

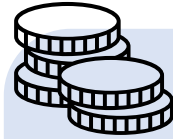
The Assessment Of Non-office Based Screening Techniques For Oral Cancer In India

Submitted to: Dr P. R. Sodani (President, IIHMR
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Rationale



Increasing cases of Oral cancer



High costs of treatments



Lack of representation of rural areas



Inaccessible services



High Tobacco consumption

Patient Journey



Research Question & Objectives

RESEARCH QUESTION

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

OBJECTIVES

1

To assess the overall burden of oral cancer in India.

2

To assess the non-office-based screening techniques for oral cancer and its feasibility.

3

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

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*. Following websites were also reviewed for updated information: *GLOBOCAN 2020, NCDIR, NCPR, IARC, and ICMR*.

The following *keywords* were used:

1. “Oral cancer” OR “OSCC” OR “mouth cancer”
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*.

Office and Non-office based ki definition

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”

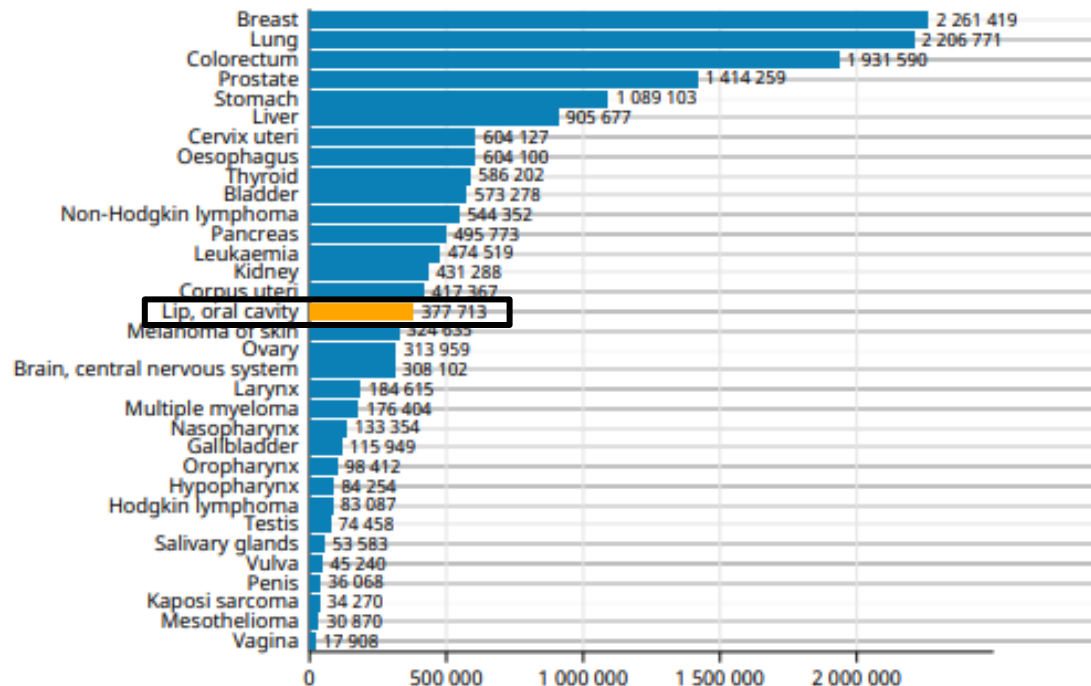
This includes the examinations that require a clinical setting in a physician’s office such as imaging techniques.



Globally, oral cancer accounts for a substantial amount of new cases

The developing countries face the major brunt of lip and oral cavity cancer, with South-central America.

