ORIGINAL ARTICLE

Analysis of survival and factors associated with oral cancer

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Abstract

Introduction: Oral cancer accounts for 5.2% of all malignancies in men in Brazil, and is considered the most common cancer of the head and neck (H&N) region, excluding skin cancer. Despite the diagnostic and therapeutic advances in the oncology area, disease-free survival is still low. **Objective:** To describe and analyze patient survival and the factors associated with oral cancer. **Methods:** A retrospective, observational study was conducted through analysis of the medical charts of H&N cancer patients assisted at the Mossoro League of Cancer Research and Combat (LMECC) from 2006 to 2015. The data were analyzed by exploratory descriptive statistics. Survival was described using the Kaplan-Meier method. **Results:** There was predominance of men (59.7%), with a mean age of 65 years, Caucasians (56.6%), farmers (52.0%) from Mossoró (RN), Brazil (66.7%), and smokers (88.4%). In the majority of cases, tumor occurred in the tongue (52.6%), at an advanced stage (73.6%), and was first treated predominantly with surgery (69.6%). Mean survival time of the patients was 2524 days, and was lower in patients with lymph node metastasis and in those submitted to nonsurgical treatment. Mortality rate was 45.5%. **Conclusion:** The high rates of mortality and advanced stage patients indicate late diagnosis, which reflects the need for preventive actions, training of health professionals, and improved access to the health system.

Keywords: oral cancer; carcinoma, squamous cell; Epidemiological profile; Survival analysis.

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Introduction

Oral cavity cancer accounts for 5.2% of all malignancies in men in Brazil, and is considered the most common cancer of the head and neck (H&N) region, excluding skin cancer[1]. In Brazil, the incidence of oral cancer is among the highest in the world[2], with estimated 15,490 cases (11,140 in men and 4350 in women) in 2016, according to the National Cancer Institute (INCA)[1].

As in most malignant diseases affecting the H&N region, the predominant risk factors are tobacco smoking and alcoholism. These factors separately have significant effects, and present synergistic effect when combined[3]. Human papillomavirus (HPV), especially HPV-16 and HPV-18, have also been reported in some studies, as well as sun exposure, especially for lip lesions[4,5].

Predominance usually occurs in males, the elderly (>60 years old), and low socioeconomic level populations[6].

The most affected anatomical sites are the tongue and the floor of the mouth[4]. Squamous cell carcinoma is the most prevalent histological type of cancer (over 90% of patients), and is still frequently diagnosed at an advanced stage[6,7].

Despite all diagnostic and therapeutic advances in cancer, the survival of patients with oral cancer is still low, with an overall 5-year survival rate of 30%[6]. It is believed that this is due to late diagnosis, and immediate recognition of lesions by health professionals is important to increase the cure rates through application of specific treatments.

In this context, this study aimed to describe and analyze the survival and factors associated with oral cancer in patients with confirmed diagnosis of the disease assisted at the Mossoro League of Cancer Research and Combat (*Liga Mossoroense de Estudos e Combate ao Câncer* - LMECC) between 2006 and 2015.

Methods

This study was submitted to and approved by the Research Ethics Committee of the State University of Rio Grande do Norte (UERN) under protocol no. 2,461,859.

A retrospective, observational study was conducted with patients diagnosed with oral cancer treated at the Mossoro League of Cancer Research and Combat (LMECC). Individuals were evaluated over a 10-year period (2006-2015) through analysis of medical records. Data on date and cause of death was collected from the Mortality Information System (*Informação sobre Mortalidade* - SIM).

All patients diagnosed with oral cancer (ICD-10: C01-C06) confirmed by pathological examination in the established period were included in the study. Patients with oropharyngeal tumors with invasion of the oral cavity, with synchronic tumors, and with lip cancer were excluded from the sample.

The variables analyzed included sociodemographic (gender, age, race, occupation, origin), clinical (location, size, presence of lymph nodes or distant metastases, staging, and treatment) and histopathological (histological type, histological grade, presence of angiolymphatic and perineural invasions) aspects, as well as risk factors (tobacco smoking, alcoholism, and family history).

Tumor staging (TNM) was defined according to the standards established by the American Joint Committee on Cancer (AJCC) and Union for International Cancer Control (UICC) for classification of malignant tumors[8].

