Clinico-pathologic profile and treatment outcome of children with nasopharyngeal cancer seen at hemato-oncology unit of TASH, Ethiopia

A Research Thesis To Be Submitted To Addis Ababa University, College of Health Sciences, Pediatrics and Child Health Department for Partial Fulfillment of the Requirements for a Specialty Certificate in Pediatrics and Child Health

By – Bezawit Melaku Barkiligne, MD

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ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES SCHOOL OF MEDICINE DEPARTMENT OF PEDIATRICS AND CHILD HEALTH

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Primary Investigator

Dr Bezawit Melaku _____ _____

Signature Date

Primary Advisor

Dr Daniel Hailu _____ _____

Signature Date

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List of Acronyms

AJCC - American Joint Committee on Cancer

CT – Computed Tomography

EBV – Epstein Bar Virus

EFS – Event Free Survival

HLA – Human Leukocyte Antigen

IHC – Immunohistochemistry

LMIC – Low and Middle Income Countries

MHC – Major Histocompatibility Complex

MRN – Medical Record Number

NPC – Nasopharyngeal Cancer

OS – Overall Survival

PET – Positron Emission Tomography

REC – Research and Ethics Committee

RT – Radiotherapy

SPSS – Statistical Package for the Social Sciences

TASH – Tikur Anbessa Specialized Hospital

WHO – World Health Organization

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Abstract

Background: As an unusual disease in children, nasopharyngeal cancer has variable incidence among nations around the world. There are insufficient studies from non-endemic areas like ours and similar LMICs. It is usually diagnosed late in the more advanced stages of the disease. Histologic presentation and treatment outcome is especially different among children and yet therapeutic approaches have been extrapolated from guidelines made for adults.

Objective: To assess the sociodemographic, clinico-pathologic profile and treatment outcome of children with nasopharyngeal cancer seen at pediatric hemato-oncology unit of TASH

Methods: This is a cross-sectional descriptive review of pediatric patients who were treated for nasopharyngeal carcinoma at Tikur Anbessa Specialized Hospital. The hospital's database and patients' chart review was done to collect data on the diagnosis and management of NPC during the study period. All eligible pediatric patients who were on follow-up beginning from January 2018 to January 2024 were assessed for their clinico-pathologic profile and treatment outcome. A questionnaire was used to collect the clinical data including sociodemographics, clinical, radiologic and pathologic reports along with the treatment oucome. The data was entered into SPSS for analysis. The relationship between the independent and dependent variables was explained through chi-sqaure analysis. The overall and event-free survival of the patients was estimated using Kaplan-meier analysis.

Result: Out of the 31 patients in the study, 61.3% were male with a M:F ratio of 1.6:1. Their ages ranged from 6-18 years with the median age of presentation being 14 years. The majority of cases came from Oromia region accounting for 38.7% of case. The major presenting symptom was neck mass (90.3%) followed by nasal congestion and epistaxis. The duration of illness upon presentation ranged from 8 weeks to 2 years with a median of 21 weeks. 64.5% of the patients presented with T4 stage disease. Undifferentiated histology predominated accounting for 77% cases. All patients were started with chemotherapy but only 58.1% could gain access to radiotherapy. There was significantly low overall and event-free survival at 3 years with 42% and 20% respectively.

Conclusion: Nasopharyngeal cancer commonly presents in pre-adolescent and adolescent age groups with a unilateral or bilateral neck swelling. Most presentations are loco-regionally advanced and undifferentiated in histology. Treatment is via concurrent chemoradiotherapy with survival significantly lower than the developed world's counterparts.

Keywords: Nasopharyngeal carcinoma, Pediatrics, Children, Ethiopia

1. Introduction

1.1 Background of the Study

Nasopharyngeal cancer is an uncommon disease in children which accounts for <1% of all childhood malignancies.(1) Incidence varies widely around the world with more cases reported in China, Southeast Asia and Mediterranean countries as compared to the Western world.(2,3) Incidence in developing countries is not well-reported. Correct diagnosis is made with imaging of the primary site and tissue biopsies.(4) >90% of pediatric cases are undifferentiated (type III) variant with advanced spread.(1) The treatment is multimodal with radiation being the backbone of all regimens. (5,6)

1.2 Statement of the Problem

Childhood NPC is usually not recognized early until patient is in advanced stages. The diagnostic challenges are largely due to lack of specific signs and symptoms.(1) In low-resource settings, there is an additional burden of timely access to proper diagnostic modalities and treatment options. Therefore, the survival of patients is expected to be guarded as compared to the developed nations.

Additionally, there is a lack of standard management guidelines in the pediatric age group. Despite the pathogenetic differences between the two age groups, most protocols are extrapolated from trials seen in adult nasopharyngeal cancer patients. However, significant differences on the survival of pediatric patients were observed as compared to adults. (7,8)

Even less so is known on the demographics, clinical patterns and treatment outcomes of childhood NPCs in low- and middle-income countries. In Africa, studies have been reported from Northern Morocco and Nigeria but were largely inclusive of the adult population.(9,10) One study aimed at investigating the epidemiological evidence regarding NPC in Ethiopia has been published from TASH in 2021.(11) This descriptive report included both adolescents and adults with primary focus on the clinico-epidemiologic pattern of the disease. (11). However, pediatric studies are still unavailable to date.

