

Quality of life and Oral Manifestations in Pediatric Patients under Antineoplastic Treatment in Aracaju, SE

<https://doi.org/10.32635/2176-9745.RBC.2024v70n3.4766>

Qualidade de vida e Manifestações Oraís em Pacientes Pediátricos em Tratamento Antineoplásico em Aracaju, SE
Calidad de Vida y Manifestaciones Orales en Pacientes Pediátricos en Tratamiento Antineoplásico en Aracaju, SE

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ABSTRACT

Introduction: Childhood cancer is a group of diseases that have in common the uncontrolled proliferation of abnormal cells. Antineoplastic treatment causes adverse effects, especially oral changes. **Objective:** To evaluate the presence of oral manifestations in children undergoing antineoplastic treatment and the quality of life related to oral health. **Method:** Cross-sectional study with a quantitative and qualitative approach. Twenty-three users, aged 0 to 14 years old, from the Association of Volunteers at the Service of Oncology in Sergipe were evaluated. Alterations in the oral cavity were evaluated by clinical examination at a dental outpatient clinic. Oral health-related quality of life was analyzed using the Parental-Caregiver Perceptions Questionnaire (P-CPQ). **Results:** The most prevalent sex and neoplasm, respectively, were male (52%) and acute lymphocytic leukemia (45%), and the predominant age group was 6 to 10 years old. Quality of life scores were high. Oral examination revealed few clinical manifestations (absent in 75% of cases), while reported manifestation highlighted changes in taste (73%). **Conclusion:** The number of oral manifestations was small. The PCP-Q proved to decline in the quality of life of children in the midst of the experience of dealing with antineoplastic treatment.

Key words: Oral Manifestations; Mouth/drug effects; Quality of Life; Pediatrics.

RESUMO

Introdução: O câncer infantojuvenil é um grupo de doenças caracterizadas pela proliferação descontrolada de células anormais. O tratamento antineoplásico frequentemente causa efeitos adversos, incluindo alterações orais significativas. **Objetivo:** Avaliar a presença de manifestações orais em crianças em tratamento antineoplásico e a qualidade de vida relacionada à saúde bucal. **Método:** Estudo transversal com abordagens quantitativa e qualitativa. Foram avaliados 23 usuários de 0 a 14 anos da Associação dos Voluntários a Serviço da Oncologia em Sergipe. As alterações na cavidade oral foram avaliadas por meio de exame físico realizado em um ambulatório odontológico. A qualidade de vida relacionada à saúde bucal foi analisada utilizando o *Parental-Caregiver Perceptions Questionnaire* (P-CPQ). **Resultados:** O sexo mais prevalente foi o masculino (52%) e a neoplasia mais comum, a leucemia linfocítica aguda (45%). A faixa etária predominante foi de 6 a 10 anos. Os escores de qualidade de vida foram altos. O exame bucal revelou poucas manifestações clínicas (ausência em 75% dos casos), enquanto as manifestações relatadas destacaram alterações no paladar (73%). **Conclusão:** A quantidade de manifestações orais foi pequena. O P-CPQ indicou um declínio na qualidade de vida das crianças em razão das experiências relacionadas ao tratamento antineoplásico.

Palavras-chave: Manifestações Bucais; Boca/efeitos dos fármacos; Qualidade de Vida; Pediatria.

