



## Prevalence of Burkitt's lymphoma among lymphoma patients in Enugu State university teaching hospital (ESUTH) Parklane from 2006-2011

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### Abstract

Burkitt's lymphoma is a highly aggressive and uncommon type of lymphoma identified and described in the last century by Denis Parson Burkitt in Africa, in areas endemic to malaria. The main aim of this project Prevalence of Burkitt lymphoma in Enugu State University Teaching Hospital (ESUTH) Parklane is to ascertain the prevalence rate, and also the Histomorphological pattern of Burkitt lymphoma in Enugu State Teaching Hospital (ESUTH) Parklane. Two hundred (200) paraffin blocks of lymphoma patients diagnosed and treated in Enugu State University Teaching Hospital (ESUTH) Parklane were sorted from 2006 to 2011. Fifty (50) of the blocks were Non-Hodgkin Lymphoma and only fourteen (14) blocks were Burkitt's lymphoma. Haematoxylin and Eosin staining Technique was used and the stained Burkitt's lymphoma sections have starry sky appearance. The data presentations showed that in Enugu State University Teaching Hospital (ESUTH) Parklane, Burkitt lymphoma affects males than females, affects children average age seven (7) than others, the rare nature of Burkitt lymphoma, cervical lymph node as the highest primary sites of Burkitt lymphoma and finally the decrease in the incidence and prevalence of Burkitt lymphoma in Enugu State University Teaching Hospital (ESUTH) Parklane due to decreasing Epstein Barr Virus (EBV) and Human Immune Virus (HIV) infection and also increasing poverty alleviation.

**Keywords:** Burkitt lymphoma, Prevalence, Patients

### Introduction

Burkitt's lymphoma (BL) is one of the fastest growing malignancies in the pediatric population in the world <sup>[1]</sup>. Burkitt's lymphoma is a high-grade B cell Non-Hodgkin's lymphoma (NHL) which exists in endemic sporadic, and human immunodeficiency associated subtypes. The endemic variant, usually involves the maxilla and other facial bones while head and neck manifestations in non-endemic Burkitt's lymphoma are most times rare <sup>[2]</sup>.

Burkitt's lymphoma can also be defined as a monoclonal proliferation of B lymphoma which is characterized by rapid growth and facial asymmetry, loosening and drifting of teeth, and enlarged gingival (gum around the root of the teeth) <sup>[3]</sup>. It occurs most frequently in children between the ages of 2-12 years and the tumor most times affects male more than the females and, in most cases, the jaws are involved. In some patients, pancreas, kidney, abdominal lymph nodes, testes, ovaries, thyroid gland, salivary glands, breast, heart and long bones are also involved <sup>[4]</sup> Burkitt's lymphoma is most common type of lymphoma in children in Africa and there is some evidence linking its cause to a virus known as the Epstein-Barr virus <sup>[5]</sup>. Outside of Africa, chromosomal defects in some of the patient's cells (especially children) may be the cause of this type of lymphoma <sup>[6, 7]</sup>. Children still seems to be the most affected of Burkitt's lymphoma when compared to adult; there are just few cases of adult with this type of lymphoma all over the world <sup>[8]</sup>. In adult Burkitt's lymphoma frequently

produces bulky abdomen and may involve the liver, spleen, and bone marrow. This malignancy grows very rapidly in such that a person who appeared to be in good health a month ago may now be critically ill <sup>[9]</sup>. The number of new cases of this tumor is rising in most countries, while this type of lymphoma is still relatively rare in the United States; it is responsible for 50% of cancer deaths in children in Uganda and central Africa <sup>[10]</sup>. About 90% of American children with Burkitt's have abdominal tumors, while the average age of patients with endemic Burkitt's is seven years, and outside Africa, the average age is closer to 11 years. Burkitt's lymphoma is 1000 times more common in persons with AIDS than in the person without this virus. Currently, about 2% of AIDS patients develop Burkitt's lymphoma. The majority of these AIDS patients have stage IV disease by the time the tumor is diagnosed <sup>[11]</sup>.

