An Overview of Oral Cancer in Indian Subcontinent and Recommendations to Decrease its Incidence.

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Abstract.

The Objective of this article is to review the current prevalence and risk factors for oral carcinoma across the Indian subcontinent. Oral cancer is increasing in Indian subcontinent mainly due to lack of hygiene, tobacco use, chewing tobacco leaves, smoking and many other factors which are discussed in detail in this article. Cancer is the second most common cause of mortality and morbidity today after cardiovascular problems. Oral cancer is the eleventh most common cancer in the world and two third deaths due to oral cancer occurs in developing world, out of which one third occurs in Indian Subcontinent. Human papilloma virus is a known risk factor oral cancer specially type 16 and 18. This is causing not only huge impact on the health of the community but also the economy of the Indian subcontinent countries. We have summarized few recommendations in this article, by which oral cancer can be tackled in Indian subcontinent. We have recommended different approaches from primary prevention to secondary and tertiary prevention methods. These include better hygiene, health education, and proper screening methods to detect those at risk, earlier treatment and smoking cessation clinics, proper legislation at government level and global approach as well.

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1. Introduction

1.1 Indian Subcontinent

The Indian Subcontinent is a region of the Asian continent on the Indian tectonic plate south of the Himalayas, forming a land mass which extends southward into the Indian Ocean. It is also called South-Asian subcontinent, Indo-Pak subcontinent or simply South-Asia or the Subcontinent. Geographically, the Indian subcontinent is a peninsular region in south-central Asia, rather resembling a diamond which is delineated by the Himalayas on the north, the Hindu Kush in the west and Arakanese in the east; and which extends southward into the Indian Ocean with the Arabian Sea to the southwest and the Bay of Bengal to the south-east. With all seven countries included, the area covers about 4.4 million square kilometres, which is 10% of the Asian continent or 2.4% of the world’s surface area. Some academics hold, that the term South Asia is more common in Europe and America as compared to subcontinent or Indian subcontinent. A booklet published by the United States Department of State in 1959 includes Afghanistan, Ceylon (Sri Lanka), India, Nepal and Pakistan as part of subcontinent region, “Indian subcontinent”: Geology and Geography. The Columbia Electronic Encyclopaedia, 6th edition, Columbia University Press, 2003”. Central Asia comprising of Pakistan, India, Bangladesh, Nepal, Bhutan, Sri Lanka and an island off the south eastern tip of the Indian peninsula is also, often considered as part of the subcontinent.”

Historically forming the Greater Indian subcontinent or part of British Empire were Pakistan, India, Bangladesh, Nepal, Offshore of Sri Lanka, Maldives and Bhutan. The region also includes the disputed Territory of Aksai Chin and Jammu and Kashmir which are now controlled by Xinjiang province of China. Overall, it accounts for about 34% of world’s population. Here we consider only Afghanistan, India, Pakistan, Nepal, Bangladesh and Sri Lanka along with Jammu and Kashmir as part of subcontinent. (After Partition: India, Pakistan, and Bangladesh. (BBC, 2007-08-08).

1.2 Oral cancer

The term oral cavity refers to lips, buccal mucosa, alveolar ridges, retro molar trigone, hard palate, floor of the mouth and anterior two-thirds of the tongue. Oral cancer or oral cavity cancer, a subtype of head and neck cancer, is any cancerous tissue growth located in the oral cavity [3]. There are several types of oral cancers, some being squamous cell carcinomas, basal cell carcinomas, verrucous carcinomas, nasopharyngeal carcinomas, malignant melanoma, ameloblastoma, mucoepidermoid carcinoma, and so on; around 90% are squamous cell carcinomas, originating in the tissues that line the mouth and lips. Many other different types of carcinomas of oral cavity can finally become malignant and result in a squamous cell carcinoma. Oral or mouth cancer most commonly involves the tongue. It may also occur on the floor of the mouth, cheek lining, gingiva (gums), lips, palate (roof of the mouth), maxilla or mandible. Most oral cancers look very similar under the microscope and are called squamous cell carcinoma. These are malignant and tend to spread rapidly. These oral cancers are heterogeneous and arise from different parts of the oral cavity, with different predisposing factors, prevalence, and treatment outcomes. It is the sixth most common cancer reported globally with an annual incidence of...
over 300,000 cases, of which 62% arise in developing countries. There is a significant difference in the incidence of oral cancer in different regions of the world. The age-adjusted rates of oral cancer vary from over 20 per 100,000 populations in India, to 10 per 100,000 in the United States, and less than 2 per 100,000 in the Middle East [4]. In comparison with the U.S. population, where oral cavity cancer represents only about 3% of malignancies, it accounts for over 30% of all cancers in India. The variation in incidence and pattern of oral cancer is due to regional differences in the prevalence of risk factors. But since oral cancer has well-defined risk factors; these may be modified giving real hope for primary prevention. Despite the fact that the oral cavity is accessible for visual examination and that oral cancer and premalignant lesions have well-defined clinical diagnostic features, oral cancers are typically detected in their advanced stages. In fact, in India, 60-80% of patients present with advanced disease as compared to 40% in developed countries. Consistent with patients presenting for medical care with more advanced disease in India compared with developed countries, overall survival is also reduced. Early detection would not only improve the cure rate, but it would also lower the cost and morbidity associated with treatment. The precancerous lesions and conditions of oral cancer are a ray of hope in prevention.

The precancerous lesions are:
1. Leukoplakia
2. Erythroplakia
3. Palatal changes amongst reverse smokers (smoker's palate)

The precancerous conditions are:
1. Oral submucous fibrosis
2. Oral lichen planus

The above mentioned conditions and lesions provide an opportunity for early detection and thus help prevent the malignant changes that may occur in them and then thus proceed to oral cancer. If diagnosed in the early phase, stopping the tobacco habit can reverse the condition. Thus, if appropriate measures for early detection and with good public education carried out, nipping the problem in the bud would be possible.

