Survival Rates Of Patients With Oral Cancer In Pakistan , Analysing The Related Risk Factors, Social Determinants, Preventive Measures And Treatment Modalities. A Retrospective Study

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ABSTRACT

Background : Oral cancer begins as a persistent growth or sore in the mouth. Oral cancer, which includes malignancies of the lips, tongue, cheeks, floor of mouth, hard and soft palates, and pharynx (throat), can be fatal if not detected and treated promptly. It is a significant public health issue globally, but there is a notable disparity in its prevalence. In 2018, an estimated 177,384 deaths and 354,864 new cases of lip and oral cavity cancers were reported, with Asia alone accounting for over 70% of the deaths. According to the research, males are twice as likely as women to acquire oral cancer, with men over the age of 50 having the highest risk. Smoking is one of several risk factors for developing mouth cancer.Cigarette, cigar, and pipe smokers are six times more likely than nonsmokers to get mouth cancer. Users of smokeless tobacco, such as dip, snuff, or chewing tobacco, are 50 times more likely to acquire cheek, gum, and lip cancer. In our country, paan, chalia, and gutka are the leading causes of monthly cancer. Oral malignancies are approximately six times more likely in drinkers than in nondrinkers. Human Papillomavirus (HPV) strains are etiologic risk factors for oropharyngeal squamous cell carcinoma. Socioeconomic status is another risk factor contributing to oral cancers in developing countries like Pakistan and India.

Objective: To know the Survival rates of patients with oral cancer in Pakistan , analysing the related risk factors, social determinants, preventive measures and treatment modalities

Method:.This is a retrospective, observational institutional based that was carried out at the oral and maxillofacial surgery JPMC Abbasi Shaheed Hospital Karachi 3 months after the approval of the synopsis.

Results:Oral cancers were studied separately in three groups: OC, lip, and salivary glands. OC tumours were more frequent (47%). The majority of all cancer patients were men (59%) and in the 41-64 age group (43%). The mean age of the patients was 61.2 (SD 15, median 64, range 14-103), 58.7 (SD 14, median 62, range 27-87), and 51.5 (SD 17, median 52, range 6-85) for OC, lip, and salivary gland cancers, respectively (P < 0.001). A clear gender and age difference emerged between patients with these tumours (P < 0.001). Males dominated, especially in lip cancers (85%), and the majority of the patients in all these three groups were over 40 . Further analyses showed no gender difference by age within these three tumor sites.Tongue cancers were the most prevalent OC type (50%).

Conclusion: OC tumours are the most frequent.The majority of all cancer patients are men and in the 41-64 age group. The overall five-year survival rate of patients with OC cancer is 30%.Survival is negatively related to stage of tumour at the time

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of diagnosis. The overall five-year survival rate of patients with lip cancer is 62%. The survival was higher in patients diagnosed at earlier tumour stages than in those diagnosed at advanced stages.

