

2023-07-27

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<https://pearl.plymouth.ac.uk/handle/10026.1/21059>

10.1111/cdoe.12898

Community Dentistry and Oral Epidemiology

Wiley

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‘You Learn to Smile with Your Eyes’, Exploring the Impact of Enhanced Personal Protective Equipment on Primary Care Dental Practitioners in the UK: An Interpretative Phenomenological Study

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Journal: Community Dentistry and Oral Epidemiology

Accepted: 19 July 2023

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Keywords

Qualitative Research; Dentistry; Personal Protective Equipment; Clinical Skill; Communication

Funding Statement

ARL is a National Institute for Health and Care Research (NIHR) funded Academic Clinical Fellow. The authors declare no further funding from any agency in the public, commercial or not-for-profit sectors

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest Disclosure

The authors declare no competing interests

Ethics Approval Statement

Ethical approval for this study was granted by the University of Plymouth, Faculty Research Ethics and Integrity Committee; Project number 2654.

Author Contributions

The study was conceptualised by ARL and MN. The interview guide was developed by ARL, JML and MN, with interviews conducted and transcribed by ARL. The process of data analysis, including coding of the emerging themes was undertaken by ARL and MN. The refining of themes to their final iteration involved ARL, JML and MN. The manuscript was drafted by ARL and finalised after critical feedback from JML and MN.

ABSTRACT

Objective: The aim of the study was to explore how dental practitioners in primary care settings perceive the impact of enhanced personal protective equipment (PPE) upon patient communication and wider clinical practice.

Methods: This study utilised a qualitative approach, rooted in critical realism. An Interpretative Phenomenological Analysis (IPA) methodology was adopted as the study method. In accordance with IPA, in-depth semi-structured interviews were conducted. Eight dental practitioners were recruited, with data analysis conducted according to the principles of IPA.

Results: Three themes were synthesised [related to communication and clinical practice]: 1) *Impaired communication and relationship building*; 2) *Physical impacts and required adjustments when wearing enhanced-PPE*; 3) *Psychological stress of implementing enhanced-PPE*. Theme one reflects changes to the dynamic of communication between patients and colleagues brought about by enhanced-PPE. Theme two describes the physical and psychological strains of providing care in enhanced-PPE and the ways through which practitioners tried to overcome these challenges. Theme three explores how the roll-out and guidance related to the use of enhanced-PPE affected clinical practice.

Conclusions: Dental Practitioners described several barriers to communication as well as physical and mental stressors caused by enhanced-PPE, all of which were perceived to impact upon the quality of care provided to patients. Further research is required to develop effective interventions to mitigate the impact of enhanced-PPE upon clinical practice and to explore the long-term impact of enhanced PPE on clinical practice, post COVID.

INTRODUCTION

Contracting infectious diseases is an occupational risk for healthcare workers and can occur through contact with patients' body fluids or blood.¹ Several enhanced infection prevention strategies exist to prevent or manage infectious diseases.² The use of personal protective equipment (PPE) forms a significant part in the management of infective diseases.³ In the case of acute respiratory infections, an enhanced level of PPE is required. Although the concept of what constitutes enhanced-PPE may differ dependent upon time or location, for this study it refers to respirator masks, gloves, and gowns as well as head coverings, face shields or goggles.⁴

The novel human coronavirus, SARS-CoV-2, was first identified in Wuhan, China in 2019.⁵ The resulting illness has become known as COVID-19.² Infection causes a spectrum of symptoms and in severe cases, acute respiratory distress syndrome and death.⁵ COVID-19 spreads via respiratory droplets, allowing the virus to be inhaled, absorbed via mucosal surfaces, or spread through contact with fomites.³ The enhanced infection prevention strategies which are used to manage highly infectious diseases are often only utilised by small numbers of trained staff in hospital-based isolation units.⁶ However, in contrast to other infectious diseases, COVID-19 spread rapidly, also affecting community healthcare.⁷

COVID-19 transmission is of particular concern to dentistry, where practitioners work in patients' airways and many procedures create aerosol or droplets.⁸ Therefore, in response to COVID-19, dental organisations around the world instituted enhanced infection prevention protocols. These included the need for enhanced-PPE for direct patient care.⁹ Much of the evidence supporting the use of enhanced-PPE is of low-quality and conflicting.³ This poor-quality data combined with an absence of dental literature, meant that many of the policies enacted within the dental setting were based upon poor indirect evidence and expert opinion.⁹

