

Impact of Social Media in Educating and Improving the Oral Health Status in Children

Ayesha¹, Krishna Priya Vellore², Mayuri Ganesh³, Saigeeta K⁴, Niharika Sowki⁵

How to cite this article:

Ayesha, Mayuri Ganesh, Saigeeta K, *et al.* Impact of Social Media in Educating and Improving the Oral Health Status in Children. Ind J Dent Educ. 2024;17(4):171-182.

Abstract

Social media platforms are increasingly utilized in pediatric care to promote oral health education, assist in remote monitoring, and influence patient behavior. These tools play a crucial role in providing dental care in regions with limited access to pediatric dental specialists. Additionally, social media supports monitoring between appointments and offers remote diagnosis and guidance for children's oral health. This approach became particularly important during the COVID-19 pandemic, where virtual consultations via mobile devices and webcams helped ensure safety by minimizing in-person contact. Teledentistry serves as an effective supplement to traditional dental care, improving patient management and bridging the gap in pediatric dental services in underserved areas. However, further research is necessary to ensure its safe and evidence-based application in pediatric dentistry.

Keywords: Social Media, Remote monitoring, COVID-19 pandemic, Teledentistry, Personal digital assistants.

INTRODUCTION

A nation's future prospects are deeply connected to the growth of its younger generation. At present, approximately 1.8 billion youth populate the globe, with India leading the way by hosting 356 million individuals aged 10 to 24 outpacing China's 269 million in the same demographic.¹ The World Health Organization (WHO) defines adolescents as those between 10 and 19 years old, and this group also fits within WHO's broader classification of "young people," ranging from

10 to 24 years. Adolescence is a formative phase, marked by distinct physical and cognitive needs. It is during this period that individuals develop skills, knowledge, and emotional regulation, essential for a successful transition into adulthood.²

Sadly, the global burden of oral diseases continues to rise. Conditions such as dental caries, periodontal disease, tooth loss, oral mucosal lesions, oropharyngeal cancers, and oral manifestations of HIV/AIDS, along with oral trauma, are significant public health challenges worldwide. Among them dental caries and periodontal disease have historically been considered the most important

Author's Affiliation: ^{1,4,5}Assistant Professor, ²Professor and Head of the Department, ³Associate Professor, Department of Pediatric and Preventive Dentistry, Army College of Dental Sciences, Secunderabad, Telangana 500083 India.

Corresponding Author: Krishna Priya Vellore, Professor and Head of the Department, Department of Pediatric and Preventive Dentistry, Army College of Dental Sciences, Secunderabad, Telangana 500083 India.

E-mail: krishnapriyavllr@gmail.com

Received on: 18.10.2024

Accepted on: 02.12.2024



This work is licensed under a Creative Commons
Attribution-NonCommercial-ShareAlike 4.0.

global oral health burdens.³ Untreated cavities in permanent teeth affect over 40% of individuals globally, across all age groups. In India, this condition is widespread, impacting approximately 70% of children and young adults.⁴ Aggressive periodontitis, a severe form of gum disease that typically manifests during puberty and can result in early tooth loss, affects around 2% of young people.⁵

All these diseases have taken a toll on people's health due to their lack of knowledge and information on oral hygiene. A young person with high self-esteem and good social skills, who is clear about her/his values and has access to relevant information is likely to make positive decisions about health. External factors have a tremendous impact on how adolescents think and behave; the values and behaviours of their peers are increasingly important while parents and other family members continue to be influential. Factors within the wider environment like mass media also play a very important role.⁶ Infact, many health behaviors established in adolescence influence both immediate and long-term health and growth.

SOCIAL MEDIA AND ORAL HEALTH

Effective communication bridges the gap between dental professionals and patients, fostering a productive therapeutic relationship.⁷ Advances in technology have enhanced health promotion efforts by making information readily available. However, traditional channels like leaflets or consultations limit the quantity and scope of information that can be shared. Social media, a key component of digital networking, enables users to exchange ideas, personal messages, and media in real-time, enhancing engagement and collaboration.

Mobile technology and electronic communication offer the potential to disseminate health messages to large segments of the population. This mode of intervention has several advantages over traditional face-to-face or telephone based interventions, primarily because mobile technology enables real time delivery of health interventions in everyday environments. Mobile technologies encompass devices such as mobile phones, personal digital assistants (PDAs) like BlackBerry and Palm Pilot (Fig. 1), smartphones like the iPhone, enterprise digital assistants (EDAs), portable media players (e.g., MP3 and MP4 players) (Fig. 2), handheld gaming consoles (e.g., PlayStation Portable,

Nintendo DS) (Fig. 3), as well as handheld and ultra-portable computers like tablet PCs and Smart books (Fig. 4). These devices have a range of functions from mobile cellular communication using text messages (SMS) (Fig. 5), photos and video (MMS) (Fig. 6), telephone, and World Wide Web access, to multi-media playback and software application support.



