
RESEARCH COMMUNICATION

Cancer of the Oral Cavity - Trends in Karachi South (1995-2002)

Yasmin Bhurgri^{1, 2, 3}

Abstract

The objective was to study the time trends in site-specific oral cancer incidence and to determine the age-and socio-economic profile over time in Karachi South. Oral cancer ranks second in this population, in both genders. The incidence is the highest reported worldwide. Incident oral cancer cases received at the Karachi Cancer Registry during 1st January 1995 to 30th June 2004 were reviewed. To ensure maximally complete data, cases registered between 1st January 1995 and 31st December 2002 were considered for the present study. Cases of lymphoma, leukemia and melanoma were not included. Trends were studied by grouping cases into two periods, 1995-1997 and 1998-2002.

A total of 2253 cases of oral cancer were registered in Karachi South for the 8 year study period accounting for 8.8% of all cancer cases. Overall, the most common site was the mucosa cheek (55.9%), followed by the tongue (28.4%), palate (6.8%), gum (4.4%), lip (3.1%) and floor of the mouth (1.4%). About 30% of cases occurred in patients 40 years and younger and 23% occurred in patients 65 years and older. Sub-categories of oral cancer showed variation in trends, but an earlier onset of disease in period two was evident for all categories. The incidence of lip cancer in men decreased, the rates remained level in females. An increased incidence was observed for tongue, but a more dramatic increase in the cheek was evident in both sexes, despite no improvement during the past decade in detection of early, localized lesions. A strong socio-economic factor with a poorer, low literacy profile of oral cancer was apparent in the entire study period. The evidence that the largest increase in incidence has occurred in this population may unfavorably affect the mortality rates.

Oral cancer trends are an interplay of prevalent risk factors, the level of prevalence, preventive education and intervention. Cost effective and efficient cancer control focused around the target populations would be beneficial for Pakistan. Educational campaigns should include information on oral hygiene, awareness of risk factors and symptoms and the importance of seeking early professional help when any of these are recognized. Audio-visual media involvement is imperative in view of the literacy status of the target population. Capacity building is required by the Government to increase the availability and accessibility of professionals. Population screening would reduce the incidence of oral cancer, but requires careful planning, and extensive financial resources. Mobilization of general practitioners, health visitors, volunteer organizations and medical students for early detection of oral cancer is the essential need of today.

Key Words: Cancer - oral cavity - time trends - Karachi, Pakistan

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Introduction

The objective of the present investigation was to study the time trends in site-specific oral cancer incidence and to determine the age-and socioeconomic profile over time in Karachi South.

Karachi Cancer Registry (KCR) established in 1995, as a collaboration of the International Agency for Research on Cancer (IARC) has acquired 10 years stability (1995-2004)

for Karachi South (KS), a sample population of Pakistan. The city of Karachi is divided into 5 districts, South, Central, West, East and Malir. Karachi District South has a population of 1,724,915 with 929,394 (54%) males and 795,521 (46%) females, and an annual growth rate of 1.94% as calculated by the Federal Census Bureau. The population distribution of KS is similar to the population distribution of Pakistan as regards age, gender, and religion. KS has the distinction of being the only district in the country with a representation

¹Karachi Cancer Registry ²Aga Khan University Hospital, Karachi ³Sindh Medical College, Karachi, Department of Pathology, Address for Correspondence, Sindh Medical College, Rafiqi Shaheed Road, Cantt, Adjacent Jinnah Postgraduate Medical Centre, Karachi, Pakistan E-mail: bhurgri@cyber.net.pk

of all ethnic and socio-economic groups of the country. It is thus a sample population of the country in the absence of other data sources.

Cancer of the oral cavity, excluding salivary gland ICD-10 (International Classification of Diseases 10th Revision) categories C00-06, ranks sixth in the world in both sexes. It is the third most common cancer in males in the developing countries. In Karachi, the malignancy ranks second in both genders. The incidence is the highest reported worldwide.

The risk factors of oral cancer in the more developed countries are smoking, alcohol and sunlight exposure. Areca nut, betel quid or paan chewing, naswar and poor diet are additional risk factors of oral cancer in Asia. Paan is arecanut or betelnut cut into small pieces using a special instrument called sarota. The husk is wrapped in a betel leaf with lime and may include clove, cardamum, catechu (kattha), etc for extra flavouring. Tobacco leaves are often added to Paan by the habitual users. A recent addition to the family is Paan Masala, i.e. arecanut in ready to eat pouches. This is usually a sweetened mixture of spices whose primary base is betelnut crushed into very small pieces. This modification in arecanut use makes it more palatable for the children and is freely available in many school tuck shops, especially, in the low socio-economic neighborhoods. The addition of tobacco to paan masala converts it to 'Gutka'.