Classification of oral cancer is as follows:

<table>
<thead>
<tr>
<th>International classification of oral tumors by American society of cancer.</th>
</tr>
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<tbody>
<tr>
<td><strong>ICD-10</strong></td>
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<tr>
<td><strong>ICD-9</strong></td>
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<td><strong>DiseasesDB</strong></td>
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<td><strong>MeSH</strong></td>
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1.2.1 The international scenario for oral cancer

Cancer is the second most common cause of morbidity and mortality in the world today after cardiovascular problems. Six million people die due to cancer every year. It is estimated that by 2020 there will be 15 million new cases every year. Oral cancer is the eleventh most common cancer in the world with an estimated 267,000 cases and 128,000 deaths in around 2000, two-third of which occurs in developing countries. The Indian subcontinent accounts for one-third of the world burden. The incidence from oral cancer is increasing in several parts of the world particularly in Australia, Japan and parts of Europe. Oro-pharyngeal cancer is a significant part of the global burden of cancer. Oral cancer occurrence is particularly high in males. Incidence rates for oral cancer vary in men from 1 to 10 cases per 100,000 populations in many countries. Tobacco and alcohol are regarded as the major causes for oral cancer. There are strong synergistic effects on oral cancer risk when a person is both a smoker and drinker. This risk is generally increased as compared to being smoker or drinker alone. The population-attributable risks of smoking and alcohol consumption have been estimated to 80% for males, 61% for females, and 74% overall. The evidence that smokeless tobacco causes oral cancer was confirmed recently by the International Agency for Research on Cancer. Tobacco use, including smokeless tobacco, and excessive alcohol intake estimated to account for about 90% of oral cancers. (Nair MK, Sankaranarayanan R. Epidemiologic leads to cancer control in India. Cancer Causes Control. 1991 July, 2(4):263-5). The 58th World Health Assembly Resolution on Cancer Prevention and Control (WHA58.22, 25 May 2005) urged member states to develop and reinforce national cancer control programmes, prioritizing preventable tumours and risk factors intervention (http://screening.iarc.fr). Focus is on cancers amenable to early detection and treatment, such as oral cancer.

2. The scenario for oral cancer
in Indian Subcontinent

The problem of cancer is universal; the only variation occurs in types, site or other clinicoepidemiologic parameters. Tobacco chewing was identified as its cause about century ago but continued practice and research proved it as the most important avoidable factor of oral cancer. Head and neck cancers account for one of the fourth of all cancers in Indian males. In south Asia oral cancers account for about up to 40% of all cancers. In India the incidence of oral cancer is about 3-7 times more common as compared to resource rich countries. India tops in the prevalence of oral cancer in the world and remains the commonest cancer amongst the male population. Oral cancer is the third most common cancer in India after cervical and breast cancer amongst women. In India, the age standardized incidence rate of oral cancer is reported at 12.6 per 100,000 people. The increased prevalence of the oral cancer in the Indian subcontinent seems to be due to the high exposure to sunlight due to farming, smoking and other smokeless tobacco habits, alcohol, spicy food, and neglect of overall oral health. It is said that one third of all oral cancers are preventable and one third of them occur due to risk factors. The highest age-adjusted incidence for oral cancer is highest in India, i.e. 15.7 per100, 000 and lowest in Japan which is 0.2 per 100,000 and the difference is predominantly due to use of tobacco between the two nations. In the West, the cancer of tongue and floor of mouth is common whereas in Indian subcontinent the cancers of gingival and buccal mucosa are common due to placement of tobacco quid in the oral cavity. This cancer of gingivobuccal complex is termed as Indian oral cancer (Oral Cancer Prevention and Research Foundation, India).

Human Papilloma Virus (HPV) especially types 16 and 18 are known risk factors (there are over 100 variables) and independent causative factor for oral cancer (Gilson et.al. John Hopkins).

Symptoms associated with oral cancer are as follows:

**Skin lesions, lump or ulcer:**
1. On tongue, lips or other mouth area
2. Usually small
3. Most often pale colored, rarely dark or discoloured
4. Early signs include white patch (Leukoplakia) or a red patch (Erythroplakia) on soft tissues of the mouth
5. Usually painless initially but may develop with burning sensation as the tumour advances

Additional problems and symptoms associated with oral cancers may be
1. Tongue problems
2. Swallowing difficulty
3. Mouth sores that do not resolve in 14 days

**Signs and tests for oral cancer:** An examination of the mouth by a physician or dentist or other health care provider shows a visible and/or palpable mass or lesion on the lip, tongue or mouth. A tissue biopsy of the lip or tongue or other oral tissues and microscopic examination of the lesion confirms the diagnosis of oral cancer. The person may develop difficulty in speaking and swallowing with oral cancer.

The information emerging from Vietnam and China indicate that oral cancer incidence have tripled since 1980, partly due to chewing of betel quid although tobacco is generally not added to betel quid in these regions. In some parts of Pakistan, Afghanistan and India it is the leading cancer in men and third most common cancer in females in these areas. Cultural and hereditary factors are considered as risk factors in these parts and along with that, a lack of awareness, poor oral hygiene and fruit and vegetable lacking diets are also important risk factors in this connection. Oral cancer is common form of cancer and accounts for much of cancer related deaths in Indian males. (Sujha Subramanian et.al, Bulletin of the World Health Organization; Research Article DOI: 10.2471/BLT.08.053231).

In case of oral cancer the greatest risk factor is tobacco. It is important to mention here that tobacco is also one of the largest causes of preventable deaths in the world.