Fig. 1: Personal Digital Assistant



Fig. 2: Portable Media Players



Fig. 3: PlayStation Portable



Fig. 4: Smart Books

Technological advancements and increased processing power have enabled single mobile devices, such as smartphones and PDA phones, to perform many, if not all, of these functions efficiently.⁸ The smartphone user base in India has crossed 300 million as shipments grew 18 percent annually in 2016 compared to the global smartphone market which grew only three percent.⁹ Additionally, mobile technology offers economies of scale, as interventions can be easily delivered to large populations. Applications can be downloaded, and automated systems can send messages to vast numbers of users at a relatively low cost.



Fig. 5: Short Message Service



Fig. 6: Multimedia Messaging Service

Motivational messages, monitoring, and behavior modification tools traditionally used in face-to-face settings can be adapted for mobile phone delivery. These interventions can be customized, with content tailored to the participant's age, gender, ethnic background, or specific challenges they are dealing with.^{10,11}

SMS messaging¹² has its limitations, such as the potential for data entry errors, which could lead to incorrect actions, and the risk of misunderstanding or misinterpreting messages. It may also pose challenges for individuals with visual impairments. In countries like India, where literacy rates are lower, text messaging may not be the most effective method for delivering oral health information to those who need it most. SMS technology cannot capture the verbal and non-verbal signals that may have an effect on the context and therefore the interpretation of the message. When using this form of communication, ensuring data protection and confidentiality is crucial. There is also the risk that recipients might delete messages without reading them if they perceive the messages as intrusive.

Multimedia Messaging Service (MMS) and voice messaging can help deliver oral health education to individuals who are illiterate or have difficulty understanding written messages. MMS overcomes

the limitations of SMS, allowing the inclusion of formatted text, photos, drawings, graphics, animations, PowerPoint presentations, audio clips, and videos.¹³

Patient adherence to preventive and treatment protocols, along with outcomes, is closely tied to the quality of communication between providers and patients. Healthcare providers can enhance oral health literacy and improve outcomes by presenting up-to-date knowledge and skills in ways that promote comprehension and proper use of the information.¹⁴ A 2015 HIMSS Mobile Technology Survey of over 200 healthcare provider employees revealed that nearly 90% of respondents were using mobile devices within their organizations to engage patients. Moreover, 36% believed that patient portals integrated with apps were the most effective means for engaging patients. These app-enabled patient portals allow real-time interaction between patients and providers, making engagement easier to achieve.¹⁵

Social networking sites have become platforms for companies to advertise, recruit, educate, and market their products. For oral health, the primary objective of using these platforms should be to offer accurate, clear, and concise health information from diverse perspectives. Behavioral interventions, both online and offline, using digital media range from personalized multimedia tools to brief, general video interventions. Social media platforms can be categorized into different types, including social networking (e.g., Facebook, Twitter, Snapchat, Instagram), professional networking (e.g., LinkedIn), mass sharing (e.g., YouTube), content creation (e.g., blogs), knowledge aggregation (e.g., Wikipedia), and virtual reality or gaming sites.

Among the various social networking platforms, WhatsApp (Fig. 7) stands out as the most widely used. Originally designed as an alternative to traditional text messaging, WhatsApp has become extremely popular among smartphone users, particularly among younger demographics, due to its broad accessibility and ease of use. A key advantage of WhatsApp is that it allows users to send and receive messages for free, as long as they have internet access. In India, WhatsApp ranks as the leading instant messaging app, according to a report published by the research firm TNS. Mobile messenger service WhatsApp's user base in India has grown to 70 million active users, which is over a 10th of its global users.¹⁶



Fig. 7: WhatsApp Logo

Research on the application of WhatsApp within medical science remains limited. However, studies have shown that it facilitates effective

communication among plastic and reconstructive surgery staff for both clinical coordination and academic purposes. Additionally, WhatsApp has been successfully utilized by blood banks to recruit donors and maintain engagement for future blood donation drives. Despite these findings, there is a lack of research focusing on the role of WhatsApp in promoting oral health through mass communication.

REVIEW OF LITERATURE

Table 1: Summary of studies using mobile apps for oral health education and promotion among children