Data were collected in a standard form prepared exclusively for this study, and later compiled in a database and analyzed by exploratory descriptive statistics using Microsoft Excel 2010® and SPSS 20.0 software. A bivariate analysis (Chi-squared test) was performed to determine association between each of the variables. For survival time, defined as the time (in months) between disease diagnosis and patient death, analysis was performed by estimating the survival table and the Kaplan-Meier cumulative curve. A significance level of 5% ($p < 0.05$) was adopted for all statistical procedures.

The study project was approved by the Ethics and Research Committee of the State University of Rio Grande do Norte (UERN) under protocol no. 2,461,859.

Results

We analyzed 57 medical records of patients diagnosed with oral cancer treated between 2006 and 2015 at the Mossoro League of Cancer Research and Combat (LMECC).

Regarding the sociodemographic profile, Table 1 summarizes the characteristics of the study participants, showing that most patients were men (59.7%), white (56.6%), and farmers (52.0%). Patients' ages ranged from 36 to 95 years, with a mean age of 65 years, a standard deviation of 13.8, and a median of 64 years. Most of the participants affected belonged to the >60 age group (35.1%).

Table 1. Sociodemographic profile.

Characteristics		Frequency	%
Gender	Male	34	59.7
	Female	23	40.3
Age (in years)	30-39	2	3.5
	40-49	4	7.0
	50-59	13	22.8
	60-69	20	35.1
	70-79	9	15.8
	80-89	6	10.5
	90-99	3	5.3
Skin color*	White	30	56.6
	Brown	22	41.5
	Black	1	1.9
City of origin	Mossoró	38	66.7
	Apodi	5	8.8
	Caraúbas	2	3.5
	Pau dos Ferros	2	3.5
	Serra do Mel	2	3.5
	Others	8	14.0
Occupation*	Farmer	26	52.0
	Housekeeper	8	16.0
	Carpenter	2	4.0
	Driver	2	4.0
	Mason	2	4.0
	Teacher	2	4.0
	Other	8	16.0
	Total	**57**	**100.00**

*Data not available.

With respect to the risk factors, 88.4% of the patients were tobacco smokers or former smokers, 40.5% were alcoholics or former alcoholics, and 39.5% had a history of simultaneous abuse of tobacco and alcohol; in addition, 41.5% had a family history of cancer.

Table 2 shows the profile of malignant oral neoplasia, which is associated with tumor staging, size, location and presence of metastasis. Tumors were predominantly located in the tongue (52.6%). Lesion size ranged from 0.3 to 5.5cm, with most of them between 2 and 4cm (41.0%). Over half of the patients (56.6%) had lymph node metastases and none presented distant metastasis at the initial stage. Regarding staging, IVA tumor predominated (30.2%).

Table 2. Clinical profile.

Characteristics		Frequency	%
Tumor location	Tongue	30	52.6
	Floor of the mouth	12	21.1
	Hard palate	6	10.5
	Alveolar ridge	5	8.8
	Jugal mucosa	4	7.0
Tumor size	≤2 cm	12	30.8
	2-4 cm	16	41.0
	>4 cm	11	28.2
Lymph node metastasis*	Yes	30	56.6
	No	23	43.4
Tumor staging*	I	7	13.2
	II	7	13.2
	III	15	28.3
	IVA	16	30.2
	IVB	8	15.1
	Total	**57**	**100.0**

*Data not available.

Application of the Chi-squared test (X^2) or the Fisher's exact test, at a significance level of 5%, on tumor staging with the patients' general characteristics (Table 3) revealed statistically significant association between tumor stage and alcoholism and tobacco smoking, with smokers and/or alcoholics presenting higher incidence of stage III and IV tumors.

Table 3. Tumor staging *vs.* patient characteristics.

General characteristics		Tumor staging*		Total	*p*-value
		I and II	III and IV		
Gender	**Female**	28.57% (n=6)	71.43% (n=15)	**100.00% (n=21)**	**0.773** [1]
	Male	25.00% (n=8)	75.00% (n=24)	**100.00% (n=32)**	
Age	**<60 years**	25.00% (n=7)	75.00% (n=21)	**100.00% (n=28)**	**0.805** [1]
	>60 years	28.00% (n=7)	72.00% (n=18)	**100.00% (n=25)**	
Family history*	**No**	34.78% (n=8)	65.22% (n=15)	**100.00% (n=23)**	**0.470** [2]
	Yes	20.00% (n=3)	80.00% (n=12)	**100.00% (n=15)**	
Alcoholism*	**No**	43.48% (n=10)	56.52% (n=13)	**100.00% (n=23)**	**0.014** [2]
	Yes	6.25% (n=1)	93.75% (n=15)	**100.00% (n=16)**	
Smoking*	**No**	80.00% (n=4)	20.00% (n=1)	**100.00% (n=5)**	**0.015** [2]
	Yes	20.00% (n=7)	80.00% (n=28)	**100.00% (n=35)**	

[1] Chi-squared test [2]; Fisher's exact test.