RESUMEN

Introducción: El cáncer infantil es un grupo de enfermedades que tienen en común la proliferación descontrolada de células anormales. El tratamiento antineoplásico causa efectos adversos, especialmente cambios orales. **Objetivo:** Evaluar la presencia de manifestaciones orales en niños sometidos a tratamiento antineoplásico y la calidad de vida relacionada con la salud bucal. **Método:** Estudio transversal, con enfoque cuantitativo y cualitativo. Fueron evaluados 23 usuarios, con edades de 0 a 14 años, de la Asociación de Voluntarios del Servicio de Oncología de Sergipe. Las alteraciones en la cavidad bucal se evaluaron mediante examen clínico en un servicio ambulatorio dental. La calidad de vida relacionada con la salud bucal se analizó mediante el Cuestionario de Percepciones de Padres-Cuidadores (P-CPQ). **Resultados:** El sexo y la neoplasia más prevalentes, respectivamente, fueron el masculino (52%) y la leucemia linfocítica aguda (45%), y el grupo etario predominante fue el de 6 a 10 años. Las puntuaciones de calidad de vida fueron altas. A la exploración bucal se observaron pocas manifestaciones clínicas (75% de ausencia) y las que se reportaron manifestaciones, especialmente cambios en el gusto (73%). **Conclusión:** El número de manifestaciones orales fue pequeño. El PCP-Q mostró una disminución en la calidad de vida de los niños en medio de la experiencia de lidiar con el tratamiento antineoplásico.

Palabras clave: Manifestaciones Orales; Boca/efectos de los fármacos; Calidad de Vida; Pediatría.

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INTRODUCTION

Cancer in children and teenagers (0 to 19 years old) corresponds to a group of several illnesses that have in common the uncontrolled proliferation of abnormal cells of embryonic nature that may occur in any part of the body¹. According to the International Agency for Research on Cancer (IARC)², around 215 thousand cancer cases are diagnosed annually in children under 15 around the world. In Brazil, INCA estimates that approximately 704 thousand new cancer cases will be reported annually from 2023 to 2025, of which 7,900 will be childhood cancer. A slight predominance of male individuals afflicted can be observed, with 4,200 (53.2%) new cases, in contrast with 3,700 (46.8%) female individuals afflicted. Higher incidence rates were reported in the South (152 per million) and Southeast (145 per million) Regions³.

Chemotherapy is employed in the treatment of approximately 70% of cancer patients. Oral cavity changes occur in about 40% of these patients, increasing to over 90% in children under 12 years-old⁴. During chemotherapy, patients face intense immunosuppression, which increases their susceptibility to direct and indirect stomatotoxicity, such as mucositis, xerostomia, and fungal and viral infections⁵. Patients submitted to radiotherapy are susceptible to several side effects, including mucositis, xerostomia, trismus, progressive loss of the periodontal ligament, tissue necrosis, osteoradionecrosis and changes in the quality and quantity of saliva. The increase in cariogenic food intake, associated to a compromised oral hygiene and changes in the oral microbiota, contributes to the development of the so-called radiation caries⁶.

After the cancer diagnosis, the lifestyle of children and their families is deeply affected by the impact of the disease, generating fragilities and concerns⁷. A study on survivals of pediatric acute lymphocytic leukemia (ALL) revealed that the quality of life of these patients is negatively impacted, with difficulties in socialization and intellectual functioning⁸. Low quality of life related to health is associated to depression, anxiety, insomnia, pain, and obesity⁷.

Knowledge on the dental issues that can affect oncological child patients is key for health professionals, since 90% of these patients face some kind of oral complication due to the oncological treatment⁹. Thus, the work of a dental surgeon is essential and indispensable. Understanding the perspective of parents and caregivers on these manifestations is key to minimizing the suffering and helping children deal with the issues, since they are responsible for their health. Therefore, the objective of this research is to assess the presence of oral manifestations in children in antineoplastic treatment and quality of

life related to oral health (QLROH), contributing to the planning of dental programs and services aimed at pediatric patients with cancer.

METHOD

Cross-sectional study with a quantitative and qualitative approach. The study included 0 to 14 years-old children in antineoplastic treatment with a minimum duration of three months that use the services of the Association of Volunteers at the Service of Oncology in Sergipe (AVOSOS), located in Aracaju, Sergipe, between July 2018 and July 2019. The socioeconomic profile of caregivers was also identified.

Twenty-three children in dental treatment at AVOSOS were clinically evaluated, in addition to their respective caregivers, through questionnaires. The neoplastic changes of patients were classified according to the 10th International Classification of Diseases and Related Health Problems (ICD-10)¹⁰ and age group, according to the pediatric age criteria of INCA and the Brazilian Society of Pediatric Oncology (Sobope)¹¹. Children that were too debilitated for the clinical examination and caregivers with mobility, sensory or cognitive issues that impaired the questionnaire application were excluded.

