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Review Article

Impact of Malignant Neoplasms on Oral Health–Related Quality of Life in Paediatric and Adolescent Populations: A Systematic Review

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Malignant neoplasms of any anatomical site, along with their treatments, can significantly affect the oral health of paediatric and adolescent populations, potentially influencing their oral health–related quality of life (OHRQoL). This systematic review sought to evaluate how cancer, regardless of tumour location, impacts the OHRQoL of children and adolescents. Electronic searches were conducted in PubMed, Scopus, EMBASE, Web of Science and LILACS, as well as grey literature, up to October 2023. Clinical studies reporting on OHRQoL in patients aged 0–19 years with cancer were included. Two reviewers independently performed study selection, data extraction and risk of bias assessment using the Joanna Briggs Institute tools. Certainty of evidence was evaluated using the GRADE approach. Of 27,684 records, four studies (three cross-sectional and one randomised clinical trial) met the inclusion criteria, encompassing 253 paediatric patients. OHRQoL was assessed using OHIP-14 and ECOHIS instruments. Most studies reported a weak impact of oral health on quality of life. However, methodological limitations and very low certainty of evidence were identified. Although a weak impact of oral health on quality of life was observed among children and adolescents with malignant neoplasms, the limited number and quality of available studies prevent firm conclusions. High-quality research with robust methodology is needed to better understand this relationship and draw robust conclusions and guide clinical decision-making.

Keywords: adolescents; cancer; children; OHRQoL; oral health; paediatric oncology; quality of life; systematic review

1. Introduction

Maintenance and preservation of the general health of children and adolescents is extremely important for the future of people and society [1]. As several diseases can affect the growth and development of this population, specific healthcare programs have been developed in order to manage each one of them individually. This process allows recognising the importance of managing the quality of life of children and adolescents before, during and after medical treatments [2].

Childhood and adolescent cancers affect individuals aged 0–19 years old, being considered the main cause of death due to disease in this population and representing a global burden on the healthcare services [3]. These conditions differ from cancers in adults regarding distribution, tumour biology, clinical behaviour, risk factors, prognosis and survival rates [4–6].

The diagnosis of a malignant neoplasm has a strong psychological and social impact on the patient and family [7–9]. Additionally, physiological changes in organs and tissues with the development of symptoms affecting the patient's daily life [10] and the side effects of antineoplastic therapies [3, 11] can prolong the hospitalisation period and increase the treatment costs. All these cause disorganisation of the family core and impact the quality of life of patients and caretakers [12].

The patient's own perception of his or her health-related quality of life (HRQoL) has been considered as an important strategy to guide the treatment and evaluate the therapeutic success [7, 9]. Such a perception is captured by means of multidimensional instruments developed to assess several aspects of the daily functioning, usually involving four main domains: status of the disease and physical symptoms, functional status (e.g., performing daily activities), psychological and emotional functioning and social functioning [13].

The HRQoL of children and adolescents with cancer has been extensively studied in the literature [14, 15]. A recent systematic review identified 85 studies on this theme, totalling 7311 participants. All types of childhood and adolescent cancers were included. The studies were conducted in 30 countries and used 23 different patient-reported outcome measurements (PROMs), in which the Paediatric Quality of Life Generic Core Scales questionnaire was the most used instrument. All the studies reported low scores of HRQoL in oncological patients compared to healthy controls. Differences were also found for the type of neoplasm as well as longer hospitalisation periods, and multiple treatment modalities were associated with a poor quality of life. Mental health problems, symptoms of suffering, worsening of cognition and behaviour, poor sleeping and fatigue determined lower scores of HRQoL. On the other hand, physical activity and school attendance were associated with a better HRQoL [16].

Oral health can also interfere with HRQoL [17]. In addition to caries and endodontic and periodontal diseases, the mouth can also be either a primary or a secondary site of malignant neoplasms [18] and present manifestations of systemic conditions, including side effects of treatment. Oral conditions such as tooth loss, pain, bleeding and bad breath have a greater impact than many healthcare professionals could imagine [17, 19], particularly regarding the patient's perception of quality of life [20]. Several instruments on oral health–related quality of life (OHRQoL) were developed to evaluate this impact [7], and they have been used in adults with malignant neoplasms [21, 22].

