CONTENT ANALYSIS OF MOBILE-BASED DIGITAL DENTAL CONSULTATION APPLICATIONS IN INDIA

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DOI:https://dx.doi.org/10.4314gdj.v23i1.5

ABSTRACT

AIM: To conduct a content analysis of mobile-based Digital Dental Health Information System applications operating in India.

OBJECTIVES
1. To evaluate types of communication used for dental consultation in digital dental information systems
2. To assess language options offered by individual dental information systems
3. To determine the nature of payment models used by digital dental information systems
4. To identify the availability of digital dental information systems on online application download platforms

METHODS: A web-based, cross-sectional content analysis was conducted using applications identified from the Google Play Store and Apple iOS App Store. Search terms included dental apps, dentist apps, oral health care management, dental treatment app, dental service, and online dental consultation. A total of 253 applications were identified, of which 19 met the inclusion criteria of providing online dental consultations and/or appointment booking services in India. Data were extracted on communication modes, language options, payment models, and platform availability.

RESULTS: All 19 applications provided online dental consultation services, while 84.21% also supported offline appointment booking. Telephonic consultation was the most common mode of communication (84.21%), followed by live chat (68.42%), email (63.15%), and text messaging (52.63%). English language support was available in 94.73% of applications, while Hindi and other regional languages were supported by 57.89%. Paid consultation models were used by 89.47% of applications, with limited free or membership-based services. Most applications were available on both Google Play Store (94.73%) and iOS App Store (89.47%).

CONCLUSION: Digital dental health applications that provide doctor consultations are becoming more and more popular in India, which demonstrates their enormous potential within the country. The government must provide enabling regulations that promote the broad acceptance and use of these applications.

KEYWORDS: Teledentistry; Mobile Applications; Referrals and Consultation; Appointments and Schedules; Oral Health

INTRODUCTION

Dental consultations are often conducted in-person, with the base of oral health care being a thorough examination, treatment, and a strong patient-dentist rapport. Access to dental treatment is still difficult to come by, especially in rural areas with few specialists. Online dental consultations have become an alternative due to the quick development of digital technology and internet accessibility, consciously expanding the scope of dental services. Using digital platforms to enable real-time consultations, preliminary diagnosis, and treatment recommendations, teledentistry has become a game-changing strategy in oral health care. The advantages of teledentistry have been emphasized by earlier studies, including better access to care, cost-effectiveness, and the capacity to provide prompt procedures [1]. The use of mobile-based oral health platforms and digital dental health applications has further streamlined healthcare delivery in India, removing obstacles including a lack of workers and financial constraints. These developments have been especially helpful in closing gaps in oral health and treating populations with little access to dental care[2]. With the rise of mobile health applications and virtual consultation platforms, individuals can now connect with qualified dentists, can receive personalized treatment plans and access oral health care services more conveniently. India's digital transformation in healthcare has been marked by a significant rise in wireless subscribers, highlighting the potential for expansion of digital oral health solutions [3]. In India, the number of wireless data users increased from 281.5million to 578.2 million between 2014 and 2018, while the average monthly data usage per subscriber increased from 4.1GB to 7.7GB. The tremendous potential for oral health information system to thrive throughout the nation is highlighted by this digital expansion[4]. With features like online consultations, community aids, outpatient appointments, and hospital-to-home care services, virtual hospital applications have also become revolutionary technologies[5]. Research assessing mobile oral health applications in India is lacking, despite these game-changing characteristics. This is especially true when it comes to user engagement and how well they adhere to ethical and professional norms. In light of these advancements, the purpose of this study is to present a thorough overview of India's digital oral health information system. Through their language support for consultations, available payment methods and accessibility on digital platforms, the research reveals how mobile applications help patients and dentists communicate. Through assessing these variables, the study seeks to improve understanding of digital care in India and provide recommendations for improving mobile-based oral health solutions.

MATERIALS AND METHODS:

Study Design and Setting:

A cross-sectional, observational, web-based content analysis was conducted. The study was carried out in the

Department of Public Health Dentistry, Dr. D.Y. Patil Dental College & Hospital, Pimpri, Pune.

Inclusion Criteria:

- Applications providing online dental consultation and/or appointment booking services
- Applications developed for or operating in India
- Applications available on Google Play Store and/or Apple iOS App Store
- Applications offering dental or oral healthcare services in English and/or regional Indian languages

Exclusion Criteria

- Applications unrelated to dental or oral healthcare
- Applications limited to general medical consultations without dental services
- Duplicate applications across platforms
- Inaccessible, discontinued, or non-functional applications
- Applications requiring exclusive paid access that prevented content evaluation

Data Collection Tool and Technique:

The date is collected from apps which were following the inclusion and exclusion criteria, Figure no.1 shows detailed selection of apps with inclusion and exclusion criteria. To do a content analysis of digital dental information system the search strategy was implemented to find applications on both the Android and iOS provider. The final results were then assessed using inclusion ad exclusion criteria. We looked for Indian dental health apps on the Google Play store and iOS using search terms, dental apps, dentist apps, oral health care management, dental treatment app, dental service, online dental consultation, yielding 253 results. Of these, 19 apps met the criteria of offering online consultations or appointment booking services and were included in the study.