1. INTRODUCTION

Cancer is defined as the unregulated proliferation of cells that invade and destroy surrounding tissues. Oral cancer begins as a persistent growth or sore in the mouth. Oral cancer, which includes malignancies of the lips, tongue, cheeks, floor of mouth, hard and soft palates, and pharynx (throat), can be fatal if not detected and treated promptly [1]. It is a significant public health issue globally, but there is a notable disparity in its prevalence. In 2018, an estimated 177,384 deaths and 354,864 new cases of lip and oral cavity cancers were reported, with Asia alone accounting for over 70% of the deaths [2] According to the research, males are twice as likely as women to acquire oral cancer, with men over the age of 50 having the highest risk [3]. Smoking is one of several risk factors for developing mouth cancer.Cigarette, cigar, and pipe smokers are six times more likely than nonsmokers to get mouth cancer. Users of smokeless tobacco, such as dip, snuff, or chewing tobacco, are 50 times more likely to acquire cheek, gum, and lip cancer. In our country, paan, chalia, and gutka are the leading causes of monthly cancer [4]. Oral malignancies are approximately six times more likely in drinkers than in nondrinkers. Human Papillomavirus (HPV) strains are etiologic risk factors for oropharyngeal squamous cell carcinoma [5]. Socioeconomic status is another risk factor contributing to oral cancers in developing countries like Pakistan and India [6] . Anwar et al, (2020) in a comprehensive study conducted on a number of patients, visiting one of the largest tertiary care Hospitals in Pakistan, minimizing selection bias. Despite the recent increase in the price of tobacco products, the consumption is overall increasing even in the low socio-economic group with meager income. Chewing habits are the foremost cause of a drastic increase in OSCC from this region, consequently changing the normal mucosa of the oral cavity and leading to cancer. This is a comprehensive study conducted on a number of patients, visiting one of the largest tertiary care hospitals in Pakistan, minimizing selection bias. Despite the recent increase in the price of tobacco products, consumption is overall increasing even in the low socio-economic group with meager income [6]. Sana et al, (2020) in a retrospective study done in Mayo Hospital Lahore for a period of two years 2016,17 found that the mortality rate in the cancer of the oral cavity was 7.76% [7]. Abas et al, (2020), using data from GLOBOCAN found out that the incidence of oral cancers of the lips and oral cavity is 10.58% and the mortality rate by oral cancers is 11.27% in Pakistan [8]. As it is previously discussed, the major causes of oral cancer worldwide remain tobacco in its many different forms, heavy consumption of alcohol, and, increasingly, infection with certain types of HPV. Although the relative contribution of risk factors varies from population to population, oral cancer is predominantly a disease of poor people [9]. Prevention of this devastating disease can come from fundamental changes in socioeconomic status, as well as from actions to reduce the demand, production, marketing, and use of tobacco products and alcohol. A healthy diet, good oral and sexual hygiene, and awareness of the signs and symptoms of disease are important. Success depends on political will, intersectoral action, and culturally sensitive public health messages disseminated through educational campaigns and mass media initiatives.

El-Naaj and others (2011) described that with little to no functional and physical side effects, radiation or local excision are viable treatment options for the majority of early-stage oral malignancies. In certain circumstances, such as patients with stage I tongue cancer and stage II malignancies at other oral sites who may be at high risk of microscopic but not clinically evident involvement of the neck nodes, elective neck dissection to remove lymph nodes may be explored (N0) [10]. A combined modality approach integrating surgery, radiotherapy with or without chemotherapy, and planned and executed by a multidisciplinary team is always preferred. Appropriate importance should be given to factors such as functional and cosmetic outcomes and the available expertise. Surgery followed by postoperative radiotherapy is the preferred modality for patients with deep infiltrative tumors and those with bone infiltration [11].

So the rationale of the study is to determine the patient and tumor characteristics of oral cancers in Pakistan.

 2. To evaluate survival rates in patients with OC cancer

3. To evaluate the risk factors and social determinants.

4. To determine preventive measures and treatment modalities in the local population of Pakistan,

2. MATERIAL AND METHODS

This is a retrospective, observational institutional based that was carried out at the oral and maxillofacial surgery JPMC Abbasi Shaheed Hospital Karachi 3 months after the approval of the synopsis.

3. SAMPLE SIZE

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This is a retrospective, observational, institutional-based study that was done in the oral and maxillofacial department of JPMC Abbasi Shaheed Hospital Karachi during 2020–2024. The population was defined as those who had developed oral cancer, including oral cavity cancer and lip. A total of 935 diagnosed and treated patients of oral cancer during 2020 to 2025 were recruited[12].

4. INCLUSION CRITERIA:

Individuals 18 years of age or older suffering from malignancy of the lip or oral cavity, residing in Karachi.

All newly diagnosed oral cavity cancer patients registered in JPMC between 01st January 2020 to 1st january 2024

Oral cavity cancer patients who are residents of Karachi (who have been residing in Karachi for more than 1 year).

