

mOral Health in India: Current Scenario and Future Perspectives

Abstract

Oral diseases affect half of the world's population and found to be the most common and preventable noncommunicable diseases worldwide. The World Health Organization Oral Health Programme work plan 2018–2020 is to prevent the burden of oral diseases using digital technology. With 5 billion mobile phone subscribers in the world, covering over 85% of the world's population, the utilization of technology-based interventions for oral health promotion is no different. In India, numerous medical applications such as eRaktkosh and mDiabetes have been developed for the improvement of general health, whereas few initiatives such as mCessation and National Quitline services for oral health have been undertaken. Digitalization and oral health forms a crucial component in the future of oral health, which should be utilized in ensuring oral health for all.

Keywords: India, mobile application, oral health, technology

Introduction

An unparalleled spread of mobile technologies, as well as advancements in their innovative features to address health priorities, has evolved into a new field termed as eHealth.^[1] The term eHealth is essentially health-related information supported by electronic process and communication. The usage of the term, however, varies as some argue that it is interchangeable with health informatics with a broad definition covering electronic/digital processes in health; others use it in the narrower sense of health-care practice using the Internet. The term can encompass a range of services or systems that are at the edge of medicine/health care and information technology (IT).

mHealth or mobile health is a component of eHealth. The Global Observatory for eHealth defined mHealth or mobile health as a medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants, and other wireless devices.^[1] It includes the use of mobile devices in collecting aggregate and patient-level health data; providing health-care information to practitioners, researchers, and patients; real-time monitoring of patient vitals; and direct provision of care (via telemedicine).^[2]

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The global population stands at 7.7 billion, and there are 5 billion mobile phone subscribers in the world, with over 85% of the world's population now covered by a commercial wireless signal as stated by the International Telecommunication Union.^[3] Governments are now expressing interest in eHealth as a complementary strategy for strengthening health systems and achieving the health-related Sustainable Development Goals in low- and middle-income countries. A revolutionary increase in the penetration of smartphones and mobile networks in many countries has transformed the manner health services and the information are now managed.

eHealth applications are being tested in such diverse scenarios as improving timely access to emergency and general health services and information, managing patient care, reducing drug shortages at health clinics, and enhancing clinical diagnosis and treatment adherence, among others.^[1] Computer-based programs combine the advantages of a clinical approach, which emphasizes individualized interaction between the client and the provider, with the goals of the public health approach, which target large population segments or an entire population. Interactive technologies can be more attractive to participants because of the potential to receive individualized, tailored feedback^[4,5] and to interact at their convenience.^[6] They also hold the promise to increase retention

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rates by giving participants doses of interventions as they need them.^[7] Other advantages of eHealth promotion programs include reduced personnel demands, consistency of interventions over time, increased interactivity and flexibility, automated data collection, and the potential for more honest self-report by participants.^[8]

Oral Health Burden in India

Oral diseases affect 3.9 billion people worldwide, with untreated tooth decay (dental caries) impacting almost half of the world's population (44%), making it the most prevalent of all the 291 conditions included in the Global Burden of Disease Study. Although most of the oral diseases are preventable, they still account as the fourth most expensive to treat. In the United States alone, US\$110 billion are spent yearly on oral health care. In the European Union, annual spending on oral health care was estimated at €79 billion in the years 2008–2012, which is more than the money invested in the care of cancer or respiratory diseases. The oral and dental diseases are widely prevalent in India; although not life threatening, these diseases are often very painful, expensive to treat, and affect the quality of life.^[9] The major oral and dental diseases include (i) dental caries, (ii) periodontal diseases, (iii) dentofacial anomalies and malocclusion, (iv) edentulousness (tooth loss), and (v) oral cancer. The dental and oral diseases have been found to be associated with complications such as abscess, pain, and also with systemic diseases, which affect the overall well-being of an individual.

Oral, General, and eHealth! A Collaborative Take!

The World Health Organization defines oral health as a state of being free from the mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders.^[10] The Tokyo Declaration on Dental Care and

Oral Health for Healthy Longevity (2015) stated that “dental care should respond to the problem of increased noncommunicable diseases as living environments change, and should expand its support for people who need nursing care and preventing premature death.”^[11] Given the increasing social and economic burden of chronic disease and the need for effective approaches to prevent and treat oral health problems, emphasis on the use of information and communication technology-based health care has emerged. An understanding of the oral microflora and disease etiology reveals that mild manipulation of oral tissues through brushing or chewing can result in tissue injury and introduction of bacteria into the bloodstream, followed by their subsequent colonization over damaged heart valves, resulting in infective endocarditis. Hence, inputs from an interactive smartphone application on such vital information play a significant role in preventing heart ailments.^[12]

The utilization of technology-based interventions for oral health promotion is no different. Given the nature of these diseases being preventable, imparting adequate knowledge, utilization of adequate oral hygiene aids, and ensuring self-assessment of improper oral hygiene practices can aid in the significant reduction of oral diseases.