In order to reduce the incidence and prevalence of this rare and the most aggressive type of Non-Hodgkin lymphoma, it would be necessary to plan a board but precise differential diagnosis which will remain critically, the first step in planning an appropriate therapy. The aim of this research work is ascertain the prevalence rate of Burkitt's lymphoma in Enugu state University Teaching Hospital (ESUTH) Parklane.

### Materials and Methods

#### Study Area

Enugu State University Teaching Hospital (ESUTH)

Parklane was chosen as the study area where access to tissue blocks of burkitt's lymphoma was available

### Collection of data

I went through the archival records of Enugu State University Teaching Hospital, Histopathology department and retrieved about two hundred (200) lymphoma related specimen request forms, its blocks, tissues specimen and processing procedures, from year 2006 to 2011. Out of these two hundred (200) blocks, one hundred and fifty (150) are not diagnosed of Non-Hodgkin's lymphoma, fifty (50) blocks are Non-Hodgkin's lymphoma and fourteen (14) of which are Burkitt's lymphoma. The registers constituting vital information of patients were made available from reception section from which the dates, age, sex, clinical diagnosis of each patient were obtained.

### Method

Tissue blocks were on a rectangular shape wooden blocks with the aid of hot spatulas and are trimmed to expose the cutting surface of the tissue. Sections were cut at 3 microns using the Rotary microtone and disposable microtome blades. The sections were stained with Haematoxylin and Eosin staining technique and examined with X4 and X 10 objectives lenses. The stained slides were photomicrographed.

### Preparation of Chemicals and Special Stains:

90% Alcohol 90m l of Alcohol was measured with a measuring cylinder, 10ml of distilled water was also measured using measuring cylinder and the two solutions were mixed properly.  
70% Alcohol

### H&E Staining Protocol

Labeled sections for H&E will be adequately dewaxed, and hydrated. Slides shall be stained with Haematoxylin, rinsed in water and differentiated using 1% acid-alcohol and after that, rinsed in water again, blue properly in running tap water and counterstained in 1% eosin. Stained sections will then be dehydrated, clear in xylene and mounted with DPX

### Results

The stained burkitt's lymphoma sections consist of sheets of a similar size and morphology population of medium size lymphoid cells with high proliferative activity and apoptotic activity. It has a "starry sky" appearance which is seen under low power, and this is due to scattered macrophages containing dead body of apoptotic tumor cell. Tumor cells possess small amount of basophilic cytoplasm and thee cellular outline mostly appears squared off. In the haematoxylin and eosin stained sections of Burkitt's lymphoma viewed with x4,x10 and x40 it was re-confirmed with the aid of photomicrographs, the already diagnosed lymphoma sections, to be a high grade Non-Hodgkin's type of Burkitt's lymphoma which are seen in plates I, II, III, IV, V below:

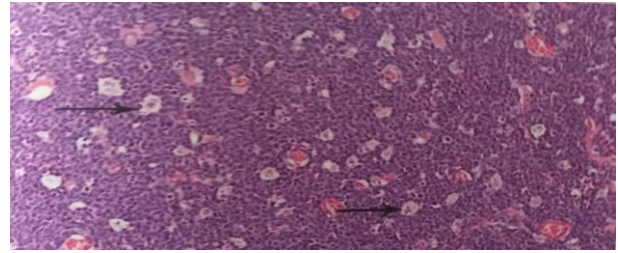


Plate 1: H & E Demonstration of Burkitt's lymphoma

Morphologically, all cases share the same histological features including a diffuse architecture, medium-sized lymphocytes with scanty cytoplasm and presence of numerous tangible macrophages representing Histiocytes.

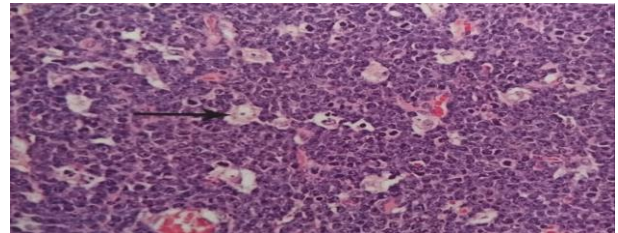


Plate 2: H & E Demonstration of Burkitt's lymphoma

The typical low magnification picture is that of a "starry-like" appearance in tissue sections caused by abundant large histocytes (arrows).

