Interval Between Diagnosis and Treatment of Oral Cavity Cancer in Health Services in the State of Bahia, 2000-2022

https://doi.org/10.32635/2176-9745.RBC.2026v72n3.5640EN

Intervalo para Diagnóstico e Tratamento do Câncer de Cavidade Oral nos Serviços de Saúde no Estado da Bahia, 2000-2022

Intervalo para Diagnóstico y Tratamiento del Cáncer de Cavidad Bucal en los Servicios de Salud del Estado de Bahía, 2000-2022

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ABSTRACT

Introduction: Oral cavity cancer shows high mortality rates in Bahia, largely attributed to late diagnosis. **Objective:** To investigate factors associated with the diagnostic and treatment intervals for oral cavity cancer in health services across the state of Bahia between 2000 and 2022. **Method:** A cross-sectional, hospital-based study was conducted with 1,305 cases retrieved from Hospital Based Cancer Registries. Descriptive statistical analyses included absolute and relative frequencies for categorical variables, and medians with interquartile ranges for age and time intervals of interest (dates) were performed. A significance level of 5% (α=0.05) was adopted, and Poisson regression with a negative binomial distribution was applied. **Results:** Most of the 1,305 individuals with oral cancer were diagnosed at advanced-stage (69.2%), were referred through the Brazilian National Health System (98.2%), and had to leave their city of origin to receive oncologic care (69.9%). The median of days since entry into oncology services to treatment initiation was 91 days, ranging between 61 and 144 days. Time was associated with the necessity of transportation as protective factor (IRR 0.57) and with sex, age and staging. **Conclusion:** Time range to begin treatment at health services in Bahia exceeds 90 days, potentially compromising treatment outcomes, prognosis, and quality of life. Referral pathways and the need to travel for care emerged as key factors influencing the diagnostic and treatment timelines.

Key words: Mouth Neoplasms/epidemiology; Mouth Neoplasms/diagnosis; Health Information Systems/statistics & numerical data; Health Services/statistics & numerical data.

RESUMO

Introdução: O câncer de cavidade oral apresenta altas taxas de mortalidade na Bahia, sendo relacionado ao diagnóstico tardio. **Objetivo:** Investigar os fatores relacionados ao intervalo para o diagnóstico e tratamento do câncer de cavidade oral em serviços de saúde do Estado da Bahia no período de 2000 a 2022. **Método:** Pesquisa de corte transversal e base hospitalar, com 1.305 casos recuperados dos Registros Hospitalares de Câncer. Foi realizada análise estatística descritiva da população em estudo, apresentando as frequências absolutas e relativas das variáveis categóricas e as medianas e intervalos interquartílicos para a idade e o número de dias entre os intervalos (datas) de interesse, considerando o nível de significância de 5% (α=0,05) e aplicado o modelo de regressão de Poisson com distribuição negativa binomial. **Resultados:** Dos 1.305 baianos com câncer oral, a maioria foi diagnosticada em estádio avançado (69,2%), encaminhada pelo Sistema Único de Saúde (98,2%) e precisou se deslocar do município de residência para receber assistência oncológica (69,9%). A mediana do número de dias entre a entrada no serviço oncológico e o início do tratamento foi de 91 dias, variando entre 61 e 144 dias. O tempo foi associado à necessidade de deslocamento, como fator protetor (IRR 0,57), ao sexo, idade e estadiamento. **Conclusão:** O intervalo de tempo para iniciar o tratamento nos serviços de saúde na Bahia ultrapassa 90 dias, o que pode impactar no tratamento, prognóstico e na qualidade de vida dos baianos. As origens do encaminhamento e do deslocamento se mostraram como fatores importantes em relação ao intervalo para diagnóstico e tratamento.

Palavras-chave: Neoplasias Bucais/epidemiologia; Neoplasias Bucais/diagnóstico; Sistemas de Informação em Saúde/estatística & dados numéricos; Serviços de Saúde/ estatística & dados numéricos.

