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Challenges in Provision of Essential Dental Care Services by Dentists during the Covid-19 Pandemic in Public and Private Healthcare Facilities in Islamabad, Pakistan

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ABSTRACT

Background: The COVID-19 pandemic has been a burden to all healthcare professionals, including dentists. The close contact and exposure to aerosols create a serious health hazard for the dental professionals; it's impossible to halt the clinical practice completely, as it not only is economically challenging, but also creates an ethical dilemma by depriving patients of care who are in need. This study aimed to explore various challenges faced by dental professionals in providing essential dental care services during the COVID-19 pandemic in public and private healthcare facilities of Islamabad and assessed their knowledge and attitude regarding updated guidelines, PPE protocols, and their implementation. **Methods:** It was a descriptive cross-sectional study that used a comprehensive questionnaire to collect data about various variables related to challenges faced by dental professionals practicing during the COVID-19 pandemic. The questionnaire consisted of eight sections, including socio-demographic, patient attitude, trends of practice, medical resources, COVID-19 SOPs, PPE, financial burden, anxiety, and depression. A sample of 70 dental professionals, with the majority dentists (93%), participated in the study. About 43% practiced in private clinics, 30% in private hospitals, and 26% in public hospitals. The data were collected using Google Forms, and then the statistical analyses using the chi-square test at $p<0.05$ were conducted using SPSS software version 25. **Results:** Majority of the participants (70%) agreed that the practice changed during COVID-19, about 68% performed non-emergency procedures due to various underlying reasons. The type of workplace was also significantly associated with a decrease in income, use of another source of income, taking a COVID-19 test for patients, and belief that the latest guidelines of dental settings during COVID-19 are useful. The field of practice of dental practitioners was significantly associated with the belief that the phone is effective in resolving patients' dental problems, the types of dental services provided, and belief in possible changes in guidelines toward dental practice during COVID-19 in the future. **Conclusion:** The study revealed that even though the knowledge of dental practitioners regarding the latest guidelines seemed up to date, they faced financial, psychological, and other challenges regarding resources in their

practices owing to this pandemic. Thus, the government and policymakers must pay attention to these factors while designing future guidelines and ensure the availability of the required material and equipment.

Keywords: COVID-19, Dentists, Dental Practice, Essential Dental Care Services, Pandemic

INTRODUCTION

Coronavirus introduced itself in 2019 as SARS-CoV-2 and affected the world as a pandemic with its drastic infection. Initially, the virus was believed to be an animal-based virus and kept transmitting harmlessly among animals. It didn't show any adverse effects on animals and hence, was not taken quite seriously by scientists and pathologists around the globe [1]. The virus began to capture tremendous attention when the first human transmission was reported in Wuhan, China. Symptoms of this virus were like a known virus, SARS (2003), causing severe acute respiratory syndrome [2]. The wave of infection kept on rising day by day, and the whole world came under the cloud of a grim situation of the Pandemic. Its transmission and infection rate made it a global emergency all over the world. On March 11, 2020, World Health Organization (WHO) declared it a global pandemic [2, 3]. COVID-19 has affected every aspect of life. It has also greatly affected medical and dental facilities all over the world. The patient flow in hospitals has been reduced due to fear of getting infected. The patient flow in hospitals has been reduced due to fear of getting infected. This has resulted in an increase in mortalities besides those caused by the coronavirus. The discussed issue has not only affected the cardiac or neurological-related patients, but the dental-based appointments have also been significantly reduced [4].

