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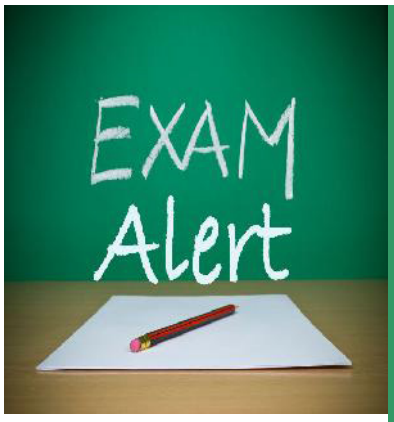


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# Eye care challenges and opportunities in developing countries

With every challenge comes opportunities for innovation, improvement and learning. At this year's COECSA Annual Congress we look forward to welcoming you to Arusha and challenging you with new ideas and research on the theme of ***"Eye care challenges and opportunities in developing countries"***.

The challenge of providing optimal eye care in Africa is substantial. In 2010 it was estimated that 4.8 million people were blind and a further 16.6 million suffered moderate to severe visual impairment in Africa. Given that approximately 70 – 80% of global blindness is avoidable or preventable, there is an enormous burden of visual impairment caused by potentially curable causes, particularly cataract and refractive error. Relieving the burden of cataract and refractive error requires a focus on facilitating access to healthcare facilities and ensuring sufficient human and resource capacity to provide high-quality cataract surgery, refraction and spectacle dispensary. Outreach clinics, patient education and the training of more optometrists and ophthalmologists are going a long way to breaking down these barriers.

While long-established causes of blindness, such as cataract and refractive error, continue to be the major cause of blindness, Africa faces the challenge of a growing epidemic of non-communicable disease. Although most industrialised countries did not develop high rates of diabetes, obesity and Alzheimer's until a time when infectious causes of death were relatively rare, Africa's expanding, ageing and urbanising population sees stretched healthcare systems facing the dual challenges of communicable and non-communicable disease. It is here that technological solutions promise to greatly expand the productivity of African healthcare workers. Equipped with a smartphone and a short training course, it is envisaged that healthcare workers will efficiently screen large numbers of people in their communities for potentially sight-threatening diseases, such as glaucoma, refractive error and diabetic retinopathy. Innovations that are proven in an African setting have a huge potential market as industrialised countries look to reduce their healthcare costs and increase productivity. Local innovations should therefore see their potential market as global, not just Africa-wide.

The unique combination of people and diseases means that Africa-specific evidence-based medicine needs to be developed. While some may argue that research is a luxury that many African countries cannot afford, a stronger argument can be made that research is a necessity that no African country can afford to go without. Well-directed research provides the knowledge to effectively plan and deliver optimal healthcare. The money spent on research will be recovered by more efficient spending of precious health dollars. Without research we are liable to continue ineffective or potentially dangerous healthcare behaviours; the knowledge from research facilitates continued improvement.

There are many reasons for optimism. Africans are better educated, wealthier, more informed and more globally conscious than ever. Given the right opportunities the challenges of eye healthcare will be met with a rigorous response from a well-trained workforce equipped with innovative solutions customised to an African setting. These changes will not happen without us all playing a part in recognising the challenges and facilitating research and innovation that brings optimal solutions to our patients, no matter where they are.

**Frank Sandi**, Chair, 4th COECSA Congress Organizing Committee

**Heiko Philippin**, Chair, 4th COECSA Congress Scientific Committee

# Ocular manifestations among patients with pre-eclampsia and eclampsia at Muhimbili National Hospital; magnitude and presentations

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## ABSTRACT

**Background:** To determine the prevalence and presentation of ocular manifestations among patients who presented with pre-eclampsia and eclampsia at a tertiary hospital.
**Methods:** A cross-sectional descriptive study was conducted at Muhimbili National Hospital (MNH). All patients with pre-eclampsia and eclampsia who met the inclusion criteria during the study period were included. A total of 113 patients were recruited. Data collection was done for six months which involved; case note review and ocular examination. Findings were recorded in structured questionnaires. Computer software SPSS version 20 was used for descriptive analysis of the gathered data. The results were summarized in frequency tables, bar and pie charts. inferential statistics were performed and a $p<0.05$ was considered significant.
**Results:** The patients age range was 18-49 years with a mean age of 29.26 years. Forty five (39.8%) patients had pre-eclampsia while 68 (60.2%) had eclampsia. The overall prevalence of visual disturbances was 51 (45.1%). Poor vision occured in 39 (35.4%) patients followed by photopsia 15.9% and diplopia 2.7%. Fundus findings were; papilledema 28.3%, retinal edema 19.5%, cotton-wool spots 18.6%, arteriolar narrowing 17.7%, flame-shaped haemorrhages 8% and macular edema 5.3%. On admision 39 (35.4%) patients had impaired vision with a corrected visual-acuity of <6/18. At discharge only 13.3% had impaired vision. The mean visual recovery time was 8.5±1.2 days.
**Conclusion:** The prevalence of visual disturbances among patients with pre-eclampsia and eclampsia at MNH was significantly high**.** Majority presented with blurred vision and it was temporary in 86.7% of patients.
**Recommendation:** Measures to create awareness among health personnel regarding sudden visual loss among pregnant women as an alarming sign of pre-eclampsia are recommended. Obstetricians need to assess vision and fundus examination in these patients and refer them for ophthalmic care accordingly.

**Keywords:** Pre-eclampsia, Eclampsia, Visual impairement, Ocular manifestations

## INTRODUCTION

Pre-eclampsia and eclampsia are hypertensive disorders of pregnancy that are associated with various ocular and systemic manifestations. Poorly managed eclampsia accounts for 75% of all maternal deaths[1] and is responsible for irreversible blindness in 1-3% of affected cases[2].

Pre-eclampsia is the new onset of hypertension and proteinuria during the second half of pregnancy. The diagnosis of pre-eclampsia is made when the blood pressure is >140/90 mmHg on two occasions combined with urinary protein excretion >300 mg/day[3]. Eclampsia is an acute life-threatening complication of pregnancy characterized by the appearance of tonic-clonic seizures, and coma which is not due to pre-existing or organic brain disorders, usually develops in a patient who had pre-eclampsia.

*Prevalence:* The condition affects approximately 6-8% of all pregnancies worldwide, with onset of symptoms in the late second or third trimester, most commonly after the 32nd week of gestation[4]. In developing countries the prevalence of pre-eclampsia ranges from 1.8% - 16.7%[5].

The incidence of eclampsia has been relatively stable at a rate of 1 in 2000 pregnancies in Europe and other developed countries[6]. A recent study in Australia showed an incidence of eclampsia of 8.6/10,000 births or 2.6% of pre-eclampsia cases[7]. In developing countries, however, the incidence varies widely from 6 to 157 cases per 10,000 deliveries[5]. In Tanzania, a study to determine the incidence of eclampsia at Muhimbili National Hospital in Dar es Salaam estimated the hospital and population-based prevalence of eclampsia to be 200/10,000 and 67/10,000, respectively[8]. A follow up study in the same hospital reported a prevalence of eclampsia to be 6%[9].

*Visual disturbances in pre-eclampsia and eclampsia:* Pre-eclampsia and eclampsia involve multiple systems and organs including the eye and visual system. Reports in literature show that up to 25% of patients with severe pre-eclampsia and 50% of patients with eclampsia have visual symptoms of clinical significance[10]. In Tanzania visual disturbances were reported among 39% cases where blurring of vision affected 36.6% of patients[11].

Visual disturbances are temporary. However 1 - 3% of affected patients remain with irreversible blindness[2]

due to involvement of the visual cortex[12,13]. Reported ocular symptoms in pre-eclampsia and eclampsia include double vision, intermittent visual loss and, photopsia. In literature focal or generalized arteriolar narrowing (70%) has been reported to be commonest sign in pre-eclampsia and eclampsia[2].

Pre-existing ocular and systemic diseases such as chronic systemic hypertension and diabetic retinopathy have been reported as risk factors for development of ocular complications in pre-eclampsia.We found no documented study that indicated the type of visual disturbances and their sequeale in Tanzania. In this study we sought to determinine the prevalence and clinical presentation of visual disturbances in patients with eclampsia admitted at Muhimbili National Hospital.

## MATERIALS AND METHODS

*Study design:* A hospital based descriptive cross-sectional study.

*Study period:* This study was carried out for 18 months from June 2013 to December 2014.

*Study area:* Muhimbili National Hospital (MNH) in Dar-es-Salaam. Data were collected from the eclampsia unit of the obstetric ward. The eclampsia unit provides care to patients admitted for management of pre-eclampsia and eclampsia. On average 40 patients with pre-eclampsia and eclampsia are admitted in the unit per month.

*Study population:* All pregnant women diagnosed with pre-eclampsia and eclampsia, who were admitted in eclampsia unit at MNH during the study period were recruited. Patients with established ocular and systemic diseases with similar fundoscopic pattern as in pre-eclampsia and eclampsia such as diabetic retinopathy; glaucoma, HIV and chronic systemic hypertension were excluded from the study.

*Sampling and sample size:* All patients who met the eligibility criteria were recruited (Box 1).

**Box 1**: Recruitment criteria

1. All patients admitted in the obstetric ward, eclampsia unit for management of pre-eclampsia and eclampsia
2. Patients who agreed to sign the informed consent to participate in the study

**Box 2**: Exclusion criteria

1. Very sick patients were excluded in the study because, we didn't want to jeopardize patients' lives for research purposes but also other subjective tests such as visual acuity taking were not possible. Such patients were left under obstetrician intensive care; we only assisted with indirect ophthalmoscopy when required.

*Data collection procedures:* Data were collected from patients admitted in the eclampsia unit. After obtaining their consent, they were requested to sign the informed consent form. A short history was taken from the patient or her next of kin. Patient's case notes were reviewed to elicit patient's current pregnancy obstetric details. Standard ocular examination was performed starting with visual acuity using a portable Snellen's chart. Best corrected visual acuity was assessed using a pinhole. The intraocular pressure was measured by a tonopen. The anterior segment was examined using a torch. Examination of the fundus was done after dilatation of pupils by tropicamide 1% using the Keeler head-mounted indirect ophthalmoscope. A structured questionnaire was used to record all the information.

*Data analysis:* All data were entered into a computer. SPSS version 20 was used to aid descriptive analysis. The results were summarized in frequency distribution tables and were interpreted basing on the study objectives. Chi-square test was used to determine the association between visual acuity levels at admision and discharge and severity of the disease in order to show the effect of the disease and its severety on the acuity level. The significance level was taken at $p<0.05$.

*Ethical considerations:* This study was ethically approved by the Ethics and Research Committee of Muhimbili University of Health and Allied Sciences (MUHAS). Permission to conduct the study was granted by the relevant hospital authorities. Written informed consent was obtained from each participant. Confidentiality and privacy was maintained throughout the study. Data was stored safely and used for the purposes of the study only.

## RESULTS

A total of 113 patients were recruited for the study. All patients met the criteria and all were included in the analysis.

**Table 1:** Age distribution of the study population (n=113)

| Age (Years) | No. | (%) |
|---|---|---|
| ≤ 20 | 11 | 9.7 |
| 21 – 30 | 50 | 44.2 |
| 31 – 39 | 43 | 38.1 |
| ≥ 40 | 9 | 8 |
| Total | 113 | 100 |

Majority (44.2%) of the study population were aged between 21-30 years. The mean age was 29.26 ± 6.97 years and the age range was 18- 49 years.

**Table 2:** Obstetric characteristics of the study population

| Character | Specific variable | No. (%) |
|---|---|---|
| Current gestation age (months) | 4 – 6 | 2 (1.8) |
| | 7 – 9 | 111 (98.2) |
| Parity | Nulliparous | 27 (23.9) |
| | Para 1 | 24 (21.2) |
| | Para 2 | 22 (19.5) |
| | Para 3 | 16 (14.2) |
| | ≥ Para 4 | 24 (21.2) |
| Any complication in previous pregnancy | None | 90 (79.7) |
| | *PIH | 9 (8) |
| | Severe pre-eclampsia | 3 (2.7) |
| | Eclampsia | 6 (5.3) |
| | Others | 5 (4.3) |
| Obstetric diagnosis | Pre-eclampsia | 45 (39.8) |
| | Eclampsia | 68 (60.2) |

* PIH = Pregnancy Induced Hypertension

Majority 111 (98.2%) of the participants were in their 3rd trimester of pregnancy during admission. Most 90 (79.70%) had no previous obstetric complications. Previous obstetric complications included: PIH 9 (8%), severe pre-eclampsia 3 (2.7%), eclampsia 6 (5.3%) and others 5 (4.3%). Most patients 45 (39.8%) were diagnosed with pre-eclampsia, 27 (23.9%) eclampsia, 35 (31%) severe pre-eclampsia and 6 (5.3%) post-partum eclampsia.

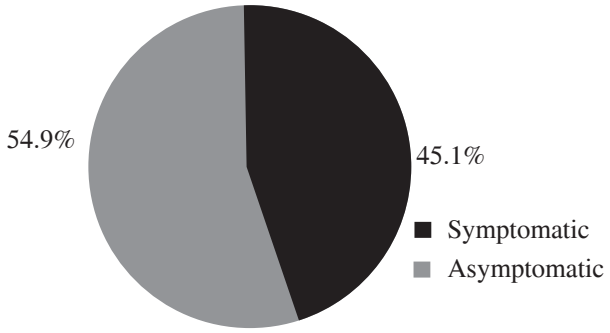


**Figure 1:** Distribution of ocular symptoms among the study population (n= 113)

Forty five percent of the study participants, presented with various ocular complaints.

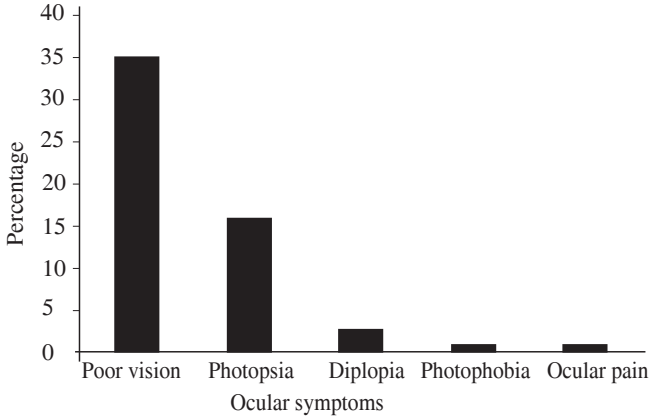


**Figure 2:** Distribution of ocular symptoms among patients who presented with visual complaints

Poor vision was the most common (35.4%) presenting visual complaint. Some patients had multiple complaints.