RESUMEN

Introducción: El cáncer de cavidad oral presenta elevadas tasas de mortalidad en el estado de Bahía, asociadas principalmente al diagnóstico tardío. **Objetivo:** Investigar los factores relacionados con los intervalos para el diagnóstico y el tratamiento del cáncer de cavidad oral en los servicios de salud del estado de Bahía entre los años 2000 y 2022. **Método:** Estudio transversal, de base hospitalaria, realizado con 1305 casos recuperados de los Registros Hospitalarios de Cáncer. Se efectuó análisis estadístico descriptivo de la población objetivo, calculando las frecuencias absolutas y relativas de las variables categóricas, y las medianas e intervalos intercuartílicos para la edad y el número de días entre los intervalos (fechas) de interés. Se aplicó un modelo de regresión de Poisson con distribución binomial negativa, adoptándose un nivel de significación del 5% (α=0,05). **Resultados:** La mayoría de los 1305 individuos fue diagnosticada en estadio avanzado (69,2%), fue derivada por el Sistema Único de Salud (98,2%) y necesitó desplazarse fuera de su municipio de residencia para recibir atención oncológica (69,9%). La mediana del número de días entre el ingreso al servicio oncológico y el inicio del tratamiento fue de 91 días, variando entre 61 y 144 días. Se asoció el tiempo a la necesidad de desplazamiento, como factor protector (IRR 0,57), al sexo, edad y estadificación. **Conclusión:** El tiempo de espera para iniciar un tratamiento en los servicios de salud de Bahía supera los 90 días, lo que puede comprometer el tratamiento, el pronóstico y la calidad de vida de los pacientes. Los orígenes de la derivación y el desplazamiento fueron factores relevantes con relación al intervalo de diagnóstico y tratamiento.

Palabras clave: Neoplasias de la Boca/epidemiología; Neoplasias de la Boca/diagnóstico; Sistemas de Información en Salud/estadística & datos numéricos; Servicios de Salud/estadística & datos numéricos.

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INTRODUCTION

According to the World Health Organization (WHO), 377,713 new cases of oral cavity and lip cancer were diagnosed in 2020, being estimated more than 450 thousand new cases until 2030, an approximate increase of 19% in ten years[1]. Brazil has an estimated rate of 7.98 for each 100 thousand inhabitants, one of the highest incidences countries of oral cavity cancer according to the National Cancer Institute (INCA) for 2026-2028[3]. This is the fifth most common type of cancer in the Northeast region among men mostly over 40 years of age[4]. In the state of Bahia, the incidence rate is 11.05 per 100 thousand men and 4.26 per 100 thousand women for the same period[3].

Predominantly, oral cavity cancer develops by the interaction of environmental factors and genetic predisposition[5]. The disease can be auto-detected through observation of tissue alterations or during a clinical exam and confirmed by biopsy of suspicious lesion[6]. However, most of these new cases is diagnosed at advanced stages (III or IV), demanding more aggressive treatments and negatively impacting the quality of life and survival of the patients[7]. Studies indicate that as high the staging, worse is the prognosis[8,9], and as short the time range between the diagnosis and the beginning of the treatment, better is the survival[10].

Some authors believe that key-points should be established for the diagnosis and treatment over time. The time range begins when the individual initiates the oncologic care at the health service, followed by the medical visit with the oncologist, diagnostic confirmation and ends when the treatment begins[11]. Time ranges exceeding 60 days to begin the treatment shortens survival in 26% compared with patients treated within 30 days, increasing the risk of death[12]. Characteristics of the health system and services impact the time range including availability and access to the service, geographical distribution, quality of the human resources and technology, operation and information[13].

In view of the Brazilian laws number 13,896/2019[14] and 12,732/2012[15] that determined 30 days for the diagnosis and until 60 days to begin the treatment after the diagnosis, studies evaluating the time range of the health services can favor monitoring and find whether the law is being complied with or not as well as the associated factors. As such, barriers of access to health services and measures to redirect the services can be identified to improve the control of oral cavity cancer in Bahia.

The objective of the present study is to investigate the factors associated with the time range between the diagnosis and treatment of oral cavity cancer at the health services in Bahia from 2000 to 2022.

METHOD

Hospital-based, cross-sectional, observational study with data available at the specialized oncology hospitals across Bahia: high-complexity care units (Unacon) in Feira de Santana, *Aristides Maltez* and *Irmã Dulce* in Salvador, *Santa Casa de Misericórdia de Itabuna*, *Hospital Regional Costa do Cacau* in Ilhéus, *Hospital Geral de Vitória da Conquista* and *Hospital Municipal de Teixeira de Freitas*.

Health data are stored and available nationally through big databases such as IntegradorRHC[16] that was utilized to collect data for the present study. It is a data collecting, processing and continuous, organized analysis of Brazilians with confirmed cancer diagnosis treated at specialized oncology hospitals. The operation of a Hospital-based Cancer Registry (HBCR) and systematic shipping of data to IntegradorRHC are mandatory for accredited hospitals in specialized oncologic attention of the National Health System (SUS)[17].