1. The relation of oral cancer with tobacco is well established and documented. Since 1985, eight case control studies conducted in India have given evidence of the role of tobacco smoking and chewing in oral cancer causation. Five of these studies reported significant estimated relative risks (as odds ratios) to current chewers of paan with tobacco compared to non-chewers, in men the relative risk varied from 1.8 (95% CI: 1.2-2.7) to 5.8 (95% CI: 3.6-9.5) (Rao and Desai ,1998; Rao et al., 1994; Nandakumar et al., 1990; Balaram et al., 2002; Dikshit and Kanhere, 2000) and the values for women ranged from 30.4 (95% CI: 12.6-73.4) for current chewers to 42.4 (95% CI: 23.8-75.6), chewers in the two studies that included women (Nandakumar et al., 2000 and Balaram et al., 2002).
2. The risk of developing oral cancer is high in cases of chewable tobacco. The incidence of oral cancer is
highest of all cancer amongst men (12%) as compared to women (8%).
3. Smoking may also lead to development of oral cancer; however the chances of laryngeal cancers are more in case of smoking rather than oral cancer.
4. Paan (chewable leaf tobacco mainly in Pakistan, India and Bangladesh) is said to be the most potent risk factor for the development of oral cancer. The combination of Areca nut, lime and tobacco is the possible reason behind the increased risk.
5. A case control study conducted in India revealed that the chances of development of oral cancer amongst men who were tobacco chewers were six fold higher than non-chewers. As far as the female population was concerned the risk was as high as 46 times more in females who had never chewed tobacco.
6. Other than life style factors, there are physical factors like radiations which have also been associated with oral cancer and exposure to x-rays.
7. Since risk factor is so profound and well established, undoubtedly curbing the use of tobacco is one of the major steps to prevent oral cancer occurrence (http://www.xomba.com/user/rawnak).
8. The increasing use of tobacco amongst the younger populations and children along with lack of oral hygiene has largely contributed to the sharp increase in the occurrence of oral cancer (http://www.xomba.com/user/rawnak).
9. Nutritional factors like diet that is deficient in fruits and vegetables could further increase the risk.
10. Biological factors include viral and fungal infections. HPV type 16 is mostly associated with the oral cancers which occur on the back of the tongue (http://www.xomba.com/user/rawnak).
11. One of the prominent factors associated with it is age (usually above 40 years).

Recently, a study from India demonstrated that oral cancer screening by trained health workers can lower mortality of the disease especially in individuals with a history of tobacco use [6]. In this randomized, controlled trial of almost 192,000 people, carried out over an eight-year period, there was a significant reduction in mortality in the intervention arm (29.9 cases per 100,000) versus the control arm (45.4 cases per 100,000), due to detection of oral cancer at an early stage. A cost-effectiveness analysis revealed that an oral cancer visual inspection by trained health workers can be carried out for under U.S. $6 per person. The incremental cost per life-year saved was U.S. $835 for the all-screened population and U.S. $156 in the high-risk population – namely, individuals with a tobacco habit (Zeb et al, 2006; 2008). Current users of nasal snuff a product which is relatively

uncommon now faced a relative risk of 3.9 (p<0.05) for cancer of gingiva (gums) in one study (Sankaranarayanan et al., 1989a,) and elevated but not significant in another study on buccal mucosa, i.e. cheeks and lips (Sankaranarayanan et al., 1990b).

The use of tobacco with lime was associated with oral and oropharyngeal cancer in a study conducted in Pakistan with a relative risk of 10.4 for women and 13.7 for men compared to those who neither chewed nor smoked (Jafarey et al., 1977).

2.1 Cancer registration in the Subcontinent

Cancer registries have been active in the region for many years, with Mumbai being listed in the Cancer Incidence in Five Continents from volume II in 1972 (see Table 1) and there were a total of eight registries included in the International Agency for Research on Cancer compilation in 2002. However, all but the South Karachi registry are in India, and therefore recourse has been made in the present report to Globocan 2002 for comparison across countries. The actual registries now in operation are illustrated in Figure 1. The overall mortality, incidence and prevalence of all cancers (not only oral cancers) can be seen in the different regions in Figure 2.

The available population based data has been presented in Tables 2 and 3 and the most prevalent cancers have been shown in terms of percentage for whole region in Figure 3. Besides Globocan and CIV, partial data has also been available for city or region based on registries in Quetta (Bhurgri et al., 2005) and (Bhurgri et al., 2000) for Karachi in Pakistan , Allahabad (Mehrotra et al., 2008) and Kolka (Sen et al., 2006) in India and multiple institutes in Nepal (Pradhananga et al., 2009).

High rates of oral cancers have been reported in Nepal (Baskota et al., 2005) and in Indian tea estate labourers in Sri Lanka (Ariyawardana et al., 2007). This in turn reflects the type of exposure to known risk factors such as betal quid, Areca nut with or without Aspergillus contamination and chewing or other forms of tobacco (Bhurgri et al., 2003b; Patel et al., 2007; Basu et al., 2008). In some situations alcohol might play a role rather than tobacco (Thomas et al., 2003). A history of diabetes melitus may also predispose (Dikshit et al., 2006) while high socioeconomic status is protective (Hashibe et al., 2003). The incidence of both tongue and oral cancers are decreasing in India although they are both independent of each other as shown in Figure 4 & 5.
3.1 The vision

To create a South Asian Oral Cancer Foundation (SAOCF) and to become a regional authority in combating the burden of oral cancer through prevention, early diagnosis, treatment and rehabilitation and set an example of dedicated service through futuristic science, to the international community.

3.2 The mission

To create a region, free from oral cancer:

1. The mission of SAOCF is to liberate the Subcontinent from the deadly claws of oral cancer, especially in view of the fact that our region tops the Figures of oral cancer sufferers

We aim to accomplish our mission by:

1. Establishing a chain of centres across the region and making the service for oral cancer prevention and early detection, accessible to all the citizens of the Subcontinent.
2. Prevention, in view of the fact that it is the only cure for oral cancer, would remain the mainstay.
3. Bringing about development of dental professionals by training them in the latest oral cancer detection techniques, thus making it possible for them to prevent oral cancer through early detection.
4. Aiding development and providing support to multidisciplinary approach in scientific and research related activities in the field of oral cancer detection and prevention.
5. Providing necessary support for conducting oral cancer research and to make provisions for timely transfer of the research outcomes for practical application.
6. A coordination of various agencies and related organizations for establishing a multidisciplinary approach to face the challenge of oral cancer.

3.3 Core values

In our efforts to provide service for oral cancer, we will give priority to improvement of scientific technologies and making them available to the people via dental professionals, based on the following core values.

3.3.1 Science

Our programmes and activities to support oral cancer training for the dental professionals, and information dissemination will be carried out on scientific basis

3.3.2 Trust

Our resources and programmes will be managed, conducted, and evaluated in a manner that upholds the trust placed in us by the people.

3.3.3 Society

Our programmes and actions will aim to improve health, especially oral health, of all people through a service that provides both prevention and treatment of oral cancer.