Enhanced-PPE has been a cause of emotion and confusion throughout the pandemic.¹⁰ A body of evidence is beginning to take form demonstrating that enhanced-PPE may impact upon the communication and clinical skills of health care workers (HCWs) in a variety of ways.¹¹

A small number of qualitative studies demonstrate additional physical burdens placed upon HCWs when using enhanced-PPE, including issues such as breathlessness, headaches, compromised mobility, and exhaustion.^{10,12-14} Furthermore, HCWs have reported

psychological stress as well as concerns over the efficacy of PPE.¹³ These additional stresses are particularly concerning when considering dentistry, which is regarded as being a stressful profession.¹⁵

The impact of PPE on verbal and non-verbal communication has also been described.^{13,14} This includes a lack of speech clarity, and the loss of facial expression which is perceived to affect cohesiveness of the healthcare teams.¹⁶ Communication problems hampered the creation of relationships between clinicians and patients and make it harder to demonstrate empathy.

The potential impact of enhanced-PPE upon communication and clinical skills is of concern to the practice of dentistry, which requires simultaneous high technical skill and careful patient communication, often compressed into short appointments. However, none of the current available literature exploring the impact of enhanced-PPE upon communication and wider clinical skills relates to the dental setting. With the view of addressing this gap within the literature, this study aimed to explore the experiences of dental practitioners regarding the impact of enhanced-PPE upon patient communication and wider clinical practice within primary care settings. The authors of this study acknowledge the importance of lived experience to attain an understanding of reality and to inform decision making within healthcare, hence the theoretical underpinning of this research within critical realism.¹⁷

METHODS

The Consolidated Criteria for Reporting Qualitative Research (COREQ) were followed and used as guidance to demonstrate quality conduct and structure of the research process.¹⁸ Study approval was granted by the University of Plymouth, Faculty Research Ethics and Integrity Committee.

Theoretical Framework

The research was conducted to explore conscious experience. Phenomenology was therefore the qualitative perspective selected.¹⁹ Interpretative Phenomenological Analysis (IPA) was a suitable methodology for this research, as the principal researcher's (ARL) role as a dental practitioner provided an opportunity to add meaning to participant data, through their shared understanding of the dental workplace, language and culture.²⁰ However, their experience of using enhanced-PPE also made the reflexive process even more pressing. A reflexive diary was utilised, allowing for the principal researcher to manage their own experiences. The other researchers were neither involved in dental practice nor had experience of enhanced-PPE,

which was useful to maximise confirmability of findings and ensure valid and credible data synthesis.²¹

Participant Selection

Participants were selected purposively and were qualified, UK registered dental practitioners. Participants needed to have experience of using enhanced-PPE in primary care. Recruitment was conducted via two avenues. This included the Peninsula Dental Social Enterprise (PDSE) clinical supervisor emailing list. PDSE employs many dentists within Southwest England at the School of Dentistry, University of Plymouth. Secondly, recruitment posts were made via Twitter and LinkedIn.

Practitioners wishing to participate contacted the research team voluntarily and provided informed consent.

Data Collection

Individual in-depth interviews were conducted remotely via Zoom. Interviews were conducted by a single researcher (ARL) following a semi-structured format. A piloted interview guide was developed by the research team (Electronic Supplement Material A). ARL was supported throughout the interview process by JML and MN who have extensive qualitative research experience.

The interviews, lasting between 22-44 minutes, were terminated via mutual agreement. Audio and visual data was collected. Each interview was transcribed verbatim by the principal researcher (ARL). Eight participants were interviewed to reach inductive thematic saturation at the data analysis phase. All researchers agreed that no new relevant codes or subthemes were emerging from the data and no new insights were added from the final participant.

Data Analysis

Initial analysis was conducted independently by two members of the research team (ARL, MN), following a set of common principles.¹⁹ These included rereading and familiarisation, initial noting of descriptive, linguistic and conceptual comments followed by development and connection of codes. This process was repeated separately for each transcript. Codes were mapped using the qualitative analysis software NVivo version 12. Participant codes were then analysed together and refined to form subthemes which were aggregated into themes. This process involved all researchers, with disagreement resolved via discussion. Several strategies were utilised to ensure accurate and credible findings. Firstly, direct quotes were used within the reporting process, ensuring that findings were not removed from their original context.²²

Secondly, the analytic process recognised the importance of providing demographic and contextual information, to maximise transferability. Finally, member validation was undertaken, ensuring concordance between accounts of participants and the researchers.²³

RESULTS

Eight dental practitioners participated in the study (Table-1). The diverse sample included representatives from multiple dental sectors, including salaried and high street NHS practice, armed forces and private practice. There was equal representation of males and females, and the sample included early-, mid- and late-career representatives. All participants provided routine dentistry, although the participant within the NHS salaried service also undertook oral surgery and conscious sedation.

