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Review

Burden of preventable cancers in India: Time to strike the cancer epidemic

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Abstract India has a rapidly growing population inflicted with cancer diagnosis. From an estimated incidence of 1.45 million cases in 2016, the cancer incidence is expected to reach 1.75 million cases in 2020. With the limitation of facilities for cancer treatment, the only effective way to tackle the rising and humongous cancer burden is focusing on preventable cancer cases. Approximately, 70% of the Indian cancers (40% tobacco related, 20% infection related and 10% others) are caused by potentially modifiable and preventable risk factors. We review these factors with special emphasis on the Indian scenario. The results may help in designing preventive strategies for a wider application.

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Background

Globally, cancer is increasingly being recognized as a major contributor to health concerns. The increasing age of populations, especially in the developing regions is an important factor, as cancer incidence increases directly with age. However, in India and similar countries, recent advancements in access to health care and therefore diagnosis are also important in documenting the role of cancer as a health problem. An estimated 13 million cancer cases are reported per year worldwide, and roughly 60% of these cases are expected to die in developing countries [1]. As per WHO projections, the death toll of cancer would reach 10 million cases per year worldwide by the year 2020. As per the recent estimates by India's National Cancer Registry Program (NCRP), 1.45 million cases would occur in 2016 with 0.74 million deaths in India. This is expected to rise to 1.73 million cases and 0.88 million deaths in 2020 [2]. Thus, one in 8 men and one in 9 women are expected to suffer from cancer [2] in their lifetime (considering a median life expectancy of 74 years).

Major potentially modifiable lifestyle factors include tobacco consumption in various forms, infections, dietary factors (which may be underestimated) and alcohol use. It is estimated that 35–50% of the cancer cases worldwide can be prevented by control of potentially modifiable factors [3,4]. While we acknowledge that variation in registry quality likely affects these results, we are struck by the observation that there is a wide geographic variation of cancer incidences among various cancer registries of India [2]. Aizwal (Capital of Mizoram state) records the highest cancer incidence in India of 270/100,000 population as compared to 40/100,000 population for Barshi (a rural area in Solapur district of Maharashtra state). Possibly, these wide variations implicate potentially controllable variations in lifestyle factors contributing to cancer risk. Such lifestyle variations might include variation in tobacco consumption, dietary factors and environmental factors that could be modified by targeted programs.

The etiological factors for preventable cancers may show wide country specific variations. Skin cancers (related to sun-exposure) are common in the western population but rare in Indians. Difference in patterns of tobacco consumption (smoked versus smokeless tobacco), alcohol consumption (spirits versus wines), and diet (less non-vegetarian and less consumption of red meat) leads to differences in incidence of related cancers too and mandates an India-centric approach to cancer prevention. In this article, we aim to discuss the burden of preventable cancer with special emphasis on the Indian scenario.

Tobacco

80% of the tobacco consumers reside in economically developing countries where there is little push to encourage prevention or help those who are already smokers. Many of them are of younger age group [3], especially men, but in India, where betel use is often combined with tobacco, it is important to acknowledge the contribution of smokeless tobacco in both men and woman. The incidence of tobacco related cancers varies widely as per geographic location and gender in India. 30–60% of total cancers among males and 10–30% among females are tobacco related by one estimate [2], so that 1 in 17 males and 1 in 50 females have a lifetime risk of tobacco related cancers in India [2]. This directly corroborates with a low proportion of tobacco consumption among females in India [5]. Alarmingly, 15% of the youth (age group 13–15 years) use tobacco in some form as per the Global Youth Tobacco Survey (GYTS 2009–10) [6]. Overall, 35% of adults (age $\geqslant$ 15 - years; including 48% of males and 20% of females) use tobacco [5], typical as smoked tobacco (14% of adults; 25% of males and 3% of females) but 33% of males and 19% of females use smokeless tobacco (with or without smoking).

Tobacco increases the risk of lung cancer as well as 15 other cancers and is the forerunner of preventable causes of cancer deaths accounting for 21% of total cancer deaths worldwide [3]. It is the strongest risk factor for lung cancer (increasing risk by 10–20-fold for this extraordinarily lethal cancer) and also it has been implicated as a contributing etiological agent for head and neck cancers (oral cavity, nasal cavity, paranasal sinuses, nasopharynx, larynx, and hypopharynx), esophagus, stomach, colorectal, pancreatic, hepatocellular, bladder, kidney, cervical cancers and leukemia [7].

Yet another challenge in India is areca nut chewing along with betel leaves (locally known as pan) and which most times is stuffed with smokeless tobacco. Betel quid usage prevalence has been found to range from 20 to 40% in the Indian population [8]. Sweetened areca nut chewing habit has been found in school going children. Khandelwal et al. [9] in their study on 3896 children, found 27% chewing areca nut and mostly (80% of these) used sweetened form of it. Most of these children are unaware of the harmful effects of these habits.

Daily consumption of ten or more quids of pan-tobacco increases the risk of cancers of gingiva; the relative risk among males and females being 15.07 and 13.69, respectively [10]. Pan-tobacco habit of more than 40 years' duration also has a relative risk of 2.03 of developing carcinoma of esophagus [11].

It is important to note that tobacco cessation has many health benefits apart from prevention of cancer, such as in reducing cardiovascular and pulmonary diseases. Quitting smoking before 50 years of age reduces the risk of death by

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