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A 15-Year Retrospective Study of Orofacial Burkitt's Lymphoma in a Nigerian Tertiary Hospital

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Abstract

Background: Orofacial Burkitt lymphoma, a major manifestation of the endemic variant of Burkitt lymphoma in African children, has historically posed serious health challenges in sub-Saharan Africa due to its aggressive nature and potential for facial disfigurement. Fortunately, both its incidence and prevalence have decreased recently.

Objectives: To investigate the pattern of Burkitt's lymphoma distribution in the orofacial region and treatment outcomes.

Methods: This retrospective review spans 15 years (2007-2021) and examines cases of Burkitt's lymphoma at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) in Ile-Ife, Nigeria. The study included records of 62 cases presenting with orofacial Burkitt's lymphoma and complete clinical, histological, and/or cytological data.

Results: There was a consistent decline in incidence over the study period. Most patients (51, 82.3%) were aged 1–10 years, with a male-to-female ratio of 2.7:1. The maxilla was the most frequently affected site (42.0%), and the majority (77.4%) presented with advanced-stage disease. Overall, 58.6% achieved remission, with a correlation ($p < 0.001$) between the number of chemotherapy cycles received and treatment outcomes.

Conclusion: Despite challenges, orofacial Burkitt's lymphoma remains treatable. This study highlights the importance of treatment adherence and completion of the recommended chemotherapy courses.

Keywords: Burkitt's lymphoma, Chemotherapy, Childhood cancer, Dental anarchy, Facial tumour.

Introduction

Oral malignancies are the sixth most prevalent type of cancer globally, notably in developing regions.[1-3] Among these, Burkitt's lymphoma (BL) is one of the most frequently observed cancers.[4-5] Typically, orofacial Burkitt's lymphoma presents with facial swelling and an endophytic tumour in the mouth, often with grossly mobile or displaced teeth, described as dental anarchy.[6] The diagnosis of BL involves clinical evaluation, histological studies, immunophenotyping with flow cytometry, and cytogenetic studies. The disease is staged using two primary systems: The Murphy/St. Jude

system for children and the Ann Arbor system for adults.[7] Other staging systems previously used include the modified Magrath staging system, which classifies the disease into localised (A and B) and advanced (C and D) stages based on location and extent.[8] Previously, surgery to reduce tumour size was a common treatment method; however, current treatment primarily involves intensive multi-agent chemotherapy and supportive care.[9] This approach has significantly improved outcomes, with paediatric cases achieving a survival rate of approximately 90% in high-income countries, although considerably lower in adults.[10-11] The objective of this research was to study the clinical manifestations of orofacial Burkitt lymphoma and its treatment outcomes in relation to the number of chemotherapy courses received at a Nigerian tertiary facility.

Methods

Study site

The study was conducted at the Adult Haematology and Paediatric Oncology Units of Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria.

Study design

This was a retrospective descriptive study.

Study population

All patients with histologic or cytologic diagnosis of orofacial Burkitt's lymphoma with complete clinical information between January 2007 and December 2021.

Ethical consideration

The study was approved by the Health Research Ethics Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife, with assigned number IPH/OAU/12/2012.

Data collection

The clinical records of patients with complete clinical information were reviewed. Information retrieved included the biodata, socioeconomic status determined according to the scheme of Ogunlesi *et al*.,[12] presenting symptoms, lesion site, clinical stage, treatment regimens, and treatment outcomes.

Following clinical diagnosis of BL, Fine Needle Aspiration Cytology (FNAC) was the first level of investigation. The diagnosis was confirmed by immunohistochemistry of a tissue biopsy. In a few instances where the confirmatory test was unavailable, the diagnosis was based solely on FNAC. The laboratory investigations included a complete blood count and complete blood chemistry panels, including uric acid and lactate dehydrogenase levels. Clinical staging of the disease was done according to the Magrath staging system. Stages A and B were considered localised, whereas stages C and D were classified as advanced. Chemotherapy regimens (based on the guidelines of the International Network for Cancer Treatment and Research Protocol Number INCTR 03-06) and the number of chemotherapy courses received were documented. Outcomes were classified as remission, relapse, default, or death, with causes of death recorded.

Data analysis

This was performed using IBM SPSS version 26, employing univariate analysis (frequencies and percentages) and bivariate analysis using Chi-square tests for associations. Statistical significance was determined using a p-value threshold of <0.05 and a 95% confidence interval.