There are some studies assessing the impact of the toxicity of specific oncologic treatments on children and adolescents with cancer, as is the case with oral mucositis. In this context, instruments such as Oral Mucositis-Specific Quality of Life Measurement (OMQoL) and Oral Mucositis Daily Questionnaire (OMDQ) have been previously used and associated with psychometric requisites [23–25]. Nevertheless, these instruments are aimed at assessing the impact of mucositis only. The results of these studies do not capture the complexity of oral health and its effect on the quality of life of affected individuals.

A review on OHRQoL in children and adolescents with cancer would help obtain important information in order to achieve a more comprehensive view on this theme, thus enabling the refine of the understanding of the actual impact of oral health and its relevance on the key concepts of quality of life. Thus, this systematic review aimed to assess the OHRQoL in paediatric and adolescent populations diagnosed with malignant neoplasms, regardless of tumour location. The purpose was not to assess the impact of oral cancers specifically, but to explore how cancer and its treatments affect children's and adolescents' perceptions of their OHRQoL.

2. Material and Methods

2.1. Protocol and Registration. The present systematic review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA).

Eligibility criteria and focused question were defined based on the Population, Exposure and Outcome (PEO) framework, in which the population consisted of children and adolescents, exposure was their malignant neoplasms, and outcome was the assessment of OHRQoL.

2.2. Focused Question. "Which is the impact of oral health on the quality of life of children and adolescents with malignant neoplasms?"

2.3. Inclusion Criteria. The studies included were those published in full text and addressing the OHRQoL of individuals aged between 0 and 19 years old who might or might not be undergoing chemotherapy (CT), radiotherapy (RT) and/or haematopoietic stem cell transplantation (HSCT) for treatment of any type of malignant neoplasm. No restrictions were applied regarding year of publication or language.

2.4. Exclusion Criteria. The following were excluded: (a) studies on patients undergoing surgical treatments only; (b) studies using questionnaires restricting the assessment of

OHRQoL to the effect of a specific condition only (e.g., effect of oral mucositis on the quality of life); (c) case reports, case series, animal studies, laboratory studies, textbook chapters, letters to the editor, abstracts of conferences/congresses and literature review.

2.5. Source of Information and Search Strategies. An electronic search on EMBASE, LILACS (via Virtual Health Library), PubMed (Medline), Scopus and Web of Science databases (Supporting I) was carried out from 12th February 2023 to 30th October 2023. Grey literature (Google Scholar and Open Grey) was also searched, thus limiting the search to the 100 first articles published.

The search strategy was performed by three reviewers (M.M., G.S.G. and J.B.F.) independently by using the keywords 'infant newborn', 'infant', 'child', 'adolescent', 'antineoplastic protocols', 'antineoplastic agents', 'chemotherapy', 'chemoradiotherapy', 'radiotherapy', 'bone marrow transplantation', 'hematopoietic stem cell transplantation', 'quality of life' and 'oral health-related quality of life', all combined by Boolean operators (AND/OR) without restrictions regarding the study's language or publication date. Manual search on the reference list of studies was also performed in order to avoid loss of relevant publications.

At the time of the initial search, weekly alerts were created in the databases to notify the authors if a new article met the inclusion criteria.

2.6. Study Selection. All the articles identified were compiled with EndNote, Version X7 (Thomson Reuters, Philadelphia, Pennsylvania), and the duplicated references were automatically removed. Next, the remaining articles were exported to the Rayyan software (https://www.rayyan.ai) and submitted to a new round of exclusion of duplications, which was manually performed by two reviewers on a blind and independent basis.

