

# The Impact of COVID-19 Pandemic on the Treatment of Patients with Head and Neck Cancer at a Reference Hospital

<https://doi.org/10.32635/2176-9745.RBC.2026v72n3.5577EN>

*Impacto da Pandemia da Covid-19 no Tratamento de Pacientes com Câncer de Cabeça e Pescoço em um Hospital Público de Referência*

*Impacto de la Pandemia de COVID-19 en el Tratamiento de Pacientes con Cáncer de Cabeza y Cuello en un Hospital Público de Referencia*

Maria Ester Moutinho<sup>1</sup>; Ana Caroline Sande<sup>2</sup>; Viviana Passos<sup>3</sup>; Tamires Guedes<sup>4</sup>; Gabriela Botelho Martins<sup>5</sup>; Manoela Carrera<sup>6</sup>

## ABSTRACT

**Introduction:** The COVID-19 pandemic caused by SARS-CoV-2 virus had high infection ratios and mortality due to its fast spread. Therefore, the reinforcement of the health system to treat the patients restricted the operation of several specialties and many health units postponed elective activities, for example, the care to oncological patients, who eventually did not receive the ideal treatment. **Objective:** To evaluate the impact of COVID-19 pandemic on the treatment of patients with head and neck cancer in a high complexity unit at a reference hospital. **Method:** Data from patients with head and neck cancer were collected between 2018 and 2021. The number of assisted patients, mean time between head and neck cancer diagnosis and beginning of radiotherapy, as well as the number of surgeries and chemo and radiotherapy sessions, tumoral staging and medical record of oral complications of antineoplastic treatment have been analyzed. **Results:** There was a significant increase of oral lesions in medical charts during the pandemic. In 2020 there was a higher prevalence of oral and lip cancer and IVA stage tumors. **Conclusion:** The pandemic did not negatively impact the care to patients with head and neck cancer, but interfered on the elective treatment.

**Key words:** Pandemic; COVID-19; Head and Neck Neoplasms.

## RESUMO

**Introdução:** A pandemia da covid-19, causada pelo vírus SARS-CoV-2, apresentou altas taxas de infecção e mortalidade em razão da sua rápida propagação. Dessa forma, o reforço do sistema de saúde para o tratamento dos pacientes restringiu o funcionamento de diversas especialidades, o que levou muitas unidades de saúde a adiarem atividades consideradas eletivas, como o atendimento a pacientes oncológicos, e, por isso, muitos pacientes não receberam o tratamento ideal. **Objetivo:** Avaliar o impacto da pandemia da covid-19 no atendimento de pacientes com câncer de cabeça e pescoço assistidos em uma Unidade de Alta Complexidade de um Hospital de referência. **Método:** Foram coletados dados dos pacientes com câncer de cabeça e pescoço referentes ao período de 2018-2021. Analisaram-se a quantidade de pacientes atendidos, a média do tempo transcorrido entre o diagnóstico e o início da radioterapia, bem como o número de cirurgias e de tratamentos de quimioterapia e radioterapia realizados, o estadiamento tumoral e o registro em prontuário médico de complicações bucais do tratamento antineoplásico. **Resultados:** Os resultados obtidos indicaram que, no período da pandemia, houve aumento do número de registros de lesões bucais nos prontuários médicos. Durante o ano de 2020, o câncer de lábio e cavidade oral e tumores em estágio IVA tiveram maior prevalência. **Conclusão:** A pandemia não afetou o atendimento aos pacientes com câncer de cabeça e pescoço, mas interferiu no seu tratamento eletivo.

