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Impact of oral diseases on the quality of life of children with sickle cell disease in two hospitals in the city of Yaoundé: a multicenter analytical study

Impact des maladies bucco-dentaires sur la qualité de vie des enfants atteints de drépanocytose dans deux hôpitaux de la ville de Yaoundé : une étude analytique multicentrique

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Original Article

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Mots-clés : Drépanocytose ; Maladies bucco-dentaires ; Qualité de vie ; COHIP-SF-19

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ABSTRACT

Context: The aim of the study was to assess the impact of oral and dental diseases on the quality of life of children s with sickle cell disease.

Methodology: A cross-sectional analytical study was conducted in two hospitals in Yaounde from January to April 2025, involving sickle cell children followed up and managed at the Mother and Child Center of the Chantal Biya Foundation and at the Yaounde Gynaeco-Obstetric and Paediatric Hospital. Socio-demographic, oral data and quality of life were collected using a pre-tested data sheet. Oral diseases were recorded during an oral examination. Quality of life was assessed using the COHIP-SF-19 questionnaire, Statistical analysis was performed using SPSS version 25.0 and Python software. Version 3.9.

Results: 200 children with sickle cell disease (SD 10.95 ± 3.53 years) were recruited, with a sex ratio of 1. The main oral diseases found were malocclusions (91.5%), dental caries (75.5%), gingivitis (39%) and maxillary prognathism (8%). One third of the children (34.5%) had a poor quality of life. The presence of dental caries ($p = 0.001$), gingivitis ($p = 0.0007$) and malocclusions ($p < 0.001$) was associated with poor quality of life in children with sickle cell disease. Malocclusions also significantly affected socio-emotional well-being ($p = 0.0002$), school functioning ($p = 0.001$) and self-image ($p < 0.001$).

Conclusion: One-third of children with sickle cell disease recruited had a poor quality of life. This was associated with dental caries, gingivitis and malocclusions.

RESUME

Contexte : L'objectif de cette étude était d'évaluer l'impact des maladies bucco-dentaires sur la qualité de vie des enfants et adolescents drépanocytaires à Yaoundé.

Méthodologie : Une étude transversale analytique a été menée dans deux hôpitaux de Yaoundé sur 4 mois. Les données sociodémographiques et bucco-dentaires ont été recueillies à l'aide d'une fiche pré-testée. Les affections bucco-dentaires ont été relevées lors d'examens cliniques avec une unité dentaire mobile. La qualité de vie a été évaluée par le questionnaire COHIP-SF-19. L'analyse statistique a été réalisée avec SPSS v25.0 et Python v3.9, avec un seuil de significativité fixé à $p < 0,05$.

Résultats : Deux cents enfants âgés de 6 à 18 ans ont été inclus (âge moyen 10,95 ± 3,53 ans ; sex-ratio = 1). Les principales affections étaient les malocclusions (91,5%), les caries dentaires (75,5%), la gingivite (39%) et le prognathisme maxillaire (8%). Un tiers des enfants avaient une mauvaise qualité de vie (34,5%). La présence de la carie dentaire ($p = 0,0011$), la gingivite ($p = 0,0007$) et les malocclusions ($p = 0,000$) était associée à la mauvaise qualité de vie. Les malocclusions affectaient le bien-être socio-émotionnel ($p = 0.0002$), le bien-être scolaire ($p = 0.001$) et l'estime de soi ($p < 0.001$).

Conclusion : Un tiers des enfants drépanocytaires recrutés ont une mauvaise qualité de vie. Elle était associée aux caries, à la gingivite et aux malocclusions.

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Introduction

Sickle cell disease is an inherited genetic disorder characterised by the presence of an abnormal form of haemoglobin called haemoglobin S (HbS). Sickle cell red blood cells break down more rapidly than normal red blood cells [1]. According to the World Health Organisation (WHO), around 300,000 children are born with sickle cell disease every year in Africa. In Cameroon, the prevalence of homozygotes varies between 1.7% and 9% depending on the region. [2]

Oral health is essential to general health and well-being [3]. It enables people to speak, smile, taste, chew and express emotions without pain or disease in the tissues of the mouth. It includes not only the absence of oral diseases, but also full functional and psychosocial capacity [3]. Quality of life is defined as a person's level of well-being, including their physical comfort, mental state, social relationships and environment [4]. Oral diseases are considered to be major public health problems in Cameroon because of their high prevalence, estimated at 29.9% for dental caries and 39.2% for periodontal diseases [3]. The oral cavity, with its abundant vascularisation and susceptibility to infection, is particularly vulnerable in patients with sickle cell disease. Oral conditions such as ulcerations, infections and periodontal problems are common in children with sickle cell disease. These conditions can not only affect their general health, but also have a significant impact on their psychological and social well-being [6].