Dental settings carry a high risk of cross-infections and rapid spread between the patient and health worker, as well as other staff members and visitors. Hence, dental hospitals and clinics require a highly effective mechanism of infection control and disease prevention urgently. COVID-19 may become an airborne disease and spread through aerosols formed during dental treatment [5]. For the time being, dentist need to move a wedge of their attentiveness towards the essentials of infection control. Moreover, the pertinent and requisite use of PPE by the workers and disposable aids for patients' protection must be established [5, 6]. Considering discoveries of genetic and epidemiologic exploration, apparently, the COVID-19 flare-up began with a single animal-to-human transmission, followed by continued human-to-human spread [7]. The transmission is mainly through aerosol droplets. In a dental setting, the patient and doctor interaction are so close, and the chances of catching an infection are high. So, dentist and patient interaction is at high risk [8]. Dental COVID-19 safety guidelines require aerosol-generating procedures to be done in negative-pressure isolation rooms (AIIRs) and the strict use of PPE (N95/equivalent respirators, eye protection, gloves, gowns). Clinicians will have to minimize the presence of staff/visitors, use aerosol-reducing procedures (rubber dams, high-volume suction, anti-retraction handpieces), and limit aerosol-generating instruments (ultrasonics, high-speeds). Examples of environmental controls are EPA-approved disinfectants and dry surfaces. Other precautions are resorbable sutures to minimize follow-ups, dilution of sodium hypochlorite for endodontics, and the use of OPGs to minimize close contact [9].

Due to the COVID-19 pandemic dental community has faced multiple setbacks. This emergency affects livelihoods across the globe. Health issues were equally faced by developed and developing countries. Indeed, the use of essential dental care services is a key metric for tracking progress toward the 3rd Sustainable Development Goals (SDG) call for good health and well-being [10]. The experts recommended considering 3A treatment during the pandemic to avoid all the risks associated with dental settings. The 3A stands for: Advice, Analgesics, Antibiotics. Thus, all the dental workers should use this triple A formula while working [11]. The dental proceedings are always at the highest risk of exposure with the patient's infections, as they include close contact with the patient's mouth and mucosal fluids. The aerosols or droplets might be emitted from manual or automated treatments in the dental department. These aerosols or droplets are small enough to persist in the air and ultimately gain entry to others' respiratory tract [12]. Several studies have been conducted to investigate the major influence of the spread of COVID-19 on hospitals. Results illustrated that dentists and other oral health workers have experienced economic, ethical, professional, and social concerns. To overcome the severity of the problems, different strategies are taken into consideration. In a nutshell, all the provided information indicates that there is still a major gap in all the studies conducted on COVID-19, probably due to its recent origin. None of the studies yet published demonstrates the situation thoroughly. The purpose of this study is to address the challenges faced by the dental workers in private and government hospitals of Islamabad to control the infection.

MATERIALS AND METHODS

This descriptive cross-sectional study employed a quantitative design and was conducted over a 3–4-month period (September–December 2021). The study setting encompassed tertiary care facilities in Islamabad, including 23 hospitals (7 government, 13 private, 3 semi-government) and 7 dedicated dental hospitals (1 government, 6 private). Participants comprised 70 licensed dental professionals actively practicing during the COVID-19 pandemic, selected via purposive sampling. Exclusion criteria applied to non-practicing professionals. Key variables included the dependent variable, Dental care services, and independent variables: Socio-demographic profile, medical resources, Hygiene, PPE, Cross-infection control, financial aid, Hospital administration role, COVID-19 SOPs, and Patient's attitude.

DATA COLLECTION PROCEDURE

Data was collected using a structured quantitative questionnaire distributed electronically. Variables were categorized into thematic sections for evaluation: medical resources (1 item), PPE (4 items), financial aid (6 items), practitioner's perspective on patient attitude (4 items), trends in dental practice (6 items), and anxiety/depression (2 items). Responses were compiled and managed using Google Forms before analysis.

STATISTICAL ANALYSIS

Data were analysed using SPSS version 25. Descriptive statistics (frequencies/percentages) summarize categorical variables. Inferential analysis utilized Pearson's chi-square tests with cross-tabulation to assess associations between three independent variables (gender, workplace type, and field of practice) and outcome variables across COVID-19-related categories. Statistical significance was set at $p<0.05$. Data cleaning and entry were performed within the SPSS environment.