**Palavras-chave:** Pandemia; COVID-19; Neoplasia de Cabeça e Pescoço.

## RESUMEN

**Introducción:** La pandemia de COVID-19, causada por el virus SARS-CoV-2, presentó altas tasas de infección y mortalidad debido a su rápida propagación. De esta forma, el refuerzo del sistema de salud para el tratamiento de los pacientes restringió el funcionamiento de diversas especialidades, lo que llevó a muchas unidades de salud a posponer actividades consideradas electivas, como la atención a pacientes oncológicos, y, por ello, muchos pacientes no recibieron el tratamiento ideal. **Objetivo:** Evaluar el impacto de la pandemia de COVID-19 en la atención de pacientes con cáncer de cabeza y cuello atendidos en una Unidad de Alta Complejidad de un hospital de referencia. **Método:** Se recopilaron datos de pacientes con cáncer de cabeza y cuello correspondientes al período de 2018 a 2021. Se analizaron la cantidad de pacientes atendidos, el tiempo promedio transcurrido entre el diagnóstico del cáncer de cabeza y cuello y el inicio del tratamiento de radioterapia, así como el número de cirugías y tratamientos de quimioterapia y radioterapia realizados, la estadificación tumoral y el registro en la historia clínica de complicaciones orales derivadas del tratamiento antineoplásico. **Resultados:** Los resultados obtenidos indicaron que durante el período de la pandemia hubo un aumento en el número de registros médicos de lesiones orales. Durante el año 2020, el cáncer de labio y cavidad oral y los tumores en estadio IVA tuvieron mayor prevalencia. **Conclusión:** La pandemia no afectó la atención a los pacientes con cáncer de cabeza y cuello, pero sí interfirió en el tratamiento electivo de los mismos.

**Palabras clave:** Pandemia; COVID-19; Neoplasia de Cabeza y Cuello.

<sup>1</sup>Universidade Federal da Bahia (UFBA), Instituto Multidisciplinar de Reabilitação e Saúde. Salvador (BA), Brasil. E-mail: tetemoutinho@hotmail.com. Orcid ID: <https://orcid.org/0009-0008-7516-3222>

<sup>2</sup>UFBA, Faculdade de Odontologia. Salvador (BA), Brasil. E-mail: anac.sande@gmail.com Orcid ID: <https://orcid.org/0000-0003-3236-0134>

<sup>3,4</sup>Unidade de Alta Complexidade Oncológica – Obras Sociais Irmã Dulce. Salvador (BA), Brasil. E-mails: viviana.passos@irmadulce.org.br; tamires.guedes@irmadulce.org.br. Orcid ID: <https://orcid.org/0009-0001-4051-4837>; Orcid ID: <https://orcid.org/0000-0002-6904-3290>

<sup>5</sup>UFBA, Instituto Multidisciplinar de Reabilitação e Saúde. UFBA, Instituto de Ciências da Saúde, Programa de Pós-Graduação em Processo Interativo de Órgãos e Sistemas. Salvador (BA), Brasil. E-mail: gabrielabm@ufba.br. Orcid ID: <https://orcid.org/0000-0002-0917-4598>

<sup>6</sup>Universidade Estadual da Bahia (Uneb), Departamento de Ciências da Vida. UFBA, Faculdade de Odontologia. Salvador (BA), Brasil. E-mail: manoela\_p@hotmail.com. Orcid ID: <https://orcid.org/0000-0002-3711-5835>

**Corresponding author:** Manoela Carrera. UFBA, Faculdade de Odontologia. Avenida Araújo Pinho, 62 – Canela. Salvador (BA), Brasil. CEP 40100-150. E-mail: manoela\_p@hotmail.com



## INTRODUCTION

After the World Health Organization (WHO) declared COVID-19 a pandemic caused by the novel coronavirus SARS-Co-V-2, the etiologic agent of the disease, isolation measures and social distancing were implemented to contain the spread of the virus<sup>1</sup>. These measures were imposed because the primary mode of transmission occurs through contact with respiratory droplets produced by an infected person generated during coughing, sneezing or even speaking in close proximity to others. Secondary transmission through contact with contaminated surfaces have been reported<sup>1</sup>.

Individuals with comorbidities such as diabetes, hypertension, respiratory diseases and oncologic patients are more likely to develop severe COVID-19 after SARS-Co-V-2 infection and a more severe disease course that requires oxygen support and may progress to intubation, long periods of hospitalization at intensive care units (ICU) and high mortality rates<sup>2</sup>.

Elective and non-urgent medical procedures were postponed to reduce patient flow in hospital settings. Such measures affected the continuity of care of patients in treatment for head and neck cancer<sup>3</sup>. The term head and neck cancer refers to a group of tumors that affect the anatomic regions of the upper aerodigestive tract, encompassing the areas of the oral cavity, pharynx and oropharynx, larynx, paranasal sinuses and salivary glands. Ninety percent of head and neck cancer cases are squamous cell carcinomas<sup>4</sup>.