1.3 Significance of the Study

In light of the limited knowledge about NPC in children in Ethiopia, the present study will attempt to investigate and add valuable input on pediatric nasopharyngeal carcinoma. As previous studies were not exclusively conducted in the pediatric age group and were short of assessing the treatment outcomes, this study will also try to fill the gap on the factors that may affect its outcome especially in limited resources. It is also our hope to raise awareness of this rare malignancy to clinicians for early diagnosis and referral.

2. Literature Review

2.1. Epidemiology

Nasopharyngeal carcinoma is a malignant tumor which arises from the epithelial lining of the nasopharynx frequently originating from the fossa of Rosenmuller.(4) It is one of the rarest forms of cancer and according to the International Agency for Research on Cancer (IARC) 133,354 new cases (across all age groups) were diagnosed in the year 2020 accounting for only 0.01% of all cancers diagnosed that year. Highest cases were reported from South-Eastern and Eastern Asia (77%). (12,13) According to the 2020 population based cancer registry data of Addis Ababa, it ranked as the 21st most common cancer across all age and sex groups.(14) It has a bimodal distribution of occurrence at 10-20 years and 40-60 years of life. The incidence is highly variable among various regions and races accounting for 1.33% of all NPC patients in one single institution study in China. (2) Higher incidence is seen among male patients with a ratio of 2-3 to 1. (2,3,11)

2.2. Comparison to adults

The sociodemographic, clinicopathologic features and treatment outcomes of patients with this carcinoma tend to vary based on the age at diagnosis. Even though the sexual distribution was similar to their adult counterparts, there was a greater incidence of the disease among African race in the pediatric age group. This racial dominance was explained as the possible association with low socio-economic status, greater and earlier EBV exposure and increased genetic predisposition among the Black population in one of the studies.(7,8,15)

All the reviewed studies demonstrated a more advanced presentation of NPC in the pediatric age group with undifferentiated or poorly differentiated histologic features.(7,8,15) The risk of NPC-related mortality was however greater among adults despite the advanced presentation of young and adolescent patients. The overall 5 year survival among children ranged 75-90% as compared to adult survival of 50%.(7,8) The reasons proposed for these differences were more aggressive treatment in younger patients, better tolerance with less need to reduce doses and interrupt treatment with lower likelihood of serious comorbidities among children and the differences in histology.

2.3. Etiology and risk factors

The interplay of several virologic, genetic and environmental factors predisposes patients for the development of NPC. Among the virologic predispositions, EBV is the most extensively studied and constantly associated risk factor. This was evidenced by the detection of viral DNA, nuclear antigens and antibodies in the malignant cells or serum. (16) Apart from viruses, genetics plays an immense role in acquiring NPC. Many studies have now identified a susceptibility locus within the MHC region that codes for the HLA genes. Other non-HLA susceptibility loci were also identified.(1)

From researches focused on dietary practices and their association with NPC, it has been stated that those taking salted fish and preserved vegetable are at a greater risk. On the contrary, decreased consumption of fruits and vegetables were also linked with similarly increased risk of nasopharyngeal carcinoma. A large population-based case-control study in southern China also demonstrated an animal-based factor consisting of red meat, poultry, fish and seafood had a strong positive association with NPC risk in adults. The findings in adolescents were similar but weaker. (17)

2.4. Clinical Presentation and diagnosis

The median age at presentation for most childhood NPC is 13 years. The diagnosis is usually delayed because of late presentation of patients due to its location and nonspecific signs and symptoms. (1) The common presenting symptoms include unilateral or bilateral cervical lymphadenopathies, nasal symptoms (bleeding, congestion), frequent ear infections, headache and in some late stages multiple cranial nerve palsies. (2,3)

Radiologic studies at presentation will assess the stage of the disease, magnitude of the primary site and locoregional spread. Distant metastases can further be evaluated via chest and

abdominal CT scans or PET scans. On a study done on radiologic patterns of NPC at our hospital, a diagnosis of nasopharyngeal carcinoma was made on imaging in 90% of the cases, but 10% were given alternative diagnosis. (18)

All patients require tissue diagnosis from the mass and all accessible lymph nodes. This will aid in differentiating NPC from tumors occurring in the same location during childhood, such as rhabdomyosarcoma or lymphomas. World Health Organization (WHO) proposed three histologic classifications of nasopharyngeal carcinoma: keratinizing squamous, non-keratinizing differentiated and undifferentiated subtypes.

2.5. Staging

NPC is staged according to the American Joint Committee on Cancer (AJCC) eighth edition system.(19) (*Table 1*) Close to 80% of patients in the pediatric age are diagnosed as stage IV.