RESULTS

A total of 70 participants took part in the study. Four age groups were selected; most participants fell into the age range of 24 to 34 years. Out of 70 dentists, 45 (64%) were female who responded to the questionnaire. The data was collected from private, public hospitals and from a few private clinics. The questionnaire has been responded to by 48 general dentists and 22 specialists. Most participants (43.5%, n=30) were practicing in private clinics, about 30% (n=21) in private hospitals, while only 26% (n=18) in public hospitals. Participants were mostly young dentists, with the majority (94.3%, n=66) having <10 years' experience. About 93% of participants were dentists, while only five participants were hygienists. Among these, over 75% were general dentists, while the remaining were specialists. As we concluded from this study, 47.1% of dental professionals responded that during the pandemic, there was a rise in phone calls by patients. 70% of dentists have changed their working time and dental practice during the emergency. 31.4% of dentists didn't perform any non-emergency treatment during the pandemic, while 45.7% performed procedures because of patients' requests, and 22.9% performed procedures because of the financial crisis. 30% dental professionals were more focused on preventive care, whereas 48.6% were not performing unnecessary treatments. Descriptive results showed that most dentists faced challenges in getting PPE.

They reported that there was a significant increase in the price of PPEs due to an increase in usage. In section 3, questions were asked about the experience of dentists during the pandemic. 37.1% of dentists were providing emergency treatment, 14.3% were giving palliative/supportive care to the patients, while 17.1% were more inclined towards preventive care. Responses were taken regarding the attitude of patients towards seeking the essential dental care services. 45.7% responded that patients do not bother about the pandemic anymore. 31.4% felt that patients are more comfortable taking advice on phone calls, whereas 8.6% believed that patients use home remedies and self-medication. For patient facilitation, 7.1% thought tele-dentistry is the key solution in a pandemic situation for remote counseling, while in 22.9% dentists' opinions, awareness of patients is very important regarding maintenance of oral hygiene and in seeking essential dental services in time.

Table 1: Analysis of Demographic Characteristics of Study Population

Category	Variable	F	%
Gender	Female	45	64.30

	Male	25	35.70
	General dentists	48	68.60
Professional Background	Specialists	22	31.40
	Dental hygienists	5	7.10
Clinical Experience	<10 years	66	94.30
	Private clinics	30	42.90
Practice Setting	Private hospitals	21	30.00
	Public hospitals	18	25.70
	Changed work hours/practice	49	70.00
Pandemic Impact	Increased phone calls	33	47.10
	Not performed	22	31.40
Treatment Behavior: Non-Emergency	Performance: Patient requests	32	45.70
Procedure	Performed: Financial reasons	16	22.90
	Preventive care focus	21	30.00
Clinical Priorities	Avoiding unnecessary treatments	34	48.60
	Emergency treatment	26	37.10
Service Provision	Palliative/supportive care	10	14.30
	"Not bothered" by pandemic	32	45.70
	Preferred phone consultations	22	31.40
Patient Attitudes	Used home remedies/self-medication	6	8.60

There was a strong correlation between the field of practice of dentists and their perception of the efficacy of phone calls to address the dental issues of the patients (p=0.031). Phone consultations were unanimously supported by pediatric dentists (both practitioners agreed/strongly agreed), but prosthodontists were not as supportive (all were neutral to strongly disagree). Orthodontists were mostly neutral (6/8), but general dentists, the largest group (n=48), were mixed: 19 agreed, 15 were neutral, and 12 disagreed (7 disagreed + 5 strongly disagreed). The most extreme was the single endodontist strongly agreeing, and OMFS radiology had no responses.