The type of treatment of head and neck cancer is determined according to the diagnosis, location of the primary lesion, tumor staging, age and general health conditions of the patient. Surgery is often the primary treatment modality and aims to achieve complete tumor resection with disease free-margins, either with curative intent or to alleviate symptoms in advanced disease (palliative intent)<sup>5</sup>. In addition, radiotherapy alone, chemotherapy or combined treatments are available, being eligible when there is significant tumor advance or advanced tumor stage which is associated with late diagnosis<sup>4,6</sup>.

Current evidence recommends that treatment for head and neck cancer should not be postponed, unless there are important clinical reasons preventing the patient from receiving treatment; additionally, the multidisciplinary care should be continuous during the course of the treatment<sup>3</sup>. In Brazil, the interval between diagnosis and treatment initiation is approximately 60 days<sup>7</sup>.

Radiotherapy and chemotherapy cause many adverse events. In patients with head and neck cancer, complications are particularly relevant, such as oral mucositis, reduced salivary flow, dysphagia, oral

candidiasis, taste disorders, trismus, osteoradionecrosis and pain<sup>8,9</sup>. Therefore, it is essential the involvement of a dentist in the multiprofessional team since it is the professional in charge of the pre-treatment oral assessment and oral health optimization, follow-up during and after the treatment since these toxicities can be debilitating and may compromise or interrupt cancer treatment<sup>9</sup>. However, during the COVID-19 pandemic, dental-surgeons were restricted due to the high production of aerosols as well as the exposure to respiratory droplets<sup>9,10</sup>.

The COVID-19 pandemic affected the functioning of several health services. Delayed initiation of head and neck treatment may impact the required treatment burden and prognosis of the patient<sup>11,12</sup>. Therefore, evaluating whether the COVID-19 pandemic affected access to care and multidisciplinary follow-up may improve understanding of changes in treatment dynamics. This study aimed to evaluate the impact of the COVID-19 pandemic on radiotherapy delivery in patients with head and neck cancer treated at a reference philanthropic hospital.

## METHOD

This was a quantitative, retrospective and documental study designed to investigate the impact of the COVID-19 pandemic on the care provided to patients with head and neck cancer treated at the High-Complexity Oncology Unit of a reference philanthropic hospital.

Medical records of patients diagnosed and treated exclusively at the radiotherapy service for head and neck cancer between July 2018 and December 2021 were evaluated. The pre-pandemic period went from July 2018 to February 2020 and the period from March 2020 up to December 2021 was considered the pandemic itself. Medical records of patients with head and neck cancer who underwent radiotherapy between July 2018 and December 2021 were included, regardless of whether they also received other treatment modalities. Information regarding surgery and chemotherapy was extracted obtained from these same medical records. Medical records of patients whose treatment was conducted exclusively in other sectors, such as medical oncology or head and neck cancer were excluded.

Exclusion criteria included medical records with incomplete radiotherapy information as well as duplicate and unavailable records in either physical or electronic archives.

Based on the medical record review, data related to the time between the diagnostic biopsy and first radiotherapy consultation for treatment planning as well as the time between the biopsy and the beginning of the radiotherapy treatment were recorded. Variables collected included sex, place of residence, tumor site and stage, history of

surgical procedures, radiotherapy and chemotherapy treatments. Furthermore, information on oral mucositis and other oral complications related to cancer treatment were collected as well.

Data were analyzed with the software R<sup>13</sup> (version 4.3.1). Descriptive analyses were performed (absolute and relative frequencies, means, medians, quartiles, and standard deviations) in order to identify the general and specific characteristics of the study sample.

The Ethics Committee of “*Obras Sociais Irmã Dulce*” approved the study (report number 4,747,867 (CAAE (submission for ethical review) 46328921.0.0000.0047) involving human participants in compliance with Directive 466/12<sup>14</sup> of the National Health Council.