3.4 Overview

The SAOCF’s Strategic Plan is to make the Subcontinent, a region free from oral cancer. The driving forces behind our plan are to adopt needed change and to respond to the needs of the people we serve. Just as we initiate this programme, we embark on the strategic plan mindful of the momentum with which the epidemic of oral cancer is spreading, the trends that are involved and the means by which we can encourage people to consider health as their priority and ensure that they have the access to the best services, which can benefit the region. This strategic plan is drafted in a way that addresses the multitude of challenges that tobacco intervention can offer. The goals and objectives of this plan are centred on:

1. Knowledge that will help us in understanding disease processes, their underlying causes as well as the concepts that determine population dynamics related to those diseases.
2. Advances in oral cancer detection techniques that provide means for early diagnosis of pre-cancerous and cancerous lesions, with ease and precision. Also ensuring dissemination of the advanced science for professional development.
3. Innovation and development of excellent communication infrastructure that would enable us to propagate the message of prevention and early detection and simultaneously help dental professionals to get connected to the community directly and provide
them education as well as service.
4. The plan is to set forth an aggressive agenda to enhance training and development of members. The Dental Associations and Dental Councils of member states recognizes the need to translate advances and progress for bringing excellence in service through the communication of the information to health professionals, professional organizations, and to the public, through organized efforts.

3.5 Curing oral cancer

1. Putting a stop to the soaring statistics of oral cancer in the region and considering the face that India ranks first in the prevalence of oral cancer, has raised the need to curb the disease.
2. Curing oral cancer is an ambitious goal of SAOCF, which is sought to be achieved through early detection and prevention. SAOCF also recognizes the importance of partnerships in mobilizing an integrated health promotion enterprise comprising health professionals, voluntary health organizations, industry and government.
3. To combat the rapid growth of oral cancer statistics will require a greater ability to learn and absorb new techniques and create a sound infrastructure for service through the centres.

3.6 Facing the challenge of tobacco

1. The functions of taste, expression of feelings, speech and its contribution to aesthetics, to a large extent, make the oral cavity a unique organ.
2. Dental professionals are closely associated with the health of this complex environment. The challenge oral cancer poses is increased threat not only to the health of oral cavity, but to overall health. The increasing morbidity and mortality associated with this oral disease has made the health of oral cavity a cause of great concern.
3. In the context of increasing threat of oral cancer and the importance of dental professionals in its prevention and early detection, SAOCF will take a step forward in a unique way.
4. Also, to strengthen the stand of the tobacco intervention initiative, we seek to bridge the gaps between various professionals and their organizations, by establishing active communication with them and using various media for the same.
5. With the efforts to strengthen the foothold of the dentists and the summation of the ongoing efforts of the various professionals and organizations we aim to reach the summit of our mission. It won't be difficult to imagine a day, when oral cancer and the associated morbidity and mortality will become non-existent, resulting in humanity living healthier and more productive life.

3.7 Building capacity through co-ordination

1. The unique role of the SAOCF in oral cancer prevention and early detection, attributing to its target professionals and the mode of function, is its greatest prospect for its leadership role.
2. The combination of oral cancer prevention, early detection, cure and promotion of oral health, consequently overall health, enables the SAOCF to diversify its goal. Enrooting the goal in various professions and disciplines would help us materialize it.
3. Providing the necessary training to strengthen oral health professionals in oral cancer will help us in the development of an effective task force against oral cancer. It is equally essential to communicate the initiative to the people so as to make them realize the potential health benefit that such a step would have. This further strengthens the role of the dental professionals against cancer.

3.8 Sustaining the uniqueness

To achieve our vision and attaining the ultimate goal of making the Subcontinent a cancer free region, our diverse investments and coordination with various disciplines need to be carefully balanced.
1. Although we seek to undertake multidisciplinary action through a multidisciplinary task force, the vision and strategies, adopted and executed through the diverse professional groups, with the dental profession assuming the central role, is what makes our efforts unique.
2. It is through this uniqueness that we aim to assume leadership and set an example for all professional organizations to cooperate and coordinate with them in their efforts.

3.9 Other challenges

Oral cancer is not a disease that affects the health alone. It also affects the socio-economic life of the patient. Similarly, the burden of prevention, treatment and rehabilitation of the disease is also felt on the
national economy.

### 3.9.1 Psychological aspects

1. The very sound and the idea of the word “cancer” is enough to put the strongest person in despair. The effect of the word on the personality of the person starts right from the time a biopsy is demanded for the diagnosis; with heightened anxiety till the reports arrive.
2. Once the patient is confirmed to have oral cancer or even for that matter pre-malignant lesion, the role of the doctors/dentists is very crucial.
3. The deleterious effect of oral cancer on the psychosocial well being of the patient is one of the major challenges faced by doctors. Also, if the cancer is treated once, the fear of recurrence or relapse curtails the person’s happiness and confidence.
4. The effect of cancer surgery that leads to the disfigurement of face, changes the complete insignia of the person. SAOCF aims to address these problems by training dental professionals to deal with these aspects of cancer.

### 3.9.2 Economic aspect

1. The effect of oral cancer treatment takes a heavy toll on the financial condition of the person. The treatment is expensive, apart from its side effects.
2. Oral cancer is now shifted from the high income countries to middle and low income countries, which already suffer from dearth of resources. India has the maximum number of oral cancer sufferers and the resources to serve such a huge number remain limited.
3. The most pragmatic answer to such a situation is PREVENTION. The SAOCF aims at prevention and early detection. Before the disease reaches the state of higher morbidity and mortality, it has to be prevented or identified early and treated effectively.
4. Prevention and early detection is the SAOCF’s answer for the economic impact of the disease.

### 4.2 Building competencies:

1. With significant research and advancement in oral cancer detection and treatment techniques, there is an increased responsibility to get them reaching to all the professionals and oral health professionals in specific.
2. To bring about an improvement in every dental clinic and skills of every dental professional needs a variety of flexible and innovative training programmes for early detection and diagnosis of oral cancer so that a competent task force, for addressing every aspect of tobacco can be set-up.
3. Carrying out research and development and getting into the mainstream poses an array of challenges that need to be dealt with, if the outcomes of the research are to be adapted to benefit the common people.

