

Navigating the Pandemic Storm: A Survey of Libyan Dentists' Experiences and Adaptations to COVID-19

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Abstract

Background: Dental healthcare systems in developing nations have faced unprecedented difficulties in maintaining consistent and sufficient healthcare services amid the COVID-19 pandemic. Numerous countries, Libya included, have introduced rigorous guidelines. These measures are designed to create alternative approaches, aiming to reduce the potential transmission of COVID-19.

Material and Methods: In November 2023, an anonymous online survey targeting Libyan dentists was distributed through professional networks and associations. Conducted electronically via secure online platforms or email, responses were collected until the end of January. The survey comprised approximately 16 questions covering challenges encountered during the pandemic, coping strategies, changes in infection control practices, and demographic information.

Result: The survey revealed that the 31-40 age group comprised 64.4% of respondents, highlighting its prevalence. Additionally, 73.1% identified as dentists, emphasizing their crucial role in primary dental care. Government guidance influenced clinical practices for 66.3% of respondents. COVID-19 led to a substantial decrease in patient numbers, reported by 49% of respondents. Teleconsultations were favored, with 77.9% opting for telephone consultations and 56.7% for video consultations, emphasizing the importance of telehealth. Most respondents (55.8%) expressed cautious optimism about a 3 to 6-month timeframe for a return to pre-pandemic clinical activity levels. A significant majority (70.2%) stressed the need for stronger cross-infection measures. Furthermore, 73.1% of respondents were willing to undergo regular testing, reflecting a proactive approach in curbing COVID-19 transmission within dental settings.

Conclusion: This study provides valuable insights into the challenges faced by dental professionals in Libya during the COVID-19 pandemic. Key findings include changes in clinical procedures, widespread adoption of preventative measures, and expectations for improved care quality post-pandemic. These findings highlight the dedication of dental practitioners to maintaining high standards of care while prioritizing public health and safety in challenging circumstances.

Keywords: COVID-19; libyan dentists; survey; infection control; pandemic; dental healthcare systems; and telehealth

Introduction

In late 2019, a new coronavirus, known as COVID-19, emerged in Wuhan, China, and rapidly spread globally, posing unprecedented challenges in public health, humanitarian efforts, and the economy. Consequently, numerous countries and government agencies implemented nationwide lockdowns to restrict human movement and curb the virus's spread [1]. Despite preventive and responsive measures, the global count of confirmed COVID-19 cases had surpassed 206 million by August 2021, resulting in over 4.3 million fatalities worldwide. This emphasizes the severity of the global health crisis [2]. The COVID-19 pandemic has triggered an

unparalleled global health emergency, fostering worldwide collaboration to detect novel virus strains, produce and distribute vaccines, and comprehend ways to adapt to living with COVID-19 [3]. Despite the virus primarily spreading through droplets and face-to-face contact, healthcare systems have persevered in delivering services, placing healthcare workers, especially dental care professionals, at the forefront of exposure to the infection [4].

It is documented that the saliva of an infected individual harbors a substantial viral load [5], making aerosol-generating procedures (AGPs) in dental practice a significant potential source of cross-infection and transmission [6].

Additionally, the work of Coulthard et al. (2020) emphasizes the importance of adapting infection prevention protocols in dental practices [7]. These references lay the groundwork for our exploration into the unique circumstances faced by dentists in Libya during the pandemic. In compliance with national lockdown regulations, global dental associations, including the Libyan Dental Association, recommended the temporary suspension of routine elective care [8]. Throughout this period, the dental profession sustained services by utilising telephone or virtual consultations and providing guidance. Simultaneously, emergency care was delivered either at dental clinics or designated local hubs.[8,9]

The impact of COVID-19 on Libyan dentists has been profound and multifaceted [10]. The enforced national lockdowns and restrictions on non-essential services disrupted dental practices, significantly affecting patient volumes [11], and, consequently, the financial stability of dental professionals [12]. The necessity to adhere to stringent infection control measures [12], including the use of personal protective equipment (PPE) and modifications to practice environments, aimed at safeguarding both dentists and patients but posed additional challenges to the routine workflow of dental clinics [11,12]. Moreover, adapting treatment protocols became essential to prioritize urgent cases and mitigate the risk of virus transmission, leading to adjustments in procedures and the implementation of new clinical guidelines [13]. The adoption of telehealth and teledentistry emerged as a crucial response, providing a means for virtual consultations and follow-ups, especially for non-urgent cases [14]. The mental health impact on dental professionals cannot be understated, as the stress of adapting to new protocols, concerns about personal safety, and the overall uncertainty of the situation may have contributed to mental health challenges within the profession [15]. Additionally, disruptions to conferences and continuing education programs presented challenges for ongoing professional development and networking opportunities [16]. On a positive note, dentists may have actively participated in vaccination efforts, contributing to public health initiatives by administering COVID-19 vaccines or supporting vaccination campaigns [17, 18].