Results

A total of 103 patients were diagnosed with Burkitt's lymphoma within the period of study, and 62 (60.2%) presented with orofacial involvement. The majority of affected individuals were children, and the male-to-female ratio was 2.7:1. Nearly all the cases (98.4%) belonged to the low socioeconomic class (Table I). Over the past 15 years, the incidence of orofacial Burkitt's lymphoma has declined consistently, as illustrated in Figure 1.

In terms of clinical presentation, the most common symptom was jaw swelling, and 48 patients (77.4%) presented with advanced disease (Table II).

Table I: Sociodemographic distribution of cases

Variable	Frequency n = 62 (%)
Age groups (years):	
1-10	51 (82.3)
11-20	10 (16.1)
21-30	1 (1.6)
Gender:	
Male	45 (72.6)
Female	17 (27.4)
Socioeconomic status:	
Low	61 (98.4)
Middle	1 (1.6)

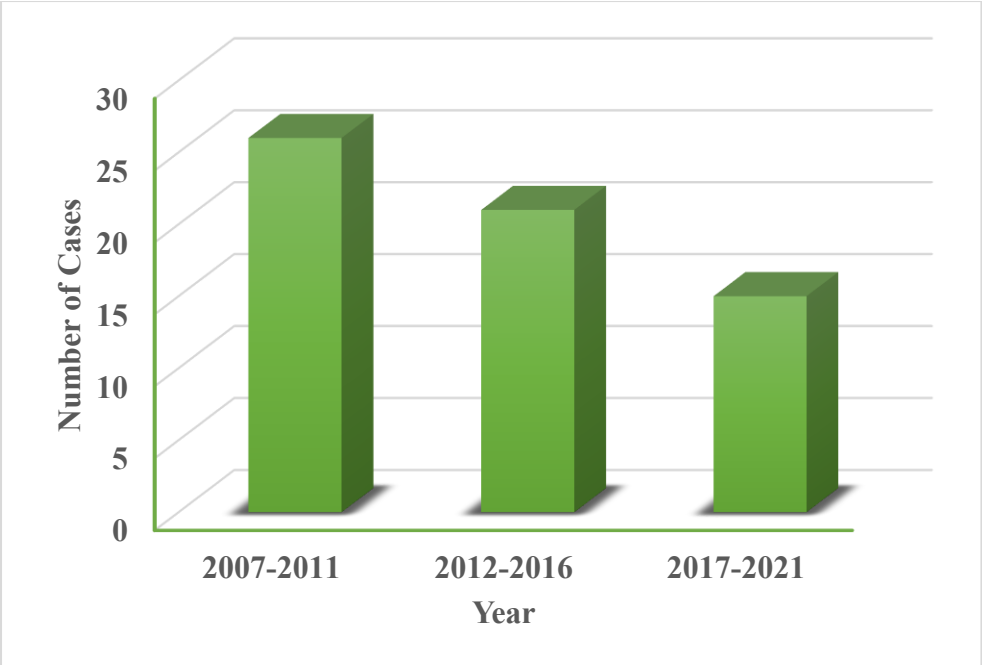

Figure 1: Trend of admission of Orofacial Burkitt lymphoma within the study period

The majority of patients presented to the hospital within the first 8 weeks of symptom onset, with a peak between the fourth and eighth weeks (Figure 2). Anatomically, the maxilla (42.0%) was the most frequently affected site. Other rare sites included the scalp, ear, parotid gland and the tonsils (Figure 3).

Thirty-nine patients (62.9%) received three or more courses, while four patients (6.5%) did not receive any chemotherapy. Overall, across the entire cohort, 34 patients (58.6%) achieved remission. (Table III). The mean number of courses was 3.52. The association between the number of chemotherapy courses received and treatment outcome was statistically significant ($p<0.0001$). As the number of chemotherapy courses increased, the proportion of patients in remission also increased, whereas the rates of death, relapse, and default declined correspondingly (Table IV).