Two participants had practiced within the urgent dental hubs which were set-up during the suspension of routine dental services in the UK and had early exposure to enhanced-PPE. All other participants began using enhanced-PPE following the reopening of dental services in June 2020. Two participants were practice owners, one NHS and one in private practice. All participants averaged a four-day working week. Analysis of participant data led to the aggregation of three themes: 1) *Impaired Communication and Relationship Building*; 2) *Physical impacts and required adjustments when wearing enhanced-PPE*; 3) *Psychological stress of implementing enhanced-PPE*. The processes of identifying each theme from direct quotes are presented in tables 2-4.

Impaired Communication and Relationship Building

All interview participants experienced changes the dynamic of communication. This did not only affect patient-practitioner relationships but also affinity between colleagues. The use of respirator masks meant that speech became muffled. Participants found that they were often having to repeat themselves. The elderly and those with '*learning or hearing disabilities*' (P7) were perceived to be most disadvantaged by enhanced-PPE. One practitioner mentioned: '*they don't realise how much they lip read... we notice that they can't hear you when we're discussing plans for treatment, that kind of thing.*' (P5).

Despite practitioners showing an understanding of the importance of effective communication, and that enhanced-PPE impaired mutual understanding, participants observed that they

engaged *less* with patients. This was compounded by the fact that speaking and breathing with respirator masks was such '*hard work*' (P2) or as another participant said: '*speaking with these masks... many times you would not be understood anyway, so what's the reason to speak?*' (P8).

For some participants, enhanced-PPE intensified what were '*classic*' (P3) difficulties between the dental practitioner and their nurse. Participants reported using gestures and raising their voices to overcome communication problems. These were in turn perceived as rude and aggressive, causing tension within team relationships. The '*strain*' (P5) of communicating in enhanced-PPE had dramatic consequences for members of one participant's nursing team; '*I know nurses who don't work in the profession anymore. It's a strain, the added challenge of the mask, being able to hear.*' (P5).

Participants were aware that enhanced-PPE also had ramifications for non-verbal communication. Practitioners observed that additional layers of PPE acted as a '*physical barrier*' (P7), causing a degree of '*separation*' (P4). Participants perceived that they lacked personability, looking '*faceless*' (P2). This was particularly problematic when meeting new patients; practitioners felt that their patients couldn't get to know them as '*they don't actually really know what you look like*' (P3). These findings demonstrate the importance of being able to read facial expressions during social interactions. See table 2 for a description of all codes contributing to the development of this theme.

Physical Impacts and Required Adjustments when Wearing Enhanced-PPE

This theme describes the physical and psychological strain of providing care in enhanced-PPE and the ways through which practitioners tried to overcome these challenges. Participants discussed the fact that their working environment became uncomfortable. A widely shared experience related to overheating, with clinical work becoming '*sweaty, hot and really tough*' (P2). Participants became '*very dehydrated*' (P4), in turn causing practitioners to suffer from headaches, making even routine procedures challenging.

The restrictiveness of respirator masks around participants' faces caused breathlessness and claustrophobia. This hyperventilation contributed to participant exhaustion and to headaches, owing to hypoxia, as one participant mentioned: '*the masks are really claustrophobic... you find yourself hyperventilating and breathing much faster and heavier than you would do normally*' (P7). Practitioner hyperventilation and overheating was partly responsible for a

further burden upon practice, described by participants as ‘fogging’. This refers to the impairment of vision through eyewear which fills with condensation: *‘I had a memorable one the first time that happened [referring to fogging]... that would have been a very questionable amalgam [filling]. I was fogging up... eventually I could see nothing’* (P3). Furthermore, participants perceived that their thinking skills became impeded. Extra layers of equipment caused compression around the head, which caused distraction and stress. This was described as ‘mindfog’ (P3) and *‘It impacts on your thoughts as well... your ability to process and do complicated things when you are wrapped up like a microwave meal.’* (P5).

