RESEARCH PAPER

" Effect of Covid 19 on global healthcare delivery and practices: A Narrative Review".

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ABSTRACT
Background: COVID-19 is a viral disease that primarily affects the lungs, potentially leading to severe and life-threatening conditions. Recognized as a global public health crisis, the World Health Organization (WHO) classified it as a pandemic on March 11, 2020. Recent outbreaks of coronaviruses have contributed to ongoing public health challenges. Coronaviruses are positive-sense RNA viruses that primarily impact the human respiratory system. This study aims to address challenges faced by dental professionals during the pandemic and to improve preparedness for future health emergencies. COVID-19 has significantly influenced healthcare practices worldwide, highlighting the need for dental professionals to uphold rigorous infection control standards. Timely, strategic health decisions and adherence to consistent protocols are crucial in minimizing viral transmission. In addition to routine protective measures such as masks and gloves, dental practices are encouraged to incorporate preoperative rinses and high-volume evacuation to reduce infection risk. The dental setting presents unique challenges in infection control, necessitating appropriate strategies. These include pre-evaluating patients, using appropriate PPE, practising strict hand hygiene, and utilizing tools like rubber dams and anti-retraction handpieces. Additionally, thorough disinfection procedures and proper waste disposal within clinics are essential for maintaining a safe environment..
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INTRODUCTION

COVID-19 is a viral disease affecting the lungs that might be serious and deadly, and has emerged as a serious calamity for public health across the world. The World Health Organization (WHO) declared it officially a pandemic on March 11, 2020. Apart from the health consequences of the disease itself, this pandemic has even altered society worldwide, with obligatory lockdowns and social distancing almost globally, leading to devastating economic effects for various industries and resulting in the shutting of factories, stores, and offices[1].

In the past few years, coronavirus outbreaks have become a significant public health concern worldwide. Coronaviruses are a family of RNA viruses that primarily infect the respiratory systems of humans. Some recent strains, such as Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS), have appeared in animals like cows, camels, and cats, showing zoonotic transmission to humans. The newly isolated viral strain was initially called "the novel coronavirus" (nCoV) and later named "Severe Acute Respiratory Syndrome Coronavirus 2" (SARS-CoV-2). The rapid spread of coronavirus disease 2019 (COVID-19) has led many governments to implement extraordinary measures to contain the infection[2]. Because health is a primary concern, the rise in cases and fatalities has resulted in enforced quarantines, home isolation, and restrictions on travel and movement in many countries, significantly impacting people's daily and working lives. The pandemic has also affected the quality of life for the general public and healthcare workers (HCWs), leading to various psychological issues such as generalized anxiety disorder, depression, poor sleep quality, and others.

The COVID-19 pandemic has introduced substantial challenges for both dental and medical professionals. Due to close contact with patients and exposure to bodily fluids, along with the generation of droplets and aerosols, dental professionals are particularly at risk for airborne infections such as COVID-19. To reduce the risk of transmission within healthcare settings, many European countries temporarily restricted dental services to emergency care only[2]. To address these risks, national and international health organizations have recommended enhanced safety protocols, including additional personal protective equipment (PPE). However, the intense worldwide demand for PPE has led to shortages, making it difficult for dental providers to access necessary protective supplies[3].

As a result of the rapid spread of COVID-19, most countries worldwide implemented stay-at-home orders and restricted or prohibited professional activities, including elective dental care. The latest national survey of dentists and

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specialists reveals that the COVID-19 crisis has greatly impacted the provision of dental care[4]. During this time, institutions training future dental professionals also closed their doors, allowing only emergency care, and sent students home. In addition to increasing health risks for those providing emergency care at dental institutions, the disruption of both pre-doctoral and post-doctoral dental education caused by COVID-19 has had several implications[5].

Hence, this present study was conducted to harness these insights regarding the problems faced by dental professionals during the pandemic and enhance the dental community's preparedness for future health crises, acknowledging the profound effects COVID-19 has had on global healthcare delivery and practices.

Methods:

This literature review helped us gain a deeper understanding of the importance of oral health and its impact on both oral and general health. Moreover, our research highlighted the disparities in access to dental care that exist among different populations. This literature study covered 18 articles, 3 (16.67%) of which are quantitative and 15 (83.33%) qualitative (Fig 1).

Relevant databases, including PubMed, Google Scholar, Sage Journals, and Wiley Online Library, were searched. A recurring theme across the 18 articles was the problems faced by dentists during this pandemic due to the poor knowledge regarding this pandemic, treatment disparities experienced by the dentists due to lack of proper prevention kits, lockdowns and lack of Telehealth services. The main emphasis of each article was identified and categorized into five focused areas: Problems faced by Dentists during COVID-19, Tele Health Practice, Lessons learned from COVID-19 and Preparing the Dental workforce for future Crises.