As for tumor histological type, squamous cell carcinoma was observed in 100% of the cases, whereas for histological grade, 32.7% of the tumors were well differentiated, 65.3% were moderately differentiated, and 2.0% were undifferentiated. Angiolymphatic invasion was observed in 38.9% of the cases, whereas perineural invasion was found in 55.6% of them.

Concerning treatment, 69.6% of the participants were treated initially with surgery, 19.6% underwent chemotherapy alone, and 10.7% underwent chemotherapy associated with radiotherapy. After one year of treatment, many patients (38.6%) had discontinued medical follow-up, 36.8% had no disease, 15.8% presented active disease, and 8.8% had died.

Twenty-nine of the 57 patients died, 26 from oral cancer and three from other causes; thus, the mortality rate from oral cancer was 45.6%.

Application of the Chi-squared (X^2) and Fisher's exact tests, at a significance level of 5%, on death rate with the general characteristics of the patients (Table 4) showed statistically significant association between tobacco smoking, tumor staging, lymph node metastasis, tumor histological grade, and first treatment performed, thus patients with a history of smoking, stage IV tumor, lymph node metastasis, moderately differentiated histology, and submitted to non-surgical treatment were more likely to die.

Mean survival time of the patients was 2,524 days with a standard deviation of 519.19 days, and half of the individuals survived a maximum of 554.9 days (Graph 1).

Graphs 2, 3 and 4 represent patient survival time as a function of the variables lymph node metastasis, tumor stage and treatment.

Table 4. Death by cancer *vs.* patient characteristics.

General characteristics		Death by cancer		Total	p-value
		No	Yes		
Gender	Female	43.48% (n=10)	56.52% (n=13)	100.00% (n=23)	0.174 [1]
	Male	61.76% (n=21)	38.24% (n=13)	100.00% (n=34)	
Age	<65 years	55.17% (n=16)	44.83% (n=13)	100.00% (n=29)	0.903 [1]
	>65 years	53.57% (n=15)	46.43% (n=13)	100.00% (n=28)	
Family history*	No	41.67% (n=10)	58.33% (n=14)	100.00% (n=24)	0.279 [1]
	Yes	58.82% (n=10)	41.18% (n=7)	100.00% (n=17)	
Alcoholism*	No	52.00% (n=13)	48.00% (n=12)	100.00% (n=25)	0.753 [1]
	Yes	47.06% (n=8)	52.94% (n=9)	100.00% (n=17)	
Smoking*	No	100.00% (n=5)	0.00% (n=0)	100.00% (n=5)	0.048 [2]
	Yes	44.74% (n=17)	55.26% (n=21)	100.00% (n=38)	
Staging*	I and II	78.57% (n=11)	21.43% (n=3)	100.00% (n=14)	0.001 [1]
	III	73.33% (n=11)	26.67% (n=4)	100.00% (n=15)	
	IV	25.00% (n=6)	75.00% (n=18)	100.00% (n=24)	
Staging*	I and II	78.57% (n=11)	21.43% (n=3)	100.00% (n=14)	0.025 [1]
	III and IV	43.59% (n=17)	56.41% (n=22)	100.00% (n=39)	
Lymph node metastasis*	No	73.91% (n=17)	26.09% (n=6)	100.00% (n=23)	0.007 [1]
	Yes	36.67% (n=11)	63.33% (n=19)	100.00% (n=30)	
Histological grade*	Well differentiated	87.50% (n=14)	12.50% (n=2)	100.00% (n=16)	< 0.001 [1]
	Moderate differentiated	31.25% (n=10)	68.75% (n=22)	100.00% (n=32)	
First treatment performed*	Surgery	71.79% (n=28)	28.21% (n=11)	100.00% (n=39)	< 0.001 [1]
	Chemotherapy	9.09% (n=1)	90.91% (n=10)	100.00% (n=11)	
	Radiotherapy + Chemotherapy	16.67% (n=1)	83.33% (n=5)	100.00% (n=6)	