Author name and year	Name of the application used	Purpose of application	Methods	Conclusion/outcome
Soler <i>et al.</i> , 2009	Molarcropolis app	Designed to engage adolescents through an interactive game to improve their understanding of oral health and motivate healthy behaviors.	Surveyed adolescents (ages 13–24) to evaluate the impact of the game on oral health awareness and habits.	The participants found the game educational and engaging, reporting positive changes in their oral health habits.
Levine <i>et al.</i> , 2012	MySmileBuddy	Aims to assess dietary risks for childhood caries and educate parents.	Pilot study involving trained community healthcare workers who supported parents using the app.	The app was found to be user-friendly and helpful for parents.
Shao <i>et al.</i> , 2014	DAYA tooth brushing game	Helps children build consistent brushing routines under parental supervision.	Pilot testing on children aged 6–10 to assess usability and impact.	The app was effective, with older children and parents reporting positive experiences.
Underwood <i>et al.</i> , 2015	Brush DJ app	This mobile app provides scientifically-backed oral hygiene routines, incorporating motivational music, reminders for mouth rinsing and fluoride use, and notifications for dental appointments.	A qualitative survey explored participants' experiences, perceptions, and beliefs about the oral health app, including individuals up to 74 years old, with the largest proportion (37.1%) belonging to the 7–12-year age group.	The mobile app proved effective in promoting oral hygiene education and encouraged participants to brush for extended periods. Key themes identified were motivation, learning, adherence to routines, and perceived advantages.
Alqarani <i>et al.</i> , 2018	Your child's smile	Offers parents guidance on their child's oral health, starting from the pre-partum stage through infancy and adolescence.	A survey was conducted to evaluate the improvement in parents' knowledge before and after using the mobile app for children up to 15 years old.	Notable enhancement in knowledge regarding dental caries and oral hygiene was observed.
Zotti <i>et al.</i> , 2019	1. Time 2 Brush (children >5 years). 2. Little Monsters Toothbrush time (children ≤5 years).	Both apps followed the same format. These two applications target different age groups using fictional characters and timers to motivate children to develop effective oral hygiene practices.	Randomized trial involving study and control group involving 4–7-year-old children. The control group received oral hygiene instructions provided chairside.	A reduction in plaque scores was observed, with no new caries lesions on permanent molars. Improved oral hygiene compliance was noted among children, along with enhanced parental knowledge.

table cont....

Author name and year	Name of the application used	Purpose of application	Methods	Conclusion/outcome
Alkilzy <i>et al.</i> , 2019	Manual toothbrush with sensor that is linked to the smartphone via Bluetooth.	This manual toothbrush integrates with a smartphone app through Bluetooth, enabling real-time monitoring by parents and offering rewards to children for proper brushing techniques.	A randomized controlled study assessed the effectiveness of a manual toothbrush equipped with a gravity sensor, used alongside a mobile tooth brushing app, in children aged 5–6 years. The control group used a manual toothbrush without the app.	Decline in plaque index was more pronounced in the test group than in the control group, which gives evidence for the effectiveness of gaming in tooth brushing via a smartphone app.
Farhadifard <i>et al.</i> , 2020	Smartphone app, brush DJ	The app offers evidence-based routines for maintaining oral hygiene, including motivational music played for 2 minutes during brushing. It also provides reminders for rinsing the mouth, maintaining fluoride levels, changing toothbrushes, and scheduling dental appointments. A randomized controlled trial compared the effectiveness of the reminder app with traditional verbal oral hygiene education among orthodontic patients aged 15–25 years. The study found significant improvements in brushing frequency and duration among those using the smartphone app.	Randomized controlled trial comparing reminder smartphone application with conventional method of verbal oral hygiene education in maintenance of oral hygiene of 15–25-year-old patients undergoing orthodontic treatment.	The study found notable differences between the two methods, with the smartphone app leading to higher brushing frequency and longer brushing sessions.

Table 2: Summary of studies using social networking media for oral health education and promotion among children

Author name and year	Name of the media used	Purpose of application	Methods	Conclusion/outcome
Zotti <i>et al.</i> , 2016	WhatsApp	Promoted oral hygiene with video tutorials and parent-patient interaction.	Adolescents undergoing orthodontic treatment participated in a randomized controlled trial using WhatsApp for interaction and hygiene tracking.	Improved compliance and fewer white spot lesions among participants.
Scheerman <i>et al.</i> , 2019	Telegram	Combined oral health education with behavior coaching for adolescents.	Randomized trial involving adolescents (ages 12–17) with parental involvement.	The intervention led to better tooth brushing habits and lower plaque scores.
Lotto <i>et al.</i> , 2020	WhatsApp	Distributed educational messages on early childhood caries (ECC).	Randomized trial with children (36–60 months) and parents in low-income communities.	Improved health literacy among parents and positive changes in children's diets.
Simsek <i>et al.</i> , 2020	YouTube	YouTube videos describing oral habits searched.	Evaluated videos on oral habits and assessed quality of information available for patients and parents.	Majority were inappropriate with inadequate information.

Table 3: Summary of studies with telediagnosis using smartphone camera/digital camera/web camera in children