Three reviewers (M.M., G.S.G. and J.B.F.) selected the studies on an independent basis by evaluating titles and abstracts according to the eligibility criteria. When the study's title or abstract did not provide enough information, then the article was fully recovered and examined for an ultimate decision. Any divergence on the eligibility of a given study was consensually solved or with the help of a fourth and fifth reviewers (J.R.T. and J.B.M.)

2.7. Data Extraction. The following data were collected: author, publication year, country, study's design, study's objective, size of total sample and size of eligible sample for systematic review; age and gender of the participants; type of neoplasm; type of antineoplastic treatment, side effects of antineoplastic treatment (when available), use of medication for control of side effects (when available), type of questionnaires or other instruments used to measure the OHRQoL, study's results and interpretation of the impact on OHRQoL. If data could not be fully available for extraction, then the study's corresponding author was contacted by e-mails throughout 4 weeks. When the requested data corresponded to most part of the data to be extracted and the corresponding author did not send them, then the article was excluded from the review.

2.8. Strategy for Data Synthesis. A narrative synthesis of the findings on the impact of OHRQoF was performed, covering the study's objectives, main characteristics of the investigated population, demographic data and type of antineoplastic treatment used. Medications used, time of their use and instruments used to measure the OHRQoF were considered when available.

2.9. Assessment of the Risk of Bias and Study Quality. The risk of bias of the included studies was independently assessed by three reviewers (M.M., G.S.G. and J.R.T.) by using the Joanna Briggs Institute's Critical Appraisal Checklist [26, 27]. The results were shown in traffic light and weighted bar graphs generated by using the Risk of Bias Visualisation (ROBVIS) package, an online visualisation tool and generic dataset model [28].

The certainty of evidence was assessed by using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system [29].

3. Results

3.1. Study Selection. A total of 27,684 citations were identified during the initial search on the electronic databases, with 12,824 duplicates being removed, which resulted in 14,860 potentially eligible studies. After reading the titles and abstracts, 14,825 articles were excluded and 35 remained for full reading. Of these, 31 articles were excluded after full reading and, in some cases, after requesting more information from the authors (Supporting II). No record was found in the grey literature. Therefore, four articles were selected for data extraction in order to answer the focused question. Figure 1 shows the flowchart of a systematic review.

3.2. Characteristics of the Studies and Data Extraction. Three cross-sectional studies [30–32] and a randomised clinical trial [33] published between 2015 [30] and 2023 [32] were included in the present systematic review. These studies were conducted in Brazil [30, 31], Italy [33] and Turkey [32].

The total samples showed little variation in size, ranging from 23 [30] to 117 [31] participants, totalling 480 patients (adult and paediatric). Nevertheless, only data from patients aged 0–19 years old were used in the present systematic review, resulting in 253 participants.

Among these 253 eligible participants in the study, 129 (50.98%) were male and 124 (49.01%) female. The included studies assessed patients who were undergoing treatment with different types of antineoplastic therapies as well as those who were not. Patients studied by Bardellini et al. [33] were treated with CT only, whereas those studied by Lima et al. [31] were treated with CT and/or RT combined or not with surgical resection. Kilic et al. [32] included patients