Number of new cases in 2020, both sexes, all ages



Lip and oral cavity cancer is the **17th most common cancer** in the world, according to new cases in 2020

~1.8%
of all incident
cancer cases

~2%
of all cancer
deaths

~11.7%
increase in
projections in
2025

India faces a major chunk of oral cancer cases

India is known to be the global epicenter of OC, leading in 9 of the 28 Indian cancer registries for males in India

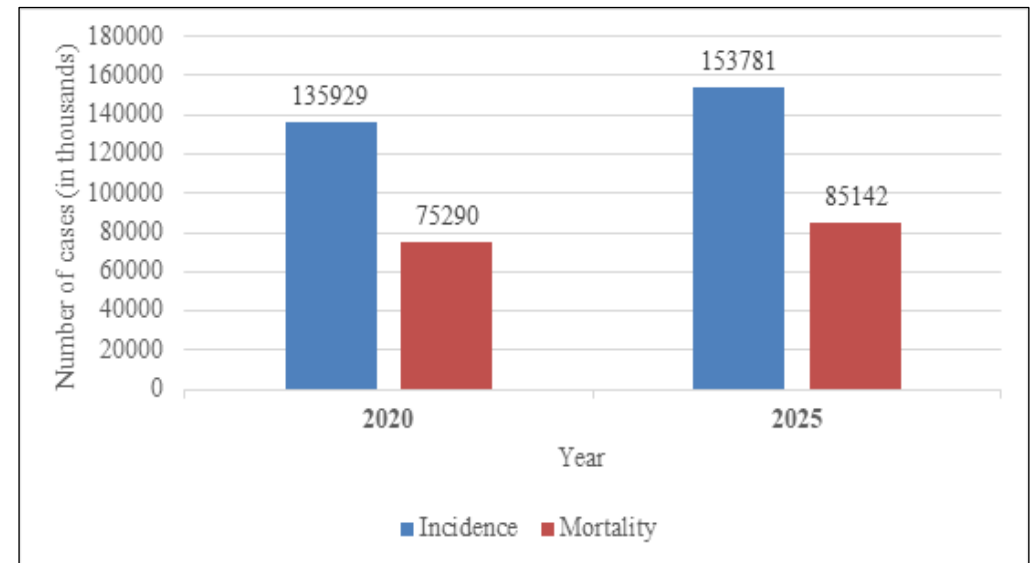
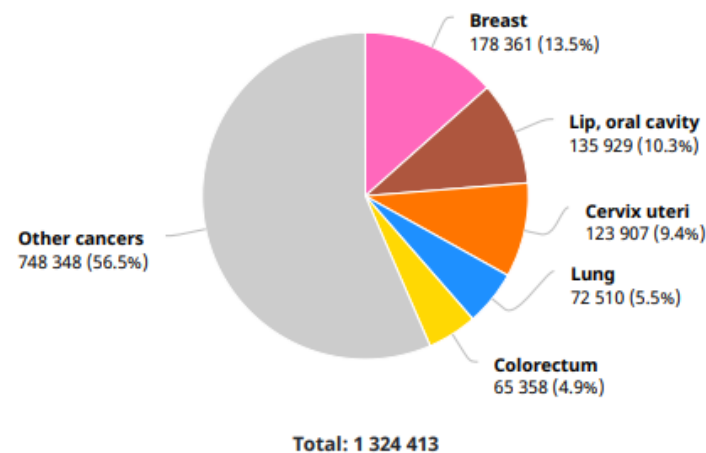
~10.3% of total incidence, in 2020
2nd most common cancer

~8.8% of cancer-related deaths in India, in 2020

21.77 prop per 100,00 &
300,413 five year prevalence

~13.1% rise in both incidence and mortality rates in 2025

Number of new cases in 2020, both sexes, all ages



Estimated number of incident cases and deaths from 2020 to 2025

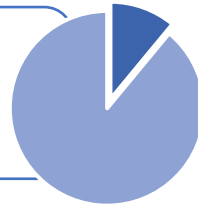
Burden of Oral Cancer

Associated Risk Factors

Tobacco, Alcohol, Chewing of betel quid, Marijuana consumption and HPV

Tobacco is a major etiologic agent for oral cancer

~11% of tobacco associated cancers are known to be oral cancers



Positive association between intake of tobacco and increased probability of OC

Tobacco associated cancers

40-50% in men

~20% in females

Social Determinants



Direct expenses

~75% share of total treatment costs is OOPE

US \$641 per cancer patient is government's expenditure, which is very low in comparison to other nations

Indirect expenses



Loss of productivity

Loss of income due to treatment

~7.2% of total cancer DALYs in 2016

Long durations of staying away from home and transportation costs

Why is it important from an Indian perspective?