Based on these findings, this study comprehensively documents and analyzes the diverse experiences of Libyan dentists during the COVID-19 outbreak. It sheds light on the challenges they faced, the adaptive strategies employed, and the evolving landscape of infection control and prevention practices in dentistry. The present study offers a nuanced understanding of the impact of the pandemic on dental professionals, with the aim of facilitating the development of informed guidelines and recommendations for future preparedness in the face of global health crises.

Material and Methods

1.1 Participant Recruitment

In this study, dentists were selected from different regions of Libyan society, encompassing various sectors. The inclusion criteria stipulated that participants must be residents of Libya and aged 25 years or older.

1.2 Questionnaire

We distributed an anonymous questionnaire through Google Forms among dentists in Libya in November 2023, utilizing text messages, emails, WhatsApp, and various social media platforms. To ensure the high quality of the collected data, we designated all essential questions with the required function, and 104 responses were collected from different countries in Libya.

This survey encompassed participants' socio-demographic information, the effects of the COVID-19 pandemic on dental practices, responses to the crisis, perspectives on the pandemic's lasting impact, and the influence of vaccination campaigns. Additionally, the questionnaire featured "free text" sections, enabling respondents to provide extra comments for thematic analysis, enhancing our comprehension of the quantitative data.

1.3 Study analysis instrument

The returned survey responses were downloaded to an Excel document to allow detailed analysis. The data were "cleaned" by assessing the data at an individual

level with reference to the date stamps, demographic information, and free-text entries to allow removal of any duplications. The cleaned data was analyzed to produce quantitative and qualitative results. Statistical analyses were conducted using Statistical google sheet to generate descriptive statistics, with a significance level set at ($P < 0.05$). Open-ended responses were reviewed and categorized into thematic groups.

Result

1.1 Demographic

The survey received 120 responses, and after the data was carefully cleaned, it resulted in 104 unique responses. Notably, there was a slightly higher participation rate from males than females, as illustrated in (Figure.1). Predominantly, respondents were higher from Benghazi (39.4%, $n=41$), followed by Tripoli (32.7%, $n=34$), Misrata (15.4%, $n=16$), and Sabha (3.8%, $n=4$) (Figure.2). The majority of responses were received from those aged (31-40) (64.4%, $n= 67$)(Figure.3).

Figure.1: Demographic information: (Gender)

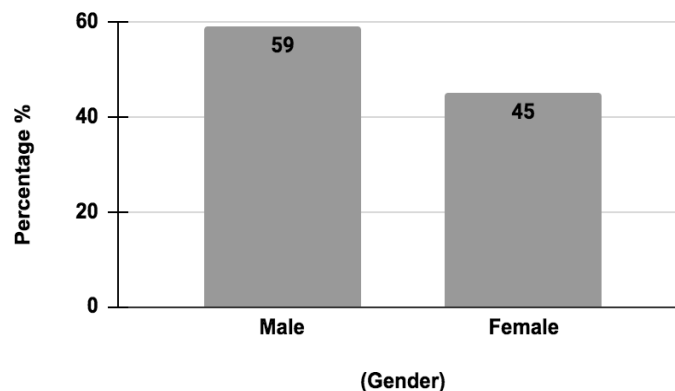


Figure.2:Geographical distribution

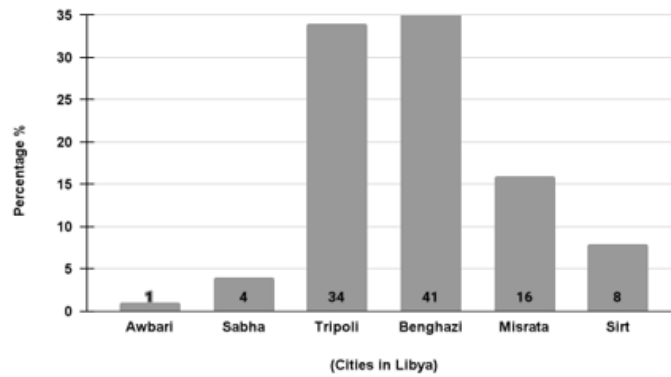
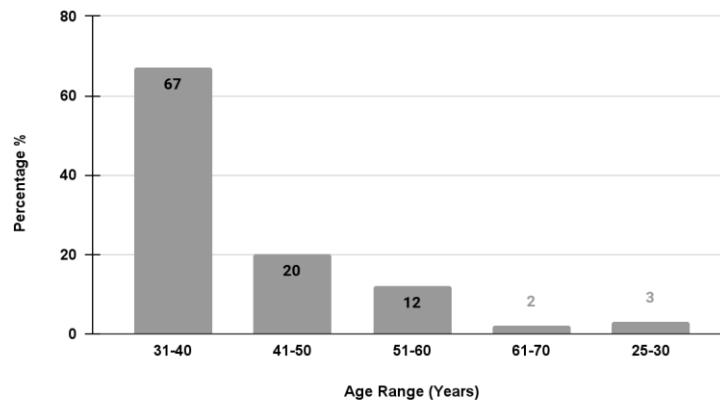