**Table 3:** Visual acuity status on the day of admission and discharge among the study population (n=113)

| Visual acuity | VA on admission day No. (%) | VA on the day of discharge No. (%) |
|---|---|---|
| (BCVA:6/18-6/6) Normal vision | 74 (64.6) | 98 (87.6) |
| (BCVA: <6/18) Visual impairment | 39 (35.4) | 15 (13.3) |
| Total | 113 (100) | 113 (100) |

($p$<0.001)

*BCVA = Best Corrected Visual Acuity

On admission, 39 (35.4%) of patients had visual impairment, while at discharge only 15 (13.3%) had visual impairment. There was a remarkable improvement of visual acuities between admission and discharge day. This finding was statistically significant (p <0.001).

**Table 4:** Visual acuity among patients with pre-eclampsia and eclampsia

| Obstetric diagnosis | Visual impairment (BCVA:<6/18) No. (%) | Normal vision (BCVA:6/18-6/6) No. (%) |
|---|---|---|
| Pre-eclampsia | 5 (12.8) | 40 (54.0) |
| Eclampsia | 34 (87.2) | 34 (46.0) |
| Total | 39 (100) | 74 (100) |

Among patients with visual impairment, majority had eclampsia (87.2%).

**Table 5:** Average duration for recovery of transient vision loss among the study population

| Duration of visual recovery (days) | No. | (%) |
|---|---|---|
| < 1 | 7 | 18.0 |
| 1-4 | 11 | 28.2 |
| 5-10 | 16 | 41.0 |
| >10 | 5 | 12.8 |
| Total | 39 | 100 |

Majority of patients who presented with visual impairment spontaneously regained VA of >6/18 within one week. The mean recovery time was 8.5±1.2 days.

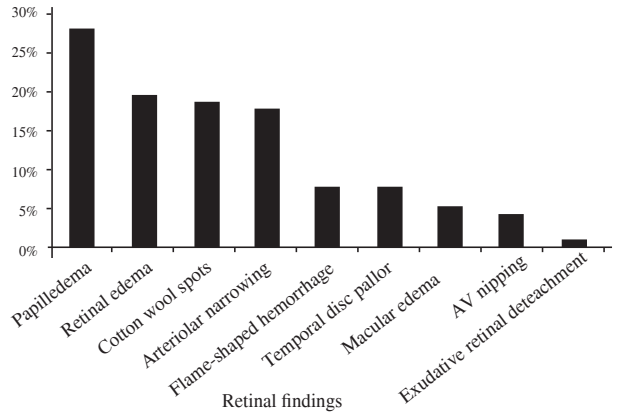


**Figure 3:** Distribution of ocular findings among the study population

Papilledema (bilateral disc swelling) was generally the most common (28.3%) fundus finding. Macular edema (5.3%) and exudative retinal detachment (0.9%) were the fundus abnomalities found to be the underlying causes of visual impairment. None of the study participants had significant abnormal anterior segment findings.

## DISCUSSION

The aim of our study was to determine the prevalence and presentation of visual disturbances in patients with pre-eclampsia and eclampsia admitted at Muhimbili National Hospital. Study participants comprised of pregnant mothers with mean age 29.26 ± 6.97 years. This is the age when most marriages and child bearing occur in the urban general population of Tanzania[14]. This age group is essentialy a potential work force for the families and society at large and therefore requires a special attention to help prevent morbidities and reduce mortalities. Among the study participants, 23.9% were first time pregnant women (null-porous) and most of them (98.2%) were in 3rd trimester of pregnancy. This distribution complies with the documented facts that nulliparity is one of the risk factors for pre-eclampsia and eclampsia. It is estimated that women with pre-eclampsia are twice as likely to be nulliparous compared to women without pre-eclampsia[15] carrying their first to fourth pregnancy. Majority (80%) had no previous obstetric complications. This group of patients needs to be informed about pregnancy induced hypertension and related complications during antenatal clinic visits to ensure access to required services in time. Our findings show that visual disturbances occurred in slightly less than half (45.1%) of study participants. Poor vision was the commonest symptom that affected 35.4% patients. This finding is similar to studies elsewhere[2,16,17] that reported poor vision as the most common ocular manifestation among patients with pre-eclampsia and eclampsia.

Results show that 39 (35.4%) patients presented with visual impairment of less than 6/18 on admission. The predominance of the proportion of visual impairement among patients with eclampsia 20/27 (74%) over pre-eclampsia 20/39 (51.3%) implies that visual impairment was related to the severity of the disease. It is of utmost importance to strengthen the capacity of screening and managing pregnancy induced hypertension in antenatal clinics in the peripheral hospitals so as to halt the progression of the disease to a more severe form. This will decrease both mortalities and morbidities, in particular visual impairment related to pre-eclampsia and eclampsia.

In most patients however visual loss was temporary such that at discharge only 15 (13.3%) had visual impairment. The visual recovery average time of 8.2 days found in this study is similar to a study done at the Parkland hospital in the United States which revealed visual recovery of 4 hours to 8 days[16,18]. The improvement in vision in most patients signifies improved management and care of patients with pregnancy induced hypertension as studies show that vision improves with good care[19]. It is worth noting however that more than 13.3% of patients remained visually impaired at discharge. The vision in these patients may or may not improve depending on the cause. Patients whose vision does not improve may need further ophthalmological care including establishing and treating the cause of poor vision to avoid irreversible blindness. Therefore, there is a need to create awareness among staff managing patients with pre-eclampsia and eclampsia to refer affected patients for ophthalmological care by having meetings between the eye and obstetric departments to discuss the same.

In this study, the commonest posterior segment findings were related to increased intracranial pressure including papilledema (28%), retinal oedema (19.5%) and cotton wool spots (18.6%). Arteriolar narrowing was found in 17.7% while macular oedema occurred in 5.3%. This is in contrast to the studies done at Ross Eye Institute, in the United States that showed focal and generalized arteriolar narrowing secondary to spasms of arterioles to be the commonest finding occurring in 70% of study participants[2]. The frequency of arteriolar narrowing has

been noted to decline owing to improved management of pregnancy induced hypertension[20].

The underlying causes of poor vision were macular edema, exudative retinal detachment and optic neuropathy. This is in agreement with studies done in the USA and Romania on similar subject which mentioned retinal edema, vascular abnormality, retinal detachments and cortical blindness as causes for poor vision in patients with pre-eclampsia and eclampsia[16,21]. However, in recent studies, more emphasis is put on cortical blindness[22]. Clinically cortical blindness is characterized by a triad of reduced visual acuity, intact pupillary reflexes and normal fundus. The exact mechanism of cortical blindness is unclear but is associated with cerebral vasospasms, ischemic injury of the occipital cortex, vasogenic edema due to increased capillary permeability and focal edema of the occipital lobe. In this study visual impairment of cortical aetiology was suspected in 4.1% of the patients who presented with poor vision. Inability to perform retinal imaging as well as brain studies limited the study findings. Diagnostic investigations such as Ocular Coherent Tomography (OCT) would have revealed other subtle retinal changes that were not identified by clinical examination alone. Studies done in Columbia University in the United States and Tel-Aviv Sourasky Medical Center in Israel documented the identification of sub-clinical retinal and choroidal thickening, subretinal fluid and photoreceptors irregularities by OCT as causes of visual impairment in patients with pre-eclampsia and eclampsia[22,23]. In the absence of imaging techniques and visual evoked potential studies to diagnose cortical blindness, future studies need to estimate serum levels of S100B protein which is a peripheral biomarker of central nervous (CNS) injury as demonstrated by a study done in Uppsala University, Sweden[24].

## CONCLUSIONS

The prevalence of visual disturbances among patients with pre-eclampsia and eclampsia at MNH was significantly high and majority presented with blurred vision. Visual impairment was associated with severity of the disease and was temporary in 87% of patients.

## RECOMMENDATION

Creation of awareness among health personnel regarding sudden visual loss among pregnant women as an alarming sign of pre-eclampsia need to be instituted. Obstetricians should perform visual acuity and fundus examination in patients with pre-eclampsia and eclampsia and refer them for ophthalmic care accordingly.

## ACKNOWLEDGEMENT

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# Facial cleanliness and prevention of cross-border spread of chlamydial infection are vital in elimination of active trachoma in Narok County, Kenya

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## ABSTRACT

**Background:** Active trachoma is an eye infection caused by *Chlamydia trachomatis* and a dirty face is the most important risk factor. The interventions recommended by World Health Organization (WHO) are Mass Drug Administration (MDA), facial cleanliness and environmental improvements (FE). Trachoma inflammation-follicular (TF) in children aged 1-9 years old is the monitoring indicator.
**Objective:** To assess the progress towards elimination of TF as a public health problem in Narok County, Kenya.
**Methods:** Project documents were reviewed. The survey methods were published elsewhere. In Kenya, district-baseline trachoma surveys commenced in 2004. From 2010, surveys were conducted in geographical areas (segments) with 100,000 to 200,000 people each. Narok County covers the previous Narok and Transmara districts. A baseline trachoma survey was conducted in Narok district in 2004 and impact surveys in 2010 and 2014. Interventions commenced in 2007. A baseline survey was conducted in Transmara district in 2011 and interventions commenced in 2013. Impact survey is due in 2016.
**Results:** In 2004, 1,348 children aged 1-9 years old were examined in Narok district. Prevalence of TF was 30.5% (95% CI:25.6% - 35.8%). In 2010, 3,998 children were examined in 5 segments. The prevalence of TF in the district was 11.0% (95% CI:8.0% - 14.0%). Three segments (North Eastern, North Western and Central) had prevalence of less than 5%. The prevalence in the South Western segment was 26.7% (95% CI:18.7% - 34%) and in South Eastern segment 21.6% (95% CI:15.4% - 27.8%). In 2014, 800 children were examined in South Eastern and 720 in South Western segment. Prevalence of TF in South Western was 21.0% (95% CI:12.8% - 29.2%) and South Eastern 21.8% (95% CI: 14.2% - 29.3%). Prevalence of a dirty face in the South Eastern segment was 43.0% (95% CI: 35.9% - 50.1%) and South Western segment 31.1% (95% CI: 24.4%-37.9%). In 2011, 1,600 children were examined in two segments in Transmara district. The prevalence of TF in the district was 10.6% (95% CI: 4.6% - 16.5%), North Eastern segment 2.9% (95% CI:0% - 6.5%) and South Western 18.3% (95% CI:7.9% - 28.6%). The prevalence of dirty faces in Transmara West was 34.4% (95% CI:28.1% - 40.6%) and in Transmara East 33.1% (95% CI:19.8% - 46.4%). The South Western segment was incorporated in the Narok County trachoma control project. There were cross-border nomadic migrations between Narok County and Tanzania. Trachoma interventions in Kenya and Tanzania were not harmonized.
**Conclusions:** There was an impressive progress towards elimination of TF in Narok district between 2004 and 2010. Dirty faces, delayed interventions in Transmara district and cross-border migrations dampened the progress in the County. Laboratory testing is needed to verify occurrence of chlamydia infection.

**Key words:** Trachoma, Prevalence, Dirty face, Environmental improvements

## INTRODUCTION

Trachoma is the leading infectious cause of blindness in the world and it is caused by the *Chlamydia trachomatis*. The World Health Organization (WHO) recommends Mass Drug Administration (MDA) as well as facial cleanliness and environmental improvements (FE) in communities where prevalence of TF is 5% or higher. Prevalence of trachomatous inflammation-follicular (TF) in children aged 1-9 years old is the recommended clinical indicator for active trachoma[1]. The most important risk factor for transmission of *Chlamydia trachomatis* infection is a child's dirty face[2].

District-based trachoma prevalence surveys to identify endemic areas in Kenya begun in 2004 and ended in 2012[3-5]. In August 2010, a new constitution with a devolved system of government was promulgated. Administrative districts and provinces were abolished and replaced with 47 autonomous counties. Consequently, trachoma surveys were conducted in geographical areas (segments) with 100,000 to 200,000 people each to mitigate against changing administrative units and boundaries[6,7]. The surveyed segments were used as interventions areas. Initially, WHO had recommended "trachoma districts" with 100,000 people each[8] but later adopted intervention areas with 100,000 to 250,000 people[1].

Narok County comprises of the previous Narok and Transmara districts. By early 2016, Narok was the only county in Kenya where more than one impact

surveys had been conducted. The aim of this study was to assess progress towards elimination of TF the County.

## MATERIALS AND METHODS

This assessment was conducted in January and February 2016. Trachoma project reports and survey data were reviewed. All the methods used for trachoma methods in Kenya have been published elsewhere[3,5,6].

A baseline survey for Narok district was conducted in 2004 and interventions commenced in 2007. Two impact surveys were thereafter conducted in 2010 and 2014.

In Transmara, a baseline survey was conducted in 2011 and interventions commenced in 2012. The first impact survey is due later in 2016.

## RESULTS

In 2004, 1,348 children aged 1-9 years old were examined in Narok district (Table 1). The prevalence of TF was 30.5% (95% CI:25.6%- 35.8%). The entire district was surveyed without segmentation.

In 2010, 3,998 children were examined in 5 segments in Narok district (Table 1). The prevalence of TF in the whole district was 11.0% (95% CI:8.0%-14.0%). The prevalence in the North Eastern, North Western and Central was lower that 5%. These 3 segments were excluded from further MDA but FE interventions were continued. The prevalence in the Southern Western segment was 26.7% (95% CI:18.7%-34%) and in South Eastern segment 21.6% (95% CI:15.4%-27.8%). Also in 2010, 3,995 children were examined for dirty faces in the district and the prevalence of a dirty face was 42.8% (95% CI:41.2%-44.4%). Eight hundred children were examined for dirty faces in each of the 2 endemic segments. In the South Western segment 440 children (55.0%, 95% CI:51.5%-58.5%) had dirty faces. In South Eastern segment 447 children (59.6%, 95% CI:56.1%-63.1%) had dirty faces.

