



Minimizing the Burden of Cancer in the India: Goals for a High Performing Health Care System

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ABSTRACT

Among various diseases, cancer has become a significant problem for human beings. India has a rapidly growing population inflected with a cancer diagnosis. Between 2004 and 2019, the cancer mortality rate was high in India, responsible for total death, with about 0.3 million deaths per year. This is due to reduced availability of prevention, diagnosis, and treatment of the diseases. This article, is a part of the delivery of cancer control services, access to health care across the cancer control continuum and related to environmental factors like food habits, industrialization, overgrowth of the population, social etc. in addition to this, efforts have also been made to foresee the effect of escalating number of cancer patients on the Indian economy.

Keywords: Cancer, health care system, India.

INTRODUCTION

In India, there is also a statement that cancer frequency is on the increase; and an expectation that maybe with the advances in technology, cancer is analyzed perhaps a change in our attitude and approach, the ethnicities associated with cancer are vulnerable, and we are more open to accepting cancer diagnosis and discussing cancer more openly. IARC has published updated estimates for 28 types of cancer in 184 countries, giving a complete outline of the global cancer problem in the globocan report. On the Indian scene, 1.1 million new cancer cases were measured, indicating India as a single country (of the 184 countries). Globally, the five most common cancers considered in both sexes were cancers of the lung, breast, colorectum, prostate, and cervix uteri. The estimated five most common cancers in men, remained cancers of lung, prostate, colorectum, stomach, and liver, amounting to a total of 4,285,250 cancers, and death due to these cancers. In women, the five most frequent cancers were cancers of breast, colorectum, lung, cervix uteri, and corpus uteri with a total of 3,721,266 cases. Death due to these cancers. For the first time, breast cancer is significant cancer in Indian women and cause of cancer death, superior cervix uteri cancer, despite cervical cancer considered more common in rural India. The need for the hour is to instrument well planned and systematized cervical cancer screening programs, and prophylactic HPV vaccination. The treatment is mainly needed for lung cancer, cancer due to the tobacco smoking habits highly leading worldwide. The change in lifestyle can oppose cancer. Another tobacco-associated cancer in India is oral cancer. However, all tobacco habitués do not show development to cancer, and hence a vital risk often not taken into account is the genomic constitution of an individual developing the cancers. In males, Consideration needs to be focused on stomach and colorectal cancers as well.

Using implementation science (IS) to advance cancer prevention in India²

almost a million individuals were diagnosed with cancer in India, representing 7 % of the global incidence. Oral, cervical, and breast cancers-cancers that are either preventable and or agreeable to early detection and treatment are the leading causes of cancer-related morbidity and mortality in the country. Although India's national cancer control program was thrown in 1976, large scale implementation of cancer prevention and control strategies has yet to take place, and public expenses on cancer remain low. In this paper, we highlight employment science research.

Implementation science significances that have the potential to catalyze cancer avoidance India. The three reading cancers in India are far more mortal than in high-income countries, primarily due to delays in diagnosis and treatment.

This scenario has determined despite the fact that research in India has been instrumental in identifying various low-cost approaches to cancer screening and detection. For example, randomized controlled trials have measured the impacts on mortality of visual inspection of the cervix followed by the treatment of pre-cancerous and cancerous lesions when implemented by different parts of health workers with varying frequency. In the case of oral cancer, A trail 191,872 individuals in Kerala, although underpowered to detect statistically significant reductions in mortality among all suitable individuals, found that screening was efficacious among those who adhered to three or four rounds of oral, visual screening as well as among individuals using alcohol and or tobacco, mostly due to early detection and reductions in the incidence of advanced cancers. Breast cancer screening and early on detection through clinical breast investigations are also



being studied in India, with high rates of acceptance and observance of diagnostic and treatment references.