Several studies have been carried out on the impact of oral diseases on the quality of life of children with sickle cell disease. In Brazil in 2016 and 2024, Da Matta et al. [7] and Mattos et al. [8] reported the significant negative impact of oral symptoms and functional limitations on the quality of life of children with sickle cell disease compared with healthy controls. In Cameroon, Chetcha et al. in 2018 [9] looked at the oral manifestations of sickle cell disease in Cameroonian children [10]. No study has explored the quality of life related to oral diseases in children with sickle cell disease. This study was therefore carried out to assess the impact of oral diseases on the quality of life of children with sickle cell disease in two hospitals in the city of Yaounde.

Methodology

This was a prospective analytical cross-sectional, study conducted in two purposely-selected Yaounde-based referral hospitals, from January to April 2025. Referral hospital were the Gynaecological-Obstetric and Paediatric Hospital (GOPHY) and the Mother and Child Centre of the Chantal Biya Foundation (MCC/CBF). Both of the structures are specialised in care of children with sickle cell disease. The study population were children with sickle cell disease aged 6 to 18 years with a confirmed diagnosis of sickle cell disease documented by haemoglobin electrophoresis and who had given their informed consent or assent. All participants were regularly followed up in the haematology department of referral hospitals (MCC/CBF and GOPHY). We conducted consecutive and convenience sampling.

Data on collect sociodemographic characteristics (age, sex, level of education, and region of origin), medical history (type of sickle cell disease, number of hospitalisations per year, and reasons for hospitalisation), and oral health (presence of caries, gingivitis, malocclusions, and maxillary prognathism) were collected using including a pre-tested questionnaire and a clinical examination.

The impact of oral diseases on quality of life was assessed using the COHIP-SF-19 (Child Oral Health Impact Profile – Short Form – 19), a validated questionnaire comprising 19 items divided into three dimensions: oral health (items 1 to 5), functional well-being (items 6 to 9), and socio-emotional, school, and self-esteem well-being (items 10 to 19) [11]. Each item was rated on a 5-point Likert scale, ranging from zero (never) to four (usually). The overall COHIP-SF-19 score, obtained by summing the points attributed to each item, ranged from 0 to 76. A high score reflected a good quality of life with a low impact, while a low score indicated a high impact on quality of life.

Data collected were entered and analysed using SPSS software version 25.0. Python 3.9 was used for some specific comparisons. Impact of oral diseases in quality of life of participants were assessed with relevance to overall COHIP-SF-19 score. This impact was classified as low (51 to 76 for a good quality of life), moderate (26 to 50) and significant (0 to 25 for marked repercussions on daily life) [12]. We used the Shapiro-Wilk test and the Mann-Whitney test. A p-value of less than 0.05 was considered statistically significant. The protocol study was approved by the Institutional Review Board of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde I and the ethical clearance n°0138/UY1/FMSB/VDRC/DAASR/CSD issued. Informed consent was obtained from the parents or the assent of the children for each participant, after explanation of the study objectives. All data remained strictly confidential, anonymous and used only for scientific research purposes.

Results

Two hundred children living with sickle cell disease were included in this study. The mean age of the participants was 10.95 ± 3.53 years, with extremes of 6 and 18 years. The sex ratio was 1. The majority of the children, (85%), lived in Yaounde. Most of them had attended primary school, (61%). Half of the children, (51%) were from the Centre region (Table I). Our study population consisted of 99% homozygous sickle cell patients. Among them, 57.5% had been hospitalised more than three times per year. Vaso-occlusive crises were the main cause of hospitalisation, accounting

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for 62% of cases (Table II). Analysis of oral diseases revealed a high prevalence of malocclusions, 91.5%. Dental caries was present in 75.5% of children and gingivitis in 54%. Overshot teeth were present in 8% of participants. (Figure 1)