[1] Chi-squared test; [2] Fisher's exact test.
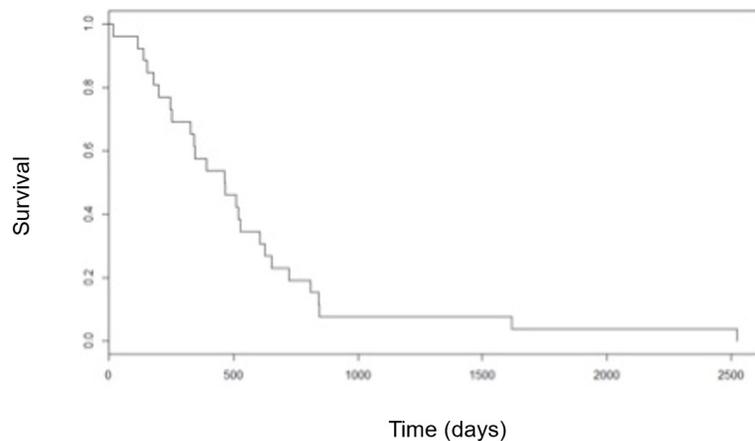
Graph 1. Patient survival time as a function of cancer.
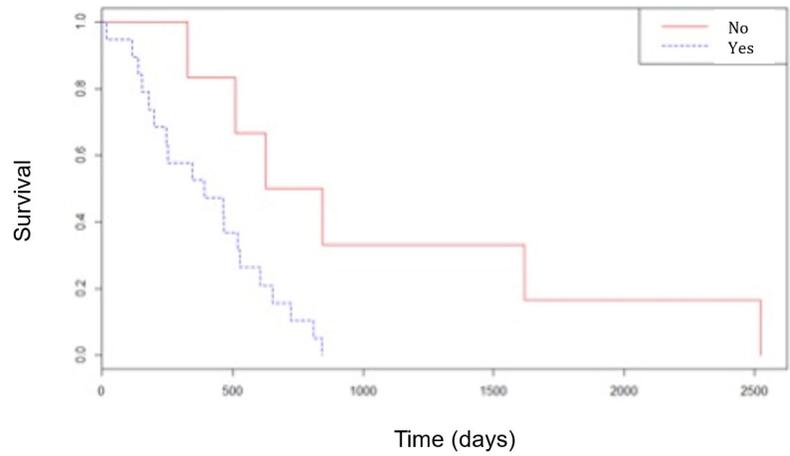
Graph 2. Survival time as a function lymph node metastasis.
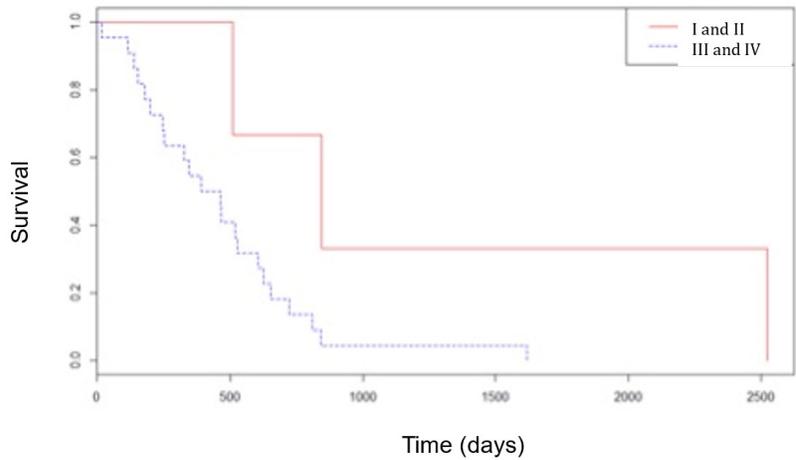
Graph 3. Survival time as a function of tumor stage.
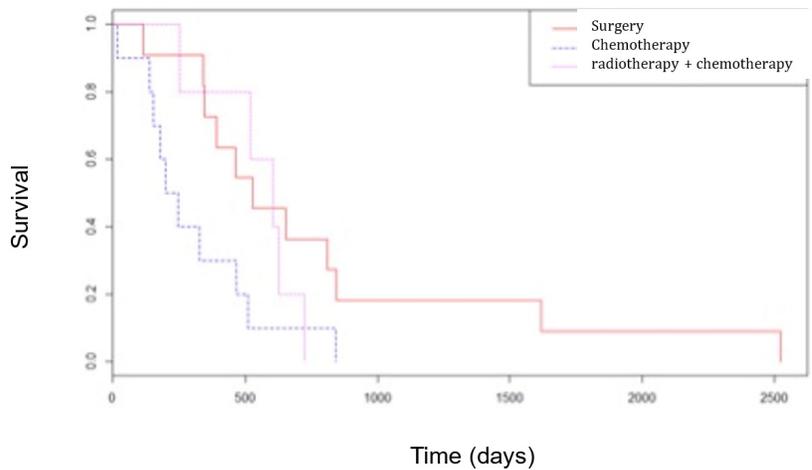
Graph 4. Survival time as a function of surgical procedure.

