

# Dental care for children in a tertiary hospital

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**Aim:** To evaluate the profile of pediatric onco-hematological patients and the outpatient dental care provided to these individuals from January 2016 to December 2019 by the Pediatric Dentistry division of the Dentistry and Stomatology Service of a tertiary hospital. **Methods:** Data were collected from the medical records of 179 pediatric patients undergoing treatment for onco-hematological diseases, aged between 0 and 19 years, regarding their profile and the outpatient dental care provided by the Pediatric Dentistry Service of the Dentistry and Stomatology Service of a tertiary hospital. Data were tabulated and subjected to descriptive statistical analysis. **Results:** The majority of the patients were male, with a mean age of 12. Anemia and leukemia were the most prevalent diseases in this study. During the evaluation period, 1548 dental appointments were performed, 696 of which were clinical evaluations. The remaining appointments involved various dental procedures. The most common procedures included the topical application of fluoride and dental prophylaxis, followed by extractions, laser therapy, tooth decay removal, and restorations/sealants. **Conclusion:** Assessing patient profiles and the dental care provided are important tools for improving dental care protocols and enhancing the quality of life for pediatric onco-hematological patients.

**Keywords:** Neoplasms. Hematology. Oral health. Pediatric dentistry.



## Introduction

Neoplastic pathologies in children and adolescents between 0 and 19 years old are considered rare events compared to adults, representing about 2% to 3% of all malignant tumors recorded in Brazil<sup>1</sup>.

In malignant neoplasms, there is a disorderly growth of cells invading organs and tissues. However, in children, there are differences in clinical behavior, histopathological origin, and primary sites of the disease<sup>2</sup>. In children and adolescents, tumors tend to have a short latency period, being extremely aggressive and invasive, but generally, they respond better to antineoplastic treatment, thus having a better prognosis compared to other populations<sup>2</sup>.

Authors suggest that before starting onco-hematological treatment, patients should have excellent oral health to avoid the risk of complications<sup>3,4</sup>. Carious lesions affecting both primary and permanent teeth, periodontal diseases where the accumulation of bacterial plaque increases the severity of mucosal infections, predisposing to gingival inflammation, as well as the presence of opportunistic infections caused by bacteria, fungi, and viruses, are some complications that can negatively interfere with onco-hematological treatment<sup>3,6</sup>.

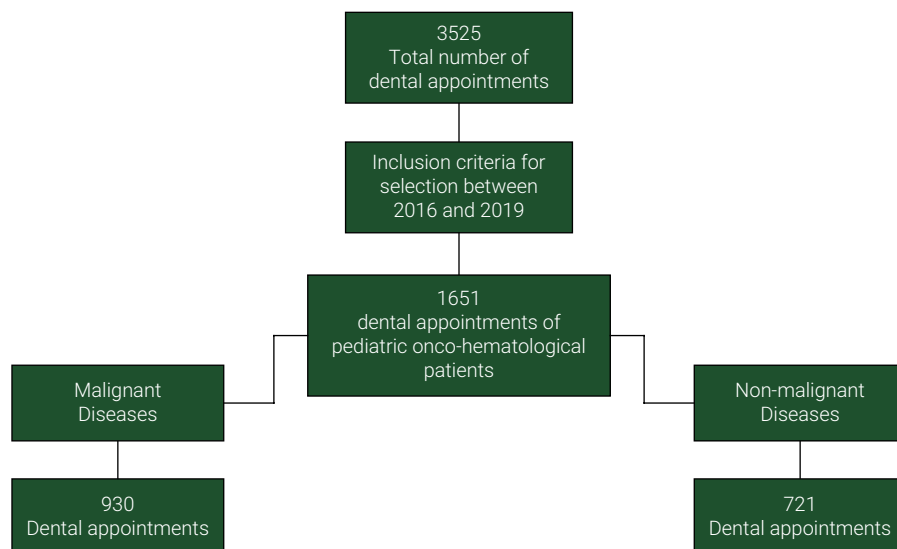
The profile of pediatric onco-hematological patients treated in hospitals in Brazil shows that a large part of these individuals have poor oral health, and this condition is often responsible for increasing hospitalization time, causing delays, and even the suspension of onco-hematological treatments, raising the risk of systemic complications<sup>6-9</sup>.

Thus, the objective of this study was to retrospectively evaluate the profile of pediatric onco-hematological patients aged between 0 and 19 years and analyze the outpatient dental care provided to these individuals from January 2016 to December 2019 by the Pediatric Dentistry Service of the Dentistry and Stomatology Service of the Clinical Hospital of Ribeirão Preto Medical School - USP (HCFMRP/USP).