Prevention is defined as the study of the uptake, implementation, and sustained use of research findings in routine practice and program settings can help connect the evidence-practice gap the gap between what is known based on the best available research and what is practiced routinely. Specifically, implementation science can help answer a range of questions related to how health systems can be reinforced to deliver cancer prevention and care services, such as how programs can reach at-risk populations and how services should be constituted for efficient delivery and improved uptake. In this article, we propose an implementation science framework for cancer prevention drawing on the implementation science and cancer prevention literature and based on the World Health Organization (WHO)'s health systems framework. Using this framework, we describe implementation science priorities to promote screening, early detection, and treatment of the top 3 cancers (oral, breast, and cervix) in India.

Cancer screening, early detection, and treatment services³

Identifying suitable models for delivering cancer screening, the first exposure, and therapy is an implementation science priority in India. It is undistinguishable whether cancer screening efforts should focus on multiple cancers (as opposed to single diseases) and whether cancer screening should be offered along with screening for other NCDs such as diabetes and hypertension.

Table 1: Implementation science research recommendations: “pull” factors⁴

S.No	Implementation Science Research Recommendations: “Pull” Factors
1.	Identify effective ways to increase responsiveness and understanding of cancer prevention and control across investor groups.
2.	Thoroughly monitor and evaluate cancer education efforts, including through the inclusion of cancer knowledge questions in national surveys.
3.	Examine the role of socio-cultural factors such as fear and stigma that pose barriers to the uptake of cancer prevention and control services.
4.	Develop and test policies to address barriers to access and utilization of cancer prevention and control resources.

Table 2: Health Information⁵

S.NO	Implementation Science Research Recommendations: “Push” and “Infrastructure” Factors Health Information
1.	Generate and widely spread research and programmatic knowledge and knowledge products such as clinical guidelines and quality standards, pre-service and in-service training programs, and reporting and monitoring tools.
Medical Products and Technologies	
2.	Identify and field tests through demonstration projects, pilots, etc. novelties (e.g., HPV DNA testing using self-sampling) that can be used in point-of-care settings, improve the presentation of screening and diagnostic tests, and facilitate scale-up of programs.
3.	Identify how best to influence information and statement technologies to enhance community outreach, health worker training, quality assurance, and service provision.
Cancer Screening, Early Detection, and Treatment Services	
4.	Identify suitable service delivery models, including packaging of services for multiple cancers and NCDs.
5.	Implement pilot and demonstration projects and monitor and evaluate on-going programs to identify barriers and implementors to effective service delivery.
6.	Explore the role of and partnerships between public and private (non-profit and for-profit) institutions in service delivery.
Health Workforce	
7.	Examine alternative strategies to increase the health staff for cancer prevention and control, such as finished task-shifting.
8.	Identify optimal ways to train, supervise, and support health care workers.
Health Financing	
9.	Estimate the economic impacts of cancer.
10.	Identify cost-effective methods for cancer prevention and care, ensuring financial protection and financing service delivery.

Implementation Science Framework for Cancer Prevention⁶

The use of IS to facilitate the uptake and sustained adoption of evidence-based health promotion approaches is gaining global appreciation (2008). In the United States (US), where cancer is the 2nd most common cause of death, the adoption of evidence-based involvement for cancer prevention and control has led to some reductions in morbidity and mortality. However, widespread use of remains a challenge even in higher-income countries like the US due to a range of factors including the quantum of evidence available (e.g., the number of efficacy studies), availability, training, and experience of service providers,



congruence between research and field experience, accessibility of resources for service delivery, and community acceptance. A push-pull-infrastructure model has been proposed to understand and guide the process of translating cancer control into practice. According to this model, this is shaped by the generation and propagation of scientific knowledge regarding involvements (“push”) in concert with efforts to increase the demand for interpositions (“pull”) and savings in systems for interference delivery (“infrastructure”). IS can help identify how to push, pull, and infrastructure-related factors intersect in the adoption of evidence-based approaches across the cancer control continuum. It can generate knowledge concerning cancer prevention and control plans and identify effective ways to synthesize, communicate and distribute this knowledge (“push” factors), discover mechanisms to improve service delivery through policies, medical novelties, and financing mechanisms (“infrastructure” factors), and promote an understanding of how social, cultural and economic factors influence the demand for and uptake of services across the care variety (“pull” factors). In this paper, we draw on the six building blocks of the health system as defined by the WHO - information, medical products and technologies,