Figure.3:Demographic information: (Age)



1.2 Clinical practice

The respondents were asked to describe themselves professionally. The majority of respondents described themselves as dentists (73.1%, n=76) with (16.3%,n=17) describing themselves as specialists (6.7 %,n=7) of respondents were in internship and (3.8%,n=4) of the sample were

consultants (Figure.4). Regarding the locations where respondents offered their dental services, as depicted in (Figure. 5), the data indicated that the majority operated within the public sector (51.9%, n=54). In contrast, those affiliated with the private sector comprised (29.8% n=31), and (17.3% n=18) were engaged in both private and public sectors. A minimal percentage of (0.9% , n=1) were associated with the academic sector.

Figure.4:How do you describe yourself (professionally)

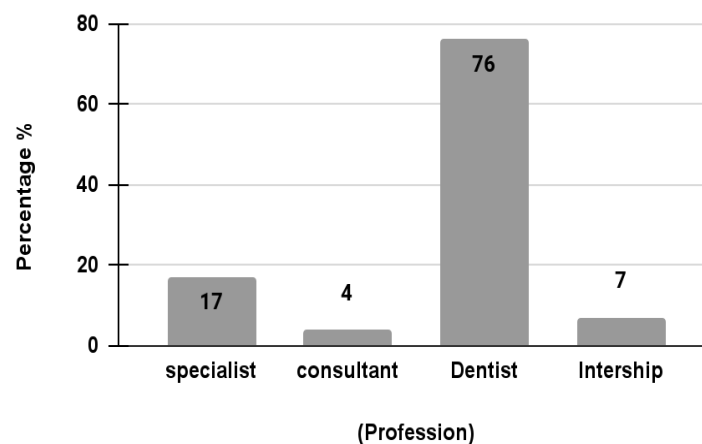
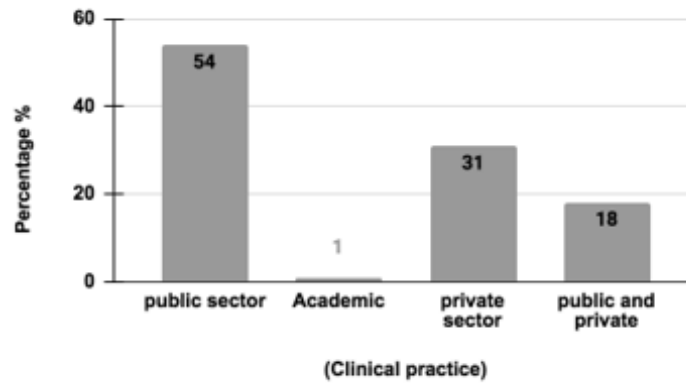


Figure.5: Clinical practice



1.3 COVID impact on clinical capacity

The impact of COVID-19 on clinical capacity within dental care systems has been substantial and multifaceted, with several contributing factors. These effects manifest in various aspects of clinical capacity. The survey specifically examined the primary reasons for changes in clinical practices, as illustrated in (Figure 6). A notable proportion of respondents encountered the effects of diverse factors, with the most significant influences being government guidance (66.3%, n=69), local restrictions (64.4%, n=67),

heightened cross-infection measures (28.8%, n=30), and workforce challenges, such as staff sickness and self-isolation (24%, n=25). One intriguing facet deserving close examination is to know how much has changed in the amount of patients since the start of the COVID-19 pandemic across dental care. as depicted in (Figure. 7). Many respondents reported a substantial decrease in the number of patients since the beginning of the pandemic, comprising 49% (n=51). Another group of respondents noted a slight increase, accounting for 27.9% (n=29), while a smaller portion, 16.3% (n=17), mentioned a slight decrease. A minority, 5.8% (n=6), indicated that there was no change in the number of patients.

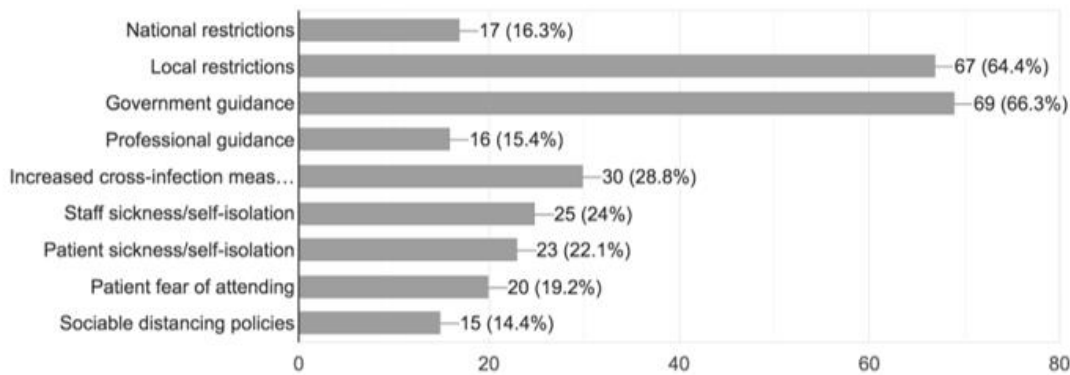


Figure 6: Throughout the pandemic what factors primarily contributed alterations in your clinical capacity?