Every analytical register of Bahia with confirmed histopathology of oral cavity cancer of the categories C00, C02 to C06 (C00, lip, C02, other unspecified parts of the tongue, C03, gingiva, C04, floor of the mouth, C05, palate and C06, other unspecified parts of the mouth) diagnosed with squamous cell carcinoma (code 8070/3) classified according to the International Classification of Diseases for Oncology, second edition (ICD-O) until 2004 and according to ICD-O/03 since 2005 identified at IntegradorRHC in the age range older than 19 years from 2000 to 2022 have been included in the study.

The lower age-range to join the study followed the Brazilian statute of children and adolescents (ECA) where adolescence covers individuals until 18 years old[18].

Cases already diagnosed, non-compliance of the law-mandated time range or missing information of the dates of diagnosis and beginning of the treatment at the health services or any other variable utilized in the model were excluded.

Sociodemographic variables (sex, age, race/color, marital status, education, main occupation) related to risk factors (tobacco, alcohol use and family history), characterization of the tumor (primary location of the tumor, TNM and staging) and time range of the health services (original referral, transportation, dates of entry in the service, first medical visit, diagnosis and beginning of the treatment) of the eligible registers were considered.

The sociodemographic variables race/color, marital status, education and main occupation have been categorized for the objectives of the analyzes. The variable race/color was dichotomized in Whites/Non-Whites. Whites included individuals who self-claimed as Whites and Non-Whites included Blacks, Browns, Yellows and

Indigenous, favoring the separate analysis of those who match the profile of disease morbidity. Marital status was divided in: with spouse (married, common-law marriage) and without spouse (single, widow/er, separated). Education was categorized in illiterate, elementary school (complete and incomplete), middle and high-education (complete or incomplete). The occupations were categorized according to the aggregated structure in big groups of the Brazilian classification of occupations[19].

Time range data were analyzed as a continuous variable to reduce the pejorative bias of "delay, wait". Time ranges for the diagnosis and treatment followed the criteria proposed by the Aarhus Statement[11], with emphasis in the time range of the health services.

Statistic descriptive analysis was performed initially for the study population with absolute and relative frequencies of the categorical variables and medians and interquartile ranges for age and days of the time ranges of interest. Four time ranges (days) were calculated according to: i) Interval Entry-Medical Visit: time between the date of entry in the oncologic service and date of the first medical visit; ii) Interval Medical Visit-Diagnosis: time between the first medical visit and histopathologic diagnostic confirmation; iii) Interval Diagnostic-Treatment: time between the diagnosis and beginning of the first oncologic therapeutic; iv) Interval of the health service (total time): time between the entry at the unit and beginning of the actual treatment. Medians and interquartile ranges were calculated for each one of these periods utilizing the Wilcoxon test for groups comparisons with level of significance of 5%.

Poisson's regression and negative binomial distribution that adjusts to overdispersion was applied to estimate the incidence rate of additional waiting days between the entry in the oncologic service and beginning of the treatment depending on one or more predictors. The selection of the covariables for the initial model was based on theoretical criteria, the software R[20], version 4.3.2 and SPSS[21], version 22.0 (SPSS Inc., Chicago. USA) were utilized for all the analyzes.

The submission to the Ethics Committee was waived because only public, secondary, deidentified data (available in INCA's website) were utilized in compliance with Directive 510/2016 of the National Health Council[22].

RESULTS

3,919 analytical cases of oral cancer have been registered in Bahia from 2000 to 2022, 86.5% of which were squamous cells carcinoma. Upon application of the eligibility and exclusion criteria, 1,305 registers formed the final population of the study and were analyzed (Supplementary figure 1).

The sociodemographic characteristics and lifestyle of the population diagnosed with oral cavity revealed that most were men (74.9%), median age of 60 years, ranging between 52 and 70 years of age, self-claimed Non-Whites, (83.6%), complete elementary school (61.5%), without spouse (65.6%), workers of agriculture, forestry and fishing activities (50.9%), with no family history of cancer (68.4%) and tobacco (72.1%) and alcohol users (50.7%) (Table 1).

Table 2 reveals that tongue (33.2%) was the most common anatomic site of oral cavity cancer, more than half of the patients (50.8%) was diagnosed at stage IV, the most advanced of the disease. The majority (98.2%) was referred by SUS and had to leave their origin city to submit to the treatment (69.9%).

