

# Ocular Manifestations among HIV Infected Children in Ouagadougou, Burkina Faso

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## Abstract

Ocular manifestations among HIV infected children are diverse and global incidence varies from 7% to 75%. At this age, eye lesions are often unnoticed because of the incapacity to express eye discomfort. The purpose of this study is to describe ocular manifestations among HIV-infected children and hence associated factors in the Department of Paediatrics at the Yalgado Ouédraogo Teaching Hospital. This was a cross-sectional descriptive and analytical study conducted between July 2014 and December 2014. A complete ophthalmic examination was systematically done to all HIV-positive children attending the clinic, as part of their routine medical visit. The most recent socio-demographic, clinical, biological and treatment data were registered. Seventy-nine children had an ocular examination and among them 92.4% were on ARV treatment. The incidence of ocular manifestations was 46.7%. Median age was 8 years old (interquartile 6 - 12 years old). Sex ratio was 1.3. The risk of ocular manifestations involvement among boys was twice than that of girls. More than half (59.5%) of children who had ocular problems had not expressed ocular discomfort. Ocular adnexal lesions were more common (35.4%) compared to eye segments (8.9%) lesions. Anterior segment and posterior segment lesions were statistically associated with immune system depression ( $p = 0.003$  and  $0.001$ ). However, this relationship was not statistically significant ( $p = 0.15$ ). Five out of seven children who had eye fundus lesions had CD4 count  $<350$  cells/mm<sup>3</sup>. Ocular manifestations were very common among HIV infected children in our context. Ophthalmic examination should be systematic at admission and regularly repeated during follow-up.

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## Keywords

### Paediatric HIV, Ocular Manifestations, Ouagadougou

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## 1. Introduction

At the end of 2012, it was estimated that 2 million children under 15 years old were infected by HIV in Sub-Saharan Africa, which was almost 62% of the world total population in this age group [1]. In 2014, the number of children under 15 years living with HIV in Burkina Faso was estimated to be 13.000 [11.000 - 15.000] [2]. Thanks to ARV triple therapy, prognosis of children has significantly improved. However, in our context, diagnosis is often late, adherence to ARV treatment insufficient and complications frequent. Among these complications ocular lesions occupy an important place [3]. The incidence of ocular complications in HIV-infected patients varies from 42% to 75% and some of these complications may lead to blindness [3]-[5]. Ocular manifestations may be observed at all stages of immuno-depression and may affect any eye segment. However, the incidence and the gravity of lesions depend on immune status [3] [4] [6].

In West Africa and more specifically in Burkina Faso, data on ocular manifestations among HIV-infected children are scarce hence this study is carried out.

## 2. Methodology

This study was carried out in the department of Paediatrics at Yalgado Ouedraogo Teaching Hospital (CHU-YO) in Ouagadougou, Burkina Faso. This hospital is one of four main reference hospitals providing care and support to HIV-infected children in the country. We conducted a descriptive and analytical cross-sectional study between July and December 2014. All HIV-positive children aged between 2 and 15 years, whose parents or legal guardians gave an informed consent to participate in the study, were included.

Data were collected during routine medical visits. Children whose parents signed the consent form were convened for a complete ophthalmic examination at the ophthalmology department. The examination included: visual acuity testing using Monoyer scale, external inspection of eyes and adnexia, assessment of eye motility, a slit-lamp examination, and a detailed funduscopy examination was done using a direct or indirect ophthalmoscopy. Children who could neither read, nor show the E of Snellen, nor identify drawings were not taken into account in visual acuity testing. Clearance for the study was obtained from the hospital authorities.

Study variables were: socio-demographic characteristics, medical histories (ocular pathology, diabetes, hemoglobinopathies, impaired renal functions) clinical characteristics (nutritional status, WHO clinical stage, ocular complaints, visual acuity and ocular abnormalities). Biological characteristics were also registered (immune status according to WHO classification and viral load). Only the most recent CD4 count and viral load (less than six months before the visit) were taken into account. ARV treatment and opportunistic infections prophylaxis in use were also recorded.

The Chi 2 test was used for comparison of proportions. We considered a statistical threshold significance of 5%. Parents or legal guardians wishing to include their children in the study signed an individual consent form. All ocular abnormalities diagnosed were managed in the department of ophthalmology.

## 3. Results

### 3.1. Children Profile

Overall, 79 children all HIV1 infected were included. Ocular manifestations were reported in 37 (46.7%) children.

The median age was 8 years (interquartile range; 6 - 12 years). The 6 to 10 years age group accounted for 48.1% of children. The sex-ratio was 1.13. None of the children had histories of diabetes, hemoglobinopathies or impaired renal function.

The most common pathologies involved at the time of the examination were malnutrition (12.6%), pneumonia (7.6%), acute media otitis (5.1%), and prurigo (5.1%).