1.4 Adapting to Crisis: Navigating Challenges During the Pandemic

The survey inquired about the additional measures implemented by respondents during the crisis, as presented in (Figure. 8). A mere (21.2% , n=22) of practitioners opted not to employ any additional measures. Among those who proactively introduced supplementary measures, the predominant methods were telephone consultations (77.9%, n=81) and video consultations (56.7%, n=59). These emerged as the primary strategies employed during the COVID-19 pandemic to effectively adapt to the

crisis(Figure. 9) presents the opinions of respondents regarding the timeframe required for dental clinical activity to revert to pre-COVID-19 levels. The predominant response indicated that it would take more than 3 months but less than 6 months (55.8%, n=58). Additionally, 31.7% (n=33) of respondents reported that clinical activity took more than 6 months but less than 9 months to return to pre-COVID-19 levels. A smaller proportion of respondents, accounting for 8.7% (n=9), mentioned that it took less than 3 months for dental activity to return to pre-COVID-19 levels.

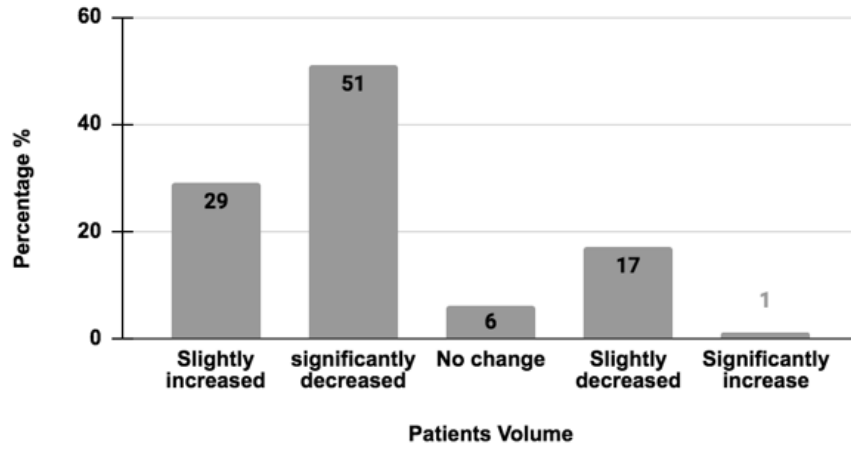
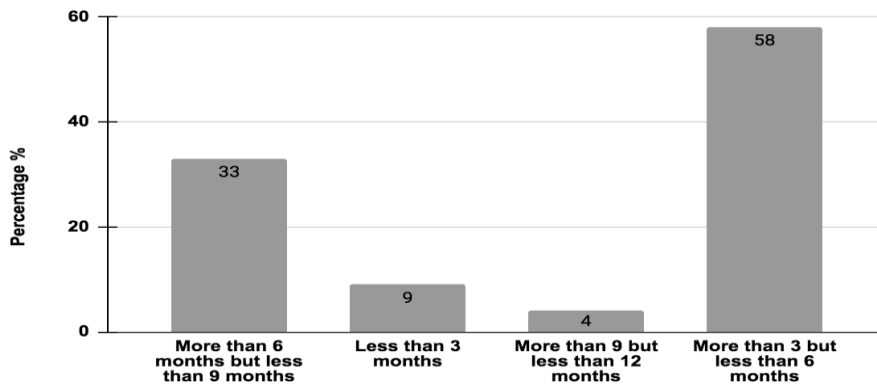


Figure 8: How did you adapt during the pandemic?

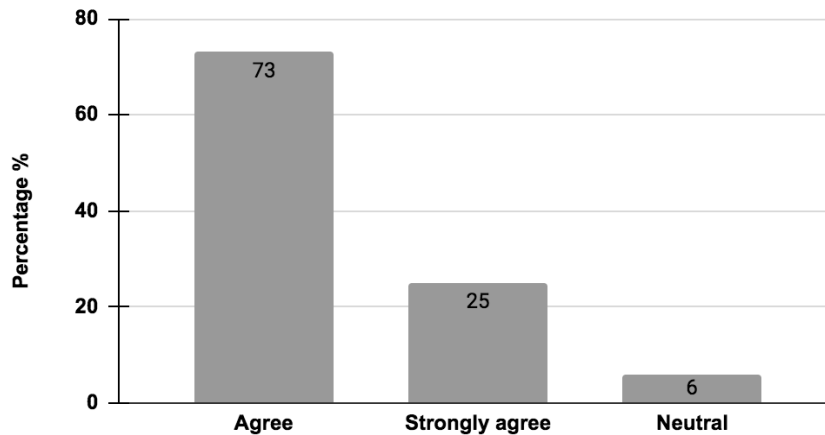
Figure.9: Covid effect: How long did it take for dental clinical activity to return to pre-COVID-19