Table 1: Socio-demographic characteristics of study population(N=200)

Variables	Number (n)	Percentage (%)
Age groups (Years)		
[6-9[	63	31,5
[9-12[	58	29,0
[12-15[	39	19,5
[15-18]	40	20,0
Gender		
Male	100	50,0
Female	100	50,0
Place of residence		
Yaounde	170	85,0
Out of Yaounde	30	15,0
Level of education		
Nursery	2	1,0
Primary	122	61,0
Secondary	75	37,5
Higher	1	0,5
Region of origin		
Adamawa	5	2,5
Center	102	51,0
East	11	5,5
Far North	0	0,0
Littoral	6	3,0
North	2	1,0
North-West	10	5,0
West	53	26,5
South	10	5,0
South-West	1	0,5

Table 2: Clinical history of participants (N=200)

Variables	Frequency (n)	Percentage (%)
Type of sickle cell disease		
Homozygous (SS)	198	99.0
Heterozygous (AS)	2	1.0
Number of hospitalisations per year		
0	5	2.5
1 to 3	80	40.0
More than 3	115	57.5
Reason for hospitalisation		
Vaso-occlusive crisis	124	62.0
Anaemia	23	11.5
Others (to specify)		
Malaria	40	20.0
Acute chest syndrome	11	5.5
Pulmonary infection	2	1.0

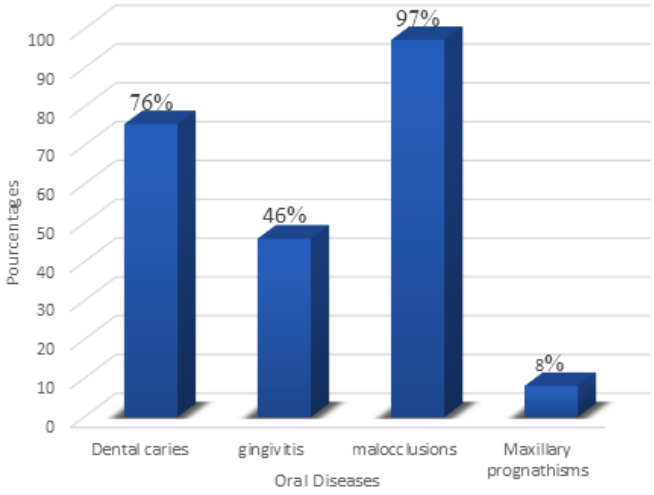

Figure 1: Frequency of oral and dental diseases

Evaluation of oral quality of life using the COHIP-SF-19 questionnaire showed that 47.5% of children had an average quality of life. One third of the children 34.5% had a poor quality of life, and only 18%had a good quality of life. The overall mean COHIP-SF-19 score was 35.36 ± 12.42. (Table III)

Table 3: Distribution of participants according to global quality of life category (COHIP-SF-19).

Quality of life categories	Overall COHIP-SF-19 Score (Intervals)	Number (N=200)	Percentage (%)
Good	51-76	36	18,0
Moderate	26-50	95	47,5
Bad	0-25	69	34,5

The presence of dental caries (p = 0.001) (Figure 2), gingivitis (p = 0.0007) (Figure 3) and malocclusions (p < 0.001) was positively associated with poor quality of life in children with sickle cell disease. Malocclusions also significantly affected socio-emotional well-being (p = 0.0002), school functioning (p = 0.001) and self-image (p < 0.001) (Figure 4). No statistically significant association was observed between maxillary prognathism and overall quality of life (p = 0.76). Similarly, none of the specific COHIP-SF-19 dimensions showed a significant association with prognathism (Figure 5).