**Table 1***:* TF surveys conducted in Narok County which comprises of the previous Narok and Transmara districts

| Year | Study area | Survey segments+ | Children 1-9 years old examined | | Prevalence of TF (95%CI) | Interventions* |
|---|---|---|---|---|---|---|
| | | | Total | With TF# | | |
| 2004 | Narok | Narok district | 1,348 | 411 | 30.5% (25.6%-35.8%) | AFE |
| 2010 | Narok | South Western | 799 | 213 | 26.7% (18.7%-34.6%) | AFE |
| | | South Eastern | 800 | 173 | 21.6% (15.4%-27.8%) | AFE |
| | | Central | 800 | 34 | 4.3% (2.2%-6.3%) | FE |
| | | North Eastern | 800 | 17 | 2.1% (0.0-%4.5%) | FE |
| | | North Western | 799 | 3 | 0.4% (0.0%-0.9%) | FE |
| | | Narok district | 3,998 | 440 | 11.0% (8.0%-14.0%) | AFE |
| 2011 | Transmara | North Eastern | 800 | 23 | 2.9% (0.0%-6.5%) | FE |
| | | South Western | 800 | 146 | 18.3% (7.9%-28.6%) | AFE |
| | | Transmara district | 1,600 | 169 | 10.6% (4.6%-16.5%) | FE |
| 2014 | Narok | South Western | 720 | 151 | 21.0% (12.8%-29.2%) | AFE |
| | | South Eastern | 800 | 174 | 21.8% (14.2%-29.3%) | AFE |

+From 2010 surveys were conducted in geographical areas (segments) with 100,000-200,000 people each.
#TF=Trachoma Inflammation-folicular.
*A = Antibiotics (mass drug administration), F = Facial cleanliness and E = Environmental changes

Project reports indicated that in 2010 the prevalence of TF in the South Eastern segment was 21.6% (95% CI: 15.4%-27.8%) and in South Western segment 26.7% (95% CI: 18.7%-34.6%)[6]. There was a decrease in prevalence but the endemicity did not changed and the UIG for TF was not achieved. The overlapping 95% Confidence Intervals in Figure 1 indicates that decline was not significant.

In 2014, 1,520 children were examined in the 2 remaining endemic segments in Narok district: 800 in the South Eastern and 720 in the South Western segment (Table 1). The prevalence of TF in the South Western segment was 21.0% (95% CI:12.8%-29.2%) and South Eastern 21.8% (95% CI: 14.2%-29.3%). The change in the prevalence of TF between 2010 and 2014 is shown in Figure 1. Out of the 1,520 children examined, 568 (37.4%) had dirty faces. Two hundred and twenty-four (31.1%) out of the 720 children from the South Western and 334 (41.8%) out of the 800 children from the South Western segment had dirty faces. The mean prevalence of a dirty face in the two segments was 37.4% (95% CI:32.1%-42.6%). The change in prevalence of a dirty face in the 2 segments between 2010 and 2014 is shown in Figure 2.

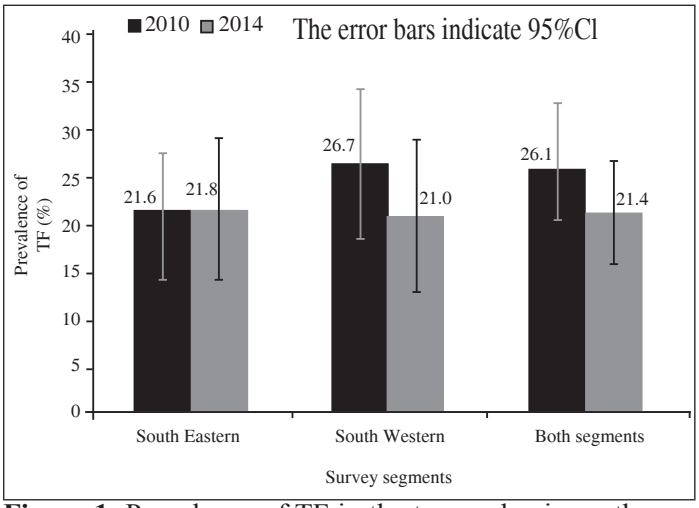


**Figure 1**: Prevalence of TF in the two endemic southern segments in 2010 and 2014

This means that there was a statistically significant reduction in prevalence of a dirty face but none of the segments had achieved the UIG of having 80% of the children 1-9 years old with clean faces.

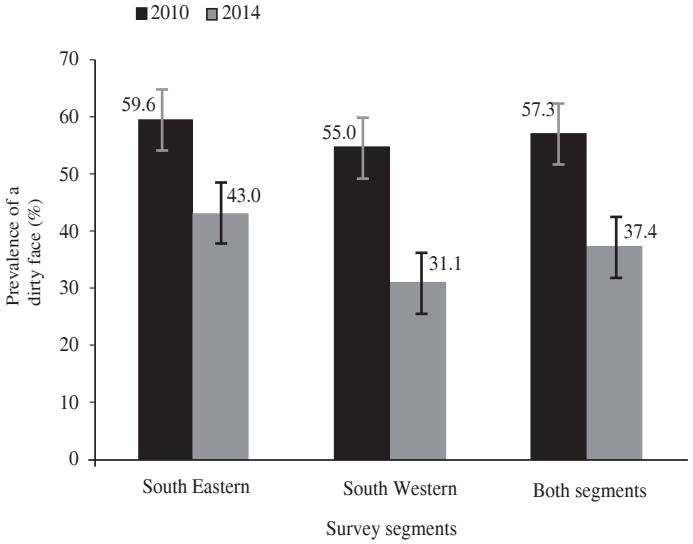


**Figure 2:** Prevalence of a dirty face in the two segments in 2014 and 2010

In 2011, Transmara district was divided into two survey segments and 1,600 children examined (Table 1). The prevalence of TF in the district was 10.6% (95% CI: 4.6%-16.5%), North Eastern 2.9% (95% CI:0%-6.5%) and South Western 18.3% (95% CI:7.9%-28.6%). The South Western segment was incorporated in Narok trachoma control project. Five hundred and forty-three of the 1,600 children had dirty faces: 269 and 234 in North Eastern and South Western segments respectively. The prevalence of a dirty face in Transmara district was 33.9% (95% CI:27.9%.40.0%), North Eastern segment 33.6% (95% CI:23.2%-44.0%) and South Eastern segment 34.3% (95% CI:28.0%-40.5%).

The trachoma-endemic communities in Narok county are nomadic and there is free migration across the international border with Tanzania. However, by the time this paper was written, trachoma interventions between the two areas had not been harmonized.

## DISCUSSION

The was an impressive initial progress towards elimination of TF as a public health problem in Narok district following 3 annual doses of MDA which dropped the prevalence of TF from 35.5% in 2004[3] to 11.0% in 2010[6]. However, this trend was not documented in the 2 southern segments with poor facial hygiene and perennial nomadic migrations across the international border with Tanzania. Reports from other trachoma control programmes indicate that three annual doses of MDA may not eliminate active trachoma in hyper-endemic districts where trachoma risk factors are also prevalent[1].

Even though MDA was stopped in three non-endemic segments in Narok where the prevalence of TF was less than 5%, FE interventions were continued to prevent re-emergence of TF. Studies conducted in other African countries have reported re-emergence even after this elimination threshold has been achieved[9,10]. It is not clear at which prevalence level MDA should be stopped, especially when the treatment coverage is not consistent and treatment is guided by clinical diagnosis[11]. In hyper-endemic communities in Ethiopia, active trachoma was reported to have re-emerged after four annual rounds of MDA with high treatment coverage which had reduced the prevalence of infection to 2.6%[9].

A dirty face is believed to be the common final pathway for environmental risk factors[2]. All the endemic areas in Narok and Transmara districts had high prevalence (>80%) of a dirty face. Facial cleanliness will take a long time to implement since it requires provision of adequate water and behavior change.

The delayed TF interventions in Transmara district slowed the progress towards elimination of TF in the entire county. Narok and Transmara are neighbouring districts inhabited by same cultural group.

The main limitation of this study is the likelihood of confounders. Laboratory testing has never been done to confirm the occurrence of chlamydia trachomatis in Narok County. Clinical grading (prevalence of disease) was used as recommended by the WHO[1] but the aim of interventions is to eliminate chlamydial infection as a public health problem[2]. Moreover, other bacterial infections, allergy and viruses such as adenovirus, coxsackie virus and Molluscum contagiosum can cause follicular inflammation which can be confused with TF[12].

The other important confounder which were not investigated is MDA treatment coverage. The WHO recommends that the whole target population should be treated[1] and MDA is considered successful when at least 80% of the total population is treated[8].

## CONCLUSIONS

There was an impressive progress towards elimination of TF in Narok district between 2004 and 2010. Dirty faces, delayed interventions in Transmara district and cross-border migrations contributed to the slow progress in Narok County. Laboratory testing is needed to verify the burden of chlamydial infection.

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# Knowledge, attitude and practice in assessment of childhood ocular disorders among primary health workers in Garissa district, Kenya

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## ABSTRACT

**Objective:** To determine the knowledge, attitude and practice in assessment of childhood ocular disorders among primary health workers in Garissa district, Kenya.

**Methods**: A cross-sectional study was conducted between December 2013 and January 2014 in health centers and dispensaries within Garissa district. Quantitative data was collected using semi-structured questionnaires among 45 primary health workers. The process was through direct interview where the participants were asked questions and shown pictures of common childhood ocular disorders.

***Results*:** The level of knowledge and practice varied depending on the area of assessment amongst the 45 participants. The correct diagnosis among participants were 51.11% for ophthalmia neonatorum, 13.33% for congenital glaucoma, 80%, 13.33% and 4.44% for ophthalmia neonatorum, congenital glaucoma, strabismus, corneal ulcer and refractive error respectively. Most (80%) of the respondents attributed wearing of spectacles to poor vision without giving actual diagnosis of refractive errors. Red eyes were mainly attributed to trauma (44.44%) and infection (44.44%). White eye reflex was mainly attributed to cataract by 64.44% of the participants while only 6.67% mentioned retinoblastoma. Only 20% had some knowledge on physical ocular signs of vitamin A deficiency. Over 50% of the participants would refer the cases assessed apart from ophthalmia neonatorum, red eyes and vitamin A deficiency which most of the participants would start the patients on treatment first. Most respondents believe the eye conditions could lead to vision loss except for strabismus.

**Conclusion:** There was generally poor knowledge in both assessment and management of childhood ocular disorders. Structured approach should be enhanced through regular training and use of childhood eye disease manual.

## INTRODUCTION

Early and accurate detection of childhood ocular disorders may be a challenge to primary health workers. They range from congenital/hereditary to acquired eye conditions including trauma. Some eye disorders in children must be diagnosed early to prevent loss of vision, mortality and to optimize treatment outcomes. Certain eye conditions which are easily missed include amblyopia, glaucoma, ocular inflammation, strabismus, trauma, nystagmus and leukocoria amongst others[1].

Approximately three-quarters of the world's blind children live in the poorest regions of Africa and Asia. Almost half of all blindness in children especially from the poorest communities are due to avoidable causes that are amenable to cost effective interventions[2, 3].

Primary health workers especially those working in dispensaries and health centers play a crucial role in integrated eye care services. They have very close contact with the community, especially at village level. It is imperative for them to have basic understanding of eye disorders for prompt management or referral. In almost all these situations the primary point of contact is often not an eye care professional but other health professionals. Often, eye care services suffer where countries do not have the infrastructure to produce or attract eye care workers in the required numbers[4].

A study done in Meru South and Kisumu East districts of Kenya at MCH clinics in primary health facilities showed that 55.4% of the health workers correctly diagnosed the red eye, 95.2% ophthalmia neonatorum and 80.7% squint. However, the practice towards eye diseases in general was low. The child health and nutrition card section of Mother and Child Health (MCH) booklet was well completed in 78.1% but the section on identification of early eye problems was only completed in only 0.8% of the children[5].

In a study conducted in Mwanga district, Tanzania; among the 49 respondents, skills in assessing visual acuity and recognizing specific eye diseases and their management were weak[6]. Cataract (white pupil) was correctly identified by 67.3% of respondents and 63.2% mentioned surgery as the treatment; 67.3% correctly recognized and stated the proper management of conjunctivitis (antibiotics). Severe eye injury was recognized by 75.5% of health workers and 69.3% knew how to manage it correctly (immediate referral). The mean skills score of all respondents was 6.2 out of a possible 12[6].

A baseline study of eye service provision at health centers in 2 districts in Malawi carried out in late 2010 indicates that medical assistants, enrolled nurses and patient attendants report that they provided treatment to eye patients. However, the research showed that these workers generally had poor skills. Only 56% could

accurately identify a cataract. The level of knowledge and skills of health workers in this setting appears to be too limited to ensure that children receive appropriate and timely interventions. Delay in referral and intervention is a critical problem in Africa and contributes to childhood blindness[7].

A pilot study in Kilimanjaro Region of Tanzania found that there was also very minimal knowledge on the aetiology of various eye diseases and considered everything as being infections. Overall, 88% of workers recognized cataract in a picture, 63% knew that it required surgery but only 50% realized surgery was urgent. Only 38% recognized squint as needing referral and none considered this urgent. Moreover, 38% could correctly suggest a cause of a large corneal scar[8].

A study done in Ethiopia by Yewubnesh *et al*[9] showed that, the concept of Primary Eye Care (PEC) as an integral part of Primary Health Care (PHC) is not well incorporated in the training and job descriptions of health workers in developing countries.

## MATERIALS AND METHODS

This was a cross sectional study involving all nurses and clinical officers working in health centers and dispensaries within Garissa district. Those working in higher health institutions were excluded. The number of the health workers in the targeted institutions was obtained from the regional office. The data was collected between December 2013 and January 2014.

All the potential participants were given brief introduction on the nature of the study, its purpose and assurance of confidentiality. Those who accepted to participate signed a consent form before taking part in the study. Those who were absent at their respective institutions were contacted through phone to find out if they were willing and going to be available for the study.

The participants were directly interviewed and the information recorded in semi-structured interviewer questionnaires capturing the specific objectives. Confidentiality of the participants was observed by not indicating their names on questionnaires or any form of identification. Selected pictures were shown to the participants during the interview depending on the questions being asked. The participants were required to identify the pictures and answer related questions. The interview was carried out by the principle investigator and a study assistant.

Data collected was coded, entered into Microsoft excel database and subsequently analysed using STATA software version 11.

The study proposal was approved by Kenyatta National Hospital/University of Nairobi Research and Ethics Committee. An introductory letter was also obtained from division of ophthalmic services to facilitate collection of data.

## RESULTS

The study had anticipated to recruit all the 51 Primary Health Workers (PHW). However, 4 were absent and 2 declined to participate. Forty five PHW responded, thus a response rate of 88.24%. The mean age of the respondents was 29.64 (SD 4.49), median 28, range of 23-48 years. The male: female ratio was 1:1.6. Most (66.67%) of responders were Kenya Registered Community Health Nurses (KRCHN). The mean duration of practice was 5.99 (SD 4.18), median 5 and range of 1-23 years. The respondents were almost equally distributed between the health facilities with a slight majority (51.11%) stationed at dispensaries (Table 1).