The subtheme ‘adjusting and adapting to enhanced-PPE’ provides insight into the ways by which participants modified their use of PPE to mitigate its impact. Participants found innovative means to overcome the perceived barriers to verbal communication, utilising visual tools such as ‘sketches’ (P8). They also felt that that they ended up ‘compensating’ (P3) for the loss of non-verbal cues, trying to express themselves through parts of their face which were visible, as one participant mentioned: *‘you learn to smile with your eyes now instead of your mouth’* (P7). A common solution to the problems posed by enhanced-PPE was to relax its usage. Participants became less concerned about whether ‘they’ve put the mask on correctly’ but about making it ‘more comfortable’ (P5). These experiences suggest that practitioners started exercising judgment; weighing up the impact of enhanced-PPE upon their ability to undertake clinical work against the risk posed by COVID-19.

As PPE impacted upon practitioners, this in turn had ramifications for treatment provided to patients. Practitioners may have consciously or unconsciously changed the care they provided to patients to avoid creating aerosol: *‘It’s interesting talking through and remembering the days where I just used to pick up the scaler and people used to leave with clean teeth.’* (P5). Table 3 provides further insight into the synthesis of this theme, including further supporting quotes.

Psychological Stress of Implementing Enhanced-PPE

This final theme explores the difficulties that participants faced when incorporating enhanced-PPE into their practice. Participants shared a sense of panic as they were ‘scrabbling around’ (P1) to get procedures set up and staff trained. Some participants felt forced to learn how to work with enhanced-PPE on the go and that they were not necessarily sure that they were using PPE correctly; *‘The training was not as good as it could have been... it was a bit of a panic...’*

the first time I had to don the enhanced-PPE; I was being directed by my dental nurse who used it for the first time the week before...’ (P4).

A further difficulty encountered by participants, was that different practitioners had contrasting opinions regarding how enhanced-PPE should be used. This led to confusion and a loss of cohesion. This heightened anxiety was compounded through shortages of enhanced-PPE; participants were using ‘*expired equipment*’ (P8) and in one case, non-clinical ‘*Screwfix™ reusable masks...*’ (P1).

Practitioners’ also doubted some of the evidence used to support enhanced-PPE within the dental setting. They shared an element of suspicion surrounding how effective it was at protecting them and their team. Enhanced-PPE was perceived to simply provide a degree of ‘*theatre*’ (P5), which made patients and practitioners feel safer. See table 4 for further description the process of thematic synthesis.

DISCUSSION

This study is unique, providing the first insight into the impact of enhanced-PPE upon dentistry. Several participants discussed their perceptions of the evidence to support the use of enhanced-PPE, implying that they felt that its use on such a scale within the dental setting was flawed, designed only to help people ‘feel’ protected. Participants described a multitude of stressors upon clinical performance that were also experienced within the wider healthcare context. Visual issues such as fogging and glare were reported commonly within hospital-based surveys and qualitative studies.^{12,24} Participants in our study also felt that respirator masks caused breathlessness; this had a profound impact when trying to perform clinical work due to hypoxia and consequent confusion or headaches. In addition, participants reported issues related to claustrophobia. Godsell *et al.* also identified that the wearing of restrictive equipment can be perceived to be claustrophobic.¹³ This suggests that respirator masks could pose a further psychological as well as physiological burden for practitioners. The impact of psychological stress upon performance within the field of psychology is well established but is less explored within the medical context.²⁵

Participants in hospital-based studies raised similar concerns to the participants in our study regarding the impact of enhanced-PPE upon treatment being provided to patients. Treatment

planning could be influenced either consciously or subconsciously, by a desire to minimise time spent in enhanced-PPE.^{10,13}

The experiences of our study participants demonstrated the impact of enhanced-PPE upon patient and teamworking communication, as words became less clear and the ability to lip read was lost, resulting in repetition and inefficient task completion.¹⁴ It is well documented that healthcare teams are overstretched and stressed, and therefore, enhanced-PPE adds an additional layer of complexity when trying to work efficiently and cooperatively.²⁶ Participants found that diminished ability to communicate through facial expression and body language reduced the ease with which a rapport between patient and practitioner could be built. Enhanced-PPE was perceived to physically block communication by healthcare workers in the hospital setting too.¹³ Practitioners shared an understanding of the need to implement behaviour changes to overcome perceived barriers to communication, particularly maintaining or exaggerating eye contact.²⁷ Participants also described steps taken to mitigate the impact of enhanced-PPE upon them and the care they could provide; this included forfeiting the use of enhanced-PPE appropriately.