Globally, there is a variation in the trends of oral cancer, depending on the prevalence of risk factors, and success of cancer control programs. There have been reports of a rising incidence of oral cancer from many countries of the world, particularly in young male adults. Increased incidence is reported from the United States (Morse et al 1999; Shiboski et al, 2000; Llewellyn et al, 2001; Silverman, 2001; Schantz and Yu, 2002), Canada (Howell et al, 2003), Norway (Mork and Glatte, 1998), Spain (Borras, et al 2001), Australia (Moore et al, 2001), and Taiwan (Ho et al, 2002).

The Mumbai Cancer Registry reports a decreasing trend for oral cancer especially lip cancer in recent studies, probably attributed to a decrease in the usage of paan and tobacco. Stable trends are reported among young adult men and women in this population. This is linked to a causal association with the persisting high prevalence of smokeless tobacco in this age group. (Sunny et al, 2004) In South Africa the incidence of oral cancer in the period 1988-1991 was higher in migrant women of Indian origin, than it was in 1964-1966, and apparently all educative preventive measures had failed. (Hille et al 1996) Thus oral cancer trends are an interplay of prevalent risk factors, the level of prevalence, preventive education and intervention.

Methodology

Incident oral cancer cases, excluding salivary gland, ICD-10 (International Classification of Diseases 10th Revision) categories C00-06, registered at the Karachi Cancer Registry for Karachi South (KS), during 1st January 1995 to 30th June 2004 were reviewed. To ensure maximum completion of data, cases registered between 1st January 1995 to 31st

December 2002 were considered for the present study. Cases of lymphoma, leukemia and melanoma were not included. The cases were categorized by tumor site and the age and sex of the patient. Trends were studied by grouping cases into two periods: period 1 (1995-1997), and period 2 (1998-2002).

The data were classified using ICD-O2 (International Classification of Diseases-Oncology, 2nd edition) and computerized using a customized version of Canreg-3, with internal checks on the validity of entered data. (WHO 1990) Manual and computerized validity checks for the cancer data were performed as per recommendations of International Agency for Research on Cancer (IARC) and International Association of Cancer Registries (IACR). (Parkin et al., 1994; Skeet, 1991) This involved factors influencing comparability i.e. classification and coding. All cases whether clinically diagnosed or histologically verified, were included in the study. The residency status of cases was re-ascertained and rechecked. People residing in the specified geographical regions for more than six months were considered residents. Demographical variables recorded were the hospital patient-number, date of incidence, name, age, sex, address, ethnicity, topography, morphology, grading and staging. Tumors were categorized according to the UICC, TNM staging system, to standardize with the staging systems in other parts of the world.

Incidence rates were calculated based on the 1998 census for Karachi South (population of 1,724,915; males 929,394 and females 795,521), annual growth rate 1.94%. (Census 1998) The growth rates were based on the inter-census growth-rate and measures for inflow and outflow of population, calculated by the Federal Bureau of Statistics. Standardized incidence rate was calculated with an external reference population, the 'world' population with a given 'standard' age distribution. (Segi, 1960) The methodology applied was direct standardization, using 5-year age groups. The rates given are the annual incidence per 100,000 population, averaged over the number of years for which data are presented. The data were analyzed using SPSS 11.0.

To determine the socio-economic profile of oral cancer, the district was divided into 3 subcategories based on the income of approximately 70% of the resident population. The categories ranged from 1 to 3 in an ascending income strata. (Table 1) Category I was composed of the predominantly the financially deprived class with an annual income of less than \$2000, and a low literacy level. Residents of category II had an annual income range of \$2001-\$20,000 annual income range with a moderately high literacy.

Table 1. Percent Increase in the Number of Oral Cancer Cases Between Period I (1995-1997) and Period II (1998-2002)

Category	Annual Income in US\$	Percent increase
I	< 2000	96%
II	2001-10,000	200%
III	10,001->50,000	10%

Category III was largely made up of educated professionals, with an annual income of more than \$20,000. A sample survey was conducted to categorize the financial status of the population.