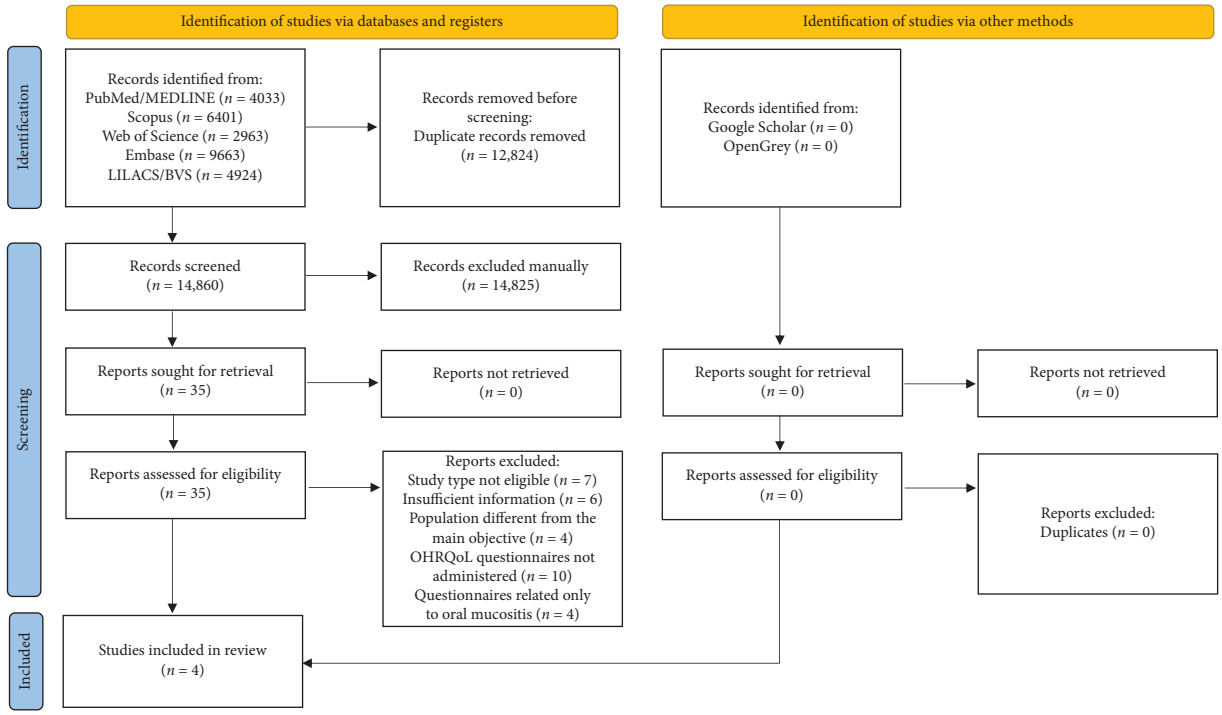

Figure 1: PRISMA flowchart.

submitted to CT or RT, whereas Tinoco-Araujo et al. [30] evaluated those with an indication for HSCT. No study on patients submitted to solid organ or HSCT was identified.

Bardellini et al. [33] and Tinoco-Araujo et al. [30] used a simplified version of the Oral Health Impact Profile (OHIP-14) instrument to measure the impact of oral health on the quality of life of their participants, whereas Lima et al. [31] and Kilic et al. [32] used the Early Childhood Oral Health Impact Scale (ECOHIS) instrument. Both instruments were translated into the languages of the populations in question and then validated. The characteristics of the studies are detailed in Table 1.

3.3. Results of Individual Studies (Narrative Synthesis). Tinoco-Araujo et al. [30] conducted a study with 100 individuals aged between 4 and 78 years who would be submitted to autologous or allogeneic HSCT (study group) in order to assess the OHRQoL by comparing them to healthy controls, paired by age and gender. Only one dentist applied the Portuguese version of the OHIP-14 questionnaire. Twenty-three patients were within the eligibility criteria for the present systematic review. It was necessary to contact the authors in order to obtain specific data from the eligible population. Significant differences were identified between the groups regarding functional limitation ($p < 0.001$), physical pain ($p = 0.025$), physical disability ($p = 0.016$) and social disability ($p = 0.01$). The overall impact of oral health on the quality of life of the patients was considered weak as the OHIP-14 scores had a mean of 4.69 and a median of 5.54.

