

THE ASSESSMENT OF NON-OFFICE BASED SCREENING TECHNIQUES FOR ORAL CANCER IN INDIA

Dissertation Submitted to



The IIHMR University, Jaipur

for the partial fulfillment for the award of the degree of

Master of Business Administration (MBA)

in

Hospital and Health Management

by

Harleen Kaur

Under the Supervision and Guidance of

Dr. P.R. Sodani

2021

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TO WHOMSOEVER IT CONCERNS

DECLARATION BY STUDENT

I hereby declare that this dissertation titled **The Assessment of Non-Office Based Screening Techniques For Oral Cancer In India** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

Harleen Kaur

30.06.2021



July 2, 2021

EXPERIENCE CERTIFICATE

This is to certify that Harleen Kaur (Employee ID –27450) was interning in our organization from January 18, 2021 to March 12, 2021 in the capacity of Knowledge Management Associate - Intern based at the New Delhi office.

We wish you all the success in future endeavors.

For ZS Associates India Pvt Ltd

A handwritten signature in black ink, appearing to read 'Apoorva'.

Apoorva Aggarwal
Office Managing Principal

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Impact where it matters.

CERTIFICATE

This is to certify that dissertation title **The Assessment Of Non-Office Based Screening Techniques For Oral Cancer In India** is a record of the research work undertaken by Harleen Kaur in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management) from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.

Faculty Guide:

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Date: 30.06.2021

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ABSTRACT

Oral cancer is key public health dilemma in India. Oral cancer consists of cancer of the lip, mouth, and tongue. In 2020, lip and oral cavity cancer accounted for approximately 2% new cases and 1.8% deaths globally. In the year 2020, lip and oral cavity cancer accounted for 135,929 new cases, making it the 2nd leading cancer site across all sexes and ages. Tobacco is a major etiologic agent for oral cancer amongst many, as it accounts for major share of all the cancers, with tobacco related cancers accounting for about 40-50% in men and about 20% in females of all cancers.

The 5-year survival rate is above 80% for localized cancer whereas it is less than 20-30% for advanced stage of the disease. Unfortunately, many cancer incidences are detected in advanced stages. Hence, early detection and treatment are important to decrease the mortality rates and improve the survival rates for patients in the country. In India, numerous cases of oral cancer are not detected in the localized stages, that presents a dilemma for the treatment of OC. There are several causes for delay in OC patients getting care, with delays in care caused by the patients themselves, and the low socio-economic status being the major reason. The burden of treatment of oral cancer has a degrading impact on not just the quality of life, but the treatment expenditure adds more burden for the patients in India as the direct and indirect costs are very high.

Various screening techniques have emerged over the years namely, but the standard physical examination is the most common and proven to be cost-effective screening method. With a major concern of accessibility, screening techniques can be generalised for a large population and initial examinations made accessible to all to reduce the delay in seeking treatment, can be addressed through the concept of non-office-based screening methods.

Various health insurance programs and policies have also been instituted by the central and state governments, the guidelines got management of common cancers. Additionally, several NGOs and CSR initiatives have also been organised for the screening of oral cancer through screening camps and awareness campaign. Although there has been a lot of progress in the recent years, the OC burden also continues to rise steadily impacting the individuals as well as the country. The lack of awareness, adequate task force and infrastructure, lack of optimal national screening program, all add to the challenges faced for UHC.

Keywords: Oral cancer, India, Screening, Policies, Early detection, Tobacco

ACKNOWLEDGEMENTS

I take this opportunity to express my profound gratitude and deep regards to Vinod Nair (Knowledge Management Manager, ZS Associates) for providing me this wonderful opportunity. I want to extend my sincere regards to my team for sharing his feedback and views on the project.

I would like to sincerely thanks my college mentor Dr. P.R.Sodani (President, IIHMR University) for his cordial support and feedback. With his continuous help and effective guidance, I was able to complete my thesis.

I express my deep sense of gratitude to my dear friends and family for their moral support through the process of researching and writing the thesis. The accomplishment wouldn't have been possible without them.

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ABBREVIATIONS

AB - Ayushman Bharat

ANM- Auxiliary Nursing Midwifery

ASHA- Accredited Social Health Activist

BPL - Below Poverty Line

CCI - Commission on Chronic Illness

CHC - Community Health Centre

CPHC - Comprehensive Primary Health Care

CSR – Corporate Social Responsibility

DALY - Disability-adjusted life year

DH - District Hospital

GBD - Global Burden of Disease

GDP - Gross domestic product

GLOBOCAN – Global Cancer Incidence, Mortality and Prevalence

GoI – Government of India

HBCRs - Hospital Based Cancer Registries

HMCPF - Health Minister's Cancer Patient Fund

HMDG - Health Minister's Discretionary Grant

HWC - Health and Wellness Centers

IACR - International Agency for Research on Cancer

ICD - International Classification of Diseases

ICMR - Indian Council of Medical Research

LMICs - Low- And Middle-Income Countries

MeSH - Medical Subject Headings

MoHFW - Ministry of Health and Family Welfare

NCCP - National Cancer Control Programme

NCD - Noncommunicable Disease

NCDIR - National Centre for Disease Informatics and Research

NCRP - National Cancer Registry Program

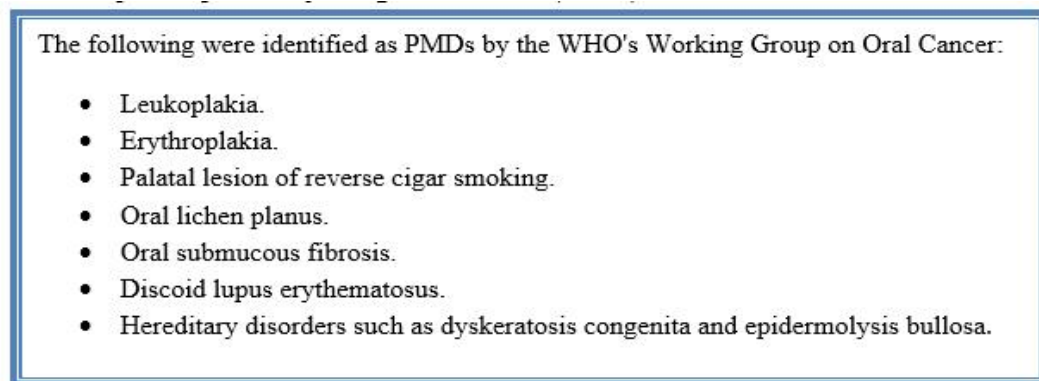
NFHS - National Family Health Survey
NGO – Non-Governmental Organisation
NNMS - National Noncommunicable Disease Monitoring Survey
NPCDCS - National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke
OC – Oral Cancer
OEC - Oral Exfoliative Cytology
OOPE- Out-of-pocket expenditure
OPMDs - Oral Potentially Malignant Disorders
OSCC – Oral Squamous Cell Carcinoma
OVE - Oral Visual Examination
PBCRs - Population Based Cancer Registries
PMJAY - Pradhan Mantri Jan Arogya Yojana
RAN - Rashtriya Arogya Nidhi
RCC – Regional Cancer Centres
RSBY - Rashtriya Swasthya Bima Yojana
SCHIS - Senior Citizens Health Insurance Scheme
SCI – State Cancer Institutes
TCCC - Tertiary Care Cancer Centres
UHC - Universal Health Care
WHO - World Health Organization

INTRODUCTION

Oral cancer is key public health dilemma in India. Oral cancer consists of cancers of the lip, mouth, and tongue, consisting of ICD(10) C00-06. According to WHO, the oral cavity “extends from the vermilion border of the lip to the junction of the hard and soft palate in the roof of the mouth and to the circumvallate papillae on the tongue, consisting of the lips, commissures, tongue, floor of mouth, gingivae, buccal mucosa, retromolar trigone and hard palate.”

Oral squamous cell carcinoma (OSCC) primarily occurring from epithelium cells forms ~90% of all oral cancers. Oral cancer is generally headed by pre-cancerous lesions, Oral potentially malignant disorders (OPMDs), that include “inflammatory oral submucosa, fibrosis, erythroplakia, leukoplakia, candidal leukoplakia, dyskeratosis congenital, and lichen planus”.

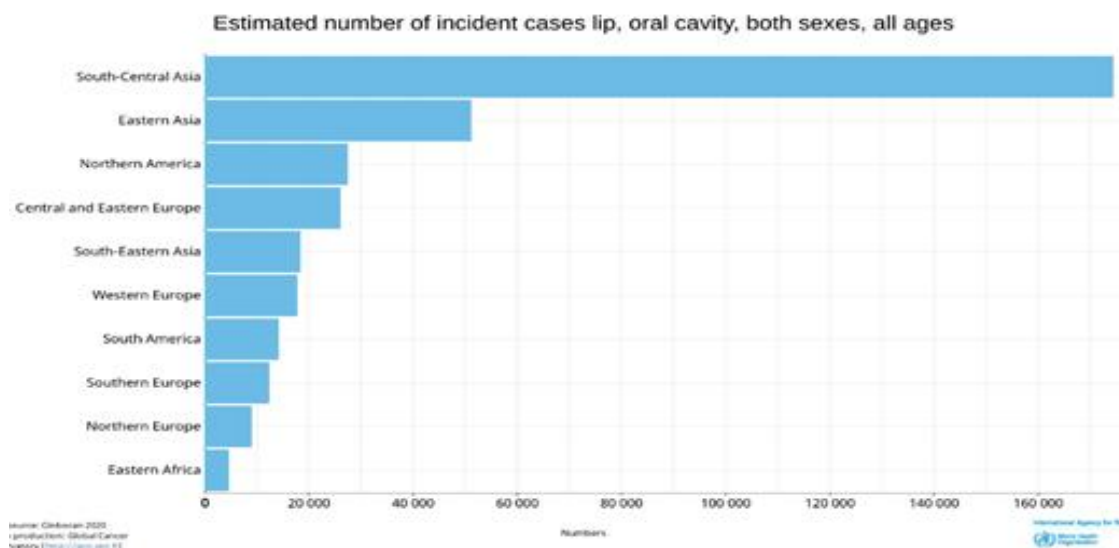
Fig 1.1: Important potentially malignant disorders (PMDs)



According to GLOBOCAN 2020, the lip and oral cavity cancer accounted for approximately 2% new cases and 1.8% deaths globally, being the 17th most common neoplasm globally, with 377,713 incident cases and about 177,757 deaths estimated in 2020. Globally, lip and oral cavity cancers accounted for 2.6% of all cancer cases in men and 1.23% in women, with the overall proportion of 1.96%.