Table 2: Association Between Field of Dental Practice and Belief in the Effectiveness of Phone Calls to Resolve Patients' Dental Problems

Variables		Belief that the Phone is Effective to Resolve Patients' Dental Problems					Total	P-Value
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
Field of Practice	Pediatric Dentistry	1	1	0	0	0	2	0.031
	Prosthodontics	0	0	1	1	1	3	
	Orthodontics	0	1	6	1	0	8	
	OMFS Radiology	0	0	0	0	0	0	
	OMF surgery	0	2	2	1	1	6	
	Endodontics	1	0	0	0	0	1	
	Operative Dentistry	0	1	0	1	0	2	
	General Dentistry	2	19	15	7	5	48	
Total		4	24	24	11	7	70	

Table 3: Association between Field of Dental Practice and types of dental services provided

Variables		Types of Dental Services Provided								Total	P
		ET (1)	PLC (2)	PC (3)	NT	1 & 2	2 & 3	1,2 & 3	1 & 3		
Field of Practice	Paediatric Dentistry	1	1	0	0	0	0	0	0	2	0.038
	Prosthodontics	2	1	0	0	0	0	0	0	3	
	Orthodontics	3	0	2	0	0	1	1	1	8	
	OMFS Radiology	0	0	0	0	0	0	0	0	0	
	OMF surgery	4	0	0	0	0	0	1	1	6	
	Endodontics	0	0	0	1	0	0	0	0	1	
	Operative Dentistry	2	0	0	0	0	0	0	0	2	
	General Dentistry	14	8	10	1	1	0	11	3	48	
Total		26	10	12	2	1	1	13	5	70	

ET: Emergency Treatment, PLC: Palliative Care, PC: Preventive Care, NT: No Treatment

Table 3 shows that there is a statistically significant relationship between field of practice and type of services offered by dental practitioners during the pandemic (p =.038). Pediatric dentists (n = 2) provided services only in the form of emergency treatment (ET; n = 1) or palliative care (PLC; n = 1). Prosthodontic practitioners (n = 3) provided ET only (n = 2) or PLC only (n = 1). The most varied services were provided by orthodontists (n = 8): ET alone (n = 3), PC alone (n = 2), and PLC+PC (n = 1), ET+PLC+PC (n = 1), and ET+PC (n = 1). The OMF surgeons (n = 6) offered mostly ET (n = 4) although they also offered combined services (ET+PLC+PC: n = 1; ET+PC: n = 1). The one endodontist indicated that he did not provide any treatment (NT). ET was provided by operative dentists only (n = 2). General dentists (n = 48) showed general service patterns: ET alone (29.2%, n = 14), PLC alone (16.7%, n = 8), PC alone (20.8%, n = 10), NT (2.1%, n = 1), and combinations--most notably ET+PLC+PC (22.9%, n = 11). OMFS radiology specialists did not report on any services.

Table 4: Association between Type of Dental Practice (Workplace) and Effect on Income during Covid-19

Type of Workplace	Public Hospital		Private Hospital		Private Clinic		P-value
Variables	Yes	No	Yes	No	Yes	No	
Decrease in income	7	11	14	7	24	6	**0.014**
Use of another source of income	2	16	10	11	12	18	**0.042**
Total	9	27	24	18	36	24	

There was a major gender-related disparity in the attitude of dentists towards the utility of COVID-19 guidelines (p=0.014). Male practitioners showed a higher level of endorsement, whereby 44% (11/25) strongly agreed regarding the utility of the guidelines and 84% (21/25) agreed in general. Female practitioners, on the other hand, were generally supportive (80%, 36/45 agreed or strongly agreed), but had more subdued enthusiasm: only 13% (6/45) strongly agreed, and 66% (30/45) chose standard agreement. It is important to note that the neutrality was higher among females (18%, 8/45 vs. 8% among males), and disagreement was low in both groups. This trend indicates that although both sexes held guidelines in a positive manner, male dentists were more vocal in their acceptance.