Bardellini et al. [33] carried out a study between November 2013 and March 2015 in order to assess the impact of two toothpastes on the degree of oral hygiene and OHRQoL in 64 patients (aged 6–14 years old) hospitalised due to a diagnosis of acute lymphoid leukaemia (ALL). Patients in all phases of CT (according to the 2009 standard protocol) presenting grade 1 or 2 mucositis were included. After randomisation, the patients were separated into Group A, where they used the Bioxtra toothpaste (Biopharm, Milan, Italy), and Group B, where they used a fluoride-containing toothpaste without menthol. The OHIP-14 questionnaire was used by only one examiner to assess the OHRQoL at T0 (day of diagnosis of oral mucositis) and T1 (8 days after). At T0, the median values were 5 (interval of 2–4) and 4 (interval of 2–12) for Groups A and B, respectively. At T1, the median values were 8 (interval of 4–20) and 8.5 (interval of 4–18) for Groups A and B, respectively. The impact of OHRQoL was shown to be weak at both assessment times, with no statistically significant differences between the groups ($p = 0.33$).

Lima et al. [31] performed a study between July 2019 and March 2020 in order to identify and describe oral lesions related to side effects resulting from antineoplastic therapies and assess their impact on the quality of life of children and family. The study included 117 patients (aged 2–6 years) in different phases and types of antineoplastic protocols for clinical evaluation. OHRQoL was assessed by using the ECOHIS (B-ECOHIS) questionnaire, with total score ranging from 0 to 16 and mean value of 8. There was an association between type of antineoplastic treatment used and the domain 'psychological discomfort' ($p = 0.019$), as well as between mouth ulcers and total score ($p = 0.038$). Oral mucositis was the most prevalent clinical manifestation, having a significant impact on the child's functional limitation ($p < 0.001$), although it was weak in relation to the family core. The domain 'self-image' had a weak impact as well. Tooth pain was reported by 45.3% of the patients, but

Table 1: Characteristics of the included studies.

Author, year, country	Study design	Aim	Sample Total/ eligible	Sex F/ M	Age Min–Max (Mean)	Type of neoplasm	Type of treatment	Side effects	Use of medication for side effects	Questionnaire	Results Group = median (min–max)* p value (interpretation)
Tinoco-Araujo et al. (2015), Brazil	CS (with GC)	OHRQoL pre HSCT	200/23	6/ 17	4–19 (12)	HE (MD)	None	NA	NA	OHIP-14	SG = 5.54 (0–12) CG = 3.37 $p = 0.027$ (weak impact)
Bardellini et al. (2016), Italy	RCT	Effect of two toothpastes on OHRQoL	64/64	41/ 23	6–14 (I)	ALL	CT	Mucositis	I	OHIP-14	Group A T0** = 5 (2–14) Group A T1** = 8 (4–20) Group B T0** = 4 (2–12) Group B T1** = 8.5 (4–18) $p = 0.33$ (weak impact)
Lima et al. (2022), Brazil	CS (without GC)	OHRQoL in children undergoing antineoplastic therapy	117/117	52/ 65	2–6 (5)	SO/HE (MD)	CT and/or RT and/or surgery	Mucositis Xerostomia Aphtha Candidiasis	I	B-ECOHIS	8*** (0–16) (weak impact)
Kilic et al. (2023), Turkey	CS (with GC)	OHRQoL in children with ALL and AML	99/49	25/ 24	< 3–10 (I)	ALL AML	None	NA	NA	T-ECOHIS	CG = 6 (0–26) SG = 10 (0–29) $p = 0.133$ (weak impact)

Note: F: female; M: male; Min: Minimum; Max: Maximum; Med: median; CT: chemotherapy; I: information unavailable.

Abbreviations: ALL, acute lymphoid leukaemia; AML, acute myeloid leukaemia; B-ECOHIS: Brazilian version of the questionnaire early childhood oral health impact scale; CG, control group; CS, cross-sectional; HE, haematological neoplasm; HSCT, haematopoietic stem cell transplant; MD, multiple diagnosis; NA, not applicable; OHIP-14, oral health impact profile; OHRQoL, oral health–related quality of life; RCT, randomised clinical trial; RT, radiotherapy; SG, study group; SO, solid neoplasm; T-ECOHIS, Turkish version of the questionnaire early childhood oral health impact scale.

*Questionnaire total score.

**T0 = day of diagnosis; T1: 8 days after diagnosis; Group A: Bioxtra toothpaste; Group B: toothpaste with fluoride and without menthol.