### 4.3 Bridging research and practical efforts:

1. Despite the fact that oral cancer and its consequences can be totally prevented, treated and controlled, there exists a significant gap in the public’s knowledge, attitudes and behaviours. Various preventive measures that can significantly reduce the oral cancer burden, contribute to bridging the gap between research and development and public awareness.
2. To get knowledge disseminated in a way that will help people adopt behaviour patterns, which will improve their health and of those associated with them, and help them make appropriate decisions. An enhanced and sound system of communication, which utilizes all the measures and methods for timely
knowledge and information sharing, will be set-up. 3. SAOCF will take efforts, not only to equip the professionals with knowledge and skill, but also to get them connected with the population in an effective manner, which can educate and make them aware.

4.4 Facing the burden of the disease:

The far reaching efforts of oral cancer on the physical, social, psychological and economic well being of a person and the increasing number of affected people, pose a huge challenge.

1. The increasing number of people affected by the disease, most of who belong to the weaker socio-economic section, has made it difficult to reach the affected people.

2. The increase in the prevalence of risk factor and susceptible behaviour in the society has turned the demographics to a greater number of younger and poorer sufferers. An intensified approach for the prevention of risk factors and behaviour is the need of the day. The younger population especially needs to be protected.

4.5 Addressing disparities:

Oral cancer has now become a greater threat because it is affecting people who belong to the lower socio-economic strata. They have very limited access to education, prevention and treatment. This segment of the population is more vulnerable to oral cancer because of higher exposure to the risk factor (tobacco) which complicates the situation further. This shows the glaring disparities that would result in oral cancer statistics. In order to bridge these disparities, SAOCF will direct its action towards:

1. Provision of easy and accessible, detection and treatment services.
2. Awareness and education programmes.
3. Prevention through action against risk factors, especially tobacco.
4. Provision of educational resources to both the professionals and public.

4.6 Professional workforce:

1. Adequately trained professionals are the lifeblood of education, practice and research. Researchers, educators, and practitioners should reflect the diversity of the oral cancer challenge in the region and thus have a broad mix of skills.

2. There is a variation in the oral cancer distribution across the region and its diverse communities. However, the research and professional dental workforce does not adequately represent the composition and the diversity of the country.

3. Data show that under-represented minority dentists play a large role in increasing access to underserve and minority populations. They can influence other health professionals to be more culturally sensitive, and serve as role models to other minorities and to would-be educators or researchers.

4. To achieve proper coverage in the rural areas, all trained dental health professionals after completion of their course have to do a 1 year compulsory work posting in rural areas, which will be paid according to the government regulations.

5. In terms of diversity, the magnitude of the challenge is perhaps best expressed by looking at the “pipeline”, or the number of under-represented minority dentists and students in the dental schools.

6. Sustained efforts, new partnerships, and innovative and flexible programmes are needed to ensure a competent, diverse and robust research workforce.

7. There is thus a need for a diverse and equal distribution of personnel to face the challenge.

4.7 Strengthening the research base:

1. Strong research-oriented academic environments are needed to develop the intellectual talent for research, and to enable existing investigators to acquire and expand their skills in new areas of science.

2. Oral health research can be carried out in a number of settings including dental schools, different components of academic health centres, hospitals and independent research institutions.

3. The capacity of dental schools to conduct research and to serve as training grounds for future researchers is important for the future of clinical and applied oral health research.

4. However, major barriers must be overcome. These include a critical shortage of faculty, a lack of integration between the basic and clinical sciences in pre-doctoral programs, inadequate incorporation of research into the dental curriculum, and financial shortfalls.

5. Efforts to bolster the research infrastructure to ensure a workforce that is adequate both in numbers and ability, is needed to meet the demands of the changing oral health needs of the community.
4.8 Creation of a platform for united efforts:

1. Creation of a platform that allows activities and inputs from professionals from diverse backgrounds is essential for compilation and maximization of efforts and outcomes.
2. It is vital to set-up a dynamic platform and undertake multilateral and inclusive research for compiling a tangible evidence base, which can ultimately benefit the common man.
3. Utilizing the different modes of media and communication to translate research into practical benefit.
4. Thus such a dynamic and inclusive platform would provide for activities as well as resultant benefits.

4.9 Creating media and public awareness:

1. As defined in Healthy People 2010, health communication "encompasses the study and use of communication strategies to inform and influence individual and community decisions to enhance health."
2. Based on the above definition, communication efforts are meant to ensure that target audiences become informed, change behaviour, and make decisions that will improve clinical care and health outcomes.
3. Target audiences include health care providers, consumers, the research community, and other groups such as educators, policymakers, industry, and the media.
4. One of the main challenges of our health communication efforts is to find the most effective ways to communicate and disseminate health information, clinical information and research findings, to target audiences.

4.10 Establishing and developing collaborations:

1. The changing needs of the region, have unfolded many challenges and possibilities that need to be taken into consideration. Thanks to this fact, the necessity to collaborate with the various channels of technical expertise cannot be overlooked or underestimated. Thus for developing the collaborations network SAOCF has set up the following Goals
2. Establishing communications with key stake holders and informing them at the right time about our various initiatives and developments. Communication of this nature will not get SAOCF the recognition of being one among various professional bodies. The recognition and acknowledgement of our work is the key to the diversification of our vision and goal.
3. In course of our efforts for establishing our identity and gaining recognition as one among various professional and scientific bodies, SAOCF will do its level best to contribute to various disciplines through our knowledge base and built capacity.
4. The association that we seek with the various professional and scientific bodies would be bilateral. Through our activities and investments in various disciplines, we will also attract interest and investments from these disciplines in SAOCF.
5. This nature of association will result in multi-lateral benefits and development.

4.11 Creating and upgrading tangible evidence base:

1. The provisions that are made on the SAOCF website provide an excellent resource for creation of a tangible data base. To make the facility more effective, we have set the following goals.
2. The provisions available through the website should be made suitable for use; this will be the first target of the preliminary stage. To achieve this task, we will provide training to professionals for using the provision. Also, we aim to make the modules for the people easy and self explanatory.
3. Unless these two are not implemented together, the utilization will be restricted to net savvy people in metros and large cities.
4. A thorough training of importance and utilization of the SAOCF provisions is vital. It should be done at the right time and in the right way.
5. There have been efforts right from the time of preliminary development of the website that provisions of the initial questionnaires that are asked to the patients record accurate data; similarly, throughout the patient dentist interaction, the data quality is maintained.
6. Once the initial modules are implemented, quality improvement of the questionnaire will begin, based on response to the first stage.
7. Creation of a large evidence base needs a good deal of documentation. The process will not be complete, unless the data collected is sorted and analyzed.
8. Efforts will be made to put the data in the correct pockets. The database thus generated will be more practical and helpful.