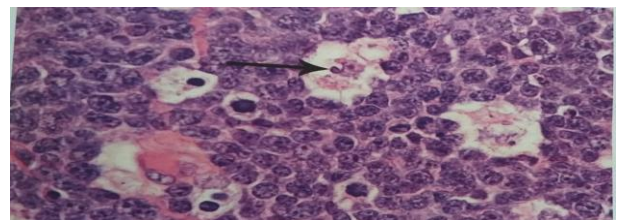


Plate 3: H & E Demonstration of Burkitt's lymphoma

Note the distinct presence of histocytes and phagocytosis of nuclear debris (arrow). The cellular debris is accumulated as a result of rapid rate of apoptosis in tumour cells.

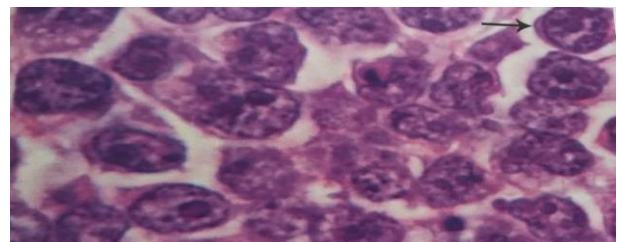
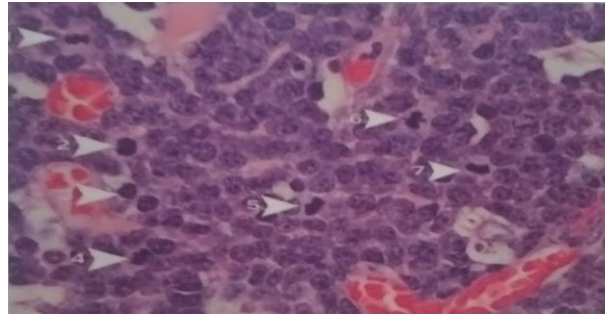


Plate 4: H & E Demonstration of Burkitt's lymphoma

The individual lymphoma cells are medium sized, contain scant basophilic to amphophilic cytoplasm (arrow) and round to irregular but not nuclei containing one to several peripheral small nucleoli



**Plate 4:** H & E Demonstration of Burkitt's lymphoma

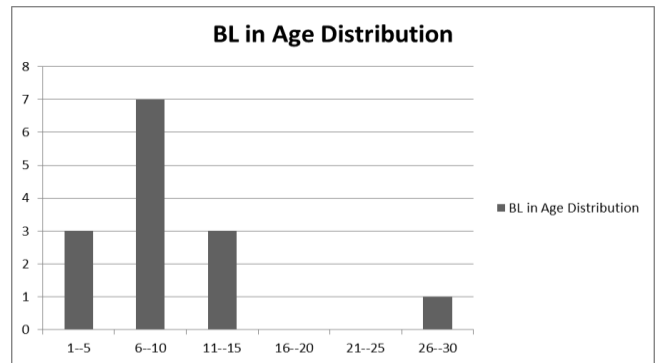
Typical Burkitt's lymphoma contains frequent mitosis. This image shows at least 7 of mitosis in one X40 microscopic field

**Data Presentation**

In order to make sure of a perfect understanding of the prevalence of Burkitt's lymphoma Enugu State Teaching Hospital Parklane, the following that presentations would be necessary using bar charts.

**Table 1:** A table showing the age distribution amongst sexes of Burkitt's lymphoma patients ESUTH Parklane

Age	Male	Female
1 – 5	2	1
6 – 10	5	2
11 – 15	2	1
16 – 20	0	0
21 – 25	0	0
26 – 30	1	0



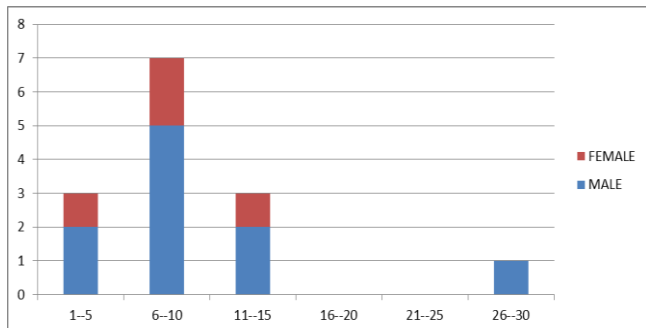
**G2:** a bar chart showing the age distribution of burkitts lymphoma in ESUTH Parklane