Exposure to various risk factors or predisposing factors for cancer of the oral cavity or lip.

All cases who have completed at least one modality of cancer-directed treatment at JPMC

5. EXCLUSION CRITERIA:

Anyone not meeting the inclusion criteria or people who refused to provide information and with missing contact information were excluded.

Mixed or unclear diagnosis.

3. All cases who have received any form of cancer directed therapy before registering

in JPMC.

6. STUDY DESIGN

This is a retrospective, observational institutional based study.

7. DATA COLLECTION PROCEDURE:

After ethical approval, patients meeting the inclusion criteria were recruited. Written informed consent and a detailed medical history will be obtained. A total of 935 diagnosed and treated patients of oral cancer in JPMC during 2020 to 2025 were recruited. The age date was calculated from the date of birth of the patient mentioned in the hospital records till the date of registration,marital status at the time of registration was recorded as unmarried/married,,both males and females. For survival analysis, the patients were followed from the date of diagnosis to late 2023. We defined survival as the time from diagnosis until December 31, 2023 or until death due to oral cancer, whichever occurred first. Vital status was ascertained through a combination of information from patient records, telephone calls, and the death-register files at the JPMC .
Information abstracted from patient records included birth year, gender, date of diagnosis; TNM stage, primary tumour site, and histopathology type. Treatment modality (surgery, pre- or postoperative radiotherapy, chemotherapy) and the final admittance dates to the hospital were also recorded, as were the date and the cancer or non-cancer causes of death.

8. STATISTICAL ANALYSIS:

Preoperative demographics were compared between the two groups using independent t-tests or Mann-Whitney U-tests for continuous variables and chi-square tests or Fisher exact tests for categorical variables.

9. RESULTS:

Oral cancers were studied separately in three groups: OC, lip, and salivary glands. OC tumours were more frequent (47%). The majority of all cancer patients were men (59%) and in the 41-64 age group (43%). The mean age of the patients was 61.2 (SD 15, median 64, range 14-103), 58.7 (SD 14, median 62, range 27-87), and 51.5 (SD 17, median 52, range 6-85) for OC, lip, and salivary gland cancers, respectively ($P < 0.001$). A clear gender and age difference emerged between patients with these tumours ($P < 0.001$). Males dominated, especially in lip cancers (85%), and the majority of the patients in all these three groups were over 40 (**TABLE 1**). Further analyses showed no gender difference by age within these three tumour sites (**FIGURE 1**). Tongue cancers were the most prevalent OC type (50%).

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TABLE 1: Primary tumour site in oral cancer patients (n = 935) by gender and age

Variables	N (%)	oral cavity No(%)	Lip(n=%	salivary glands N %
Sex				
Female	383 (41%)	180(47%)	58 (15%)	146 (38%)
Male	552 (59%)	132.45(24%)	470 (85%)	324 (62%)
Age				
<40	140.2 (15%)	15(11%)	18 (13%)	37 (26%)
41-64	402(43%)	164(41%)	`188 (47 %)	188 (47%)
65 or more	392 (42%)	44 (11.4%)	39(10%)	105 (27)

