

Epidemiology of Oral Cancer in Pakistan

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Abstract

Oral carcinoma is one of the most frequently reported form of cancer in Pakistan. In time oncogenic prognosis facilities are still available in various regions countrywide. Provincial comparison indicates that more than 67% cases of oral squamous cancer are reported from Punjab whereas ratio in KPK is also high than Sindh and Baluchistan. The prevalence of this growing ailment can be minimized only by collaborative efforts of both government and general public regarding awareness of oral hygiene, causes of oral and esophageal carcinogenesis, early symptoms of this disease and its management.

Keywords: Oral carcinoma; oncogenic prognosis; oral squamous cancer; oral hygiene; esophageal carcinogenesis.

1. Introduction

Globally, oral cancer is included in top ten most malignant issues. But in Southeast Asia, it is considered among the most common types of cancers because huge percentage of people are habitual for betel quid chewing, smoking, and alcohol consumption [1,4,5]. Other factors which make this type of malignancy common, are delayed diagnosis, rapid death, and sickness frequencies. That's why; round the globe researchers are trying to focus on not only causes and effects of various oral carcinomas but also their effective cure. In this regard, the trends are shifting as raising recovery than morality rates. Similarly, review of published epidemiological data indicates that oral cancer more frequently occurs in women and youngsters [2,3] but specifically in Asian countries, males are predominant sufferers of this type of cancer than females [14].

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These epidemiological investigations are required for better handling, cure, and control of oral cancer because such data help policy makers in overall effective and programmed management, prevention, and control of disease under discussion here. These epidemiologic surveys also highlight the areas and regional variation in occurrence of oral cancer. The socioeconomically poor persons are more prone to oral cancer risk, mainly due to lack of awareness and preventive resources [2]. Squamous cell carcinomas are the most common among the oral malignancies [3]. Similarly, according to GLOBOCAN, lip and oral cavity cancer is the 12th most common cancer among Asian countries [6,8] like Bangladesh, India, Pakistan and Sri Lanka, where 75% of reported carcinomas are related to oral cavity. Furthermore, 90% of these reported oral cancer cases result due to consumption of tobacco in diverse forms [7]. According to this repository, Pakistan is at the second highest ASIR of lip and oral cancer and is mostly reported among males [6]. This most reported squamous cell carcinoma which is type of oral cancer, initiates from the oral epithelial mucosa and results in long term malignant oral ulcers which gradually become visible. Its major risk factors are tobacco and betel nut chewing, tobacco smoking and alcohol consumption are the major risk factors [14].

2. Causes of oral cancer

The frequently reported and leading causes of oral cancer (Table.1 and Table. 2) are as follows:

Table 1: Causative agents of oral carcinoma

Carcinogens of Oral esophageal tract	Forms of consumption	Severity level	Reference(s)
Cigar	Smoking	Cancers of oral cavity, pharynx, larynx, and esophagus due to altered enzymatic metabolism.	16,17,18,19,20, 53,54,55
Marijuana	Smoking	Oral cancer	19,20
Cigarette	Smoking	Oral squamous cell carcinoma	56
Shisha or Hookah or water pipe	Smoking	Inflammation, esophageal and oral cancer	57, 58, 59
Naswar (unsmoked tobacco)	Chewing & Oral snuff	Intense damage to oral mucous membranes, Oral cancer	21, 63
Betel quid	Chewing	Leukoplakia, erythroplakia, oral submucous fibrosis and oral cancer	22, 23
Alcohol	Oral intake	Oral especially salivary gland tumors, pharynx, larynx, esophagus, and liver, oral epithelial dysplasia, epithelial atrophy, altered enzymatic activity in oral mucosa and suppressed immune system	24, 25, 26,27, 28, 29, 30
Gutkka	Chewing	Oral cancer	65
Pan masala	Chewing	Oral submucous fibrosis and oral cancer and mainly carcinogenesis of salivary gland	66, 67, 68, 69, 70
Mate	Oral intake	oral carcinogenicity	38
Mouthwash	Oral intake	Alcohol based product so develops oral and pharyngeal cancers	30