Analysis:

The data collected from the internet platforms were organized and analysed using Microsoft Excel.

RESULT:

A total of 19 mobile-based digital dental consultation applications that met the inclusion criteria were included in the content analysis. The results are presented according to the four predefined study objectives. Table 1 lists the included applications along with their official links.

Types of Communication for Dental Consultation:

All 19 applications (100%) supported online dental consultations. Offline appointment booking was available in 16 applications (84.21%), while 3 applications (15.79%)—iCliniq, Bajaj Health for Doctors, and Healthians—did not support offline consultations.

Applications such as Practo™, Lybrate™, Indian Dental World, 1mg™, mfine™, iCliniq, Zocdoc, Ask Apollo, Medicas, Clove Dental, MediBuddy, Q UP, Bajaj Health for Doctors, Pristyn Care Health App, Doctors App, Healthians, Pearlii, Scano, and Netmeds™ provided online consultation services.

Multiple communication modes were observed. Telephonic consultation was the most frequently available mode (16 applications; 84.21%), followed by email communication (13 applications; 68.42%), text messaging (11 applications; 57.89%), and live chat (10 applications; 52.63%). Most applications supported more than one communication modality. Detailed findings are presented in Table 2A.

Language Options Offered by Digital Dental Applications:

English language support was available in 18 applications (94.73%), while Hindi and other regional Indian languages were supported by 11 applications (57.89%) each. Eight applications (42.11%) provided services exclusively in English. Language distribution across applications is summarized in Table 2B.

Nature of Payment Models:

A paid consultation model was the most common, adopted by 17 applications (89.47%). Free consultation services were available in 3 applications (15.78%), and membership or subscription-based plans were offered by 5 applications (26.31%). The distribution of payment models is presented in Table 2C, addressing this objective explicitly.

Availability on Online Application Download Platforms:

All 19 applications (100%) were available on the Google Play Store. 18 applications (94.73%) were available on the Apple iOS App Store, while one application (5.27%) MediBuddy was not available on iOS at the time of analysis. Platform availability is detailed in Table 2D.

Application download numbers and user ratings were recorded as publicly available indicators of application visibility and popularity. As shown in Table 3, one application recorded more than 10 million downloads, while most applications had download counts ranging between 100,000 and 1 million. According to Table 4, 13 applications (68.42%) had user ratings between 4 and 5 stars. These indicators were not used to assess user satisfaction or clinical effectiveness, as the study did not include user interviews or surveys.

DISCUSSION:

The findings of the study underlines how important digital dental information systems in enhancing oral healthcare accessibility, efficiency and overall patient experience. These technologies make record-keeping easier by securely preserving patient data and providing instant access to dental histories and treatment experience. These improve communication between patients and healthcare providers, enhance diagnostic accuracy using modern imaging technology, and simplify appointment scheduling. Patients benefit from transparent pricing, instructional resources and automatic reminders for appointments and pricing, instructional integration of digital dental information systems with specialists and remote consultations via teledentistry considerably expands access to quality care ,particularly in comprehending the entire range of services these system offer [6,7].The current study aligns with earlier research on digital healthcare system, particularly those that focus on healthcare applications for treating systemic disorders. Consistent with prior research, this study shows that mobile health [mHealth] applications play an important role in enhancing healthcare accessibility and user research, this 1mgTM and Netmeds stand out as the most effective applications due to their vast features, high user ratings and widespread availability.

The study reveals that 13 out of 19 applications recorded user ratings between 4 and 5 stars; however, these ratings were interpreted solely as indicators of application popularity and visibility rather than direct measures of user satisfaction, as the study did not include user interviews or perception-based assessments. High user ratings may reflect perceived usability or accessibility of applications but do not necessarily link to satisfaction or clinical effectiveness, which requires primary user-level evaluation. Apps like PractoTM, which are known for their teledentistry and complete consultation capabilities, have effectively established themselves as reliable platforms in digital healthcare market. Furthermore, the findings of this study align with those of Verghese Thomas et al., who emphasized the importance of multilingual platforms in increasing the adoption of mHealth applications among populations with limited access to healthcare [8]. Our data shows 100 % of mHealth apps are available on Android and