FIGURE 1 : Distribution (%) of oral cancer patients (n = 935) by age, men and women separately, for three tumour sites (no gender difference by age within sites)
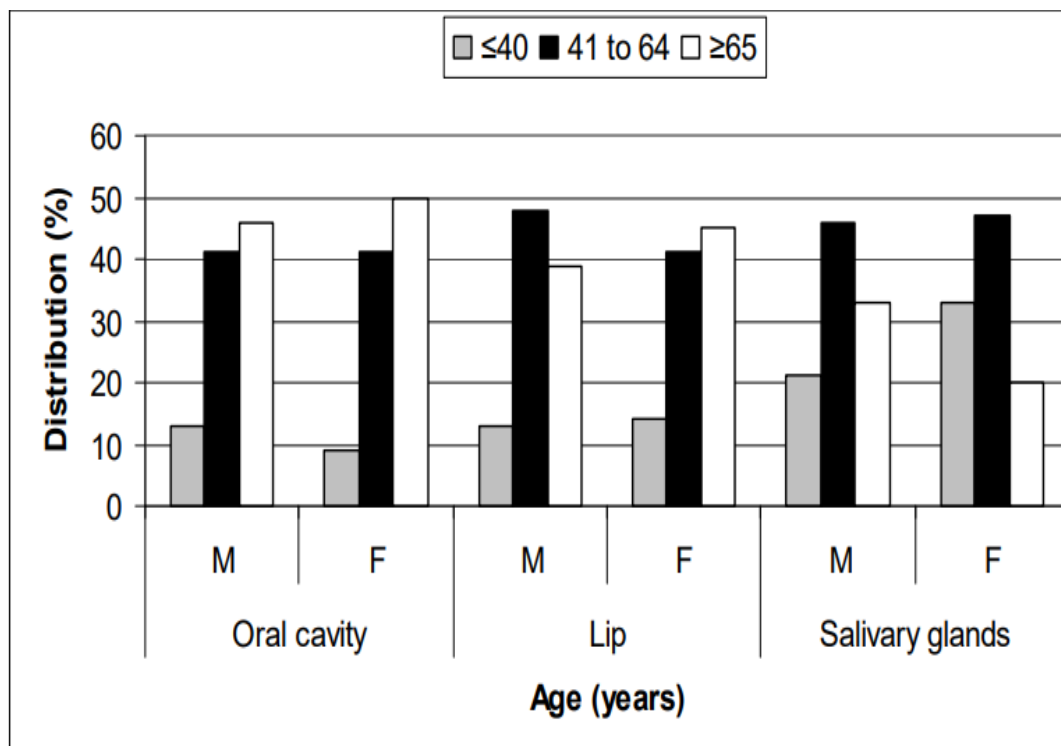
The overall 5-year survival of the OC cancer patients was 30%. For the survival analysis, these patients were followed for a maximum of 116 months (mean (SD) `16, range 0- 60). Of all 935 patients, 664 (71%) died of their oral cancer, 38 patients (4%) died of other causes,158 (17%) survived, and 74 (8%) were lost to follow-up. No associations emerged between gender and age and patient survival. However, stage of tumor at diagnosis and treatment were related to survival. Patients diagnosed at stages III or IV had shorter survival than those diagnosed at stages I or II ($P < 0.05$) (**Figure 2**). The outlook was also poor for patients treated with radiotherapy alone; they were more likely to die sooner ($P < 0.05$).

