Original Research Article

Journal of College of Medical Sciences-Nepal, Vol-21, No.3, Jul-Sep 2025

ISSN: 2091-0657 (Print); 2091-0673 (Online) Open Access
DOI: 10.3126/jcmsn.v21i3.84414

Clinicopathological Profile and Treatment Outcomes of Pediatric and Adolescent Non-Hodgkin's Lymphoma Cases in a Tertiary Cancer Hospital of Central Nepal

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ABSTRACT

Background

Non-Hodgkin's lymphoma (NHL) is the most common type of lymphoma in pediatric and adolescent age groups. Advances in combination chemotherapy protocols have significantly improved survival, even in resource-limited countries. The objective of this study this study is to find the clinicopathological features and treatment outcomes of pediatric and adolescent NHL at B.P. Koirala Memorial Cancer Hospital (BPKMCH).

Methods

A retrospective cross-sectional study was conducted among 65 pediatric and adolescent patients diagnosed with NHL between 2008 and 2012. Clinical presentation, histopathology, staging, treatment received, and outcomes were analyzed. Chemotherapy regimens included CHOP/R-CHOP and MRC 842/841 protocols, with radiotherapy for selected patients were analyzed in this study.

Results

Among 65 patients, 72.3% were male. The most common age group was 13–19 years (53.8%). Cervical lymphadenopathy was the most frequent presentation (55.4%). Histologically, intermediate-grade lymphomas predominated (50%). The majority presented with stage III (41.5%) and stage IV (32.3%) disease. Of 60 patients treated, 45% (27/60) achieved cure, while 25% died before completion of therapy and 30% defaulted. Relapse occurred in 18% of cured patients. Only 22.2% of survivors remained on long-term follow-up.

Conclusions

Pediatric and adolescent non-Hodgkin's lymphoma predominantly affects older children, with a male preponderance and frequent cervical lymphadenopathy. Most patients present with advanced-stage disease, and intermediate- and high-grade lymphomas are common. Treatment outcomes are variable, highlighting challenges such as relapse, treatment default, and poor follow-up. Early diagnosis and improved treatment adherence are essential to optimize outcomes in this population.

Keywords: Non-Hodgkin's lymphoma; pediatric oncology; chemotherapy outcomes; Nepal.

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INTRODUCTION

Non-Hodgkin's lymphoma (NHL) represents one of the most frequent childhood and adolescent malignancies worldwide, accounting for 7-10% of pediatric cancers.[1] Globally, survival rates have improved significantly with the introduction of standardized protocols such as LMB and BFM regimens, with cure rates exceeding 80-90% in high-income countries.[2,3] However, outcomes in low-and middle-income countries (LMICs), including Nepal, remain inferior due to late presentation, treatment-related toxicity, and poor compliance.[4,5] The clinical spectrum of NHL is heterogeneous. Children often present with extranodal involvement such as abdominal or mediastinal masses, and histological subtypes include Burkitt lymphoma, lymphoblastic lymphoma, diffuse large B-cell lymphoma (DLBCL), and anaplastic large cell lymphoma (ALCL).[6,7] Prognosis depends on disease stage, histology, treatment intensity, and availability of supportive care.[8,9] Limited research has been published in this area from Nepal among pediatric NHL. There is a need to document institutional experience for regional and international comparison. This study aims to analyze the clinicopathological profile, treatment outcomes, and challenges of managing pediatric and adolescent NHL at BPKMCH over five years.

METHODS

A retrospective cross-sectional study was conducted among 65 cases at Pediatric Oncology of B.P. Koirala Memorial Cancer Hospital (BPKMCH) with suspected lymphoma. This study was conducted by taking retrospective data of 2008 to 2012. Ethical approval was taken before collecting the data. All the clinical details and histopathological reports were retrieved from patient's hospital record file. Pretreatment assessment included hematological, biochemical, and radiological investigations (CXR, USG, CT, MRI if needed), as well as bone marrow examination related data was also collected. All confirmed NHL patients who consented to treatment were given standard chemotherapy protocols using agents such as doxorubicin, cyclophosphamide, vincristine, cytarabine, ifosfamide, methotrexate, and etoposide (CHOP/R-CHOP and MRC 842/841). Radiotherapy was considered for older children with residual disease. Patients were advised to undergo regular follow-up, and responses were recorded accordingly. A predefined proforma was used for data collection. Collected data was entered into Microsoft Excel and analysed using SPSS-16. Data was analyzed using a descriptive statistical tool.

RESULTS

This study included 65 pediatric and adolescent cases of non-Hodgkin's lymphoma (NHL), with the majority (53.9%) aged 13–19 years and predominantly male (72.3%). The most common clinical presentation was cervical lymphadenopathy (55.4%), while other sites included inguinal, axillary, abdominal, nasal, and ocular regions (44.6%). More than half of the patients (53.8%) presented within 2–6 months of symptom onset. Histopathologically, intermediate-grade lymphomas were most frequent (50%), followed by high-grade (40%) and low-grade (10%), with mixed type (47.7%) and lymphoblastic lymphoma (27.7%) being the most common subtypes. Most cases were diagnosed at advanced stages, with stage III (41.5%) and stage IV (32.3%) predominating. Among 60 patients with available outcomes, 45% completed therapy and were cured, 25% died, and 30% defaulted; relapse occurred in 18% of those cured. Only 3% received radiotherapy, and regular follow-up was poor, with just 22.2% adhering. Organ involvement was seen in 22 cases, most commonly in bone marrow (31.8%), spleen (27.3%), and liver (22.7%) (Table 1).

