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A Rampant Increase in Oral Cancer Trends in Pakistan during the Period 2010 to 2016

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ABSTRACT

Oral cancer is widely spreading throughout Asia. This study focused on the prevalence of oral cancer in Pakistan from 2010 to 2016. Data for oral cancer cases was collected from the country's numerous cancer registries and cancer treatment facilities. Age and gender factors were analyzed in the data. For the given time, prevalence, incidence, and rate of age-standardized illness were determined. Data analysis indicated that oral cancer prevalence in Pakistan is increasing year after year, with the growth being particularly pronounced in the country's male population. From 2010 to 2016, the overall prevalence was 0.1 percent. The most common age of diagnosis for oral cancer was 45-65 years, and the standardized cancer incidence rate was 633.411 i.e. 8/1000000 with a confidence interval of 95%. The study concluded that oral cancer is significantly increasing in Pakistan, and there is a dire need to address this problem. In addition, we recommend the development of an appropriate nationwide system of cancer registry.

Keywords: Pakistan, Oral Cancer, Incidence, Prevalence, Age-Standardized rate

INTRODUCTION

Cells are stimulated by intracellular or extracellular signals that determine whether they will proliferate or not. In the case of cancer, cells receive the continuous signaling, which cause uncontrolled proliferation. This continued proliferation can be fatal and abnormal cells can reach other body parts through metastasis (Hejmadi, 2009). Cancer has become the main cause of mortality worldwide (Ma & Yu, 2006). Exposure to Solar radiation, x rays, rays from radioactive substances, smoking, poorly fried and cooked food, sedentary lifestyle, lack of exercise, and newly emerging viruses that cause DNA break-down and reproductive abnormalities are all factors that contribute to the spread of this disease (Torre et al., 2015). In Asia, over 2 million people died from cancer in 2000 and it is estimated that 7.1 million new cases will appear by the year 2020 (Yoo 2010; Park et al., 2008).

Cancers of the oral cavity and oropharyngeal space are referred to as oropharyngeal cancers (OPCs). 89% of OPCs are squamous cell carcinomas (Brandizzi et al., 2008; Devita et al., 2011) while others are salivary gland tumours, lymphoma, and sarcomas. Risk factors for OPCs include age, BMI, nutrition, HPV infection, poor dental hygiene, tobacco, betel, quid chewing, smoking, alcohol, and micronutrient deficiency (Kumar et al., 2016).

The worldwide prevalence of oral and lip cancer is well documented by GLOBOCAN (Sung et al., 2020) and according to WHO reports (Ghantous & Abu, 2017) it is the 11th most common cancer worldwide. However, the situation is more adverse in India where it is found to be 3rd among the most prevalent cancers (Sahoo et al., 2013). In 2014, the cancer country profile published by WHO showed that oral and lip cancer is the main cause of deaths due to cancer in Pakistani men (WHO 2014). The cancer report published by Shaukat Khanum Cancer and Memorial Hospital and Research Centre (a leading hospital facility in the country for cancer care) also demonstrated that they had a much larger influx of oral cancer patients (CRCDM 2017).

This grave issue is posing a higher load on the health monitoring and management system of the country and there is an urgent need to track illness aetiology trends to develop an effective prevention and treatment plan. Therefore, the goal of this research was to look at trends in oral and lip cancer prevalence in Pakistan from 2010 to 2016. The gender and age-specific incidences obtained in this study will help to deduce major causes and

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efficient interventions to reduce oral cancer in Pakistan and also future guidelines may be set for appropriate management to mitigate the incidence of this disease.

MATERIALS AND METHODS

Data Collection

Comprehensive information (clinical history) of all the individuals diagnosed with oral cancer during the period 2010 to 2016 were obtained from the institutes of nuclear medicine located in various cities, Punjab cancer registry, Karachi cancer registry, and Shaukat Khanum cancer registry in Lahore, Punjab, Pakistan. The cases, which were clinically diagnosed as oral and lip cancers by the pathologists, were included in the study. The data obtained for oral cancer patients from each source were documented in excel sheets and grouped according to gender, age, and locality.