Table 1. Classification Criteria and Stage Groupings According to the 7th and 8th Editions of the UICC/AJCC Staging System

	7th Edition	8th Edition
T category		
	T1: Nasopharynx, oropharynx, or nasal cavity without parapharyngeal extension	T1: Nasopharynx, oropharynx, or nasal cavity without parapharyngeal extension
	T2: Parapharyngeal extension	T2: Parapharyngeal extension, adjacent soft tissue involvement (medial pterygoid, lateral pterygoid, prevertebral muscle)
	T3: Bony structures of skull base and/or paranasal sinuses	T3: Bony structures (skull base, cervical vertebra) and/or paranasal sinuses
	T4: Intracranial, cranial nerves, hypopharynx, orbit, infratemporal fossa/masticator space	T4: Intracranial extension, cranial nerves, hypopharynx, orbit, extensive soft tissue involvement (beyond the lateral surface of the lateral pterygoid muscle, parotid gland)
N category		
	N0: No regional lymph node metastasis	N0: No regional lymph node metastasis
	N1: Unilateral cervical, unilateral or bilateral retropharyngeal lymph nodes, above the supraclavicular fossa, ≤6 cm	N1: Retropharyngeal (regardless of laterality) Cervical, unilateral, ≤6 cm, and above caudal border of cricoid cartilage
	N2: Bilateral metastatic lymph nodes, ≤6 cm in greatest dimension, above the supraclavicular fossa	N2: Cervical, bilateral, ≤6 cm, and above caudal border of cricoid cartilage
	N3a: >6 cm in dimension	N3: >6 cm and/or below caudal border of cricoid cartilage (regardless of laterality)
	N3b: Supraclavicular fossa	
Stage/Group		
	I: T1 N0 M0	I: T1 N0 M0
	II: T2 N0–1 M0, T1–2 N1 M0	II: T2 N0–1 M0, T1–2 N1 M0
	III: T1–3 N2 M0, T3 N0–1 M0	III: T3 N0–2 M0, T1–2 N2 M0
	IVA: T4 N0–2 M0	IVA: T4 or N3 M0
	IVB: Any T N3 M0	IVB: Any T, any N M1
	IVC: Any T, any N M1	

Abbreviations: UICC/AJCC, Union for International Cancer Control/American Joint Committee on Cancer.

2.6. Treatment

The treatment of nasopharyngeal cancer is multimodal with radiation being the backbone of all treatment regimens as it is a highly radiosensitive tumor. Traditionally, 66-70 Gy was used on the primary site while involved lymph nodes given as 1.8Gy once daily doses. Prophylaxis to uninvolved cervical lymph nodes is delivered bilaterally at 45-50 Gy. For the best possible outcome, consistent use of radiotherapy is crucial. Disruption in delivery is however inevitable for several reasons especially in a resource limited countries. The interruption has been shown to negatively impact the degree of loco-regional disease control and overall prognosis of patients.(20)

With the introduction of adjuvant chemotherapy, significant improvements in tumor response and reduction in the dose of radiation given to the patients was able to be achieved. This benefit was essentially observed when the patients received concomitant chemoradiotherapy. (5,6)

3. Study Objectives

3.1 General Objective

To evaluate the clinico-pathologic profile and treatment outcome of children with nasopharyngeal cancer seen at pediatric hemato-oncology unit of TASH in the specified time period

3.2 Specific Objectives

- Describe the demographic pattern of children with NPC
- Assess their clinical & histologic presentations
- Evaluate the received treatment and its outcome
- To identify factors that affect survival

4. Research Methods

4.1 Study setting

The study was conducted at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. Until recently it was the only referral center for the care of pediatric hemato-oncology cases. It has multiple pediatric hemato-oncology specialists and fellows, clinical oncologist, pathologists, pediatric radiologists and other health care professional providing a multi-disciplinary care for such patients. It also has two separate inpatient units for chemotherapy administration and one radiotherapy unit.

4.2 Study Period

A 6-year hospital-based study was made.

4.3 Study Design

A cross-sectional study with retrospective data collection.

4.4 Population

4.4.1 Source Population

All children on follow-up at TASH hemato-oncology units from January 2018 to January 2024

4.4.2 Study Population

All children diagnosed with NPC who had follow-up at TASH hemato-oncology units from January 2018 to January 2024

4.5 Eligibility

Inclusion criteria – age less than or equal to 18, confirmed nasopharyngeal cancer, follow-up in the specified study period

Exclusion criteria - age >18, incomplete documentation (> 10% of the variable) of condition during follow-up

4.6 Sample Size Determination

The sample size is calculated using single population proportion taking a prevalence of 5%, from a study done in Morocco including both pediatric and adult population.(9) A confidence interval of 95% and 5% margin of error were taken into account.

$$n = Z^2p(1 - p)/d^2$$

- Z - z-score -1.96
- d - margin of error - 0.05
- p - population proportion - 5%
- n - Sample size - 80

This was taken as the least number of patients that could participate in the study. However, since the prevalence of NPC in children has not been well described and is expected to be

lower than this, a 6 year retrospective analysis was chosen to increase the power of the study and all eligible patients on follow-up in the specified period were incorporated.

4.7 Data collection and measurement

After selecting the study cases, the data was collected by the principal investigator by reviewing medical records. Structured Checklist was used that encompasses socio-demographic information, clinical data and treatment outcome. Google form was used for data collection along with Google drive for storage of the acquired data.

4.8 Data quality control and Management

To certify data quality, the google form was initially tested on 5% of the sample. Any issues picked while pre-testing were adjusted prior to beginning the data collection. Each variable was accordingly labeled with continuous monitoring in the pre-testing and data collection periods by the principal investigator. The comprehensiveness and consistency of the data was thoroughly cross-checked on each day of data collection.