Immune status was normal (CD4 > 500 cells/ml) in 55 (69.6%) children aged above 5 years and in 2 children aged less than 2 years (CD4 > 25%). Viral load was undetectable (<50 copies/ml) in 34 (43%) patients.

Antiretroviral treatment (ART) was prescribed to 73 children (92.4%). Mean duration of ART was 46.69 months  $\pm$  26.76 months (range: 7 months to 9 years). Fifty (63.29%) children received concomitant ART and co-trimoxazole prophylaxis. One-third of patients (31.5%) experienced ART failure.

### 3.2. Ocular Manifestations

Ocular complaints were reported in 32 (40.5%) children and were as follows: itchy eyes (7), eye discharge (7), eye watering (6), poor eye sight (4), eye pain (3), blurred vision (2), blindness, red eye, and diplopia (1) patient respectively.

Visual acuity testing was normal ( $>7/10$ ) for the right eye in 65/70 (92.8%) children and for the left eye in 67/70 (95.7%) children. No case of neuro-ophthalmologic disorder was reported. **Table 1** summarizes other ocular disorders.

### 3.3. Risk Factors for Ocular Manifestations

The risk of having ophthalmic manifestations was statically the same for the two sexes (OR = 1.57; IC<sub>95</sub> [0.54 - 4.53]).

Patients having immune deficiency and/or very high viral load ( $\geq 10\ 000$ ) were more at risk for ocular manifestations involvement (**Table 2**). No Child with undetectable viral load presented ocular disorders.

Relation between eye segments manifestations and immune status is illustrated on **Table 3**.

Ocular fundus lesions were found at all stages of immuno-depression. Five (5) children out of 7 who had fundus lesions had CD4 count  $<350$  cells/mm<sup>3</sup>. Ocular fundus was abnormal in 6 children out of 73 (8.2%) who were on ART, and in 1 out of 6 who were not on ART (16.6%) (OR = 0.45; IC<sub>95</sub> [0.05 - 12.35]).

## 4. Discussion

### 4.1. Frequency of Various Ocular Manifestations

Ocular manifestations were involved in 46.7% of HIV-infected children in this West African cohort. The prevalence is similar to those published elsewhere in Africa particularly in Uganda, Rwanda and Democratic Republic of Congo [3] [5] [7]. Prevalence rates depend on study period and children's mean age at the time of study. In

**Table 1.** Ophthalmic manifestations.

Pathology	n	Frequency
<b>Adnexia (n = 28)</b>		
Mucopurulent Conjunctivitis	12	42.9%
TELC*	11	39.3%
Papillary conjunctivitis	3	10.7%
Eyelashes trichomegaly	1	0.3%
Stye	1	0.3%
<b>Anterior segment (n = 7)</b>		
Anterior uveitis	3	3.8%
Keratitis	3	3.8%
Cataract	1	1.3%
<b>Posterior segment (n = 7)</b>		
Papillary excavation,	2	28.6%
Vasculopathy	2	28.8%
Cotton wool spots,	1	14.3%
Vitreous humor inflammation Sequellae	1	14.3%
Retinal haemorrhage	1	14.3%

\*Tropical endemic limbo-conjunctivitis (TELC).

**Table 2.** Ocular manifestations according to immune deficiency and viral load.

	Ocular manifestation (yes) n (%)	Ocular manifestation (No) n (%)	Total n (%)	OR	IC <sub>95</sub>
<b>Immune deficiency</b>				<b>7.81</b>	<b>[2.5 - 34.5]</b>
Absent	18 (32.7)	37 (67.3)	55 (100.0)		
Moderate	8 (66.6)	4 (33.4)	12 (100.0)		
Advanced	6 (85.7)	1 (14.3)	7 (100.0)		
Severe	5 (100.0)	0 (0.0)	5 (100.0)		
<b>Total</b>	<b>37 (46.8)</b>	<b>42 (53.2)</b>	<b>79 (100.0)</b>		
<b>Viral load</b>				<b>3.67</b>	<b>[1.77 - 10.7]</b>
≥10 000	22 (64.7)	12 (35.3)	34 (100.0)		
<10 000	15 (33.3)	30 (66.7)	45 (100.0)		
<b>Total</b>	<b>37 (46.8)</b>	<b>42 (53.2)</b>	<b>79 (100.0)</b>		