Study Parameters

To analyze the data various parameters were set, such as age at the time of diagnosis, gender of the patient, and geographical region. Age-wise data was categorized into eight groups i.e. 0 – 15, 16 – 25, 26 – 54, 55 – 65, and 66 above. The geographical distribution of the cases was according to administrative units of the country i.e., Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, and Federal territory.

Data Analysis

The study was designed to provide accurate estimates of oral cancer prevalence in the Pakistani population according to gender and age. Crude, as well as age-standardized rates per 100,000 for the period 2010 to 2016 were generated with a confidence interval of 95%. The Pakistan Bureau of Statistics provided statistics on population estimates.

For the study period (2010–2016), prevalence estimates and incidence rates were calculated for the entire population as well as for each gender. The data were subjected to regression analysis with a 95% confidence interval.

RESULTS

Pakistan is a South Asian country spanning 881913 square kilometers and is the fifth most populous country in the world. The geographical distribution of study cases and other details are given in table I. Among all the reported cases most oral cancer cases were from the Sindh region followed by Khyber Pakhtunkhwa, Punjab, Balochistan and Federal areas.

Administrative Units	Population (2016 census)	Male %	Female %	Cancer cases distribution % (approx.)	Oral Cancer cases distribution % (approx.)
Punjab	110 M	50.9	49.1	54	28
Sindh	47.89 M	52.1	47.9	21	31
Khyber Pakhtunkhwa	30.52 M	50.7	49.3	18	29
Baluchistan	12.34 M	52.5	47.5	5	11
Federal areas	7 M	51.7	48.3	2	0.6

It was observed that the oral cancer cases are increasing in the country with time (fig. 1a). From 12150 cases in 2010, they increased each year and in 2016 the number of newly diagnosed cases reached 41225. The point prevalence percentage of oral cancer in the population calculated for each year in the study period is shown in fig. 1b. The regression analysis showed a linear relationship and the R2 value appeared to be 0.9708 and p-value < 0.001. The period prevalence was 0.1% from 2010 to 2016.

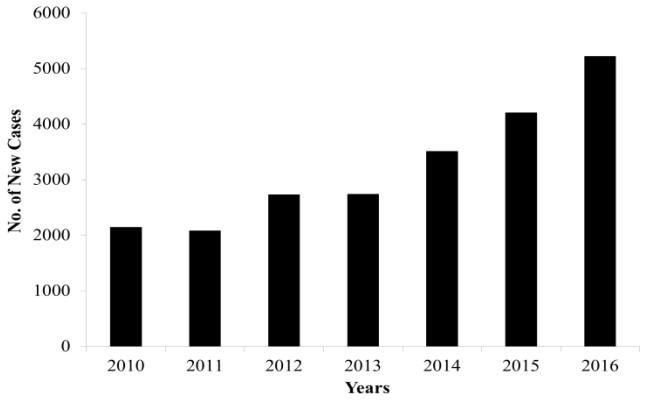
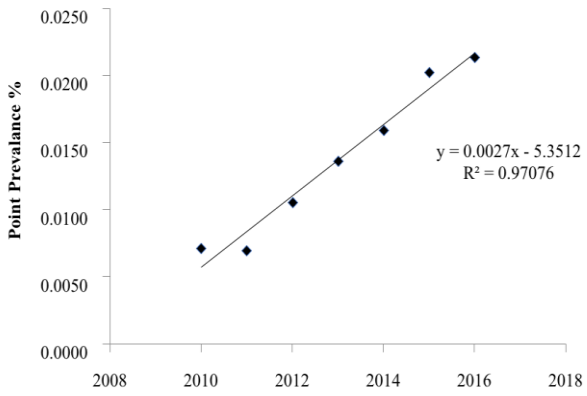


Fig. 1a: Number of newly reported cases of Oral cancer in Pakistan from 2010 to 2016



	Coefficients	Standard Error	P-value
Intercept	-5.351210978	0.416416421	> 0.001
Year	0.002665131	0.000206863	> 0.001

Fig. 1b: Prevalence percentage of Oral cancer in overall Pakistani population from 2010 to 2016

The data from the oral cancer cases showed that the disease is more common in males as compared to females. When the number of cases was analysed each year it was observed that females were less affected than males. However, there was a constant increase in number with each year in both the genders (fig. 2a). The incidence rate was determined for males, females and the overall population for the study period (fig. 2b) and the analysis showed that females were significantly less affected than males.