Author name and year	Device for diagnosis	Methods	Conclusion
Amável <i>et al.</i> , 2009	Digital camera, Web-based system (MedQuest)	Used digital images for remote dental diagnosis of children aged 4–6.	Remote evaluations through digital photographs were found reliable for diagnosis.
Torres-Pereira <i>et al.</i> , 2012	Smartphone camera	Assessed intra-oral images captured via smartphones for caries screening.	Remote assessments were as accurate as in-person exams.
Kopycka-Kedzierawski <i>et al.</i> , 2013	Intra-oral camera	Mothers were trained to identify caries in children and share findings remotely.	The method showed high sensitivity and specificity in identifying dental issues.
Purohit <i>et al.</i> , 2017	Smartphone camera	This study evaluated the DMFT index among 12-year-olds, comparing clinical examinations with videographic assessments. Both methods yielded consistent results.	Clinical and video-graphic methods of assessment were proven to be comparable for screening of dental caries in school children.
Estai <i>et al.</i> , 2017	A mobile teledentistry system designed for Android devices, utilizing the 'Remote-i' cloud server to collect, transmit, and review dental images.	The study compared the cost-effectiveness of a mobile teledentistry system against traditional exams, demonstrating the feasibility of the tele-approach for large-scale dental screenings.	Teledentistry offers a cost-effective solution for conducting large-scale dental screenings in remote areas.
de Almeida Geraldino <i>et al.</i> , 2017	Mobile phone camera	Smartphone-captured images were used for remote diagnosis of dental trauma, with the results proving as accurate as those from in-person assessments by pediatric dentists.	The accuracy of remote diagnosis was found to be comparable to that of in-person assessments. Mobile phone cameras offer a practical solution for capturing images to diagnose traumatic dental injuries remotely.
Kale <i>et al.</i> , 2019	Smartphone camera, social networking application (WhatsApp)	After receiving training, mothers used smartphones to identify dental caries in their children, sharing their findings via WhatsApp. Their assessments were shown to be both sensitive and accurate.	The method recorded good sensitivity, specificity and accuracy. Children were more cooperative for examination with smartphone in comparison to conventional visual examination as they are familiar with the former.
Al Shaya <i>et al.</i> , 2020	Smartphone camera, Google drive, social media application (WhatsApp Messenger)	The intra-oral images captured by pediatric dentists proved reliable for diagnosing dental caries in children aged 6 to 12 years.	Teledentistry through smartphone technology provides reasonable reliability for initial caries diagnosis in children, though its accuracy is limited by the absence of radiographs.

Table 4: Summary of studies with teleconsultation using smartphone camera/digital camera/web camera in children

Author name and year	Device for examination	Methods	Conclusion
Lienert <i>et al.</i> , 2010	Telephonic communication	This retrospective study analyzed dental trauma-related phone calls from patients, with an average age of 8.7 years. A notable number of these calls concerned injuries to primary teeth.	Tele-dental consultations are helpful when a dentist is not available. Most of the calls were related to injuries in primary dentition.
Mariño <i>et al.</i> , 2014	Intra-oral camera that transmits audio and video, Web camera	Non-randomized field trial where Community dentists shared images of pediatric patients with specialists to consult on conditions like cleft lip, palate, trauma, and orthodontic concerns. This approach shortened screening times and improved referral processes.	Teledentistry conducted at remote locations was successful in provision of accurate diagnosis, reduced screening time thereby promoting appropriate referrals.

table cont....

McLaren <i>et al.</i> , 2016	Intra-oral camera, Computer camera	Retrospective study reviewed the effectiveness of live video consultations for treatment planning in pediatric patients. The approach helped reduce costs, save time, and improve access to specialized care.	Live-video consultation facilitates completion of treatment plans by paediatric dentists for paediatric patients with extensive treatment needs. It decreased time and cost and increased access to speciality care.
Sanghvi <i>et al.</i> , 2021	Telephone consultation	During the COVID-19 pandemic, telephone consultations with pediatric dentists were assessed. These consultations successfully minimized in-person visits while maintaining high levels of patient satisfaction.	Telephonic consultations reduce face-to-face contacts with good patient satisfaction during pandemic.

Table 5: Summary of studies utilizing teledentistry for behaviour guidance in children

Author name and year	Mobile application used	Methods	Conclusion
Patil <i>et al.</i> , 2017	"My little dentist"	Tested the app's effect on children's anxiety during dental procedures.	The app reduced anxiety and promoted positive behavior during subsequent visits.
Meshki <i>et al.</i> , 2018	"Crazy dentist"	Evaluated the game's effectiveness in preparing children for treatments involving anesthesia.	The game successfully reduced anxiety and improved children's cooperation.
Elicherla <i>et al.</i> , 2019	"Little Lovely Dentist"	Compared the app's effectiveness to the tell-show-do technique.	The app was more successful in lowering anxiety due to its interactive features.
Radhakrishna <i>et al.</i> , 2019	Smartphone dentist game	Randomized interventional clinical study compared a smartphone-based dental game and the tell-show-play-do approach with the standard tell-show-do method. Both alternatives demonstrated greater effectiveness in reducing anxiety in children.	The mobile dental game application, along with the tell-show-play-do technique, proved significantly more effective in reducing anxiety compared to conventional methods, owing to their interactive approach.
Asokan <i>et al.</i> , 2020	Mobile dental application "Little Lovely Dentist"	A double-blinded randomized trial examined the use of a magic trick combined with the "Little Lovely Dentist" app to manage anxiety in children aged 4-5. Both methods proved effective in reducing dental anxiety.	Active distraction using the dental game was well-received by child patients; however, all distraction techniques proved effective in reducing anxiety.

THE PROMISE OF MOBILE TECHNOLOGY

Technological advancements are accelerating globally, including in India, paving the way for innovative, cost-effective, and easily scalable solutions for health promotion and education. Mobile phone-based interventions are one possible approach to be harnessed.