Results

A total of 2253 cases of oral cancer were registered in Karachi South for the 8 year study period (1995-2002), accounting for 8.8 % of all cancer cases. Overall, the most common site was the mucosa cheek (55.9%), followed by the tongue (28.4%), palate (6.8%), gum (4.4%), lip (3.1%) and floor of mouth (1.4%). About 30% of cases occurred in patients 40 years and younger and only 23% occurred in patients 65 years and older.

The age standardized incidence rates (ASIRs) per 100,000, 1st January 1998 to 31st December 2002 in Karachi South were 21.3 in males and 19.3 in females whereas the ASIRs per 100,000 for 1st January 1995 to 31st December 1997 were 14.2 and 14.6 in males and females, respectively. A rising incidence was observed in both genders, more apparent in males.

Sub-categories of oral cancer showed a variation in trends over the last decade. Lip cancer (ICD-10 categories C00) in males decreased and the age-standardized incidence rate fell from 0.9 to 0.7 per 100,000 from period 1 (1995-1997) to period 2 (1998-2002). The rates remained leveled at 0.4 in females. An increased incidence was observed for tongue (C01-02). The ASIR per 100,000 in males increased from 4.2 to 5.3 whereas the rates in females increased from 4.9 to 6.6. The highest increase was observed in cancers of mouth (C03-06). The ASIR per 100,000 in males increased from 9.1 during 1995-1997 to 15.3 in 1998-2002; whereas in females the rates increased from 9.3 to 12.3. (Figure 1)

The mean ages were 51.2 years (95% CI 49.4; 53.1) and 50.0 years (95% CI 48.2; 52.4) for males and females respectively in 1995-1997. The equivalent figures for 1998-2002 were 49.5 years (95% CI 47.5; 51.4) and 53.7 years (95% CI 51.5; 55.6). Approximately 97% of the oral cavity cancers were histologically confirmed. The majority of the

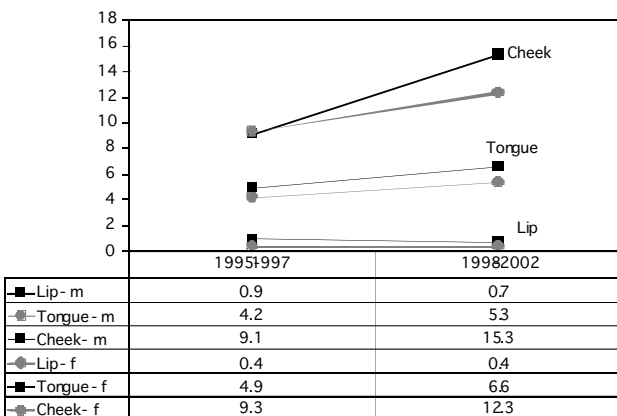


Figure 1. Trends in Subcategories of Oral Cancer 1996-1997; 1998-2002

oral cancer (47.1%) cases presented as grade II. Two-thirds of the cases were discovered at advanced stages. Of the cancers reported during 1995-2002, 65.0% of the oral cancers had spread to a distant site at the time of diagnosis, stage III or IV. The predominant morphology was squamous cell carcinoma in 96.5% of the cases.

The age specific incidence rates for lip cancer in males showed an earlier onset of disease in period two and an associated downward trend in all age groups except 60-64 year age group, whence there was a leveling of rates. There was a decrease in the peak incidence rate. In females an earlier onset and earlier peak was observed for cancer lip. The age specific incidence rates for cancer cheek showed an upward trend in all age groups in both sexes. This increase was dramatic in the younger age groups. (Figures 1-4)

There was a poor socio-economic profile of oral cancer. There was a 100% increase in oral cancer cases in category I or the lower socio-economic group. The rise was 200% in the second category, however the total number of cases in category I remained the highest in both periods. The increase in category II was an insignificant 10%. A decrease in the rates was not observed in any socio-economic category.