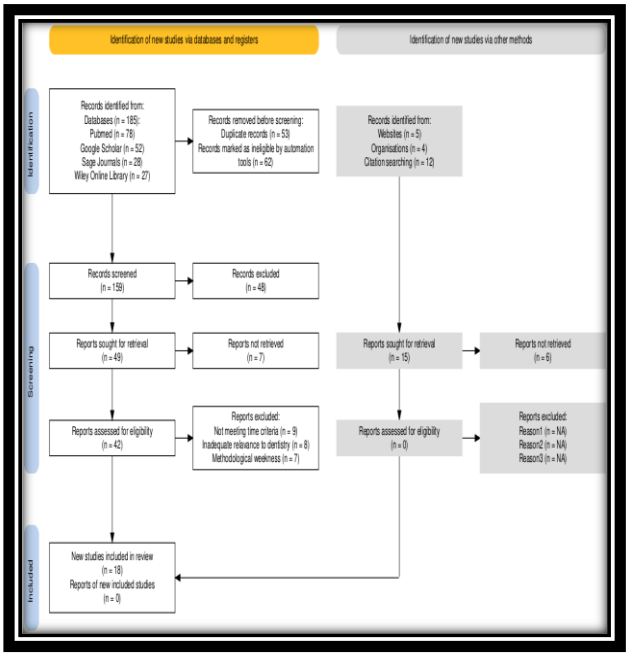

Fig 1: PRISMA 2020 flow diagram depicting the study selection process[6]

Problems faced by dentists during COVID-19:

We are all well aware of the occupational hazards associated with dentistry, including hepatitis B and C, along with their relative risks. The possibility of a dental professional being positive for COVID-19 and infecting other patients potentially must not be ignored. It has come into view as a difficult task for the healthcare system including dentistry; as the primary route for spread is said to be by droplet transmission, during coughing, sneezing, and contact with fomites additionally[7]. However, there are legitimate concerns concerning aerosol transmission generated while talking, breathing, etc. In a few cases, feco-oral transmission has also been reported with viral isolation from the faeces of some patients. Most countries including India are using measures such as complete lockdown and quarantine of positive and suspected cases of COVID-19. Routine attention to dental care has been terminated in most countries after the complete lockdown[8].

Dental Professionals are treating emergency dental cases with strict use of protocols and guidelines like the use of personal protection equipment (PPE). So many countries then quickly started to take measures to reduce cases in the community; they started quarantining positive and suspected cases to prevent possible transmission between known cases and the local population; measures such as self-isolation, social distancing, and enhanced hygiene practices[9]. The New York Times brought to the notice of the world that dentistry had the highest risk out of many professions concerning COVID-19. Literature indicates that dental healthcare professionals are at high risk of COVID-19 infection due to their close, face-to-face interactions with patients[10]. In another study, it was found that the COVID-19 epidemic affected people's patterns of utilizing emergency dental services in Beijing, China. As reported within the limitations of the study, the COVID-19 epidemic had a significant impact on the use of emergency dental healthcare services[11].

Tele Health Practice and COVID 19:

Telemedicine has proven to be the most effective tool in mitigating some of the effects caused by the imposition of restrictive measures among people during the COVID-19 pandemic. Several authors have suggested that inconsistency in implementing telemedicine as a solution for ongoing medical education contributes to the lack of standardized protocols for aerosol-generating procedures in dentistry[12]. Teledentistry has been increasingly used by various dental schools during the pandemic.

Although there are numerous regional differences in isolation policies, the severity of the outbreak and the availability of resources have greatly impacted the functioning of dental schools during the pandemic, although the responses of dental institutions to the COVID-19 pandemic show some similarities in work. While e-learning already existed before, it evolved and expanded as a result of the COVID-19 pandemic, with the use of synchronous online teaching methods when interacting with participants. Since 2019, several tele dentistry

platforms, like Olo Health®, have emerged to help prevent and manage oral malignant disorders and improve overall oral health, aiming to reduce unnecessary travel and minimise productivity loss[13]. Similarly, teledentistry has been effectively utilized for treating patients with more complex oral conditions by conducting photographic teleconsultations for initial visits and follow-up evaluations, enabling effective remote patient management. After an adequate anamnesis by video call and photographic evaluations during the first visit, patients were followed up with remote evaluations of their pathologies, such as fungal infections, dry mouth syndrome, sialolithiasis, traumatic ulcers, third molar pericoronitis and others[14].