The median time range between the diagnosis and beginning of the treatment exceeded 90 days, ranging between 61 and 144 days (Table 3), 30 days more than the legal mandate requiring initiation within 60-days. This result accounted for the longest time range observed in health services.

The results of the Poisson regression with negative binomial distribution evaluating the association between time range of health services and origin of referral and transportation revealed that both are significant factors impacting the time range of health services in Bahia (p<0.001) (Table 4).

A multivariate analysis of negative binomial regression was performed including the variables origin of the referral, necessity of transportation, sex, age and clinical staging in the model in order to estimate the independent effects of these variables over waiting time. The results demonstrate association with the necessity of transportation, indicating that patients who needed to move to seek treatment were assisted within a shorter time range of health services than those who did not had to move to seek treatment. In addition, sex presented statistical significance suggesting that women were assisted within a greater time range at the health services than men. Age and clinical staging have also presented statistical significance. There was no statistically significant association for the origin of the referral (Table 5).

DISCUSSION

The results revealed that the majority of the individuals with oral cavity cancer in Bahia were diagnosed at advanced stages of the disease and accessed the oncologic services referred by the health system. Most of them needed to leave their origin cities to receive specialized treatment, reflecting the regional coverage of oncologic care. The time range between entry in oncologic service

Table 1. Sociodemographic characteristics and lifestyle of Bahia's individuals diagnosed with oral cavity cancer. Bahia, 2000-2022 (n=1,305)

Variable	n	%
Sex		
Male	976	74.8
Female	329	25.2
Race/color[a]		
White	211	16.4
Non-White	1.079	83.6
Education[b]		
Illiterate	361	28.6
Elementary	776	61.5
Middle	114	9.0
High	11	0.9
Marital status[c]		
With spouse	448	34.4
Without spouse	853	65.6
Occupation[d]		
Agriculture, forestry and fishing	502	50.9
Officers	2	0.2
Public managers	7	0.7
Science and arts professionals	19	1.9
Middle-school support staff	8	0.8
Administrative services	15	1.5
Services and sales	128	13.0
Extractivism, civil construction, textile and others	236	23.9
Chemicals, steel, food	23	2.3
Servicing and maintenance	47	4.8
Cancer family history[e]		
Yes	378	31.6
No	819	68.4
Tobacco use history[f]		
Yes	858	72.1
No	332	27.9
Alcohol use history[g]		
Yes	623	50.7
No	606	49.3

Source: IntegradorRHC[16].
Caption: SUS = National Health System.
Note: [a]15 missing data; [b]43 missing data; [c]4 missing data; [d]318 missing data; [e]108 missing data; [f]115 missing data; [g]76 missing data.

Table 2. Clinical and histopathological characteristics of lesions of oral cavity of Bahia's individuals diagnosed with oral cavity cancer. Bahia, 2000-2022 (n=1,305)

Variable		n	%
Location of the tumor			
Tongue		433	33.2
Lip		126	9.7
Gingiva		56	4.3
Floor of the mouth		265	20.3
Palate		230	17.6
Other parts of the mouth		195	14.9
TNM			
	T1	11.4	11.4
	T2	23.9	23.9
T	T3	21.4	21.4
	T4	36.8	36.8
	N/R	6.4	6.4
	N0	50.2	50.2
	N1	14.9	14.9
N	N2	19.2	19.2
	N3	9.3	9.3
	N/R	6.4	6.4
	M0	93.2	93.2
M	M1	0.4	0.4
	N/R	6.4	6.4
Staging[a]			
In situ		5	0.4
I		125	10.7
II		228	19.7
III		214	18.4
IV		591	50.8
Origin of the referral			
SUS		1.282	98.2
Non-SUS		23	1.8
Transportation from the origin city to submit to the treatment			
Yes		912	69.9
No		393	30.1

Source: IntegradorRHC[16].
Captions: TNM = Classification of Malignant Tumors; SUS = National Health System.
Note: [a]142 missing data.