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FIGURE 2 : Survival rate in oral cavity cancer patients (n = 935).
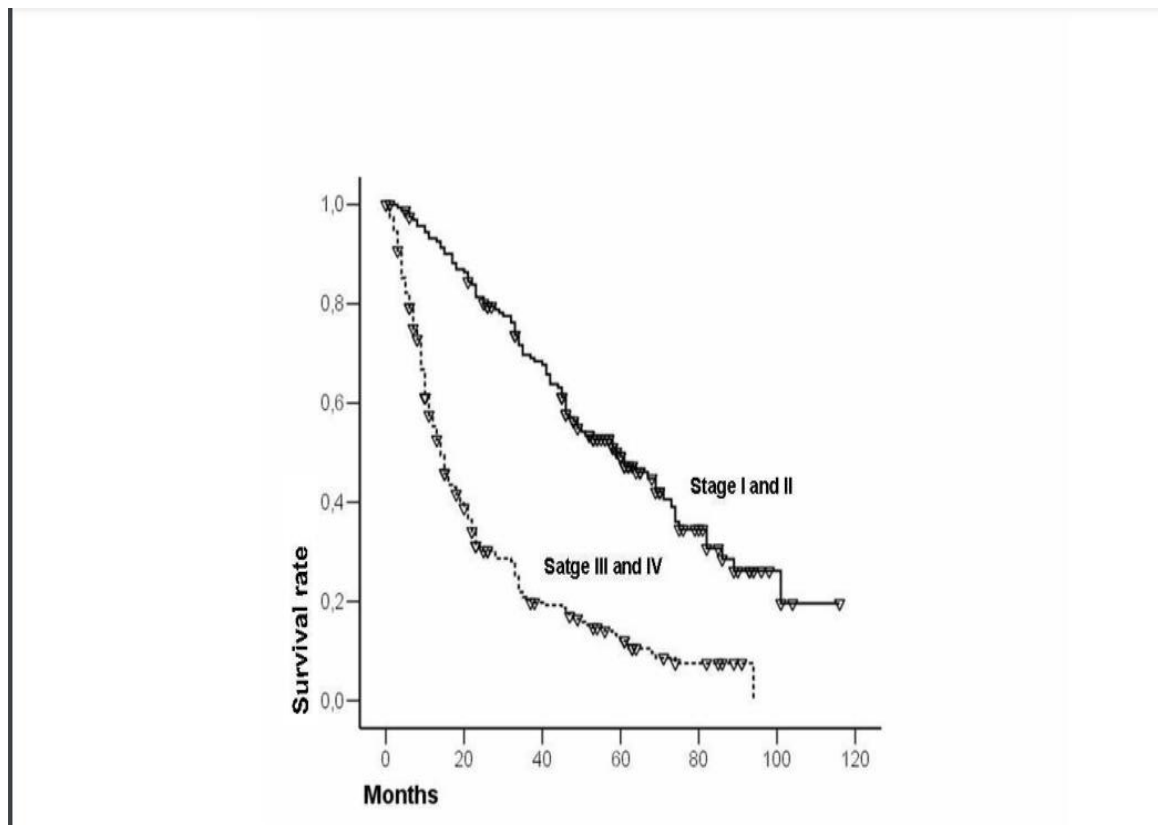
In terms of treatment modalities patients who underwent surgical procedures had longer survival as compared to those who had undergone surgery with radiotherapy or radiotherapy alone.

Treatment	ORAL CANCER	LIP CANCER	oral cancer (5 years survival rate %	lip cancer (5 years survival rate%)	
Surgery	140 (15%)	392 (42%)	54%	69%	
Surgery + radiotherapy	542 (58%)	402 (43%)	27%	75%	
Radiotherapy	141 (15%)	66 (7%)	08 %	nill	

10. DISCUSSION:

The present study investigated patient and tumour characteristics of oral cancers in Karachi, Pakistan , in 5 years period from 2020 to 2024 with the main focus on OC cancers. The study further evaluated survival rates and the time elapsed between symptoms being noticed by oral cancer patients and the diagnosis. We used hospital-based data in order to have a general preview of oral cancers in Karachi. The dental and maxillofacial department of JPMC, Abbasi Shaheed is a comprehensive

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center in Karachi, providing diverse programmes in prevention, early detection, patient care, education, community activities, and international collaboration. Therefore for the period 2020 to 2024, we evaluated the patient and tumour characteristics for oral cancers. All eligible patients were identified from the patient attendance list and information files held in the records department of each hospital. No patient can be admitted to a hospital or treated without first filling in the required forms and documents. Study data collection forms and records files were cross-checked to ensure inclusion of all eligible cases. For the survival analysis of oral cancer patients, vital status was ascertained through a combination of information from patient records, telephone calls, and death register files at the Abbasi Shaheed Hospital Karachi . To evaluate the time elapsed from patient noticing of symptoms and the diagnosis of oral cancer, all the information gathered during the 48 interviews and all the patients' responses were validated by referring to and checking them with their medical records at the hospital, or at the physician's or dentist's office.

