



# Association Between Mode of Delivery of Dental Consultancy and Economic Considerations

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## ABSTRACT

**Objective:** COVID-19 has greatly impacted the dental health delivery system while causing an economic crisis globally. This study aims to assess the relationship between virtual consultancy and physical visits during and after the pandemic, and whether monetary concessions can affect the patient's decision.

**Materials and methods:** A self-administered online questionnaire were distributed to a random sample of 271 participants who were part of a descriptive, cross-sectional, observational study that took place in Karachi, Pakistan. This included demographic data, dental history, and preferences. The socioeconomic status was evaluated using the Modified Kuppaswamy Scale. For statistical analysis, SPSS.24 software was used. A  $p < 0.05$  was considered statistically significant.

**Results:** Data was accumulated from 271 participants: Most of them were females (55.7%), had a bachelor's degree (73.8%), were 21-30 years (61.3%), and belonged to the upper-middle class (36.9%). 50.2% were in favor of a virtual consultation during COVID-19 and when offered a 50% discount, the percentage increased significantly by 8.8%. Alternatively, under post-COVID circumstances, only 31.7% preferred virtual consultation. However, when offered a rebated price, the percentage raised significantly by 11.5%. Chi-square tests identified significant associations between economic considerations (discounts, socioeconomic status) and mode of delivery with a  $p < 0.001$ .

**Conclusion:** The findings shed light on the future of the dental care delivery system. When offered monetary incentives, people preferred virtual consultancy over physical visits. This can establish a new criterion for dental care delivery to serve more people and enhance health equity.

**Keywords:** COVID-19; Dental Care; Socioeconomic Status; Telehealth.

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## INTRODUCTION

The initial outbreak of coronavirus in Wuhan in 2019 led to an unprecedented pandemic that colossally affected economies through mass lockdowns leading to disruption of services. Among such services, the healthcare delivery system was also impacted by a reduction of service utilization by about a third.<sup>1</sup> Further, viral mutations have resulted in several variants<sup>2</sup> with an increased transmission rate and severe symptoms, holding the claim that coronavirus is here to stay.<sup>3</sup> The coronavirus is primarily transmitted via respiratory droplets, with the oral cavity and nasopharyngeal region serving as the primary entry and exit points.<sup>4</sup> As such, occupational exposure to the virus makes healthcare workers most susceptible to contracting COVID-19<sup>5</sup> with dentists having the highest risk.<sup>6</sup> With regards to COVID-19, the dentist and patient are at a bilateral risk for contracting and transmitting the disease. The use of a high-speed rotary handpiece further magnifies the risk of aerosol production and droplet spread.<sup>7</sup> As a prevention and containment measure, healthcare organizations worldwide began postponing treatment for patients until they tested negative, and only performing emergency treatments.<sup>7-8</sup>

However, coping with the new normal, the healthcare industry was quick to adapt to a new mode of care delivery: telehealth.<sup>9</sup> Although not recent, telehealth or teledentistry (as called for dental health services) gained popularity during the pandemic for dental diagnosis and treatment planning.<sup>10</sup>

Due to COVID-19 restrictions, both dentists and patients preferred the much safer option of consulting online and minimizing contact unless necessary.<sup>11</sup> While telehealth was an alternative during COVID-19 times, exploring its acceptance in the post-pandemic

era can inform future care protocols and consultation options. Online consultations can influence dentist-patient relationships, can save time and money, and have a positive effect on the environment through reduced carbon emissions since no travel is involved.

Hence, this study aims to investigate the acceptance of teledentistry and patients' preference for a physical or virtual consultation and whether incentives can impact choice. The results can inform advances in dental care delivery and enhance health equity through remote access to dental services.

## MATERIALS AND METHODS

This was a descriptive, cross-sectional, observational survey targeting the general population in Karachi, Pakistan. The study was approved by the Ethical Review Committee of Altamash Institute of Dental Medicine, Karachi, Pakistan. (AIDM/ERC/06/2022/01), between June and July 2022, a self-administered online questionnaire was distributed via social networking sites such as Facebook, WhatsApp, and Instagram. The information was gathered over five weeks using convenience sampling and informed consent was obtained from all participants. The sample size for this study was 271, calculated using the Open-Epi software.