Discussion

Most patients in this study were male (59.7%), corroborating the fact that oral cancer usually presents higher incidence and mortality in men, probably because of the greater past exposure of these individuals to the main risk factors of the disease, tobacco and alcohol, whose consumption is higher among males[3,4,6]. Another explanation for this gender difference would be the higher frequency of dental appointments among women and the socioeconomic differences between genders[9]. However, the mortality ratio between the genders has decreased over the years, with an increased number of women affected by the disease. This is possibly due to changes in the habits of women, who are increasingly approaching the male lifestyle[7,10].

The patients' ages ranged from 36 to 95 years, with a mean age of 65 years. Most of the participants affected belonged to the >60 age group, a finding similar to results reported in other studies, which showed that oral cancer presents higher occurrence in individuals over 50 years old[3,4,6,7]. This is because prolonged exposure to risk factors is needed to establish the neoplastic process.

Regarding skin color, most of the study participants were white (56.6%), also corroborating the findings of other studies[4,7]. Most of the patients were farmers (52.0%) from Mossoró (66.7%), the municipality where the hospital is located. Head and neck (H&N) cancer usually affects individuals with low educational level and socioeconomic status, thus it is expected that professions that require low or no schooling predominate among patients.

The main risk factors for oral cancer are tobacco smoking and excessive alcohol consumption. In this study, 88.4% of the patients were smokers or former smokers and 40.5% were alcoholics or former alcoholics. Smokers are four times more likely to develop oral cancer, being directly proportional to the number of cigarettes consumed, thus individuals who smoke more than 20 cigarettes daily present a 6-fold higher risk[3].

As for alcohol consumption, risk for oral cancer is associated with the consumption frequency, thus the greater and the longer the alcohol consumption, the higher the risk of developing the disease. Consumption of distilled beverages (liquors) is more associated with oral cancer due to their higher alcohol content[3].

Simultaneous consumption of tobacco and alcohol was present in 39.5% of the patients. When present simultaneously, these factors have a synergistic effect. It was reported that the synergism between tobacco and alcohol increases the risk of developing oral cancer in approximately 10 times[3].

With respect to tumor location, the tongue was the most affected site (52.6%), followed by the floor of the mouth (21.1%), corroborating the results of other studies[3,4,6,7]. Cancer of the tongue and floor of the mouth, in addition to presenting higher incidence, are associated with higher mortality rate because lesions spread more easily, developing regional metastases[6,7,11]. In addition, the floor of the mouth seems to be the region most sensitive to the effects of tobacco and alcohol[12], which explains its high prevalence among patients with oral malignant neoplasia.

Lesion size ranged from 0.3 to 5.5 cm, with most of them between 2 and 4cm (41.0%). Over half of the patients (56.6%) had lymph node metastases at the time of diagnosis, and there were no cases of distant metastasis at initial presentation. The prognosis of oral cancer is associated with the size of the primary tumor, the number of compromised lymph nodes, and the presence of distant metastasis[7].

Most patients (73.6%) were diagnosed at advanced tumor stage (III and IV), which has also been observed in other studies[6,13]. The advanced stage presented by patients at the first consultation with the specialist suggests late diagnosis. This delay in diagnosis is possibly linked to poorly symptomatic progression of the disease, poor knowledge about the disease by patients and health professionals, fear of diagnosis, and difficulties in the access to specialized professionals. It was reported greater percentage of advanced stage tumors in cases referred by the public health network. These patients also presented lower 5-year survival[4].