***Mean.

the result was not statistically significant. With regard to the impact on the family core, it was observed that 22.2% of the individuals missed the job and 21.4% often reported to be upset. Nevertheless, the overall impact on the OHRQoL of the study population was found to be weak and non-significant on the family core.

Kilic et al. [32] performed a study between January 2018 and December 2020 in order to assess the OHRQoL of 41 children with ALL or acute myeloid leukaemia (SG) compared to 50 controls without systemic disease (CG). Data on simplified oral hygiene index (SOHI) and DMFT/dmft index were collected by two examiners and only one researcher applied the ECOHIS questionnaire for assessment of OHRQoL. Children younger than 7 years old were evaluated based on their parents' report, and there was no detailed information on the application of the questionnaire to children older than 7 years old. The resulting data showed that pain was reported by 20.1 and 44.8% of the participants, respectively, in CG and SC. The author associated the pain to oral complications of antineoplastic treatment, individual's perception of pain and even the impact of neoplasm on oral tissues. The domain 'self-image' and 'social interaction' of the children showed similar results between both groups. A decrease in the functionality of the children in SG was observed for basic daily activities, such as eating, drinking and sleeping ($p = 0.004$), but it was not enough to have a significant impact on symptoms ($p = 0.051$) and family function ($p = 0.277$). With regard to the impact of OHRQoL on the family core, no significant differences were found between the groups ($p = 0.324$). The overall impacts on CG and SG were 6.0 and 10.0, respectively, thus demonstrating that there were no significant differences in OHRQoL between the groups ($p = 0.133$) and that the overall impact of oral health on the quality of life of the oncological paediatric population was weak.

3.4. Risk of Bias/Quality of Study and Certainty of Evidence. Among the three cross-sectional studies, one showed a high risk of bias [30] as only two of the eight items assessed had favourable answers. The other two studies had an uncertain risk of bias, as one had two negative assessments and an uncertain assessment [31] and the other had two negative assessments and two uncertain ones (Figure 2) [32].

The randomised clinical trial by Bardellini et al. [33] had inadequacy in only one of the 13 requisites assessed, in which the OHIP-14 questionnaire was used to assess the OHRQoL in all participants despite their age ranging from 6 years to 14 years old (Table 2).

Certainty of evidence was rated as very low (Table 3) because three-fourths of the included studies demonstrated methodological failures potentially impacting the results found, which consequently reduce the certainty of evidence. In addition, some limitations regarding indirect assessment (only two OHRQoL instruments had been used) and imprecision (due to sample number) were identified.

4. Discussion

There are still few studies evaluating OHRQoL in children and adolescents with systemic diseases. Therefore, identifying only a small number of eligible articles in this review was not unexpected. Even so, it was surprising that only four studies specifically addressed OHRQoL in this population [30–33], especially considering the extensive literature available for adults with cancer, in whom the impact on OHRQoL is well established and often substantial [9, 34, 35]. The limited number of studies becomes even more striking when noting that only two of the included publications [31, 32] had OHRQoL as their primary outcome, while the remaining two studies [30, 33] assessed OHRQoL only as a secondary component. Interestingly, the studies with a primary focus on OHRQoL were also the most recent ones, suggesting a growing awareness of the importance of this topic.

Leukaemia is the most frequent malignant neoplasm in childhood and adolescence [3], and the oral side effects of antineoplastic therapies are common clinical challenges. For this reason, we anticipated finding studies specifically evaluating conditions such as oral mucositis. Although our search strategy was intentionally broad (Supporting I), only four studies on mucositis and OHRQoL in paediatric patients were identified [23–25, 36], which contrasts sharply with the volume of studies available for adults [21, 22]. The scarcity of paediatric studies may reflect not only the lower prevalence of childhood cancer but also the methodological and practical challenges of assessing self-perceived outcomes in young children [37].