## Methods

This was a retrospective study. Data were collected from the medical records of pediatric patients undergoing treatment for onco-hematological diseases aged between 0 and 19 years. The data were retrieved from an outpatient dental care service provided by the Pediatric Dentistry division of the Dentistry and Stomatology Service of a tertiary hospital from January 2016 to December 2019.

Patients who had never been diagnosed with onco-hematological diseases, those with incomplete or missing clinical information, and individuals over 19 years of age were excluded from the study (Figure 1).



**Figure 1.** Flowchart for the selection of dental appointments and distribution of medical diagnoses

For sample characterization, demographic information such as gender and age was collected. Additionally, patients were classified according to the nature of the disease into two groups: I) patients with malignant diseases, and II) those with non-malignant diseases.

Regarding dental appointments, these were classified into two types: I) clinical evaluation, which includes medical history and extra- and intraoral clinical examination, and II) procedures, which encompass dental treatments typically performed in tertiary care settings.

The collected data were tabulated and submitted to descriptive statistical analysis.

### Ethical aspects

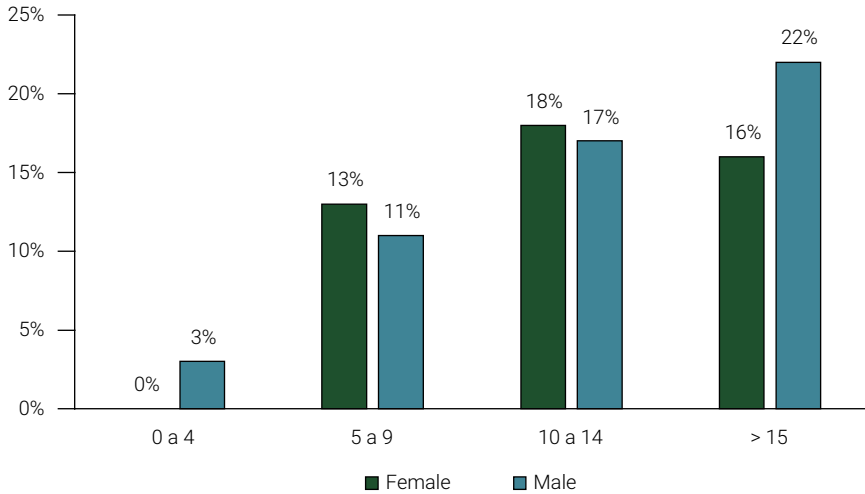
This study followed the ethical principles dictated by Resolution 466/2012 of the National Health Council and was approved by the Ethics Committee for Research in Human Beings at CHRPM/USP (CAAE: 38625320.0.0000.5440).

### Results

Between January 2016 and December 2019, 3525 dental appointments were conducted at the Dentistry and Stomatology Service of a tertiary hospital, 1651 of which were for pediatric onco-hematological patients. Specifically, 930 dental appointments were for patients with malignant diseases, and 721 were for patients with non-malignant diseases (Figure 1).

This study included 179 pediatric onco-hematological patients. Male patients comprised 53% of the sample ( $n=95$ ), with a mean age of  $12.47 \pm 3.73$  years.

Figure 2 illustrates the distribution of age intervals by sex of patients during their initial dental appointments.



**Figure 2.** Frequency distribution of age intervals and gender among pediatric onco-hematological patients

Table 1 shows that the most prevalent malignant diseases were ALL (25%) and CNS neoplasms (25%), followed by sarcomas/osteosarcomas (18%), other solid tumors (15%), and AML (7%). Among non-malignant diseases, aplastic anemia (25%) and sickle cell anemia (21%) were the most frequent, followed by Fanconi anemia (14%) and other hematological problems (12%).