1.5 Enhanced Cross-Section Control Measures Post Onset of COVID-19

After the onset of COVID-19, 70.2% (n=73) agreed that there should be increased cross-infection measures, while 24% (n=25) strongly agreed, and 5.8% (n=6) were neutral, as shown in (Figure.10)

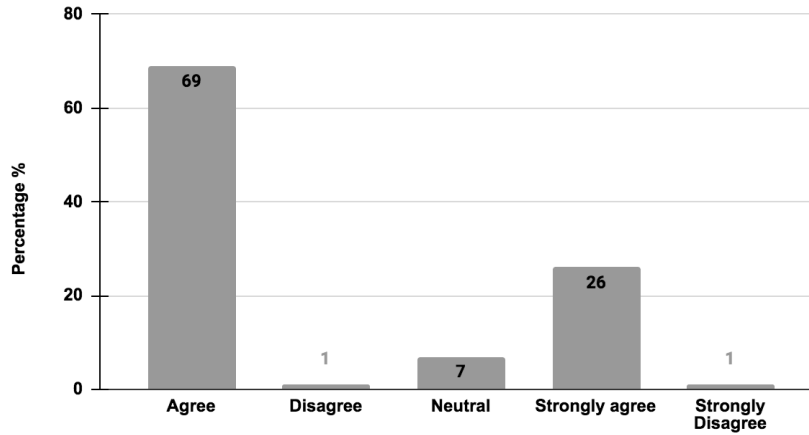
Figure.10: Covid impact: After the onset of COVID-19 there will be increased measures for cross-section control



1.6 Challenges in Dental Treatment Arrangements Post-COVID-19: Navigating Extraction Delays

During COVID-19, various reasons led to delays in dental extractions. Most respondents to this question (66.3%, n=69) agreed, with 25% (n=26) strongly agreeing, while 6.7% (n=7) were neutral, as shown in (Figure. 11).

Figure. 11: Covid impact: After COVID-19 arranging extractions may be challenging leading to delays in dental treatment



1.7 Testing and Vaccination Views Among Dental Personnel

Due to the impact of COVID-19, it has become commonplace for dental personnel to undergo regular testing. This survey showed that the majority, 73.1% (n = 76), agreed to undergo regular tests, while 19.2% (n = 20) strongly agreed, and 6.7% (n = 7) were neutral, as illustrated in (Figure. 12). Additionally, when asked about the necessity of providing proof of

vaccinations, 63.5% (n = 66) agreed, while 29.8% (n = 31) strongly agreed, and 4.8% (n = 5) were neutral, as shown in (Figure. 13). In further inquiry, respondents were asked how frequently dental personnel should undergo regular testing, revealing that 51.9% (n = 54) opted for monthly, 37.5% (n = 39) for weekly, and the remaining 10.6% (n = 11) preferred daily testing. (Figure.14)

Figure.12:After COVID-19 it is advisable for dental personnel to undergo regular testing

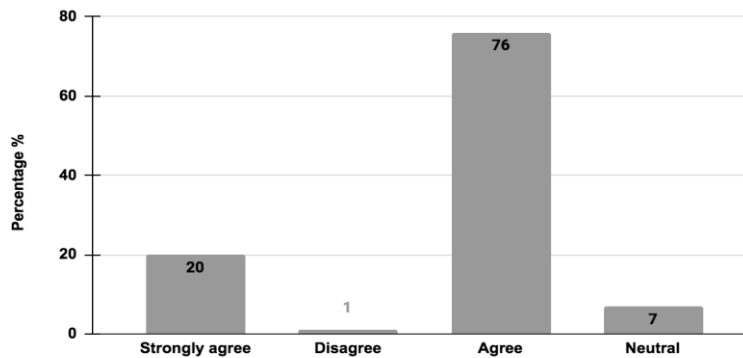


Figure.13: After COVID-19 dental staff should present proof of vaccination before delivering clinical