The measurement of OHRQoL relies on instruments capable of capturing individuals' perceptions of their oral health and its repercussions on daily functioning. However, the cognitive limitations of young children and the diverse social contexts in which they live may hinder self-reporting accuracy [38, 39]. For this reason, available instruments undergo rigorous validation and linguistic adaptation to ensure adequate comprehension and reliability [40–47]. Several tools exist for preschoolers and school-age children, such as ECOHIS, SOHO-5, COHIP-PS, POQL-PS and OH-ECQOL, among others. Broader age-range instruments are also available, including the PedsQL Oral Health Scale and the COHQOL [48]. Nevertheless, most instruments were originally developed in English, and few have been validated across languages, restricting their applicability in many settings. ECOHIS remains the most widely translated and validated option for young children [48].

One of the most evident methodological limitations of the included studies is the inappropriate choice of OHRQoL instruments for certain age groups. In two studies, a questionnaire designed for adults (OHIP-14) was applied to young children [30, 33, 49], a practice that compromises the validity of the measurements.

Despite these limitations, the overall impact on OHRQoL was consistently weak across studies, although it was higher than that observed in healthy controls and markedly lower than findings reported in adult oncology populations [50–52]. Interpreting this pattern, however, is challenging. The small number of studies, heterogeneity in methods, inadequate instrument selection and high risk of bias all contribute to very low certainty of evidence. These factors may mask a true underlying impact. Alternatively, the effect of malignant neoplasms and cancer therapy on oral health perceptions may genuinely differ between adults and

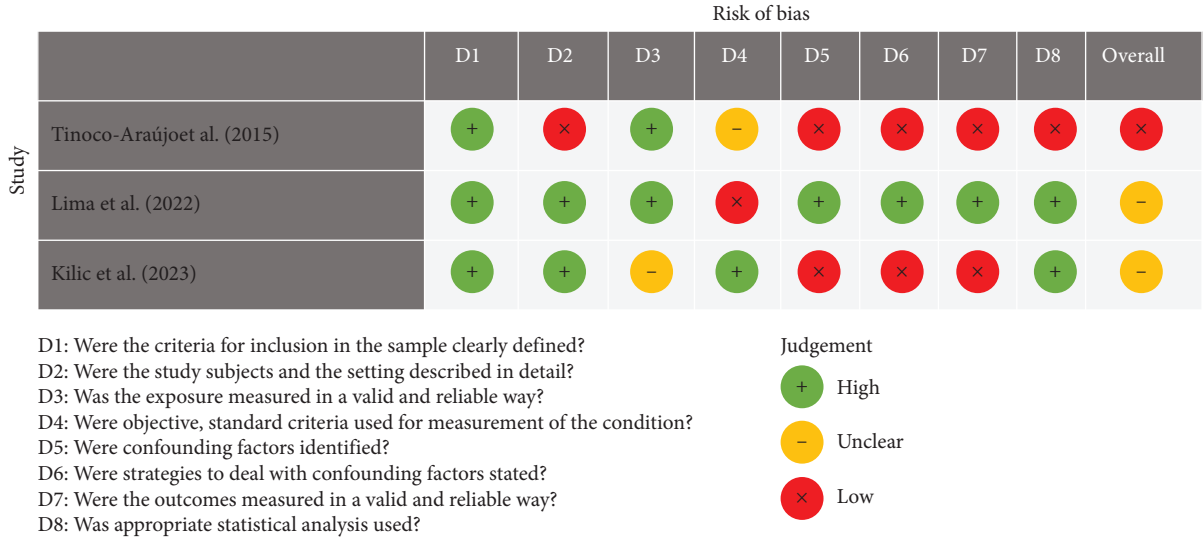

Figure 2: Presentation of the risk of bias analysis in the traffic light graph showing individual results for each domain of the included studies.

Table 2: Analysis of methodological quality in clinical trials evaluated with the Joanna Briggs Institute Tool (JBI)—Bardellini et al. (2016).