Telemedicine was further used in cases that would normally require clinical examination to distinguish between potentially malignant lesions from those that were truly malignant and necessitated immediate attention. This enabled dentists to treat patients with precancerous lesions, medication-related jaw osteonecrosis, and controlled autoimmune diseases by comparing newly received photos with the last photos taken at the dental clinic. For these conditions, clinical changes were assessed to evaluate the risk of malignant processes and to manage potential recurrences, infections, pain, and lesion stability. In addition to the various devices that can be used in telemedicine, instant messaging applications have become increasingly popular for better communication between doctors and patients. For example, WhatsApp-based teleradiology consultation proved to be an effective tool for interpreting X-rays with different dental pathologies for patients. Furthermore, dental telemedicine can be successfully applied during the follow-up of patients who have undergone extraction or oral and maxillofacial surgical procedures, although more work is required to determine patients' compliance and doctors' attitudes towards integrating remote dentistry in the standard protocols of telemedicine[15].

Lessons learned from COVID-19:

According to the FDI, the primary role of dental practitioners during an infectious disease outbreak is to deliver safe and suitable oral health care. This should encompass preventive, diagnostic, and therapeutic care. Those who have the appropriate skills and training should be used to support other healthcare professionals in front-line positions. Therapeutic and preventive oral health care should remain accessible during infectious disease outbreaks due to the connection between oral health and overall health and well-being[16]. Oral health should be a priority in the initial response to infectious disease outbreaks, as the chronic nature of major oral diseases and the impact of interrupted care can contribute to the progression of communicable diseases. Dental care providers should follow all guidelines and regulations governing their participation in mitigating the risk of transmission of infectious diseases in clinical settings. They should also promote patient's oral health through prevention, education, and the empowerment of patients to perform proper home oral health care. Innovative technologies such as tele dentistry can expand the reach of dental practices and provide safe access to care for patients and care providers[17].

Governmental and National Dental Association (NDA) groups should include dentists and dental team members in all discussions and decisions regarding the regulation and guidance of healthcare delivery and health professional roles. All active practitioners should have access to affordable PPE and continuing education modules on relevant topics. Governmental and NDA bodies can help with appropriate financial aid and administrative support during and after infectious disease outbreaks when few patients are being cared for. Appropriate financial and administrative assistance can also be provided for public oral health care programs by the Government and NDA bodies to help cover the costs of complying with local regulations for safe practice. Dental practitioners and dental students can be prioritized for vaccination and included in vaccine administration programs, with the provision that dental team members receive proper training for this role[18].

Dental students should be prepared for handling infectious disease outbreaks through the inclusion of specific public health and infectious disease curriculums in their training This must include information about the mode of transmission and IPC measures. Training in evidence-based infection control and clinical procedures is required so that students learn proper management techniques to limit aerosol production or spread. In addition, dental students should be trained in the importance of collaborating with other healthcare professionals. Digital, virtual, and in-person technology methods should be included in student's opportunities for learning. Students should also be provided with the knowledge and skills that will allow them to be integrated into frontline emergency response teams[19].

Research institutions should support studies on infectious disease transmission and ways to minimize it within dental settings. Aerosol-generating procedures and IPCs are specific areas to be included in research projects *(FDI World Dental Federation, 2022)*.

Preparing the Dental workforce for future crises:

The unexpected nature of the COVID-19 public health crisis brings to light an important question: "Are we adequately preparing the future dental workforce to handle similar outbreaks?" This emphasizes the importance of incorporating crisis management training into dental education, equipping students with essential skills for responding to health crises and natural disasters. Such training should include obtaining reliable information, communicating effectively with patients, communities, and staff, providing emergency dental care, triaging patients through various methods (e.g., phone, video, or in-office), and managing financial challenges associated with crises[20]. It also underscores the need for training in teledentistry. A recent national survey revealed that nearly 20% of responding dental professionals had to close their practices entirely, highlighting the important role of teledentistry in such situations. Although dentistry is a field that requires in-person consultations to comprehensively assess and treat oral diseases, teledentistry is a great platform to offer consultations and referrals, mainly when social distancing

is warranted[21]. By minimizing direct patient interactions, tele dentistry also has the potential to reduce the use of personal protective equipment (PPE) and other highly valuable clinical resources during a pandemic.