4.9 Study Variables

Dependent Variables - Response to treatment, event free survival, overall survival, and death

Independent Variables - Age, sex, address, major presenting symptom, stage, histology, radiation dose and duration, chemotherapy type and cycle

Operational Definitions

Case definition: “A nasopharyngeal malignancy arising from the nasopharyngeal epithelial lining’ as confirmed on histopathological examination of biopsy obtained from nasopharyngeal specimen.” The three histologic subtypes as specified by the WHO classification system will be used as stated below:

Type I – Keratinizing Squamous

Type II – Non-keratinizing differentiated

Type III – Undifferentiated subtypes

4.10 Data Processing and Analysis

After data collection and quality were assessed, each finalized forms were transferred to SPSS version 29 for analysis. Continuous data was described using mean, median, and standard deviation; while categorical data was reported using frequencies and percentages. Chi square tests, Kaplan-meier analysis and cox regression models were done to assess survival and possible factors that may affect it. Statistical significance was considered at level of significance of 5%, with 95% confidence interval (CI) used to present the association. Finally, the results were depicted using text, table, charts and graphs.

4.11 Ethical Considerations

Ethical approval was obtained from Research and Ethics Committee (REC) in the Department of Pediatrics and Child Health. Data was anonymized and the confidentiality of the participants' name and MRN was preserved all through the study. A coded method of identification was used instead.

4.12 Dissemination of the Results

The findings will be presented to Addis Ababa University, College of Health Sciences, Pediatric and Child Health Department for the requirement of partial fulfillment of specialty certificate in pediatric and child health. The results of the study will also be submitted for publication in peer-reviewed journals. Findings may also be presented at local and international conferences.

5. Results

5.1 Socio-demographic data

The study included the medical information of 31 patients aged less than or equal to 18 years who visited hemato-oncology follow-up clinics at Tikur Anbessa Hospital between January 2018 and January 2024. Among these study subjects, 19 (61.3%) were males and 12 (38.7%) were females with a male to female ratio of 1.6:1. All but two of the patients (93.5%) were above ten years of age with the median age of presentation being 14 years. (*Figure 1*)

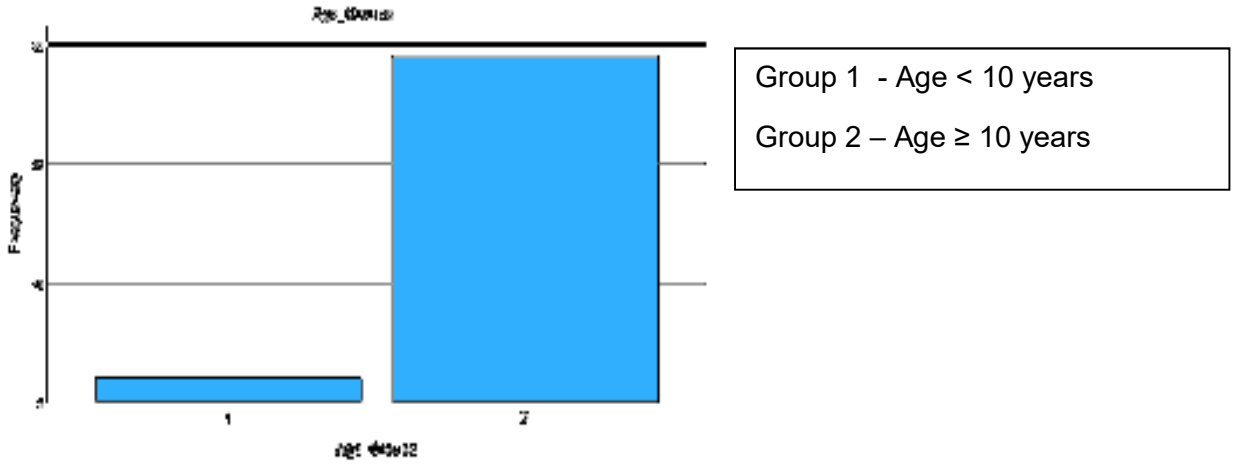

Figure 1: Distribution of patients by age groups

The majority of the cases were from Oromia region accounting for 12 out of 31 cases (38.7%,), followed by 6 cases from Addis Ababa (19.4%) and 5 cases from SNNPR (16.1%). 51.6% of these patients reside in urban areas while the remaining 48.4% were from the rural side. *(Figure 2)*