9. A well-managed and tangible evidence base creation needs efforts from the preliminary stages itself.

5. Experience with technical and policy solutions

Non communicable diseases such as cancer are emerging as the main challenge and major public health problems in India. These diseases are mostly lifestyle related and have a long latent period and need special infrastructure and personals and human resources for managing it. Population based registries within the National Cancer Registry programme and outside the network has provided a picture of the patterns of cancer in India, though it does not represent all areas in India but only some parts of it as shown in the Figure 6. The number of new cancers in India annually is presented in table 5.

Following are the different type of interventions which can be applied in reduction and cure of oral cancer in South Asia.

5.1.1 Primary prevention

Primary prevention eliminates exposure to the risk factors or cancer causing agents. Primary prevention for the type of cancers that are of greatest concern in developing countries is immunization against the causative agents and treating infectious agents, implementing dietary interventions, introducing tobacco control programmers, reducing excessive alcohol consumption and using chemoprophylaxis. Oral Submucous Fibrosis (OSF) is a condition which is debilitating and potentially cancerous is caused primarily by chewing areca nuts and its mixtures as demonstrated by numerous studies and other evidences (Murti et al., 1995). The condition may extend sometimes beyond mouth to oesophagus (Misra et al., 1998). The high malignant potential of OSF is well established (Murti et al., 1985). As smoking is one of the main causes of oral cancer so primary prevention is one of the best interventions to reduce the risk of oral cancers by minimizing the use of tobacco.

5.1.2 Cost effectiveness of primary prevention

The cost effectiveness studies of primary preventive intervention are relatively rare and are mostly available in high income countries. For example studies in the United Kingdom (UK) and United States of America (USA) shows that the costs of treating and screening of an individual for helicobacter pylori infection to reduce the risk of stomach cancer ranges from US$ 25,000 to US$ 50,000 per life year saved but another study showed that the cost effectiveness of the intervention would be more in Columbia where the cost of health care interventions are less and stomach cancers are common. In a study on costs of tobacco related cancers for the ICMR (Tata Memorial center, Mumbai, India), the direct and medical and non medical costs like travelling and indirect costs, like loss of income during treatment and premature death were assessed in a cohort of 195 oral cancer patients for three years from 1990. The average total costs per cancer patient, discounted at the 1999 level amounted to be about 350,000 Indian rupees with direct costs amounting to 13% of total costs. The costs of 163 500 total tobacco related cancers diagnosed in India in 1999 as estimated for this study amounted to be about Rs. 57,225 billion (ICMR, 2001). Apart from financial costs tobacco users have a higher risk of premature death as compared to nonusers. In a retrospective study conducted in Chennai (India), the relative risk of death in men who were smokers was 2.1 (Gajalakshmi and Peto, 2002). Thus anti-tobacco intervention is one of the most cost-effective and beneficial intervention to prevent cancer and cancer related deaths besides many other diseases. In fact many longitudinal studies have shown that the risk of lung cancer decreases slowly after quitting smoking till it reaches to the level of nonsmokers after 10 years of quitting (IARC, 1986).

5.1.3 Community interventions

A large controlled educational intervention trial in three states of India with ten years of annual follow up was conducted during 1967-88. Messages imparted through personnel communication were reinforced by documentaries, slides, posters, exhibitions, folk dramas, radio messages and newspapers articles (Gupta et al. 1986a). The educational intervention was significantly effective in decreasing the use of tobacco and increased the quitting rate of smoking in two areas (Ernakulum, Kerala and Srikakulam, Andhra Pradesh), assessed after five and ten years of follow up (9% and
14.3% in Ernakulam and 17% and 18.3 in Srikakulam). This resulted in the substantial reduction in the incidence of Leukoplakia, a precancerous lesion to only 40-60% of the incidence rate in the intervention area with smoking having higher level of reduction than the chewing group (Gupta et al, 1992). Within the intervention area the incidence of oral lesions was less in those who gave up smoking habit (Gupta et al, 1995). These results underscore the great potential for primary prevention of oral lesions and cancers through anti-tobacco interventions and cessation of tobacco use. In a similar intervention study conducted in Sri Lanka, the quit rates after 5 years of intervention in men and women respectively were 26.5% and 36.7% compared to 1.1% and 1.5% in a control cohort (Anantha et al, 1995).

5.1.4 Mass media intervention

Media plays a very important role nowadays so if effectively used it can be of significant use to mobilize the mass and create awareness among the general public about the risks of smoking and its hazards. Newspapers, Television, radio and internet all can be used for this purpose for conveying the message to the general public. In 1990, information about the hazards of tobacco were broadcasted on All India Radio (the only radio medium at that time), through 30 Sunday morning episodes in 16 languages from 84 stations. Community surveys in two states showed about 30% listenership among the potential audience in both states where in Karnataka about 6% of the listeners reported to have quit smoking and 4.3% in Goa. In addition about one third of tobacco users intended to quit and another third had reduced their consumption and intended to quit as well (Chaudhary, 1994). This clearly states that radio communication had potential benefits even during 1990s where the way of communication was less and media was not as developed as today as most of the people today have access to some sort of communicatory media either internet or radio or Television or newspapers. Besides radio and television, newspapers can also be used to convey anti-tobacco message through articles on smoking hazards and different cartoons to reflect its hazards and to encourage the public to avoid tobacco use.

5.1.5 Sufficient evidence for long term oral cancer risk reduction for the South Asian region

All the above efforts points to the utility of scaling up similar educational efforts through incorporating them into routine regional government’s health programmes and mass communication and to add anti-tobacco education in schools curriculum. Besides this there should be made voluntary organizations and these organizations can also play a role in educating the people about smoking and tobacco hazards and thus they can make a difference as well.