94.73% on iOS, with many offering multilingual support in English and Hindi. This availability on digital platforms ensures broader reach and accessibility, particularly among India's diverse and underserved population. Additionally, previous studies such as the research conducted by Vijay et al., assessed patient perceptions and satisfaction with
e- health applications. Their findings suggest that patient without comorbidities reported lower satisfaction and perceived usefulness compared to those managing chronic illness[9]. This aligns with our results, which indicate that difference in user experience, service offering and technological literacy could be contributing factors to varying satisfaction levels. The study also highlights a critical gap in digital health adoption, particularly among population with limited technological literacy. While mobile health services are increasingly available, many individuals still face barriers to accessing digital dental care. Although all analysed apps provide 100% online consultations and 84.21% offline consultations, as well as 84.21% telephonic communication and 68.42% email support, there remains a disparity in adoption due to digital literacy challenges, lack of internet connectivity and financial constraints. These findings align with Bhargava and Sarkar et al., who noted that low digital literacy remains major obstacle to the effective deployment of systems for Electronic Health Records [EHR][10]. In order to tackle these issues, the Indian government has initiated programs like the Pradhan Mantri Gramin Digital Saksharta Abhiyan, which was introduced in 2017, aim to digitally educate at least one member of every rural household. Such government –led initiatives are essential for increasing digital healthcare adoption, particularly among marginalized communities [11]. The study also identifies key trends in emerging healthcare technologies. Notably, the adoption of AI –based services remain limited, with only 10.52% of the applications incorporating AI- driven tools. Despite their current low reach, AI-driven solutions have the potential to enhance personalized dental care, improving diagnostic accuracy and automated administrative processes. Additionally, only 15.78% of apps offer free services, with most platforms operating on paid model. The predominance of paid services indicates the need for affordable healthcare options to ensure broader adoptions. This finding aligns with studies by Joshi et al., which highlight the growing role of mHealth interventions in improving healthcare delivery, particularly in addressing resource constraints in India's healthcare system [12]. A major barrier to fully integrating digital healthcare into primary and secondary healthcare system is the lack of training and awareness among healthcare provider regarding telehealth and associated technologies. According to Venkataraman et al., healthcare professionals in developing countries often struggles with adopting telehealth due to inadequate training limited technical knowledge and infrastructure constraints [13]. Furthermore, poor internet connectivity in rural regions further limits the effectiveness of digital health solutions. Our findings support these claims, as we observed that while mobile –based healthcare solutions offer cost-effective alternative their widespread adoption remains hindered by infrastructure limitations technological illiteracy, and lack of trust in digital health services. However, digital healthcare platforms, including telemedicine apps and AI–based diagnostic tool, are progressively bridging the healthcare gap in rural and suburban areas. Digital dental systems have been shown to reduce patient travel time, improve specialist access and enhance overall patient convenience [14]. Teledentistry in particular minimizes the need for both patient and doctor travel and reducing administrative burdens for dental professionals. It enhances the quality of oral healthcare by enabling seamless data sharing diagnosis, treatment planning. Additionally, undeserved population benefit from easier appointment scheduling, medication accessibility and care specifically for individuals with limited mobility [15]. A significant strength of this study is its focus on the feasibility of digital dental information systems as an alternative to conventional healthcare infrastructure. Unlike traditional healthcare models, digital solution requires lower initial investment, faster implementation and minimal government intervention, making them highly adaptable for rural regions. These systems enhance health literacy through interactive, video tutorial and AI- driven language translations, fostering better health-seeking behaviour. Furthermore, the collaboration of digital dental health applications with government healthcare initiatives, such as by integrating remote consultations, oral health awareness programs and simplifies appointment scheduling the Ayushman Bharat Health Account (ABHA), could substantially improve rural dental care. In addition, cutting expense and travel time teleconsultation and digital connectivity increase rural public's access to health care. Digital dental health system can easily include the medical history provider by the Ayushman Bharat Health Account[ABHA][16]

LIMITATIONS:

The study's limitations include reliance on publicly available data, changing app features, user bias in ratings, and a lack of clinical accuracy. It excludes smaller platforms applications requiring paid subscription and direct user feedback, resulting in limited insights into user experiences. A focus on technology-dependent apps may exclude underserved individuals who lack digital access, and the prevalence of paid services may limit expenses.

PUBLIC HEALTH SIGNIFICANCE:

The digital dental information systems provide remote consultations that help eliminate barriers to oral health care, making healthcare more accessible. They offer convenient options for those with busy schedules or mobility restrictions. Early detection through online consultations prevents minor issues from worsening. These platforms also provide guidance on oral hygiene and preventive care. Additionally, online consultations can be a cost-effective solution for addressing minor concerns.

CONCLUSION:

This study provides a structured content analysis of mobile-based digital dental consultation applications operating in India, based on four predefined objectives. The findings show that all included applications supported online dental consultations, with telephonic and chat-based communication being the most commonly available modes. English was the predominant language offered, while Hindi and other regional languages were available in just over half of the applications, indicating partial multilingual support.

With respect to payment models, the majority of applications operated on a paid consultation basis, with limited availability of free services or membership-based plans. Most applications were widely accessible through major online download platforms, particularly the Google Play Store and Apple iOS App Store, highlighting strong digital availability of dental consultation services.

Overall, the content analysis demonstrates that digital dental information systems in India are primarily designed

around paid, English-language services delivered through telephonic and online communication and are widely accessible via mobile platforms. These findings are relevant for understanding the current structure of digital dental consultation services and may assist policymakers, developers, and oral health professionals in identifying areas for improvement, particularly in expanding multilingual support, affordability, and equitable access to digital oral healthcare services.

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