Table 3. Median of days between diagnosis and beginning of the treatment in health services for Bahia's individuals with oral cavity cancer. Bahia, 2000-2022 (n=1,305)

Time range	Median (Q1 – Q3)
Entry at oncology service until the first clinical visit (days)	2 (0 – 14)
First clinical visit until the diagnosis (days)	19 (8 – 43)
Diagnosis until the beginning of the treatment (days)	62 (7 – 111)
Entry at oncology service until beginning of the treatment[a] (days)	91 (61 – 144)

Source: IntegradorRHC[16].
Note: [a]Time range of health services

Table 4. Incidence rate and confidence interval of 95% of the time range of the health services, origin of referral and transportation of individuals with oral cavity cancer in Bahia. Bahia, 2000-2022 (n=1,305)

Variables		IRR	CI 95%	*p*
Origin of referral	SUS	1.00	1.00	**<0.001**
	Non-SUS	0.54	0.52 – 0.57	
Transportation	No	1.00	1.00	**<0.001**
	Yes	1.10	1.08 – 1.11	

Source: IntegradorRHC[16].
Captions: IRR = Incidence Rate Ratio; CI = confidence interval; SUS = National Health System.

Table 5. Analysis of negative binomial regression of time range of health services for individuals with oral cavity cancer. Bahia, 2000-2022 (n=1,163)

Variables	IRR	CI 95%	*p*
Origin of referral			**0.2**
SUS	—	—	
Non-SUS	0.66	0.40-1.20	
Transportation			**<0.001**
No	—	—	
Yes	0.57	0.49-0.65	
Sex			**<0.001**
Male	—	—	
Female	1.40	1.21-1.64	
Years (years)	1.01	1.01- 1.02	**<0.001**
Clinical staging			**<0.001**
In situ	—	—	
I	2.38	0.75-5.61	
II	1.90	0.60-4.44	
III	1.70	0.54-3.96	
IV	1.30	0.41-2.99	

Source: IntegradorRHC[16].
Captions: IRR = Incidence rate ratio; CI = confidence interval; SUS = National Health System.

and beginning of the treatment was relatively long with important variations of the cases.

Aligned with the literature, the findings of the present study have also revealed that the socioeconomic profile of individuals with oral cavity cancer consisted of males, self-reported non-Whites, mean age of 60 years, workers of agriculture, forestry and fishing activities, without cancer family history, without spouse and low education level[7,23]. The highest prevalence in men can be associated with behavioral factors as high tobacco and alcohol use as also indicated by other authors[23] and the National Health Survey (PNS) 2019[24] that revealed a prevalence of 37.1% of regular intake of alcohol among men as opposed to 17.0% in women. Agriculture, forestry and fishing are the cornerstone of the economy of Bahia accounting for 14.3% of the Gross Domestic Product (GDP) in the first trimester of 2025[25]. Individuals working outdoors are exposed to sun rays and when unprotected are at increased risk of oral cavity cancer[26].

According to the Census of 2022 of the "*Instituto Brasileiro de Geografia e Estatística (IBGE)*", the population of Bahia is formed by 22.4% self-declared Blacks and 57.3% Browns, totaling 79.7% of the population, reinforcing the profile of the state as the larger Black population of Brazil[25]. These data underscore the relevance of considering sociodemographic characteristics as race/color in the strategies of health prevention and care in order to promote equity of diagnosis and treatment of oral cavity cancer. A retrospective analysis of cases of squamous cell carcinoma in Bahia between 2010 and 2017 revealed statistically significant association between education level and staging at diagnosis ($p<0.05$), pointing out that low education individuals present high frequency of tumors at advanced stages, suggesting that restricted access to information compromises early detection of the disease[27].

Although this type of cancer is easy to detect in most of the cases through a simple procedure as visual inspection of the mouth and suspicious lesions, the majority was diagnosed at later stages in Bahia, consistent with 2020 INCA's Report that revealed that the most frequent staging of oral cavity cancer in Brazil was IV (62.24%)[28]. This fact is attributed to the asymptomatic character of tumors at initial stages, culminating in significant impacts on quality of life and survival, in addition to barriers of access to health services and poor formation of health professionals[27].

The present findings have also indicated that most of the cases were referred by public health institutions and diagnosed at advanced stages. A retrospective, observational study involving 37,121 patients diagnosed with squamous cell carcinoma in the head and neck region between 2016 and 2018, being 36,914 in public hospitals and 207 in private clinics (oncoclinic), observed that oral cavity was the predominant primary site in men and women, 52.2% and 33.5% respectively[23]. The majority was also diagnosed at locally advanced stages (III-IVB), regardless of the primary site. Metastatic disease (clinical stage IVC) was diagnosed for a small percent of the cases (2.9%)[23]. Another study indicates that patients from public health institutions have low socioeconomic status compared to patients assisted by private hospitals[29]. Locally advanced stage was observed for most of the cases diagnosed and treated in private hospitals. On the other hand, there was low proportion of oral cavity cancer as primary site in private hospitals compared to oropharynx[23]. This can reflect the trajectory of patients with oral cavity cancer submitted to surgical resection who are not often referred to oncologic clinics[23]. The increase of the proportion of oropharynx cancer over time in private hospitals can suggest a rise of the prevalence of HPV related tumors[23,30-32].