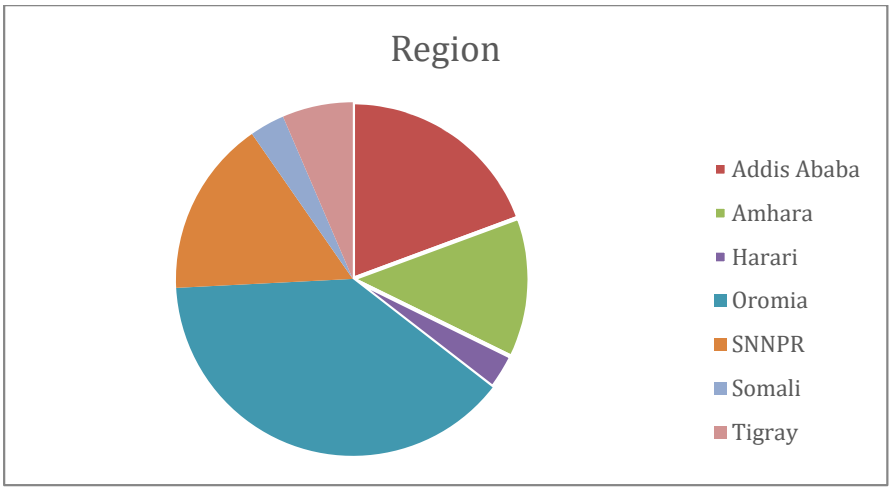

Figure 2: Distribution by Geography

5.2 Clinical Data

5.2.1 Presenting Symptoms

28 out of the 31 patients (90.3%) came with a complaint of neck mass followed by nasal congestion and epistaxis accounting for 38.7% and 25.8% respectively. Other associated complaints included difficulty opening mouth, shortness of breath at night and maxillary swelling. (*Figure 3)*

More than 80% of the patients came with two or more symptoms at presentation. (*Figure 4)*

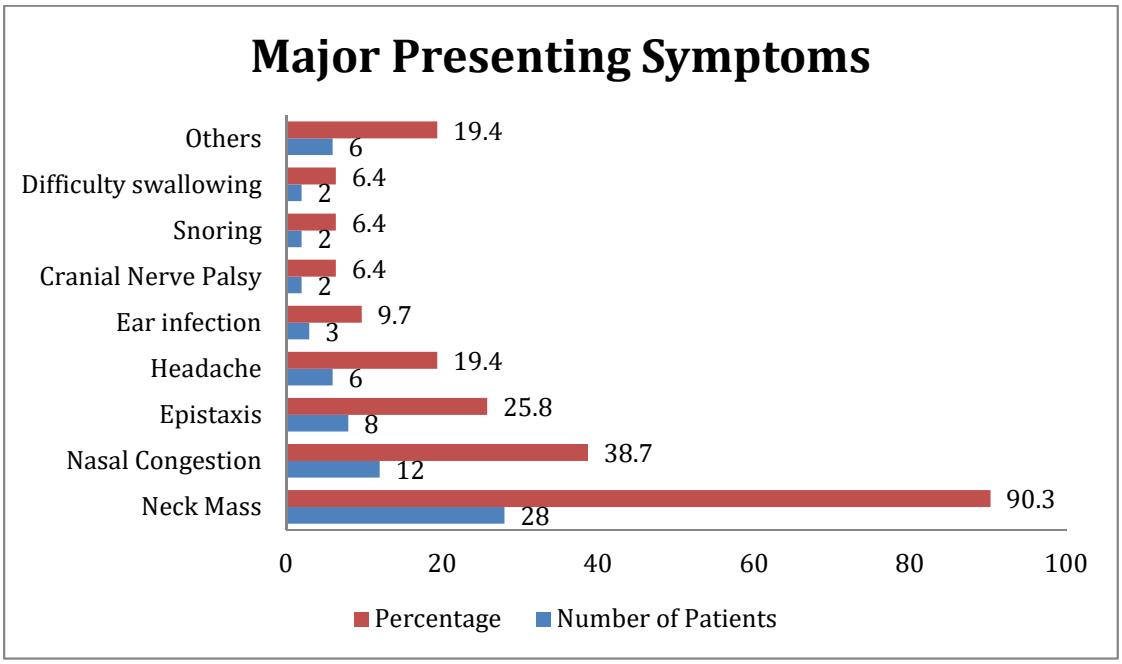

Figure 3: Major presenting symptoms

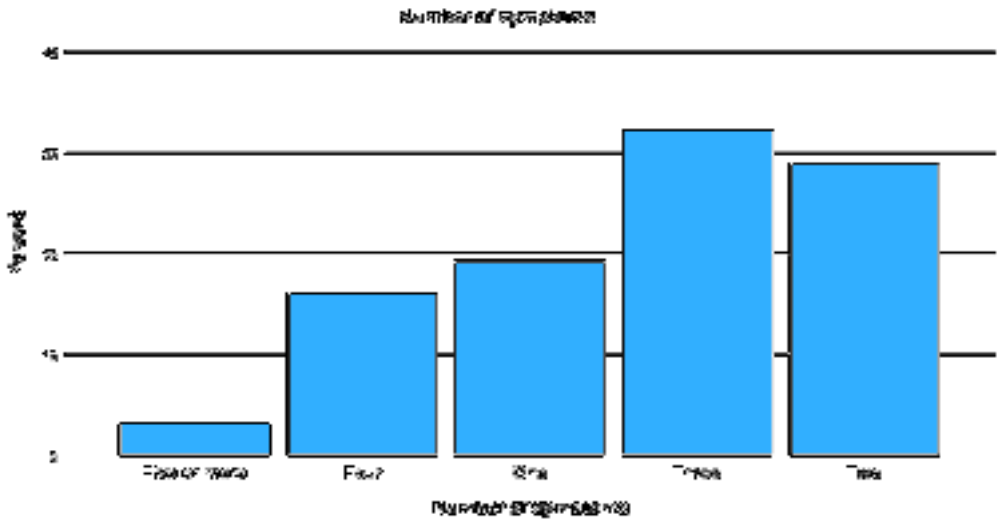

Figure 4: Percentage of number of symptoms

5.2.2 Duration of illness

The duration of illness before diagnosis ranges from eight weeks to two years with a median of 21 weeks. Majority presented within 3-6 months of symptoms (45.3%) followed by ≤3 months and 6 months – 1 year ranges, each accounting for 22.6%. Only three cases (9.5%) came after one or more year of illness. (*Figure 5*)