There has been significant interest from different countries regarding a mHealth program focusing on oral health (m-OralHealth) through various global workshops [Figure 1].^[13]

Government Initiatives and mHealth

Mobile applications serve as an essential tool as they can be exploited for population-level strategies to disrupt the current escalating trend of oral diseases. A user-friendly approach and combination of features not only allow the application to be accessible but also aid in monitoring our daily activities. The Government of India has initiated numerous IT, web, and mobile-related initiatives, with the first point of contact being the National Health Portal: a digital initiative of the Ministry of Health and Family Welfare. The objectives of the portal are to improve the health literacy, improve access to health services, and decrease the burden of disease through awareness. Among the other applications, the National Health Portal (NHP) health directory services^[14] provide information related to hospital and blood bank across India. It utilizes current geographical location and provides user with the information about the nearest hospital. The Indradhanush Immunization app^[15] facilitates young parents in tracking the immunization of their children. The application No More Tension^[16] calculates the stress level of an individual, based on a questionnaire, and the score would advise them the steps they should incorporate in their life in order to avoid stress. The Pradhan Mantri Surakshit Matritva Abhiyan^[17] avenues for registration of private sector/voluntary sector/retired obstetricians, radiologists, and physicians willing to provide free

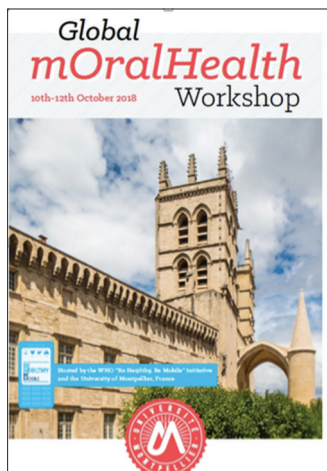


Figure 1: Global mOral health workshop

antenatal services to pregnant women at government health facilities on the 9th of every month. The application India Fights Dengue^[18] aids in checking the dengue symptoms, whereas India's voice against AIDS-NACO AIDS^[19] app manages AIDS prevention and control societies. The NHP Swasthya Bharat^[20] empowers the citizens to find reliable and relevant health information. My Health Record^[21] is a personal record locker, whereas mDiabetes^[22] contributes to improving awareness about diabetes and promoting healthy diets and active lifestyle, which are vital to the prevention of diabetes. Mera Aspataal^[23] allows feedback to be consolidated, analyzed, and disseminated on a frequently updated dashboard. eRaktkosh^[24] is an initiative to connect, digitize, and streamline the workflow of blood banks across the nation.

Mobile Applications and Oral Health! The Need of the Hour

The government initiatives have been significantly utilized in the improvement of general health; however, their utilization in oral health still remains scanty with only a few initiatives such as mCessation and National Quitline services.^[25] An analysis of the existing literature reveals that self-perception of dental status and oral function is an essential aspect of oral health, and mobile apps play a significant role in motivating evidence-based oral health behavior. A previously published report revealed that 70% of respondents reported that their teeth felt cleaner since using the app and 88% were motivated to brush their teeth for longer. Ninety percent of the respondents reported that they would recommend the app to their friends and family. Therefore, it was concluded that the mobile application not only contributed to greater motivation for young people to care for their teeth more effectively, but also has enormous potential as a way to convey crucial oral health messages and information.^[26] The need for a comprehensive mobile application in a country like India thus increases many folds due to an increased disease burden and a poor oral knowledge and attitude toward dental treatments.

Digitalization and Oral Health: The Indian Perspective

With the ongoing Internet revolution in India and over 460 million Internet users, India is the second largest online market, ranked only behind China. By 2021, there will be about 635.8 million Internet users in India. According to the report titled, "Internet in India 2017" by the Internet and Mobile Association of India and Kantar IMRB, the number of Internet users increased by 11.34% over December 2016 and stood at 481 million in December 2017. The number of Internet users in India is expected to reach 500 million by June 2018. Internet penetration in urban India was 64.84% in December 2017 when compared to 60.6% in December 2016. In comparison, rural Internet penetration has grown from 18% last December to 20.26% in December 2017.

According to census 2011, the estimated population in urban and rural India is 455 million and 918 million, respectively. This recent digitalization has ensured that 295 million urban populations and 186 million rural populations are using the Internet. There are an estimated 281 million daily Internet users, out of which 182.9 million or 62% access Internet daily in an urban area, as compared to only 98 million users or 53% in rural India. There are an estimated 143 million female Internet users overall, which is approximately 30% of the total Internet users.^[27]

Digitalization and oral health hence forms a crucial component in the future of oral health in a multilingual country like India where the technology can be utilized in spreading adequate information. While Digital India is paving its way in rural India, there also exists an underlining digital gender gap. Digital literacy is, therefore, a key to ensure that everyone stays informed, engaged, and safe online. Although the urban population is much lower than the rural population, the urban-rural digital division is more acute than what the penetration portrays. The future growth policies, therefore, must focus on bridging the digital division, which if adequately utilized can ensure oral health for all.

Suggestions

Mobiles and the Internet have now become an integral part of our daily life. The current situation, especially in a country like India, warrants the need for utilization of this active mode of information in improving the oral health condition of the individuals.

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Conflicts of interest

There are no conflicts of interest.

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