**Table 1**: General characteristics of the study participants

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Age-groups (years) | | |
| 20 – 25 | 4 | 8.89 |
| 26 – 30 | 28 | 62.22 |
| 31 – 35 | 6 | 13.33 |
| 36 and above | 7 | 15.56 |
| Gender | | |
| Female | 28 | 62.22 |
| Male | 17 | 37.78 |
| Designation | | |
| Clinical Officer | 8 | 17.78 |
| BScN | 0 | 0 |
| KRCHN | 30 | 66.67 |
| KECHN | 7 | 15.56 |
| Duration of practice (years) | | |
| 1 – 5 | 24 | 53.33 |
| 6 – 10 | 18 | 40.00 |
| 11 – 15 | 2 | 4.44 |
| 16 and above | 1 | 2.22 |
| Station | | |
| Dispensary | 23 | 51.11 |
| Health Centre | 22 | 48.89 |
| Post qualification PEC training | 1 | 2.22 |

Ophthalmia neonatorum was correctly diagnosed by 51.11% of PHW with 66.67% able to identify the signs displayed. The main attributed risk factor was infected birth canal as given by 68.89% of the respondents. In management, majority (40%) would give eye drops or ointment for treatment. Tetracycline Eye Ointment (TEO) would be the most prescribed by 88.89% of PHW who chose to treat with eye medication (Tables 2 and 3).

**Table 2:** Knowledge of ophthalmia neonatorum

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Signs identified in picture | | |
| Purulent discharge | 14 | 31.11 |
| Purulent discharge / Swollen eyelids | 30 | 66.67 |
| Swollen eyelids | 1 | 2.22 |
| Diagnosis | | |
| Ophthalmia neonatorum/ Neonatal conjunctivitis | 23 | 51.11 |
| Eye infection | 13 | 28.89 |
| Syphilis | 1 | 2.22 |
| Trachoma | 1 | 2.22 |
| Don't Know | 7 | 15.56 |
| Aetiology/ Risk factors* | | |
| Infected birth canal | 31 | 68.89 |
| Unsterile hands of birth attendants | 5 | 11.11 |
| Don't know | 5 | 11.11 |
| Bacterial infection | 5 | 11.11 |
| Foreign body | 2 | 4.44 |
| Eye trauma | 1 | 2.22 |

* Multiple responses allowed.

**Table 3:** Practice in management of ophthalmia neonatorum

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Management* | | |
| Clean eyes, topical (eye) & systemic antibiotics | 4 | 8.89 |
| Clean & give eye medication | 17 | 37.78 |
| Treat then refer | 4 | 8.89 |
| Vitamin A | 1 | 2.22 |
| Eye drops/ ointments only | 18 | 40.00 |
| Topical (eye) and systemic antibiotics | 3 | 6.67 |
| Systemic antibiotics | 3 | 6.67 |
| Prevention* | | |
| Cleaning eyes after birth | 19 | 42.22 |
| Application of tetracycline eye ointment to newborns | 22 | 48.89 |
| Good management of labour | 4 | 8.89 |
| Prompt treatment of infections in antenatal mothers | 22 | 48.89 |
| Others | 7 | 15.56 |
| Choice of eye medication (n=43) | | |
| Gentamycin | 1 | 2.22 |
| TEO | 40 | 88.89 |
| TEO + Gentamycin | 1 | 2.22 |
| TEO + Neomycin | 1 | 2.22 |

Others include don't know (n=1), health education on eye hygiene (n=5) and use of glasses (n=1)

Glaucoma was diagnosed by only 13.33% of the PHW. However, 60% were able to correctly identify the hazy cornea. Majority (71.11%) did not know if glaucoma is treatable. The practice was generally good as most (71.11%) of PHW would refer such a case. The few who mentioned eye medication were unable to specify the type (Table 4).

Strabismus was well diagnosed by 80% of the PHW and the sign correctly identified by 91.11% of them. Majority (64.44%) would refer for management (Table 5).

**Table 4:** Knowledge and practice in congenital glaucoma

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Signs in the pictures* | | |
| Hazy cornea | 27 | 60.00 |
| None | 7 | 15.56 |
| Lens opacity | 2 | 4.44 |
| Big eyes | 10 | 22.22 |
| Diagnosis | | |
| Glaucoma | 6 | 13.33 |
| Cataract | 5 | 11.11 |
| Neonatal conjunctivitis | 1 | 2.22 |
| Vitamin A deficiency | 1 | 2.22 |
| Don't know | 32 | 71.11 |
| Is condition treatable? | | |
| Don't know | 32 | 71.11 |
| Yes | 13 | 28.89 |
| Management | | |
| Give eye drops/ointment | 2 | 4.44 |
| Give eye drops then refer if no improvement | 2 | 4.44 |
| Refer immediately | 32 | 71.11 |
| Advice on spectacles | 1 | 2.22 |
| Don't know | 7 | 15.56 |
| Vitamin A | 1 | 2.22 |

* Multiple responses allowed

**Table 5:** Knowledge and practice in strabismus

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Signs identified in the picture | | |
| Abnormal eye deviation | 41 | 91.11 |
| Normal eyes | 1 | 2.22 |
| Don't know | 3 | 6.67 |
| Diagnosis | | |
| Squint/strabismus | 36 | 80.00 |
| Don't know | 8 | 17.78 |
| Congenital eye problem | 1 | 2.22 |
| Is the condition treatable? | | |
| Yes | 17 | 37.78 |
| No | 13 | 28.89 |
| Don't know | 15 | 33.33 |
| Management | | |
| Reassure | 6 | 13.33 |
| Observe then refer if no improvement | 1 | 2.22 |
| Refer * | 29 | 64.44 |
| Advice on spectacles | 2 | 4.44 |
| Don't know | 6 | 13.33 |
| Vitamin A | 1 | 2.22 |

*Refer includes refer immediately (n=21) and refer for surgery (n=8)

Leukocoria was mainly attributed to cataract by 64.44% of PHW. Only 8.89% to retinoblastoma or eye tumour. Most of the cases would be referred by 95.55% of the respondents. Surgery was mentioned by 44.44% of them as the reason for referral (Table 6).

**Table 6:** Knowledge and practice in leukocoria

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Signs identified in the picture | | |
| White eye reflex | 21 | 46.67 |
| Distorted pupil | 2 | 4.44 |
| Lens opacity | 20 | 44.44 |
| Swollen eyes | 2 | 4.44 |
| Diagnosis | | |
| Cataract | 29 | 64.44 |
| Retinoblastoma | 3 | 6.67 |
| Eye infection | 1 | 2.22 |
| Don't know | 8 | 17.78 |
| Trachoma | 1 | 2.22 |
| Glaucoma | 1 | 2.22 |
| Vitamin A deficiency | 1 | 2.22 |
| Eye tumour | 1 | 2.22 |
| Is this condition treatable? | | |
| Yes | 34 | 75.56 |
| No | 5 | 11.11 |
| Don't know | 6 | 13.33 |
| Management | | |
| Refer immediately | 23 | 51.11 |
| Don't know | 1 | 2.22 |
| Refer for surgery | 20 | 44.44 |
| Vitamin A | 1 | 22.22 |

Corneal ulcer was diagnosed by 13.33% of PHW correctly. In practice, 64.44% would refer without intervention. TEO was the most (83.33%) probable eye medication to be prescribed in treatment (Tables 7 and 8).

**Table 7:** Knowledge of corneal ulcer

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Signs identified in the picture* | | |
| Hazy cornea | 23 | 51.11 |
| Red eyes | 27 | 60.00 |
| Lens opacity | 2 | 4.44 |
| Abnormal pupil | 4 | 8.89 |
| Don't know | 1 | 2.22 |
| Swollen eyes | 5 | 11.11 |
| Corneal scar | 1 | 2.22 |
| Corneal ulceration | 2 | 4.44 |
| Eye lid ulcer | 1 | 2.22 |
| Diagnosis | | |
| Corneal ulcer | 6 | 13.33 |
| Eye tumour | 7 | 15.56 |
| Trachoma | 4 | 8.89 |
| Eye trauma | 1 | 2.22 |
| Don't know | 17 | 37.78 |
| Entropion | 1 | 2.22 |
| Conjunctivitis | 6 | 13.32 |
| Cataract | 2 | 4.44 |
| Blindness | 1 | 2.22 |
| Is the condition treatable? | | |
| Yes | 19 | 42.22 |
| No | 8 | 17.78 |
| Don't know | 18 | 40.00 |

* Multiple responses allowed

**Table 8:** Practice in management of corneal ulcer

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Management | | |
| Give eye drops\ointment | 5 | 11.11 |
| Give eye medication then refer | 3 | 6.67 |
| Eye shield/pad then refer | 3 | 6.67 |
| Refer immediately | 29 | 64.44 |
| Don't know | 5 | 11.11 |
| Choice of eye medication (n=6) | | |
| TEO | 5 | 83.33 |
| TEO + Gentamycin | 1 | 16.77 |

All the respondents were able to identify the red eye. Majority attributed it to trauma and infection by 44.44% each. On management, 64.44% would give eye medication only. Most (66.67%) of the respondents mentioned and specified which eye medication they would give. Majority (46.67%) of them would give tetracycline eye ointment alone (Table 9).

**Table 9:** Knowledge and practice in management of red eyes in a child

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Signs identified in the picture* | | |
| Red eyes | 45 | 100 |
| Eye discharge | 1 | 2.22 |
| Swollen eyes | 2 | 4.44 |
| Tearing | 8 | 17.78 |
| Diagnosis* | | |
| Trauma | 20 | 44.44 |
| Allergic conjunctivitis | 17 | 37.78 |
| Foreign body | 8 | 17.78 |
| Infection | 20 | 44.44 |
| Management | | |
| Give eye drops\ointment only | 29 | 64.44 |
| Eye drops\ointment + eye pad | 1 | 2.22 |
| Eye medication then refer | 5 | 11.11 |
| Refer immediately | 5 | 11.11 |
| Systemic antibiotics | 5 | 11.11 |
| Choice of eye medication (n=30) | | |
| Gentamycin only | 6 | 20.00 |
| Steroids only | 5 | 16.67 |
| Steroids + Gentamycin | 2 | 6.67 |
| TEO only | 14 | 46.67 |
| TEO + Gentamycin | 1 | 3.33 |
| TEO + Steroids | 1 | 3.33 |
| TEO + Steroids + Gentamycin | 1 | 3.33 |

* Multiple responses allowed

Most (84.44%) of the PHW said they were able to identify a child with poor vision. Wearing of spectacles was grossly associated to poor vision by 80% of the respondents though only 6.67% mentioned refractive error. Referral for evaluation and management was preferred by majority (77.78%) of the respondents. Use of spectacles in children would be advocated by 71.11% of PHW (Tables 10 and 11).

**Table 10:** Knowledge in poor vision and refractive error

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Ability to identify a child with poor vision | | |
| Yes | 38 | 84.44 |
| No | 7 | 15.56 |
| How to identify poor vision (n=38) | | |
| History/complaints | 10 | 26.32 |
| Observation | 3 | 7.89 |
| Both* | 25 | 65.79 |
| Conditions attributed to a child wearing spectacles | | |
| Refractive error | 2 | 4.44 |
| Myopia | 3 | 6.67 |
| Poor vision | 36 | 80.00 |
| Blindness | 3 | 6.67 |
| Don't know | 1 | 2.22 |
| Is the condition treatable? | | |
| Yes | 39 | 86.67 |
| No | 3 | 6.67 |
| Don't know | 3 | 6.67 |

* Multiple responses allowed.

**Table 11:** Practice in management of refractive error

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Management of refractive errors | | |
| Reassure | 1 | 2.22 |
| Observe then refer if no improvement | 1 | 2.22 |
| Refer to eye clinic for evaluation and management | 35 | 77.78 |
| Advice on spectacles | 6 | 13.33 |
| Refer for surgery | 2 | 4.44 |
| Advocate for use of spectacles in children | | |
| Yes | 32 | 71.11 |
| No | 13 | 28.89 |
| Reasons for not advocating for spectacles (n=13) | | |
| Will cause worsening of vision/blindness | 7 | 53.85 |
| Stigmatization | 1 | 7.69 |
| Children would break spectacles | 5 | 38.45 |

A slight majority (66.67%) of PHW said they were able to identify a child with eye manifestations of vitamin A deficiency. They mainly relied on history of night blindness (93.33%). Only 11.11% of PHW gave the correct schedule of administering vitamin A as part of

treatment (Table 12). Childhood eye disease manual was used by 4.44% of the PHW while 35.56% would fill eye section in MCH booklets (Table 13).

**Table 12:** Knowledge and practice in management of vitamin A deficiency

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Are you able to identify a child with eye manifestations of vitamin A deficiency? | | |
| Yes | 30 | 66.67 |
| No | 15 | 33.33 |
| Signs/ symptoms (if Yes )* (n=30) | | |
| Poor vision especially at night | 28 | 93.33 |
| Bitot's spot | 8 | 26.67 |
| Corneal scar | 1 | 3.33 |
| Management of vitamin A deficiency* | | |
| Vitamin A | 26 | 57.78 |
| Vitamin A day 1, day 2 & week 4 | 5 | 11.11 |
| Refer immediately to eye clinic for intervention | 4 | 8.89 |
| Don't know | 6 | 13.33 |
| Advice on food rich in Vitamin A | 6 | 13.33 |
| Give multivitamins | 1 | 2.22 |
| Refer to a nutritionist | 1 | 2.22 |
| Participation on nutrition education on Vitamin A supplementation | | |
| No | 14 | 31.11 |
| Yes | 31 | 68.89 |
| Reasons for not participating in nutrition education (n=14) | | |
| No time | 6 | 42.86 |
| No prior experience | 4 | 28.57 |
| Don't have teaching material | 2 | 14.29 |
| Language barrier | 2 | 14.29 |

* Multiple responses allowed

**Table 13:** Use of Kenya childhood eye disease manual/ Kenya MCH booklets

| Variable (n=45) | Frequency | (%) |
|---|---|---|
| Use Kenya childhood eye diseases manual | | |
| Yes | 2 | 4.44 |
| No | 43 | 95.56 |
| Reasons for not using manual (n=43) | | |
| Not available | 30 | 69.77 |
| Not aware of it | 13 | 30.23 |
| Filling of eye section for all children in the new Kenya MCH booklets | | |
| Yes | 16 | 35.56 |
| No | 29 | 64.44 |
| Reasons for Not filling the eye section (n=29) | | |
| Not available | 6 | 20.69 |
| No time to examine the eye | 1 | 3.45 |
| Only for those with eye problems | 5 | 17.24 |
| No prior experience | 11 | 37.93 |
| Not aware | 5 | 17.24 |
| Done in MCH | 1 | 3.45 |

Using five-level likert scale, most respondents believe that childhood ocular disorders could lead to loss of vision except for strabismus which had a positive response of only 8.89% (Table 14).