Concerning tumor histological type, squamous-cell carcinoma was present in all cases. Squamous cell carcinoma tends to predominate not only in oral cancer, but also in H&N cancer in general[7].

The histopathological grading system is composed of three categories: grade I (well differentiated), grade II (moderately differentiated), and grade III (poorly differentiated)[14]. If the same tumor presents different grades, the highest grade is considered. In the present study, 65.3% of the lesions were moderately differentiated. The use of this classification on patient prognosis is controversial, thus it should not be used alone to determine survival[7].

In addition, 38.9% of the patients presented angiolymphatic invasion and 55.6% had perineural invasion. Angiolymphatic vascularization can influence tumor evolution and patient survival[7]. Other histological variables could not be evaluated due to lack of information in the medical records.

Cancer treatment depends on the stage of the disease, and should consider maintenance of phonation and deglutition and patient quality of life. Surgery is recommended mainly for early cases. Radiotherapy may be neoadjuvant for treatment of larger tumors or adjuvant to eliminate residual tumor cells. Chemotherapy is recommended in refractory cases and extensive or inoperable lesions[6].

Of the patients undergoing treatment at the hospital, 69.6% had surgery as their initial treatment, 19.6% underwent chemotherapy initially because they had unresectable lesions or because of high surgical risk, and 10.7% of patients were treated with radiotherapy associated with chemotherapy.

After one year of treatment, many patients (38.6%) had discontinued medical follow-up. This may have influenced the mortality rate found. Oral cancer is a serious disease that requires specialized monitoring, thus discontinuation of treatment in the institution results in higher mortality rate.

Regarding mortality, 29 of the 57 patients died, 26 from oral cancer and three from other causes, thus the mortality rate by oral cancer was 45.6%. A study conducted by Daher et al. (2008) found a mortality rate of 45.5%[4].

The Northeast region of Brazil has the second highest oral cancer mortality rate in the country and, in recent years, there has been an increasing trend in oral cancer mortality in the region[10]. This fact may be associated with changes in lifestyle that increase exposure to risk factors as well as with improvement in the information systems, which could lead to a higher death record[15]. Another possible associated factor is the poor access to health services. The North and Northeast regions of Brazil have the lowest rates of health professionals and the highest percentage of citizens who have never consulted with a dentist[16].

As for patient survival, statistical survival curves for lymph node metastasis (p=0.039) and surgical procedure (p=0.021) at 5% significance level showed that patients with lymph node metastasis and non-surgical treatment presented a smaller probability of survival as time of disease increased. Lower survival in patients undergoing non-surgical treatment was found[6].

Limitations to this study include its retrospective nature based on the analysis of medical records, in which information is often not adequately informed and there is no standardization. Thus, much information ends up being lost.

The poor survival of patients with oral cancer is a worrying factor, considering that it is a disease with a high chance of cure when early diagnosed. Therefore, early diagnosis and effective management to reduce mortality, morbidity and disfigurement produced by lesions and often by treatment itself are essential.

Health education is needed to combat abuse of major cancer-related substances, such as tobacco and alcohol. More effective measures aimed at abandonment and non-resumption of tobacco and alcohol consumption after treatment should also be applied, because maintenance and/or recurrence rates of smoking and alcoholism in patients treated for H&N squamous-cell carcinoma are high[17]. It is also necessary to implement public policies that ensure easier access to health services, enabling early identification of lesions and consultation with specialists, who can confirm the diagnosis and indicate the appropriate treatment. One way of contributing to oral cancer early diagnosis would be a higher qualification of dentists, who are more likely to receive patients with initial lesions in routine consultations[4]. A rate of 60% of patients referred by dentists were at early stages of the disease, whereas most patients referred by physicians were at advanced stages[4].

Conclusions

Patients with oral cancer assisted at the Mossoró League of Cancer Research and Combat (LMECC) are mostly men in the sixth decade of life, white, farmers from Mossoro, and smokers. The high rates of mortality and advanced stage patients are of concern and indicative of late diagnosis, which reflects the need for preventive actions, training of health professionals, and improved access to the health system.

References

1. Brasil. Ministério da Saúde. Estimativa 2016: incidência de câncer no Brasil. Rio de Janeiro: INCA; 2015. 122 p.

2. Warnakulasuriya S. Global epidemiology of oral and oropharyngeal cancer. Oral Oncol. 2009;45(4-5):309-16. **http://dx.doi.org/10.1016/j.oraloncology.2008.06.002**. PMid:18804401.