service delivery, health workforce, financing, and leadership and governance - to organize the push- and infrastructure-related IS priorities ((WHO), 2007) while pull-related priorities focus on community-level issues. In the following sections, we apply this framework to identify evidence gaps and needs that, if addressed, can accelerate oral, breast, and cervical cancer prevention in India.

Cancer Control Continuum⁷

The cancer control continuum has been used since at least the mid-1970s to describe the various stages from cancer etiology, prevention, early detection, diagnosis, treatment, survivorship, and end of life. As modern biology has to change the our understanding of cancer, we now recognize that the categories are helpful labels, but the processes are not so disconnected. For example, we identify that colonoscopy is both a screening test for colon cancer and a prevention strategy if tumors found. The cancer control continuum is a useful framework on which to view plans, progress, and priorities. It helps us identify research gaps, where we must cooperate with others to have an impression, and where more resources may be needed. Figure 1 shows the cancer control continuum.

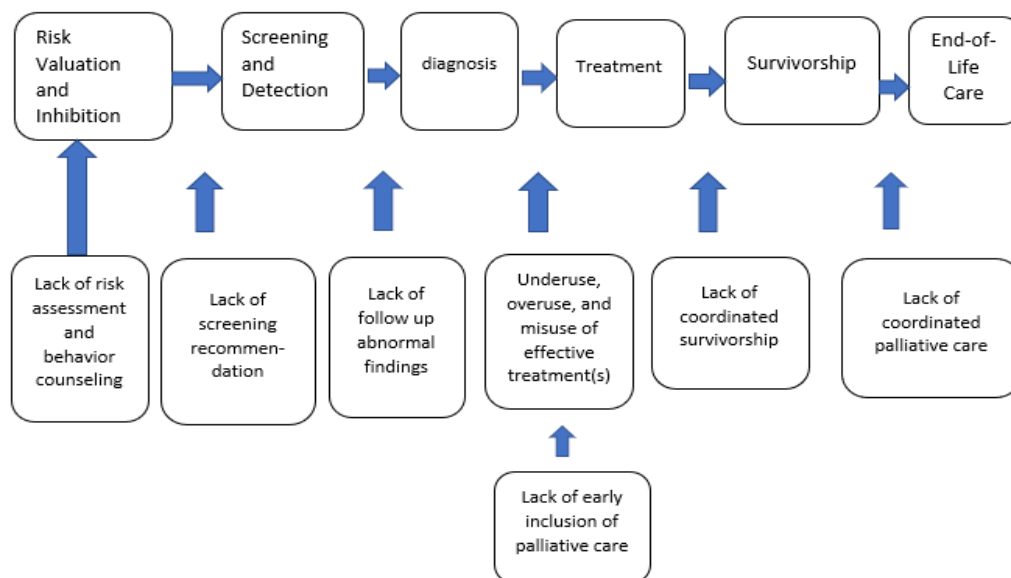


Figure 1: Cancer control continuum

Diet⁸

The causes of cancer in U.S.A. was estimated by Doll and Peto in 1981. Tobacco was found to be responsible for 25-40% of cancers and diet for 10-70% of cancers. In India, dietary habits may be responsible for about 10 to 20 % of cancers. Dietary factors may enhance the role of other risk factors. Most of the cancers have some relationships with diet. Predominant among them are cancers of the upper aero digestive tract (mouth, throat, esophagus, and lungs), stomach, large intestine, and breast cancer in women.

Cancer of the head and neck⁹

The main risk factors for these cancers are tobacco and alcohol. A diet rich in green and yellow vegetables has been shown to offer protection against oral cancer. Avoidance of alcohol and tobacco is the most crucial preventive action against throat, mouth, and lung cancers. Cancer of the Oral cavity can be detected early, and every opportunity in which a health care person interacts with a tobacco habitude should be exploited to detect precancerous conditions or cancers of the oral cavity.