The 11th annual report (2014-2015) by the Internet and Mobile Association of India¹⁷ (IAMAI) highlighted that India had approximately 300 million internet users and was on track to surpass the U.S. as the second-largest internet market. The report predicted that by 2018, India's internet user base would exceed 500 million, with rural users accounting for nearly 210 million. Mobile internet

adoption in India has been expanding rapidly. Projections indicated that by 2017, the number of mobile internet users would reach 506.4 million. In 2016, the smartphone user base surged to 251.79 million. Mary Meeker Internet trends 2017 report stated that Indians spend 28 hours per week on mobile as compared to 4 hours on television, with 45% of time spent on entertainment and 34% time spent on search, social & messaging.¹⁸ The use of social networking sites (SNS) has been steadily increasing in India, especially among college students. This trend has significantly influenced society as a whole, with a particularly strong impact on the student population. A study by Manjunatha S explored the usage of social networking sites among the college students in India. It revealed that the majority of the Indian students (62.6 %) spent 1-10 hours per week on using Social Networking

Sites; Majority (72%) had nearly 1-10 user accounts.¹⁹ Among social networking platforms, WhatsApp has recently emerged as a transformative tool for communication. Its popularity continues to grow

rapidly on both mobile phones and computers. The graph below shows growth of its users in recent years (Fig. 8).

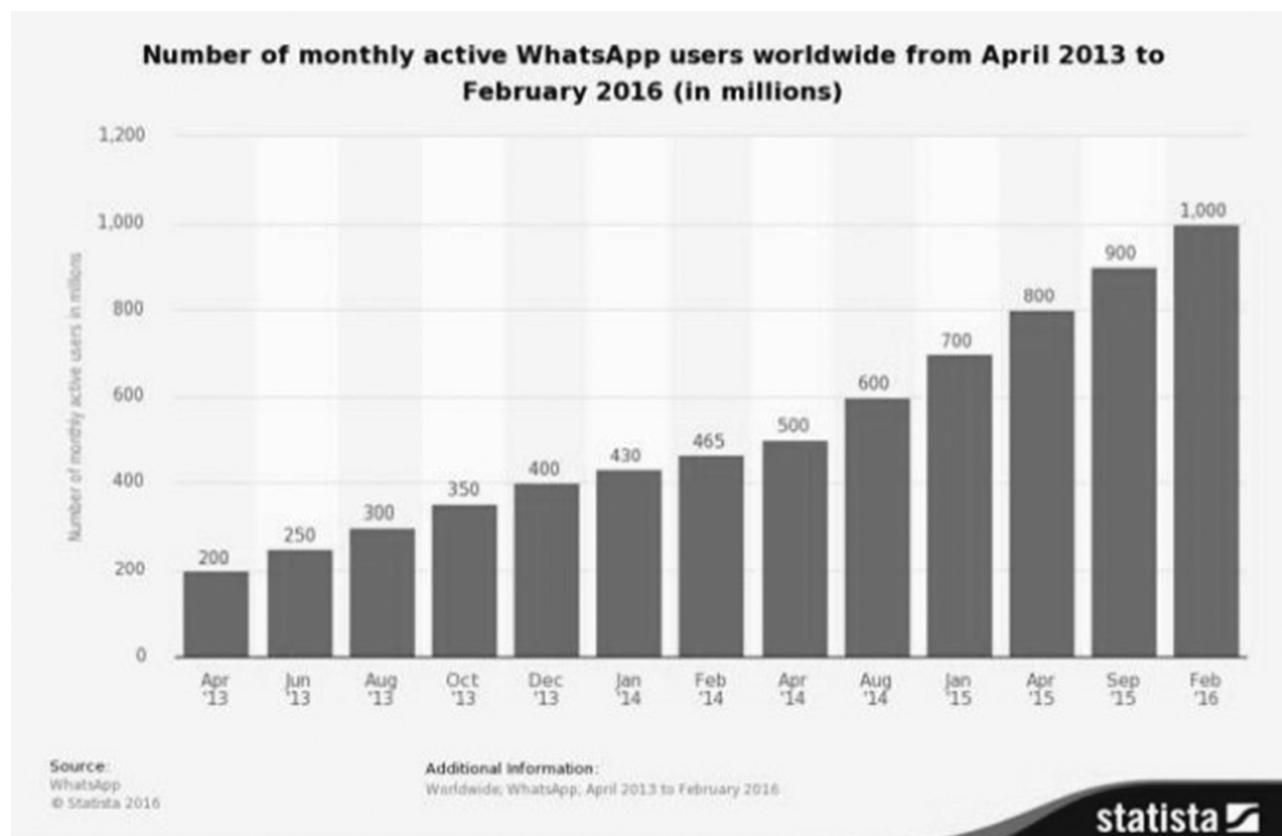


Fig. 8: Graph Showing number of monthly active users worldwide (Source: Statista)

As of February 2016, the mobile messaging app announced more than 1 billion monthly active users of WhatsApp, from over 700 million in January 2015. In India, the mobile messaging platform announced more than 200 million monthly active users as of February 2017.²⁰

Role of mHealth in Healthcare

A key role of healthcare services is to promote healthy behaviors and support individuals in managing chronic conditions independently. However, the amount of information, encouragement, and support that can be conveyed during consultations, within existing service infrastructures or through other traditional media (such as leaflets), is limited. Mobile health interventions aim to foster healthy habits such as raising awareness of oral health practices among college students and enhance disease management, particularly for oral health conditions. The mobile

devices have a range of functions from mobile cellular communication using text messages (SMS), photos and video (MMS), telephone, and World Wide Web access, to multi-media playback and software application support.