For data collection, a clinical form prepared for the research was used, which included information on age, sex, type of cancer, signs and symptoms of oral manifestations after antineoplastic treatment. The following was also recorded: oral hygiene habits, caregiver income, kinship degree, and the perception of parents/caregivers on QLROH, through the Parental-Caregiver Perceptions Questionnaire (P-CPQ)¹².

P-CPQ is a self-fillable questionnaire composed of 35 questions that assess the perceptions of parents and/or guardians on the impact of oral diseases (such as caries and malocclusion) in the quality of life of children. Questions 1 and 2 refer to the global perception of guardians on the oral health and general well-being of children, with answer options that range from 0 to 4. The other questions are divided in four broad categories: oral symptoms (questions 3 to 8), functional limitations (questions 9 to 16), emotional well-being (questions 17 to 24) and social well-being (questions 25 to 35). The answer options range from 0 to 5 points (0 = never; 1 = once or twice; 2 = sometimes; 3 = often; 4 = every day or almost every day; 5 = don't know). The total score is obtained by adding up the scores of all questions. The greater the score, the greater the impact of oral diseases in the quality of life¹³.

The intraoral physical examination was performed with the help of a wooden wedge and a lantern by two researchers, one of them an oral and maxillofacial surgeon

experienced in assisting patients with special needs. Personal protective equipment was used to assess the changes in the children's oral mucosa. These assessments were performed simultaneously by the two researchers, who recorded data such as caries lesions, root remains, calculus, periodontal disease, halitosis and oral hygiene deficiency, that may have been present prior to the treatment. Oral changes related to antineoplastic therapy were also observed, such as mucositis, primary herpetic gingivostomatitis, candidiasis and prolonged retention of deciduous teeth. Parents and caregivers reported oral changes over the last 12 months, highlighting changes in taste, xerostomia, and bleeding gums.

Data obtained were typed in a Microsoft Excel (2007 version) spreadsheet. Tables and graphs were produced for better visualization of results. Qualitative variables were expressed in absolute and relative values. Scores obtained through the P-CPQ were evaluated based on values considered high, above 20 points.

This research has been approved by the Research Ethics Committee of *Universidade Tiradentes* (Unit), report number 3156134 (CAAE (submission for ethical review): 87716418.7.0000.5371), in compliance with Resolution 466/12¹⁴ of the National Health Council. Each evaluation was performed after the children's guardians signed the Informed Consent Form (ICF), authorizing the participation in the study, in addition to the Informed Assent Form (IAF) by the literate children.

RESULTS

Thirty-four oncological patients assisted by AVOSOS were assessed, of which 11 were excluded for not being actively in antineoplastic treatment, resulting in 23 patients that met the research inclusion criteria. Regarding sex, there was a slight predominance of the male sex, with 52% of cases. ALL was the most common neoplasm, representing 45.83% of cases, followed by brain and central nervous system tumors (20.83%) and other kinds (20.83%). Among those, the following were identified: neuroblastoma, embryonal rhabdomyosarcoma, pineal tumor with hydrocephalus, cystic tumor and liver tumor. The study also included children with non-Hodgkin lymphoma (8.33%) and Hodgkin lymphoma (4.16%) (Figure 1).

Regarding duration of neoplasm treatment, most patients (65%) were observed to be in treatment for a period of 6 to 12 months. Most patients (87.5%) had received over 12 chemotherapy and/or radiotherapy doses. Chemotherapy was the most common treatment, used by 38% of patients, followed by combined treatment (chemotherapy, radiotherapy and surgical procedures) in

25% of cases, and chemotherapy associated to surgery in 13% (Figure 2).