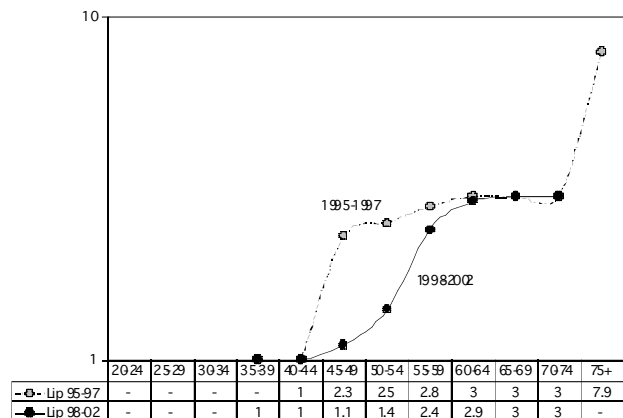


Figure 2. AIRs Cancer Lip 1995-1997; 1998-2002 - Males

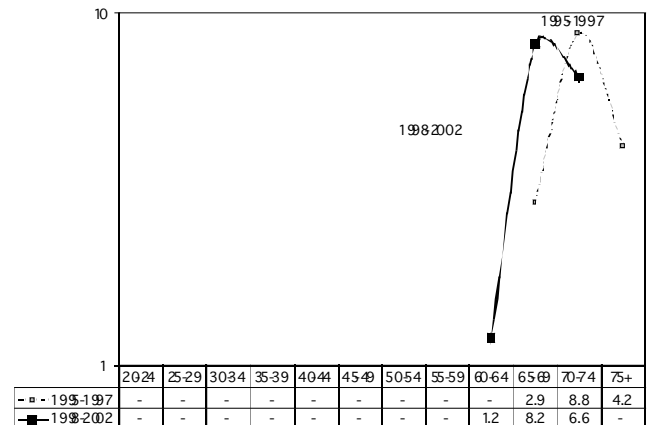


Figure 3. AIRs Cancer Lip 1995-1997; 1998-2002 - Females

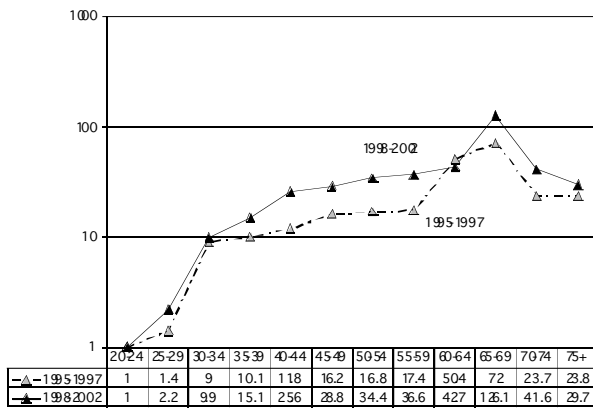


Figure 4. AIRs Cancer Cheek 1995-1997; 1998-2002 - Male

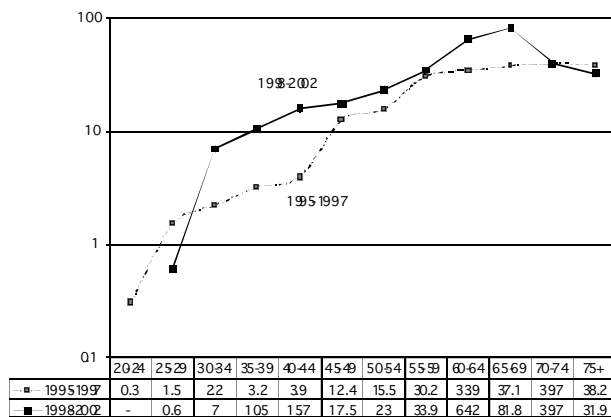


Figure 5. AIRs Cancer Cheek 1995-1997; 1998-2002 - Female

Discussion

A persisting rise in the age standardized incidence rate for oral cancer is observed in Karachi in both genders and in all age groups. A decrease in the incidence of lip cancer in males was associated with a leveling of rates in females. Moderate upward trends were observed for cancer tongue and a dramatic increase was observed for cancer cheek. As distinct from other geographical areas oral cancer remained equally common in males and females. A rising incidence is also equally observed in the young males and females in this population. There is a minor trend toward a younger age at diagnosis and a slight increase among women. A third of the cases occur in patients 40 years and younger.

Oral cancer trends should be interpreted in terms of exposure to risk factors such as betel quid, arecanut and tobacco use in the population. In Karachi specifically and in Pakistan generally, alcohol is a notable omission as a risk factor, however tobacco, areca nut, betel quid chewing, paan masala, and poor diet are associated with aspergillus contamination of arecanut. The age-standardized annual incidence for cancer of the lip, remained unchanged as no

change in the smoking habits has been observed in Karachi.