**RESULTS**

Medical records of 338 charts of patients with head and neck malignant neoplasms were included, most of them males (76.3%). In 2018 and 2019, most patients resided in Salvador (53.4% and 51.8%, respectively) and similar

proportion were observed in 2020 (53.5%) and 2021 (51%). In 2020, tumors located in the lip and oral cavity were most frequent, with stage IVA representing 36.9% of the cases. In 2019, the pharynx was the most frequent tumor site (38.6%) and staging IVA predominated (Table 1).

With regard to the interval between the biopsy and the first visit to radiotherapy it was observed that 2019 showed the longest interval between the diagnostic exam and the first consultation with the radiation oncologist (median 90 days (60 – 150 days) in relation to the other years investigated (median 60 days (30 – 120 days) (Table 2). It was also noticed that during the pre-pandemic period, the time between the biopsy and initiation of the elective treatment was longer (median 150 days (90 days – 210 days), whereas 2020 showed a shorter interval (median 90 days (0 – 150 days). The results are summarized in Table 2.

With regard to the treatment regimens, 2019 showed the highest proportion of patients undergoing surgery (22.9%). Most patients investigated received concomitant chemoradiotherapy with chemotherapy and 2021 showed the highest proportion (78.1%). Details are presented in Table 3.

**Table 1.** Populational characterization related to sex, residence and tumor characteristics of patients with head and neck cancer at the radiotherapy service (High Complexity Oncologic Unit – *Obras Sociais Irmã Dulce*, 2022)

Year	2018		2019		2020		2021	
	n	%	n	%	n	%	n	%
<b>Frequency</b>	73	21.6	83	24.6	86	25.6	96	28.4
<b>Sex</b>								
Female	19	26.0	20	24.1	21	24.4	20	20.8
Male	54	74.0	63	75.9	65	75.6	76	79.2
<b>Residence</b>								
Other cities	34	46.6	40	23.7	46	53.5	49	51
Salvador (capital)	39	53.4	43	51.8	40	46.5	47	49
<b>Location</b>								
Unknown location	0	0	0	0	2	2.4	2	2.1
Pharynx	15	20.5	32	38.6	20	23.3	31	32.3
Larynx	27	37	23	27.7	23	26.7	27	28.1
Lips and oral cavity	20	27.4	21	25.3	31	36.0	22	22.9
Major salivary glands	2	2.7	2	2.4	4	4.7	1	1
Nasal cavities	4	5.5	3	3.6	0	0	10	10.4
Cervical nodes*	5	6.8	2	2.4	6	7.0	3	3.1
<b>Staging</b>								
I	6	8.2	7	8.4	4	4.7	7	7.3
II	5	6.8	5	6.0	2	2.3	0	0
III	11	15.1	14	16.9	13	15.1	19	19.8
IVA	22	30.1	27	32.5	31	36.0	29	30.2
IVB	9	12.3	7	8.4	17	19.8	17	17.7
IVC	4	5.5	2	2.4	8	9.3	5	5.2

\*Cervical nodes of squamous cell carcinomas with primary occult.



The occurrence of oral toxicities related to cancer treatment, particularly the frequency and severity of oral mucositis increased in 2020 (25.6%) according to the medical records compared with previous years. During the pre-pandemic year, 21.7% of the patients developed oral mucositis. Other oral complications – including osteoradionecrosis, oral candidiasis, hyposalivation –, occurred in 3.6% of the patients in 2019 and 3.5% in 2020. In 2021, only two patients presented other oral complications (Table 4).

## DISCUSSION

Patient demand for care at the reference hospital did not appear to be substantially affected during the pandemic as the number of patients with head and neck cancer increased in 2020 even with changes in the service caused by the pandemic.

The pandemic modified the healthcare services delivery. In many healthcare facilities, professionals were reassigned to COVID-19 dedicated areas, medical appointments and elective surgeries were suspended, resulting in changes in treatment protocols of many other diseases, including cancer. It is known that timeliness of diagnosis and beginning of the treatment of head and neck cancer influence the prognosis of the patient and the COVID-19 pandemic can be considered a factor affecting healthcare delivery<sup>14-17</sup>.