The questionnaire was administered in English as well as in Urdu and was divided into three sections: Demographics including age, gender, education, and income; Dental History including past dental visits; and Consulting Preferences including scenario-based questions detailing incentives to assess choice between physical and virtual mode of dental consultancy. Additionally, socioeconomic status was determined using the Modified Kuppaswamy Scale.

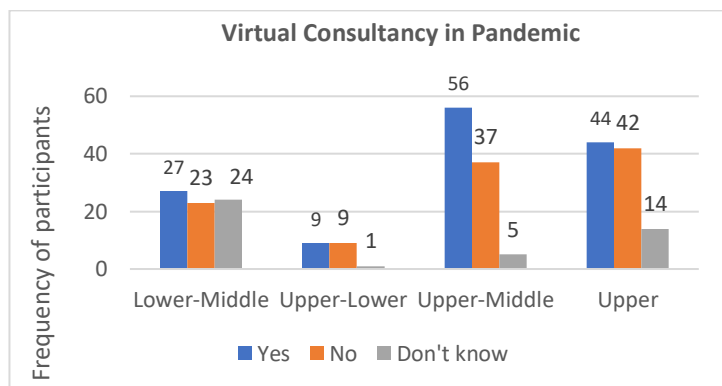
There was no set inclusion or exclusion criteria; anyone with access to the survey was included as a participant. Data was kept confidential, and privacy was protected.

The IBM SPSS version.24 was used for statistical analysis and tests included frequencies for descriptive statistics, cross-tabulations, and chi-square to determine associations. A p-value of  $\leq 0.05$  was considered significant.

## RESULTS

Data was collected from 271 participants; the majority were between the ages of 21-30 years (61.3%), females (55.7%) with a bachelor's degree (73.8%), and belonging to an upper middle class (36.9%). Table 1 summarizes the demographic characteristics of the participants. Regarding dental history, 87.1% reported prior dental visit experience; 60.1% visited the dentist, when necessary, while 14.4% preferred visiting once a year. When asked about telehealth consultancy, 77.1% had no prior experience while 18.1% had availed of the option before the survey.

During the pandemic, the most preferred mode of dental consultation was virtual consultancy for more than half the participants. When stratified according to socioeconomic status, 80.2% in favour of virtual consultancy belonged to the upper classes. However, for all socioeconomic classes, a greater number of participants preferred virtual consultancy over physical visits during the pandemic (Figure 1).

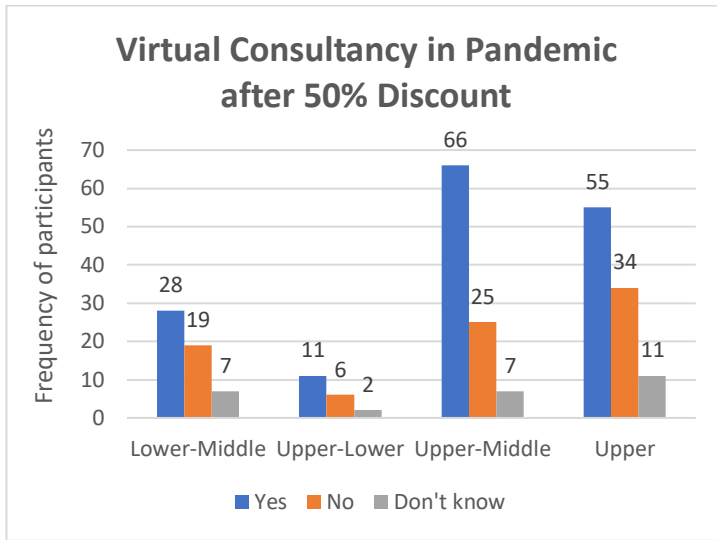


**Figure 1: Preference** for virtual consultancy in pandemic according to socioeconomic status.

When offered an incentive of a 50% discount on virtual consultancy during the pandemic times, the number of participants preferring teleconsultations increased from 50.2% to 59% (Figure 2). The association between the offered incentive and preference for virtual consultancy was significant with a  $p < 0.001$ .