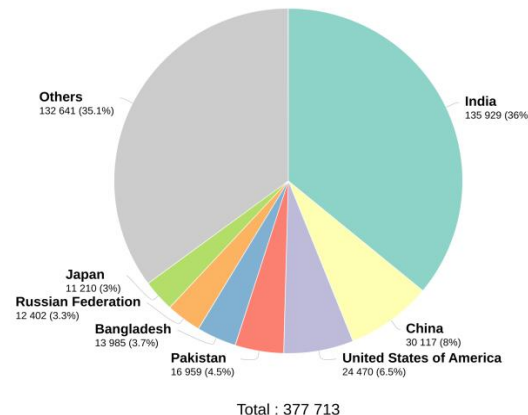
Oral cancer presents a significant health dilemma for countries experiencing economic transition, with the brunt primarily being faced by the middle- and low-income countries, with more than 50% of oral cancer cases reported from LMICs, including India. India has the one of the largest numbers of incident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



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.



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 Nambia in women.



India is responsible for 36% of total lip and oral cavity cancers and 42.4% deaths worldwide

In comparison to other cancers how is oral cancer difficult to treat?



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.



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.



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.

What is required?

Early diagnosis, and appropriate treatment are known to improve the survival rates

For
***cost-effective oral
cancer screening
programs***

to be instituted in high-risk
groups as those in India.

***Novel techniques
for screening***

of oral cancer for early detection
with various advantages over the
conventional diagnostic
methodologies.

***Provisions for early
detection***

and treatment of oral cancer

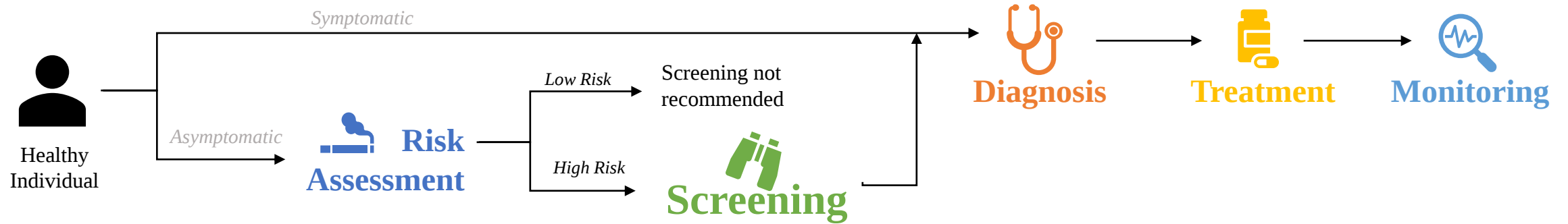
This study aims at highlighting the various screening methods utilized for detection of oral cancer and which of those can be employed for a diverse population like India. The various policies and initiatives by government and non-government organizations for early detection and appropriate screening of the population have also been discussed.



Screening Methods for Oral Cancer

Chapter 1 - Results

Screening techniques can be applied for the early detection of oral lesions



What is screening?

The application of a test to people who are seemingly disease-free for identification of individuals who have the disease from those who do not

What to screen for?

OSCC is preceded by clinically detectable chronic lesions known as OPMDs - premalignant lesions and conditions for varying periods.