It was seen that at the global level, the incidence and mortality were steadily elevated in men than in comparison to women. The highest number of new cases were reported in South-Central Asia followed by Eastern Asia and North America.

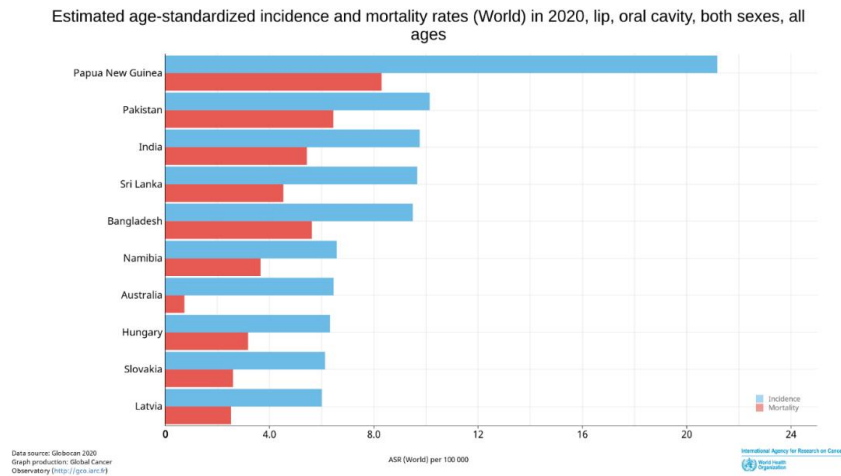
Fig 1.2: Estimated no. of incident cases of lip and oral cavity for all age groups and sexes:



Source: IARC, GLOBOCAN 2020 - World Report⁶

In countries level data, the age standardised incidence rates were maximum in Papua New Guinea, Sri Lanka followed by India and Pakistan respectively for males. In females, the highest rates were seen in same countries- Papua New Guinea, Pakistan, Bangladesh and India. Likewise, the maximum mortality rates were in Papua New Guinea, Pakistan, India followed by Sri Lanka and Bangladesh in men and Papua New Guinea, Pakistan, Bangladesh followed by India and Namibia in women.⁵

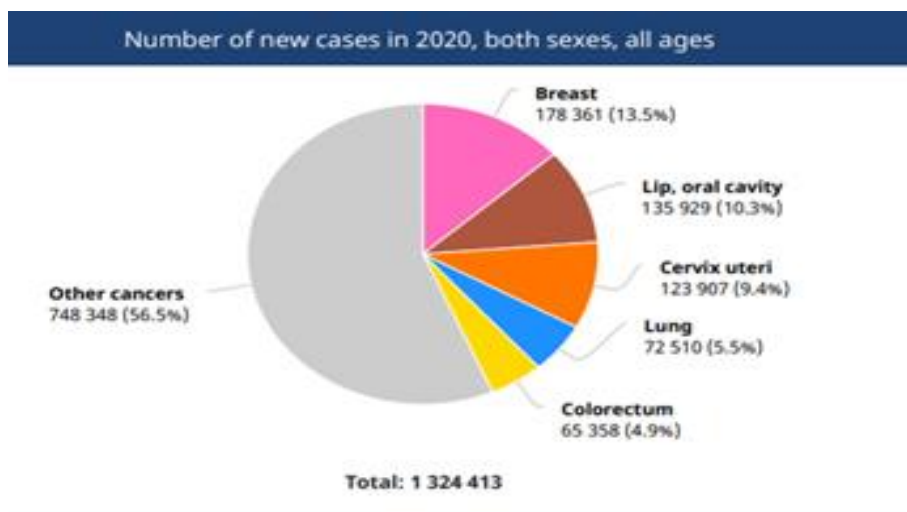
Fig1.3: Age standardised incidence and mortality rates (World) in 2020 for lip and oral cavity cancer



Source: IARC, GLOBOCAN 2020 - World Report⁶

India is known to be the global epicentre of OC. It is the most common cancer with lead in 9 of the 28 Indian cancer registries for males in India. As per GLOBOCAN 2020-India report, oral cancer was the 2nd commonest cancer ranked by the number of new cases, with total of 135,929 new cases accounting to 10.3% of total incidence in India.

Fig 1.4: Number and proportion of new cancer cases in India in 2020 for both sexes and ages

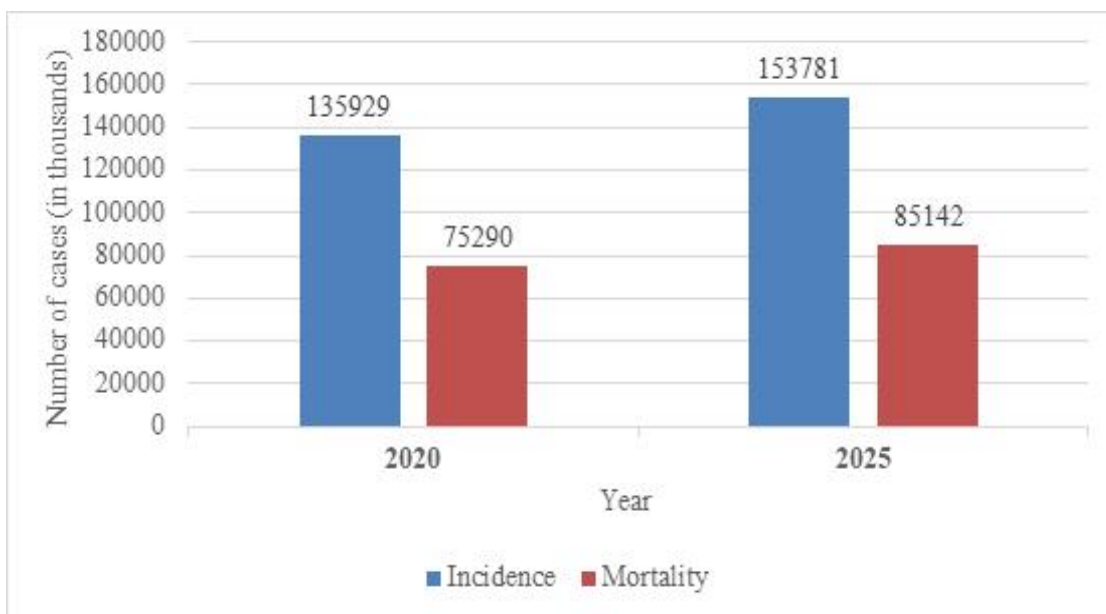


Source: IARC, GLOBOCAN 2020 - India Report⁶

With 104,661 new cases in males, it was the most common cancer forming 16.2% of all cancer cases in males. In females, lip and oral cavity cancer accounted for 4.6% of all cancer cases, making it the 4th most common cancer with 31,268 cases. Oral cancer accounted for 8.8% of cancer-related deaths in India, with 75,290 deaths in 2020.

The GLOBOCAN 2020 data for India, also estimated an increase in both incidence and mortality rates of 13.1% to 153,781 cases and 85,142 deaths in 2025.

Fig 1.5: Estimated number of incident cases and deaths from 2020 to 2025



Source: IARC, GLOBOCAN 2020 - Cancer Tomorrow⁶

With an estimated 135,929 incident cases in India in 2020, this increase in cases is the most important concern for community health. In spite of various treatment options and increasing awareness, the number of new cases of OC in India continues to rise, with an estimated 13.1% increase in incident cases in 2025.

Various risk factors are associated with oral cancer, including tobacco, alcohol, HPV etc. Tobacco is a major etiologic agent for oral cancer amongst many, as it accounts for major share of all the cancers. According to data from National Cancer Registry Program, the tobacco associated cancers accounted for 40-50% of all cancers in men and ~20% in females.