	Yes	No	Unclear	NA
1. Was true randomisation used for the assignment of participants to treatment groups?	X	□	□	□
2. Was allocation to treatment groups concealed?	X	□	□	□
3. Were treatment groups similar at the baseline?	X	□	□	□
4. Were participants blind to treatment assignment?	X	□	□	□
5. Were those delivering treatment blind to treatment assignment?	X	□	□	□
6. Were outcomes assessors blind to treatment assignment?	X	□	□	□
7. Were treatment groups treated identically other than the intervention of interest?	X	□	□	□
8. Was follow-up complete, and if not, were differences between groups in terms of their follow-up adequately described and analysed?	X	□	□	□
9. Were participants analysed in the groups to which they were randomised?	X	□	□	□
10. Were outcomes measured in the same way for treatment groups?	□	□	□	X
11. Were outcomes measured in a reliable way?	X	□	□	□
12. Was appropriate statistical analysis used?	X	□	□	□
13. Was the trial design appropriate and any deviations from the standard RCT design (individual randomisation, parallel groups) accounted for in the conduct and analysis of the trial?	X	□	□	□

Note: Overall appraisal: include X exclude □ seek further info JBI, 2020.

Table 3: Certainty of evidence.

		Certainty assessment					
No. of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**No. of patients**	**Certainty**
3	Observational	Serious[a]	Not serious	Serious[b]	Serious[c]	189	⊕○○○ Very low
1	Randomised controlled trial	Serious[a]	Not serious	Very serious[b]	Serious[c]	64	⊕○○○ Very low

[a]Three included studies presented some problems related to the risk of bias.
[b]Only two of the main OHQoL were employed for observational studies, and only one for the randomised controlled trial.
[c]The total number of children/adolescents evaluated was < 400.

paediatric patients, reflecting distinct biological behaviours, treatment responses and psychosocial contexts [53].

Across the included studies, both ECOHIS and OHIP-14 showed stronger impacts in the dimensions related to physical pain and functional limitation. Lima et al. [31] associated these findings with mucosal alterations, such as ulcers and mucositis, which are common during antineoplastic therapy. Psychological discomfort also emerged as a relevant domain, being associated with treatment modality [31] or with oral health behaviours and caries activity [30].

Children and adolescents with cancer experience substantial emotional and cognitive burden throughout the course of the disease. Cancer and its treatment can affect attention, memory, executive function and adaptive behaviour [54–56]. These changes may influence how young patients perceive and report symptoms related to oral health. Additionally, each stage of therapy—from diagnosis to treatment completion—may impose different challenges and needs, potentially altering OHRQoL perceptions over time [57].

OHRQoL instruments have become increasingly integrated into clinical care and research agendas, supporting patient-centred decision-making, communication and follow-up. Their use is particularly meaningful in medically complex populations, where oral conditions may influence systemic health, treatment tolerance and psychological well-being [58]. Despite the limited and heterogeneous evidence available, our findings highlight an important gap in paediatric oncology and underscore the urgent need for high-quality studies with robust methodology, appropriate psychometric tools and adequate sample sizes to better elucidate the true impact of cancer and its treatment on OHRQoL in young patients.

The present systematic review identified a weak impact on the OHRQoL in children and adolescents with malignant neoplasms, but it was not possible to obtain consistent findings due to the limitations of the studies and very low certainty of evidence. Therefore, further studies on this theme are necessary.

Data Availability Statement

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

Project administration: K.L.O.
Study design: K.L.O.; J.R.T.; M.M.
Data curation: M.M.; J.R.T.; G.G.
Formal analysis: J.R.T.; J.B.F; M.M.; M.B.M.
Validation: M.M.; J.R.T.; J.B.F; M.G.; M.B.M.
Writing–original draft preparation: M.M.; K.L.O; J.B.F.
Writing–review and editing: J.R.T.; J.B.M.
Supervision: K.L.O.; M.B.; M.G.

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Supporting Information

Additional supporting information can be found online in the Supporting Information Section. *(Supporting Information)*
Supporting I—Search strategies.
Supporting II—Excluded articles and reason for exclusion.

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