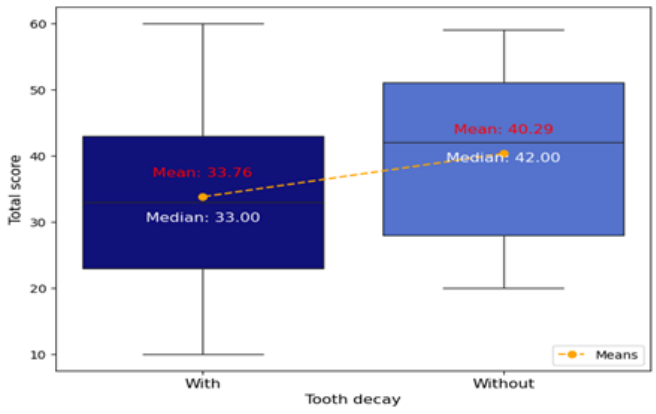

Figure 2: Association between dental caries and the overall quality of life of our study population

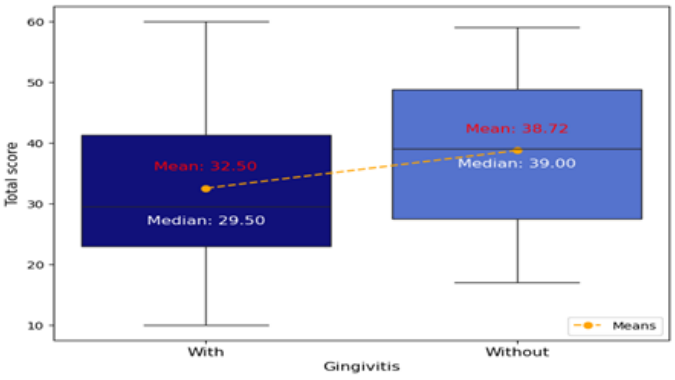

Figure 3: Association between gingivitis and overall quality of life in our study population

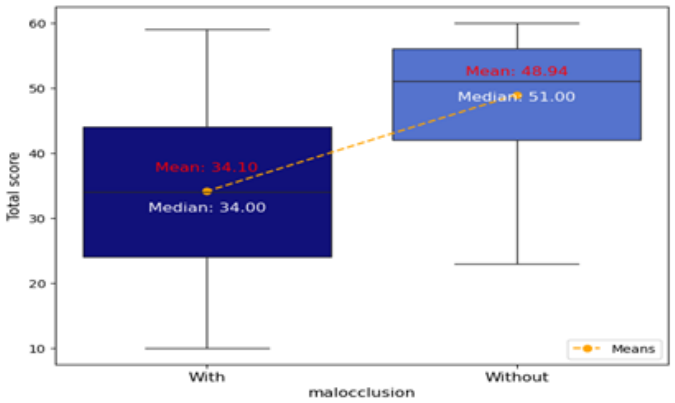

Figure 4: association between malocclusions and overall quality of life in our study population

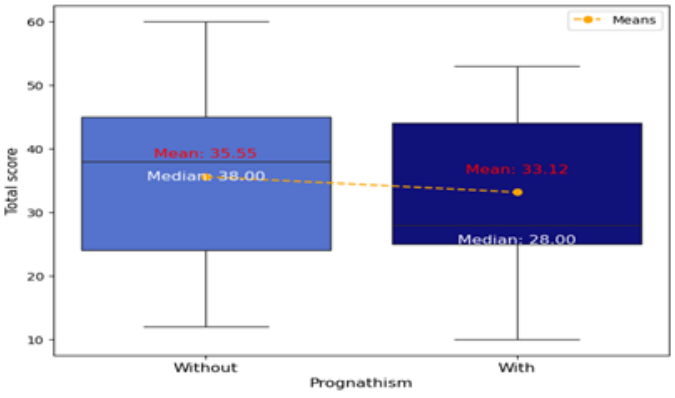

Figure 5: Association between maxillary prognathism and overall quality of life in our study population

Discussion

The main objective of this study was to assess the impact of oral diseases on the quality of life of children with sickle cell disease in Yaounde. Our study included 200 children aged 6 to 18 years, with a mean age of 10.95 ± 3.53 years. This mean age is comparable to that reported by Mendes et al. in Brazil [13], suggesting that children in both studies received regular follow-up during a critical stage of the disease. The most represented age group was under 10 years, a period generally associated with intensive medical monitoring due to the emergence of complications.

The observed sex ratio was 1, similar to that reported by Mendes et al. [13], whereas Makolo et al. in the Congo reported a sex ratio of 1.2 [9]. This difference could be explained by sample size and inclusion methods. Most participants were enrolled in primary school, consistent with their age, and similar to the 49% reported by Makolo et al. [9]. The predominance of children from the Centre region is likely due to the location of the study centres, an observation consistent with Chetcha et al. [10].

