



Is It Possible to Reduce Cancer Burden in India?

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Abstract

Objective: *The purpose of this article is to briefly review the risk factors of cancer in India and the ways to reduce the burden of cancer.*

The incidence of cancer in India is rising and the rise can be attributed to lack of awareness, poor screening and lifestyle changes. More than 70 % of cancers are caused due to preventable risk factors. Tobacco consumption, HPV infection, unhealthy diet and lack of physical activity are the most important risk factors for cancer in India. Making people aware of the risk factors of cancer and reducing the exposure of risk factors in them can drastically reduce the incidence of cancer. Individuals who are already exposed to risk factors, they should be prevented from further exposure to the risk factors and regular screening for cancers in them can reduce the mortality and morbidity from cancer. It will also help in the reduction of other non communicable diseases as most of the risk factors are common among them.

Introduction

Cancer is a growing problem in India, with over one million new cases per year. The incidence of cancer is rising both in urban and rural areas. Breast, cervical, lung and oral cancers are the most common cancers in India. These 4 types of cancer contribute for more than 60% of total cancer burden in India.¹ Cancer causes psychological distress not only to person with illness but also to their family members.

The most important risk factors for cancer in India are;

- a. **Tobacco use:** As per the fact sheet of Global Adult Tobacco Survey (2009-2010) around 34.6% of Indian population use tobacco. The prevalence of tobacco use is higher in rural areas compared to urban

areas.² There are many ways in which tobacco is used in India.

This can be broadly classified into;

1. Smokeless tobacco:

Khaini: It is one of the most common method of chewing tobacco in which dried tobacco leaves are crushed and mixed with slaked lime and chewed as a quid.

Gutkha: It's a combination of areca nut, tobacco, flavouring agents and some secret ingredients which increase the addiction potential.

Paan with tobacco: It contains betel leaf, areca nut, slaked lime and catechu. Sweets and other condiments can also be added.

Paan masala: It is a commercial preparation containing the areca nut, slaked lime, catechu, and condiments, with or without powdered tobacco.

Mawa: It is a combination of areca nut pieces, scented tobacco, and slaked lime that is mixed on the spot and chewed as a quid

Mishri, gudakhu and toothpastes: These are popular among rural India because people believe that tobacco has germicidal chemicals which will help in cleaning teeth. Mishri is roasted tobacco powder that is applied as toothpowder. Gudakhu is a paste of tobacco and sugar molasses.

2. Smoked tobacco:

Beedis: Crushed and dried tobacco is wrapped in tendu leaves and rolled into a beedi. These are commonly used in rural population.

Cigarettes and cigars: Tobacco wrapped in tobacco leaves is a cigar, whereas a cigarette is a roll of tobacco wrapped in paper.

Chillum: Smoking of tobacco in a clay pipe.

Hookah: It involves a device that heats the tobacco and passes it through water before it is inhaled.³

Another important component of tobacco exposure is the second hand smoke. It is also called as environmental smoke or passive smoking.

According GATS, around 30% of the population are exposed to second hand smoke, of which 26% are non tobacco users.²

The addiction to tobacco is due to the presence of Nicotine. The addiction to nicotine is more common in people who start using it at younger age.⁴

Tobacco use in any form, whether smoking or chewing is an important risk factor for oral, oropharyngeal and lung cancer. Tobacco consumption is also linked to many other cancer in the body like kidney, urinary bladder, stomach, pancreas, cervix rectum.^{5,6,7}

Apart from cancer, tobacco is also an important risk factor for other non-communicable diseases like Myocardial infarction, Stroke, peripheral vascular diseases, COPD, etc.⁸

b. Infections: some bacteria and viruses are known to cause cancer. The infective agents that cause cancer are Human papilloma virus, Hepatitis B virus, Epstein barrvirus, HIV, H.pylori, etc.⁹

The most important among them in Indian scenario is the Human Papilloma Virus. Almost all (99.7%) of cervical cancers are caused by infection with high risk HPV.¹⁰

There are more than 100 types of HPV, of which at least 15 are cancer-causing, also known as high risk type. HPV infection is a sexually transmitted infection and most individuals are infected with HPV shortly after onset of sexual activity.

The 16 and 18 types of HPV are known to cause 70% of cervical cancers and precancerous cervical lesions.^{11,12,13}

Lifestyle changes: Adoption of western diet containing high carbohydrate and fat content, coupled with lack of physical activity is important risk factor for breast cancer. Life style changes is also associated with increased risk for diabetes, hypertension.^{14,15}

There are other risk factors like aging, exposure to radiation, exposure to carcinogenic substances, genetic factors, but these contribute to a small proportion of cancer in India.