There was only a small difference between the volume of patients with head and neck cancer treated in the pre-pandemic period compared to the pandemic period at the service investigated in this study. In 2020, the number of visits exceeded the results in 2019, despite the functioning changes during the pandemic. This result differs from what was found in previous studies that reported a

**Table 2.** Median of time (days) between biopsy and first visit to radiotherapy and biopsy and beginning of the radiotherapy (High Complexity Oncologic Unit – Obras Sociais Irmã Dulce, 2022)

Year	2018	2019	2020	2021
	Median (q1-q3)	Median (q1-q3)	Median (q1-q3)	Median (q1-q3)
<b>Time between biopsy and first radiotherapy clinical visit</b>	60 (30-120)	90 (60-150)	60 (30-120)	60 (30-120)
<b>Time between biopsy and beginning of radiotherapy</b>	60 (0-150)	150 (90-210)	90 (0-150)	90 (0-150)

**Table 3.** Population characterization in relation to therapeutic regimen (High Complexity Oncology Unit – Obras Sociais Irmã Dulce, 2022)

Year	2018		2019		2020		2021	
	n	%	n	%	n	%	n	%
<b>Surgery</b>								
No	61	83.6	64	77.1	71	82.6	83	86.5
Yes	12	16.4	19	22.9	15	17.4	13	13.5
<b>Therapeutic regimen</b>								
Radiotherapy	21	28.8	21	25.3	27	31.4	20	20.8
Radiotherapy and chemotherapy	52	71.2	62	74.7	59	68.6	75	78.1
Unknown*	0	0	0	0	0	0	1	1

\*patient without record of therapeutic regimen in the medical chart.

**Table 4.** Frequency of the presence or not of oral mucositis and other oral complications (High Complexity Oncology Unit – Obras Sociais Irmã Dulce, 2022)

Year	2018		2019		2020		2021	
	n	%	n	%	n	%	n	%
<b>Oral mucositis</b>								
Unknown	65	89	65	78.3	64	74.4	85	88.5
Grades I and II	6	8.2	18	21.7	19	22.1	10	10.4
Grades III and IV	2	2.7	0	0	3	3.5	1	1
<b>Other oral complications</b>								
No	69	94.5	80	96.4	83	96.5	94	97.9
Yes	4	5.5	3	3.6	3	3.5	2	2.1

reduction of the outpatient activities in 2020<sup>11,16,17</sup>. In addition, an increase in the number of visits in 2021 was observed, possibly reflecting the easing of social distancing measures and the widespread vaccine availability against the SARS-CoV-2, indicating an accumulated demand of patients who did not access the service due to restriction imposed in 2020.

The demographic profile of the patients with head and neck cancer in this study revealed a predominance of male patients, reinforcing the existing literature. Smoking and alcohol consumption use are the main risk factors for this type of cancer and men are generally more exposed to these risk factors than women<sup>4,17</sup>. Another characteristic observed was that most of the patients who attended the service between 2020 and 2021 did not live in Salvador. This finding was unexpected contrary to the expected because there were limitations in the inter-cities public transportation because of the pandemic to counter the aggravation of the disease. One possible explanation is that these patients have used alternative transportation means as cars and municipal transportation services. In addition, the reduction of the number of city buses due to the rising cases of COVID-19 may have contributed to reduce the demand for the service in patients living in Salvador.

The predominance of oral cavity tumor in 2020 may be related to the profile of clinical manifestations. The compromise of anatomical structures facilitates earlier recognition and disease progression, in addition to promoting the reduction of the functionality of the patient. Diagnosis of oral cavity cancer is typically established with clinical examination through the identification of visible tissue changes, mainly at advanced staging followed by biopsy under local anesthesia<sup>8</sup>. In contrast, the diagnostic biopsy for larynx and oropharynx cancer often requires general anesthesia, resulting in more exposure of airways, and may require imaging studies performed by a specialized physician. In many situations, these specialists were reassigned to COVID-19 treatment units or even had activities restricted due to the risk of contamination by aerosols<sup>19</sup>.

Although there has been a change in tumor distribution, from pharynx to lips and oral cavity, there was no great difference in regard to staging that continued predominantly at advanced stages, regardless of the location and period of the study. An increase of staging of tumors IVC between 2019 and 2020 was also observed. Contrary to expectations, there was reduction of this tumor staging in 2021. Initially, because elective procedures were resumed and concerns regarding viral exposure, it was believed that the suppressed demand of the previous year would seek medical care, potentially resulting in more advanced-stage presentation<sup>20</sup>. The absence of information and complete data in some

charts of the service may have influenced the interpretation of these findings.