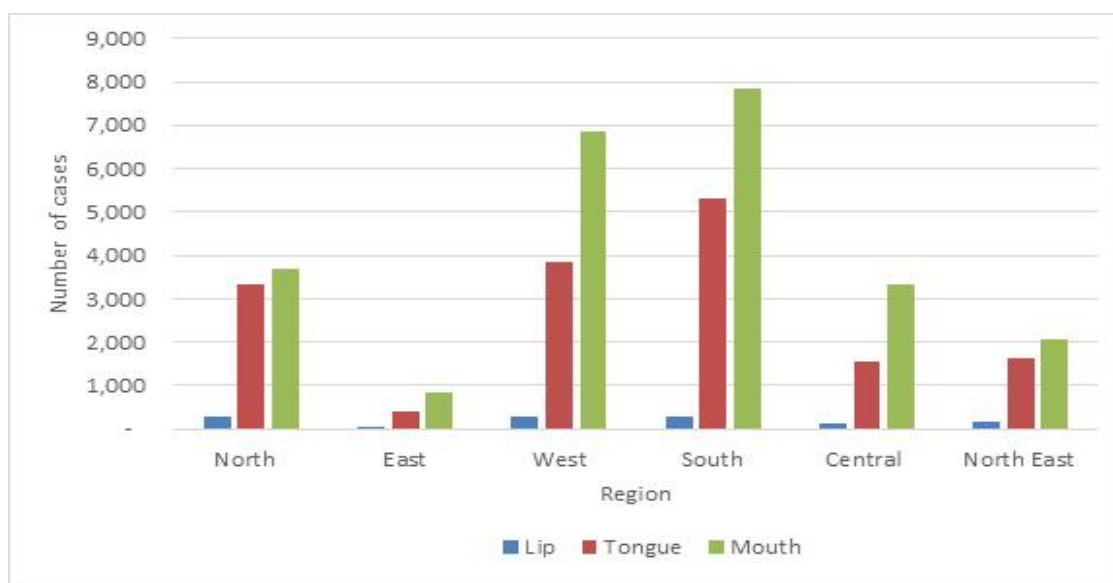
The consumption of tobacco consumption is a key reason of cancer, notably in the developing nations. The frequent consumption of tobacco in several ways such as “gutka”, “zarda”, “mawa”, “kharra”, “khaini”, “cigarettes”, “bidi”, “hookah”, etc, all contribute to the transformation of pre-malignant lesions to OC both young and adult Indian population.

In a case-control study Sankaranaryanan et al, stated a positive link between intake of tobacco and increased probability of OC. The effect of tobacco chewing was seen in both smoking sexes, independent of the use of tobacco. Various studies have reviewed the association of SLT use with OPMDs and cancers of oral cavity along with possible contribution to other disease.

Several additional risk factors like alcohol, chewing of betel quid, marijuana intake and HPV are also associated with oral malignancies, especially in the NE region that accounts for the highest incidence. The consumption of tobacco and alcohol, both are related with leucoplakias, the most prevalent OPMDs and hence require cost-effective interventions for reduction of their consumption. Several tobacco cessations programs have been carried out and have proven to be cost-effective for LMICs.

As per PBCR data, several anatomic site cancers including oral, lung, pharynx etc are known to be related with the consumption of tobacco. About 25% of all cancers are proven to be related with tobacco use in India, with the East Khasi Hills district in Meghalaya having the highest relative proportion of ~70.4% in men and ~46.5% in women.

Fig 1.6: Number of lip, tongue and mouth cancer related with the use of tobacco by region



Source: Report of NCRP (*Data of only 58 HBCRs under NCRP)⁸

Several studies have demonstrated that late diagnosis or detection at a late stage is the primary root of decreased survival rates due to the cancerous mechanisms of the lesions. The 5-year survival rate was reported to be 54.3% for early-stage tongue cancers and a mere 3.1% for late stages. Sites other than tongue, the 5-year survival rate was found to be 60.2% for localised and 3.3% for advanced stages. An estimated 60-80% of OC cases are detected at late stages in India, in comparison to just 40% in developed countries, making the situation more dire for India. As we have seen, tongue cancer is the major type of oral cancers as they are likely to metastasize early. In comparison to other cancers with distant metastasis, oral cancers are known to have the least survival rate.

Table 1.1: Number and relative proportion as per Stage of disease for both tongue and mouth cancer

Clinical Extent of Disease	Tongue		Mouth	
	Number (n)	Relative proportion (%)	Number (n)	Relative proportion (%)

Localized only	3924	33.7	5535	24.5
Locoregional	6838	58.5	15146	67.0
Distant Metastasis	445	3.8	1043	4.6
Unknown	472	4.0	888	3.9
Total	11689	100.00%	22612	100.00%

Source: Report of NCRP (ICMR-NCDIR)⁸

According to available literature, oral cancers can be prevented either by reduction in exposure to risk factors, or by screening for OPMDs. Unfortunately, several cases are diagnosed at advanced stages which decrease the chances of cure, putting five-year survival rates ~20% only. If detected early where complete cure there is a probability of decrease in mortality rates associated and increased the survival rates for cancer patients in the country.

Early detection and treatment are important to decrease the mortality rates and increase the survival rates for cancer patients in the country. There are many rationales for delay in oral cancer patients getting care with delays in seeking treatment or poor accessibility to resources.

The treatment of oral cancer has a negative effect on not just the quality of life, but the added treatment expenditure adds up to the burden for the patients in India. The direct and indirect costs associated with cancer are very high. The lower socioeconomic groups face the greatest burden of oral cancers, due to increased exposure to risk factors and inadequate access to prevention and treatment. With about 65% of the population of India residing in rural areas, this poses another challenge in cancer care. In India, the government's expenditure is US \$641 per cancer patient, which is very low in comparison to other nations with higher cancer burden. In India, the expenditure on public health is ~1.6% of GDP, that remains the lowest possible globally. Hence, majority of expenditure on healthcare is OOP, with studies reporting that ~75% the same, despite numerous schemes for cancer treatment by the government.

It is essential to know, that health care costs do not only involve direct costs like treatment expenses but also indirect expenses, such as loss of yield and loss of income due to treatment. The long durations of staying away from home and transportation costs all translate to an increase amount of indirect expenses and this along with the cost of therapy pose is a huge burden for patients countrywide. This financial upheaval faced by cancer

patients and the family on diagnosis and treatment, could possibly cause psychological stress.

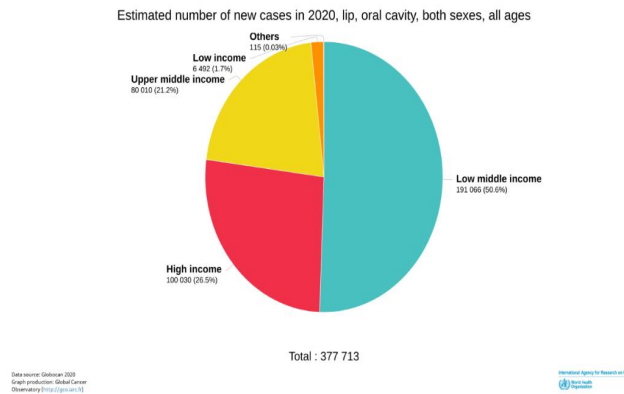
According to study by “India State-Level Disease Burden Initiative Cancer Collaborators”, lip and oral cavity cancer with 7.2% of total cancer DALYs was one of the prominent types of cancer in 2016. The cancers responsible for over 5% of total cancer DALYs included stomach, breast, lung, lip and oral cavity, pharynx other than nasopharynx, colon and rectum, leukemia and cervical.

Fig 1.7: Proportion of total cancer DALYs by several cancer types in India, 2016 (top 10 only)¹⁸

Both sexes combined		Females		Males	
Types of cancers*	% of total cancer DALYs	Types of cancers*	% of total cancer DALYs	Types of cancers*	% of total cancer DALYs
1 Stomach cancer	9.0%	1 Breast cancer	16.8%	1 Lung cancer	10.4%
2 Breast cancer	8.2%	2 Cervical cancer	10.8%	2 Lip and oral cavity cancer	9.6%
3 Lung cancer	7.5%	3 Stomach cancer	9.0%	3 Pharynx cancer other than nasopharynx	9.1%
4 Lip and oral cavity cancer	7.2%	4 Colon and rectum cancer	6.1%	4 Stomach cancer	9.0%
5 Pharynx cancer other than nasopharynx	6.8%	5 Lip and oral cavity cancer	4.6%	5 Leukaemia	6.0%
6 Colon and rectum cancer	5.8%	6 Ovarian cancer	4.6%	6 Colon and rectum cancer	5.6%
7 Leukaemia	5.2%	7 Lung cancer	4.4%	7 Oesophageal cancer	5.1%
8 Cervical cancer	5.2%	8 Leukaemia	4.3%	8 Larynx cancer	4.8%
9 Oesophageal cancer	4.3%	9 Gallbladder and biliary tract cancer	4.3%	9 Liver cancer	4.6%
10 Brain and nervous system cancer	3.5%	10 Pharynx cancer other than nasopharynx	4.3%	10 Brain and nervous system cancer	4.0%

Oral cancer presents a significant health dilemma for countries experiencing economic transition, with the brunt primarily being faced by the middle- and low -income countries, with more than 50% of oral cancer cases reported from LMICs, including India. India has the one of the largest numbers of incident cases and mortality rates for oral cancer globally.

Fig 1.8: Estimated no of cases in 2020 – according to Income levels



Source: IARC, GLOBOCAN 2020 - India Report⁶

Additionally, due to the rising population growth and aging, the demographic profile of India is rapidly changing with the aging (elderly) population increasing at 3x rate in comparison to the overall population growth. These along with increasing life expectancy are known to cause an increase in the overall burden of cancer.

Being the 17th most common cancer, oral cancer is also responsible for 1.8% deaths globally and 2% incident cases, indicating that it mostly is detected at late stages, leaving hardly any opportunity for effective management and patient survival. Due to this, the odds of cure are very low, with the survival rates dropping to about 20% only. According to Ajay et al, the chances of encountering cataclysmic hospitalization expenditures are ~160% higher with cancer when compared to communicable disease conditions.