Patient and tumour characteristics: Oral cancer has traditionally been a disease dominated by the male gender (Moore et al. 2000; Silverman 2001; Stewart and Kleihues 2003). Higher alcohol and tobacco use and outdoor occupations in men have been considered the main reasons for the male predominance, whereas recent reports from different parts of the world show a decreasing male to female ratio among OC cancer patients (Luukkaa et al. 2003; Tarvainen et al. 2004). This has been attributable to an increase in smoking among women, particularly in western countries. In the present study, oral cancer occurred more frequently in men, with a male to female ratio of 1.4:1. Smoking prevalence is estimated as 20 to 26% among males and 2 to 4% among females (Mosavi-Jarahi et al. 2004). This may be a plausible reason for the higher occurrence of oral cancers in men. Similar to the vast majority of the previous reports from all over the world (Moore et al 2000; Parkin et al. 2002, Silverman 2003) only a small proportion of OC tumors were in patients aged 40 and younger, average age at the time of diagnosis was 61, and SCC was the most frequent histological type of OC and lip cancers. Among all OC cancers, the tongue was the most common site of occurrence, in accordance with that reported from different parts of the world, mostly western counties such as the UK (Moore et al. 2000). Oral SCC is amenable to early detection and clearly attributable to lifestyles, smoking, and alcohol drinking, so it is usually regarded as preventable. Although SCC is the most prevalent type of malignant oral tumours, each distinct histological type needs to be considered according to the individual prognosis in patient management and treatment. Almost 60% of the OC cancer patients were at stage III or IV at diagnosis. Late diagnosis of oral cancers generally results in a very poor prognosis and strongly reduced survival rates. Oral cancer treatment in advanced stages means radical surgical resection and comprises complicated postoperative reconstructive procedures. Furthermore, surgery should be accompanied by radiotherapy and sometimes chemotherapy. The present results speak for the necessity of a national programme underscoring early detection of oral cancer.

Survival Oral cavity cancer: The overall survival outcome for oral cancer is dismal, with the 5-year survival being around 50%. The 5-year survival in the present study is comparable with that reported from developing countries. Further analysis showed that OC cancer patients with stage I or II tumours had the longest survival, while the lowest was in later stages. This reveals the smaller influence of treatment when tumours have been diagnosed in advanced stages. Patients treated with radiotherapy alone had shorter survival than those who were treated surgically or who had been operated on and had had adjuvant radiotherapy. Of all patients who had radiotherapy as the sole treatment modality, 71% were at an advanced disease stage at the time of diagnosis and were plausibly in poor general health. These findings support earlier reports regarding the relation between treatment and survival in patients with OC cancer (Chen et al. 1999; Carvalho et al. 2004; Chen et al. 2004). Primary surgical management with adjuvant radiotherapy has been associated with high rates of local control in previous reports (Chen et al. 1999; Woolgar et al. 1999; Davidson et al. 2001; Carvalho et al. 2004). However, the reason for longer survival found here for patients treated by operation alone may be mainly that this method is used for treatment of earlier tumors. The decision to treat is based not only on the stage of tumour but also on several other factors such as the general health of the patient, state of surgical margins, and in some instance by the patient's decision about treatment. These all may have an impact on the outcome of the treatment and on survival