The advantage of the mobile technology:^{10,11}

- They are handy and popular, as many people carry their mobile phone with them wherever they go.
- They allow temporal synchronisation of the intervention delivery and also allow the intervention to claim people's attention when it is most relevant.
- Temporal synchronisation of the intervention delivery also allows interventions to be accessed or delivered within the relevant context (i.e., the intervention can be delivered at any time and extra support can be requested

wherever and whenever it is needed).

- They are potential economies of scale as it is technically easy to deliver interventions to large populations.
- The technological functions that have been utilised for health care consumers (college students in the present study) include text messages (SMS), software applications, and multiple media (SMS, photos) interventions.
- The technology supports interactivity, which allows people to obtain extra help when needed.
- Motivational messages, monitoring, and behaviour change tools used in face-to-face support can be modified for delivery via mobile phones.
- Interventions can be personalised with the content tailored to the age, sex, and ethnic group of the participant or to the issues they face.

TELEDENTISTRY

Applications of teledentistry in pediatric dentistry:

Teledentistry offers significant benefits for pediatric care by enabling remote monitoring, guiding patient behavior, and promoting oral health education in areas with limited access to specialized dental services. The COVID-19 pandemic highlighted its importance, as virtual consultations reduced patient contact and safeguarded healthcare providers. By employing tools like intra-oral cameras and mobile applications, teledentistry provides a cost-effective means to enhance the reach of pediatric dental care.

Oral health education and promotion

Children's oral health is important for their general health of the body, social, physical and mental well-being.²¹ Mobile technology, internet, and mHealth applications have successfully captured public attention and reached broad audiences through oral health education and promotion programs.²² Oral health education and promotion initiatives delivered through mobile technology, the internet, and mHealth applications have successfully captured public interest and reached a wide audience.²³ In recent years, the number of mobile and internet users

have dramatically increased across the globe, which has changed the way, the patient education can be undertaken.²³ These methods have been explored through various studies, with a particular focus on assessing their effectiveness in pediatric populations.

Children are adept in using digital technology and are more immersed in their use than adults.²⁴ Social networking applications have been popular amongst dental professionals to interact with their patients.²⁵ In summary, the use of internet and mobile based applications enhances patient awareness and knowledge to support oral hygiene²⁶, provides an effective communication channel for parents and communities in remote areas²⁷, and addresses the shortage of trained dental public health professionals.²⁸ These apps are convenient, as they can be accessed directly via smartphones, eliminating the need for additional devices. Personalized reminders and behavior guidelines can also be provided based on real-time assessments and feedback can be delivered.²⁹ They also help overcome cultural, social and logistic challenges that are often encountered with conventional education methods.²⁹ The mobile based health apps, which are used for patient education, should be based on recognized behaviour change techniques. They should offer clear instructions on performing tasks, demonstrate proper behaviors, provide timely prompts and cues, and reward users upon successfully completing desired actions.²⁹

However, concerns persist about the app's usability if it is too complicated, users may avoid engaging with it, diminishing its intended impact.³⁰ Furthermore, the app must safeguard user privacy, avoid overwhelming users with frequent messages that could cause fatigue, feature an appealing design to sustain interest, and be adaptable to meet individual needs.³⁰

Remote diagnosis and monitoring

Children and adolescents are a key demographic for early detection and prevention of oral health issues.³¹ However, geographic and socioeconomic disparities continue to hinder efforts to improve oral health outcomes. Expanding access to dental services in remote areas requires affordable and sustainable solutions to ensure that children can receive necessary care, even in regions with limited healthcare infrastructure.³² Children and adolescents are the prime target population for early diagnosis and prevention of oral health

diseases.³¹ Teledentistry, leveraging electronic dental records, communication technologies, the internet, and modern digital tools like intra-oral cameras and webcams, has accelerated the delivery of dental services.

Teledentistry offers a range of services, including tele-triage, teleconsultation, telediagnosis, and telemonitoring.³³ Telediagnosis utilizes images to remotely assess and identify oral health issues, while tele-triage assists in determining the urgency of patient cases, ensuring timely care. These methods facilitate safe access to dental services. Telemonitoring, teleconsultation, and tele-triage help minimize unnecessary patient travel, particularly benefiting individuals in remote areas who face socioeconomic and geographic challenges in accessing dental care.³⁴ It also offers improved access to pediatric dental specialists, who can review images and records provided by non-specialist dentists or dental assistants, and develop appropriate treatment plans accordingly.³³ Remote dentists can share digitally collected data for triage, diagnosis, and patient referrals.³⁴ This process includes gathering patient history through questionnaires, documenting examination findings, and transmitting intraoral and radiographic images captured via intraoral or digital cameras. The data related to the patient are transmitted using an online electronic record management system from the remote site to the hub site where the specialist consultant is available.³⁴