Burkitts lymphoma is responsible of 50% of cancer deaths In children between the range of 6-10 years. And children seem to be most affected compared to adults

3. Distribution Among Primary sites of burkitts lymphoma in ESUTH Parklane

**Table 3:** A table showing the primary sites of burkitts lymphoma

Samples sites	Samples sizes
Cervical LN	5
Ascitic Fluid	4
Subcutis	1
Other lymph nodes	4



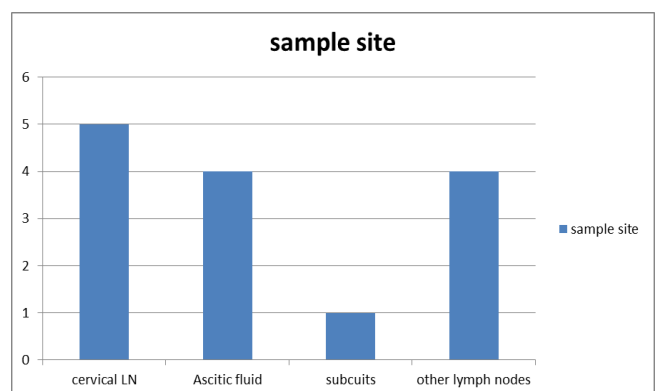
**G1:** A bar chart showing the age distribution amongst sexes of Burkitt's lymphoma patients in ESUTH Parklane.

The incidence of Burkitts lymphoma is higher amongst males than females in ESUTH Parklane which has a ratio of 3:1. There is no known reason for this in predominance of tumour amongst male patients

2. Age distribution in Burkitts

**Tables 2:** Tables showing the age distribution of Burkitts lymphoma

Age	BL in Age Distribution
1-5	3
6-10	7
11-5	3
16-20	0
21-25	0
26-30	1



**G3:** A bar chart showing the distribution amongst primary sites of Burkitt's lymphoma

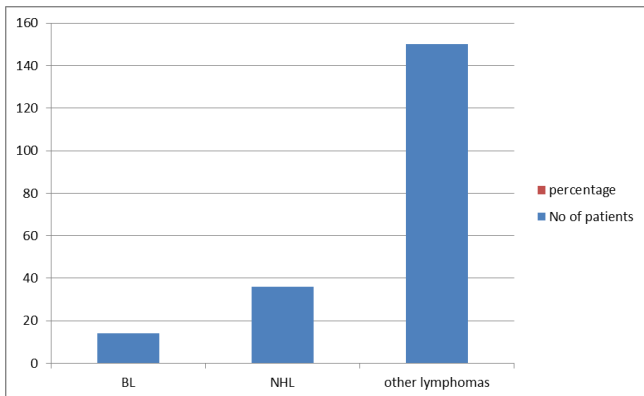
Patients may have facial tumor, tumors at the testes, ovaries, skin, sinuses, ascetic fluid, and subcutis but it is much more likely to see cervical lymphoma in most patients.

4 Distribution of Burkitt's lymphoma, NHL and other lymphoma incidence in ESUTH parklane.



**Table 4:** Table 4 showing the distribution of incidence of Burkitt’s lymphoma, NHL and other lymphoma

Disease	No. of Patients
Bl	14
Nhl	36
Other Lymphoma	150



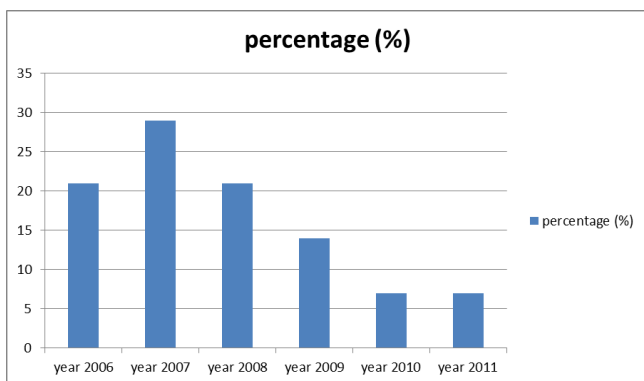
**G4:** A bar chart showing the distribution of Burkitt’s lymphoma, NHL and other lymphoma.