It is said that around 70 % of cancers in India (40% tobacco related, 20% infection related, and 10 % others) are caused by preventable risk factors.¹⁶

Oral, breast, cervical and lung cancer are the most common cancers in India.¹

Luckily these cancers are amenable to prevention or early detection.

Reducing the burden of Cancer

1) Primary Prevention

The goal of primary prevention is to reduce the exposure to risk factors. The ways of preventing cancer through primary prevention are,

Tobacco prevention: Preventing a person from using tobacco of any form. Prevention efforts must focus on young adults as almost no one starts smoking after the age 25.¹⁷

In India, the onset of tobacco use typically occurs in adolescence, with an estimated 5500 young people starting tobacco use every day.¹⁸

A recent national survey revealed that more than 25% of adolescents aged 13 to 15 years in India had used tobacco.¹⁹

Youth are vulnerable to social and environmental influences to use tobacco; messages and images that make tobacco use appealing to them are everywhere. Young people want to fit in with their peers. Images in tobacco marketing make tobacco use look appealing to this age group. If the people are exposed to tobacco a younger age group, they are more likely to develop tobacco addiction. Intervention programs in schools and colleges for preventing tobacco use should be included in the school curriculum, and the children should be made aware of health hazards of tobacco use through audio visual methods, demonstrations, plays etc. There are legislations to control tobacco in India, like the COTPA, but proper implementation is necessary for the control of tobacco.

Tobacco Cessation: If a person is already consuming tobacco, he should be provided assistance to quit. All health care providers should ask the history for tobacco use and should at least provide a brief intervention for tobacco cessation, focusing on enhancing tobacco users' motivation to change and connecting them with evidence-based resources to help make the next quit attempt a success.

The 5A's approach is a brief, effective way with a goal of meeting tobacco users' needs in terms of readiness to quit. It hardly takes less than 5 minute. The 5A's include;

- a) Ask about tobacco use every time,
- b) Advise tobacco users to quit,
- c) Assess the willingness to make a quit attempt,
- d) Assist the individual toward a successful quit attempt,
- e) Arrange for Follow-up contact.²⁰

Self help material, quit lines, Group behavioural therapy, Individual or group counselling, will help in tobacco cessation.^{21,22}

Pharmacotherapy in form of Nicotine replacement therapy and other drugs like bupropion, clonidine, varenicline could be used whenever necessary.

Pharmacotherapy should be strongly recommended to all persons with severe dependence, with multiple failed self-attempts and who are unable to abstain with brief intervention alone.²³

Vaccination: Cancers are caused due to infection with some viruses and bacteria. Few vaccines are available to prevent cancer.

- a) Hepatitis B vaccine to prevent Hepatitis B infection, which is known to cause hepatocellular cancer.

Dosage and schedule: In children the dosage is 10µg, primary immunisation is given at birth, followed by 3 doses at 6, 10 and 14 weeks. In adults the dosage is 20µg, and schedule is 0, 1 and 6 month.²⁴

Human Papilloma Virus vaccine: Two types of HPV vaccine are available in India, one is the bivalent cervarix and other is quadrivalent Gardasil. Recently nonavalent Gardasil vaccine is approved by FDA.

The recommended schedule for HPV vaccination for females is,

Schedule: a) If the female is less than 15 years at the time of first dose then, a 2-dose schedule (0, 6 months) is recommended.

- b) If the female is more than 15 years of age at the time of first dose than, a 3-dose schedule (0, 1-2, 6 months) is recommended.²⁵

Some countries are promoting/advocating HPV vaccination in males to prevent genital warts and anal cancers.²⁶

Nutritious diet and exercise: Fruits and vegetables contains various phytochemicals and antioxidants which work together to lower the risk of cancer.²⁷

Antioxidants help in reducing the damage to DNA from free radicals.²⁸

Exercise is known to reduce the risk of cancer but the exact risk reduction varies for different cancers.

Maintaining healthy weight: The number of cancer cases attributed to obesity as the risk factor

is around 20% with an increased risk of malignancies being influenced by diet, weight change, and body fat distribution together with physical activity. There is a strong association between obesity and the following cancer types: endometrial, oesophageal adenocarcinoma, colorectal, postmenopausal breast, prostate, and renal, whereas the less common malignancies are leukaemia, non-Hodgkin's lymphoma, multiple myeloma, malignant melanoma, and thyroid tumours.²⁹

Central Obesity is considered as an important risk factor for breast cancer irrespective of the menopausal and hormonal receptor status.³⁰

2. Secondary Prevention

Screening is an important part of secondary prevention.