It is vital for cost-effective oral cancer screening programs to be instituted in high-risk groups as those in India. With the increase in new cases and the subsequent increased economic burden on the population of India, it has become vital to make provisions for early detection and treatment of oral cancer. Early diagnosis, and appropriate treatment are known to improve the survival rates. Various studies have reported the advent of novel techniques for screening of oral cancer for early detection with various advantages over the conventional diagnostic methodologies.

This study aims at highlighting the various screening methods utilized for detection of oral cancer and which of those can be employed for a diverse population like India. The various

policies and initiatives by government and non-government organizations for early detection and appropriate screening of the population have also been discussed.

REVIEW OF LITERATURE

Title	Author (Year)	Key Findings
“Cost Analysis of Oral Cancer Treatment in a Tertiary Care Referral Center in India”	Ramireddy, J. et al (2017)	“The objective of this retrospective observational study is to find out the approximate cost of treatment of oral cancer through various modalities to come up with recommendations which will reduce the indirect cost thereby reducing the financial burden to the patient. This study was done in a tertiary care center for cancer treatment and the direct cost (medical expense), indirect cost (non-medical expense) incurred by the patients, their economic status and source of fund for payment of the expenses were obtained. In this study the authors have highlighted that the indirect cost or non-medical expense involved in the treatment of oral cancers is very high and is a major factor for discontinuing the treatment, so steps should be taken to reduce the indirect cost associated with the treatment of oral cancer.”
“Oral cancer statistics in India on the basis of first report of 29 population-based cancer registries”	Sharma, S. et al (2018)	“The objective of this study is to summarize and provide an overview of age-specific oral cancer incidence reported in 29 population-based cancer registries in India. The secondary data on age-adjusted rates of incidence of oral cancer and other associated sites for all ages (0–75 years) were collected from the report of the NCRP 2012–2014 in 29 population-based control registries. It was shown that among both males and females, mouth cancer had maximum age adjusted incidence rates (64.8) in the central zone. Hence it was concluded that oral cancer incidence increases with age with typical pattern of cancer of associated sites of oral cavity seen in the northeast region. Also, a greater number of cancer registries should be established across country for more adequate representation of all regions of India.”
“Challenges of the	Coelho, K. R.	“In this review, the authors systematically examine primary and

Oral Cancer Burden in India”	(2012)	secondary data where the incidence or prevalence of oral cancer is known to be directly reported. It is shown that the variability in age-adjusted incidence with crude incidence is projected to increase by 2030. The challenges related to oral cancer focus on measurement of disease incidence and disease-specific risk behavior, predominantly, alcohol, and tobacco use. It is highlighted that even though oral cancer and consequences can be prevented, treated, and controlled, there exists a significant gap in the Indian public’s knowledge, attitudes, and behaviors. Hence future research should be aimed at improving quality of data for early detection and prevention of oral cancer.”
“Report of National Cancer Registry Programme”	ICMR-NCDIR (2020)	“This report contains 5 years (2012-2016) data from the network of cancer registries working under the National Cancer Registry Programme (NCRP). The present report has included data from 28 Population Based Cancer Registries (PBCRs) and 58 Hospital Based Cancer registries (HBCRs) in India based on its completion and verification.”
“The burden of cancers and their variations across the states of India: the Global Burden of Disease Study 1990–2016”	Dhillon PK et al (2018)	“This initiative was the first to report comprehensive approximates of incidence, prevalence, mortality, and DALYs for 28 types of cancers in every state of India from 1990 to 2016 as a part of GBD 2016. Using all available data, including 42 population-based cancer registries the authors have highlighted the heterogeneity in the burden of specific types of cancers across the states of India, including the contribution of major risk factors to cancer DALYs in India. They recommend the information to be considered to strengthen infrastructure and human resources for cancer prevention and control at both the national and state levels, primarily focusing on the 10 cancers contributing the highest DALYs in India, and to be focus of screening and early detection programs.”
“Recommendations for screening and	Rajaraman P et al (2015)	“Recognizing the significance of effective early detection and screening program on reduction of cancer burden, the Indian

early detection of common cancers in India”		Institute for Cytology and Preventive Oncology, together with US National Cancer Institute Center for Global Health, organized a workshop that summarizes feasible options and appropriate evidence for screening and early detection of common cancers in India. They provided evidence-based recommendations for breast, cervical and oral cancer, that can be utilized by policy makers, clinicians, and public health practitioners as a guide.”
“Population-based cancer screening through community participation: Outcome of a district wide oral cancer screening program from rural Kannur, Kerala, India”	Philip PM et al (2018)	“This cross-sectional survey of a multi-stakeholder district-wide screening was carried out among >15 years of age across 48 panchayats of Kannur district in Kerala, India, in six stages enumerated in the study, it was found that among the only 2507 were screened with 13 oral cancers and 174 oral precancers detected.” “Although there was lack of centralized survey monitoring, data evaluation and documentation but through multi-stakeholder involvement and community participation this program was impactful, implicating the organization of similar camps.”
“Screening for oral cancer: Future prospects, research and policy development for Asia”	Nagao T & Warnakulasuriya S. (2020)	“This descriptive review discusses the advantages and disadvantages for oral cancer screening with instances to high incidence countries in Asia. The objective is to evaluate the studies conducted for oral cancer, and to examine feasible options in the future to aid policy development for Asia. It recommends screening in high-risk populations and provision of education on risky lifestyles. It also highlights further research topics such as increasing public awareness and impact of professional education, comprehensive tobacco and areca nut cessation programs etc.”

METHODOLOGY

This study is a descriptive study, which utilizes a structured search of articles based on keywords, wherein relevant studies were retrieved from well recognized databases presented on the Google Scholar, PubMed, Cochrane Library, ScienceDirect & GOI websites. The following keywords were used to gather the sources required, which was accomplished through a secondary desk research:

1. “Oral cancer” OR “OSCC” OR “mouth cancer”. These terms thereby produced a list of MeSH terms including their subheadings, that were used further.
2. “screening” OR “feasibility” OR “disease burden” OR “economic burden” OR “tobacco” OR “treatment cost” OR “government policies” OR “early detection”
3. “India” OR “South Asia” OR “Asia”

The above search terms were combined to execute a search with the below inclusion criteria:

1. Relevant articles published after 2000 which were available for public use
2. Literature published in the English language.

Following websites were also reviewed for updated information: GLOBOCAN 2020, NCDIR, NCPRI, IARC, and ICMR. Moreover, after suggestions from mentor changes were made and additional articles referenced.

RESEARCH QUESTION

What is the feasibility of non-office-based screening techniques for oral cancer in the Indian healthcare system?

OBJECTIVES

- To assess the overall burden of oral cancer in India.
- To assess the non-office-based screening techniques for oral cancer and its feasibility.

- To assess the facilities and policies available for screening of oral cancer in the Indian healthcare system

CASE DEFINITIONS

- **Non-office-based screening** – “screening methods that do not require a visit to the physician’s office and can be carried out by themselves or through a trained healthcare professional (including physician) in another setting or through the aid of a lab wherein a specimen can be processed”. These may include self-examination, or visual-examinations by front-line workers using devices and vital-staining techniques and biomarker detection techniques, with the specimen collected at doorstep by a trained professional.
- **Office-based screening** – “screening methods that require a visit to physician’s office and cannot be carried out by themselves or in another setting”. This includes the examinations that require a clinical setting in a physician’s office such as imaging techniques.

RESULTS

6.1. SCREENING METHODS FOR ORAL CANCER

Screening is based on the idea of malignancies preceding clinically evident lesions, which if detected and treated early can inhibit transformation to malignant tumor or reduce their staging. In CCI Conference held in 1951, on “Preventive Aspects of Chronic Disease”, screening was defined as "the presumptive identification of unrecognized disease or defect by the application of tests, examinations, or other procedures which can be applied rapidly". Hence, it is the test for people who are seemingly disease-free for identification of individuals who have the disease from those who do not. It is aimed for identification of tissue changes that may suggest the probability of development of development of the disease and differs from a diagnostic test.

Most oral carcinomas succeed detectable lesions, known as OPMDs exhibiting epithelial dysplasia. Other studies also are of the consensus that the large number of cancers are succeeded an evident pre-clinical phase.

Various screening techniques and practices for common cancers are relatively well-documented and defined, in comparison to OC. For numerous decades, the oral cavity has been considered a target site agreeable for screening as it presents in an easily accessible site for visual examinations. As per the criteria established by Wilson and Junger, OC ticks several boxes justifying screening. Additionally, a Cochrane Review examined the data and established OC as a screen-able disease.

The primary step for oral cancer diagnosis consists of proper observation of traces of oral lesions in the mouth by a physician or a dentist. In case of any alleged malignancy, the patient is referred to a surgeon who performs the required tests. The dentist has a crucial role to play in the early examination of oral cancer occurrence.

