] In the BOS document it stated the minimum PPE requirements for AGP treatments: "Current UDC guidance states the use of FFP3 masks as part of the PPE for AGP procedures."

However, a systematic review[19] concluded that there was little evidence that wearing more PPE led to better protection and might in fact lead to contamination. Although the authors argued that there was little evidence for the use of additional PPE in relation to COVID-19, the College of General Dentistry [CGD] published guidance on the safe management of COVID-19 in general dental practice[20] and in September 2021, the Care Quality Commission [CQC] in England advised on COVID-19 PPE requirements in dental practices. For AGP procedures, the CQC[21] recommended: disposable long-sleeved fluid-resistant gowns or coveralls; FFP3 respirator masks; a full-face shield or visor and gloves.

It is interesting to note that the conclusions in that systematic review,[19] published on the Cochrane Database of Systematic Reviews[22] and ranking highly in the hierarchy of evidence for medicine, were not employed within the field of dentistry.

With regard to UK dental SOPs, the participants stated that because of the ever-changing statutes, the various COVID-19 guidance documents for dentistry were not always easy to interpret and there were undoubtedly grey areas. Variations in dental guidance between the four UK nations was a topic that several participants found interesting, and some participants were aware of differences in dental guidance from other countries. Each of the four UK nations provided COVID-19 dental-specific information in accordance with frequently updated recommendations and statutes made by the UK government. However, the apparent differences between the four UK nations and their varying release dates of COVID-19 dental information may have been a reason for confusion for dental professionals.

It was particularly notable that each of the eight participants had strong views when theme 6 (Taking Precedence) was analysed. Several suggested that, in some cases, assessing capacity and gaining informed consent prior to treatment had been really difficult, particularly when wearing FFP3 masks. This was in marked contrast to pre-pandemic when communication was easier. Furthermore, compromises regarding safety had to be made and questions were asked about the evidence and reasons for COVID-19 dental SOPs. Consequently, the authenticity of COVID-19 dental-specific guidance was questioned and trust in the persons responsible for the information wavered.

Conclusion

The aim of the study was to gain personal insight and experience of how a sample of dental professionals, their patients and practices were affected by the use of mandatory enhanced PPE when undertaking AGPs. This was achieved. The analysis of the data reflect this group of dental professionals' real-life experiences of a fundamental shift-change into the mandatory requirements to alter the way in which they treated patients.

As with the majority of studies, there were a number of limitations which included the timescale for the undergraduate research project, the sample size in comparison to the twelve participants[23] and the exclusion of NHS dental professionals. Each limitation had the potential to improve the quality of the findings and the ability to further answer the research question because different outcomes were possible.

Nevertheless, although the results may not be generalisable, the research does provide good baseline data for present day knowledge and for future research. For future studies that do not have the same limitations, greater insight into working in UK dentistry during the COVID-19 pandemic could inform decision making for the dental sector, should another pandemic occur.

Conflict of interest

There are no conflicts of interest for either author.

There was no funding for this study as it was part of the lead author's undergraduate curriculum.

Authors' contribution

1. HD designed the project proposal, carried out the interviews and wrote up the study.
2. MH supervised project proposal and write up of study.

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