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A Ten Year Retrospective Study on the Patterns of Retinoblastoma in Children: Central Hospital Warri, Nigeria

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ABSTRACT
Retinoblastoma (Rb) is the most occurred neoplasm of the eye in children arising from immature retina cells in one or both eyes, presenting about 3% of all childhood malignancies , hence therapeutic approaches need to consider the cure of the disease and preserve vision with minimal longterm side effects. The research aimed at observing the pattern of retinoblastoma between the year 2009 to 2018 among children who attended Ophthalmology department at the Central Hospital, Warri, South Southern Nigeria. Records on retinoblastoma among children < 13years were reviewed from hospital records and fifty two cases were recorded as retinoblastoma. Parameters that were taken into consideration were age, gender and anatomical site of the disease. Chisquare test was used to investigate an association between age, gender and patterns of retinoblastoma. Significance was accepted at $p<0.05$.Findings from this study showed that 65.38% males and 34.61% females were affected. Unilateral cases were more predominant (80.77%) than bilateral cases (19.23%). The disease occured more in children < 4 years of age (51.92%) . Findings from our study also showed that age and gender had a significant effect on the patterns of retinoblastoma (x^2= 18.995;7.393., p= 0.001;0.025) . It was observed from this study that bilateral and unilateral cases of retinoblastoma occurred more in males than females

Key-words: Retinoblastoma; Bilateral; Unilateral; Central Hospital Warri; Children

INTRODUCTION
Retinoblastoma has been reported as one of the most malignant tumors in infants ,[1-3] and several studies had revealed that majority of patients with retinoblastoma present themselves for treatment only during advanced stages of the disease.[1-3] According to Adio and Koalafe , some of the factors affecting late presentations of children with the tumour includes slow financial status of caregivers, lack of knowledge about the disease and its outcome with high cost of hospital care.[3]

The occurence of retinoblastoma from multiple studies varies in different regions.[4-7] In the United States of America ,the tumour was recorded in 1 of every 15000 live births while in developing countries in Africa and Asia, retinoblastoma has been noted in 1 out of 18000 live births.[4-6] Lohmann, stipulated that in the United Kingdom, bilateral cases was usually present within the first year and the average age of diagnosis was about 9months while unilateral cases peaks between 24 and 30months of age. [7] Despite the advancement in technology and treatments methods of retinoblastoma, the mortality rate has remained high in developing and developed countries.[8-9]

Retinoblastoma can be diagnosed clinically through direct signs such as exophthalmos, strabismus, nystagmus, proptosis or leukokoria.[2,10] A study by Essuman et al.among Ghanian children and another carried out in Indonesia depicted that leukocoria and proptosis were the most observed signs of retinoblastoma.[2,10]

Several retrospective studies had reported the patterns of retinoblastoma ,[4-9]but data on the studied population on retinoblastoma in South Southern ,Nigeria is lacking , hence this study aimed at investigating the patterns of retinoblastoma between the year 2009 to 2018 among children who attended Ophthalmology department of the Central Hospital, Warri, South Southern Nigeria. The research also aimed at investigating the age group and sex commonly affected. Findings will serve as a baseline data for further studies

MATERIALS AND METHODS
This study was a retrospective cohort study that observed the patterns of retinoblastoma among children < 13 years who attended Ophthalmology department of the Central Hospital, Warri, South Southern Nigeria. Fifty two cases were reviewed as retinoblastoma from January 2009 to January 2018. Inclusion criteria were records of patients who attended the ophthalmology department and diagnosed with retinoblastoma. Records of patients who were > 12years of age were excluded from the study.

Ethical approval was obtained from the Research and

Ethics Committee of the Faculty of Basic Medical Sciences, Delta State University, Abraka, Delta State, Nigeria with reference number DELSU/CHS/ANA/68/135 along with a protocol number from the Central Hospital CHW/ECC VOL 1/149. Chisquare test was used to test for an association between age, gender and patterns of retinoblastoma. Significance was accepted at $p<0.05$.

RESULTS

Table 1: Age and Sex distribution of Retinoblastoma

Age(years)	Male	Female
<4	17(32.69%)	10(19.23%)
<7	10(19.23%)	3(5.77%)
<10	5(9.62%)	3(5.77%)
<13	2(3.84%)	2(3.84%)
Total	34(65.38%)	18(34.61%)

Table 2: Age and Sidedness of Retinoblastoma

Age	Right	Left	Bilateral	Total	Chi-square	P-value
<4	12(23.08%)	13(25.00%)	2(3.85%)	27(51.92%)		
< 7	3(5.77%)	8(15.38%)	2(3.85%)	13(25.00%)		
<10	4(7.69%)	-	4(7.69%)	8(15.38%)	18.995	0.001
<13	-	2(3.85%)	2(3.85%)	4(7.69%)		
Total	19(36.54%)	23(44.23%)	10(19.23%)	52(100%)		