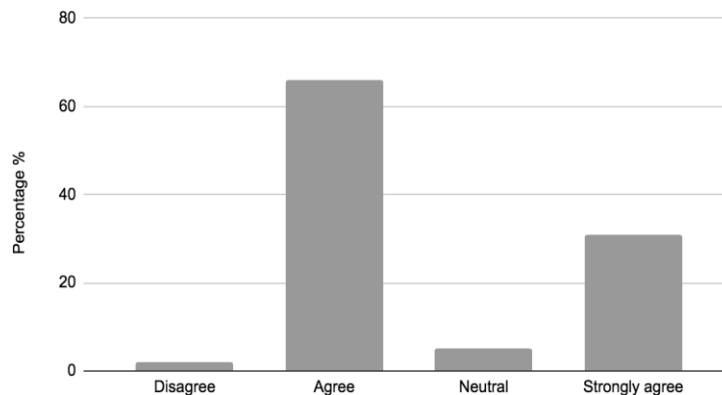
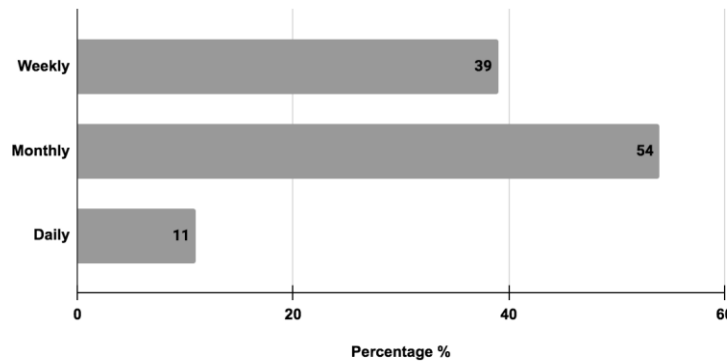


Figure.14: After COVID-19 dental staff should undergo virus testing?



1.8 Elevated Dental Care Post-COVID-19: Expectations for Enhanced Quality"

Responses to this question revealed that a majority (64.4%, n=67) agreed that after COVID-19, there is an expectation of enhanced quality in our dental care outcomes. A significant portion (32.1%, n=24) strongly agreed, while a smaller percentage (9.6%, n=10) remained neutral. Only a minimal number (1.9%, n=2) expressed disagreement, and a mere 1% (n=1) strongly disagreed with the notion as illustrated in Figure. 15. This survey provides insights into the prevailing expectations regarding the post-COVID-19

landscape in dental care, highlighting a generally positive outlook toward improved quality. Another question inquired about the impact of COVID-19 on our capacity to see and evaluate dental follow-up patients. The respondents indicated a consensus, with a substantial majority (75%, n=78) agreeing, and a noteworthy percentage (20.2%, n=21) strongly agreeing. A smaller portion (3.8%, n=4) expressed neutrality on the matter, while only 1% (n=1) of respondents strongly disagreed. As illustrated in Figure.16. These findings shed light on the perceived influence of COVID-19 on the ability to conduct follow-up assessments in dental care, revealing a predominantly affirmative stance among participants.

Figure.15: After COVID-19, there is an expectation of enhanced quality in our dental care outcomes.

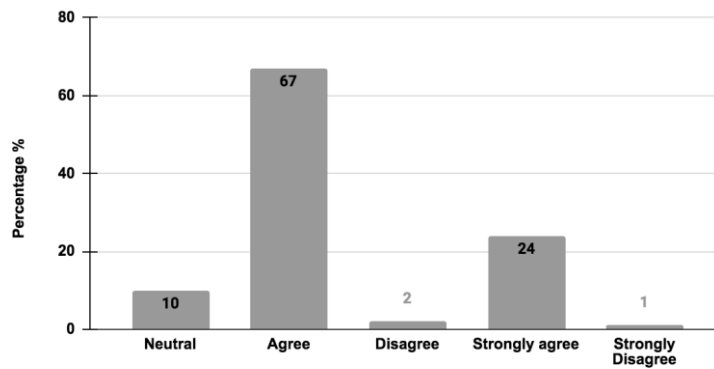
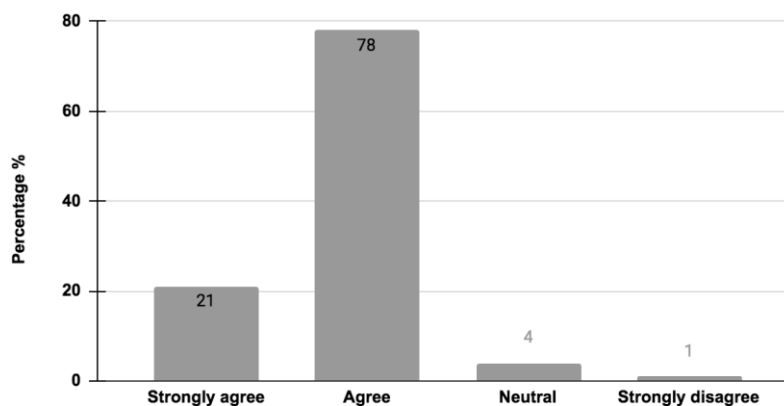


Figure.16: Our capacity to evaluate/see dental follow-up patients has been influenced by the effects of COVID-19.