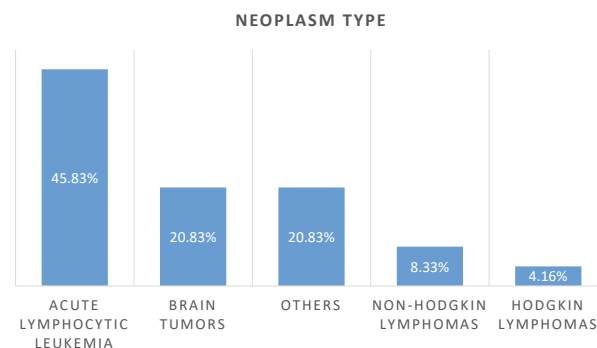


Figure 1. Distribution of patients by treated neoplasm type

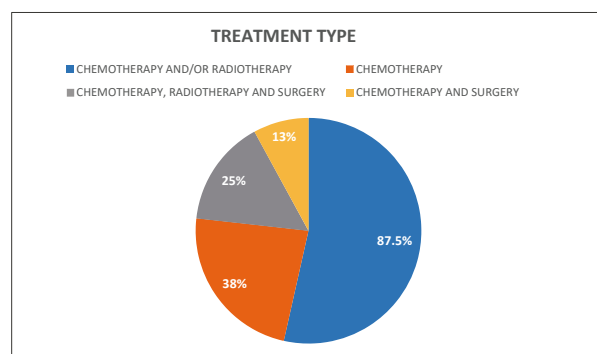


Figure 2. Distribution of patients by type of neoplastic treatment

In the QLROH assessment through the P-CPQ questionnaire, the caregivers were instructed to answer based on their perceptions on the oral health of their children. The results showed that most high scores were related to emotional and social well-being (7.60 and 8.69, respectively), while oral symptoms presented a low score (3.39), indicating that patients did not report significant complaints about oral changes. As to the parents' overall perception on the oral health and general well-being of the child, most reported that children had good oral health (73.91%) and that it was not impacting their quality of life (Table 1).

The oral manifestations were analyzed through physical examination to identify changes related to the antineoplastic treatment. However, few cases were diagnosed, totaling five patients among the 23 included. Among those cases, the following were observed: two prolonged retention of deciduous teeth (8.33%), one mucositis (4.16%), one primary herpetic gingivostomatitis (4.16%) and one candidiasis (4.16%) (Table 2).

The main oral change reported by caregivers was in taste, affecting 73.95% of patients and associated to discomfort, followed by xerostomia and bleeding gums.



Table 1. Assessment of quality of life related to oral health. Aracaju, Sergipe, 2019

P-CPQ	Mean
Total	31.43
Oral symptoms	3.39
Functional limitations	6.13
Emotional well-being	7.60
Social well-being	8.69
Overall perception	N (%)
Q1	
Good, very good and excellent	17 (73.91%)
Bad or regular	6 (26.09%)
Q2	
Very or very much	4 (17.39%)
Moderately	2 (8.7%)
Not at all or very little	17 (73.91%)

The change in taste was observed in all age groups, with a greater prevalence among children aged 6 to 10 (39.13%), with equal number of cases in both sexes (four girls and four boys). Xerostomia had the same distribution among children aged 6 to 10 and 10 to 14, presenting similar rates in both age groups (Table 2).

The sociodemographic profile of parents and caregivers was assessed through a questionnaire developed for the research. Most caregivers were observed to be female (86.95%), with the most prevalent age group being from 36 to 45 years-old (52.17%) and primarily married (34.78%). Regarding education, most had incomplete elementary school (39.13%). Patients' mothers were identified as the most present guardian (82.60%). In addition, many caregivers offered full-time care to the patients (82.60%), and unemployment was the most observed condition among them (78.23%) (Table 3).

DISCUSSION

Antineoplastic chemotherapy causes immunosuppression and changes in the oral cavity, which can aggravate the general state of patients, leading to treatment interruption and significant morbidity^{15,16}. Lesions in the oral cavity are one of the most frequent complications of chemotherapy, due to the high sensibility of tissues and mouth structures to the toxic effects of chemotherapeutics¹⁷.