3. Andrade DM, Barbosa-Branco A. Synovitis and tenosynovitis in Brazil: analysis of sickness benefit claims. Rev Bras Epidemiol. 2015;18(1):194-207. **http://dx.doi.org/10.1590/1980-5497201500040017**. PMid:25651021.

4. Daher GCDA, Pereira GDA, Oliveira ACDA. Características epidemiológicas de casos de câncer de boca registrados em hospital de Uberaba no período 1999-2003: um alerta para a necessidade de diagnóstico precoce. Rev Bras Epidemiol. 2008;11(4):584-96. **http://dx.doi.org/10.1590/S1415-790X2008000400007**.

5. Lima MAPD, Silva CGLD, Rabenhorst SHB. Association between human papillomavirus (HPV) and the oral squamous cell carcinoma: a systematic review. J Bras Patol Med Lab. 2014;50(1):75-84. **http://dx.doi.org/10.1590/S1676-24442014000100011**.

6. Bonfante GMDS, Machado CJ, Souza PEAD, Andrade EIG, Acurcio FDA, Cherchiglia ML. Sobrevida de cinco anos e fatores associados ao câncer de boca para pacientes em tratamento oncológico ambulatorial pelo Sistema Único de Saúde, Brasil. Cad Saude Publica. 2014;30(5):983-97. **http://dx.doi.org/10.1590/0102-311X00182712**. PMid:24936815.

7. Carli MLD, Pereira AAC, Hanemann JAC, Santos SL. Características clínicas, epidemológicas e microscópicas do câncer bucal diagnosticado na Universidade Federal de Alfenas. Rev Bras Cancerol. 2009;55(3):205-11.

8. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. TNM - classificação de tumores malignos. 7. ed. Rio de Janeiro: INCA; 2013. 254 p.

9. Machado LP, Camargo MBJ, Jeronymo JCM, Bastos GAN. Uso regular de serviços odontológicos entre adultos e idosos em região vulnerável no sul do Brasil. Rev Saude Publica. 2012;46(3):526-33. **http://dx.doi.org/10.1590/S0034-89102012000300015**. PMid:22635038.

10. Perea LME, Peres MA, Boing AF, Antunes JLF. Tendência de mortalidade por câncer de boca e faringe no Brasil no período 2002-2013. Rev Saude Publica. 2018;52:10. **http://dx.doi.org/10.11606/S1518-8787.2018052000251**.

11. Leite ICG. Mortalidade por câncer de boca e faringe em cidade de médio porte na Região Sudeste do Brasil, 1980-2005. Rev Bras Cancerol. 2010;56(1):17-23.

12. Radoï L, Luce D. A review of risk factors for oral cavity cancer: the importance of a standardized case definition. Community Dent Oral Epidemiol. 2013;41(2):97-109, e78-91. **http://dx.doi.org/10.1111/j.1600-0528.2012.00710.x**. PMid:22882534.

13. Teixeira AKM, Almeida MEL, Holanda ME, Sousa FB, Almeida PC. Carcinoma espinocelular da cavidade bucal: um estudo epidemiológico na Santa Casa de Misericórdia de Fortaleza. Rev Bras Cancerol. 2009;55(3):229-36.

14. Barnes L, Eveson JW, Reichart P, Sidransky D. Pathology and genetics of head and neck tumours. vol. 9. Lyon: IARC; 2005.

15. Secoli SR, Padilha KG, Leite RDCBD. Avanços tecnológicos em oncologia: reflexões para prática de enfermagem. Rev Bras Cancerol. 2005;51(4):331-7.

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16. Fajardo S, Aerts DRGDC, Bassanesi SL. Acurácia da equipe do Sistema de Informações sobre Mortalidade na seleção da causa básica do óbito em capital no Sul do Brasil. Cad Saude Publica. 2009;25(10):2218-28. **http://dx.doi.org/10.1590/S0102-311X2009001000012**. PMid:19851621.

17. Pinto FR, Matos LL, Gumz Segundo W, Vanni CMRS, Rosa DS, Kanda JL. Manutenção do tabagismo e etilismo em pacientes tratados por câncer de cabeça e pescoço: influência do tipo de tratamento oncológico empregado. Rev Assoc Med Bras. 2011;57(2):171-6. **http://dx.doi.org/10.1590/S0104-42302011000200014**. PMid:21537703.