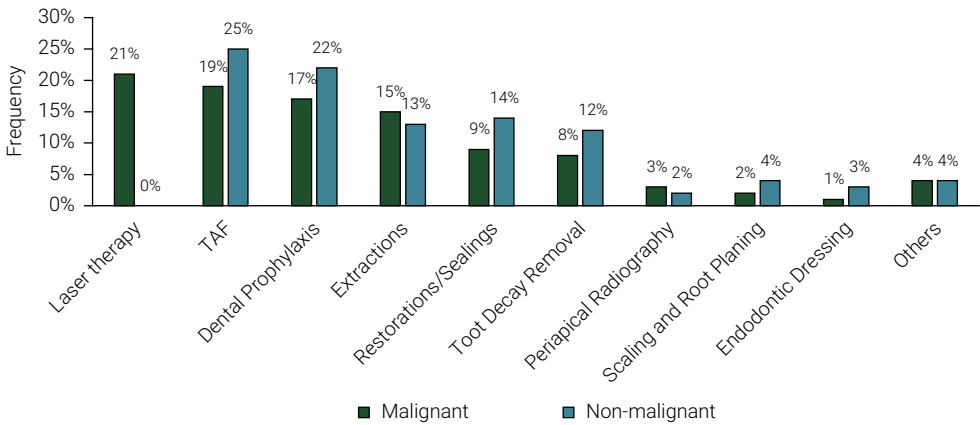
**Table 1.** Prevalence of malignant and non-malignant diseases in pediatric patients

Malignant Diseases	n (%)	Non-malignant Diseases	n (%)
ALL	29 (25)	Aplastic Anemia	16 (25)
CNS Neoplasms	29 (25)	Sickle Cell Anemia	14 (22)
Sarcomas/Osteosarcomas	21 (18)	Fanconi Anemia	9 (14)
Other solid tumors	18 (16)	Other hematological problems	8 (12)
AML	8 (7)	Hemophilia A	7 (11)
Non-Hodgkin's Lymphoma	6 (5)	ITP	5 (8)
Hodgkin Lymphoma	3 (3)	Hemoglobinopathies	2 (3)
CML	2 (2)	Wiskott-Aldrich Syndrome	2 (3)

ALL: Acute Lymphoblastic Leukemia, CNS: Central Nervous System, AML: Acute Myeloid Leukemia, CML: Chronic Myeloid Leukemia, ITP: Idiopathic Thrombocytopenic Purpura

Figure 3 shows that in patients with malignant diseases, laser therapy (21%) and topical application of fluoride (TAF) were the most common procedures, followed

by dental prophylaxis (17%) and extractions (15%). For the group of patients with non-malignant diseases, TAF (25%) and dental prophylaxis (22%) were the most performed, followed by restorations (14%), extractions (13%) and tooth decay removal (12%). The distribution of frequency of dental care, clinical evaluations and procedures performed in onco-hematological patients in the years between 2016 and 2019 is shown in Table 2.



TAF: Topical Application of Fluoride

**Figure 3.** Frequency distribution of dental procedures performed on patients with malignant and non-malignant diseases.

The number of dental appointments for pediatric onco-hematological patients increases linearly each year. Dental procedures were the most frequently performed appointments throughout all the years evaluated.

**Table 2.** Distribution of frequency of dental appointments, clinical evaluations and procedures performed in pediatric onco-hematological patients

	n (%)				Total
	2016	2017	2018	2019	
Number of Dental Appointments	360	353	434	504	1651
Clinical Assessment	154 (21)	164 (22)	174 (23)	250 (34)	742
Procedures	206 (23)	189 (20)	260 (29)	254 (28)	909
Topical Application of Fluoride	45 (23)	48 (24)	49 (25)	57 (29)	199
Dental Prophylaxis	43 (25)	37 (21)	47 (27)	48 (27)	175
Extractions	30 (24)	26 (21)	33 (26)	37 (29)	126
Laser therapy	1 (1)	16 (15)	58 (55)	31 (29)	106
Restorations / Sealings	40 (38)	18 (17)	23 (22)	25 (24)	106
Tooth decay removal	36 (39)	16 (17)	17 (18)	23 (25)	92

Continue

Continuation					
Scaling and root planning	3 (12)	7 (28)	5 (20)	10 (40)	25
Periapical Radiography	0 (0)	8 (36)	10 (45)	4 (18)	22
Endodontic dressing	1 (7)	6 (40)	8 (53)	0 (0)	15
Suture Removal	2 (15)	3 (23)	4 (31)	4 (31)	13
Exfoliative Cytology	0 (0)	2 (25)	2 (25)	4 (5)	8
Ulectomy	0 (0)	0 (0)	1 (100)	0 (0)	1
Intralesional Corticosteroid Application	0 (0)	0 (0)	0 (0)	4 (100)	4
Biopsy	2 (33)	0 (0)	1 (17)	3 (50)	6
Frenectomy	0 (0)	1 (50)	0 (0)	1 (50)	2
Molding	1 (100)	0 (0)	0 (0)	0 (0)	1
Prosthesis Installation	1 (100)	0 (0)	0 (0)	0 (0)	1
Prosthesis Adjustment	1 (100)	0 (0)	0 (0)	0 (0)	1
Bleeding Surgical Approach	0 (0)	1 (100)	0 (0)	0 (0)	1
Cutting Dental Edge Regularization	0 (0)	0 (0)	1 (100)	0 (0)	1
Occlusal Adjustment	0 (0)	0 (0)	1 (25)	3 (75)	4
Gingivectomy	0 (0)	0 (0)	0 (0)	1 (100)	1