The bar chart shows how rare Burkitt’s lymphoma is in ESUTH Parklane compared to NHL and other lymphoma in general.

5. Distribution of incidence and prevalence of Burkitt’s lymphoma in ESUTH over the years.

**Table 5:** A table showing incidence and prevalence of Burkitt’s lymphoma in ESUTH over years

Occurance	Percentage (%)	
Year 2006	3	21
Year 2007	4	29
Year 2008	3	21
Year 2009	2	14
Year 2010	1	7
Year 2011	1	7



**G5:** Lymphoma in ESUTH parklane over the years

The bar chart shows the decrease in incidence and prevalence of Burkitt’s lymphoma from 2006 to 2011 which is basically because of increased protection against Epstein bar Virus and Human immune Virus, and also awareness of this rare but aggressive type of Non-Hodgkin’s lymphoma.

**Discussion**

Burkitt’s lymphoma is the first human Tumor to be associated with a virus Epstein Bar Virus and is also the first Non- Hodgkin’s lymphoma to be described in association

with Human Immune Virus Infection and among human neoplasm, it has the shortest doubling time thus its unequal proliferation rate creates special challenges for diagnosis.

Over results showed that Burkitt’s lymphoma prevalence and incidence in Enugu State University Teaching Hospital Parklane were higher in males than females in the ration 3:1 with no known reason so far for this increase in predominance among males. This in line with results of most previous studies carried out across the nation. Fifteen studies from nine centers across northern southern Nigeria described the sex distribution of patients with Burkitt’s lymphoma and all reported male predominance with a male: female ratio ranging from 1. 2-2. 7:1 [12, 13].

Our study also compared the age distribution of patients in Enugu State University Teaching Hospital Parklane with higher distribution seen in children between the ages of 6-10 years. This proves why Burkitt’s lymphoma is said to be responsible for at least 50% of cancer death in children. The peak ages ranging from 5-10 years observed in this research work is also in correlation with the findings in Kenya and Uganda [5]. Aderele and Antia in Ibadan observed that 99 percent of children with Burkitt’s lymphoma belonged to the low socio-economic class. They postulated that frequent infections due to malnutrition to which children from low socio-economic background are prone, make their immunity too weak to combat the Epstein Barr virus which is associated with Burkitt’s lymphoma [14]. This suggests a row for low socio-economic status in the occurrence of the disease probably due to associated immunosuppression from malnutrition or malaria associated with poor living conditions.

We also found that patients have facial tumors at the testes, ovaries, skin, nasal sinuses, lymph nodes and ascetic fluid with higher predominance of cervical lymphoma in most patients.

Our result showed fluctuations in rate of the incidence and prevalence of Burkitt’s lymphoma from 2006 to 2011. In 2007, it went to its peak, fell in 2008 and continued decreasing until 2011 which is basically due to decrease in cases of Epstein Bar virus and Acquired Immune Deficiency Syndrome in Enugu State and also the awareness of this rare but aggressive type of Non-Hodgkin’s lymphoma. This is similar to findings in Lagos revealed in the study by Brown [13]. According to Brown, the exact cause is not clear, but has been attributed to improvement in living conditions and better malaria control measures, given the role of malaria in endemic Burkitt’s lymphoma.

Knowledge of the factor responsible for this decline would be useful in proffering solutions towards reducing the incidence of the disease.

**Conclusion**

This study confirmed that the prevalence of this rare but aggressive type of non-Hodgkin’s lymphoma in Enugu State University Teaching Hospital (ESUTH) Parklane, which is associated with mostly male children of ages 6-10 years, is on the decrease due to some degree of awareness of this lymphoma.

**Recommendation**

In line with the observation made during this study, individuals within the age limits of 2 to 12 years should endeavor to go for screening as the actual case is not yet known, for proper follow-up andearly treatment. And also

Burkitt's lymphoma screening should be included in routine screening, diagnosis and prognosis.

### Conflict of Interest

None declared

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