**Table 3.** Relation between immune status and eye lesions.

	Immune deficiency n (%)				Total	P
	Absence	Moderate	Advanced	Severe		
<b>Adnexia lesions</b>						
yes	16 (57.2)	7 (25.0)	2 (7.1)	3 (10.7)	<b>28 (100.0)</b>	0.15
no	39 (76.4)	5 (9.8)	5 (9.8)	2 (4)	<b>51 (100.0)</b>	
<b>Posterior segment lesions</b>						
yes	2 (28.6)	0 (0.0)	2 (28.6)	3 (42.8)	<b>7 (100.0)</b>	<b>0.001</b>
no	53 (73.6)	12 (16.7)	5 (6.9)	2 (2.8)	<b>72 (100.0)</b>	
<b>Anterior segment lesions</b>						
yes	1 (14.2)	2 (28.6)	2 (28.6)	2 (28.6)	<b>7 (100.0)</b>	<b>0.003</b>
no	54 (75.0)	10 (13.9)	5 (6.9)	3 (4.2)	<b>72 (100.0)</b>	

Africa, the highest prevalence rates of up to 75% were recorded before triple therapy era [5]. Ocular complaints were more common (40%) among our patients who were relatively older, compared to other studies (29.7%) where children were younger (mean age 2.2 years) [8]. Indeed young children are not always capable of expressing visual symptoms nor collaborate in an effective way during ophthalmic examination, hence possible under estimation of cases. In our context, a systematic eye inspection upon HIV detection among children should be highlighted, especially when the child is young and his immune status severely affected.

Ocular manifestations were dominated by adnexia abnormalities and involved one third of our patients. The same observation was made in Tanzania [9] [10], in the USA [11] and in France [12]. These are primarily mucco-purulent conjunctivitis which are cosmopolitan and more related to poor hygiene and bad weather conditions rather than immuno-depression status during HIV infection. The possibility of eyelashes trichomegaly in children living with HIV/AIDS has also been reported [13].

Anterior and posterior segments manifestations were rare. Eye segments lesions are usually associated with severe immuno-depression [7] [14]-[16], hence this was not the case for the majority of our patients on triple therapy at the time of the study. However, we cannot exclude possible recovery of initial lesions with anti-retroviral treatment, before our passage. Moreover, ocular fundus pathologies were more common among patients with TCD4 cells count below 350 cells/mm<sup>3</sup>. Indeed, it is at this stage of severe immuno-depression that one finds opportunistic germs (Herpes virus, toxoplasma, Varicella Zona Virus, *Pneumocystis jiroveci*, cryptococcus) which may have an impact on eye segments [13]. On the other hand, patients who received effective anti-retroviral treatment were less exposed to eye segment lesions [3].

Contrary to the previous studies on adults [17] which reported neuro-ophthalmologic manifestations in 6% of HIV-infected patients, no case of neuro-ophthalmologic pathology was noted in our study. This is probably be-

cause the majority of our patients were on anti-retroviral treatment (92.4%) and opportunistic infections prophylaxis (70.88%). Neuro-ophthalmologic manifestations usually occur during HIV encephalopathy, opportunistic infections and tumor pathology of the central nervous system [17].

## 4.2. Factors Associated with Ocular Manifestations

First of all, our study confirms what other authors already described; the risk of ophthalmic lesions involvement is much higher in children with severe immune deficiency and/or high viral load [13] [16]. Indeed all children who had ophthalmic abnormalities had no undetectable viral load. Two assumptions can be made; either the initial eye lesions persist because of ART failure, or eye lesions appeared or reappeared following ART failure. Indeed the purpose of anti-retroviral treatment is to restore immunity and reduce viral replication; this would in turn reduce opportunistic infections hence eye infections. Regular eye inspection during ART is therefore very important, especially in the absence of ART success, since most eye disorders may potentially evolve to blindness [3] [14] [18].

Secondly, boys had approximately twice more ocular manifestations than girls even if this result was not statistically significant. Indeed boys play more often outdoors (football) exposing themselves to dust.

We were not able to assess the impact of ART on eye lesions as the time of their appearance could not be specified in this type of study. Moreover, infection pathways and duration could not be clarified. Also, the number of children examined was relatively small and all of them were recruited at Yalgado Ouedraogo Teaching Hospital which is a reference hospital; therefore the results may not reflect the reality for the rest of the country.

## 5. Conclusion

High prevalence of ocular manifestations among children living with HIV/AIDS at the Yalgado Ouedraogo Teaching Hospital is comparable to those of other regions of the continent. These manifestations are generally benign and adnexal. Severe eye segment lesions which can lead to blindness are more common in very immuno-depressed children even those on ART. We recommend a systematic complete ophthalmic examination when HIV is detected and on regular basis during routine visits once ART is initiated. Screening and treatment of ocular manifestations in children living with HIV/AIDS should imply a multi-disciplinary team hence the paediatrician, the ophthalmologist, and ART support team.