Table 5: Perspective of Dental Practitioners Regarding Usefulness of Latest Guidelines for COVID-19 in Dental Settings

Variables		Belief in the Usefulness of the Latest Guidelines for COVID-19 in the Dental Setting					Total	P-Value
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
Gender	Male	11	10	2	2	0	25	0.014
	Female	6	30	8	1	0	45	
Total		17	40	10	3	0	70	

The COVID-19 policy views of dentists were considerably affected by the workplace setting. Practitioners in government hospitals had the highest testing adherence (89% agreement with testing patients) and guideline endorsement (94% agreement) but reported the highest dissent (11% testing disagreement) as well. The views on testing were polarized (60% agreement vs. 20% disagreement), and the support of the guidelines was tempered (83% agreement but only 10% strong agreement) in the private clinics. The middle ground was found in the private hospitals, where 67% of the hospitals agreed to testing and 67% approved the guidelines, but the neutrality was significant (29% in testing). The two policies were also quite related to the workplace (testing: p=0.013; guidelines: p=0.015) and showed the impact of institutional contexts on pandemic responses.

Table 6: Association between Type of Dental Practice (Workplace) and Observance and Belief in Policy regarding Covid-19 in dental settings

Variables		Taking the COVID-19 Test for Patients					Total	P-Value
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
Type of Workplace	Government Hospital	9	7	0	1	1	18	0.013
	Private Hospital	7	7	6	0	1	21	
	Private Clinic	3	15	6	6	0	30	
Total		19	29	12	7	2	69	

Variables		Belief in the Usefulness of the Latest Guidelines for COVID-19 in the Dental Setting					Total	P-Value
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
Workplace	Government Hospital	9	8	0	1	18	9	0.015
	Private Hospital	4	10	6	1	21	4	
	Private Clinic	3	22	4	1	30	3	
Total		16	40	10	3	69	16	

Specialization significantly influenced dentists' expectations about future COVID-19 guideline changes (p=0.033). Surgical fields demonstrated the strongest anticipation of updates, with OMF surgeons showing the highest conviction (50%, 3/6 strongly agreed). Pediatric and prosthodontic specialists unanimously expected modifications (all agreed/strongly agreed), while orthodontists were predominantly neutral (63%, 5/8). General dentists—representing the majority—leaned toward agreement

(71%, 34/48 agreed/strongly agreed) but with notable neutrality (27%, 13/48). Only isolated dissent emerged in operative dentistry (1/2 disagreed) and OMF surgery (1/6 disagreed). This pattern suggests practitioners in high-aerosol specialties anticipated greater policy volatility, while orthodontists foresaw stability.

Table 7: Variation of Belief among Dental Practitioners regarding Possible Changes in COVID-19 Related Guidelines toward Dental Practice in the Future

Variables		Belief in a Possible Change in Guidelines toward Dental Practice during COVID-19 in the Future					Total	P-Value
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
Field of Practice	Pediatric Dentistry	1	1	0	0	0	2	0.033
	Prosthodontics	1	2	0	0	0	3	
	Orthodontics	0	3	5	0	0	8	
	OMFS Radiology	0	0	0	0	0	0	
	OMF surgery	3	1	1	1	0	6	
	Endodontics	0	1	0	0	0	1	
	Operative Dentistry	1	0	0	1	0	2	
	General Dentistry	7	27	13	1	0	48	
Total		13	35	19	3	0	70	

DISCUSSION

COVID-19, due to its contagiousness and risk of infection due to ease of exposure from respiratory droplets, has been a serious concern for dental practitioners and hence their patients [13]. Aldhuwayhi et al [21] reported that 99% dentists believe that dentists are at a higher risk of COVID-19. Our results also showed that about 43% (n=30) of dental practitioner and about 36% (n=25) of their dental assistants tested positive for COVID-19 [14]. On the contrary, Ahmadi et al. reported only 1% (n=3) Covid positive participants and none of the assistants tested positive, while 3% reported having a symptom for COVID-19. Another country-level study reported the COVID-19 positivity rate among dentists to be 17% in Pakistan [8, 15]. Regarding exposure, our results showed that about 57% participants reported that they had visits from high-risk patients. However, only 6% (n=15) of participants in Ahmadi et al., study reported visits from high-risk patients [16].