Table 3: Gender and Sidedness of Retinoblastoma

Gender	Right	Left	Bilateral	Total	Chi-square	P-value
Male	10(19.23%)	16(30.77%)	8(15.38%)	34(65.38%)	7.393	0.025
Female	9(17.31%)	7(13.46%)	2(3.85%)	18(34.62%)		
Total	19(36.54%)	23(44.23%)	10(19.23%)	52(100%)		

Findings from this study showed that 32.69% males and 19.23% females were < 4 years of age (Table 1) . A total of 19.23% males were < 10years as compared to 5.77% females of the same age (Table 1). Table 2 shows that 23.08% of patients < 4years had their right eyes affected while 25.00% of patients within the same age limit were diagnosed with retinoblastoma for the left eye. A total of 5.77% and 15.38% of children < 7years had their right and left eyes affected. Retinoblastoma was observed on the right eyes of 7.69% patients <10 years while it was seen on the left eyes of 3.85% patients < 13 years of age . Bilateral cases was observed on 3.85% each in children < 4 and 7years of age while a total of 7.69% and 3.85% cases were seen in children <10 and 13 years of age (Table 2). Table 2 further reports age having a significant effect on the pattern of retinoblastoma ($p<0.05$) .

Table 3 shows that 19.23% males and 17.31% females had their right eyes affected while 30.77% males and 13.46% females were diagnosed with retinoblastoma for the right eye. Bilateral cases were observed in 15.38% males and 3.85% females. Further findings showed that gender had a significant association with patterns of retinoblastoma ($p<0.05$).

DISCUSSION

Retinoblastoma has been reported a malignant neoplasm of the retina which occurred in infants and early childhood.[11] The most common and early sign of retinoblastoma is *white pupillary reflex* also termed *leukocoria*.[11] According to Bananomi et al. the disease has been a potential threat to both the sight and life of children affected by it.[12]Irrespective of types, retinoblastoma from this study occurred more in children < 4years of age. Findings were similar to previous studies from various parts of the world.[10,13-14] Kazadi et al.,in Democratic Republic of Congo reported the average age of less than 1year.[13]Rahman in Mumbai and Sukanya et al. in Indonesia stipulated that retinoblastoma occurred more frequently in children <5years of age.[10,14]Kayembe *et al*. and Illunga et al. in Democratic Republic of Congoobserved the tumor at an average age of 2.4 and 3years of age.[15-16]

Retinoblastoma is an eye tumour that has occurred in both males and females,[10, 14,16] irrespective of pattern , males from this study were more affected than females. Findings were similar to Rahman, who discovered retinoblastoma in more males than females in Mumbai,[10]on the contrary, findings were different from a study carried out in Aden Yemen by Ba-Saddik*et al* . According to their study , retinoblastoma was reported more in females as compared to males.[17]

Retinoblastoma is known to originate from the nuclear layers of the retina following two genetic hits that suppress both alleles of the RBI gene. [18] Knudson, hypothesis explains two forms of retinoblastoma. The first form is heritable,bilateral and multifocal.The second form is sporadic,unilateral and unifocal.[18] The victims of sporadic retinoblastoma,if he or she survives and marries, becomes the carrier of the gene and originator of familial retinoblastoma.[18] Findings from our observation depicts that unilateral and bilateral cases were present in all age groups alongside males and females. Observations were similar with previous studies .[10,16] Unilateral cases was more frequent than bilateral cases from our study. Findings were similar to a study carried out on children aged 1 to 10years by Khan et al.[19] He observed that unilateral neoplasm occurred in more than half of the patient investigated. Similar findings were seen in a Ghanian retrospective study carried out within a period of one year.[2]

Retinoblastoma can be diagnosed by performing routine ocular fundus examination in a child from a high risk family, the prognosis and frequency makes it an important tumour.[20] From this observation,retinoblastoma affected mainly the left eyes of patients diagnosed with the tumour.Observations were in concordance with Essuman et al. and illunga et al. [2,16]However it was different from Oza et al. who recorded that majority of children experienced retinoblastoma in their right eye.[21]

Findings from this study demostrated that bilateral cases were higher in males than females. This was different from that of Oza et al. who observed equal bilateral cases in males and females.[21] He observed that the occurence was more frequent in the right eyes of females than males which contradicted our findings. However he also recorded a higher frequency of retinoblastoma in the left eye in males as compared to females ,which was consistent with our findings.

Bilateral cases among females from this research appeared only in children aged 7 to 12 years while it occurred in all age group among male patients.

CONCLUSION

This retrospective study was conducted on 52patients with retinoblastoma. The prevalence was higher in males than females. Retinoblastoma was frequently diagnosed in children <4years and the left eye was commonly affected. Bilateral and unilateral cases were prevalent in males than females.

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