Discussion

The findings of this study, drawn from a meticulously cleaned dataset comprising 104 unique responses out of 120 collected, provide valuable

insights into the experiences and perspectives of Libyan dentists amidst the COVID-19 outbreak. The survey questions were compiled from various

previously published surveys, enhancing the comprehensiveness and relevance of the study [19, 20].

Demographics

Notably, the participation rate was slightly higher among males compared to females, indicating potential gender disparities in research engagement that warrant further investigation. Furthermore, the geographic distribution of respondents revealed a majority from Benghazi, followed by Tripoli, Misrata, and Sabha. This geographical diversity underscores the necessity for tailored interventions and support mechanisms tailored to the specific needs of dental professionals across different regions. Moreover, the predominance of respondents within the (31-40) 64.4% age group highlights the significance of considering the perspectives and requirements of this demographic cohort in shaping future policies and guidelines. Understanding the experiences of dentists within this age range is crucial for developing effective strategies to address the challenges posed by the pandemic and ensure the resilience of the dental profession.

The survey results provide insights into the distribution and preferences within the dental profession. The majority of respondents (73.1%) identified themselves as dentists, emphasising their prevalence and central role in providing primary dental care. The presence of specialists, interns, and consultants highlights the diversity of expertise within the field, contributing to comprehensive dental care.

The distribution of respondents across sectors reveals significant patterns. A slight majority (51.9%) operate within the public sector, indicating a commitment to providing accessible dental care, particularly in regions with robust public healthcare infrastructure. Conversely, nearly one-third (29.8%) are affiliated with the private sector, catering to patients with insurance coverage or seeking specialized treatments. The presence of practitioners in both private and public sectors (17.3%) demonstrates flexibility in navigating diverse practice environments. Surprisingly, only a small percentage (0.9%) are associated with the academic sector, despite its importance in dental education and research. This may reflect challenges such as teaching commitments and administrative duties. Nonetheless, academic institutions play a crucial role in training future dental professionals and driving innovation in dentistry.

Impact of COVID-19

The findings from the survey shed light on the substantial and multifaceted impact of COVID-19 on clinical capacity within dental care systems. The challenges posed by the pandemic have led to significant changes in clinical practices, driven by various factors. Government guidance emerged as a primary influencer, with 66.3% of respondents citing it as a significant reason for changes in clinical practices. Government directives and recommendations have played a crucial role in shaping responses to the pandemic, including guidelines on the provision of dental services, infection control measures, and patient management protocols. Dental practices have had to adapt quickly to evolving guidance to ensure patient and staff safety while maintaining essential services. Local restrictions also exerted a substantial influence, with 64.4% of respondents reporting their impact on clinical practices. Localized lockdowns, regional outbreaks, and fluctuating infection rates have necessitated adjustments in dental service delivery. Practices operating in areas with heightened restrictions have faced challenges in scheduling appointments, managing patient flow, and adhering to capacity limits imposed by authorities. Heightened cross-infection measures have further impacted clinical capacity, as noted by 28.8% of respondents. The need to implement rigorous infection control protocols, such as enhanced cleaning and disinfection procedures, personal protective

equipment (PPE) requirements, and physical distancing measures, has reduced the efficiency of dental services. These measures, while crucial for mitigating the spread of COVID-19, have increased the time and resources required for each patient encounter, limiting the overall capacity of dental practices. Workforce challenges, including staff sickness and self-isolation, have also contributed to changes in clinical practices, affecting 24% of respondents. The pandemic has resulted in workforce disruptions due to illness, quarantine requirements, and caregiving responsibilities. Staff shortages have strained dental practices, leading to reduced operating hours, appointment cancellations, and increased workload for remaining staff members.

The survey highlights significant changes in patient volume within dental care settings since the onset of the COVID-19 pandemic, crucial for assessing its impact on dental practices and patient access to oral healthcare. A significant finding reveals a substantial decrease in patient numbers, reported by 49% of respondents. This decline, influenced by government restrictions and patient concerns about virus transmission, likely deterred routine dental care-seeking behaviour. Fear of contracting COVID-19 in healthcare settings, alongside stay-at-home orders and social distancing measures, may have contributed to this trend. Consequently, dental practices face challenges such as financial strain, operational adjustments, and maintaining continuity of care for patients. Conversely, 27.9% of respondents reported a slight increase in patient volume since the pandemic's onset, which is intriguing and attributable to several factors. Patients may have postponed dental visits initially but resumed as restrictions eased or vaccination rates increased. Additionally, those experiencing delayed dental issues sought treatment, contributing to the uptick. Changes in patient demographics, like population growth or shifts in healthcare utilization patterns, may also influence the observed increase. 16.3% of respondents noted a slight decrease in patient volume, highlighting the pandemic's impact on patient flow in dental practices. While less pronounced than the substantial decrease observed in the majority, this finding underscores significant changes. Reasons for this decrease may vary, including changes in patient preferences, economic uncertainties, or disruptions in dental referral pathways. A minority (5.8%) reported no change in patient volume, suggesting resilience or effective adaptation strategies employed by these practices to maintain patient engagement and service provision amidst the pandemic's influence on dental care delivery.