Secondary prevention refers to early detection of cancer. If cancer is detected at an early stage, there is higher chance of cure and even the prognosis and survival is better.

There are various screening methods available for screening for oral, breast, cervical and lung cancer. There are studies done to prove that screening for these cancers is effective in reducing the mortality from that cancer.

a. Screening for oral cancer:

The various methods available for screening for oral cancer are visual inspection of oral cavity using halogen light, use of toluidine blue staining, fluorescence technology, exfoliative cytology.³¹

Screening for oral cancer by visual inspection of oral cavity using halogen light is the simplest and cost effective way for screening. There is evidence from a large randomised controlled trial that, screening for oral cancer in high risk individuals is beneficial in mortality reduction.³²

There are precancerous lesion in the oral cavity like, Leukoplakia, erythroplakia, Submucous fibrosis, lichen planus. Individuals identified with these lesion can be given appropriate treatment to reduce the chances of getting them transformed into cancer.^{33,34,35}

b. Screening for cervical cancer

The various screening tests available for cervical cancer screening are PAP smear, Visual inspection with acetic acid (VIA), Visual inspection with lugol's iodine (VILI) and HPV DNA testing.³⁶ Lack of infrastructure, trained manpower and resources are the bottleneck to screening for cervical cancer by PAP smear and HPV DNA test in developing countries like India.³⁷

There are some large randomised controlled studies conducted in India, which used 5% acetic acid for screening for cervical cancer and have shown promising results.^{38,39}

The advantage of using VIA is, very cost effective, immediate results and can be done by a trained health worker. This can be combined with cryotherapy as per the WHO's screen and treat strategy to treat cervical precancerous lesion, limiting the loss to follow up.⁴⁰

There are precancerous lesion in the cervix like, CIN I, CIN II and CIN III. Females identified with these lesions can be treated by cryotherapy or conisation or LEEP, whichever is appropriate. The advantage in cervical cancer screening is the lag period between the oncogenic HPV infection and the invasive cervical cancer is 15–20 years.⁴¹

c. Screening for breast cancer

The various screening methods for breast cancer screening are, Clinical breast examination, breast self-examination, mammography and MRI.

Screening for breast cancer will lead to down staging the disease, which will help in having better prognosis and good survival.

There is limited evidence for benefits of Clinical Breast examination and self breast examination. There are many studies done using mammography as a screening for breast cancer. The recent US preventive task force guidelines recommends screening mammography once in two years after the age of 50 years.⁴²

The issues with mammography for screening in Indian women are, most Indian's have dense breast, in which sensitivity of mammography is low; the problem of over diagnosis and there is always a slight risk of exposure to radiation.

Currently there is no much evidence regarding survival benefit by clinical breast examination, but as a adjunct screening with mammography, it can help in finding earlier breast cancers and upto 5-10% of cancers missed by mammography.⁴³

In females having hereditary history of breast cancer (BRCA I/II mutation) MRI with mammography is helpful.⁴⁴

d. Screening for Lung Cancer

The various screening methods for lung cancer are, chest X-ray, sputum cytology, Low dose CT.

There are studies done for screening for lung cancer using chest x ray and sputum cytology, which has shown no benefit in the mortality reduction after screening.^{45,46}

There is one randomised controlled trial which showed screening with low dose CT in high risk elderly people will reduce the mortality by around 20 % and all-cause mortality by around 6.7%. Based on these findings, the US preventive task force has recommended screening with low dose CT annually in high risk elderly people.⁴⁷ But this study was done in US and whether we will find a similar reduction in mortality in Indian population by screening with low dose CT is not known. The other factor is the cost of low dose CT, which many Indians may not afford for annual screening. More importantly, people should be made aware of the causes and risk factors of cancers, the importance of early detection through screening and self-examination of the oral cavity and Breast.

Conclusion

With growing population in India and more people at risk to develop cancer, there will be an increase in the incidence of cancer in years to come. Reducing the exposure of risk factors and early detection in the form of screening can help in reducing the incidence of cancer and mortality from it by more than 50 %. The risk factors being common for other non-communicable diseases like, Myocardial infarction, stroke, diabetes mellitus, hypertension; eliminating or reducing the exposure to risk factors will reduce the incidence of these diseases also. Efforts should be made to

reduce the exposure to risk factors and encourage people to get themselves screened for cancers.

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