DISCUSSION

In this study, we analyzed 65 pediatric and adolescent cases of non-Hodgkin's lymphoma over five years to explore their clinicopathological characteristics and treatment outcomes. In adolescents aged 13–19 years comprised the majority of cases (53.9%), with a male predominance (72.3%). Cervical lymphadenopathy was the most common presentation (55.4%), and over half of the patients (53.8%) presented within 2–6

Table 1. Characteristics and treatment outcomes of patients with Non-Hodgkin's Lymphoma. (n=65)	
Characteristics	**Frequency (%)**
Age (years)	
<5	10(15.38)
6-12	20(30.77)
13-19	35(53.85)
Gender	
Male	47(72.31)
Female	18(27.69)
Clinical presentation	
Cervical region	36(55.38)
Inguinal, axillary, abdominal, nasal, and ocular regions	29(44.62)
Duration of symptoms	
Within 2 months	23(35)
2-6 month	35(53.8)
>6 month	4(6.2)
Histopathology	
Intermediate-grade lymphomas	32(50)
High-grade	26(40)
Low grade	7(10)
Subtypes	
diffuse large B-cell lymphoma	6(9.2)
Lymphoblastic lymphoma	18(27.7)
Burkitt lymphoma	1(2)
Round cell tumor	2(3.1)
Mixed type	31(47.7)
Diffuse small cell type	5(7.7)
Reactive follicular hyperplasia	1(1.5)
Stage	
I	3(4)
II	13(20)
III	27(41.5)
IV	22(32.3)
Treatment outcome (n=60)	
Completed therapy and were cured	27(45)
Died	15(25)
Defaulted	18(30)
Replace among cured (n=27)	5(18)
Radiotherapy	
Yes	2(3)
No	63(97)
Regular follow-up (n=27)	
Yes	6(22.2)
No	19(77.8)
Organ involvement (n=22)	
Bone marrow	7(31.82)
Spleen	6(27.27)
Liver	5(22.73)
CNS	3(13.64)
Lungs	1(4.55)

months of illness. Histopathologically, intermediate-grade lymphomas accounted for 50%, followed by high-grade (40%) and low-grade (10%), with mixed type (47.7%) and lymphoblastic lymphoma (27.7%) being the leading subtypes. Most patients were diagnosed at advanced stages, with stage III (41.5%) and stage IV (32.3%) predominating. Among 60 patients who received chemotherapy, 45% were cured, 25% died, and 30% defaulted, while relapse occurred in 18% of the cured group. Only 3% received radiotherapy, and follow-up compliance was low, with just 22.2% of cured patients attending regularly. Organ involvement was observed in bone marrow (10.8%), spleen (9.2%), liver (7.7%), CNS (4.6%), and lungs (1.5%).

This study showed that majority of patients (70%) were adolescents, similar to other Asian series.[10] Male predominance (72%) is consistent with other studies.[2,11] Cervical lymphadenopathy as the most common presentation contrasts with abdominal disease reported in Western cohorts, suggesting regional variation.[12] Most patients presented with advanced-stage disease (74% in stage III-IV), a pattern often reported in LMICs.[4,13] This is likely due to delayed health-seeking behavior, limited diagnostic facilities, and low awareness. Intermediate-grade lymphomas were most frequent, consistent with other Asian studies.[10] Treatment outcomes showed a cure rate of 45%. While this is lower than survival rates in high-income countries (>80%). [2,6] It is comparable to outcomes from other LMICs.[14] High default rates (30%) and treatment-related mortality (25%) were significant contributors to poor overall outcomes. These findings emphasize the urgent need for improved supportive care, financial assistance, and psychosocial support to enhance adherence.[15] Relapse occurred in 18% of cured patients, similar to international data (10–20%) depending on histology and treatment intensity.[3,7] Long-term follow-up remains a major challenge, with only 22.2% of survivors maintaining regular visits. Our findings are consistent with other Asian experiences, where outcomes remain inferior to those in Europe and North America due to similar

socioeconomic and infrastructural challenges.[10,13] Incorporating international pediatric NHL response criteria[1] and adapting risk-stratified treatment protocols may improve outcomes in Nepal. This five-year institutional study demonstrates that pediatric and adolescent NHL in Nepal is characterized by advanced-stage presentation, cervical predominance, and high treatment abandonment. While cure rates of 45% are encouraging in a resource-limited setting, improving treatment adherence, supportive care, and long-term follow-up remain critical to reducing survival disparities between LMICs and high-income countries.

CONCLUSIONS

This study highlights that pediatric and adolescent non-Hodgkin's lymphoma predominantly affects older children and shows a male preponderance. Cervical lymphadenopathy is the most common clinical presentation, and many patients present with advanced-stage disease. Intermediate- and high-grade lymphomas are the most frequent histopathological types, with mixed and lymphoblastic subtypes being prominent. Despite initiation of chemotherapy, treatment outcomes are variable, with challenges including mortality, treatment default, relapse, and poor follow-up. The findings underscore the need for early diagnosis, improved treatment adherence, and structured follow-up to optimize outcomes in this patient population.

Conflict of interest: None

Funding: None

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Citation: Sharma KS, Panthee S, Mehta S. Clinicopathological Profile and Treatment Outcomes of Pediatric and Adolescent Non-Hodgkin's Lymphoma Cases in a Tertiary Cancer Hospital of Central Nepal. JCMS Nepal. 2025; 21(3): 302-306.