**Table 14:** Attitude on childhood ocular disorders with regard to loss of vision using five-level likert scale

| Variable n=45 | Do you think the conditions below can lead to loss of vision? | | | | |
|---|---|---|---|---|---|
| | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
| Opththalmia neonatorum | 20 (44.44%) | 18 (40.00%) | 5 (11.11%) | 2 (4.44%) | - |
| Glaucoma | 16 (35.56%) | 7 (15.56%) | 20 (44.44%) | 1 (2.22%) | 1 (2.22%) |
| Strabismus | 1 (2.22%) | 3 (6.67%) | 17 (37.78%) | 13 (28.89%) | 11 (24.44%) |
| Leukocoria | 40 (88.89%) | 3 (6.67%) | 1 (2.22%) | - | 1 (2.22%) |
| Corneal ulcer | 32 (71.11%) | 7 (15.56%) | 6 (13.33%) | - | - |
| Red eyes | 13 (28.89%) | 22 (48.89%) | 5 (11.11%) | 4 (8.89%) | 1 (2.22%) |
| Refractive error | 16 (35.56%) | 11 (24.44%) | 18 (40.00%) | - | - |
| Vitamin A deficiency | 33 (73.33%) | 10 (22.22%) | 1 (2.22%) | - | 1 (2.22%) |

## DISCUSSION

It is a major concern that only one (2.22%) of health workers had post qualification training in primary eye care, which was for a duration of five days. This is a major hindrance in basic understanding of eye disorders for prompt management or referral. Often the eye care training given as part of diploma or certificate qualification is not adequate to deliver quality eye care services [4].

Adequate knowledge and good practice on childhood ocular disorders is very crucial among PHW as it would determine the course of management and outcome. In this study, the level of knowledge varied depending on the area of assessment.

This study showed that even though majority had moderate knowledge regarding signs and risk factors, they exhibited poor knowledge in making accurate diagnosis for ophthalmia neonatorum. Only 23 (51.11%) accurately diagnosed ophthalmia neonatorum and 13 (28.89%) vaguely mentioned eye infection although 66.67% were able to identify both purulent discharge and swollen eyelids. Majority (68.89%) of the health workers mentioned infected birth canal as a risk factor for ophthalmia neonatorum. None mentioned premature rupture of membrane, prolonged labour or contaminated linen.

The practice in treatment was use of eye medication only (40%) while others (37.78%) would clean the eyes followed by eye medication. Only 8.89% of the respondents reported that they would clean the affected eyes then give both eye medication and systemic antibiotics which is generally the recommended approach. A study done in Meru and Kisumu districts in Kenya showed that a higher percentage (95.2%) of health workers correctly diagnosed ophthalmia neonatorum and 100% knew how to treat by using antibiotics eye drops or ointment[5]. There is great need to emphasize that in ophthalmia neonatorum, infection is not only confined to the eyes but may have systemic involvement thus need to add systemic antibiotics to cleaning the eyes and use of eye antibiotics. The most common eye medication mentioned among the health workers was TEO (93.33%).

The general trend in prevention of ophthalmia neonatorum was application of TEO to newborns (48.89%), prompt treatment of infections in antenatal mothers (48.89%) and cleaning eyes soon after birth (42.22%). This means probably over 50% of the health workers interviewed would not apply TEO on newborns. The practice is generally poor compared to a study conducted in Meru and Kisumu which showed that 73% of the respondents would use TEO on newborns and 74% would do antenatal screening for mothers as preventive measures[5].

There was generally poor knowledge on congenital glaucoma. Even though 60% of the respondents were able to identity corneal haziness, only 6 (13.33%) gave the correct diagnosis and 32 (71.11%) did not know if the condition was treatable. Five (11.11%) of the respondents apparently mentioned cataract as the diagnosis which probably indicates poor understanding of ocular anatomy. A study done in Ethiopia showed that glaucoma was barely known among the Health Extension Workers (HEW), only 16% had heard the word glaucoma but none of them knew what it was[9].

Most of the respondents (71.11%) said they would immediately refer a child with glaucoma although only 13.33% knew the diagnosis. The effectiveness of the referrals may be put to test as caregivers are unlikely to be given proper explanation and counselling regarding the disease and its effects on vision. In addition, 28.88% of the PHW would not refer immediately. Only 4 (8.88%) would give eye medication but were unable to specify.

Most (80%) of the health workers correctly diagnosed strabismus. This closely compares to 80.7% found in the study done in Meru and Kisumu[5]. However, only 17 (37.78%) knew that the condition was treatable. In terms of management, 29 (64.44%) would refer immediately and only 8 (17.78%) knew the condition might require surgery. Squint was appropriately managed by 79.6% of the PHW in a study done in Meru and Kisumu[5]. A pilot study in Kilimanjaro region (Tanzania) showed that 38% of the PHW recognized squint as needing referral[8]. It is surprising that one of the respondents chose administration of vitamin A as the preferred treatment.

Most (91.11%) of the respondents were able to identify leukocoria correctly. Among them, 46.67% mentioned white eye reflex while 44.44% identified it as lens opacity. Majority (64.44%) attributed the condition to cataract and only 3% mentioned retinoblastoma. There is poor knowledge of other possible causes of leukocoria especially retinoblastoma which is life threatening. Others mentioned vitamin A deficiency, trachoma, eye infection and glaucoma. Studies done in Mwanga District (Tanzania) [6], Malawi[7] and Kilimanjaro region (Tanzania) [8] showed that 67.3%, 56% and 88% respectively identified cataract in a picture.

Most (95.55%) of the PHW interviewed would refer a child with leukocoria. This is a good attitude amongst the health workers. Out of the 29 respondents who mentioned cataract as a possible diagnosis, 96.55% would refer with a majority (58.62%) of them specifying need for surgery. All those who mentioned retinoblastoma would refer immediately. Other studies in Mwanga (Tanzania)[6] and Kilimanjaro region (Tanzania)[8] showed that 63.2% and 63% respectively, knew that cataract required surgery.

There was generally poor knowledge on corneal ulcer among the health workers. Only six (13.33%) of the respondents gave the correct diagnosis and two (4.44%) identified corneal ulceration in the picture. This is a major concern given that about 35.2% of visual loss in children is due to corneal pathology as shown by a study in Malawi, Uganda and Kenya[10]. Most (77.78%) of the PHW said they would refer immediately. However, it is only 3(6.67%) who would give eye medication then refer. Five (11.11%) respondents would just give eye medication while another 5 (11.11%) did not know what to do. It is

notable that none of those who specified eye medication would give steroids. They all said they will give TEO with one respondent combining it with gentamycin eye drop.

All the respondents were able to identify the red eye. Majority attributed it to trauma (44.44%) and infection (44.44%). Others were allergic conjunctivitis (37.78%) and foreign body (17.78%). Majority, 29 (64.44%), of the PHWs interviewed would give eye medication alone to a child presenting with red eyes. Only 5 (11.11%) would give eye medication then refer to eye clinic comparable to 14.5% found in Meru and Kisumu[5]. The commonest antibiotic mentioned was TEO (46.67%), steroids only (16.67%) and steroids antibiotics combination (13.33%) amongst others. It might be difficult for the PHW to correctly diagnose aetiology of a red eye and thus they are encouraged to give eye antibiotics and refer. Some of the treatment options like steroids may worsen the condition especially if it is due to an infection.

Most of the respondents 38 (84.44%) said they could identify a child with poor vision. However, there was moderate knowledge on identification of the poor vision with 65.79% of them mentioning use of history and direct observation only. When shown a picture of a child wearing spectacles, 36 (80%) of the respondents attributed it to poor vision, 2 (4.44%) mentioned refractive error, 3 (6.67%) myopia, 3 (6.67%) blindness and 2 (2.22%) did not know the diagnosis. This could imply that most of the health workers do not know specific indications for using spectacles as poor vision might not necessarily be due to refractive error. However, the attitude was generally good since 35 (77.78%) of the respondents would refer a child in need of spectacles to eye clinic for evaluation and further management. However, 13 (28.89%) of PHW would not advocate use of spectacles in children. Amongst this group, seven reported that spectacles could lead to worsening of vision.

Childhood blindness or visual impairment associated with vitamin A deficiency is common in low-income countries[2]. Clear understanding of ocular manifestation and management of vitamin A deficiency in these settings need to be enhanced. In this study, 30 (66.67%) of the respondents said they were capable of diagnosing a child with ocular manifestations of vitamin A deficiency. Out of this, 93.33% mentioned poor night vision as the main symptom to aid in diagnosis. There was poor knowledge on ocular signs of vitamin A deficiency. The only ocular signs mentioned were Bitot's spot and corneal scar by just eight and one respondent respectively. These signs are very important especially when dealing with young children who may not complain of poor night vision.

The study showed that 31 (68.89%) of the respondents would give vitamin A to a child with ocular manifestations of vitamin A deficiency. However, only 5 (11.11%) would give it correctly. Most (68.89%) of PHW participate in nutrition education on vitamin A supplementation through health talks. The most common reason for not participating was lack of time. Other challenges were lack of teaching materials, poor experience and language barrier as some of the PHW do not understand the local language.

The Kenya childhood eye disease manual/ Kenya MCH booklets help to guide health workers in managing various childhood disorders including eye diseases. It enables identification of children with specific childhood eye diseases and thus prompt treatment or referral. It is of great concern that only 2 (4.44%) of the respondents use Kenya childhood eye diseases manual. Out of the 43 (95.56%) who do not use, 30 (69.77%) reported that they did not have the manuals while the remaining 13 (30.23%) were not even aware of its existence.

Majority of the respondents (64.44%) do not fill eye section for all children in the new Kenya MCH booklets. It is only 16 (35.56%) who reported that they fill in appropriately. The main reason for not filling was lack of prior experience. It is a great concern that 5 (17.24%) of those who do not fill indicated that they were not aware of existence of that section while 6 (20.69%) did not have the booklets. A study in Meru and Kisumu (Kenya) showed that the section on identification of early eye problems was completed in only 0.8% of 330 booklets sampled[5]. Although this study showed that 16 (35.56%) of the respondents do fill the MCH booklets appropriately, it can only be verified by examining actual MCH booklets of children attending the MCH clinic.

Generally over 50% of the respondents believe that the childhood ocular conditions could lead to visual loss. However, the exception was with squint where 53.33% disagreed at various levels while 37.78% were neutral.

Most (71.11%) respondents would advocate use of spectacles in children. About half (53.85%) of those who would not, believe spectacles would worsen vision leading to blindness. This myth needs to be eliminated as it is likely to deter management of children who have refractive error, considering that uncorrected refractive errors account for 12 million (63.16%) of 19 million children who are visually impaired worldwide[11].

## CONCLUSION AND RECOMMENDATIONS

Participants had generally good knowledge in diagnosis of ophthalmia neonatorum, squint, and red eyes but poor in glaucoma, leukocoria, corneal ulcer, refractive error and ocular signs of vitamin A deficiency. Most PHW were positive that childhood ocular disorders could lead to vision loss except for squint. They also showed good advocacy for use of spectacles in children. The practice was good in squint, glaucoma, refractive error and leukocoria but poor in ophthalmia neonatorum, corneal ulcer, red eyes, vitamin A deficiency and use of guidelines/MCH booklets.

There is need to encourage and facilitate post-qualification training, continuous medical education and regular supervision with regard to PEC among PHW. Enhance sensitization among PHW about the MCH and childhood eye disease manual coupled by routine auditing/sampling of filled MCH booklets and distribution of adequate childhood ocular disorders guideline to all health facilities.

More research is needed to cover other parts of the country so as to give the national picture on the level of knowledge, attitude and practice among PHW on childhood eye disorders.

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# Health care seeking behaviour characteristics of patients presenting with advanced ocular surface squamous neoplasia at Queen Elizabeth Central Hospital in Malawi

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## ABSTRACT

**Introduction:** Ocular Surface Squamous Neoplasia (OSSN) is the most common adult malignant ocular neoplasm in Malawi and its incidence is known to be on the rise in Africa. Reasons for delayed presentation in patients having advanced disease have not been described in Malawi. We did a study to determine health care seeking behaviour characteristics of patients presenting with advanced ocular surface squamous neoplasia at Queen Elizabeth Central Hospital in Blantyre, Malawi.

**Methods:** This was a descriptive cross sectional study in which patients with stage T3-4d disease were recruited into the study. Interviews with patients were conducted and collected data was entered on Epi data and analysed using Microsoft excel.

**Results:** A total of 81 patients were recruited in this study and of these, 53% were females. Mean age was 37.4 (±9.8 SD) years and 65.4% of patients were married. Eighty-nine percent of study patients sought health care at least one month after noticing tumour in the eye. Reasons for presenting later than a month after noticing the tumour included low suspicion of cancer (52.5%) and transport challenges (29.6%). Majority (77%) of patients in the study had no prior knowledge of the disease and lack of awareness on availability of treatment services for ocular surface squamous neoplasia was reported in 83% of all patients. Only 19% of the patients in this study regarded their eye disease as life threatening.

**Conclusion:** Majority of patients made their first contact with health facilities after a month of having noticed the tumour on the eye. Lack of awareness of the disease and availability of its treatment was found in OSSN patients. We recommend programmes aimed at increasing public awareness of the disease and its treatment.

## INTRODUCTION

Ocular Surface Squamous Neoplasia (OSSN) is the commonest adult ocular malignant neoplasm in Malawi and its incidence is known to be on the rise in Africa[1,2]. This disease can progress in weeks to months from a mild disease (T1) to advanced disease (T4)[3]. In African studies on health care seeking behaviour, lack of knowledge of the disease, lack of education, treatment at a lower level health facility, long distance to health facility and transport costs have been reported as common reasons why most patients with different conditions fail to seek help early[4-9]. This was observed in patients with club foot, cervical cancer, malaria and congenital and developmental cataracts[4-9].

Malawi has free public health services system for all patients. The public health care system in Malawi is structured in such a way that there are three levels; primary, secondary and tertiary levels being provided at health centers, district hospitals and central hospitals respectively. The central and district hospitals also provide primary health care services to their immediate target population.