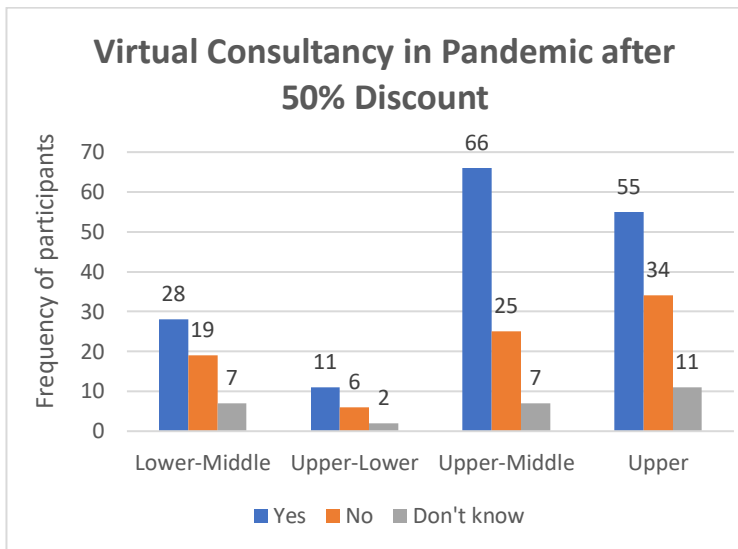
**Table 1: Demographics distribution of participants (n=271)**

Variable	Frequency	
	No.	%
<b>Gender</b>		
Male	120	44.
Female	151	55.
<b>Age (Years)</b>		
10-20	21	7.7
21-30	166	61.
31-40	31	11.
41-50	24	8.9
50+	29	10.
<b>Education</b>		
Below Matriculation	2	0.7
Matriculation	7	2.6
Intermediate	16	5.9
Bachelors	200	73.
Masters and above	46	17.0
<b>Socioeconomic Status</b>		
Lower-Middle	54	19.
Upper-Lower	19	7.0
Upper-Middle	100	36.
Upper	98	36.



**Figure 2:** Preference for Virtual Consultancy in Pandemic after 50% Discount according to Socioeconomic Status.

On the contrary, teleconsultation was not a popular choice in the post-pandemic era. Overall, only 31.7% of the respondents showed a preference for virtual consultancy in normal circumstances; 72.1% of them belonged to the upper classes.



**Figure 3:** Preference for Virtual Consultancy in Post-COVID Circumstances after 50% Discount according to Socioeconomic Status

However, when offered an incentive of a 50% discount on teleconsultation during normal times, the number of respondents opting for virtual consultations increased from 31.7% to 43.2% (Figure 3)

There was a significant association between the incentive offer and preference for teleconsultation with a  $p < 0.001$ . While the preference change was observed for all socioeconomic classes with more people opting for teleconsultation over physical visits, the Upper class still preferred physical visits over virtual visits in normal times.

## DISCUSSION

This study examined patient preferences regarding virtual consultation during and after the pandemic era. Our findings revealed a positive correlation between opting for virtual consultancy and the pandemic. This confirms the results of another survey which determined that during the COVID-19 pandemic, 70.7% of the respondents were unwilling to visit a dental clinic and that 80.5% preferred teledentistry to contact dental specialists for assistance.<sup>12-13</sup>

Additionally, an Iranian study emphasized how one-third of Iranian dentists stated that the volume of phone calls from patients seeking dental consultation had grown dramatically after the introduction of the lockdown.<sup>14</sup> This confirms the findings of our study, depicting a preference for virtual consultation over in-person consultation during the pandemic. Further, we found that this association was stronger for those belonging to upper socioeconomic classes. In concordance with another study, we conclude that during the COVID-19 pandemic, patients feared contracting the illness and avoided dental visits<sup>11</sup>, especially those belonging to upper socioeconomic classes and subsequently having a better education.<sup>15</sup> Preferences of respondents from lower classes were less influenced by the presence of the pandemic and can be attributed to a lack of information about the virus, making them less fearful of exposure.