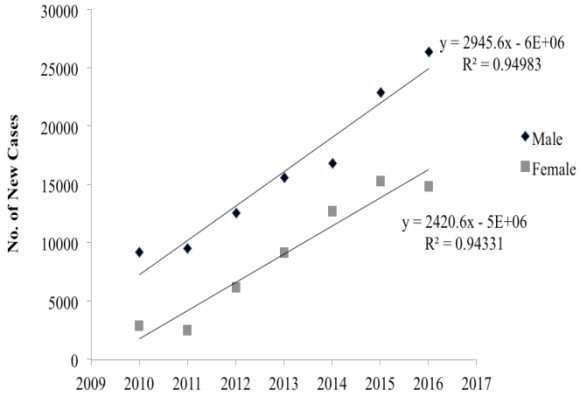


Fig. 2a: Gender wise distribution of new cases of oral cancer in each year of the study period

	Male			Female		
	Coefficients	Standard Error	P-value	Coefficients	Standard Error	P-value
Intercept	5913403.104	609442.7365	0.000197508	-4863619.432	534218.4405	> 0.001
Year	2945.630714	302.7533213	0.000194947	2420.619286	265.3840918	> 0.001

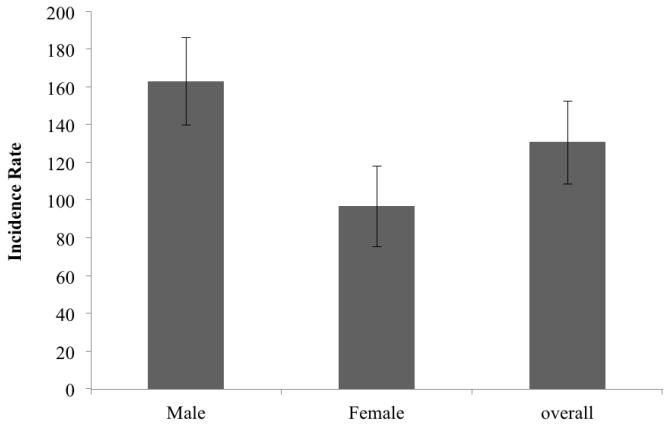
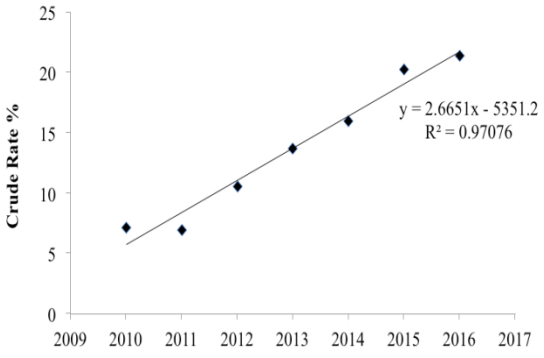


Fig. 2b: The incidence rate per 1 million of oral cancer among male, female and overall population is shown during the study period of 2010 to 2016

Age appeared to be an important factor for oral cancer prevalence and the number of new cases was found more with increasing age. Most patients, when diagnosed with oral cancer, were between 56 and above years of age. The crude prevalence rate per 100,000 members of the population (fig. 3a) showed a linear increase in each year ($P < 0.001$). The prevalence rate by age group i.e. age-specific rate (ASR) per million people and Age-standardized disease rate (ASDR) of Pakistani standard population according to the 2016 census are shown in fig. 3b. During the study period, the oral cancer rate of incidence was 633.4 ± 11.8 per 1 million population with 95% CI.