These findings have clear implications for future research and demonstrate the importance of working towards striking a balance between using enhanced-PPE in a way which provides sufficient protection whilst minimising the impact that it can have upon communication and clinical practise.

Pre-emptive training informing practitioners of stressors associated with the use of enhanced-PPE may allow them to develop coping strategies to mitigate the impact of these stressors before being exposed to them. This may help reduce negative emotions and provoke thought processes which enhance control over physiological responses to stressors.²⁸ Education regarding breathing techniques when using enhanced-PPE may also help to reduce some of the issues related to practitioner comfort and vision.²⁹

The use of closed loop communication has been used within the aviation industry to reduce miscommunication.³⁰ This simple intervention may improve communication between team members when using enhanced-PPE as it standardises conversations and provides an opportunity for clarification through the three step 'call out', 'check back' and 'confirmation' process. Remote video communications between dental practitioner and patient have been

shown to be received positively by patients.³¹ The increased uptake of ‘teledentistry’ may help to overcome some of the barriers in place when trying to communicate in enhanced-PPE.

The standardisation of guidelines for enhanced-PPE across different organisations may help to reduce some of the fear and scepticism surrounding when and why it should be used. Moreover, a risk-based approach to usage of enhanced-PPE rather than blanket adoption would minimise its impact upon clinical performance and communication as it would be used less frequently.

Little experimental data exists exploring the protectiveness of enhanced-PPE against splatter and aerosol created during dental procedures. It would be beneficial to test different combinations of enhanced-PPE to ascertain their protectiveness within the dental setting. Similarly, there is a paucity of data quantifying the impact of enhanced-PPE upon dental practitioners. It would be valuable to explore the effect of enhanced-PPE upon a number of parameters such as task completion or psychologic measures of stress.

This study warrants to mention some limitations. Auxiliary staff, including nurses and hygiene-therapists are key stakeholders and members of the dental team, who were not included in this study. It would therefore be beneficial to triangulate the findings of this qualitative study by conducting further research involving a wider body of dental team members, as well as patients themselves. Furthermore, the primary sampling method employed meant that seven participants were practicing within Southwest UK, and so perspectives represented were less geographically diverse. The study also only involved UK-based dental practitioners, thus limiting transferability of findings to countries where guidance related to PPE was different. However, the study sample had strengths, including equal representation of male and female practitioners with a range of years of experience. They also represented all sectors of primary care dental practice.

CONCLUSION

This research has expanded upon current literature related to healthcare workers’ experiences of enhanced-PPE and has provided novel data related to dental settings. Dentistry is a stressful profession and was recognised as such prior to the COVID-19 pandemic.¹⁵ The participants in our qualitative study described from their experiences the demands and impacts of wearing enhanced PPE, creating challenging communication and disrupted clinical practice.

It is important to explore ways in which changes to PPE training, equipment, policies, and usage may limit the extent to which it impacts upon performance and communication. This would help to mitigate the impact that enhanced-PPE could have, should another acute viral respiratory illness become widespread within the community in the future.

REFERENCES

- 1 Verbeek J, Rajamaki B, Ijaz S, Sauni R, et al. Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. *Cochrane Database Syst. Rev.* 2020. 5;CD011621.
- 2 Loibner M, Hagauer S, Schwantzer G, Berghold A and Zatloukal K. Limiting factors for wearing personal protective equipment (PPE) in a health care environment evaluated in a randomised study. *PLoS One.* 2019;14(1):e0210775.
- 3 Hersi, M., Stevens, A., Quach, P., Hamel, C., et al. Effectiveness of Personal Protective Equipment for Healthcare Workers Caring for Patients with Filovirus Disease: A Rapid Review. *PLoS One.* 2015;10(10):e0140290.
- 4 World Health Organisation. Infection Prevention and control of epidemic and pandemic prone acute respiratory infections in healthcare; WHO Guideline. Geneva, Switzerland. 2014. URL: <https://www.who.int/publications/i/item/infection-prevention-and-control-of-epidemic-and-pandemic-prone-acute-respiratory-infections-in-health-care>. Accessed February 2022.
- 5 Houghton C, Devane D, Biesty L, Meskell, P, et al. Barriers and facilitators to healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases: A rapid qualitative evidence synthesis. *Cochrane Database Syst. Rev.* 2020;4:1-55.
- 6 Department of Health, Advisory Committee on Dangerous Pathogens. Management of Hazard Group 4 viral haemorrhagic fevers and similar human infectious diseases of high consequence.2015.URL: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/534002/Management_of_VHF_A.pdf. Accessed February 2022.
- 7 Pinasti R, Ernawati. Literature review: Dental practice management in the new normal era and prevention measures regarding dental bioaerosol in Indonesia'. *Indian J. Public Health Res. Dev.* 2020;11(11):270-275.