This crisis has made it evident that there is an urgent need for frontline health professionals, leading to calls for retired physicians to rejoin the medical workforce. If dentists are willing to volunteer during a crisis, they should have the opportunity to do so, which underscores the importance of training future dental professionals and providing ongoing education programs to prepare the dental workforce[22]. A notable example is California’s executive order recognizing dentists as essential healthcare workers, with a call for dental professionals to join the California Health Corps to help manage the rise in COVID-19 cases.

DISCUSSION:

This Narrative Review explored the impact of the COVID-19 pandemic on dental professionals globally. It was found that, upon reopening clinics, health workers had to adjust their practices, emphasizing the importance of implementing stricter sterilization procedures, personal protective measures, and screening protocols to protect both their health and the public's safety[23]. As with many healthcare workers, dentists are required to work near the patients, which places them at high risk of contracting the infection through dental aerosols and respiratory droplets during procedures. It was unsurprising, that routine dental services were suspended, limiting care to emergency cases only. However, dental professionals in many regions around the world were unprepared for the restrictions imposed on their practice[24].

As a result, they faced numerous challenges, including uncertainties about how to distinguish between emergency, urgent, and non-urgent cases. Dentists expressed indecision regarding cases they were allowed to treat, particularly in the absence of clear guidelines from their professional association and seemingly *ad hoc* rulings from authorities, which confused rather than clarified. They also encountered the moral dilemma of providing only symptomatic treatment for non-emergency cases, even though this approach did not align with professional guidelines[25].

They had the additional responsibility of considering the collective welfare of the public, and their safety and balancing this with providing definitive treatment for all patients as required by their professional ethics. In contrast to dental health workers, many primary healthcare workers continued their duties throughout the pandemic. However, congruently, they also had to contend with changes in their practices, including retraining and redeployment to cope with the rapidly increasing number of positive COVID-19 cases[26].

This is especially true for frontline nurses, who had to adapt to increased workloads, the discomfort of additional layers of PPE, and a higher risk of exposure to occupational hazards, including direct contact with contaminated instruments and patient secretions, contributing to higher anxiety not only for their safety but that of their families. Adding to these challenges are the perceptions and beliefs shaped by misinformation spread across various platforms and sectors of society. Lack of knowledge and stigma can lead to fear and even aggression, underscoring the importance of authorities delivering factual, evidence-based, and consistent communication during a crisis[27].

While restrictive measures may have helped reduce the spread of the virus, they also infringed upon people’s freedom. Research indicates that isolation and quarantine can lead to heightened stress, anxiety, and depression. For dentists, a major source of fear and anxiety during the pandemic was the risk of unknowingly contracting the virus and transmitting it to other patients or their own families. Social distancing measures further strained family relationships, as family members feared they might carry COVID-19. These effects had significant mental health implications and should be taken into account in future interventions[28].

In most settings, many went above and beyond to lessen the social, economic, and financial impacts of the pandemic through advocacy and volunteerism. Many were determined to be better prepared and committed to continuing personal protective measures and biosafety practices in their clinics post-pandemic, underscoring the strong collectivist values and desire to protect others in the community[29]. Therefore, future guidelines and protocols from dental associations and healthcare organizations for use during a pandemic should consider the collectivist orientation and close family ties within communities. This approach would help ensure that restrictions are appropriate, reducing fear and fostering greater acceptance of practice changes. While this study considers dentists as primary healthcare workers who, like others in the health workforce, are required to work near patients, the transferability of research findings may have limited applicability to other primary healthcare workers due to inherent differences in roles and responsibilities.

CONCLUSION:

COVID-19 has challenged healthcare systems and healthcare professionals significantly. The role of oral healthcare professionals is vital. In the oral healthcare sector, additional training to improve health or simulations regarding infection control should be emphasized, as putting themselves at unnecessary risk is morally unacceptable. The incidence of infection has demonstrated that healthcare providers and dental practice teams are at a higher risk of SARS-CoV-2 exposure due to direct interactions with patients and potential contact with blood, contaminated saliva, other bodily fluids, and infected sharps[30].

Healthcare professionals are responsible for adhering to high infection control standards, with timely clinical decisions playing a critical role in promoting effective health strategies. Uniform protocols and guidelines should be followed to prevent the spread of the virus. In addition to standard barriers such as masks and gloves, preoperative rinses and high-volume evacuation are recommended. Dental practices present a challenging environment for controlling infection transmission; therefore, level-

appropriate strategies must be implemented. These include patient pre-evaluation, proper use of PPE, hand hygiene, rubber dams, and possibly anti-retraction handpieces. Additionally, clinic disinfection and proper waste disposal are also essential[31].

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