Fig 6.11. - Methods for oral cancer detection²⁸

Let us take a look at the various methods for oral cancer detection:

1. **Physical examination:** It is the principal and most important evaluation for OC, which generally comprises of – a systematic visual examination and palpation. Also known as OVE (Oral visual examination), it is a proven technique for screening to detect the manifestation of PMDs. With an general sensitivity of 85% and specificity of 97%, oral visual examinations are a reliable method.⁵ As per findings from a cluster study by Sankaranarayanan et al, visual examination was found to be a convenient method that aids in reduction of mortality in high-risk groups and was known to avoid ~37,000 deaths due to oral cancer globally. A 15-year follow-up trial evidence demonstrated a 38% reduction in incidence of OC and 81% mortality reduction in the population in the high-risk groups.
This technique is also known to be cost-effective in a resource-limited setting. Additionally, several other methods of oral cancer screening are available as adjuncts to OVE and use of these aids requires further research for use in high-risk populations.
2. **Histopathological examination:** The OSCC differs from indolent to quite aggressive tumours that have high invasive potential, the development of which is divulged by the histological assays. The identification and suitable sampling of the oral lesions forms a very crucial step in a histological examination. As sometimes, the changes may ensue in the areas that did not show any prior evidence during physical examination. Hence, a method that identifies both, histopathological and molecular changes, should be ideal to identify benign or malignant tumours.

3. **Vital staining methods:** It is an adjunct method for the diagnosis of cancer. These include toluidine blue staining, methylene blue (MB), Lugol's iodine, and acetic acid staining etc. As this method is not just easy to use but also cost-effective and widely available, it is suitable for use in developing countries like India. These staining techniques can be utilised as a secondary diagnostic method for verification of lesions as malignancies.
4. **Biopsy:** The biopsies could be of different types:
 - a. **Brush biopsy:** It is a simple, painless, economical method wherein the transepithelial cells are taken by scraping the surface mucosa for oral cancer screening, with a sensitivity and specificity as high as ~90% when compared to other biopsy techniques.
 - b. **Exfoliative cytology:** OEC is an easy and non-invasive method appropriate for primary detection of OC, requiring skilled cyto-pathologists. In spite of some benefits, OEC is neither specific nor sensitive and hence can be used in large-scale population screening.
5. **Optical and radiological techniques:** Numerous optical and radiological methods are also used for the diagnosis of cancer, with frequently used being X-ray also known as an orthopantomogram for oral cancer. Other commonly used radiological techniques include fluoroscopy, ultrasound, etc. Some recently identified “optical spectroscopy techniques include laser-induced tissue autofluorescence and diffuse reflectance, along with optical imaging techniques like optical coherence tomography and tissue fluorescence imaging”.
6. **Biomarkers:** Biomarkers are the biological entities present in the tumour cells or the bodily fluids, present in serum or saliva that would eventually lead to OC may aid in detection. Some common biomarkers include “TSG p16, TSG p53, Ki-67 antigen, and DNA ploidy”. A known primary indication of OSCC is the expression of p53 protein. Salivary biomarkers such as “circulating tumour DNA, miRNAs, and extracellular vesicles” are also used in the early detection of OC.

Lately, various innovations have been seen like the detection of cancer-derived exosomes. The method of saliva testing can be investigated for development into point-of-care devices, owing to its ease in collection and analysis in comparison to any other body fluids for the detection of OC. Few detection arrangements like “Nano-biochips” and “cytology-on-chips” have also been developed.

7. **Other methods:** Major advancements in diagnostic techniques for rapid detection of cancer biomarkers have been seen in recent years. Various spectroscopic methods used in detection of oral malignancy include “elastic scattering spectroscopy, diffuse reflectance spectroscopy, and optical coherence tomography”. “Light-based-detection systems (LBDS)” have also emerged significant for OC diagnostics due to its minimalism and ease-of-use.

Also, various ground-breaking devices such as “ViziLite, Velscope, Identafi, Microlux/DL” etc. are commercially available and utilized in clinical settings and are non-invasive and can be used for initial screening by trained health workers.

These methods can be classified as office-based and non-office based centred around the requirement of a visit to physician office. Such distinction can help us identify the methods that can be easily replicated for a large population.

Table 6.11: Description of techniques for oral cancer detection²⁸

Technique	Principle	Specimen	Sensitivity	Advantages	Disadvantages	Cost (~₹)
Brush biopsy	Brushing and microscopic examination	Oral cells	77%	Non-invasive Low cost Minimal skills required	Inadequate sampling False negative results	500–1500
Exfoliative biopsy	Scraping and microscopic examination	Oral epithelial cell linings	100%	Low cost Minimal skills required & instrumentation	Sample contamination False-negative results Low sensitivity	600–2600
Histopathological examination	Microscopic examination	Oral tissue	NA	Large sample needed Quick collection Less risky	Time-consuming Chances of human error Less specific	800–6400
Immuno-histochemistry (IHC)	Staining and microscopic examination	Oral tissue	NA	Widely used Rapid	No availability of standardized stains Tricky quantification Odds of human error	1750–3500
Physical examination	Systematic visual examination and palpation	Oral cavity	NA	Non-invasive Easy to use For high-risk groups Low cost	Detection in a late phase Requires skilled personnel Risks of false positive and negative	200–500
VELscope	Fluorometry	Oral tissue (in situ)	74.10%	Low cost Non-invasive Easy and rapid Convenient Early detection	Chances of false positive and negative No definitive diagnosis Low sensitivity Inadequate sampling	1000–2000
Vital staining techniques	Visual tissue staining and microscopic examination	Oral tissue	97.80%	Simple Low cost Non-invasive Widely available	High % of false-positive cases	20–200
ViziLite	Tissue reflectance-based examination	Oral soft tissue (in situ)	77.30%	Non-invasive Easy and rapid Convenient Early detection Low cost	No recording Low specificity for dysplasia Non-specific	1000
Optical and radiological techniques	Optical and radiological examinations	Oral mucosa & tissue & Sputum	87 – 100%	High sensitivity Accurate Rapid Non-invasive Early detection Patient compatible	Expensive Sample contamination High level of expertise required Complex	400-6000

Non-office-based techniques are the ones that do not require a visit to physician's office or travelling long distances for screening. Targeting the expansion of these techniques to general population can prove to be vital in the early detection of oral cancer, leading to timely treatment. This may include the methods like self-examination or visual examination, for initial diagnosis carried out by a healthcare worker on a scheduled visit for screening. Additionally, the use of saliva-based tests and light-based systems can be used for further diagnosis as taking a simple swab of mucosal lining of the mouth and sending it for further investigation, does not require the presence of the suspected patient. The results are then assessed by clinicians distantly; this telemedicine-based oral cancer screening method has massive ability for wide application in India.

Self-examination is deemed to be one of the highly effective approaches for early detection of OC in India. Also, the feasibility of several other practices has been evaluated and assessed for general populations. A study in Mumbai evaluated the practicality of methods such as visual examination, toluidine dye application and VelScope-aided investigation by healthcare workers.

As we have seen, most of the techniques used are not easily accessible for the larger population and also are invasive and would require visits to the physician's office for diagnosis. Hence, there is need for OC screening methods that are not just easy-to use but also non-invasive, rapid and accessible to the larger population. While there are many benefits to screening there are also certain drawbacks as for the possibility of producing either false positive or false negative results.

6.1.1 Opportunities

The transformation to OSCC is a multistep development, preceded by clinically detectable chronic lesions known as OPMDs, which consists of premalignant lesions and conditions for varying periods. As these OPMDs are generally asymptomatic, restorative assistance is not requested up until development of major disturbances.

The long delays in the conversion of benign to malignant may provide a chance for the prevention of OC. There is a significant difference in the number of people diagnosed in advanced stages of cancer vs. early stages, between developed and developing countries. This is the scenario, even though the oral cavity is easily accessible for visual examination and distinct clinical features are present to distinguish between OCC and premalignant lesions.

Oral cancer is also responsive to 2° prevention as it can be identified and tackled at pre-cancerous stages by the use of cost-effective screening techniques, as they succeed easily detectable conditions of the oral cavity. These lesions can be identified early during regular general health check-ups or screening procedures by health personnel or by even by self-examination.¹³

An ideal screening technique should not just be easily applicable and acceptable to the masses, but also cost-effective with high sensitivity and positive predictive value. Various cost-effective OC screening programs have been initiated and their effect examined in specific high-risk groups in India with mixed victory. A standard oral examination has demonstrated to be one of the simplest, and cost-effective methods for screening of OC.

A cluster-RCT, assessed the effectiveness of visual screening, the study demonstrated a 24% decrease in mortality in high-risk population, with a 38% decrease in incidence. Through an analysis, it was seen that though the screening charges were about \$6 per person, the incremental expenditure per life-year saved was ~\$835 for all people qualified for screening and ~\$156 for high-risk groups. Self-examination can also possibly lower the expense of the screening further and raise awareness in high-risk populations in India.

The early detection programs generally use public-health devices for identification of pre-cancer prior to its development into advanced stage disease. Also, various studies with a 5 & 10-year follow-up have demonstrated the effect of educational interventions in reduction of use of tobacco and decline in the incidence of OPMDs. Hence the diagnosis and management of PMDs is crucial for control of cancer as well as an essential approach for secondary prevention. As India reports high incidences of oral cancer, it is vital to understand that early detection and management can hinder the development of cancer from the supposed OPMDs. Early detection could hence possibly enhance the cure rate and decrease the cost and morbidity related. Some countries have incorporated screening for oral malignancies into their general health screening, which has proven to be quite beneficial, although this is not widely available.

In addition to physical or self-examination, numerous other non-office-based screening methods have been assessed including OEC and light-based detection systems. However, no other screening method than visual examination seem to be relevant and cost-effective for the general populace.

Various adjunctive techniques are also commercially available for the early detection of oral cancer or OPMDs or pre-malignant lesions. These non-invasive diagnostic techniques used for the detection include oral brush biopsy and cytology, fluorescent instruments, and narrow band imaging (NBI), making the tissue aceto-white and staining with toluidine blue.²² Alas these adjunctive techniques have proven to be unsuccessful in the improvement of sensitivity or specificity of screening beyond visual examination in application to primary care.