5.1.6 Secondary prevention

Secondary prevention consists of screening programmes to detect and treat precursors of oral cancer thus preventing or reducing the incidence of highly invasive cancers. Effective screening can detect invasive cancers very early and thus improve the likelihood that treatment will be successful. The cost effectiveness of secondary prevention depends on many factors including the costs of diagnostic tests, the prevalence of disease and the availability of effective treatments.

5.1.7 Cost effectiveness of secondary prevention


5.1.8 Medical interventions

Medical interventions include surgical removal of the tumors, chemotherapy and radiation. As compared to oral cancer treatment cost effectiveness, the cost effectiveness of treatment for stomach and esophageal cancers are worse and ranges from US$ 53,000 to US$ 163,000 per year of life saved. In general the standard of treatment in developing countries is less well organized and not available to everybody due to its costs as compared to developed countries. The preventive interventions are also different in developing and developed countries with better preventive interventions in developed countries. The availability of cost effective methods of prevention and treatment for cancers in low and middle income countries varies significantly depending on the type of
cancer, with a substantial effects on the equity of the outcomes.

5.2 Programmatic approach and structural challenges

As smoking is one of the major causes and risk factors for oral cancer in South Asia so the South Asian governments i.e. Pakistan, India, Bangladesh, Sri Lanka, Nepal, Maldives and Jammu and Kashmir have all launched different awareness programmers at different levels to discourage smoking and create awareness among people to avoid smoking and develop clean habits. These programmes range from advertisements on Television, Radios and newspapers to work shops and posters preparation and organizing rallies and seminars in different places and institutions about smoking and its adverse effects on health and as a possible risk factor not only for oral cancer but also lung cancer,oesophageal cancer and other cancers. In few Indian and few states of Nepal shopkeepers are informed not to sell cigarettes to youngsters below 16 years of age but these is no legislation passed about it yet in any of these countries. The basic problem in this part of the world is that most people are illiterate and they do not have access to Television and radios so they don’t get the proper awareness about it. The problem in the educated population is that they are although aware of the effects of it but they either use it as a fashion or to relieve stress. Both in India and Pakistan, there is ban on smoking in public places but rarely seen to be followed or obeyed by people and there is less action from the government or legislative authorities against those who disobey or violate the roles. There are programmes about adverse effects of smoking on Television but as most of these cigarette companies are international companies so they get the state television and other private channels easily hired for publicity of their cigarettes and other tobaccos. There needs to be strict legislation against smoking from these regional governments and those who do not abide by the law should be punished. Smoking advertisements should be banned on television and radios and strong anti smoking campaigns should be launched. More awareness needs to be created amongst the public about smoking hazards and smoking should be strictly banned in all public places and those found guilty of disobeying the law should be fined. Besides antismoking campaign more is needed to be done in creating awareness among the general population about regular use of brush and tooth paste, use of less Paans (chewable form of tobacco in the subcontinent) and discourage the use of Alcohol.

5.3 Tobacco cessation clinics

Although informal tobacco cessation clinics have been in use in Pakistan, India, Sri Lanka and Bangladesh for longtime but no evaluation reports are available from any of these countries. The recent of availability of nicotine replacement therapy in the shape of nicotine patches and Buproprion has prompted several health facilities to set up tobacco cessation clinics for people who want to quit smoking but cannot do it on their own. These clinics are mostly funded by the regional governments and some of them are also working in private sector and these clinics employ pharmacologic therapy in addition to behavioural therapy which may include different strategies ranging from telephone calls, individual counselling, rational emotive therapy and yoga with pranayam which has shown encouraging results (Shastri, et al, 2003).

5.4 Economic interventions

Economic analysis by several agencies has shown that tobacco is a net drain on an economy. Demand side interventions such as advertising and promotion bans, smoking restrictions as well as increase in price through taxation are all effective at reducing tobacco related oral cancers, mortality and morbidity. Measures to reduce the supply of tobacco in these countries have been met with less success except in control of smuggling to some extent but nevertheless aids given to farmers in some parts of these countries have seen a shift amongst the farmers from tobacco cultivation to other crops cultivation and thus further steps must be taken to encourage the farmers to cultivate other crops instead of tobacco. The farmers should be given special aid for this as once suggested by World Bank as well in 1999 (World Bank, 1999). Research carried out in Indian state of Karnataka has shown the willingness of framers to shift from tobacco cultivation to other crops like dairying and cotton crops if given some aid and assistance by the government (Panchamukhi, 2002). Additionally phasing out government support to tobacco production and finding substitute crops for revenue generation and export will aid in the transition to a tobacco free society.

5.5 Political approaches and structural challenges
The South Asian governments are taking steps on individual levels to counter the risk of oral cancer and smoking but not much on regional level and together. These include more taxes on tobaccos imports, decreasing the subsidies for tobaccos and increasing the cost of cigarettes so that people can be discouraged from smoking. As south Asia and Pacific accounts for the highest smoking related deaths in the world about 40%. Men are common smokers in this part of the world and females are rare smokers in this region whereas this gap is narrow in high income countries mainly Europe and America. About 1.1 billion people smoke currently and about four- fifths of these are residing in the low and middle income countries. Nearly all the South Asian governments are implementing more taxes on cigarettes and tobacco to raise the cost of the habit and discourage smoking this way. Only educating consumers that tobacco or smoking is injurious to health is not sufficient as mostly the people underestimate the future risk to their health and young people are more prone to develop and adopt to risky behaviors and life styles. Although most of these countries have done some sort of legislation to ban smoking in public places, implement high taxes on tobacco but more efforts are needed and more steps should be taken be these regional governments. Intervention proven effects can be to increase the taxes on tobacco, disseminating information about health risks in the general public, restricting smoking in public places, banning advertising and increasing access to therapies. Some governments in the developing countries are using the tobacco tax even for health care purposes.

Government interventions that could affect people’s attitudes towards smoking and knowledge about the hazards of smoking can also be very helpful. As cigarettes are the most widely publicized products in the world so strong anti smoking campaign in the public alongwith education and information campaigns can counter this hazardous effect of smoking. These governments can also publicize reports about smoking hazards through health ministry and directing all the smoking manufacturer companies to put warning labels on packages, broadcasting antismoking messages in the media.