Table 2: Other oncogenic factors of oral cancer

Factors		Oncogenic outcomes	Reference(s)
Environmental Factors	Viral infections	Induction of malignant tumors of oral squamous epithelium, leukoplakia and salivary gland carcinoma by many viral strains like EBV, HPV and Herpes	14, 39-43
	Diet and nutrition	Oral and pharyngeal cancers due to processed food items	31, 32
	Bacterial infections	<i>Dialister</i> , <i>Peptostreptococcus</i> , <i>Filifactor</i> , <i>Peptococcus</i> , <i>Catonella</i> and <i>Parvimonas</i> , <i>Porphyromonas gingivalis</i> and <i>Fusobacterium nucleatum</i> have been reported to induce oral malignancy	76, 77
	Fungal infections	<i>Candida</i> species because nodular leukoplakia may develop malignant tumors	44
	Immunosuppressors	Lip and oral cancers have been reported in HIV patients and chain smokers	45
	Occupational risks	Salivary glands, lip, posterior mouth, pharynx, and larynx cancers are caused by excessive solar radiation, sulfur dioxide, asbestos, pesticide exposures, and mist produced during rubber products production, exposure of metals via plumbing, from wood working in an automobile industry due to strong inorganic acids exposure and burning of fossil fuels	47, 49, 50
	Dental problems	Carelessness regarding dental care and overall poor oral hygiene may induce oral cancer	33, 48
	Heavy metals exposure	Chronic exposure may cause oral carcinogenesis	74, 75
Genetic Factors		Dysregulation in gene expression pattern e.g., enzymatic malfunction of tobacco carcinogen metabolism may result in oral and upper aerodigestive track carcinomas	15, 51, 52

3. Gender and age group

The reported data of last two decades indicates that females are suffering more than males [3,12,73]. Currently, it is prevailing more in youngsters than aged ones [13].

4. Ethnic variations

Ethnic variations definitely exist as oral cancer is the second most common type of carcinoma in females of Pakistan whereas in India is the most common form of cancer. Whereas Western Africa, Eastern Asia and North African present low incidences regarding this. The mortality rate of oral cancer was higher in male than in female till recent past but now trend is changing [78].

5. Survival and Mortality

Estimation of WHO indicates that 10.3 million persons die due to cancer currently [9]. In past 5 years survival rate of oral cancer patients is around 50% and so far, no improvement has been noticed in this ratio [10,11]. But

when we consider Asian countries, among them, South Central Asia has reported yet, the highest age standardized mortality rate of 3.0. Because the diagnosis of oral cancer becomes difficult as the disease advances. Moreover, data related to women show comparatively higher survival rates than men, in cancer of tongue and oral cavity [3].

6. Frequency in Pakistan

Being the most common cancer around the world, approximately its 300,000 cases are reported per annum [60]. Sadly, according to the recent global data, oral cancer is prevailing at the highest in Pakistan [61]. Prevalence of oral cancer is comparatively higher in males than females, in Pakistan [60]. Just like other countries, in Pakistan also diverse risk factors of oral cancer are present e.g., diet, alcohol, tobacco use, infections, genetic and environmental factors. Reported data indicates that even among these, tobacco smoking and alcohol consumption are considered as universal causal factors [62]. Following is a graphical presentation of oral cancer frequency in Pakistan in different provinces [Figure 1].