Tobacco is the most crucial identified cause of cancer and is responsible for about 40 to 50 % of cancers in men and about 20 % of cancers in women. India has the added burden of tobacco chewing, which is more prevalent than smoking in lots of areas. Tobacco chewing has resulted in a considerable burden of Oral cancers and oral precancerous conditions. There are various other forms of tobacco use peculiar to specific geographic regions of India, and these need special attention.

Cancer Epidemiology¹⁰

Cancer is a group of diseases with similar characteristics. Cancer can occur in all living cells in the body, and different cancer types have a different natural history. Epidemiological studies have shown that 70 - 90 % of all cancers are environmental. Lifestyle-related factors are the most important and preventable among the environmental exposures. Tobacco consumption, either as smoking tobacco (or) chewing tobacco will account for 50 % of all cancers in men. Dietary practices, reproductive and sexual practices, etc. will account for 20-30 % of cancers. Appropriate changes in lifestyle can reduce morbidity and mortality from the right proportion of Cancer, Diabetes Mellitus, and Cardiovascular diseases.

Cancer of the stomach

Consumption of large amounts of red chilies, the food at very high temperatures and alcohol consumption are the main risk factors for stomach cancer in India.

Cancer of the large intestine

Heavy consumption of red meat can lead to the risk of colon cancer. White meat, such as that of poultry, do not have this risk. There is an international correlation in between the occurrence of large bowel cancer and the consumption of red meat. In South India, there is a trend towards escalating use of red meat, and this can lead to increased risk for large bowel cancer.

Breast cancer in women¹¹

Breast cancer is emerging as the important cancer in women. A large number of factors are identified as risk factors for breast cancer. Late age at first pregnancy (greater than 30 years), single child, late age at menopause, etc. are some of them. A high-fat diet is also identified as a risk factor. Physical activity is found to be protective for breast cancer. The sudden changes towards affluent lifestyles have reduced the physical activities to a minimum and increased the consumption of diets rich in fat. High-fat diets during the pubertal age and obesity in the post menopausal age are risk factors for breast cancer. Regular breast self-examination by women themselves is a very good way of detecting breast cancer in early stages. Detecting cancer when it is in a very first stage can improve the cure rate from breast cancer.

Cancer of the uterine cervix¹²

Cancer of the uterine cervix is still the main common cancer among women in India. Improvements in living standards

and access to health care have reduced the rate of occurrence of cervical cancer in some states like Kerala. However, the changing sexual behavior in young adults might lead to another wave of cervical cancers. Early age at first intercourse, poor sexual hygiene, multiple sexual partners, repeated childbirth, etc. are some of the reproductive risk factors for cervical cancer. Improvements in the living standards of women have resulted in a reduction in the incidence of cervical cancer. Regular cervical cytology examination (papsmear) by all women who have initiated sexual activity can prevent the occurrence of cervical cancer. This has been accomplished in many European countries. However, there are many limitations to cytology-based cervical cancer

screening in India. The States in India are in various levels of health care delivery and health infrastructure, and there may be certain areas in which screening programs are significant, irrespective of the screening strategy. Signs of cancer is shown in Figure 2.



Figure 2: Signs of cancer

Cost-effective care¹³

The cost of cancer management is mainly on the initial diagnostic tests, cancer drugs, and end of life care. These costs are higher in India as the majority of patients are diagnosed at advanced stages due to a lack of adequate awareness and no coordinated screening strategy driven by the government. If the standard guidelines are followed, this will help in providing cost-effectiveness care. A body like the UK National Institute of Clinical Excellence is needed in India, which not only looks at the intervention or guidance but also if it is cost-effective. One can argue that this would not be in the best interest of the country as healthcare is not universally provided for Indian citizens. This can at least help us to optimize the use of certain drugs/ interventions for some indications e.g., patients with human epidermal growth factor positive breast cancer can at least get 9 weeks of therapy as shown in the FINHER trial rather than

12 months as is the standard all across the developed world. Controlling the cost of drugs, compulsory licensing, royalty payment to inno, and wiser use of the generic drugs will all aid lower treatment costs.