- 8 Benzian H, Beltrán-Aguilar E, Niederman R. Systemic Management of Pandemic Risks in Dental Practice: A Consolidated Framework for COVID-19 Control in Dentistry. *Front Med.* 2021;8:644515.
- 9 COVID-19 Dental Services Evidence Review (CoDER) Working Group Recommendations for the re-opening of dental services: review of international sources, Version 1.3. 2020. URL: <https://oralhealth.cochrane.org/news/recommendations-re-opening-dental-services-rapid-review-international-sources>. Accessed February 2022.
- 10 Broom J, Broom A, Williams Veazey L, Burns P et al. "One minute it's an airborne virus, then it's a droplet virus, and then it's like nobody really knows...": Experiences of pandemic PPE amongst Australian healthcare workers. *Infect. Dis. Health.* 2021;27(2):71-80.
- 11 Hoernke K, Djellouli N, Andrews L, et al. Frontline healthcare workers' experiences with personal protective equipment during the COVID-19 pandemic in the UK: a rapid qualitative appraisal. *BMJ Open.* 2021;11:e046199.M
- 12 Chen F, Lin X, Zang Y, Liu Y, Wang X. Dispatched nurses' experience of wearing full gear personal protective equipment to care for COVID-19 patients in China-A descriptive qualitative study. *J. Clin. Nurs.* 2021. 30;13-14:2001-2014.
- 13 Godsell M, Shaban R, Gamble J. "Recognizing rapport": health professionals' lived experience of caring for patients under transmission-based precautions in an Australian health care setting. *Am. J. Infect. Control.* 2013;41(11):971-975.
- 14 Hayirli T, Stark N, Bhanja A, Hardy J et al. Masked and distanced: a qualitative study of how personal protective equipment and distancing affect teamwork in emergency care. *IJQHC.* 2021;33:2
- 15 Collin V, Toon M, O'Selmo E, Reynolds L. et a. A survey of stress, burnout and well-being in UK dentists. *BDJ.* 2019;226(1):40-49.
- 16 Hampton T, Crunkhorn, R, Lowe, N, Bhat J et al. The negative impact of wearing personal protective equipment on communication during coronavirus disease 2019. *J. Lar. Otol.* 2020;134(7):577-581
- 17 Smith J, Osborn M. Interpretative phenomenological analysis as a useful methodology for research on the lived experience of pain. *Br.J.Pain.* 2015;9(1),41-42.
- 18 Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *IJQHC.* 2007;19(6):349-357
- 19 Smith J, Flowers P, Larkin M. Interpretative phenomenological analysis: theory, method and research. 2009. London: SAGE publications Inc.
- 20 Alase A. The Interpretative Phenomenological Analysis (IPA): A Guide to a Good Qualitative Research Approach. *IJELS.* 2017;5(2):9-19