Table II: Clinical presentation and disease staging

Variable	Frequency (n)	Percentage
Symptoms		
Jaw swelling	39	28.3
Protrusion of the eye	19	13.8
Abdominal swelling	16	11.6
Weight loss	13	9.4
Facial swelling	13	9.4
Fever	9	6.5
Loss of teeth	8	5.8
Leg swelling	5	3.6
Abdominal pain	4	2.9
Occipital mass	2	1.5
Neck swelling	2	1.5
Scrotal swelling	2	1.5
Generalised body ache	2	1.5
Difficulty in breathing	1	0.7
Nasal discharge	1	0.7
Recurrent toothache	1	0.7
Pedal oedema	1	0.7
Disease Staging		
Early Stage		
A	7	11.3
B	7	11.3
Advanced Stage		
C	18	29
D	30	48.4

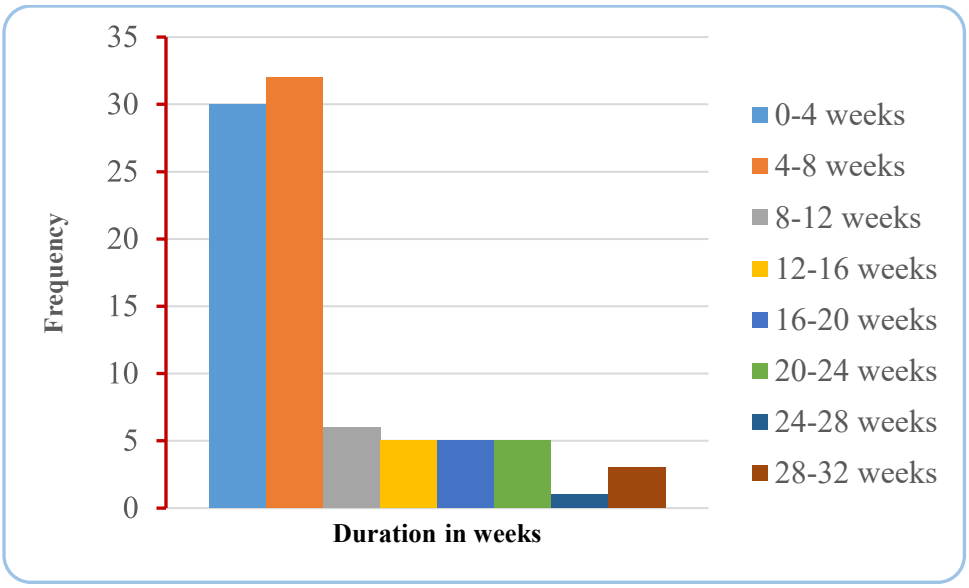

Figure 2: Duration of symptoms before hospital presentation

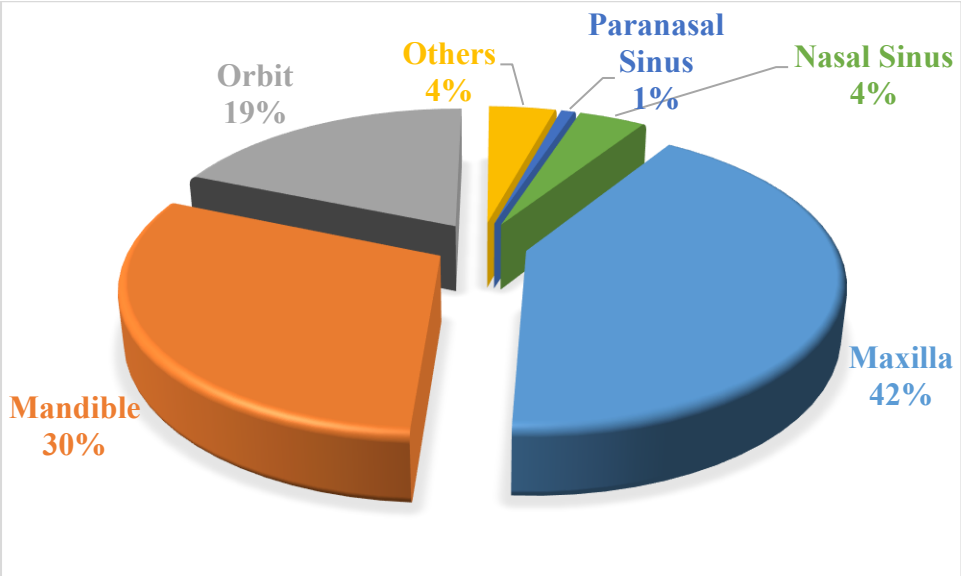

Figure 3: Anatomical sites of the lesions at the time of clinical presentation

Table III: Number of chemotherapy courses received and the treatment outcome

Number of courses	Frequency (n = 62)	Percentage	Treatment outcome	Frequency (n = 58)	Percentage
0	4	6.5	Remission	34	58.6
1	8	12.9	Relapse on treatment	8	13.8
2	11	17.7	Death on treatment	11	19.0
3	10	16.1	Defaulted treatment	5	8.6
4	8	12.9	-	-	-
6	21	33.9	-	-	-
Total	62	100		58	100

Table IV: Relationship between the number of treatment courses and outcomes

Number of courses	Remission	Relapse	Death	Defaulted treatment
1	0	0	5	3
2	2	4	4	1
3	6	2	1	1
4	5	2	1	0
6	21	0	0	0
Total	34	8	11	5

(χ^2 = 47.58, df = 12, Fisher's Exact p < 0.000001).