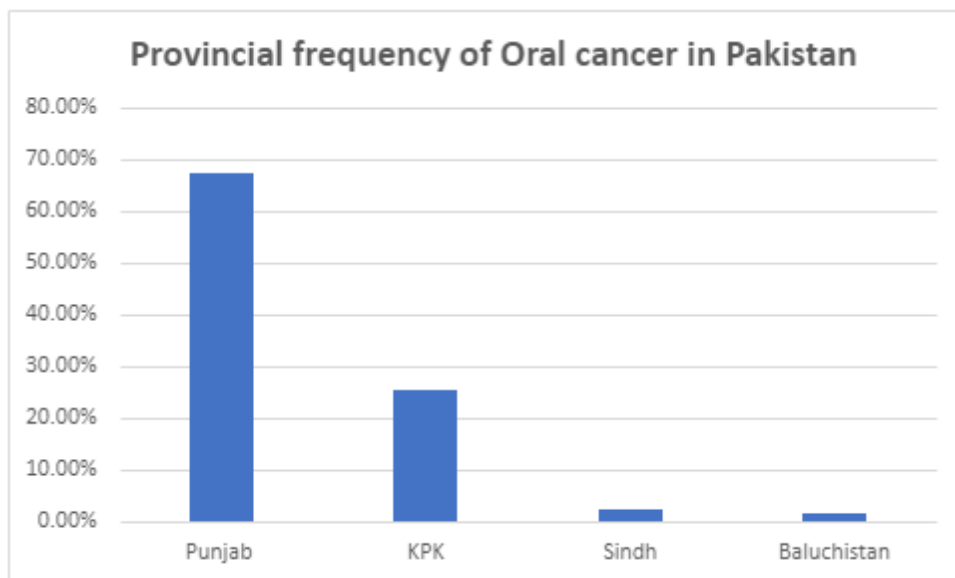


Figure 1: Epidemiological view of oral cancer in Pakistan at provincial level [81]

7. Psychological background

Oral cancer is not only globally prevailing but also results in significant mortality and morbidity rates due to its improper diagnosis and poor survival rate. That's why; patients usually develop psychological issues which should also be properly addressed. The quality of sufferers' life decline and they are often found facing emotional distress and social ignorance. In short, along with this disease treatment, psychological counselling is also important to improve the chances of survival [79,80].

8. Control and preventive measures

- According to the investigational reports of International Agency for Research on Cancer (IARC), low

intake of fruits and vegetables mainly of carrots, fresh tomatoes, and green peppers minimizes risk of oral carcinogenesis. Other effective dietary sources include fish, bread, cereals, legumes, protein, fat, fresh meat, chicken, liver, shrimp, lobster, fiber, vegetable based and olive oil [31].

- To reduce the prevalence of oral carcinomas, the consumption of processed meats, cakes, desserts, butter, eggs, soups, red meat, salted meat, cheese, pulses, polenta, pasta, rice, millet, and corn bread should be avoided [32].
- Moreover reported data highlights that macronutrients (proteins, carbohydrates, fat, and cholesterol) and micronutrients (vitamins like vitamin A (retinol), C (AA), and E (α -tocopherol); carotenoids (β -carotene); potassium; and selenium and their analogs (13-*cis* retinoic acid and β -D-glucopyranosyl ascorbic acid (AA)) and trace elements) which are frequently found in common dietary items play anticarcinogenic role [38–43].
- Important antioxidants e.g., β -carotene, retinol, retinoids, vitamin C (AA), and vitamin E (α -tocopherol) are essential in reducing free radical reactions that may ultimately result in DNA mutations, enzymatic activity changes, and lipid peroxidation of plasma membranes [20,31,33-35,37].
- Similarly, in various experimental trails vitamin E has been found as antitumor in nature, especially to control oral carcinogenesis [35].
- AA, an antioxidant, acts as a chemopreventive agent by declining nitrosation and thus inhibits the formation of nitrosamines. Moreover, it also improves the efficacy of cytochrome P450, leukocytes and macrophages and results in inactivation of leading carcinogens and of procarcinogens related to oral cancer [36].

9. Conclusion

It can be concluded that general awareness regarding oral cancer is still much less, significantly in rural areas of third world countries like Pakistan and there is a need to devise general awareness based public health program along with active screening for risk estimation in rural and remote areas' population [71]. Because oral cancer is becoming a leading and current public health problem in underdeveloped countries [72].

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