In this research, the following oral changes were observed: mucositis, herpes and candidiasis (4.16% each). This is in line with results obtained by Lopes et al.¹⁸, who reported mucositis (62.5%) as the most common oral

Table 2. Distribution of patients by oral manifestation diagnosed in the intra-oral physical examination and by the oral clinical manifestation reported by parents/caregivers. Aracaju, Sergipe

Diagnosed oral manifestation (clinical exam)	N#	%
Herpes	1	4.16%
Mucositis	1	4.16%
Candidiasis	1	4.16%
Prolonged retention	2	8.33%
Absence		75%
Reported oral manifestation	N#	%
Change in taste	17	73.90%
Mucositis	4	17.39%
Xerostomia	5	21.73%
Bleeding gums	5	21.73%
Candidiasis	1	4.34%

manifestation, followed by changes in taste (45.8%), candidiasis (41.6%) and lip herpes (25%). Hespanhol¹⁹ analyzed 97 medical records of patients in antineoplastic treatment and found that aphthous lesion was the most prevalent (4.1%), in addition to xerostomia (3.1%) and candidiasis (4.1%), results that corroborate the ones from the present study. The low number of oral manifestations may be associated to the dental assistance provided by the AVOSOS team, who has resources such as laser therapy to prevent and treat mucositis. The low number of changes diagnosed in this research may be attributed to the fact that many of these manifestations occur in the acute phase of the illness, when the patients frequently remain hospitalized to receive intensive support and closer monitoring of treatment's adverse reactions.

Taste dysfunction is a sensory change that may occur with chemotherapy, frequently due to drug diffusion in the oral cavity²⁰. In this research, most children reported changes in taste during antineoplastic treatment (73.9%). This high incidence can be explained by the fact that younger patients are more prone to suffering impact in the mouth due to chemotherapy. However, few studies investigated the sensibility in taste of children submitted to chemotherapy treatment, and existing results are controversial^{6,13,17}.

The analysis of the age range of participating patients showed a greater prevalence of the 6 to 10 years old range (39.13%), which contrasts with the study by Braga et al.²¹. According to the authors, children younger than five are more frequently affected by this type of neoplasm in many countries. Therefore, the results of this research indicate a discrepancy in the predominant age group of

Table 3. Distribution of parents/caregivers by socioeconomic profile. Aracaju, Sergipe, 2019

Profile of caregivers					
Sex	N#	%	Dedication time	N#	%
Male	3	13.94%	Part-time	4	17.39%
Female	20	86.95%	Full-time	19	82.60%
Age	Caregiver income				
28 to 35	8	34.78%	1 minimum wage	7	30.43%
36 to 45	12	52.17%	1 minimum wage + benefit	4	17.39%
46 to 55	1	4.34%	No wages	1	4.34%
56 to 65	2	8.69%	Benefit	11	47.82%
Tie	Current occupation				
Father	3	13.04%	Autonomous	3	13.04%
Mother	19	82.60%	Stay-at-home	2	8.69%
Grandmother	1	4.34%	Unemployed	18	78.23%
Education level	Marital status				
Complete high school	8	34.78%	Married	8	34.78%
Incomplete elementary school	9	39.13%	Stable union	7	30.43%
Illiterate	1	4.34%	Single	7	30.43%
Complete elementary school	5	21.73%	Divorced	1	4.34%

the neoplasms observed, suggesting that age distribution of cases may vary according to the context or studied population.

Regarding the profile of children in this study, a predominance of cancer in patients of the male sex (52%) was observed, which is in line with some literature studies^{20,22,23}, including Lopes et al.¹⁸, who found a prevalence of 75% male patients in an oncological treatment center in Teresina, Northeast, the same Region studied in this research. However, the results of this research differ from the ones found by Ribas and Araújo²⁴, who reported a female sex prevalence of 67%, which can be associated to the specific type of cancer analyzed.