The concept of biomarkers have been also researched for the purpose of cancer detection. Although, no single molecular marker has the identified for determination of leukoplakia lesions at threat of conversion to oral cancer, some candidate markers have been identified such as loss of heterozygosity in 3p and 9p and DNA aneuploidy.²² More than a few studies from India have stated the use of mobile technology (mHealth) and community health workers for screening of OC. Also, the role of dentists and dental schools in supporting remote assistance in an mHealth OC screening project.¹⁴

6.1.2. Challenges

According to the National Noncommunicable Disease Monitoring Survey (NNMS) conducted by ICMR-NCDIR, it was found that only 1.7% of the population tested had ever taken an oral cancer screening test.

Fig 6.12.: Adults aged 30–69 years who had ever undergone oral cancer screening (%)

Oral cancer screening	Urban			Rural			Total		
	Men	Women	Combined	Men	Women	Combined	Men	Women	Combined
30 - 49 years	1.1	1.7	1.4	2.4	0.4	1.4	1.9	0.9	1.4
50 - 69 years	4.4	2.5	3.5	2.1	1.1	1.6	2.9	1.6	2.2
30 - 69 years	2.1	2.0	2.0	2.3	0.6	1.5	2.2	1.1	1.7

Source: ICMR-NCDIR 2017–18

One of the major challenges of the fight against oral cancer is the delay in seeking treatment. Many issues like alleged social stigma, illiteracy and absence of awareness are chief constraints for patients looking for opportune medical care leading to delay in treatment.³⁹ Another study by Agarwal N et al discovered that sociodemographic factors, like gender discrimination, low socioeconomic status, rural lifestyle, and psychosocial factors, such as lack of fear, and usage of alternative therapy also acted as important factors in delay.

According to a cross-sectional study piloted in the NER of India, it was found only ~59% had heard about oral cancer, with a partial knowledge of the risk factors, symptoms, and signs linked with oral cancer of about 45%. It was also seen that mere 34% of partakers were informed of cancer screening.

Few studies have demonstrated the importance of education (cancer symptoms) in communities and the healthcare personnel for improvement in cancer awareness to avoid delay in seeking treatment.

Even with ground-breaking innovations in imaging techniques and treatments, the evident delay in seeking medical care continues to be a major hindrance in improvement of outcomes. This major challenge needs to be at the forefront of planning and implementation of cancer control programs.

In addition to delay in seeking treatment, there is the problem of a disintegrated, low-resource infrastructure with shortage of workforce and technical facilities continues to persist. This is all very common in the case of developing countries adding to the already present barriers for effective implementation of cancer screening programs. WHO recommends strategy and measures those nations and individual can take and has continuously emphasized the role of dentists in control of OC in general population for more than 3 decades. Owing to the multidisciplinary approach required for OC control, the role of dentists is very vital, both autonomously and along with the oral health team not just for various levels of OC prevention but also for prevention of post-therapeutic complications. Many high-income nations have reinforced and utilized their dental personnel for the opportunistic screening of OC, through proper understanding of the vital role dentists play in early detection.

Various LMICs, like India, face the added challenges of lack of national health information systems, along with the inequitable distribution of health care services, for the multifaceted approach essential for OC control. Also, the added burden of risk factors due to acceptance of tobacco and areca nut, makes OC more unmanageable. Due to this, there is a need for regional control programs focusing on one specific region.

Several findings have emphasized the delay in appearance of symptoms from their origin. Few significant population-based studies demonstrated that cases treated after 4 months had an elevated risk of mortality in comparison to those treated within a month. This shortened time gap between the diagnosis to treatment may lead to improvement in the survival of

cancer patients. A study by Joshi et al registered primary, secondary and tertiary delays of about 2.75, 1.94 and 1.4 months, respectively.

WHO has continuously advocated screening as a component of OC control program and has advised to consider this as national health priority. Despite substantial evidence on increased disease burden of oral cancer in comparison to other cancers, there are no national guidelines for OC detection in India. This can be attributed to the lack of substantial evidence of effect of OC screening on decreased mortality and hence does not comply with the criteria for a population-based screening.²⁰ Despite several recommendations for early detection, the central government has not yet introduced national program on population-based screening initiatives. The GoI has published an “Operational framework for the Management of Common cancers” namely, breast, cervix and oral, which can be referred by the States for application of screening initiatives.

The GoI also envisages free OC screening for the general population, but with the current 1.6% of GDP earmarked towards health sector, extensive targeted screening may not be feasible. Instead, opportunistic screening would prove to be a superior way to consider a screening initiative, especially as the gaps discovered in the program in one region could then be applied to another region.¹⁴

6.2. POLICIES AND FACILITIES FOR SCREENING OF ORAL CANCER

6.2.1. Central and State Government Initiatives:

Over the years the GoI has made several efforts to curb the growing burden of cancer by investing in monitoring programs, recommending adoption of initiative for formation of comprehensive screening programs and various health insurance schemes for people to lighten the overall burden of cancer.

The existing strategy under the NPCDCS programs is based on the principle of opportunistic screening. But, considering the asymmetry in information flow and lack of health awareness, screening of people with no obvious symptoms are seen as an unnecessary chore, especially for the poor.

Keeping the challenge of increased cancer burden in the forefront, MoHFW published the “Operational framework for Management of Common cancers” in 2016. This takes guidance from “Operational Guidelines for Prevention, Screening and Control of Common Non-Communicable Diseases: Hypertension, Diabetes Mellitus, and Common Cancers”, generally known as OGs for screening for common NCDs, which were published by MOHFW in 2016. This framework sets a comprehensive direction for treatment of common cancers and is recommended to be executed in continuity with the screening guidelines for NCDs. States are also recommended to use these guidelines along with NPCDCS to form a comprehensive strategy for control of cancers. Additionally, it can be used as a blueprint for addressing other the management of other cancers.

These guidelines/framework focus on the three most generally occurring cancers that account for ~34% of all cancers in India, namely breast, cervical and oral cavity cancer, which are seen as a public health priority in India. The population level screening

recommended by the framework intends to screen for risk factors, hence focusing on prevention of the cancer by inhibiting its growth to malignant lesions.

The norm is the “screening of all adult men and women above 30 years of years in a standardized population of 1000 people per village” for oral cancer. This is in accordance with numerous studies that demonstrate greater benefit in screening of those populations that are unprotected from risk factors, known as the high-risk population, such as consumption of tobacco or alcohol.²⁴ Hence the guidelines propose training of service providers engaged in screening programs to prioritize screening among the high-risk population and the inclusion of the young population in screening programs.

In accordance with the “OGs for Screening for common NCDs” , the 1st level screening for oral cancer will be the responsibility of the ANMs/Mid-level providers at SCs, and of the staff nurses at the PHCs, ensuring the accessibility of screening services nearby by adeptly skilled health-worker in well-resourced amenities and safeguarding privacy. Additionally, ANMs to be skilled in visual examination of the oral cavity.

Fig 6.21: Screening and follow up processes for Oral cancer screening⁵⁴

Type of Cancer	Age of beneficiary	Method of Screening	Frequency of screening	If positive
Oral	30 -65 years	Oral Visual Examination (OVE)	Once in 5years	Referred to Surgeon/Dentist/ENT specialist/Medical officer at CHC/ DH for confirmation* and biopsy.

When screening is introduced, both forth and back referral ties must be established on the same time, to avoid delays in positive cases for confirmation and then to the treatment site. The screening sites should be linked to the facilities to ensure timely diagnosis and treatment. Therefore, every positive case screened at the SC level would then be refereed to PHC/CHC/DH for necessary verification, probe, and management.

Keeping in mind the added psychosociological burden, support programs are also recommended for cancer patients and their family/caregivers. Recommendations have also

been made for states to explore collaborations with various organizations for provision of palliative and rehabilitative care at the community level. Health care personnel working at the frontline, members of Panchayat and local community-based units are also urged to actively engage in cancer-support-groups organized by the states.

The progress of the programme is monitored through various key indicators and various large scale periodic surveys like the NFHS, DLHS etc, based various key indicators associated with cancer burden.

Under NPCPDS, financial assistance for establishment of State Cancer Institutes (SCIs) and Tertiary Care Cancer Centres (TCCCs), with the funds shared in the ratio of between Centre and State. Till March 2018, about 15 SCIs and 20 TCCCs were approved under the programme in various States/UTs.

I. ***“National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke” (NPCPDS)***

Under the NHM, states are given financial support for activities up to district level, under the NCD Flexi-Pool along with provision of services of common NCDs, NCD clinics are also established at District and CHC levels. For provision of cancer chemotherapy, Day Care Centres are also being set up, with focus primarily on oral, breast and cervical cancer. Under NPCPDS, up till June 30, 2020, about 82,10,811 persons underwent screening through the opportunistic screening program.