Available literature from Malawi has shown that 23% of OSSN patients presented with advanced disease (T3-4d) at a central hospital[4]. However, factors associated with late presentation of OSSN patients at a central hospital have not been described. We therefore carried out this study to determine health seeking behaviour characteristics of patients presenting with advanced ocular surface squamous neoplasia at a tertiary hospital in Malawi. Specific objectives of the study were:

(i) To determine time taken by OSSN patients to make a first contact with health care system after noting a swelling (tumour) on the eye.

(ii) To determine the proportion of OSSN patients having knowledge of the disease.

(iii) To determine the proportion of OSSN patients who regard their problem as minor.

(iv) To determine the socio-demographic characteristics of patients presenting with advanced OSSN disease.

## MATERIALS AND METHODS

*Study design:* This was a descriptive cross sectional study.

*Setting:* The study took place at Lions Sight First Eye Unit, Queen Elizabeth Central Hospital.This is a major referral centre in the southern region and the main teaching hospital for the College of Medicine, University of Malawi. The hospital is located in Blantyre city and it also serves as a primary and secondary level hospital for Blantyre district.

*Study population*: Stage T3-4d ocular surface squamous neoplasia patients.

*Sampling method:* All ocular surface squamous neoplasm patients with advanced disease seen during the study period April- August 2014 who consented to participating in the study.

*Inclusion criteria:* Clinical diagnosis of ocular surface squamous neoplasia was used. The research enrolled stage T3-4d patients who fulfilled these study criteria:
(i) Patients having the disease that extended into the globe.
(ii) Patients with orbital extension.
(iii) Patients having metastatic pre-auricular or submental lymph nodes.
(iv) Those who had given informed consent.
(v) Those that had enucleation or exenteration in the past 6 months due to the disease.

*Exclusion criteria:* Children with ocular surface squamous neoplasia.

*Data collection and management*: Clinicians working in the hospital were sensitized about this study. Patients fulfilling inclusion criteria were offered information about the study by a study assistant and consent was sought by the same study assistant. The researcher administered the questionnaire only to patients who consented. The questions were in both English and Chichewa and based on patient's preference either one was used. Data collected included demographics, duration of the tumour, prior treatment sought by patients, mode of transport and patients' perception of the disease. This data was entered on EpiData 3.1 data base.

*Data analysis:* Was done using excel and was descriptive. The level of significance was set at 0.05. Nine patients had bilateral involvement. In all these patients, one eye had T1 to T2 lesions and the other eye had advanced tumour (T3 or more advanced stage). The eye with more advanced tumour was therefore used for analysis.

*Ethical considerations:* A research proposal was submitted to the College of Medicine Research and Ethics Committee (COMREC) for review and approval. Permission was sought in writing from the hospital authorities at QECH before conducting the study. Written informed consent was sought from the study participants in their vernacular language (Chichewa). Patient's privacy was upheld by interviewing one patient at a time in a room and study files were only accessed by study team.

## RESULTS

*General demographics:* A total of 81 patients were recruited into the study and 4 did not consent because they were not willing to participate in the study. Nine percent of patients had bilateral OSSN disease. The ages of patients ranged from 17 to 64 years. Over 60% of the patients recruited in the study were aged between 30 and 50 years. The mean age of study participants was 37.4 years (±9.8 SD). Of the recruited patients, 74% were HIV positive, 13.5% were HIV negative and HIV status of the remaining 12.5% was unknown.

**Table 1:** Demographic characteristics of patients in the study (n=81) Parameter

| Frequency | No. | (%) |
|---|---|---|
| Sex | | |
| Male | 38 | 47.0 |
| Female | 43 | 53.0 |
| Age (years) | | |
| <20 | 2 | 2.5 |
| 20-29 | 13 | 16 |
| 30-39 | 35 | 43.2 |
| 40-49 | 19 | 23.5 |
| 50-59 | 10 | 12.3 |
| 60-69 | 2 | 2.5 |
| Marital status | | |
| Married | 53 | 65.4 |
| Single | 9 | 11.1 |
| Divorced | 13 | 16.1 |
| Widow/widower | 6 | 7.4 |
| Ethnicity | | |
| Lhomwe | 28 | 34.6 |
| Yao | 13 | 16.0 |
| Chewa | 11 | 13.6 |
| Ngoni | 11 | 13.6 |
| Sena | 8 | 9.9 |
| Others | 10 | 12.3 |
| Education (Formal) | | |
| Primary | 43 | 53.1 |
| Secondary | 27 | 33.3 |
| Tertiary | 3 | 3.7 |
| No education | 8 | 9.9 |

*Duration of symptoms and presentation at health facility:* Only 15 patients (18.5%) in this study had history of tumour of less than 5 months duration. Eighty-nine percent of the patients made their first consultation with health system one month or more after noticing a tumour in their eye.

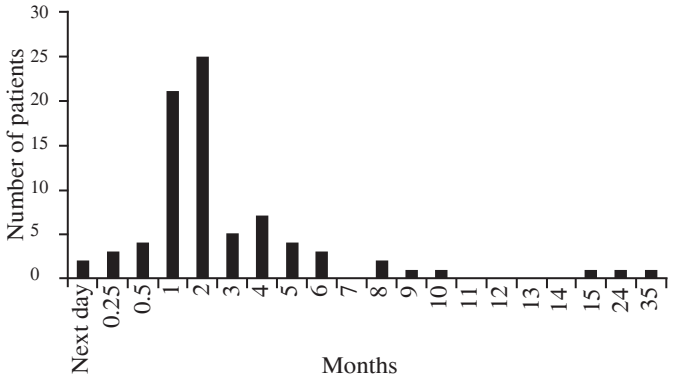


**Figure 1:** Time taken by patients to present with OSSN at any health facility for the first time (n=81)

In regard to the tumour, 89% of the study patients sought health care at least one month after noticing tumour in the eye. Major reasons given by patients for this finding included: low suspicion of cancer (52.5%) and lack of transport (14%). Other minor reasons included: fear of surgery, consulting religious leaders, superstitious beliefs and trying other treatment options.

*Patients' knowledge of ocular surface neoplasia, treatment and perception of the disease:* More patients (77%) had no prior knowledge of OSSN diseases and 83% were not aware of availability of treatment of OSSN. Of the patients in the study, 54% regarded their problem (OSSN) as a minor problem. About a third of the patients regarded their problem as worrisome and only 19% of patients in the study thought their condition was life threatening.

*Heath seeking pattern of OSSN patients:* Self-treatment with over the counter eye drugs was reported in 32 patients (39.5%) and 20 patients treated themselves for a period of more than a month. Traditional healers were consulted by 24 (29.6%) patients. Some study participants had earlier on received treatment at different levels of the health system. Half of the patients in the study sought treatment at health centres and also half of all the patients in the study were seen at the district hospitals.

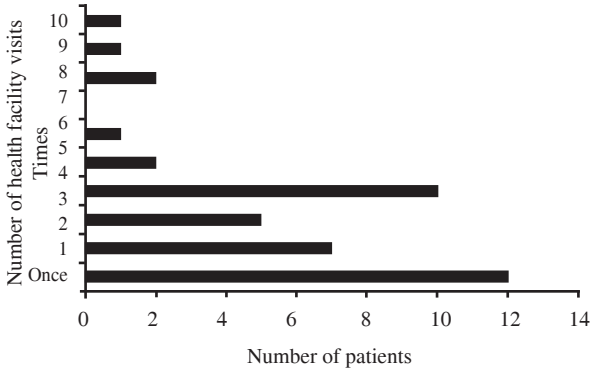


**Figure 2:** Frequency of patients' consultation with health centre (n=41)

Amongst those that consulted the health centre, 70.7% visited the health centre facility more than once. The main reasons for not consulting health centres amongst those that did not consult a health centre included: lack of confidence in the facility (53%) and proximity to higher level facility (40%).

*Referral system*: In this study, 64.2% of patients were referred by health providers from district hospitals while the other 35.8% of patients presented at the eye hospital on their own without being referred by health providers. Approximately two-thirds (65.3%) of all referred patients reached QECH within one week of being referred at a district hospital. Most of the patients (71.6%) in this study made personal arrangements for their transport. The remaining patients benefited from government's provision.

## DISCUSSION

This study shows the health seeking behaviour and barriers to health care among patients presenting with advanced ocular surface squamous neoplasia at a tertiary eye hospital in Malawi, Africa. This study reports poor knowledge of OSSN among OSSN patients, delayed presentation in seeking health care and multiple patient consultations with lower level health facilities before being referred to higher level health facilities.

Occurrence of OSSN in the age range of 30 to 50 years is consistent with prior reports[1,10]. In Malawi, the high occurrence of advanced ocular surface squamous neoplasia in this age range reflects the high prevalence of HIV infection in the same age range as reported by Malawi demographic survey[11]. HIV infection is a known risk factor for development of malignant squamous neoplasia. It is therefore not surprising to see the high numbers of advanced OSSN in this age group.

In this study, there were more females (53%) than males although the difference was found to be statistically insignificant. Other studies in OSSN done in Malawi and Tanzania have also reported findings similar to the ones reported in this study[1,12]. Female gender has been linked to low utilization of health services in a number of studies[4,5]. Some of the reasons that prevent women from accessing health care include lack of control over household finances and African communities regard women as less important in the society[5]. This finding may also be due to high HIV prevalence in women[11].

Failure to recognise a disease and its symptoms was reported to be one of the reasons why patients delayed in presenting at health facilities in Tanzania and Malawi in childhood cataracts and clubfoot diseases respectively[5,9], and this study reports low levels of knowledge on OSSN and availability of its treatment in OSSN patients. Furthermore, half of the study participants regarded their condition as a minor problem. Low suspicion of tumour

could have been due to lack of knowledge of the disease and this may have influenced the pattern of health care seeking behaviour reported in this study.

According to a study in Tanzania by Al-Attas *et al*[13], two thirds of patients with ocular trauma presented at a health facility within 24 hours of occurrence of the trauma. It was however noted that poor decision making by health workers at these facilities resulted in patients delay from presenting at specialist facility. Kalua *et al*[14] reported low competency levels in primary eye care providers in Malawi. These findings raise concern about the health sector's ability to detect the disease and institute right management.

Lack of transport and long distance were found to be barriers for patients in accessing health care services. This finding is consistent with existing literature on barriers to health care services. Distance is known to be a barrier to accessing medical care and was reported as one of the reasons why patients delayed in presenting at health facilities in Tanzania as shown by Mwende *et al*[5].

Referral process from a low level health facility to a higher level facility has been reported as a barrier to health care access[5]. This study however reports a different picture as over 60% of the referred patients got to a tertiary eye hospital within one week. Some of these patients used the government established ambulance system but others used personal resources. It is likely some patients were motivated to use their personal money for transport to seek specialist care as a result of good understanding of the disease.

Other factors associated with poor health care seeking behaviour include self-treatment, off channel treatment (informal health care providers) and belief in traditional medicine. These were also reported in some studies on African continent[5,8]. This study found that 39.5% of all patients in the study treated themselves at some point during their illness. One third of all patients in the study consulted traditional healers. These two factors are associated with poor health care seeking behaviour although they are difficult to assess because patients know that self-treatment and use of traditional medicine is not encouraged by medical practitioners.

Limitations of this study included use of clinical diagnosis and recall bias. The study did not collect and analyse histological results of recruited patients. Recall bias or poor recall was most likely encountered since almost all information collected was based on what could be remembered by the patient. Future studies on the knowledge and practise of primary and secondary health care workers in regard to OSSN is recommended in order to further understand pre-referral management of OSSN. Increasing public awareness about the disease is also recommended[15].

## CONCLUSION

Majority of patients made their first contact with health facilities after a month of having noticed the tumour on the eye. Reasons for delayed hospital presentation included low suspicion of cancer and logistical challenges in accessing health facilities. Most patients did not have any prior knowledge of OSSN disease and were not aware of availability of OSSN treatment.

## ACKNOWLEDGEMENTS

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# Prevalence and causes of blindness and severe visual impairment (BL/SVI) among children in Ntungamo district, Southwestern Uganda: A key informant cross-sectional population survey

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## ABSTRACT

**Objective:** To estimate the prevalence and causes of blindness and severe visual impairment among children in Ntungamo district South-western, Uganda.

**Methods:** This was a cross sectional community survey using the key informant method; approximately 200 village health team members were carefully selected and trained to screen for severe visual impairment using a torch, 6 meter string and a 6/60 E chart. They did house to house screening for severe visual impairment and blindness among children below 16 years in the whole district. Identified children were referred to a rendezvous point within the community to be examined further by the ophthalmologist. Data was collected using the standardized WHO childhood blindness data collection form. Proportions and causes of severe visual impairment and blindness were determined. Clinical and social characteristics were described.

**Results:** A total of 59 children were identified, 15 with severe visual impairment and 44 with blindness. Mean age was 6.5 years (95% CI 5.3-7.4) and 59% of the children were male. The prevalence of blindness and severe visual impairment was 0.02% (95% CI 0.01-0.03). Causes were analysed by anatomical site, aetiology and specific diagnosis. Majority of the anatomical causes were due to cornea (18%) and lens (17%) abnormalities. With respect to specific diagnosis, 30% was cataract and cataract surgery complications and corneal scar. Overall, 72% of the blindness and severe visual impairment was due to avoidable causes.

**Conclusion**: Prevalence of severe visual impairment and blindness was relatively low in this population. Lens and corneal abnormalities were the leading cause of blindness. Most of the cases of visual impairment and blindness were avoidable.

## INTRODUCTION

It is estimated that there are about 1.4 million blind children in the world and that about one child goes blind every minute[1]. Three-quarters of the world's blind children live in the poorest regions of Africa and Asia[2,3]. Although there are fewer blind children than adults, the number of years lived with blindness is much higher for children. More than half of blindness in children is avoidable (either preventable or treatable); majority of the children who become blind have a lifetime of visual disability ahead of them with all the associated emotional, developmental impact onto the child's life. The World Health Organization's VISION 2020 initiative, "The Right to Sight" recognises this; urgency and control of blindness in children is one of the five priorities of its VISION 2020 programme[2,4].

The causes of Blindness/Severe Visual Impairment (BL/SVI) in children worldwide are variable and differ between and within countries depending on access to and availability of health facilities[3]. Therefore, in order to reduce BL/SVI in children, it is important for different settings to determine the magnitude of the problem and specific aetiologies that lead to childhood BL/SVI. This is important for appropriate planning and efficient allocation of resources for prevention and treatment of childhood blindness.