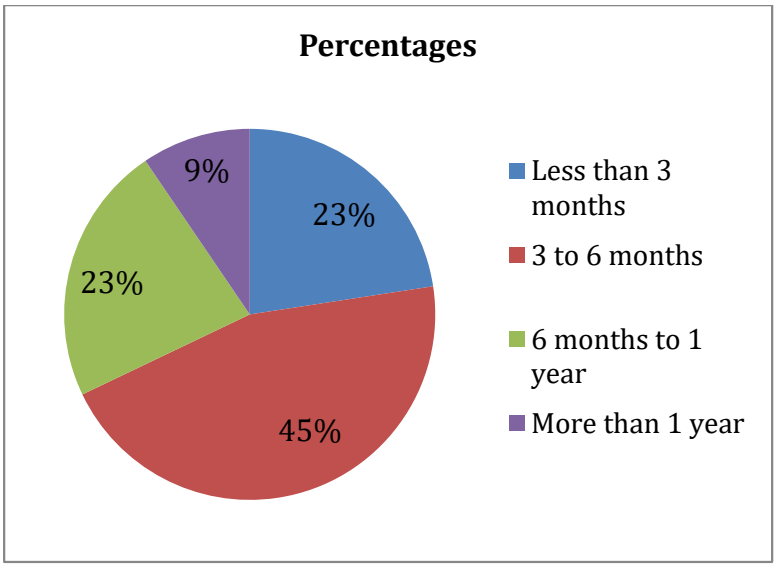

Figure 5: Range of Duration of Illness

5.2.3 Tumor Staging

This study showed majority of the patients presented with locoregionally advanced tumor with T4 accounting for 64.5% followed by T3 & T1 with 16.1% each and T2 for only 3.2% of the cases. (*Figure 6)*

On the overall tumor staging, 61.3% of the patients were advanced stage IVa with only three cases presenting with distant metastasis (stage IVb) making up 9.7% of the total cases. The rest presented with stages I, II & III constituting 3.2%, 3.2% 22.6% respectively. (*Figure 7)*

Of the 31 cases, HIV seroreactivity status was not done and/or documented for all but one patient who was found to be positive.

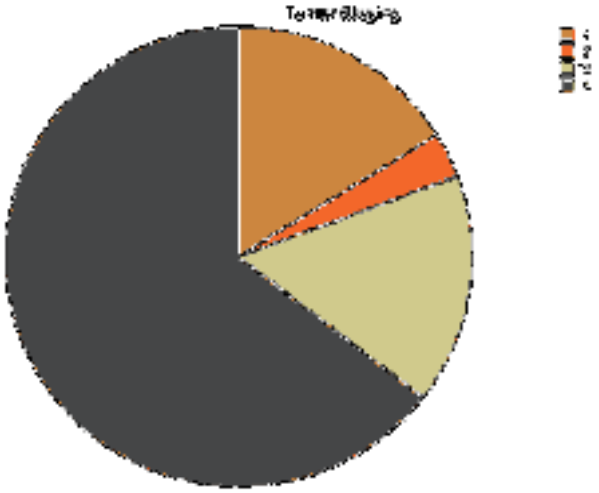

Figure 6: Distribution of Tumor Stages

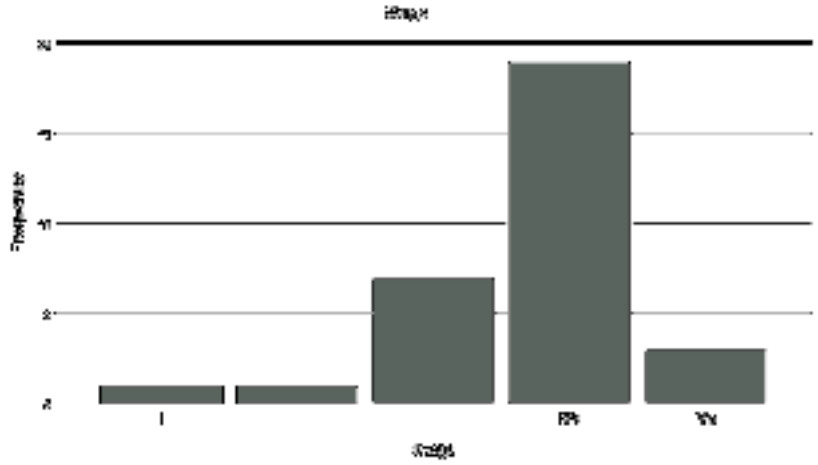

Figure 7: Frequency of overall stage

5.2.4 Histology

Histological confirmation of the diagnosis was made for all patients with 24 patients (77.4%) having undifferentiated type, 6 (19.4%) non-keratinizing differentiated type and only 1 (3.2%) keratinizing SCC (*Figure 8*). Immunohistochemisty (IHC) was available for only two of the cases (undifferentiated type and keratinizing SCC histology).