	Coefficients	Standard Error	P-value
Intercept	-5351.210978	416.4164215	> 0.001
Year	2.665130693	0.206863495	> 0.001

Fig. 3a: The crude prevalence rate of oral cancer per 100,000 population during the study period of 2010 to 2016

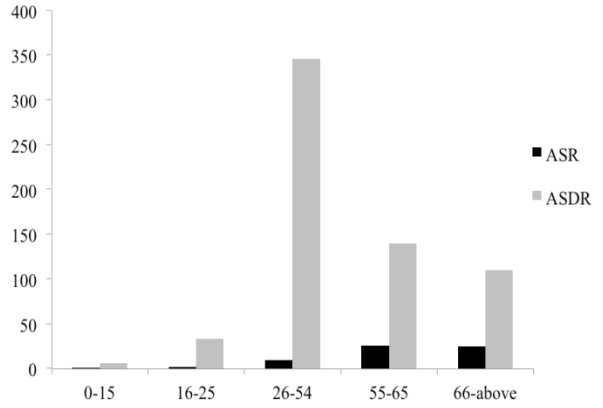


Fig. 3b: The Age-Specific Rate (ASR) of oral cancer prevalence per1M population and Age Standardised Disease Rate (ASDR) during the study period of 2010 to 2016

DISCUSSION

The findings of current research indicate that the cancer of the oral cavity is increasing at an alarming rate in Pakistan. Oral cancer is among the top ten malignancies reported in Asia. The condition is even poorer in countries like Bangladesh, Sri Lanka, Pakistan, and India where it is amongst the top three most prevalent cancers (Varshitha 2015; Shield et al., 2017). Various risk factors for cancer of the oral cavity include poor dental hygiene, human papillomavirus (HPV) infection, use of tobacco and alcohol, prolonged exposure to sun rays, poor nutrition and weakened immune system (Petti 2009).

In Pakistan, some studies were conducted in past where the prevalence of oral cancer was determined but these studies were confined to certain areas and some were not focusing exclusively on oral cancer (Bhurgri et al., 1998; Akram et al., 2003; Begum et al., 2011; Sarwar & Saqib, 2017). The present study indicated that the prevalence of oral cancer was 0.1 % in the Pakistani population in the studied time. The distribution of new oral cancer cases in different provinces (administrative units) showed that it is most frequent in Sindh followed by Khyber Pakhtunkhwa and Punjab. This high prevalence can be attributed to the extensive use of tobacco (both smoking and chewing), chronic use of quid (Naswar), Betal leaf having pieces of areca nut, calcium hydroxide, and other carcinogens (Pan). Furthermore, poor oral and dental hygiene is also a gigantic contributor to increased prevalence (Naseem 2013). Socioeconomic status and unavailability of health facilities do not allow a large proportion of the population to go for proper dental treatment and people visit fake doctors and detrimental health facilities (Malkani et al., 2021) This also leads to an increased incidence of oral cancer.

The prevalence of oral cancer during the studied period was constantly increasing and this increase was linear in both genders. However, the incidence rate was found to be more in males as compared to females during this time. Males are more likely to develop oral cancer than female members. It has been shown in various studies that males are at increased risk of developing oral cancer due to indulging more in activities like smoking, alcohol use, and HPV contact (Emslie et al., 2002; Vincke 2016). Similar reasons could be attributed in this case; as several studies have shown that men have a high tendency towards smoking than women in Pakistan (Ahmed et al., 2008; Alam 1998; Nasir & Rehan, 2001).

This study also demonstrated that the prevalence of oral cancer was higher in age groups of 56 and above during the study period. Another study in 2018 by Ajay and co-workers showed that oral cancer was found maximum in the 60-year population in India. The standardized disease incidence rate was approximately 633 cases per 1000000 standard population of Pakistan. This rate is quite high and Tyuri et al., 2017 ranked Pakistan 3rd among the Asian countries with the highest standardized incidence rate of oral cancer succeeded by the Maldives and Sri Lanka.

This study was aimed to gather data from all the possible sources available so that a conclusive statement about the accurate estimate of oral cancer burden in Pakistan could be made. But the absence of a national-level cancer registry system was a big hurdle. However, the data from various sources was carefully analyzed and it was made sure that no overstatement of facts was being made.

CONCLUSION

The present study provides comprehensive information about the oral cancer burden in Pakistan. An increase of 2.4 times has been found from 2010 to 2016. It is recommended that the health policymakers should take into consideration these trends while planning future strategies and also there should be a national cancer registry where all the cases should be reported. Such steps would ensure the appropriate and due attention for this serious issue of oral cancer in Pakistan.

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