Most studies in the literature identify leukemia (and its several variations) as the most common malign neoplasm in children⁶. Ribas and Araújo²⁴ reported that ALL (73.6%), acute myeloid leukemia (17.33%) and chronic myeloid leukemia (9%) are the most prevalent, frequently associated to complications in the oral mucosa. Those results corroborate the present research, which found that 45.83% of children in ALL treatment presented oral changes and complaints in 86.96% of cases. The parents' perception assessment regarding oral health and its impact in children's well-being is crucial, since parents are the main responsible for the health of their children. In this research, the QLROH of children was assessed and a worsening in the quality of life was observed, reflected by scores over 30 points in a total of 52 possible points (31.43), and the caregivers' responses.

Those findings corroborate the study by Bresolin²⁵, who assessed patients in cancer treatment aged 3 to 21 and showed that quality of life can be significantly affected, with acute worsening in children. Thus, this worsening is directly related to the emergence of oral changes, such as mucositis and xerostomia, that can cause troubles in mastication, phonation and swallowing. These troubles compromise daily activities and, in some cases, may demand the temporary interruption of antineoplastic treatment to manage oral complications. Therefore, the impact of oral changes not only affects the general well-being of children, but also interferes in the progress of treatment and quality of life of families.

Generally, children who received treatment for ALL presented a low QLROH during post-induction therapy up to the beginning of maintenance therapy. These children need a broad dental assessment that includes detailed clinical examination and follow-up of oral changes to identify factors that negatively influence this relationship. Goettens et al.²⁶ revealed that patients who regularly attend dental appointments present better quality of life related to health and oral health, which is in line with this study. This research showed, upon QLROH assessment, that children presented oral symptoms with low score (3.39), suggesting that patients had no significant oral changes complaints. Moreover, regarding the overall perception of parents on the oral health and general well-being of their children, most claimed that children's oral health was good and did not affect their



quality of life. This result can be explained by the fact these patients are routinely assisted by a dental team at AVOSOS, ensuring adequate preventive and therapeutic approach.

Considering the socioeconomic profile of caregivers of children assisted by AVOSOS, most had incomplete elementary school (37.50%), and the mother was the full-time caregiver (79.16%). Similar results were found by Virdee and Rood²⁷, who reported that great part of patients was also assisted by their mothers (62.1%), less frequently by fathers (13.1%), or just by the father (12.1%). This predominance of mothers in care may be associated to social factors still present in society, in which mothers often take on the main role of caring for children, especially in the context of grave illnesses. Moreover, education level and income of caregivers can reflect the socioeconomic profile of families assisted by these institutions. Incomplete elementary school and high unemployment rate among the caregivers may indicate a more socially and economically vulnerable public, which directly influences the type and intensity of the support received, and the ability to access specialized care. These aspects highlight the importance of considering the socioeconomic context of caregivers when planning and implementing support and intervention strategies in oncological assistance institutions.

A significant limitation to this research was the size of the sample found. The relatively rare nature of pediatric neoplasms restricts the number of patients available for study, resulting in often small samples. This restriction impairs the conduction of robust statistical analyses and can limit generalization of results. Moreover, ethical and logistic factors, such as consent of parents and health condition of children further increase the challenge of recruiting additional participants.

CONCLUSION

The studied sample contained a small number of oral manifestations, with prolonged retention of teeth being diagnosed as the most prevalent and changes in taste being the most reported manifestation by parents/caregivers.

The P-CPQ used for QLROH analysis showed that parents' perception regarding oral health was positive, presenting medium scores, small decline in the quality-of-life level of patients, especially social and emotional well-being.

More research needs to be directed at the hospital environment with patients who are undergoing active treatment, where there is a greater likelihood of seeing oral manifestations resulting from antineoplastic treatment. Moreover, the presence of a multidisciplinary team

assisting the treatment of these patients is essential as, in addition to physical and psychological limitations, they present quality of life deficit.

CONTRIBUTIONS

All the authors have substantially contributed to the study design and/or planning, acquisition, analysis and interpretation of the data, wording, and critical review. They approved the final version for publication.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interest to declare.

FUNDING SOURCES

None.

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Recebido em 25/6/2024
Aprovado em 15/8/2024