As these OPMDs are generally asymptomatic, medical assistance is not requested up until development of major disturbances

Techniques for oral cancer detection (1/2)

Technique	Principle	Specimen	Sensitivity	Advantages	Disadvantages
Brush biopsy	Brushing and microscopic examination	Oral cells	77%	Non-invasive Low cost Minimal skills required	Inadequate sampling False negative results
Exfoliative biopsy	Scraping and microscopic examination	Oral epithelial cell linings	100%	Low cost Minimal skills required & instrumentation	Sample contamination False-negative results Low sensitivity
Histopathological examination	Microscopic examination	Oral tissue	NA	Large sample needed Quick collection Less risky	Time-consuming Chances of human error Less specific
Immuno-histochemistry (IHC)	Staining and microscopic examination	Oral tissue	NA	Widely used Rapid	No availability of standardized stains Difficult quantification Chances of human error

Techniques for oral cancer detection (2/2)

Technique	Principle	Specimen	Sensitivity	Advantages	Disadvantages
Physical examination	Systematic visual examination and palpation	Oral cavity (in situ)	NA	Non-invasive Easy to use For high-risk groups Low cost	Detection in a late phase Requires skilled personnel Chances of false positive and negative
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
Vital staining techniques	Visual tissue staining and microscopic examination	Oral tissue	97.80%	Simple Low cost Non-invasive Widely available	High percentage of false-positive cases
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
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

Non-office-based techniques can be easily replicated for a large population

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 most effective approaches for early diagnosis of oral cancer 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 a huge need for oral cancer screening techniques that are not just easy-to use but also non-invasive, rapid and accessible to the larger population. While there are many advantages to screening there are also certain disadvantages as for the potential of producing either false positive or false negative results.

Way forward...

Opportunities



Oral cavity is ***easily accessible*** and is amenable to ***secondary prevention***



Distinct clinical features are present to distinguish between OCC and premalignant lesions



Standard oral examination has demonstrated to be one of the simplest, and cost-effective methods for screening of OC.



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***



Effect of ***educational interventions*** in reduction of use of tobacco and decline in the incidence of OPMDs



Early detection could enhance the cure rate and decrease the cost and morbidity related.

Challenges



According to the NNMS, it was found that ***~1.7%*** of the population tested had ever taken an oral cancer screening test.



Delay in seeking treatment due to illiteracy and lack of awareness, gender discrimination, low socioeconomic status, rural lifestyle, and psychosocial factors



According to a study in the NER, ***~59%*** had heard about oral cancer; mere ***34%*** of partakers were informed of cancer screening