- 21 Clancy M. Is reflexivity the key to minimising problems of interpretation in phenomenological research? *Nurse Res.* 2013;20(6):12-16.
- 22 Lockwood C, Munn Z, Porritt K. Qualitative research synthesis *International Journal of Evidence-Based Healthcare.* 2015;13(3):179-187
- 23 Green J, Thorogood N. Qualitative methods for health research. (2009) London: SAGE publications Inc.
- 24 Alarfaj M, Foula M, Alshammary S, Nwesar F. et al. Impact of wearing personal protective equipment on the performance and decision making of surgeons during the COVID-19 pandemic: An observational cross-sectional study. *Medicine.* 2021;100(37):1-5.
- 25 LeBlanc V. (2009) The effects of acute stress on performance: implications for health professions education. *Acad. Med.* 2009;84(10):25–33.
- 26 National Health Service. NHS Staff Survey 2021. National results briefing. 2022. URL: https://www.nhsstaffsurveys.com/static/b3377ce95070ce69e84460fe210a55f0/ST21_National-briefing.pdf. (Accessed June 2022).
- 27 Ferrari G, Dobrina R, Buchini S, Rudan I, et al. The impact of personal protective equipment and social distancing on communication and relation between nurses, caregivers and children: a descriptive qualitative study in a maternal and child health hospital. *J. Clin. Nurs.* 2021;00:1–12.
- 28 LeBlanc V. The effects of acute stress on performance: implications for health professions education.’ *Acad. Med.* 2009;84(10):25–33.
- 29 Ma X, Yue Z, Gong Z, Zhang H. et al. The Effect of Diaphragmatic Breathing on Attention, Negative Affect and Stress in Healthy Adults. *Frontiers in psychology.* 2017;8(874).
- 30 Etherington C, Wu M, Cheng-Boivin O, Larrigan S. et al. Interprofessional communication in the operating room: a narrative review to advance research and practice. *Can. J. Anaesth.* 2019;66(10):1251–1260.
- 31 Rahman N, Nathwani S, Kandiah T. Teledentistry from a patient perspective during the coronavirus pandemic. *BDJ,* 2020;229(3).

TABLES

Table-1: Participant Demographics

Characteristics	Participant No. (<i>n</i> =8)
Sex	
Males	4
Females	4
Years of Dental Practice Experience	
0-5 years	2
5-15 years	2
15-25 years	2
25+ years	2
Dental Practice Setting	
High Street, NHS	2
High Street, Mixed NHS and Private	1
High Street, Private	1
Salaried Service, NHS	1
Salaried Service, Armed Forces	2
Other salaried service (Dental Social Enterprise)	1

Table-2: Description of the synthesis of the theme *Impaired Communication and Relationship Building* from original codes, supported by participant quotes

Theme	Subtheme	Codes	Sample of Quotes which support each Code
<p align="center">Impaired Communication and Relationship Building</p> <p><i>This theme reflects the aggregation of findings related to the changes brought about within the dentist-patient and teamworking relationships through the use of Enhanced-PPE</i></p>	Perceived changes to the dental experience due to the use of enhanced-PPE	Patient appreciation of PPE as it makes them feel safe	<ul style="list-style-type: none"> P1: ‘I think like I said pretty sure patients they were relieved. You know they like, all that stuff: they like having their temperature taken, they like using the hand gel at the door. I could see that they were reassured by it.’
		PPE becoming a point for humour within the dental surgery	<ul style="list-style-type: none"> P4: ‘I also found that patients just struggled to take you seriously but I guess that’s by the by. [laughing] I looked like a Smurf.’
		People are used to PPE, so what would be the surprise at the dentist?	<ul style="list-style-type: none"> P2: ‘I’m actually quite surprised about that because I treat a lot of quite nervous, traumatized patients who were really scared of the dentist, but... Yeah, I think ‘cause so many people are used to wearing masks themselves, that when I’m wearing them, they’re kind of like, oh, it’s fine’
		Patient acknowledgement of the difficulties of practicing in enhanced-PPE	<ul style="list-style-type: none"> P5: ‘I think that just the response I get from patients is that they’re very grateful for what they can see that we’re putting ourselves through really especially when, whether it’s hot and you know it’s exhausting and you know they’re doing long procedures or I’m trying to work through a surgical or something’
	Communication when wearing enhanced-PPE	Barrier to non-verbal communication and causing separation from patients	<ul style="list-style-type: none"> P4: ‘the patients already in pain and worked up, and then they walk in and they see you dressed, like, uh, a Darth Vader kind of mask on and you can’t give... and you can’t give them... we’re very separated I guess’
		Breakdown of teamworking and communication	<ul style="list-style-type: none"> P5: ‘I think nurses who have poor hearing have suffered. I know some nurses who have had problems who don’t work in the profession anymore. It’s a strain you know, the added challenge of the stealth mask, being able to hear.’
		Difficulty in being understood through masks, and effort of verbal communication	<ul style="list-style-type: none"> P7: ‘A lot of our patients have learning or hearing disabilities as well, and so the masks just muffle everything for those patients’

Table-3: Description of the synthesis of the theme *Physical impacts and required adjustments when wearing enhanced-PPE* from original codes, supported by participant quotes