## Discussion

This study aimed to assess the profile of pediatric onco-hematological patients. It was found that the sample characterization data corroborated with the literature, suggesting that the incidence of malignant neoplasms is 2.7 times higher in the age group between 15 and 30 years than in children under 15 years old<sup>1,10</sup>.

Regarding the data on dental procedures performed between 2016 and 2019, this population's increased dental demand was observed, demonstrating how Dentistry can contribute to a multidisciplinary team<sup>11-13</sup>.

Clinical evaluations accounted for an important part of the total dental appointments performed in the studied time interval. According to the literature, periodic follow-ups of these patients are fundamental for guiding caregivers about possible oral changes resulting from underlying diseases and/or systemic treatments, as well as for preventing dental diseases and early intervention for problems in the oral cavity<sup>6,14,15</sup>. This contributes to the quality of life of the patient and reduces the risk of interruption or suspension of onco-hematological treatment to restore oral health<sup>16-18</sup>.

Procedures accounted for the majority of dental appointments carried out in this period. Among these procedures, the topical application of fluoride and dental prophylaxis were the most commonly performed in patients with non-malignant diseases. These procedures also ranked second and third among the most performed procedures in patients with malignant diseases. This may be due to the significant increase in the number of preventive procedures, or it may be associated with the

gradual increase in restorative procedures that increasingly require preventive dental measures, serving as a preventive plan to avoid oral complications. Thus, it is possible to reduce the chance of compromised onco-hematological treatment for those with unfavorable oral health<sup>3,6,12,19</sup>.

Tooth extraction was also a procedure frequently performed in the service. It was the third most performed among non-malignant diseases and ranked fourth among patients with malignant diseases. The unfavorable oral health condition of the participants may have contributed to the early condemnation of deciduous and permanent teeth without them being able to undergo dental treatment for dental recovery<sup>14,15,19</sup>.

Analyzing other reference centers in dental care for pediatric onco-hematological patients, it was also found that tooth extractions, along with restorative and preventive procedures for caries, were the most frequently performed procedures. This indicates a greater concentration of these dental procedures in tertiary care centers<sup>15,19</sup>.

Another gradual increase was observed in the number of laser therapy sessions. It is known that low-power laser has numerous purposes, including preventing and treating oral mucositis. This condition arises due to antineoplastic treatments and during the Bone Marrow Transplant (BMT) conditioning phase. Thus, it is an almost exclusive procedure for patients with malignant diseases and is used sporadically for patients with non-malignant diseases undergoing BMT<sup>5,6</sup>.

This study showed a linear growth of dental appointments for pediatric onco-hematological patients in our service. This result can be attributed to the 2017 implementation of the Residency Program in Cancer Care in the Dentistry area, which increased the number of dentists working in the care of children and adolescents. Additionally, the opening of a dental office for the exclusive care of children and adolescents in the pediatric hospital in 2019 also facilitated access to dental services for children.

It is worth noting that the individuals' oral hygiene was not evaluated in this study, so the increase in preventive dental procedures cannot be attributed to their oral hygiene condition. Therefore, it is suggested that the oral health condition of pediatric onco-hematological patients be included as a variable in future studies to evaluate how the increase in preventive dental procedures may have contributed to the oral health of these individuals.

In conclusion, it was possible to observe a linear growth in dental appointments for pediatric onco-hematological patients between 2016 and 2019, with preventive procedures being the most performed. Male pediatric onco-hematological patients with malignant diseases were the most prevalent in the study.

## Data availability

Datasets related to this article will be available to the corresponding author upon request.

## Conflicts of interests

The investigators have no conflicts of interest to declare. They agree with the study and have no financial interests to report.

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## Author Contribution

**Mariana Andrade Costa:** conception, data collection, writing the draft and the final version of the manuscript. **Karina Alessandra Michelão Grecca Pieroni:** review of the draft and review of final version of the manuscript. The authors actively participated in two distinct criteria related to authorship.

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