Also the survey reveals how dental practitioners have responded to the challenges of the COVID-19 crisis and their expectations for returning to normal clinical activity levels. It was interesting to note that a small percentage (21.2%) of respondents didn't implement any additional measures, indicating widespread acknowledgment of the need for proactive adaptation during the crisis. Among those who did introduce new strategies, telephone consultations were the most popular, adopted by 77.9% of respondents, closely followed by video consultations at 56.7%. This highlights the importance of telehealth in providing ongoing dental care while minimising the risk of virus transmission through in-person visits.

Furthermore, respondents' views on how long it will take for clinical activity to return to pre-COVID-19 levels offer valuable insights. Most respondents (55.8%) believe it will take between 3 to 6 months, suggesting cautious optimism about a gradual return to normalcy. However, a significant portion (31.7%) foresee a longer recovery period, estimating more than 6 months but less than 9 months. This reflects the recognition of ongoing challenges and uncertainties related to the pandemic's impact on dental practices.

The research delves into how dental professionals view the need for stronger cross-infection measures in light of the COVID-19 pandemic. It's clear from

the findings that a significant majority of respondents, about 70.2%, believe there's a heightened need for these measures since the pandemic began. This emphasizes just how crucial it is to implement stricter protocols to keep both patients and dental staff safe and to reduce the risk of COVID-19 transmission during dental procedures. Additionally, a notable portion of respondents, roughly 24%, feel very strongly about the urgency of these measures. This shows that many dental practitioners recognize the importance of robust infection control protocols in responding effectively to the challenges posed by the pandemic.

The study provides insights into why dental extractions faced delays amid the COVID-19 pandemic, according to dental practitioners. A significant majority, around 66.3% of respondents, agreed that various factors contributed to these delays. Moreover, a quarter of respondents, representing 25%, strongly supported this view. These delays likely stem from multiple factors, including changes in healthcare delivery models, restrictions on elective procedures, concerns about virus transmission, and resource limitations. The implementation of infection control measures and the prioritisation of urgent dental procedures may have also played a role in delaying elective dental extractions. Interestingly, about 6.7% of respondents maintained a neutral stance, indicating differences in experiences across dental practices during the pandemic.

The survey findings highlight the widespread acceptance among dental personnel of regular testing as a measure to mitigate the impact of COVID-19. A significant majority, comprising 73.1%, agreed to undergo regular tests, with an additional 19.2% strongly supporting this practice. This underscores the importance placed on monitoring and controlling the spread of the virus within dental settings.

Furthermore, there is substantial support for the necessity of providing proof of vaccinations among dental personnel, with 63.5% agreeing and 29.8% strongly agreeing. This reflects a proactive approach to ensuring vaccination coverage within the dental workforce, which is critical for protecting both staff and patients from COVID-19 transmission.

Regarding the frequency of regular testing, preferences vary among respondents, with the majority (51.9%) opting for monthly testing, followed by 37.5% preferring weekly testing. Interestingly, a small portion (10.6%) favored daily testing, highlighting diverse opinions on the optimal testing frequency.

Overall, these results emphasize the importance of implementing robust measures, including regular testing and vaccination verification, to safeguard the health and safety of dental personnel and patients amidst the ongoing COVID-19 pandemic. Such proactive measures are essential for maintaining the integrity of dental care delivery and minimizing the risk of virus transmission within dental settings.

The survey findings indicate a prevailing expectation among respondents for enhanced quality in dental care outcomes post-COVID-19, with 64.4% agreeing and 32.1% strongly agreeing. This suggests a generally positive outlook toward improved standards in dental care delivery. Conversely, only a small minority expressed disagreement or strong disagreement with this notion, highlighting the overall consensus on the anticipated enhancement of quality in dental care.

Furthermore, respondents overwhelmingly agreed on the impact of COVID-19 on the capacity to see and evaluate dental follow-up patients, with 75% agreeing and 20.2% strongly agreeing. This underscores the perceived influence of the pandemic on the ability to conduct follow-up assessments in dental care. While a small portion remained neutral on the matter, indicating some variability in experiences, the majority of respondents acknowledged

the challenges posed by COVID-19 in this aspect of dental practice. These insights provide valuable perspectives on the post-COVID-19 landscape in dental care and underscore the importance of adapting and addressing challenges to ensure continued high-quality care and effective follow-up processes in dental practice

Conclusion

This study provides valuable insights into the experiences and challenges faced by dental practitioners in Libya during the COVID-19 pandemic. Key findings include significant changes in clinical practices due to the pandemic, widespread acceptance of measures like regular testing and vaccination verification among dental personnel, and an expectation for enhanced quality in dental care outcomes post-COVID-19. These findings highlight the commitment of dental professionals to maintaining high-quality care and mitigating the spread of COVID-19 within dental settings.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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