The positive correlation between teleconsultations and the pandemic was further pronounced when an incentive was offered, leading to a significant increase in respondents preferring virtual options. This was less marked in lower classes, probably owing to an incomplete understanding of teleconsultations or a lack of

resources required for it, e.g., the internet. However, the rebated prices affected the decision of mostly upper-lower and middle classes, demonstrating budget limitations. This is in line with another study that established “smart-choice” spending in the upper-lower and middle classes, especially about healthcare decisions.<sup>16</sup>

Moving beyond the pandemic, our study also sought to establish preferences in the mode of dental consultation delivery in normal times. We found that while teleconsultations were not a popular choice among all socioeconomic classes, the offer of an incentive changed preferences significantly for certain social groups. As such, the lower-middle, upper-lower and middle classes pointedly opted for virtual consultations over physical visits during normal times, when offered a lower price. This can reflect financial constraints and opens the discussion for health equity and increased access to dental healthcare. However, the preference of the upper class was not impacted by the discounted price which displays financial stability.

Our study is unique in its approach towards tele-consultancy as preferred by various social groups and in its exploration of the impact of monetary incentives on decision-making. We also cautiously broach the notion of health equity and how virtual consultations can benefit patients with limited transportation and budgets. The adoption of teledentistry in normal times can increase access and availability of dental services to disadvantaged social groups.

However, we stipulate that if virtual consultation is being used, care must be taken to preserve the patient-doctor bond, with a special focus on communicating with empathy and compassion.<sup>17-18</sup> There is also a need to address care continuity, which is vital to both doctors and patients.<sup>18-20</sup> Teleconsultation is limited in its reach and requires physical visits to administer treatment plans.<sup>21</sup> Nevertheless, obstacles to implementing tele-dentistry can be overcome by employing fundamental approaches during virtual consultation, such as providing general practice IT assistance, greater staff training, and service user empowerment through a

standardized telehealth curriculum to develop competencies.<sup>22</sup> However, such strategies can only be used if governance and financial requirements are identified and met.<sup>23-25</sup>

Our study is limited in its approach toward understanding preferences and does not explore satisfaction associated with different options. Our sample size is also relatively small and inadvertently excludes social classes with no access to the internet since the survey was conducted online. This could have been improved upon through paper-based questionnaires with local language translations to include more people from disadvantaged groups. Further, since the majority of our respondents had never experienced virtual consultations, their preferences were based on their perspectives. A longitudinal study could have provided more accurate results, preventing this bias.

## CONCLUSION

This study offers insight into the future of dental care delivery through teleconsultations, and how economic considerations can affect preferences in certain social classes. However, further research is required to expand the evidence base for the effectiveness of teledentistry and to explore the implementation strategy.

Nevertheless, the acceptability of virtual consultations can inform new guidelines for dental care delivery to increase access and ensure health equity. Therefore, integrating teleconsultations with routine dental care is the right step toward achieving universal dental care

## Authors Contribution

- 1. H.M:** analyzed and interpreted the data, writing of the manuscript, comprehended the study, and participated in drafting the data collection and coordination
- 2. Z.A.B:** conceived the idea of the study, analyzed and interpreted the data, writing of the manuscript
- 3. N.F.H:** Conceived the idea of the study, adapted the survey after a thorough literature review and developed the design and methodology, and analysis plan, analysed and interpreted the data.

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4. **Z.M:** comprehended the study and participated in drafting the data collection and coordination

5. **K.M:** comprehended the study and participated in drafting the data collection and coordination

6. **Z.F.Z:** contributed to writing the paper, and finalized the manuscript through critical edits.

7. **H.R:** comprehended the study and participated in drafting the data collection and coordination

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### **Institutional ethical board approval**

The study was approved by the Ethical Review Committee of Altamash Institute of Dental Medicine, Karachi, Pakistan (AIDM/ERC/06/2022/01)

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### **Conflict of Interest**

The authors report no conflict of interest

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