Emphasis must be made to encourage governmental support to indigenization of diagnostic tests, expensive equipment (diagnostic and therapeutic), and perhaps through a public, private partnership.

Key outcome measures¹⁴⁻¹⁵

A part of the service commitment, the following should be collected and published centrally on a periodic basis;

- ❖ Stage at diagnosis
- ❖ Treatment offered: chemotherapy, surgery, radiotherapy, palliation, and symptom control.
- ❖ 30-day mortality post-surgery or radiation or chemotherapy.
- ❖ Hospital-acquired infection
- ❖ Cancer survival (one year, 2 years.)
- ❖ Adherence to guidelines

1. Screening all females in villages through mammography vans; Young women have dense

Breasts and mammography will not help detect cancers early. Mammography has to be used wisely or not at all as it can give unnecessary radiation Data indicates that it should be done after menopause when breasts are fattier.

2. Shifting patients to intensive care units at the end-of-life when all cancer treatments have

Been exhausted. These patients should be treated at home or local hospices.

3. Use of Image-guided and intensity-modulated radiotherapy, which is quite expensive for palliation.

4. Giving expensive targeted therapy (e.g., bevacizumab, cetuximab, panitumumab) to patients with advanced cancers for a few cycles, usually till their resources are exhausted. If patients Cannot afford these therapies, which are of limited value, they should not be commenced.

Targeted therapy should be used only where a specific biomarker is identified.

5. Genetic testing without adequate counseling: As a result, blood tests are being done to detect cancer.

6. Unnecessary tests like positron emission tomography (PET) scans/tumor markers as part of Cancer screening packages, using PET scans in the staging of early prostate cancer at low risk of metastases (T1c/T2 a prostate-specific antigen [PSA]<10) or for the staging of early breast

Cancer at low risk of metastases or as part of routine cancer follow-up in a symptomatic

patients. Do not do PSA levels in patients with no symptoms and a life expectancy of <10 years.

7. Using the cancer-directed therapy in patients in whom there will be no benefit e.g., those with a performance status of 3-4, no benefit from prior evidence-based interventions, for example, use of the third line and beyond treatments for patients with advanced gallbladder and stomach cancers.

8. Using granulocyte colony-stimulating factor for primary prophylaxis of febrile neutropenia in those with <20% risk of complication.

9. Giving high-risk anti-emetic regimens to those with a low or moderate risk of developing nausea and vomiting with chemotherapy.

10. Using combination chemotherapy for the treatment of patients with metastatic breast

Cancer unless the rapid response is needed for symptom control.

11. Offering cervical cancer vaccine to women are unlikely to benefit from the same.

12. Cervical smears in women who are over 65 years of age.

CONCLUSION

At this time, the early detection of cancer and precursor lesions represents a largely unmet potential to decrease morbidity and mortality from malignancies. The genetic disparity in the human genome is an emerging source for studying cancer, a complex set of diseases characterized by both environmental and genetic aids. Nearly 36 million deaths are due to cardiovascular disease¹⁶ mainly due to heart attack as per 2008. If it continues as such by 2030. It is estimated 23.6 million people die due to heart attack and any other cardiovascular disease as per WHO. The worldwide focus to scrap cancer needs to be on cancer awareness, initial detection, diagnosis, using chemotherapeutic drugs¹⁷⁻¹⁹, and availability and affordability of treatment in all sorts of cancers. Cancer in India has to be an urgency for the government at all stages. There are one million novel cancer cases diagnosed every year in india²⁰, and this is expected to rise. Primary detected cancers are correctable and fewer expensive to treat, and the patient goes back into their everyday routine to lead a creative life.

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