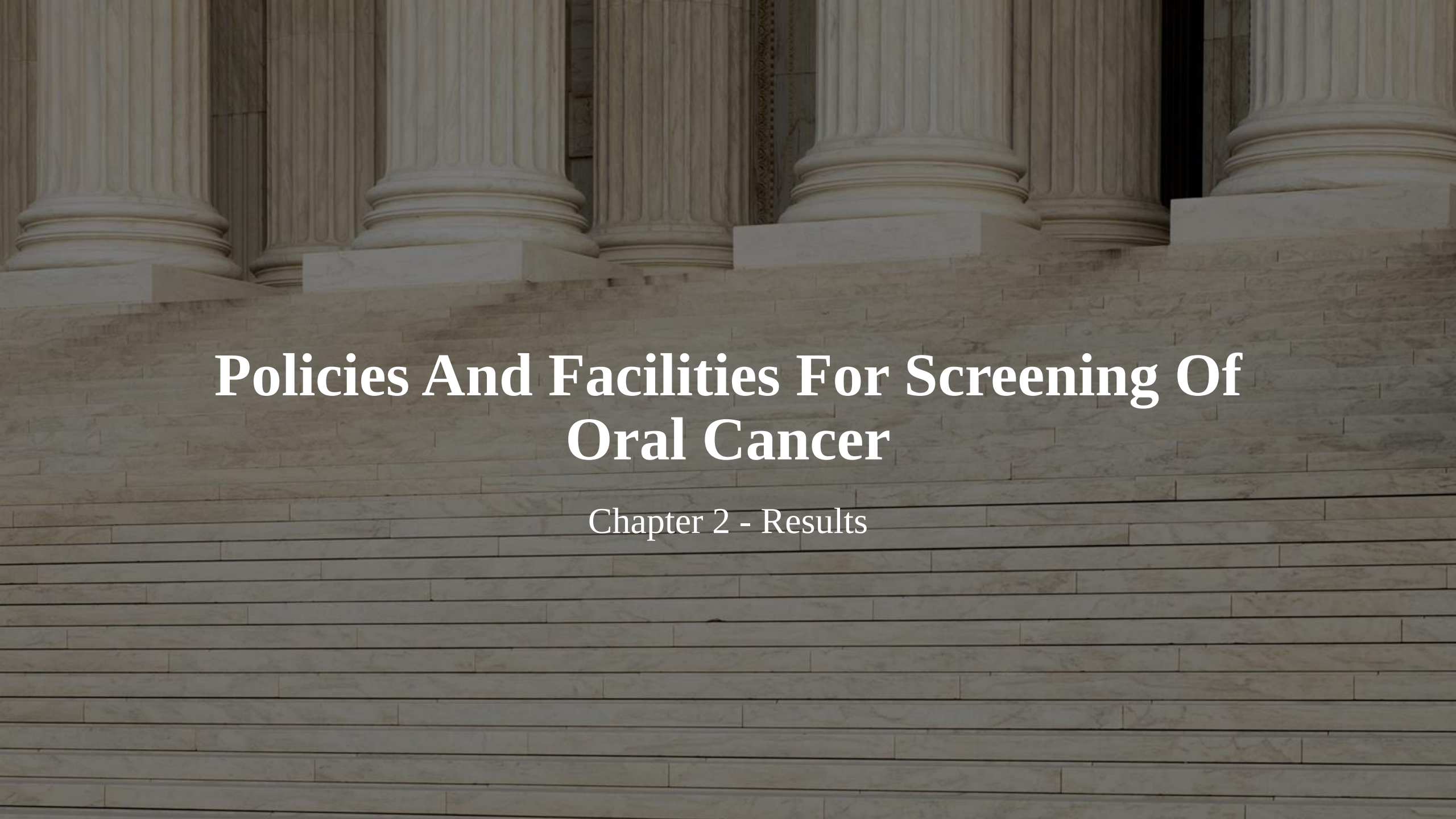
Disintegrated, low-resource ***infrastructure*** with shortage of ***workforce*** and technical facilities continues to persist.



No national program on population-based screening initiatives



~1.6% of GDP earmarked towards health sector, extensive targeted screening is not feasible

The background of the slide features a photograph of a grand, classical building entrance. In the upper portion, several large, fluted columns made of light-colored stone are visible. Below the columns, a wide set of stone steps leads up towards the building. The overall lighting is soft and even, highlighting the textures of the stone.

Policies And Facilities For Screening Of Oral Cancer

Chapter 2 - Results

Central Government initiatives (1/2)

Over the years the GoI has made several efforts to curb the growing burden of cancer by recommending formation of comprehensive screening programs and various health insurance schemes for people

1

Guidelines

The existing strategy under the NPCDCS programs is based on the principle of **opportunistic screening**.

Population level screening is recommended for screening for risk factors, focusing on prevention of the cancer by inhibiting its growth to malignant lesions.

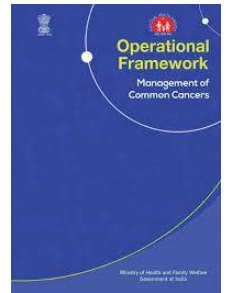
Focus on the three common cancers, namely **breast, cervical and oral cavity cancer**, which form **~34%** of all cancer cases

States are also recommended to follow these guidelines along with NPCDCS

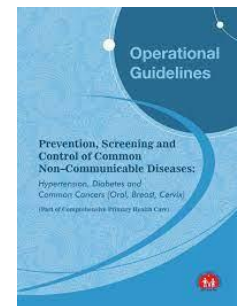
Type of Cancer	Age of beneficiary	Method of Screening	Frequency of screening	If positive
Oral	30 -65 years	Oral Visual Examination (OVE)	Once in 5years	Referred to Surgeon/Dentist/ENT specialist/Medical officer at CHC/ DH for confirmation* and biopsy.