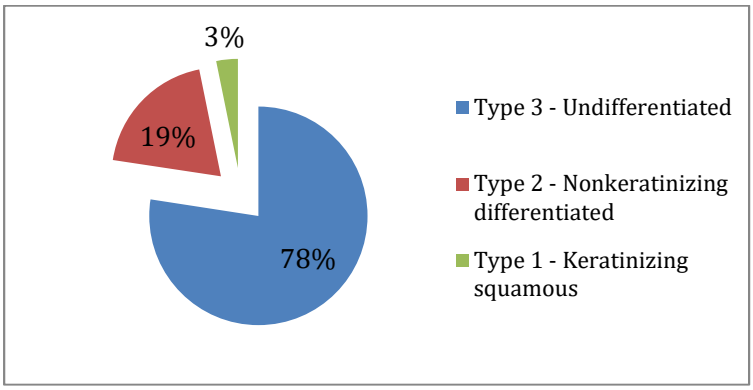

Figure 8: Distribution of histologic subtypes

5.3 Treatment

Treatment was initiated for all patients with curative intent for 27 out of 31 cases (87.1%) and the remaining 4 cases with palliative intent (12.9%). All patients were able to be started on chemotherapy although the regimens differed. Radiotherapy however was administered for only 18 patients (58.1%).

The first line regimen for 15 out of the 31 cases (48.4%) was cisplatin with gemicitabine.

Clinical Variables			

10 patients (32.3%) used 5-flurouracil with cisplatin regimen and 3 cases (9.7%) were given both regimens subsequently. The remaining three patients (9.7%) were on cisplatin monotherapy with concurrent radiotherapy. 9 patients (29%) took more than one regimen of chemotherapy either as second-line or metronomic treatment. (*Figure 9)*

14 patients (45.2%) had interruption of their chemotherapy ranging from a few days to indefinitely. The reasons for interruption were largely due to cytopenias (6/14), followed by loss from follow-up (3/14) and financial issues (2/14). The remaining 3 patients had two or more of the above reasons concomitantly.

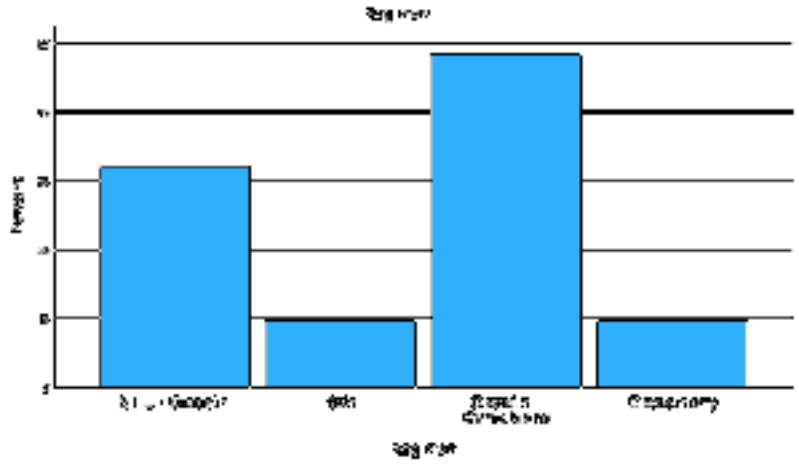

Figure 9: Type of first-line chemotherapy taken

5.4 Factors and their associations

Chi square test performed to assess association of disease stage and histology with sex, age, major presenting symptoms and duration of illness. No statistically significant association was found for both stage and histology to the other variables.

		Stage I/II	Stage III/IV	P value
Sex of patient	Male	0	19	0.167
	Female	2	10	
Age in years	< 10 years	0	2	0.956
	≥ 10 years	2	27	
Duration of illness	< 3 months	0	7	0.231
	3-6 months	1	13	
	6 months – 1 year	0	7	
	> 1 year	1	2	
Major Presenting Symptoms	Neck Mass	2	26	0.632
	Nasal Congestion	1	11	0.389
	Epistaxis	0	8	0.735
Histology type	Type 1 – Keratinizing squamous	0	1	0.718
	Type 2 – Nonkeratinizing differentiated	0	6	
	Type 3 – Undifferentiated	2	22	

Table 2: Association of stage of disease with other clinical variables

5.5 Survival Analysis

The 1-year and 3-years over all and event free survival were estimated for cases that completed their treatment using Kaplan Meier survival estimate. From the total 31 of the patients, 15 cases completed their treatment. One was lost from follow-up and 6 had events other that death (progression or recurrence). There were 6 documented deaths. The median overall survival was 30 months. The 1 year OS was 93% and EFS was 65%. The 3 year OS was 42% and EFS was 20%. (*Figure 10*)

Overall survival was calculated as the time to death or the last recent follow up since initiation of treatment. Event free survival was determined as the time to event analysis to relapse, death or progressive disease since initiation of treatment.