The trends, protocols, and services of dental settings changed during the COVID-19 pandemic, and the fast spread of the virus impacted the patient load and attitude towards dental care. Several questions in our questionnaire addressed this domain to find out about changes in the dental practice standards and services. Based on our study findings, 70% dental practitioners changed their time and practice during the pandemic [17, 18]. Of the 87% participants who changed their dental practice standards, 31% shifted their focus to preventive care, 46% changed by not performing unnecessary treatment, 10% changed by reducing treatment sessions, while 13% not report any changes. Although 40% did not perform non-emergency procedures, among those who did, about 9% mentioned aesthetic procedures only, 6% mentioned restorative treatment of asymptomatic caries only, 3% mentioned extraction of asymptomatic teeth only, 23% mentioned initial examination only, 10% mentioned all of these, and remaining mentioned a combination of one or more [19].

Similarly, these rates of non-emergency procedures are quite high and seem unreasonable, but we did not find any statistically significant association for them. In the study by Ahmadi et ai, 82% did not perform non-emergency procedures, only 2% reported performing aesthetic procedures, 1% performed restorative treatment of asymptomatic teeth, 2% performed extraction of asymptomatic teeth, while 11% performed initial examination only [17, 20]. Failure to understand the question could be one possible explanation for the high rates of non-emergency procedures in our study. If not, patient request, financial incentive, and lack of strict disciplinary action could be other possible reasons. The study found that about 68% study participants who

performed non-emergency procedures reported it to be due to the patient's request in >42% of cases and due to financial problems in >25% cases [21].

When asked about types of dental services being provided, 37% mentioned emergency treatments only, 14% reported palliative care only, and 17 % reported preventive care only, while 19% reported all three. The remaining answers were a combination of these options. Our study also found that 27% dentists reported no change in treatment plans during the pandemic, about 11% reported that they cancelled all treatment until the end of the alert phase of the pandemic, 3% reported cancellation until end of pandemic, while remaining 45% reported that they performed emergency treatment only or a combination of these options [17, 20]. Ahmadi et al [23] reported no change in response by only 1%, treatment cancellation until the alert phase of the pandemic by 26%, treatment cancellation end of the pandemic by 46% and emergency treatment only by 26% participants [17, 20]. One section of our study questionnaire inquired about changes in patients' attitudes regarding the use of dental services during COVID-19. Our study results found that 47% participants (n=33) reported an increase in phone calls from patients, which reflects a shift towards tele-dentistry. The questionnaire also asked about the dentist's perspective regarding these phone calls were effective in resolving patients' dental problems. About 6% responded as "strongly agree" and 34% with "agree" about 34% submitted a neutral response, while 26% fell in the disagreement categories. These results also varied statistically significantly among participants from various fields of practice. Ahmadi et al didn't report any association but reported agreement by 7% and disagreement by 63% participants. Another question regarding dentists' understanding of patients' perspectives of COVID-19 was also recorded on a Likert scale of agreement. About 46% participants responded that "patients do not bother anymore", about 31% responded with "taking advice on phone call from doctors", and 9% with the use of "home remedies and self-medication", and the remaining were a combination of these options [17, 20].

COVID-19 SOPs have also been a new addition among the guidelines to be reviewed and implemented to ensure patient and doctor safety. Our study also reported the beliefs and practices of dental practitioners regarding the COVID-19 SOPs by the WHO, CDC, etc. Our study reported that >82% practitioners reviewed the guidelines, >81% agreed to believe in the usefulness of the latest guidelines, and >84% reported implementation of them. Our results for belief in the usefulness of guidelines were statistically significant against gender and type of workplace, i.e., government hospital versus private hospital or clinic ($p<0.05$) [16]. Other studies didn't report these associations, but Ahmadi et al [23] reported similar descriptive results with 81% dental practitioners agreeing to follow the latest guidelines for dental practice during the pandemic. Another study by Aldhuwayhi et al, reported that 92% dentists believe that the transmission of COVID-19 can be prevented by following standard guidelines by the WHO, CDC, ADA, etc. [17, 20, 22]. Regarding implementation of COVID-19-related SOPs in dental settings, >71% participants reported that they examined the patients for symptoms related to COVID-19, and about 70% reported taking a COVID-19 test for patients. Again, the association between the type of workplace and COVID-19 SOPs regarding taking the COVID-19 test for patients was also statistically significant ($p<0.05$) [23]. G. Campus et al. reported that >57% dentists assessed their patients for symptoms of COVID-19 19 and Ahmadi et al, reported agreement to implementation of these guidelines in the dental practices of 85% dental practitioners [8, 23].