Referral linkages to be established to avoid delays.

The progress is monitored through surveys like the **NFHS, DLHS etc**, based various key indicators



Operational framework for Management of Common cancers



Operational Guidelines for screening for common NCDs

Central Government initiatives (2/2)

2 National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCPDS)



Establishment of **15 State Cancer Institutes (SCIs)** and **20 Tertiary Care Cancer Centres (TCCCs)**



States are given financial support for activities up to district level, under the **NCD Flexi-Pool**

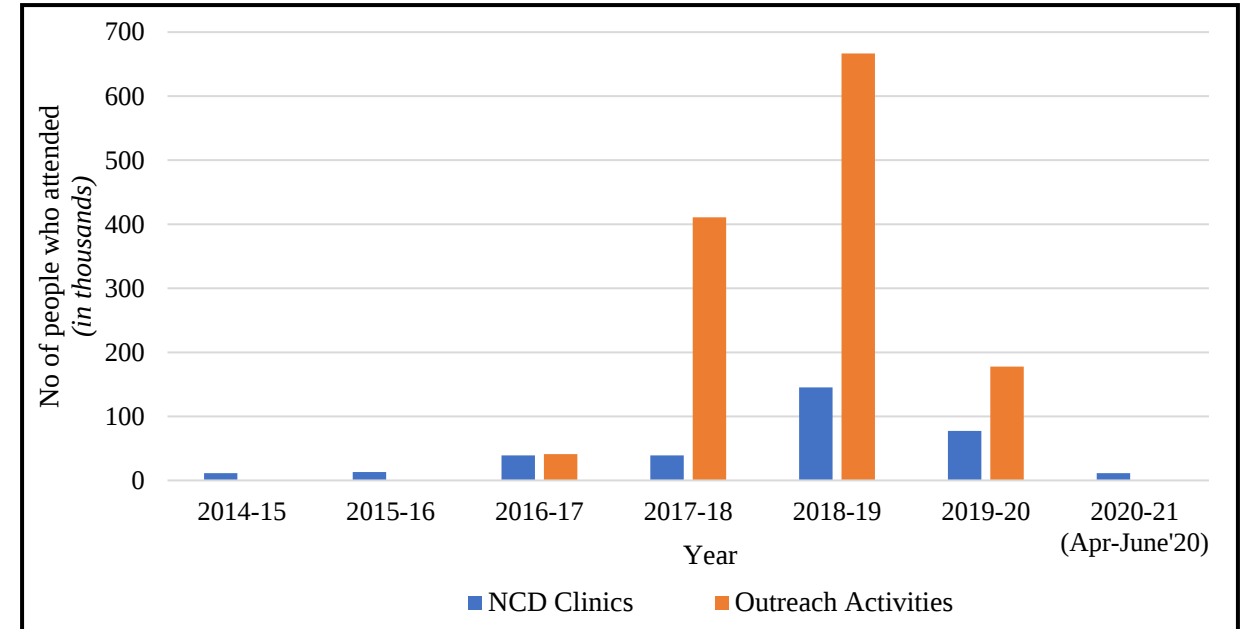


~**639** District NCD clinics and ~**4406** CHC NCD clinics



~**217 Day Care Centres** for provision of cancer chemotherapy with focus primarily on oral, breast and cervical cancer.

Fig : People who attended the NCD Clinics or attended Outreach Activities (including population-based screening) for the last 5 years



3

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. 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.

Other Government initiatives

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.

4

Health Policy & Health Insurance

Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (AB-PMJAY)

- Health and Wellness Centers (HWCs) for provision of CPHC
- Health insurance scheme

~3.67 crore screenings for oral cancer.

Umbrella Scheme of Rashtriya Arogya Nidhi (RAN)

: Financial aid for BPL families for treatment of life-threatening diseases like cancer etc | Health Minister's Cancer Patient Fund (HMCPF); Rashtriya Arogya Nidhi (RAN); Rare Diseases

Health Minister's Discretionary Grant (HMDG):

Financial aid for treatment of life-threatening diseases like cancer etc.