Table 6.21: Relative position of infrastructure from 2014-2020

	As on March 2014	As on Sept, 2015	As on Sept 2016	As on June 2017	As on March 2019	As on Sept 2019	As on June 2020
State NCD Cell	21	36	36	NA	36	36	36
District NCD Cell	96	195	356	NA	543	644	667
District NCD Clinic	95	201	356	434	585	616	639
CHC NCD Clinics	204	1362	1871	2143	3084	3827	4406
District Day Care Clinics	38	61	75	84	168	214	217

Source: MoHFW, Annual Report 2014-21

Fig 6.22: Relative position of people who attended the NCD Clinics or attended Outreach Activities (including population-based screening) for the last 5 years:

Source: MoHFW, Annual Report 2014-21

Along with the district interventions and various schemes, a pilot plan of “Integration of AYUSH with NPCDCS” is also being executed in 6 districts, for prevention and management of common NCDs. Up to June’20, ~20,04,834 people underwent screening with ~11,673 awareness campaigns organized. Additionally, several social media initiatives were also organized on days related to NCDs such as World Cancer Day, National Cancer Awareness Day etc. for spreading awareness.

II. *National Cancer Control Programme (NCCP):*

The NCCP was launched in 1975 by GoI to curb the rising incident cases of cancer. The NCRP was also launched under NCCP to identify the extent of cancer burden in India.³⁹ The data collected by these registries have facilitated the policy-makers to acknowledge the effect of cancer, with 28 regional cancer centres in India till date.

III. *Health Policy & Health Insurance*

- a. “Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana” (AB-PMJAY): Launched in 2018, it is a significant milestone in India’s quest for Universal Health Care(UHC). It aims to principally address health at all levels, through a continuum of care approach. It encompasses the establishment of 1,50,000 Health and Wellness Centers (HWCs) for provision of Comprehensive Primary Health Care (CPHC); and a health insurance scheme for the masses.

Around 6.96 crore screenings have been carried out for common cancers, out of which ~47% (3.67 crore) are for oral cancer.

- b. “Rashtriya Swasthya Bima Yojana (RSBY) & Senior Citizens Health Insurance Scheme (SCHIS)”
- c. “Health Minister’s Discretionary Grant (HMDG)”: Aid of upto Rs.1.25 lakh is provided for treatment in Govt hospitals for life-threatening diseases like cancer, rare disease etc. with about Rs 39,51,425 released for treatment upto Nov’20.
- d. “Umbrella Scheme of Rashtriya Arogya Nidhi (RAN)”: Financial aid amounting upto Rs.15 lakh for BPL families for treatment in public hospitals for life-threatening diseases like cancer, rare disease etc. This scheme includes:
 - i. “Health Minister’s Cancer Patient Fund(HMCPF)”: financial aid for BPL patients suffering from cancer, for treatment at RCCs, TCCCs and SCIs.
 - ii. Rashtriya Arogya Nidhi(RAN)
 - iii. Rare Diseases

In addition to the various schemes and policies of the central government, the state governments have also conducted various population-based screening programs and published recommendations for early detection and prevention of OC.

Under the NHM-Tamil Nadu, “Oral Pre-Cancer Screening program” was launched in 2016 to “encourage prevention and early detection” of oral cancer. The Government of TN by the use of NHM Dental units present in PHC and SDHs aims to identify precancerous and malignant lesions, with two mechanisms - a door to door comprehensive survey by the Dental Assistants and opportunistic screening. Similarly, “ASWAS” a district-level cancer control plan was organized with the collaboration of Kannur District Panchayath, District Health Department and Malabar Cancer Center (MCC) for the detection of early-stage oral cancer and pre-cancer, wherein 3,226 patients were evaluated with 13 cancers and 173 OPMDs detected.

Likewise, several population-based screening programs have been conducted in various areas of India, both at state and district level with minimal impact on the population.

6.2.2. Non-Governmental Initiatives

Various NGOs have also given their contribution to early detection of cancer through organization of oral detection camps or screening programs for the rural population. Most of these detection programs are funded through various donors or CSR activities by companies.

The Cancer Foundation of India (CFI), a voluntary organization based of Kolkata devoted to cancer prevention and control in India, has conducted several screening campaigns over the years. Cancer Screening & Prevention Centre set up for the underserved population provides free screening services for the common cancers. Over the course of 15 years CFI has ~9,000 underprivileged women through mobile screening camps.

The Indian Dental Association of India, an independent organization devoted to improving public oral health has over the years adopted various health initiatives namely National Oral Cancer Registry (NOCR) and Oral Cancer Foundation (OCF). Both initiatives focus on stratifying the risk of oral cancer and contributing to decrease in oral cancer burden in India. The Oral Cancer Foundation (OCF) launched in 2007, is a professionally led “call to action” program under which a network of SPOT Centers are set up for early detection of oral cancer. NOCR collects and classifies information on all oral cancer cases and pre-cancerous lesions in India, which can then aid to improve cancer prevention and screening programs at SPOT (Spot Prevent Oral-cancer Trauma) Centers.

Also, the Indian Cancer Society, India's first voluntary, non-profit, national organization which has conducted various medical and detection camps for the three common cancers the required population over the years, as indicated in Table below. During 2019-20, ICS along with Tata Trusts and several other organizations, jointly organized cancer screening initiatives. Through Tata Trusts-funded projects, ~ 700 camps were conducted in Mumbai and all over Maharashtra, which covered ~50,000 people.

Table 6.22: Impact of the cancer screening initiatives by ICS⁶³

Year	Camps Held (Pan India)	Beneficiaries
2015-2016	667	44201
2016-2017	661	44350
2017-2018	691	46501
2018-2019	745	79778
2019-2020	1635	105889

Several other NGOs have also initiated detection camps like the Cancer Patients Aid Association (CPAA) primary focus is the vulnerable population and aiding them in their cancer journey. Free cancer screening clinics are conducted once a week in CPAA runs diagnostic clinic labs along with on-site screening camps at subsidized rates. Yet 3,75,000 healthy individuals screened have been screened at the 7,657 camps and clinics all over India.

The Cancer Institute (WIA), a public charitable voluntary institute devoted to the care of cancer for organized various screening camps in Vizhuppuram and Chengelpet for screening, early detection, and prevention program for common cancers. It has reached 31,792 households with 40 cancers and 102 pre-cancers detected.

Along with NGOs, various companies have also contributed to the Health for all initiative by providing the population with oral cancer detection opportunities. Several CSR projects from companies have focused on organizing oral cancer detection camps for the population of India and aiding in the early detection of an easily amendable condition.

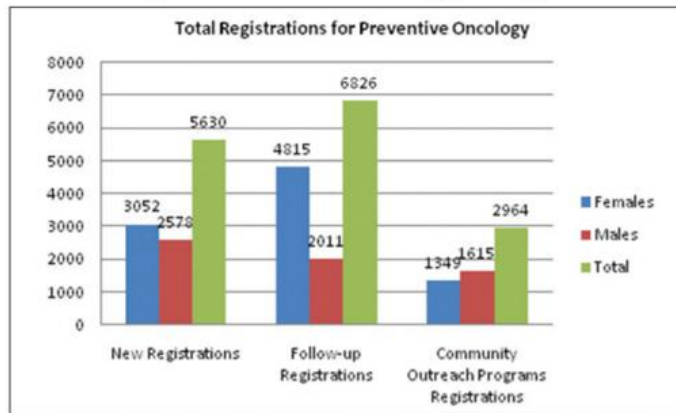
The Biocon Foundation established in 2004, under Biocon and Syngene, has recognized Oral Cancer Screening Program as one of its flagship projects through which several interventions have been carried out in the past few years. Biocon Foundation introduced a mobile health (mHealth) program, aimed at reducing the inadequacies in conventional screening and improving the treatment outcome. The mHealth program for cancer screening and surveillance allows the creation of EHRs and facilitates targeting oral cancer. The program aims at reducing oral cancer burden and financial liabilities for the patients. The program has been implemented in various settings with Govt of Karnataka,

Rajasthan, and Nagaland. Till the end of 2019, about 60,000 individuals have been screened with ~13% identified with OPMDs. Over the years, Biocon Foundation has partnered with various organizations and institute to develop screening programs along with training and research initiatives. Oral cancer screening programs were conducted in partnership with hospitals run by the South-Western Railway, with over 10,000 people screened in 2019.

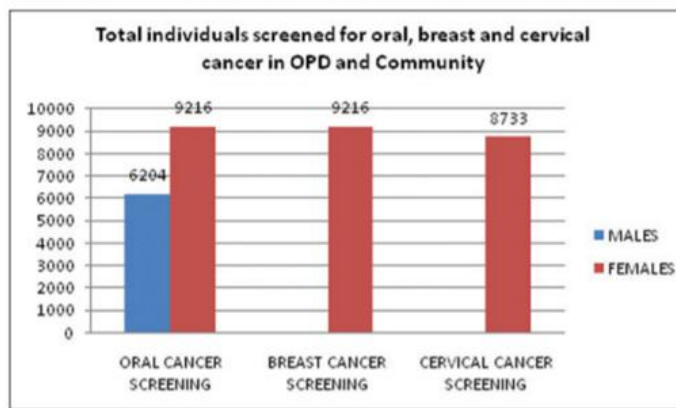
TATA Memorial Centre, a CSR initiative of TATA Trusts has been involved in a lot of healthcare activities like financial assistance to the needy and research initiatives focusing on development of new technologies to decrease the burden. One of the initiatives for fight against cancer is the “Advanced Centre for Treatment, Research and Education in Cancer” (ACTREC), which focuses on providing novel therapeutic strategies for the treatment of cancer. Under the ACTREC, in the Department of Preventive Oncology around 2,964 individuals (1,615 males and 1,349 females) were screened for common cancers in the community.

