



ORAL CANCER AND MHEALTH IN INDIA: AN OVERVIEW

Dental Science

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ABSTRACT

Oral cancer continues to remain a health challenge in India. Lack of awareness and high intake of tobacco in Indian population results in patients reporting in advanced stages of oral cancer. Moreover, rural and remote areas do not have adequate medical facilities. Recently, mHealth has shown promising results in cancer care. The low cost and reach for a large population offer an advantage for mHealth-based interventions in healthcare. Mobile technological advances are increasing rapidly in a developing nation like India. These advances in mHealth can provide solutions to the healthcare problems of India. mHealth initiatives have a potential to reduce the burden of the oral cancer burden of India.

KEYWORDS

INTRODUCTION

Oral cancer is defined as cancer of the lips, mouth and tongue, as reported in some antecedent population-based research reports. It's also adopted and complies with the definitions of oral cancer through the coding scheme of the International Classification of Diseases (ICD), WHO case definitions and IARC (International Agency for Research on Cancer). Mutations that can be inherited, induced by environmental factors, or due to DNA replication errors are known to be its causative factors.²

Risk factors comprises environmental carcinogens, alcohol, infectious agents like HPV, tobacco consumption in the form of cigarette smoke, smokeless tobacco and betel nut chewing.^{3,4}

ORAL CANCER IN INDIA

Cancer has turned out to be one of the ten leading reasons of demises in India. In 2011, Takiar and Vijay reported a 55.8% increase in cancer incidence over the past 2 decades, in accordance to national urban registries.⁵ Moreover, the IARC had anticipated that cancer incidence in India would increase from 1 million in 2012 to greater than 1.7 million in 2035. This suggests that the death rate due to cancer will also increase from 680000 to 1-2 million within same period.⁶ 20 per 100000 of the Indian population have oral cancer, which makes approximately 30% of all types of cancer.⁷ More recently, it has been shown that the projected incidence of oral cancer in selected Indian locations states rose by 28.4% between 2015 and 2020 (annual report NCDIR 2015-2016).⁸

Oral cancer is one of the major public health problems within the Indian subcontinent because - (i) majority of the cancer patients belong to middle- and low-income rural regions who don't have sufficient access to health care facilities and health services. Moreover, follow up compliance is poor after the primary examination by a healthcare professional. (ii) the lack of necessary healthcare professionals and infrastructure within the country's rural regions delays the treatment initiation. (iii) mainly people from the lower socio-economic groups are largely affected due to higher exposure to tobacco. Incidence of oral cancer is 8.4 times higher in patients who smoke and chew tobacco than in patients who do not have this habit.⁴ More than 90% of oral cancer patients in India say they use tobacco products.⁹ (iv) Lack of education and negligence in the rural regions. As a result, the patient usually has advanced stages of oral cancer (stage II and IV) which leads to poor prognosis and considerable treatment cost which patients cannot normally afford.¹⁰⁻¹⁴ One study reported that 48% of cases of oral cancer were in the advanced stages when reported to the healthcare centres.⁴ The prognosis is said to be excellent if oral cancer is detected before metastasis (82.8% surviving 5 years after diagnosis). However, in India most oral cancers are recognized after metastases, in which 5-year survival is barely 27.8%.³

In India, men are two to fourfold more affected than women mainly due to the behaviour and lifestyle.⁹ Tongue cancer has been found to be

the most common cancer while the most common area affected is the buccal mucosa and the gingiva.

In addition to tobacco consumption, a deficiency in taking of fresh food, green vegetables and a high cooking temperature in Indian dishes are accountable for oral and pharyngeal cancers.¹⁵ Nutritional deficiencies, especially of vitamin A and iron, are shown to be in association with the aetiology of hypopharyngeal cancer. A low socioeconomic status means that low affordability to proper food and hygiene conditions, which indicates poor nutrition that results in deficiencies.¹⁶

THE ONSET OF mHEALTH

The WHO's Global Observatory for eHealth outlined mHealth as medical and public health practice supported by mobile devices like mobile phones, patient monitoring devices, personal digital assistants and other wireless devices.¹⁷ It is a health services conveyed via mobile and wireless applications, including text messaging, apps, portable devices, remote sensing and social media use.¹⁸ The mobile devices that may be employed in mHealth include laptops, tablets, cell phones, smartphones, palmtops, notebooks and netbooks.

The speedily advancing technology for mobile devices and the supporting information communication network has the capacity to provide solutions to certain health care problems. This amalgamation of mobile technologies and advances in health management have led to the development of a new area of eHealth called as mHealth (Mobile Health), that has the capability to renew the face of worldwide healthcare systems.

mHealth offers the capability for substantial reach by providing tailor-made services even among traditionally underserved population groups at a comparatively low cost.^{19,20} It can improve interaction with health information by being proactive, unobtrusive, confidential and repetitive, requesting their attention, creating an urgency to reply, and giving advice in real time, on their schedules, and everywhere.²¹ It also helps healthcare professionals perform key tasks like patient management, access to medical references and research, diagnosis of diseases, access to health records, medical education and counselling, information gathering and processing, patient monitoring, and clinical decision-making.²²

mHealth IN INDIA

According to the Indian Telecom Regulatory Authority, there were nearly 1009 million (577.84 million urban and 431.61 million rural) phone subscribers as of November 30, 2015.²³ Approximately 70% of the Indian population have a mobile phone subscription (with only slight differences between urban and rural areas). This provides a good opportunity for communication and education in rural and remote areas. mHealth in India has been used to improve health communication, educate target groups in rural / remote areas and record health data.²⁴