Lip cancer: Lip cancer is a form of oral cancer but has a distinct epidemiology and different tumor behavior (Moore et al. 1999). Although this cancer is not common in Asia, in contrast to other oral cancers which are prevalent in southern parts of this continent, more thorough assessments are needed, since lip cancer is usually considered to be easily detectable and thus curable (Zitsch et al. 1995; de Visscher et al. 1999). In the present study, lip cancer patients' overall survival rates for 1, 2, and 5 years after diagnosis were 91%, 86%, and 62%. These figures are lower than those reported from western countries. One possible reason may be delay in treatment which leads to the much higher percentage of advanced SCCs at the time of treatment and thus lower survival of lip cancer patients. It was found that malignant lip tumours occurred mostly in men, on the lower lip, and as SCCs. The findings revealed that gender, age, and histological type of tumours were insignificant predictors of survival, both in univariate and multivariable analyses. The results regarding the relationship of lip cancer patients' survival with gender, age, tumour stage, treatment modality, and histo-pathological type were in line with previous results (Moore et al. 1999; de Visscher et al. 1999; Boyle 2001; Babington et al. 2003). Survival was higher in patients diagnosed at earlier tumour stages. Many previous reports also show higher survival rates for patients diagnosed at stages I or II (de Visscher et al. 1999; McCombe et al. 2000; Babington et al. 2003; Vartanian et al. 2004). In the present study, further analyses showed that patients treated with radiotherapy alone had lower survival rates than those who had undergone surgery together with or without adjuvant radiotherapy. These findings support previous studies which show higher rates of

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recurrence and lower disease-free survival in lip cancer patients initially treated with radiotherapy (de Visscher et al. 1999, Zitsch et al. 1999)..

Delay in diagnosis: Early diagnosis of oral cancers leads to higher survival rates and better quality of life outcomes (Kowalski et al. 1994; Onizawa et al. 2003). In the present study the mean patient, professional, and diagnostic delays were higher than those reported from other, especially developed, countries (Dimitroulis et al. 1992; Jovanovic et al. 1992; Pitiphat et al. 2002). No national programme exists for the prevention of oral cancers in Pakistan which may explain these findings. This study mainly shows that the "patient delay" constitutes a substantial part of the total delay time elapsed between the onset of symptoms and diagnosis. . As the majority of oral cancer patients in the present study had advanced-stage tumours at diagnosis, patient delay in seeking medical attention may be a contributing cause in a considerable number of OC cancer patients' deaths. Although the time period from patients' first awareness of symptoms to the first professional visit is called the "patient delay", the patient is not the only one responsible. Other factors such as access to health care services contribute to the length of this time (Diz Dios et al. 2005). Oral cancer patients may have insufficient or incorrect knowledge to appropriately interpret the relevance of their symptoms to a malignancy, and they may consider the symptoms to be non-serious or harmless (De Nooijer et al. 2001; Scott et al. 2006) or possibly fail to seek help due to fear of cancer or lack of faith in medical treatment (De Nooijer et al. 2001). Psychological factors such as distress and coping styles, as well as socio-economic factors have been shown to affect patients' healthseeking behaviours. The present findings reveal that patients living alone had greater tendencies for longer patient and, surprisingly, professional delays. Married patients may have better health habits and mutual support and indeed seek medical care with less delay , which may be mainly due to the supportive and motivational role of their partners. Another plausible explanation for this finding is the lack of comprehensive and socially supportive health care for cancer patients in Pakistan. Findings of the present study show that not having visited a dentist within the past 12 months was a significant determinant of patient delay. Patients who do not regularly visit a dentist seem more likely to neglect their cancer-related symptoms or to misinterpret them as common oro-dental problems.

11. CONCLUSION:

The specific conclusions of the study are:

1. Among all 935 oral cancer patients' records studied, OC tumours were most frequent. The majority of all cancer patients were men and in the 41-64 age group. Most OC cancer patients were at advanced stages at the time of diagnosis.

2. The overall five-year survival rate of patients with OC cancer was 30%. Survival was negatively related to stage of tumour at the time of diagnosis.

3. The overall five-year survival rate of patients with lip cancer was 62%. The survival was higher in patients diagnosed at earlier tumour stages than in those diagnosed at advanced stages.

4. The mean diagnostic delay found in this study was 7.2 months (SD 7.5), and "patient delay" constitutes a substantial part of the total time elapsed between the onset of symptoms and diagnosis.

12. CONFLICT OF INTEREST

We declare that there was no conflict of interest.

13. ACKNOWLEDGEMENTS

14. AUTHORS CONTRIBUTIONS

Topic selection:

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