In our study, 57 % of children with sickle cell disease were hospitalised more than three times per year, a figure similar to the 53 % reported by Mendes et al. in Brazil [13]. This high frequency may be explained by the increased metabolic demands associated with rapid growth, which exacerbate tissue hypoxia and promote vaso-occlusive crises and infections, the main causes of hospitalisation [1]. Vaso-occlusive crises accounted for 62 % of hospital admissions, a proportion close to the 61 % reported by Mendes et al. [13], reflecting their role as the first clinical manifestations often requiring hospital management [2].

The most common oral diseases, in decreasing order of frequency, were malocclusions, dental caries, gingivitis, and maxillary prognathism. These results are consistent with studies by Ndoye et al. in Senegal [14], Kowe et al. in the Democratic Republic of Congo [15], Alves et al. in Brazil [16], and Oredugba et al. in Nigeria [17].

Our findings indicate that dental caries significantly impair the quality of life of children with sickle cell disease, particularly affecting functional and socio-emotional well-being. This is consistent with the observations of Da Matta et al. [7], Mattos et al. [8], Mendes et al. [13], regardless of the assessment tool used (CPQ, PedsQL SCD, COHIP). Caries can cause pain, difficulties in chewing, and altered perceptions of oral health, directly affecting overall quality of life.

Gingivitis was associated with a significant decline in quality of life, mainly affecting socio-emotional, school, and self-esteem dimensions. Fernandes et al. [18] also highlighted the impact of gingival pain and bleeding on the perception of oral health. The chronic inflammation characteristic of sickle cell disease may exacerbate periodontal lesions, contributing to reduced overall well-being. However, no significant association was observed between gingivitis and functional well-being, confirming the observations of Da Matta et al. [7], suggesting that mild to moderate gingivitis does not always impair oral functions.

Malocclusions were associated with a significant deterioration in quality of life across all assessed dimensions. These results align with those of Da Matta et al. [7], and Mattos et al. [8], who emphasised the psychological and social impact of dental misalignment. In children with sickle cell disease, already vulnerable to physical and emotional fragility, this impact appears particularly pronounced, affecting

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self-image and social interactions.

No statistically significant association was observed between maxillary prognathism and the overall quality of life of the children. Specific COHIP-SF-19 dimensions were also unaffected by this anomaly. These findings contrast with those reported in non-sickle cell populations, where pronounced anterior overbite negatively affected quality of life [19]. It is likely that, in the context of sickle cell disease, aesthetic concerns are secondary to general health issues [20].

From a clinical perspective, these findings highlight the importance of regular oral health monitoring in children with sickle cell disease, as well as raising awareness among families and schools about oral hygiene and the prevention of dental caries and periodontal diseases. Psychosocial interventions could also be considered to improve self-esteem and emotional well-being, particularly in children with malocclusions.

Finally, despite the relevance of our findings, certain limitations should be acknowledged. The sample size and the fact that the study was conducted in only two centres may limit the applicability of the results. Future studies, particularly longitudinal ones, would be useful to monitor changes in quality of life over time and to evaluate the impact of oral health interventions.

Conclusion

Our study demonstrates a high prevalence of oral diseases, including dental caries, gingivitis, malocclusions, and maxillary prognathism, among children with sickle cell disease in Yaounde. These conditions negatively affect their quality of life, socio-emotional well-being, schooling, and self-image, which are already compromised due to the pain associated with vaso-occlusive crises. Therefore, we recommend the systematic integration of oral health professionals into the comprehensive care of patients with sickle cell disease, to prevent and manage these oral diseases and improve their overall quality of life.

Conflict of interest: The authors declare no conflict of interest.

Author's contributions: Deffo Mbeudoum Ladeesse: conceptualised and designed the study, collected field data, and drafted the initial manuscript. Angandji Tipane Prisca: supervised haematological aspects, interpreted clinical data, and critically revised the manuscript. Lowe Nantchouang Jacqueline Michele: supervised paediatric dental aspects, validated oral health data, and critically reviewed the manuscript. Tayou Tagny Claude: provided overall study supervision, methodological and statistical guidance, and final manuscript approval.

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