As per the last question in the COVID-19 SOPs section, about 68% agreed that the guidelines towards dental practice during COVID-19 will change in the future. This variable had a statistically significant association with the field of practice variable ($p<0.05$) [23, 24]. Other studies didn't report these associations, but Aldhuwayhi et al, reported that 60% dentist consider available information about COVID-19 in their professional society to be insufficient. This agreed with our study findings of 68% dentists believing in possible changes in guidelines with time. The study by Aldhuwayhi et al also compared these perception scores against different fields of practice, but their results were statistically insignificant [22-24]. The research found that most Pakistani dentists were experiencing difficulties with PPE in the COVID-19 environment: more than 65 percent experienced PPE shortages, 82 percent reported price increases, and 77 percent reported higher use, but 79 percent confirmed the usefulness of PPE in preventing transmission of which differed significantly by gender, work location, or specialty. Financial distress was severe, with>65 percent losing income (strongly associated with workplace), >43 percent relying on secondary sources of income, and 17 percent laid off assistants. Psychological effects were also harsh, with 74% saying they experienced anxiety/depression (65% because of pandemic news) [25]. The strengths were multidimensional measurement in clinical, financial, and mental health areas, and the presence of a variety of practice settings, which demonstrates sufficient knowledge of dentists about the

pandemic. The limitations included a small sample size (n=70) that was not evenly distributed, snowball sampling, and a cross-sectional design, which limits generalizability and the importance of future longitudinal research despite the resource limitations.

LIMITATIONS AND RECOMMENDATIONS

This study's limitations include its small sample size (n=70), uneven distribution across age, gender, specialty, and workplace (e.g., 94% young dentists, underrepresentation of public sector), reliance on non-probability snowball sampling, and cross-sectional design—all constraining generalizability and causal inference. Future research should employ longitudinal designs with larger, stratified samples to track evolving impacts, incorporate mixed-methods approaches to explore contextual drivers of financial/psychological strain, quantify PPE supply-chain gaps, and evaluate policy interventions like subsidies for equipment/income loss. Studies must also extend to rural settings and use validated mental health metrics to enable cross-national comparisons, strengthening crisis preparedness for dental systems.

CONCLUSION

The present study reported an overall sufficient knowledge and understanding of dental practitioners regarding dental practice during COVID-19. Even though their knowledge and learning regarding the latest guidelines seemed up to date, they faced financial, mental, and other challenges regarding resources in their practices. The government and other policymakers must pay attention to all these factors while designing future guidelines and try to ensure the availability of the required material and equipment. There's no doubt regarding the dire need for more longitudinal studies and high-quality evidence-based studies, but based on current literature and our study, we conclude that resources have been scarce during COVID-19. Furthermore, the dental professionals have faced serious financial constraints as well as psychological problems owing to this pandemic. Therefore, in this difficult time, we need to support each other within our professional community, continue to follow proper guidelines and protocol to deal with patients, be particularly cautious with aerosols and try to disinfect the clinical space as much as possible and last but not the least, we need to take care of our mental health and wellbeing, and that of those around us.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION

Maham Zulfiqar designed the research with the help of her supervisor, Dr. Nighat Sultana, conducted a literature search, designed data collection, and designed data collection. Technical content is added by the supervisor. Dr Mahrukh Zafar took care of data cleaning, biostatistics, study results, and editing the manuscript. Final approval of the draft was done by the supervisor.

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