Discussion

Over the 15 years, there was a substantial decline in the incidence of Burkitt's lymphoma (BL), reinforcing broader national trends reported across Nigerian regions, including Ibadan, Uyo, Lagos, and Enugu. [13-16] This downward trend is likely influenced by improved access to healthcare, expanded use of insecticide-treated nets, and general enhancements in public health infrastructure. [17, 18]

The age and sex distribution of patients in our cohort closely mirrors the established epidemiological profile of endemic BL, with most cases occurring in the first decade of life and a male-to-female ratio of 2.7:1. This demographic pattern aligns with reports by other researchers and historical findings from the centre of the present study. [19-22] However, there is some variation across the literature: while Fasola *et al.* and Okoh *et al.* found a less pronounced male predominance, Lavu *et al.* and Motevasseli *et al.* reported notably higher ratios of 8:1 and 9:1, respectively. [23-26] These disparities may reflect differences in regional genetics or health-seeking behaviour, but the consistent male skew has also been linked to greater male susceptibility to oncogenic mutations. [26]

A significant proportion (77.4%) of patients in this study presented with advanced stages of orofacial Burkitt's lymphoma (BL), echoing earlier findings by Fasola *et al.*[23] This late presentation can be attributed to the disease's aggressive nature and, more crucially, to pervasive delays in seeking formal healthcare. Cultural beliefs that childhood cancers are untreatable using orthodox medicine often lead families to prioritise traditional or spiritual healing approaches. [27, 28] Consequently, valuable time is lost before seeking medical intervention, with patients frequently arriving at advanced disease stages.

Out of the 62 patients included in the present study, 93.5% received chemotherapy, with a remission rate of 58.6%. The high number of patients who received chemotherapy reflects the provision of free chemotherapy through the International Network for Cancer Treatment and Research (INCTR) initiative, introduced post-2005 at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile-Ife, Nigeria, which significantly reduced financial barriers to purchasing anticancer drugs. However, only a third of the cases completed the recommended six courses of chemotherapy. Treatment discontinuation was often prompted by visible improvements, particularly a significant reduction in tumour size following initial cycles, leading many to default during home leave. Socioeconomic status played an important role in treatment adherence: 98.4% of cases were from low-income households, with none from high socioeconomic strata. This financial vulnerability also contributed to premature treatment cessation despite the free supply of anticancer drugs once symptomatic relief is observed. Parents may misinterpret early recovery as a sign of cure, unaware of the necessity for full treatment completion.

A statistically significant association was found between the number of chemotherapy courses received and treatment outcomes, as patients who completed three to six courses showed markedly lower mortality and higher remission rates. Treatment outcomes in the current cohort reflect improvement over past reports from the same centre. For instance, a remission rate of 58.6% is an advance over the 36.6% reported by Amusa *et al.* in 2005 at the same centre.[22] The default rates also declined to 8.6%, compared to 11.7% and 31.7% reported by Amusa *et al.* in the same centre and Meremikwu *et al.* in Calabar, respectively. [22, 27] This positive trend likely reflects the impact of the provision of free chemotherapy medications during the study period. Mortality in this cohort was 19.0%, a figure considerably lower than 36.0% and 85.2% as reported by Brown *et al.* and Oguonu *et al.*, respectively. [15,19] Causes of death included sepsis, tumour progression, hypoglycaemia, tumour lysis syndrome, hypovolaemic shock, and acute kidney injury, which are consistent with findings from Amusa *et al.* and Musekwa *et al.* [22, 29]

Nevertheless, four patients (6.9%) refused treatment despite counselling and the availability of free drugs, underscoring persistent challenges in belief systems and health literacy. Public health interventions aimed at improving awareness, strengthening follow-up systems, and providing psychosocial support may significantly improve

chemotherapy treatment initiation and completion.

Conclusion

There has been a consistent decline in the incidence of orofacial Burkitt's lymphoma over the last 15 years, reinforcing broader national trends reported across Nigeria. Despite challenges, orofacial Burkitt's lymphoma remains treatable, with the study highlighting the importance of treatment adherence and completion of the recommended chemotherapy courses.

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Conflicts of interest: None declared.
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