Realising this potential, several initiatives have been actively taken both by government and private organisations recently in India. The mother and child health tracking system was the first of its kind to send messages to Janani Suraksha Yojana beneficiaries (mother's security system) and licensed social health activists.²⁵ In 2012, the Indian government introduced a mobile intervention referred as NIKSHAY, a web-enabled application making easier for all concerned employees to monitor universal access to tuberculosis patient data. NIKSHAY's innovative information technology application enables all health care sector employees to trace every tuberculosis patient.²⁶ On January 15, 2016, the Indian government launched numerous mHealth initiatives across the country under the Digital India initiative giving a boost to the mHealth initiatives in the country. The aim of the program was to improve approach, reduce health care costs and make the system additional strong.²⁷

Even though mHealth has a bright future in India, there are several challenges it can face due to the demographic and social fabric of the country. Rural and remote areas of India continue to face shortage of healthcare workers. Although, mHealth has the capability to supply low cost health care in rural regions, poor phone access in rural households, lack of reliable power needed for phone usage, poor smartphone user rates, and low literacy rates could be potential challenges.²⁸ However, the rapid advancements in information and technology sector in India seems to provide promising results for the future.

mHealth IN CANCER CARE

Recently, the use of mHealth into cancer care has received a lot of scientific attention. mHealth related interventions in cancer care fall into broad categories: (1) provision of information/education in digital format, (2) provision of lifestyle interventions like exercise or vegetable consumption and (3) symptom values, which range from pain to psychological symptoms of post-traumatic stress disorder (PTSD) and (4) linking or symptom reporting.^{29,30} In several areas of cancer management mHealth has shown promising results, for example, vital improvements in pain intensity, pain disorder, quality of life, nausea, fatigue, urinary problems and emotional function; fewer days with moderate to severe neuropathic symptoms, stress and activity intervention; reduction in symptoms of post-traumatic stress disorder; reduced stress and less severe neuropathic pain compared to the usual therapy for planned outpatient visits.^{29,30,32}

The mHealth application opens up the chance of 24/7 care, in which alerts generated by the app can be checked and processed by a member of the cancer specialist team. In practice, non-business hours services may not be robust enough to enable 24/7 surveillance in many region.^{33,34} Studies have shown the willingness of cancer patients in using the application-supported care.³³ While the mobile applications offer the possibility of better communication and alarming with health services, it is essential to understand that application is only an addition but not a replacement for normal care.

However, mHealth implementation in cancer care and related research can be multiplex. This is because, the mHealth applications implementations are a relatively new addition to clinicians' armaments, and at the same time the safety implications are significant. The principles for design and implementation are not as clear as for pharmacological interventions.³³

mHealth IN ORAL CANCERS IN INDIA.

Breakthrough and the spread of mobile technologies in India has made it feasible to use mHealth for a major health problem such as oral cancer. mHealth has been used in few initiatives for oral cancer screening, smoking cessation programs and health education / promotion concerned to oral cancer. The National Informatics Centre and the Tamil Nadu government have developed an innovative digital screening programme that expedites the screening, diagnosis, follow-up and oral cancer treatment and potentially malignant oral lesions. Behe@lthy, a mobile tobacco cessation initiative, was formed by the National Tobacco Control Program with the Ministry of Health and Family Welfare and has over 2.1 million self-registered users, to date.³⁵

Bhatt et al. reported on the development of an "mHealth prototype" to be used as a principal component for screening programmes for cervical and oral cancer in rural regions of India. It was deduced that it was feasible to develop a cost effective mHealth prototype with the capability to collect, store, and transfer data, which is accepted and considered helpful by CHWs in low-resource environments.³⁶

The Biocon mHealth program was first executed in 2011 when a two-day training module for the early detection of oral cancer and the use of mobile phone applications via PowerPoints, videos and clinical cases was developed. The "Screen and Treat" program was initiated by the Biocon Foundation in collaboration with the Karnataka government. It was planned to reach the rural population through prevailing health resources and ASHAs.³⁷

Deshpande and others developed a mobile application called Prayaas-Oral Cancer Prevention. It was developed with the aim of providing basic information on the prevention of oral cancer and the rehabilitation of oral cancer. In their pilot study, they found that the application was well received by the participant.³

CONCLUSION

Recent epidemiological data shows that oral cancer continues to remain a major challenge for health care in India. mHealth has shown promising results in certain aspects of cancer management. The low cost and reach for a large population offer an advantage for mHealth-based interventions in healthcare specially in a country like India where superior healthcare facilities are lacking in remote and rural areas. Mobile-based technological advances are growing exponentially in India. The few recent mHealth interventions have shown that mHealth can solve the problem of oral cancer in India to a certain extend. Greater efforts should be made to use mHealth to address various aspects of oral cancer in India.

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