The governments can also provide nicotine replacement tablets at low costs to smokers so that they can quit the habit of smoking. The challenge here is that most of these governments take money from these companies while issuing licenses before launching their products and also take financial aid from these companies during their election campaigns. These tobacco manufacturers also provide money to media to promote their products and advertise their tobacco products. Fortunately most demand side interventions are cost effective and even cost saving as well. A 70 % increase in the price of tobacco could avert 10- 26 % of all smoking related deaths worldwide. Successful interventions in Poland and South Africa went well even with the modest increase in price, almost doubling the prices over short time (DCP2, Chapter 8; Levine and others 2004). Despite the price increase being the most cost effective measure to counter tobacco consumption, this public health measure is grossly underutilized. Indeed when adjusted for purchasing power, the price of tobacco products actually fell in the South Asian region between 1990 and 2000.

There should be fewer taxes on the daily use material for hygiene. More awareness should be created among the general public about daily brushing the teeth twice, less alcohol consumption, in case of any oral trauma inspection of the wound in oral region by a surgeon or physician and to avoid use of hot food or drinks for longer time.

5.6 Legislation

In the South Asian region, Pakistan, India and Nepal alongwith Sri Lanka, health researchers, lawyers, NGO,s, health care providers alongwith others have jointly proposed more stringent actions to curb the use of tobacco and have called on the governments of their countries to make more comprehensive legislation on advertisement, sale and use of tobacco. India also passed a bill through Lok Sabha on 30th April, 2003 addressing all types of tobacco products known as Bill, 2001. The bill prohibits advertising and sport sponsorship by tobacco companies although such legislation is not in place in Pakistan, Bangladesh, Nepal and Afghanistan. Afghanistan is the world leading opium producer currently and efforts are under way by the international community to halt the opium trade somehow. The bill also prohibits smoking in public places to protect nonsmokers especially children from environmental smoke. It has put a ban on selling of tobacco to persons below 18 years of age and within 100 meters of educational institutions, government and semi-government offices. Clear health warnings are made mandatory on all packages in local languages and in English, alongwith tar and nicotine content, to inform the public about the risk of the using the product (Gupta, 2001). This bill is awaiting presidential approval in India and the next
5.7 Global strategy

In May, 1999, the World Health Assembly which is governing body of the World Health Organization passed a legislation called Framework Convention on Tobacco Control (FCTC) that could address cross country issues like advertising and promotion, agricultural diversification, smuggling, taxes and subsidies (WHO, 2000, Chaudhary, 2000). About 160 members of the United Nation have participated in these negotiations and this convention was adopted by World Health Assembly in 2003. This treaty has been ratified by most members of the United Nation and it has paved the way for strong and effective control of tobacco use and advertisement at nation as well as international level.

5.8 Reasons for current lack of activity or ineffective legislation and implementation in South Asian countries

There are multiple factors which are causing obstacles in the effective tobacco control policy implementation at both national and regional level. At regional level there is lack of trust between the member states of South Asian region and their border disputes. At national levels, corruption in politics involving politicians accepting money as bribes from the tobacco companies so they are not sincere in tackling this problem in most of these countries. Another problem at the public level is lack of awareness and social support for those people who want to quit smoking but can’t do it due to lack of tobacco cessation clinics and other facilities.

6. Conclusion

Indian Subcontinent is a region which is highly affected with lots of diseases including oral cancer. Many of steps have to be taken to improve the current situation. This is just an initiative in that direction. Much is still needed to be done at both the regional level and national level in all these countries. There is also a greater need for more efficient steps to be taken by all these countries to create awareness among the general public, provide aid to farmers to cultivate other crops and to provide health care access and facilities to the general public, effective screening programmes to detect cancers at early stages and thus making the treatment possible and cheaper. There is also a great need at the regional level between these countries to work with one another to counter this problem and thus decrease the incidence of oral cancer as its incidence is one of the highest in this region as compared to the rest of the world.

References:

Illustrations

Illustration 1

An Overview of Oral Cancer in Indian Subcontinent and Recommendations to decrease its incidence.

Dr Zahid Ullah Khan

2012
Illustration 2

The scenario for oral cancer in Indian Subcontinent
Illustration 3

Table 01

Table 1-Numbers of South Asian Registries in the series of nine volumes of CIV

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Illustration 4

Figure 01

Figure 2- A Cancer Journal for Clinician (http://caonline.amcancersoc.org/misc/about.shtml).
Illustration 5

Figure 02

Figure 2- A Cancer Journal for Clinician (http://caonline.amcancersoc.org/misc/about.shtml).
Illustration 6

Table

### Table 2: Age-standardized Cancer Incidence Data for South Asian Countries - Males

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<th>Country</th>
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<th>Mumbai*</th>
<th>Nagpur**</th>
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### Table 3: Population-based Cancer Registry Data for Pakistan and India - Females

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<th>Country</th>
<th>Karachi*</th>
<th>Lahore*</th>
<th>Quetta**</th>
<th>Chennai*</th>
<th>Mumbai*</th>
<th>Nagpur**</th>
<th>Trivandrum*</th>
<th>Kolkata**</th>
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<td>103</td>
<td>101</td>
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</tr>
</tbody>
</table>

Illustration 7

Table 5

Table 5. Number of new cases of Cancer per Annum in India. (National Center Registry Programme in India, ICMR & National Cancer Institute (http://www.cancer.gov/cancertopics/types/head-and-neck).
Figure 3- Percentage data for the five most prevalent cancers in countries of South Asia (Globocan 2002) (Asian Pacific Journal of Cancer Prevention, Vol 10, Asian Epidemiology Supplement, 2009).
Illustration 9

Figure 06

Figure 6. Commonest Cancers in Indian males and females in different regions of India.
Illustration 10

Figure 4

Figure 4. Male Mouth Cancer Incidence /100,000 over time (Waterhouse et al., 1982; Muir et al., 1987; Parkin et al., 1992, 1997, 2002, Curado et al., 2007).
Illustration 11

Figure 05

Figure 5. Male Tongue Cancer Incidence /100,000 over time (Waterhouse et al., 1982; Muir et al., 1987; Parkin et al., 1992, 1997, 2002, Curado et al., 2007).
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