The median of the time range of health services shows that the days to deliver the diagnosis complies with Law no. 13,896/2019[14]. The guidelines of the National Oral Public Health Policy – *Brasil Sorridente* – preview that the diagnosis of oral cavity cancer can be performed by specialized buccal centers in order to speed up the diagnostic process of the disease, allowing the detection at initial stages and the patient attending the hospital only for treatment. The median between the diagnosis and beginning of the treatment in Bahia does not comply with Law no. 12,732/2012, that determines that the patient with malignant neoplasm must be submitted to the first treatment in SUS within 60 days or less from the confirmed pathological report[15]. A 2019-2021 DATASUS-based temporal time series in Brazil identified that more than half of the patients with oral cavity and oropharynx cancer initiated the treatment after the 60-day legal mandate post diagnosis[33].

In that sense, SUS, where most of cases of oral cavity tumor are referred to, has important challenges to detect and treat these tumors in a timely manner[23]. The origin of referral and transportation were important factors affecting the time range of health services. However, in the multivariate analysis, the origin of the referral lost statistical significance and necessity of transportation presented inverse relation. In despite of this, geographical barriers and structural issues of the health system hinder the access to the treatment, especially for SUS users who need to leave their origin cities and seek treatment in specialized centers[33]. This scenario reflects the reality of Bahia, marked by the scarcity of medium and high complexity services out of the great urban hubs, the fragility of the referral and counter-referral system among different levels of attention, collaboration with private institutions and bureaucratization of the processes among others. These barriers compromise the timely access to diagnosis and beginning of the treatment, directly influencing the prognosis and clinical evolution of the patients.

Regardless of the secondary data utilized in the present investigation and potential bias of information due to poor data completion, a descriptive study that evaluated the quality of the data of HBCR between 2000 and 2022 found a progressive improvement of the completion of the variables over time, mainly for the clinical variables in 2020 in comparison with the three previous years[34]. However, data provided by IntegradorRHC do not represent the totality of new cases diagnosed in Bahia since the coverage comprehends only the individuals who access accredited oncologic units and not those who do not seek treatment[16].

The criteria proposed by the Aarhus Statement[11] to promote the quality, consistency and improve the comparability of the studies about time ranges of cancer diagnosis and treatment were created for a health system different than Brazil's. In addition, the period investigated in the present study included the COVID-19 period, which might have impacted the time observed in the time ranges analyzed. Therefore, new studies with more robust data addressing the cultural, ethnic and socioeconomic diversity of the population, the organization of the health attention network, the pandemic are necessary, in addition to variables related to labor processes, assistance flows and barriers of access to the services in order to identify specificities associated with the time range of diagnosis and treatment of oral cavity cancer.

CONCLUSION

The findings of this study indicate that the time range of health services for diagnosis and treatment of cases of cancer of oral cavity in Bahia exceeds 90 days. The time range was associated with the necessity of transportation, sex, age and staging. Shorter time range of health services was observed for individuals who needed to leave their origin cities to seek treatment, characterizing it as a protective factor. In addition, women were assisted within a greater time range than men and old age was associated with extended time range.

CONTRIBUTIONS

Yasmin Rocha da Costa Oliveira, Lidiane de Jesus Lisboa and Valéria Souza Freitas contributed substantially to the conception and design of the study, acquisition, analysis and interpretation of the data, writing and critical review. Jean Carlos Zambrano Contreras, Alessandra Laís Pinho Valente Pires, Marília de Matos Amorim and Jean Nunes dos Santos contributed substantially to the analysis and interpretation of the data, writing 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

Data generated and analyzed in the present study are available at URL https://irhc.inca.gov.br/RHCNet/visualizaTabNetExterno.action.

FUNDING SOURCES

None.

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Recebido em 18/12/2025
Aprovado em 5/3/2026

Associate editor: Adriana Tavares de Moraes Atty. Orcid iD: https://orcid.org/0000-0003-2271-746X
Scientific-editor: Anke Bergmann. Orcid iD: https://orcid.org/0000-0002-1972-8777