Population based surveys are ideal methods of estimating the prevalence of childhood blindness. However, blindness in children is relatively rare and carrying out population studies requires a large sample size which is logistically and economically costly. For instance in one study conducted in India and over 4000 children were examined but only seven children were identified with blindness[5]. Other methods used from available data on the prevalence of BL/SVI in children are from studies carried out in schools for the blind, community based rehabilitation programs, hospital-based studies, and registers of the blind children. Although these targeted findings on childhood blindness are convenient, they have the potential of bias and findings may not be representative of the general population. In the recent years Key Informant Method (KIM) has been used in estimating the magnitude of childhood blindness in the population and has been found very successful in Bangladesh, Malawi, Ethiopia and other parts of Africa[6-8]. This method involves the use of trained community volunteers known as Key Informants (KI) to actively search for blind children in the community of an estimated population of children. KI test Visual Acuities (VA) of

suspected blind children by use of counting fingers at 6 metres. Those children who fail the test are brought forward to be examined by specialized eye workers. A number of studies have demonstrated that KI can recruit a large number of children quickly and the children identified are more representative of all children from the community and this method is feasible in African settings[6-9].

Uganda is one of the least developed countries in Eastern Africa with limited access to ophthalmic care. Population based data on the prevalence and causes of childhood blindness is limited, the purpose of this research was to find out the magnitude and causes of childhood blindness and visual impairment using a Key Informant Method (KIM) in rural South Western Uganda to address this knowledge gap.

## MATERIALS AND METHODS

*Study design overview*: In a community based cross sectional study, Key Informants (KI) were trained; and, used to identify children who are blind, or with SVI, from the population of children in Ntungamo district; through house to house search. The identified children were then examined by a clinical team at selected cluster centres. Diagnosis of visual problems among children brought forward by KI was confirmed during clinical examination. Comprehensive data was collected using the WHO childhood blindness collection tool.

*Study area:* The study was conducted in Ntungamo district. Ntungamo district is the most central and fairly representative of the south-western region. The district has a total of 489,320 people of which, 50% are children below 16 years of age[10].

*Study population*: All children below 16 years of age residing in Ntungamo district at the time of the study.

*Sample size*: The study assumed a prevalence of 0.8/1000 which is middle of the range of estimates for Africa[8], a precision of 20% and a confidence of 95%; the required sample size was found to be 8000 children; It was assumed that since the KI would be doing house to house screening, all the children in Ntungamo district at the time of the survey would be screened.

*Case definition*: Children aged ≤ 15 years presenting VA of less than 6/60 in better eye residing in Ntungamo district for at least the last six months.

*Inclusion criteria*: Children were eligible to participate if they fulfilled the following criteria;

(i) They were aged 15 years or below at the time of the study
(ii) They had vision less than 6/60 in the better eye
(iii) Their families had been living in Ntungamo for the last 6 months
(iv) Their parents willingly consented to participate in the study.

*Exclusion criteria*: Children were excluded if;

(i) Their age could not be ascertained at the time of the study.
(ii) They were unaccompanied with no one to consent on their behalf

*Key Informant (KI) identification and selection*: The KI were village volunteers. They were identified and selected from their respective villages with the help of the office of the District Health Officer, Ntungamo district. They were taught how to measure VA of any suspected child less than 16 years by reading the E chart at 6 metres and given an examination kit to start identifying blind children in their respective areas in a house to house search.

All children age ≤15 years who were not able to read the 6/60 E chart were registered and referred to an assessment centre for eye examination. Young children who could not read but identified or suspected by their parents to be blind were also recorded and referred for eye examination. Their vision was not tested at this point but was later tested with formal optotypes for preverbal children by a low vision orthoptist.

On agreed dates, KI with the identified children assembled at cluster assessment centres for eye examination. Presenting distance VA was measured in each eye separately and then in both eyes together using E optotype at 6 metres[11]. Children who came wearing spectacles were tested for the distance vision when wearing glasses. For children not able to be tested using the optotypes for various reasons, Cardiff acuity cards were used, employing the standard staircase method[12]. Other tests like ability to fixate and following of light were also used to reach a judgment whether the child was sighted or not.

Data was collected using the WHO/PBL questionnaire for childhood blindness survey. Socio-demographic data and relevant ophthalmic, medical, obstetric and family histories was elicited by the ophthalmologist. Ocular surface examination was assessed using a torch and magnifying loupe. Cycloplegic refraction was performed using retinoscopy and trial lenses, except when it was considered clinically inappropriate for example in dense cataract or very young children. The posterior segment of the eye was examined using indirect ophthalmoscopy. Children identified who needed treatment were treated on site. However, those who needed further assessment and treatment were referred to a specialised eye hospital.

*Data entry and analysis*: Data was directly entered into the designed database of the WHO childhood blindness software for analysis of eye examination records, cleaned in excel spread sheet and simple tabulation descriptive analysis done using STATA 11.

*Ethical consideration*: Ethical approval was sought from Mbarara University of Science and Technology Institutional Review Committee, and Uganda National Council of Science and Technology No 09/11-14. The district health officer and the chief administrative officer

of Ntungamo district gave permission to carry out the study. Parents of the referred children were provided with information about the study in the local language. Those who accepted to participate in the study were requested to sign or thumb print a consent form.

*Limitations of the study*: Although an effort was made to try and make an exact diagnosis of the possible cause of BL/SVI, this was entirely clinical; the study had no resources to conduct further investigations. The study lacked intra ocular pressure measuring equipment, therefore, congenital glaucoma was only clinically screened. However, none of the examined children had clinically overt features of congenital glaucoma.

## RESULTS

*General demographics*: The baseline characteristics of the study participants are summarised in Table 1. The total number of children who were screened and referred to the rendezvous points by the Key Informants (KI) were 250 children. Of those, only 59 children were confirmed to be severely visually impaired or blind. Mean age was 6.5 years (95% CI 5.3-7.8 years range of 6 months -15 years. Majority of the children were male (59%). Majority of the children were classified as having visual acuity of perception of light and below in the better eye. However, 49 (83%) had some degree of functionality and were able to navigate on their own. About 64% of the school age going children (more than 6 years old) were not attending school. Almost 20% of the children had received cataract surgery.

**Table 1:** Baseline characteristics among SVI/BL children in Ntungamo district (n=59)

| Baseline characteristic | No. (%) |
|---|---|
| Visual acuity | |
| 6/60-3/60 | 15 (25) |
| 3/60-PL | 40 (68) |
| NPL | 4 (7) |
| Visual acuity functionality | |
| Yes | 49 (83) |
| No | 10 (17) |
| Education (*N=33 only children 6 years and above) | |
| In special schools | 1 (3) |
| In integrated schools | 11 (33) |
| Not in school | 21 (64) |
| History of surgery | |
| None | 47 (80) |
| Cataract | 11 (19) |
| Unknown | 1 (1) |

*Prevalence of Severe Visual Impairment or Blindness (SVI/BL)*: Table 2 shows a summary of the prevalence of SVI/BL by county and by sex. Out of an estimated population of 244,660 children below 16 years in Ntungamo district, 59 children were confirmed to be SVI/BL. This gave an estimated prevalence of 0.02 (95% CI 0.01-0.03). The prevalence of SVI/BL was noted to be highest in Ntungamo municipality. Overall by sex, the prevalence of SVI/BL was found to be higher among males compared to females.

**Table 2:** Prevalence of SVI/BL among children in Ntungamo district (n=59)

| County | Estimated population under 16 years | Number of SVI/BL | Prevalence (%) | 95% CI |
|---|---|---|---|---|
| Kajara | 55,348 | 17 | 0.03 | 0.02-0.05 |
| Ruhama | 116,072 | 18 | 0.02 | 0.01-0.03 |
| Rushenyi | 63,813 | 13 | 0.02 | 0.01-0.03 |
| Ntungamo municipality (MC) | 9,427 | 11 | 0.1 | 0.05-0.2 |
| Total | 244,660 | 59 | 0.02 | 0.01-0.03 |
| Prevalence by sex and by county | | | | |
| Kajara (male) | 25,872 | 10 | 0.03 | 0.02-0.07 |
| Kajara (female) | 29,476 | 7 | 0.02 | 0.01-0.04 |
| Ruhama (male) | 55,281 | 9 | 0.02 | 0.01-0.03 |
| Ruhama (female) | 60,791 | 9 | 0.02 | 0.01-0.06 |
| Rushenyi (male) | 31,111 | 9 | 0.02 | 0.01-0.05 |
| Rushenyi (female) | 32,702 | 4 | 0.01 | 0.005-0.03 |
| Ntungamo MC (male) | 4,857 | 7 | 0.1 | 0.05-0.2 |
| Ntungamo MC (female) | 4,570 | 4 | 0.08 | 0.05-0.2 |
| Total males | 117,122 | 35 | 0.03 | 0.02-0.04 |
| Total females | 127,538 | 24 | 0.015 | 0.01-0.02 |

*Causes of SVI/BL*: Table 3, summarises the history and causes of SVI/BL among children in Ntungamo. Overall, 75% of the children had SVI/BL since birth. About 20% had a positive family history of blindness. Of those with a positive family history, 91% were in first degree relatives; majority being cataract. Among the children with SVI/BL, 53% had an associated disability; they were noted to have hearing impairment, mental difficulties, delayed milestones and other physical disabilities. Individual eye analysis was used to determine the causes of SBI/BL. Anatomical classification of causes: cornea (18%) and lens (17%) were the leading causes of SVI/BL. By aetiological classification of causes, majority (41%) of the causes were noted to be intrauterine. By actual diagnosis, cataract and post cataract (17%) and corneal scar (13%) were the leading causes of SVI/BL. About 60% of those identified causes were potentially avoidable.

**Table 3:** History and causes of SVI/BL among children in Ntungamo district (n=59)

| History/Cause | No. (%) |
|---|---|
| Age of onset | |
| At birth | 44 (75) |
| By infancy | 10 (17) |
| By five years | 5 (8) |
| Family history of SVI/BL | |
| Yes | 11 (19) |
| No | 48 (81) |
| Affected relative (n=11) | |
| First degree | 10 (91) |
| Second degree | 1 (9) |
| Presence of a co-disability | |
| Yes | 31 (53) |
| No | 28 (47) |
| Anatomical ocular abnormality (n=118 eyes) | |
| Whole globe | 17 (14) |
| Cornea | 21 (18) |
| Lens | 20 (17) |
| Retina | 8 (7) |
| Optic nerve | 13 (11) |
| Normal globe | 39 (33) |
| Aetiological classification (n=118 eyes) | |
| Intrauterine | 48 (41) |
| Hereditary | 8 (7) |
| Neonatal/Perinatal | 10 (8) |
| Postnatal | 18 (15) |
| Undetermined | 34 (29) |
| Potentially avoidable causes (n=118 eyes) | |
| Yes | 71 (60) |
| No | 47 (40) |
| Final diagnosis (n=118 eyes) | |
| Achromatopsia | 4 (4) |
| Albinism | 2 (2) |
| Others | 5 (4) |
| Post cataract | 8 (7) |
| Cataract | 12 (10) |
| Corneal scar | 15 (13) |
| Cortical blindness | 16 (14) |
| Disc atrophy/coloboma | 14 (12) |
| Refractive error | 14 (12) |
| Keratoconus | 6 (5) |
| Microphthalmos | 14 (12) |
| Nystagmus | 8 (7) |

Table 4 summarises management and visual prognosis among children with SVI/BL. Majority (76%) of the eyes were classified as blind on presentation; after refraction or low vision device, vision could be improved in 19% of the eyes, with 7% achieving vision better than 6/18. Overall visual prognosis: vision would be improved in 72% of the children with SVI/BL. Among those, 23 (39%) of the children with SVI/BL needed some form of optical correction and 19% (32%) needed surgery.

**Table 4:** Management and visual prognosis of children with SVI/BL in Ntungamo district

| Management indicator | No. (%) |
|---|---|
| Baseline unaided visual acuity (n=118) | |
| 6/60-3/60 | 28 (24) |
| 3/60-PL | 76 (64) |
| NPL | 14 (12) |
| Visual acuity after refraction or with low vision device (n=118) | |
| Better than 6/18 | 8 (7) |
| 6/18-6/60 | 14 (12) |
| 6/60-3/60 | 6 (5) |
| Worse than 3/60 | 90 (76) |
| Visual prognosis (n=59) | |
| Can improve | 42 (72) |
| Stable | 17 (28) |
| Management decision (n=59) | |
| Optical correction | 23 (39) |
| Medical | 5 (8) |
| Surgical | 19 (32) |
| None | 12 (21) |

## DISCUSSION

*Prevalence of SVI/BL*: It is estimated that of the 45 million people who are blind worldwide in 2000, 1.4 million are children from middle-income and low-income countries, the majority of whom live in the poorest regions of Africa and Asia[13,14]. Although the prevalence of childhood SVI/BL is generally low, its significance is in the fact that children who are blind have a whole life time of disability ahead of them. This is much different from other blinding conditions like age related cataract where the life expectancy of blindness is about 5 years. In this population, the overall prevalence of SVI/BL was found to be generally lower (0.02% 95% CI 0.01-0.03) compared to a similar study in the Eastern part of Uganda which found a prevalence of 0.07 (95% 0.05-0.09)[9]; prevalence was also lower than what is estimated for sub Saharan Africa of 0.08; and, from a number of selected KI studies [Ethiopia: 0.06%, Malawi: 0.09% and Ghana: 0.07%)][8,9]. In comparison with a proxy estimate of childhood blindness using the under 5 child mortality rate; the under-five mortality rate for Ntungamo is estimated to be 135/1000 live births; this gives a childhood blindness prevalence of 0.07%, which is much higher than what we found[15]. However, the under-five mortality estimate is less accurate than an actual survey. Ntungamo has been one of those areas that have benefited a lot from the various outreaches for eye health screening and treatment; over the last five years, Mbarara University Department of Ophthalmology and Ruharo Eye Centre have conducted a number of outreaches in these areas. Perhaps, the lower level of SVI/BL in this area reflects the successes of these programs.