Theme	Subtheme	Codes	Sample of Quotes which support each Code
<p>Physical impacts and required adjustments when wearing enhanced-PPE</p> <p><i>This theme demonstrates the consequences of enhanced-PPE upon the clinical aspects of care provision, as opposed to the more relational aspects of dental care.</i></p>	Burden of PPE on the self	Breathlessness, exhaustion, and claustrophobic conditions	<ul style="list-style-type: none"> P4: ‘Initially, it was extremely difficult to breathe and you would find yourself... I would find myself at the beginning of my appointments just reassuring my patients that I may sound breathless when I’m speaking.’
		Tougher working environment	<ul style="list-style-type: none"> P7: ‘you could come out of a surgical procedure and you felt like you, well you were drenched weren’t you you were drenched, and so that physically took its toll you know.’
		Unwanted reactions to enhanced-PPE	<ul style="list-style-type: none"> P2: ‘ I was wearing it an awful lot and I suffer with eczema quite badly and I did get a real bad flare up of eczema on my face.’
		Fogging and visual problems	<ul style="list-style-type: none"> P3: ‘I had a memorable one the first time that happened [referring to steaming up]... that would have been a very questionable amalgam. [laughing]’
		Restrictiveness of E-PPE affects thought processes, causing ‘mindfog’	<ul style="list-style-type: none"> P5: ‘it impacts on your thoughts as well, your ability to process, and do complicated things when you are wrapped up like a microwave meal.’
	Adjusting and adapting to E-PPE	Changing the type of PPE	<ul style="list-style-type: none"> P3: ‘we had the new masks and I got fit tested for one of those and tried that, and that was much better.’
		Getting used to changes	<ul style="list-style-type: none"> P7: ‘you know you got used to it and and then once you get used to it you relax. When you relax, you stop hyperventilating and, and you get used to positioning the light and your head and then you get used to the visor. And and so, yeah, you adapt quite quickly to it, yeah.’
		Creating ‘work-arounds’ to enhanced-PPE	<ul style="list-style-type: none"> P1: ‘I just thought how am I going to talk to people with all this gear on, so it just makes sense to me to get them in first of all, see what the problem was, tell them what we’re going to do, take radiographs or whatever, uh, give them local anesthetic. Uh, so I would do everything up until the point of the AGP in my normal PPE.’
	Alterations to treatment provision	Changes to treatment methods	<ul style="list-style-type: none"> P1: ‘like I said, a lot of the time you could find a way to make it [the procedure] not an AGP... extraction! [laughing].’
		Cost of enhanced-PPE	<ul style="list-style-type: none"> P8: ‘I raised the prices because of course you know we had to do something you know to to survive as a practice.’

Table-4: Description of the synthesis of the theme *Psychological stress of implementing enhanced-PPE* from original codes, supported by participant quotes

Theme	Subtheme	Codes	Sample of Quotes which support each Code
<p>Psychological stress of implementing enhanced-PPE</p> <p><i>Subthemes are brought together highlighting the added strain placed upon the practitioner through the roll-out of enhanced-PPE and the guidance available for its use</i></p>	Practice preparedness for the use of enhanced-PPE	Initial panic for the use of enhanced-PPE across practices	<ul style="list-style-type: none"> P4: ‘I suppose the training was probably not as good as it could have been it was all as bit of a panic wasn’t it, when we first started using it, and I guess there was no time...’
		E-PPE equipment shortages	<ul style="list-style-type: none"> P7: ‘I mean the PPE we were getting was coming out of a bunker from Salisbury Plain or something, and you could see every avian flu pandemic or previous pandemic we trained for over the last 20 years ‘cause they slapped a new sell by date on the PPE and it all smelled mouldy’
	Guidance for the use of enhanced-PPE	Implementation of guidance is a learning curve, reflecting the nature of medical practice	<ul style="list-style-type: none"> P7: ‘I could take a wisdom tooth out here, or a wisdom tooth at the hospital or a wisdom tooth at the dental school, and we'd be wearing different levels of PPE, you know, for the same procedure’
		Doubting the evidence for E-PPE	<ul style="list-style-type: none"> P6: ‘I think that it [Enhanced-PPE] gave confidence to people to treat - based on poor evidence, but people feel a bit better if you put a plastic thing in the way, like you know saying, sit behind this wall and you won't get shot.’
		Recognition that even with E-PPE, the management of aerosol is very difficult	<ul style="list-style-type: none"> P4: ‘I think the most frustrating thing about the, the whole of this... all these enhanced measures, is that one thing can go wrong and it almost makes everything else seem, worthless’