Rashtriya Swasthya Bima Yojana (RSBY) & Senior Citizens Health Insurance Scheme (SCHIS)

5

State Government Initiatives

Govt of TN through NHM Dental units in PHC and SDHs aims to identify precancerous and malignant lesions, with two mechanisms - ***door to door comprehensive survey by the Dental Assistants and opportunistic screening.***

~3,226 patients were screened with **13 cancers and 173 OPMDs** detected in “ASWAS” a district-level cancer control plan by Kannur District Panchayath, District Health Department and Malabar Cancer Center (MCC) for the detection of early-stage oral cancer and pre-cancer

Likewise, ***several population-based screening programs*** have been conducted in various areas of India, both at state and district level

NGO 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.



Indian Dental Association of India

National Oral Cancer Registry (NOCR) and Oral Cancer Foundation (OCF)

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.



Indian Cancer Society

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**.



Cancer Foundation of India (CFI)

Cancer Screening & Prevention Centre set up for free screening services for the common cancers, with over 15 years CFI has **~9,000** underprivileged women through mobile screening camps



Cancer Patients Aid Association (CPAA)

Free cancer screening clinics are conducted in diagnostic clinic labs along with on-site screening camps at subsidized rates, with **3,75,000** healthy individuals screened have been screened at the **7,657 camps** and clinics all over India



Cancer Institute (WIA)

Various screening camps in Vizhuppuram and Chengelpet for screening, early detection, and prevention program for common cancers, with **31,792 households** with 40 cancers and 102 pre-cancers detected

CSR Initiatives

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.

Biocon Foundation

Introduced a mobile health (mHealth) program, aimed at reducing the inadequacies in conventional screening and improving the treatment outcome. Till the end of 2019, about 60,000 individuals have been screened with ~13% identified with OPMDs. 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

Advanced Centre for Treatment, Research and Education in Cancer (ACTREC), which focuses on providing novel therapeutic strategies for the treatment of cancer, under which 2,964 individuals were screened for common cancers in the community.

Narayan Health

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. with ~3,085 people screened for oral cancer in Q4 2020.¹

IndusInd Bank

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 Foundation

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

Challenges

With quite a few initiatives taken by the society and the government collectively, there are still major roadblocks in the path to reducing the OC burden

~12%

of women aged 15-49 years have ever had an examination of the oral cavity

Lack of information of oral cancer screening in men

No national comprehensive program for screening of the masses

<10%

of the total population covered by Indian cancer registries, but **>65%** of the population is rural

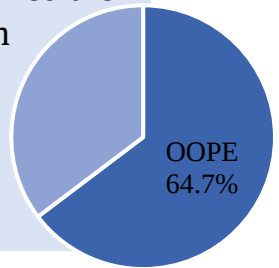
Few of the most populated states lack cancer registries

*The published guidelines have proven to be deficient, due to the **sparse mechanisms and poor enforcement by the states.***

~3% increase in public health expenditure, can reduce OOPE by **30%**

Household OOPE formed the highest share in health expenditure

India is among top nations with the highest OOPE.



*Lack of **trained health personnel** and **adequate state-of-art facilities** along with the **absence of proper data** for cancer mortalities.*

These challenges need to be thoroughly considered and reflected upon for optimal screening

Recommendations

Over the years, considerable headway has been made in screening and early detection of OC, the OC burden also continues to rise steadily impacting the individuals as well as the country

Increased campaigns
and initiatives for
***awareness of
cancer
programs***

***Comprehensive
screening
program***
scheduled every 5
years for screening of
common cancers for
high-risk population

***Awareness of
the need of
oral health***

Adequate
***monitoring and
execution***
of the programs

Current health
personnel need to be
***trained and
adequately
incentivised***

***Current
infrastructure***
needs to be
strengthened

***Population-
based
screening***
should be applied for
the larger population



THANK YOU