CONCLUSION

Oral health plays a vital role in overall health and well-being, influencing both physical and mental aspects of life. Maintaining good oral health is essential for enhancing quality of life, self-esteem, and social confidence.³⁵ India, having the world's largest youth population of 242 million, are equally burdened with major oral diseases like Dental caries, Periodontal Diseases, Premature loss of tooth that accounts to 2%. In order to promote the oral health of the adolescents and youth, it is very important to advisably change their health-related perceptions which in turn influences their oral health behavior and habits. The healthcare system in the growing era is being viewed as an "iron triangle" of access, quality and cost. In India, mHealth is one of the disruptive technologies that can sever the iron triangle by increasing access, improving quality and lowering costs for all of its market segments. As the

number of smartphone users continues to grow in India, mHealth applications are increasingly being used to deliver health messages to large audiences at a relatively low cost.

Teledentistry, rooted in internet technology and advancements in information systems, serves as a valuable complement to in-person pediatric dental care, enhancing patient management. Pediatric dentists can utilize this technology for educating patients and parents, tracking preventive care, facilitating post-treatment follow-ups, evaluating dental development, diagnosing oral conditions, planning treatments, and offering behavior guidance before appointments to reduce anxiety in children. This technological advancement in dentistry plays a crucial role in bridging the gap between the availability of pediatric dental specialists and the demand for their services, especially in areas with limited access to oral healthcare. During the pandemic, teledentistry demonstrated its potential to curb virus transmission while ensuring continuity of care. However, further research is essential to establish safe, effective, and evidence-based practices for integrating teledentistry into pediatric dentistry. Although it presents some challenges, teledentistry offers a sustainable solution for providing long-term oral healthcare to children, addressing disparities in access to specialized care. Achieving this will require collaborative efforts from health authorities and pediatric dental professionals. AAPD should consider playing vital role in dissemination of evidence via social media, and also work with private groups to ensure that the information exchanged on these forums is HIPAA compliant, accurate and evidence-based. Similarly, all discussions pertaining to patient care, the members and moderators of private social media groups should be committed to evidence-based dentistry and rely on authoritative sources of information, including official AAPD social media groups. AAPD should also recommend its members on using social media by professionals in paediatric dentistry.

REFERENCES

1. United Nations Population Fund. The Power of Adolescents, Youth and the Transformation of the Future. United States: Prographics Inc; 2014.
2. WHO. Adolescent health [Internet]. Updated 2017 Oct 17 [cited 2017 Aug 27]. Available from: URL: http://www.who.int/topics/adolescent_health/