Fig 6.23: a) Total registrations for screening services under ACTREC; b) Total persons screened for common cancer under ACTREC

Total Registrations for Preventive Oncology screening services



Total individuals screened for oral, breast and cervical cancer in OPD and Community



Source: Annual Report 2019-20, ACTREC

Under the CSR initiatives, Narayan Heath has organized “PROGRAM H.O.P.E – Harnessing Oncological Preventive and Early detection services and NCD Program”. In Q2 and Q3 together, about 8,059 people were screened for oral cancer. Under the NCD program of 2017, oral and breast cancer burden are addressed, in areas of Bangalore,

Howrah, Mysore, Jamshedpur, Jaipur and Delhi. The project expanded to conducting up to 25 screening camps a month with the support of NGOs and government organizations, with ~3,085 people screened for oral cancer in Q4 2020.

Various other initiative have been carried out by non-governmental organizations in collaboration with like-minded institutions and companies for the screening of oral cancer in India. The Lifeline express project, a collaboration of Impact India Foundation (IIF) and the Ministry of Railways, has expanded to include additional services in cancer detection in 2016. The IndusInd Bank along with TATA Trust has also lent its support to Government of Assam's Cancer program, by provision of radiology equipment at Assam Medical College and Hospital, Dibrugarh. Jindal Stainless Foundation of Jindal Stainless, also organized oral detection camps jointly with a Delhi-based NGO, ROKO Cancer in Hisar and nearby regions, with over 5,000 health camps including ~6,35,090 patient examinations, as of May 2019.

6.2.3. Challenges

As per data from NNMS only 1.7% of the population was screened, as we saw before. NFHS was accounted for as one of the sources to be utilised for monitoring of the progress of population-based screening, wherein both the woman and men were questioned on a various topic such as the consumption of tobacco and alcohol, knowledge of cancer and other NCDs and any current ailments etc. In NFHS4 held from 2015-16, the question of cancer morbidity for first asked. It was seen that <1 % of men and women in the selected population had cancer. According to NFHS 4, only 12% of women aged 15-49 years have ever had an examination of the oral cavity. It was seen that older women were about 9% more likely to have undergone an oral cavity examination than younger women. Additionally, it was seen that oral cavity examination was more common in urban areas as compared to rural areas. It was also seen that women who had no schooling are less probable to opt for an oral examination (10%) in comparison to women with ≥ 12 at about 17%. Oral examinations are seen mostly in women of Kerala, Goa, and Lakshadweep, with about more than half have had an oral cavity examination.

But this NFHS 4 data had a lot of gaps, primarily the lack of information of oral cancer screening in men. However, in the NFHS 5 (2019-20) Phase I data published, it was seen that the male population was equally accounted for in case of oral cancer screening. But the data for India cannot be presented as data for only 22 states/UTs has been published as of Dec'20, with the Phase-II survey for 14 States/UTs currently in progress.

Through various acts aiming at reducing the burden associated and spreading awareness, over the years GoI has taken several significant policy decisions to curb the increase in NCDs like cancer. Regardless of these, considerable progress has not been seen primarily due to the sparse mechanisms and poor enforcement by the states.

The GoI also published guidelines for population-based screening programme for common cancers, but this also has proven to be deficient. This is because the techniques chosen to have not proven to be optimal for the screening along with considerable lack of evidence of implementation of the examinations.

Several health policies and insurance schemes have also been initiated to reduce the financial burden faced by the poor, with various literature demonstrating the benefits of health insurance in minimizing the economic burden and improving access to quality health care. Some studies over the years, on the impact of utilisation of health services with the introduction of health insurance programs have stated a decrease in OOPE among registered families, while several others (70%) reported no effect of insurance in decrease of out-of-pocket (OOP) expenditure.

India is among the top nations with the highest OOPE. According to Economic Survey 2021, a 3% boost in public health expenditure from the present levels can reduce the OOP by 30%. The household OOPE forms the highest share (~64.7%), then the state expenditure (~11.2%), and central expenditure (~8.6%). In 2015–16, the portion of government health insurance was ~4.2% and private health insurance was 4.4%.⁷⁴

Indian cancer registries involve just about 10% of the total populace, with most of them situated in urban areas. With more than 65% of the population being rural, few of the most populated states lack cancer registries hence data from registries do not provide a complete

picture of cancer cases in India. Furthermore, there is a significant disparity in availability of cancer diagnostic services between people living in urban vs. rural areas, due to inequitable distribution.¹⁴

The ICD lists >600 types of cancer, requiring unique diagnostic and management interventions. Although the GoI has publishes guidelines for screening and management of cancer, but there is no national comprehensive program for screening of the masses. Lack of trained health personnel and adequate state-of-art facilities along with the absence of proper data for cancer mortalities add to be challenges of increased cancer burden. Additionally, in spite of the fact that in the past decade the cancer research in India has evolved, it is still not sufficient for the growing population like India.

DISCUSSION

Oral cancer is a key public health dilemma in India, as it is the second most common cancer and accounting for almost 10.3% of the total incident cases in India.⁶ It manifests in the form of OPMDs which can transform into cancerous lesions in absence of appropriate interventions. Several risk factors like tobacco, alcohol, HPV are associated with oral cavity cancer. Oral cancers account for 11% of overall tobacco associated cancers.⁸

About 60–80% of the patients are detected at late stages when compared to only 40% in developed nations, contributing to an risen mortality rate. Additionally, the difference in proportion of incident cases and that of mortality is just ~2%, indicating that most of the population is detected at late stage, decreasing the survival rate of the patient. The late detection is the chief reason of the high associated co-morbidities and deaths rates and financial drain resulting from oral cancer.

It is essential to know, that health care costs do not only involve direct costs like treatment expenses but also indirect expenses, like the loss of yield and loss of income due to treatment. With studies reporting the share of OOP being about 75% of the complete treatment costs, oral cancer is sure not an ailment for poor. This financial upheaval experienced by the cancer patient along with the loss of workdays can prove catastrophic for an individual who earns his pay daily.

It is estimated that on early diagnosis, suitable and appropriate treatment can be instigated causing rise in survival rates to 90%. Prevention, early diagnosis, and well-timed treatment are the vital facets that need to be considered to efficiently confront oral cancer burden in India. It is clearly evident from the studies that the incident cases of OC continue to rise faster than projected numbers.

Understanding the importance of early detection, several research groups globally have assessed the various screening methods in populations over the years. The physical examination is the most common screening method and apart from these various other techniques have emerged over the years namely, vital staining techniques, brush biopsy, biomarker detection, and optical and radiology imaging systems can also be employed for screening of oral cancer in India.

A major concern for application of any screening method to a diverse population lies in the differences in accessibility, affordability, and availability (3As) of cancer care. A substantial proportion of cancer cases diagnosed at advanced stages are from rural areas as compared to urban cities. Hence, screening techniques can be generalised for a large population and initial examinations made accessible to all to reduce the delay in seeking treatment, can be addressed through the concept of non-office-based screening methods. Physical examinations, staining techniques wherein sample is collected and sent to labs, use of light-based systems all can be considered methods of non-office-based screening, hence targeting a major factor contributing to delay in seeking treatment. Although numerous studies have highlighted the efficiency and cost-effectiveness of physical examinations, research on other techniques is still to find a solid ground.

The MoHFW has published operational guidelines for common NCDs. This was followed by Operational Guidelines on Management of Common cancers in 2016, that focused on the three common cancers in India, namely breast, cervical and oral cancers that formed about 34% of total cancer cases in India. There GoI recommends opportunistic screening, and the OGs for Management of common cancers recommends population-based screening for the masses for every person above 30 years of age. There has been a slow but steady increase of screened population over the years but is it enough. Up till June 30, 2020, about 82,10,811 persons underwent screening through the opportunistic screening program through NCPDS and up until Sept'19, 2,73,12,457 people underwent screening in outreach

programs which also includes population-based screening. Various health insurance programs and policies have also been instituted by the central and state governments, AB-PMJAY being the most comprehensive insurance programs providing financial assistance as well as establishing HWCs for screening of NCDs. Several Non-governmental organisations and CSR initiatives have also been organised for oral cancer detection through screening camps and awareness campaign. Although there has been a lot of progress in the recent years, the OC burden also continues to rise steadily impacting the individuals as well as the country. The lack of awareness, adequate task force and infrastructure, lack of optimal national screening program, all add to the challenges faced for UHC.

RECOMMENDATION

Over the years, considerable headway has been made in screening and early detection of OC. But the increase in incident cases has been more than the projected levels. Although the GoI has made several recommendations around the screening of oral cancer, there is no national program for screening of OC, or any type of cancer thereof. There is a dire need of a comprehensive screening program scheduled every 5 years for screening of common cancers for high-risk population of India. For the diverse population of India, and without a systematic oral health program, the concept of population-based screening should be applied for the larger population to ensure the 3As for the population that requires these interventions. Also, the current infrastructure needs to be strengthened to carry the burden of NCDs along with cancer screening with adequate health personnel. The current health personnel also need to be trained and adequately incentivised for adequate performance in screening of the population. The dental colleges established in various parts of the country can also be utilised for cancer screening programs with oral health check-ups taken up in camps for the village population. As indicated by the OGs by MoHFW, there need to be adequate referral linkages between the PHCs/CHCs and the DH to decrease the probabilities of delay in seeking treatment. ASHAs and ANMs need to be trained for door-door examination of the individuals, which if found at risk can be referred to PHCs where the attending physician can perform office-based examinations and further give diagnosis.

Increased campaigns and initiatives for awareness of cancer programs and health seeking behaviour should also be executed at the national and state levels.

REFERENCES