The interval between diagnosis and initiation of the radiotherapy has an important influence on the survival of oncologic patients because it is closely related to the progress of the disease. The consequence of the prolongation of the interval between diagnosis and beginning of radiotherapy is the significant increase in mortality risk and loss of quality of life<sup>10,20</sup>. The median interval between biopsy and beginning of the treatment of head and neck cancer was lower during the pandemic. Possibly, the prioritization of interventions in conjunction with the suspension of outpatient activities considered elective and potentially subject to postponement allowed to prioritize care delivery to oncologic patients<sup>14,15</sup>.

A mathematical model demonstrated that as long as continuity of healthcare services during the COVID-19 outbreak and the number of visits increased during the recovery phase of the pandemic for patients with head and neck cancer, recovery occurred earlier and lower was the additional risk of death due to delays of the beginning of the treatment<sup>10</sup>. The COVID-19 pandemic has considerably affected the definition of antineoplastic treatment strategies. In 2020, less surgeries were performed, reflecting the virus containment strategy since there was a recommendation to reduce non-urgent hospitalizations and restrict procedures that generated aerosols or involved the manipulation of airways<sup>19,21,22</sup>. There was an unforeseen rise of admissions of patients in intensive care units during the pandemic and many surgical centers were temporarily closed and rearranged to offer intensive care beds<sup>22</sup>. In addition, patients in post-operative recovery tend to have their immune system more vulnerable and susceptible to cross-infections<sup>23,24</sup>. These combined factors may have contributed to reduce the number of surgical procedures further to the modifications of the protocol to treat these patients.

The increase in cases treated with radiotherapy alone in 2020 can be justified due to oncologists' decision in view of the pandemic, because treatment prioritization may have favored the suspension of the adjuvant treatment due to the low immunity of patients with head and neck cancer<sup>21,25,26</sup>. In order to enhance the effects of the radiotherapy, concomitant chemotherapy is commonly indicated for advanced-stage tumors<sup>26,27</sup>. This intervention, however, may induce immunosuppression condition of the individual<sup>26</sup>. In view of the scenario of COVID-19 outbreak, the substantial immunosuppression would result in more vulnerability of oncologic patients, increasing the susceptibility of the severe form of the disease<sup>20,26,28</sup>.

Patients with head and neck cancer treated with radiotherapy and chemotherapy tend to present oral



toxicities such as oral mucositis, hyposalivation, opportunistic fungal, viral or bacterial infections or caries<sup>7</sup>. With the pandemic, dental procedures involving the use of high-speed handpieces, ultrasonic scalers, triple syringes and any activity producing aerosols and exposure to saliva droplets were not recommended<sup>8,9</sup>. Dental service of the reference unit was suspended during seven months in 2020 and the medical staff assumed the responsibility of providing support to patients with oral toxicities. Therefore, it was possible to observe an increase in the recording of oral mucositis and other oral complications in the medical charts in 2020. However, the objective of this study was not to evaluate how these toxicities were managed, but rather to identify their occurrence.

The progression of the pandemic was a challenge to be dealt with by health services and professionals, especially for oncologic treatment. Ensuring patient access to diagnosis and treatment of head and neck cancer affects prognosis cure rates and survival outcomes<sup>10,22</sup>.

A limitation of the study was the exclusive use of radiotherapy medical records and lack of complete data related to other types of care provided to the patient. Therefore, more comprehensive assessment of the effects of the pandemic on patient care was not possible.

## CONCLUSION

This study suggests that the COVID-19 pandemic was not associated with substantial changes on the delivery of care at the reference hospital. It was essential to investigate the impact of the COVID-19 pandemic on the management and treatment of patients with head and neck cancer to inform the evaluation of the current care protocols and optimize patient care and that may affect healthcare service delivery.

## CONTRIBUTIONS

Maria Ester Moutinho, Ana Caroline Sande and Manoela Carrera contributed substantially to the conception and design of the study, acquisition, analysis and interpretation of the data, drafting and critical review. Viviana Passos, Tamires Guedes and Gabriela Botelho Martins contributing to the drafting of the manuscript and critical review. All the authors approved the final version for publication.

## DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

## DATA AVAILABILITY STATEMENT

All content underlying the text of the article is contained in the manuscript.

## FUNDING SOURCES

Fellowship granted by “*Programa Institucional de Bolsas de Iniciação Científica (PIBIC)*”, “*Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)*”. Notice PROP/CI/UFBA 01/2021 PIBIC Project number 21592; Notice PROP/CI/UFBA 01/2022 PIBIC Project number 22723.

## REFERENCES

1. Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmunity*. 2020;109:102433. doi: <https://doi.org/10.1016/j.jaut.2020.102433>
2. Sanyaolu A, Okorie C, Marinkovic A, et al. Comorbidity and its Impact on Patients with COVID-19. *SN Compr Clin Med*. 2020;2(8):1069-76. doi: <https://doi.org/10.1007/s42399-020-00363-4>
3. Chaves ALF, Castro AF, Marta GN, et al. Emergency changes in international guidelines on treatment for head and neck cancer patients during the COVID-19 pandemic. *Oral Oncol*. 2020;107:104734. doi: <https://doi.org/10.1016/j.oraloncology.2020.104734>
4. Chow LQM. Head and neck cancer. *N Engl J Med*. 2020;382(1):60-72. doi: <https://doi.org/10.1056/nejmra1715715>
5. Bozec A, Culié D, Poissonnet G, et al. Current role of primary surgical treatment in patients with head and neck squamous cell carcinoma. *Curr Opin Oncol*. 2019;31(3):138-45. doi: <https://doi.org/10.1097/coo.0000000000000531>
6. Blanchard P, Michiels S, Fayette J, et al. Meta-analysis of chemotherapy in head and neck cancer (MACH-NC): an update on 107 randomized trials and 19 805 patients. *Lancet Oncol*. 2015;16(2):187-99.
7. Instituto Nacional de Câncer. Intervalo de tempo entre o diagnóstico e o início do tratamento oncológico dos casos de câncer de lábio e cavidade oral. Rio de Janeiro: INCA; 2020.
8. Lalla RV, Treister N, Sollecito T, et al. OraRad Study Group. Oral complications at 6 months after radiation therapy for head and neck cancer. *Oral Dis*. 2017;23(8):1134-43. doi: <https://doi.org/10.1111/odi.12710>
9. Conselho Federal de Odontologia (BR). Recomendações para atendimentos odontológicos em tempos de COVID-19 [Internet]. Brasília, DF: CFO; 2020 [acesso 2023 maio 4]. Disponível em: URL: <https://website.cfo.org.br/wp-content/uploads/2020/03/Material-Coronavi%CC%81rus-Dentistas-CFO.pdf>