- en/.
3. Poul Erik Petersen, Denis Bourgeois, Hiroshi Ogawa, Saskia Estupinan-Day, Charlotte Ndiaye. The global burden of oral diseases and risks to oral health. *Bull. World Health Organ* 2005; 83:661-669.
4. The Oral Health Atlas. The Challenge of Oral Disease – A call for global action. 2nd ed. Geneva: FDI World Dental Federation; 2015.
5. Albander JM, Brown LJ, Löe H. Clinical features of early-onset periodontitis. *J Am Dent Assoc* 1997; 128:1393-1399.
6. World Health Organization. The World Oral Health Report 2003. Continuous improvement of oral health in the 21st century – the approach of the WHO Global Oral Health Programme. Geneva: World Health Organization; 2003.
7. Ruth Freeman. Communicating effectively: some practical suggestions. *Br. Dent. J* 1999; 187(5):240-244.
8. Free C, Phillips G, Galli L, Watson L, Felix L, *et al*. The Effectiveness of Mobile-Health Technology-Based Health Behaviour Change or Disease Management Interventions for Health Care Consumers: A Systematic Review. *PLoS Med* 2013; 10(1):e1001362.
9. TECH2 News and Analysis: Number of smartphone users crosses 300 million in India as shipments grew 18 percent [Internet] [cited 2017 Jan 25]. Available from: URL: <http://tech.firstpost.com/news-analysis/number-of-smartphone-users-crosses-300-million-in-india-as-shipments-grew-18-percent-359075.html>.
10. Free C, Whittaker R, Knight R, Abramsky T, Rodgers A, *et al*. Txt2stop: a pilot randomised controlled trial of mobile phone-based smoking cessation support. *Tob Control* 2009; 18:88–91.
11. Rodgers A, Corbett T, Bramley D, Riddell T, Wills M, *et al*. Do u smoke after txt? Results of a randomised trial of smoking cessation using mobile phone text messaging. *Tob Control* 2005; 14:255–261.
12. Norwell N. Text messaging raises medicolegal issues. *BMJ* 2003; 326:1148.
13. Novak L, Svensson M. MMS-Building on the success of SMS. *Ericsson Review* 2001;3:102–9.
14. Wolf MS, Wilson EA, Rapp DN, Waite KR, Bocchini MV, *et al*. Literacy and learning in health care. *Pediatrics*. 2009; 124 Suppl 3:S275–S281.
15. ReferralMD. 30 Amazing Mobile Health Technology Statistics for Today's Physician [Internet]. 2015; [cited 2017 Sep 13]. Available from: URL: <https://getreferralmd.com/2015/08/mobile-healthcare-technology-statistics/>.
16. The Hindu. WhatsApp user base crosses 70 million in India [Internet]. Updated 2016 Apr 09 [cited 2017 Sep 13]. Available from: URL: <http://www.thehindu.com/sci-tech/technology/gadgets/whatsapp-user-base-in-India/article6557742.ece>.
17. Internet and Mobile Association of India (IAMAI). 11th Annual Report 2014- 15 [Internet]. [cited 2017 Oct 06]. Available from: URL: http://www.iamai.in/sites/default/files/annual_report/AnnualReport2014-15.pdf.
18. The Indian Express. Mary Meeker Internet trends 2017 report: The top highlights for India [Internet]. [cited 2017 Jun 01]. Available from: URL: <http://indianexpress.com/article/technology/tech-news-technology/mary-meeker-internet-trends-2017-report-india-top-highlights-points-to-notemobile-growth-4683709/>.
19. Manjunatha S. The Usage of Social Networking sites Among the College Students in India. *Int Res J Social Sci* 2013; 2(5):15-21.
20. Statista- The Statistical Portal. Number of monthly active WhatsApp users in India from August 2013 to February 2017 (in millions) [Internet] [cited 2017 Oct 07]. Available from: URL: <https://www.statista.com/statistics/280914/monthly-active-whatsapp-users-in-India/>.
21. Alqarni A.A., Alfaifi H.M., Aseeri N.A., Gadah T., Togoo R.A. Efficacy of a self-designed mobile application to improve child dental health knowledge among parents. *J Int Soc Prev Community Dent*. 2018; 8:424-430. [PMC free article] [PubMed] [Google Scholar]
22. Shetty V., Yamamoto J., Yale K. Re-architecting oral healthcare for the 21st century. *J Dent*. 2018; 74(Suppl1):S10–S14. [PMC free article] [PubMed] [Google Scholar]
23. Gadbury-Amyot C.C. Technology is a critical game changer to the practice of dental hygiene. *J Evid Base Dent Pract*. 2014; 14:240–245. [PubMed] [Google Scholar]
24. Campos L.F., Cavalcante J.P., Machado D.P., Marçal E., Silva P.G.B., Rolim J.P. Development and evaluation of a mobile oral health application for preschoolers. *Telemed J e-Health*. 2019; 25:492–498. [PubMed] [Google Scholar]
25. Reid Chassiakos Y.L., Radesky J., Christakis D., Moreno M.A., Cross C. Council on communications and media. Children and adolescents and digital media. *Pediatrics*. 2016; 138 [PubMed] [Google Scholar]
26. Singh N., Sultan A., Juneja A., Aggarwal I., Palkit T., Ohri T. Integration of teledentistry in oral healthcare during COVID-19 pandemic. *Saint Int Dent J*. 2020; 4:77–81. [Google Scholar]
27. Underwood B., Birdsall J., Kay E. The use of a mobile app to motivate evidence-based oral hygiene behaviour. *Br Dent J*. 2015; 219:E2. doi: 10.1038/sj.bdj.2015.660. [PubMed] [CrossRef]

- [Google Scholar]
28. Almalki M., FitzGerald G., Clark M. Health care system in Saudi Arabia: an overview. *East Mediterr Health J.* 2011;784–793. [PubMed] [Google Scholar]
 29. da Costa C.B., Peralta F.D.S., Ferreira de Mello A.L.S. How has teledentistry been applied in public dental health services? An integrative review. *Telemed J e Health.* 2020; 26:945–954. [PubMed] [Google Scholar]
 30. Middelweerd A., Mollee J.S., van der Wal C.N., Brug J., Te Velde S.J. Apps to promote physical activity among adults: a review and content analysis. *Int J Behav Nutr Phys Activ.* 2014; 11:97. [PMC free article] [PubMed] [Google Scholar]
 31. Scheerman J.F.M., Hamilton K., Sharif M.O., Lindmark U., Pakpour A.H. A theory-based intervention delivered by an online social media platform to promote oral health among Iranian adolescents: a cluster randomized controlled trial. *Psychol Health.* 2020; 35:449–466. [PubMed] [Google Scholar]
 32. Tiffany B., Blasi P., Catz S.L., McClure J.B. Mobile apps for oral health promotion: content review and heuristic usability analysis. *JMIR Mhealth Uhealth.* 2018; 6 [PMC free article] [PubMed] [Google Scholar]
 33. Jampani N.D., Nutalapati R., Dontula B.S., Boyapati R. Applications of teledentistry: a literature review and update. *J Int Soc Prev Community Dent.* 2011; 1:37–44. [PMC free article] [PubMed] [Google Scholar]
 34. World Health Organisation (WHO) Important target groups – school children and youth. https://www.who.int/oral_health/action/groups/en/ Available from:
 35. Stokes E, Ashcroft A, Platt MJ. Determining Liverpool adolescents' beliefs and attitudes in relation to oral health. *Health Educ Res* 2006; 21:192–205.