There is however, a sharp upward trend in chewing habits in the recent past. Every year Pakistan imports over one lakh tonnes of areca nut from Indonesia and India. The total business is valued at Rs 16 crore for 2,000 tonnes of white variety of arecanut which is endemic to Dakshina Kannada and northern Kerala and the rest from Indonesia. The import of areca nut from Indonesia to Pakistan meanwhile amounted to US\$ 7.03 million in 2000, dropped to US\$ 6.48 million in 2001 and increased to US\$ 7.44 million in 2002. (Jakarta Business News, 2003)

Our observation indicates a strong socio-economic factor and a poorer, low literacy profile of oral cancer. There is a growing disparity between rich and poor populations in the district. The incidence was higher in the socially deprived areas and the evidence that the largest increase in incidence has occurred in such areas may in the future unfavorably affect the mortality rates. The cause may be known risk factors aggravated by a lack of oral hygiene, deprivation from known beneficial effect of vegetables and fruit or familial clustering and viral infections. (Tavani et al, 2001) It may also reflect lack of awareness of symptoms of non-invasive or premalignant conditions, inadequate health coverage, and non-availability or inaccessibility of health professionals.

This observation also emphasizes the potential need of targeting such a population for oral health information. A cost effective and efficient cancer control focused around these target populations would be beneficial for Pakistan. Educational campaigns should include both information on the risk factors for developing oral cancer, and also the importance of seeking an early professional consultation in the case of symptoms. Audiovisual media involvement is imperative in view of the literacy status of the target population. KS is an urban population, there is growing evidence rural populations with employment in the agriculture, forestry and fishing industries, are also major risk factors for oral cancer, indicating further research in this population. (Hindle et al, 2000)

Detection of early, localized lesions has not improved significantly during the past decade. Reducing exposure to carcinogens needs an awareness of the carcinogens in the exposed population. Professional and public education about oral cancer needs to be improved. The need to perform routine oral examination to promote early diagnosis and treatment should be emphasized to clinicians. Call for prevention, should be associated with adequate facilities for appropriate treatment. Mobilization of general practitioners, health visitors, volunteer organizations and medical students for early detection of oral cancer is the essential need of today. (Figure 6)

Conclusion

Oral cancer trends are interplay of prevalent risk factors, the level of prevalence, preventive education and intervention. Our observation indicates a strong socio-

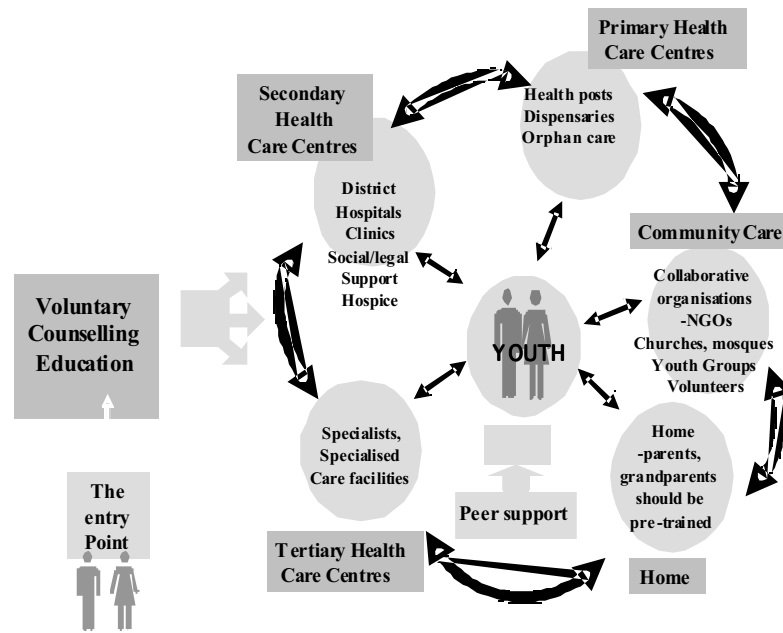


Figure 6. Education Service Providers

economic factor with a poorer, low literacy profile of oral cancer. This observation emphasizes the potential need of targeting such a population for oral health information. A cost effective and efficient cancer control focused around these target populations would be beneficial for Pakistan. Educational campaigns should include information on oral hygiene, awareness of risk factors and symptoms and the importance of seeking an early professional help in the case of symptoms. Capacity building is required on the behalf of the Government to increase the availability and accessibility of professionals.

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