10. Zhang W, Jiang X. Measures and suggestions for the prevention and control of the novel coronavirus in dental institutions. *Front Oral Maxillofac Med* 2020;2:4. doi: <https://doi.org/10.21037/fomm.2020.02.01>
11. Matos LL, Forster CHQ, Marta GN, et al. The hidden curve behind COVID-19 outbreak: the impact of delay in treatment initiation in cancer patients and how to mitigate the additional risk of dying-the head and neck cancer model. *Cancer Causes Control*. 2021;32(5):459-71. doi: <https://doi.org/10.1007/s10552-021-01411-7>
12. Rygalski CJ, Zhao S, Eskander A, et al. Time to surgery and survival in head and neck cancer. *Ann Surg Oncol*. 2021;28(2):877-85. doi: <https://doi.org/10.1245/s10434-020-09326-4>
13. Amin MB, Greene FL, Edge SB, et al. The eighth edition AJCC cancer staging manual: continuing to build a bridge from a population-based to a more “personalized” approach to cancer staging. *CA Cancer J Clin*. 2017;67(2):93-9.
14. Conselho Nacional de Saúde (BR). Resolução nº 466 de 12 de dezembro de 2012. Aprova diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. *Diário Oficial da União, Brasília, DF*. 2013 jun 13; Edição 112; Seção 1:59.
15. Schoonbeek RC, Jel DVC, van Dijk BAC, et al. Fewer head and neck cancer diagnoses and faster treatment initiation during COVID-19 in 2020: a nationwide population-based analysis. *Radiother Oncol*. 2022;167:42-8.
16. Tevetoglu F, Kara S, Aliyeva C, et al. Delayed presentation of head and neck cancer patients during COVID-19 pandemic. *Eur Arch Otorhinolaryngol*. 2021;278(12):5081-5. doi: <https://doi.org/10.1007/s00405-021-06728-2>
17. Kiong KL, Diaz EM, Gross ND, et al. The impact of COVID-19 on head and neck cancer diagnosis and disease extent. *Head Neck*. 2021;43(6):1890-7. doi: <https://doi.org/10.1002/hed.26665>
18. Silva FA, Roussenq SC, Tavares MGS, et al. Perfil epidemiológico dos pacientes com câncer de cabeça e pescoço em um centro oncológico no sul do Brasil. *Rev Bras Cancerol*. 2020;66(1):e-08455. doi: <https://doi.org/10.32635/2176-9745.RBC.2020v66n1.455>
19. Instituto Nacional de Câncer. Diagnóstico Precoce do Câncer De Boca. Rio de Janeiro: INCA;2022.
20. Ralli M, Candelori F, Cambria F, et al. Impact of COVID-19 pandemic on otolaryngology, ophthalmology and dental clinical activity and future perspectives. *Eur Rev Med Pharmacol Sci*. 2020;24(18):9705-11.
21. American Society for Radiation Oncology. Results of a national physician survey by the American Society for Radiation Oncology (ASTRO) [Internet]. Arlington: ASTRO; 2021 [acesso 2025 dez 17]. Disponível em: [https://www.astro.org/ASTRO/media/ASTRO/News%20and%20Publications/PDFs/ASTRO\\_COVID19Survey\\_2021.pdf](https://www.astro.org/ASTRO/media/ASTRO/News%20and%20Publications/PDFs/ASTRO_COVID19Survey_2021.pdf)
22. Araujo SEA, Leal A, Centrone AFY, et al. Impacto da COVID-19 sobre o atendimento de pacientes oncológicos: experiência de um centro oncológico localizado em um epicentro Latino-Americano da pandemia. *Einstein (São Paulo)*. 2020;19:1-8. doi: [https://doi.org/10.31744/einstein\\_journal/2021AO6282](https://doi.org/10.31744/einstein_journal/2021AO6282)
23. Chone CT. Increased mortality from head and neck cancer due to SARS-CoV-2 pandemic. *Braz J Otorhinolaryngol*. 2021;87(1):1-2. doi: <https://doi.org/10.1016/j.bjorl.2020.11.001>
24. Ralli M, Colizza A, Cambria F, et al. Effects of COVID-19 pandemic on head and neck oncology activity: the experience of our University Hospital. *Eur Rev Med Pharmacol Sci*. 2021;25(23):7268-71. doi: [https://doi.org/10.26355/eurrev\\_202112\\_27419](https://doi.org/10.26355/eurrev_202112_27419)
25. Favaro E, Fernandes DR, Vieira LG, et al. Complicações pós-operatórias em pacientes adultos submetidos a cirurgias com infecção confirmada por SARS-CoV-2: revisão integrativa. *Rev Latino-Am Enfermagem*. 2021;29:e3496. doi: <https://doi.org/10.1590/1518-8345.5346.3496>
26. Ürün Y, Hussain SA, Bakouny Z, et al. Survey of the impact of COVID-19 on oncologists' decision making in cancer. *JCO Glob Oncol*. 2020;6:1248-57. doi: <https://doi.org/10.1200/go.20.00300>
27. Galbiatti AL, Padovani-Junior JA, Maniglia JV, et al. Head and neck cancer: causes, prevention and treatment. *Braz J Otorhinolaryngol*. 2013;79(2):239-47. doi: <https://doi.org/10.5935/1808-8694.20130041>
28. Zhang L, Zhu F, Xie L, et al. Clinical characteristics of COVID-19-infected cancer patients: a retrospective case study in three hospitals within Wuhan, China. *Ann Oncol*. 2020;31(7):894-901.

Recebido em 24/11/2025  
Aprovado em 13/4/2026