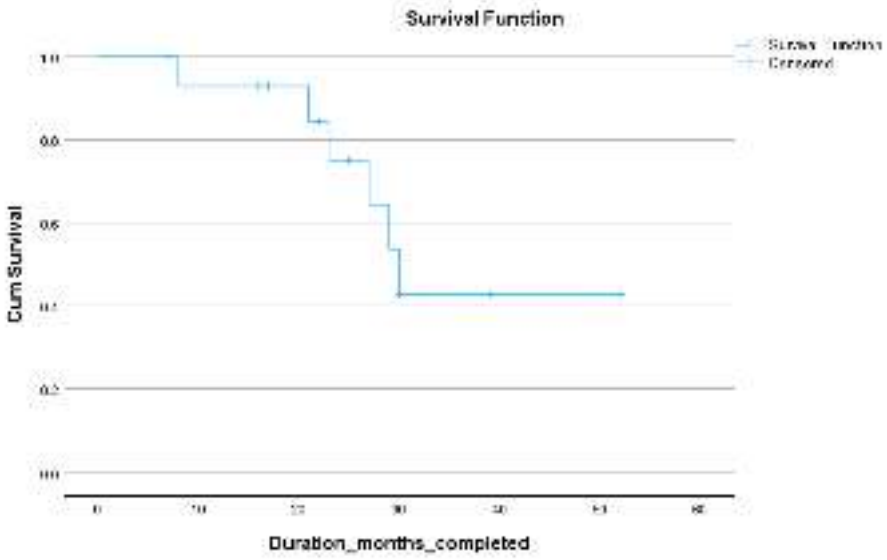

Figure 10 : Kaplan-Meier survival analysis estimate

Cox regression model used to assess the pretreatment variables prognostic effect on EFS. In this study, type of chemotherapy given and histology were found to have prognostic significance on EFS. However, none of the variables have any prognostic significance on the OS.

Variable	Sig.	Exp(B)	Lower	Upper
Age	.754	21.475	.000	4667909276.7
Sex	.240	.468	.131	1.663
Stage	.754	21.475	.000	4667909276.7
Histology	.007	.302	.128	.716
Type of Chemotherapy	.037	.144	.024	.882

Table 3: Univariate analysis of pretreatment variabes with cox regression

6. Discussion

In this study, a higher incidence of NPC was seen among male patients with a male-to-female ratio of 1.6:1. This finding was similar to other studies done in China, Egypt and one descriptive report done in Ethiopia ranging close to a 2:1 ratio. (2, 3, 11) The median age of 14 years was also comparable to larger studies giving a median of 13 years. (1)

The commonest presenting symptom was neck swelling followed by nasal symptoms of obstruction and bleeding which was similar to the larger Egyptian and Chinese reports. (2,3)

Majority of the patients presented loco-regionally advanced disease with 64.5% being T4 tumor staging. A local study on imaging patterns done by Amal Saleh, et al in 2020 showed a similar predominance of advanced tumors with 47.5% being T4 and T1, T2 and T3 stages being 18.8%, 17.5% and 7.5% respectively at time of diagnosis. (18)

The overall staging was predominated by stage IVa group accounting for 61.3% of the cases. Both stages III & IV groups were more than 80% of the cases confirming the loco-regional advancement at diagnosis. In a single institution experience from China, 94.3% of the cases were advanced with either stage III or IV disease. (2)

The undifferentiated histology accounted for more than two-third of the cases in this study showing parallel predominance as studies published from India as well as the United States. (3, 7) However, one Chinese publication had the type II non-keratinizing differentiated type in 88% of the study participants. (2)

The radiotherapy access and coverage was suboptimal in our subset of patients (58.1%) as compared to all the other reviewed studies which were able to achieve 100% access. The reasons were mostly long-waiting lists, machine breakdown or loss from follow-up. The lack of or interruption of radiotherapy has been noted to negatively impact the prognosis of patients. (20)

Although the first-line chemotherapy regimens were variable among the study subjects, they all received cisplatin-based chemotherapy which is the standard of care in nasopharyngeal carcinoma patients. (1) The overall survival and event free survival at 1 year were 93% and 65% while in 3 years it dropped to 42% and 20% respectively. These

estimates were significantly lower than the reported 5 year survivals from Italy and China showing an OS and EFS of 82-89% and 84% respectively. (2, 5) These big differences are speculated to arise from delays in diagnosis, significant loss from follow-up and lack of timely access to radiotherapy.

7. Limitations of the Study

The retrospective nature of this study might affect the quality of information collected. The inability to meet the required sample size due to the rarity of the illness and difficulty to retrieve lost cards compromises the conclusions from the data as well. The lack of IHC is also one drawback in confirming the diagnosis since many of the pediatric cases were shown to be undifferentiated in nature.

8. Conclusion

Nasopharyngeal Cancer is a rare childhood malignancy with median presentation age of 14 years. Neck swelling is the commonest presentation. More than 80% of the cases come with locoregionally advanced disease. Undifferentiated histology is the commonest type. The 3-year OS and EFS of patients were significantly lower than worldwide reports.

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