## References

- [1] UNAIDS. Global Report 2013. [http://www.unaids.org/sites/default/files/media\\_asset/UNAIDS\\_Global\\_Report\\_2013\\_fr\\_1.pdf](http://www.unaids.org/sites/default/files/media_asset/UNAIDS_Global_Report_2013_fr_1.pdf)
- [2] UNAIDS. <http://www.unaids.org/fr/regionscountries/countries/burkinafaso/>
- [3] Nsiangani, N., Kaimbo, W., Kaimbo, D. and Kapepela, M. (2013) Ocular Manifestations in HIV Infected Children in Kinshasa (Manifestations oculaires chez les enfants vivant avec le VIH/SIDA à Kinshasa). *Bulletin de la Société belge d'ophtalmologie*, **322**, 117-124.
- [4] Esposito, S., Porta, A., Bojanin, J., Gualtieri, L., Cesati, L., Vismara, E. and Principi, N. (2006) Effect of Highly Active Antiretroviral Therapy (HAART) on the Natural History of Ocular Manifestations in HIV-Infected Children. *Eye*, **20**, 595-597. <http://dx.doi.org/10.1038/sj.eye.6702189>
- [5] Kestelyn, P. and Cunningham, E. (2001) HIV/AIDS and Blindness. *Bulletin of World Health Organization*, **79**, 208-213.
- [6] Sunil, G., Vishal, J., Syril, D. and Ashwini, N. (2012) Evaluation of Ocular Manifestations and Blindness in HIV/AIDS Patients in a Tertiary Care Hospital in South India. *Ocular Immunology & Inflammation*, **20**, 336-341.
- [7] Ikoona, E., Kalyesubula, L. and Kawuma, M. (2003) Ocular Manifestations in Pediatric HIV/AIDS Patients in Mulago Hospital, Uganda. *African Health Sciences*, **3**, 83-86.
- [8] Almeida, F., Paula, J., Martins, M., Sena, D.F., Cervi, M. and Rodriguez, M. (2007) Ocular Manifestations in Pediatric Patients with HIV Infection in the Post-HAART in Southern Brazil. *Eye*, **21**, 1017-1018. <http://dx.doi.org/10.1038/sj.eye.6702861>
- [9] Padhani, D.H., Manji, K.P. and Ali, T. (2000) Ocular Manifestations in Children with HIV Infection in Dar Es Salaam, Tanzania. *Journal of Tropical Pediatrics*, **46**, 145-148. <http://dx.doi.org/10.1093/tropej/46.3.145>

- [10] Sahoo, S. (2010) HIV- and AIDS-Related Ocular Manifestations in Tanzanian Patients. *Malaysian Journal of Medical Sciences*, **17**, 12-16.
- [11] Livingston, P., Ken, N. and Sullivan, J. (1998) Ocular Disease in Children with Vertically Acquired Human Immunodeficiency Virus Infection. *Journal of AAPOS*, **2**, 177-181. [http://dx.doi.org/10.1016/S1091-8531\(98\)90010-6](http://dx.doi.org/10.1016/S1091-8531(98)90010-6)
- [12] Peyraud-Gilly, V., Korchia, F. and Derbez, M. (1998) Manifestations ophtalmologiques chez 25 enfants atteints par le Virus de l'Immunodéficience Humaine. *Ophthalmologie*, **12**, 191-196.
- [13] Cochereau, I. (1997) Ocular Manifestations Related to HIV Infection (Atteinte oculaire au cours de l'infection à VIH). *Encyclopedie médicale chirurgicale Ophtalmologie*, 21-430-A-10.
- [14] Ng, W.T. and Franzco, P.V. (2005) Ocular Association of HIV Infection in the Era of Highly Active Antiretroviral Therapy and the Global Perspective. *Clinical and Experimental Ophthalmology*, **33**, 317-329. <http://dx.doi.org/10.1111/j.1442-9071.2005.01001.x>
- [15] David, S., Zaidan, D., Gerald, W., Meisler, D., et al. (2001) Human Immunodeficiency Virus-Positive Patients with Posterior Intracorneal Precipitates. *Ophthalmology*, **108**, 1853-1857. [http://dx.doi.org/10.1016/S0161-6420\(01\)00711-4](http://dx.doi.org/10.1016/S0161-6420(01)00711-4)
- [16] Lipman, M., Gluck, T. and Johnson, M. (1997) Ophthalmic Manifestations in: Iconography of AIDS Related Diseases (Manifestations ophtalmologiques dans: iconographie des maladies cliniques liées au VIH). *Encyclopédie Médicale*, **3**, 111-119.
- [17] Govendera, P., Hansrajb, R., Naidoo, K.S. and Visser, L. (2011) Ocular Manifestations of HIV/AIDS: A Literature Review (Part 2). *South African Optometrist*, **70**, 81-88.
- [18] Offret, H. and Bloch-Michel, E. (2000) Uveitis: Eye and Virus (Uvéites: Œil et virus). Eds Masson, Paris, 271-300.



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