By looking at prevalence across the different counties; it was more or less the same. However, prevalence of SVI/BL was much higher in Ntungamo municipality compared to the other counties. There was the implied sex difference in prevalence of SVI/BL: it was almost twice as much in males than it was in females. Again, this was not statistically significant. In this population, there were more males than females (59%) compared to a similar study in Eastern Uganda which had more females than males (51%)[9]. A number of studies have noted a gender inequality for prevalence of a number of blinding conditions such as trachoma, cataract, congenital cataract and glaucoma, where, females are more affected than males[16]. Causes of SVI/BL were classified by anatomical site, by time of onset (aetiological classification) and by whether they were avoidable or non-avoidable. Anatomically, the leading causes of SVI/BL were cornea (18%) and lens (17%). This was in agreement with a number of studies done in Uganda and Africa[7,9,17-22]. Of the lens pathologies noted, cataract accounted for 60% making it the leading cause of SVI/BL. In one of the examination sites, we met a family of three siblings whose father was also diagnosed with cataract. He had refused to take them to hospital for fear of them losing even the little navigation that they had after surgery. These fears in the community may not be completely baseless as the second most common lens pathology noted was post cataract surgery complications. Paediatric cataract is not as straight forward as adult cataract; a lot still needs to be done even after the operation including, amblyopia therapy, refraction and use of pseudophakic correction. Even when all is done, outcome is not predictable; most post cataract studies particularly in Africa have reported poor outcomes[23,24]. We met a 2 year old who had undergone cataract operation in both eyes; she had received pseudophakic spectacles; however, she could not use them because they were too big and heavy. These and many other barriers to paediatric cataract services still make this problem prevalent. Now in Uganda, paediatric teams have been established including a paediatric ophthalmologist, a paediatric anaesthetist and a paediatric low vision expert. The impact of these teams is yet to be felt, in future, a study to assess this may provide valuable additional information about this situation.

The other most common anatomical cause of SVI/BL was corneal pathologies. Of these, 71% was due to corneal scar mostly following trauma, probable history

of vitamin A deficiency and dangerous practises such as traditional eye medicine. This is still a prevalent problem in this community; traditional eye medicine has been shown to be linked to corneal blindness[25-27]. The second leading corneal pathology entity was keratoconus. This was mostly seen in young adolescents with a long standing history of allergy. Treatment for keratoconus is usually optical correction such as spectacles and contact lenses if vision can be improved with refraction, however, there may be need for surgery including corneal transplant surgery in very advanced cases such as the ones seen in this survey. Uganda does not have a regular corneal service.

Classification according to onset or aetiological causes; majority of the causes were noted to be intra uterine causes. Majority (75%) of the children were said to have been born with SVI/BL conditions. In this group, cataract was the leading cause of intrauterine conditions, and corneal blindness was the leading cause of postnatal conditions. Further classification done to indicate specific diagnosis showed cataract and post cataract (17%), cortical blindness (14%), corneal scar (13%), refractive error (12%) and microphthalmos (12%) to be the leading conditions. Most of the cortical blindness was attributed to a history of cerebral malaria and or a high grade febrile episode with convulsions (probably meningitis) in these children who had otherwise been reported to having good vision prior. Uganda is still one of the countries classified to be a hyper endemic malaria area; malaria is the leading cause of less than 5 year child mortality. It would be interesting to have a properly designed study to understand the effect of malaria and meningitis on vision in our settings. A number of children had microphthalmos, some with both microphthalmos and cataract. Although the study was limited in investigating this, the most plausible cause could be a probable congenital rubella syndrome. Uganda has no rubella vaccination program for women of child bearing age. A number of children were seen with high refractive errors, mostly high myopia. When asked why their children were not using spectacles, most parents reported cost as a barrier. Refractive services are still scanty in rural Uganda; the ministry of health with other partners have started a program to provide low cost spectacles particularly in children in Uganda.

By classification according to whether causes were avoidable, 72% of the causes of BL/SVI were avoidable. Other studies have reported similar results and the current findings are comparable to other key informant method in Africa, an average of 50-70%[9,28,29]. This goes on to show that majority of the blinding conditions are potentially avoidable either by prevention or treatment. In the management of the children identified with SVI/BL, 39% needed optical correction, this included spectacles and low vision devices. With correction, vision improved in at least 19% of the eyes to better than 6/60. About 32% of the children with SVI/BL needed surgery due to mostly cataracts. It was encouraging to note that there was a chance vision could be improved in about 72% of the cases.

Similar to the study in Eastern Uganda, our study found that only a small number of children with SVI/BL (36%) were attending school. The barriers to this were not investigated, however, Uganda now offers free universal primary education; therefore, the barriers could largely be dependent on disability rather than cost.

## CONCLUSION AND RECOMMENDATION

The prevalence of SVI/BL seemed lower than suggested in previous studies. As it appears from the current and previous studies in Uganda, the leading cause of BL/SVI is likely to be from un-operated cataract and complication from cataract surgery. This needs to be addressed to all stake holders and logical steps taken to prevent BL/SVI from lens related pathologies. Also, there is still an unmet psychosocial support for the affected children particularly educational support. Planners there should focus on community-based approaches to ensure that blind children have appropriate rehabilitation services and educational placement. Planning will need to consider improving referral, surgical management and follow-up of children treated for eye conditions and scaling provision optical services and access of spectacles and visual aids.

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# Knowledge, attitude and practice on refractive error among students attending public high schools in Nairobi County

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## ABSTRACT

**Objective:** To determine the Knowledge, Attitude and Practice (KAP) towards refractive error among high school students attending public schools in Nairobi, Kenya.

**Methods:** Population survey of secondary school year 3 students in Nairobi County. Students were selected using multistage random sampling. Sampled students were enrolled after obtaining informed consent. Participating students completed a self-administered semi structured questionnaire to obtain basic demographic data and determine their KAP towards refractive error.

**Results:** A total of 11 out of 80 eligible schools were selected and 1390 students enrolled into the study. The mean age of the students was 17 years, and 54% were males. Only 539 (39%) of the 1390 students had ever had an eye-checkup. Overall 418 (30.1%) of the students did not know whether they had normal vision or not, and 316 (22.7%) did not know where to seek eye-health services. The students believed, as reported by 526 (37.8%) students, that the most common reason for poor vision was inadequate nutrition. Spectacles were identified as the commonest method of correcting poor vision by 851 (61.2%) students. Of 427(30.7%) students who had been advised to wear spectacles during previous screenings, only 148 (10.5%) of them admitted to using spectacles, The commonest reasons for students failing to wear spectacles to correct poor vision were; fear of being teased and cost as reported by 529 (38.1%) and 488 (35.1%) students respectively. Generally, students had a positive attitude towards spectacles but the myths that spectacles can damage your eyes, lead to dependence, or worsen eyesight were still prevalent.

**Conclusion:** Accessibility and affordability of eye-health services are the major reasons for non-correction of low vision. There is also inadequate knowledge of refractive error as a cause of poor vision. However, attitudes towards spectacle use are generally positive.

**Key words:** Knowledge, Attitude, Practice, Refractive error

## INTRODUCTION

Globally, uncorrected refractive errors are the main cause of moderate to severe visual impairment. Worldwide uncorrected refractive error has been estimated to account for more than half of the cause of visual impairment and 18.2% of blindness[1]. Refractive error is easy to diagnose and correct using spectacles. Nevertheless, it is estimated that 77.3% of children in urban Kenya who have significant refractive error are uncorrected. In Nairobi, Kenya, uncorrected refractive error is also the main cause of visual impairment among teenagers[2].

The study population were senior high school students in Nairobi County, one year from matriculation. They are at the point of transition into adult life and independence. They have also completed the full cycle of organised schooling and assessing their knowledge, attitude and practice at this point may explain the low rates of correction found in earlier local studies.

Lack of knowledge, stigma and erroneous beliefs towards refractive errors has been shown to play a major role in uptake of refractive services in different continents.[3-6]. However in Kenya, the knowledge, attitude and practice towards refractive error is not known. The factors that hinder eye health seeking behavior are also not known. Uncorrected refractive error has the huge potential of hindering school performance which may subsequently impact on the psychological and socioeconomic activities in later life[7].

We chose this age group because youths are a relatively captive audience who can be targeted for important health services through school based programs which have been shown to be effective[8]. Screening for refractive errors and eye health education would be such a program.

This study sought to determine the Knowledge, Attitude and Practice (KAP) regarding refractive error among senior high school students schooling in Nairobi County. This information may in future be used to develop school based programs to address refractive error.

## MATERIALS AND METHODS

In October 2014, we conducted a KAP survey among high school students enrolled in public schools in Nairobi County. A cross-sectional survey, form 3 high school students were proportionately sampled following a multi-stage random selection of the schools that took into account

the classification of the schools into National, County or District schools, and whether it was a day or a boarding secondary school. The schools were further stratified into boys schools, girls schools and mixed schools. The number of students sampled was based on the proportion of students in National, County and District schools in the study area as extracted from the Ministry of Education enrolment statistics[9].

Ethical approval was obtained from University of Nairobi - Kenyatta National Hospital Research and Ethics Committee and from the Ministry of Education. Additional permission from individual school head teachers was obtained. Participating students gave individual assent after explanations on the goals of the study. The required minimum sample size was 1,297 students. This was derived from an estimated prevalence of 11% from an earlier study in the same area but different age group to achieve an accuracy of ±0.02 in the measured prevalence. An additional 25% was factored into account for absenteeism and non-response.

Each participant completed a self-administered questionnaire to obtain demographic data and determine their Knowledge, Attitude and Practice (KAP) towards refractive error. Knowledge on the student's current status of vision, knowledge on causes of poor vision and accessibility of eye healthcare facilities was asked. Attitudes towards spectacle use were scored on a Likert scale (1=strongly disagree, 2 = disagree, 3=neutral, 4= agree and 5= strongly agree). These questions were modelled from earlier studies done in the same population[2]. Poor vision was our entry point into asking about refractive error as inability to see (poor vision) was the symptom that students were most familiar with. The data was analysed using SPSS 20.0. The median Likert scale was computed and used to identify the majority opinion to questions regarding correction of refractive error using spectacles.

## RESULTS

*Demographic data:* A total of 1,622 students were eligible for the study of whom 1,390 participated giving a response rate of 85.7% while 131 students were absent and 101 students declined. The mean age of the students was 17 years (Standard deviation= ± 1.04, range 14-23 years). In this study population there were more males (54%) compared to females (46%) and this was statistically significant ($p<0.01$). However the proportion of students who did not respond in regard to fathers education was higher at 287(20.6%) compared to the mother's education at 225(16.2%).

### Knowledge regarding refractive error and barriers to spectacle use

Table 1 summarises the knowledge and practice of participants towards spectacle use and correction. The questions were grouped as follows;

*Knowledge of current visual acuity:* To test universality of healthcare reach students, were asked whether they ever had an eye checkup. Only 539 (39%) of students had been examined prior to this study. When the students were asked what they felt about their vision, only (35.3%) felt they had normal vision.

*Knowledge on causes and remedies of poor vision:* In response to the question on what were the causes of poor vision among students, 526 (37.8%) cited poor nutrition, 429 (30.9%) shortsightedness, 178 (12.8%) long-sightedness, and 111 (7.9%) astigmatism. However, most students (61.2 %) knew of spectacles as a method of correcting poor vision.

*Accessibility of eye healthcare services:* Overall 880 (63.3%) students knew where to access eye care and the most frequently identified facility was the eye hospital by 515 (37%) students. The 539 students who indicated that they had ever had an eye check-up were asked where they had sought care, most, 345/463(64%), responded they had received their check up from an eye specialist/eye hospital.

**Table 1:** Knowledge, Attitude and Practice of refractive error in secondary school students in Nairobi County

| | Total population (n=1390) |
|---|---|
| Knowledge of current visual acuity | |
| Have you ever had an eye check up | |
| Yes | 539(39%) |
| No | 829(60%) |
| No response | 22(1%) |
| Do you feel you have normal vision | |
| I don't know | 418(30.1%) |
| I don't have normal vision | 458(32.9%) |
| Yes I have normal vision | 491(35.3%) |
| No response | 23(1.7%) |
| Knowledge on causes and remedies of poor vision | |
| What are the causes of poor vision among students | |
| Short sightedness | 429 (30.9%) |
| Long sightedness | 178 (12.8%) |
| Poor nutrition | 526 (37.8%) |
| Astigmatism | 111 (7.9%) |
| Don't know | 257 (18.4%) |
| No Response | 128 (9.2%) |
| What methods of correcting poor vision do you know | |
| Spectacles | 851(61.2%) |
| Medicine | 400(28.8%) |
| Contact lenses | 365(26.2%) |
| Surgery | 296(21.3%) |
| Don't know | 28(2.0%) |
| No response | 30(2.2%) |
| Accessibility of eye healthcare providers | |
| Do you know where to seek help if you have poor eye sight? (n=1390) | |
| Yes | 880(63.3%) |
| No | 316(22.7%) |
| No response | 194(13.8%) |
| Where did you have you eye check-up? (where students who had had an eye check-up went n=463/539) | |
| Optic shop | 155(11.1%) 87(16.1%) |
| General hospital | 236(16.9%) 110(20.4%) |
| Eye hospital | 515(37.0%) 345(64.0%) |
| Barriers to spectacle use | 76(14.1%) |
| Have you ever been advised to wear spectacles(n=1390) | |
| Yes | 427(30.7%) |
| No | 867(62.4%) |
| No response | 96(6.9%) |
| Do you use spectacles? (n=1390) | |
| Yes | 148 (10.5%) |
| No | 1210 (87.1%) |
| No response | 32 (2.4%) |
| Do you have your spectacles? (n=427) | |
| Yes | 170(39.8%) |
| No | 245(57.4%) |
| No response | 12(2.8%) |
| How often do you wear your spectacles? (n=170) | |
| All the time | 76(45%) |
| Sometimes | 90(55%) |
| No response | 4(2.4%) |
| Why students been advised to wear spectacles don't have/don't wear them? (n=245)* | |
| Expensive | 124(50.6%) |
| No difference in vision | 118(48.2%) |
| Makes vision worse | 35(14.3%) |
| Fear of being teased | 25(10.2%) |
| Broken or lost | 4(1.6%) |
| What are some of the reasons students with poor vision do not wear spectacles? (n=1390)* | |
| Cost | 488(35.1%) |
| Cosmetically unacceptable and embarrassing in public | 149(10.7%) |
| Spectacle prevent normalization of eye sight | 334(24.0%) |
| Fear of being teased | 529(38.1%) |
| Don't know | 51(3.7%) |
| Alternatives to spectacles in correction of visual defects | |
| Would you prefer another way to correct vision? (students with spectacles) (n=170) | |
| (Prefer another way to correct vision) Yes | 123 (72.3%) |
| (Do not prefer another way to correct vision) No | 37 (21.8%) |
| No response | 10 (5.9%) |
| What method would you prefer? (for only those who said yes, prefer another way to correct vision) (n=123) | |
| Contact lenses | 83 (69.1%) |
| Surgery | 37 (31.7%) |
| No response | 3 (2.4%) |

**Barriers to correction of low vision**

*Access to spectacles:* To gain insight about the use of spectacles as the main modality of correcting visual defects, students were asked whether they had ever been advised, by a health practitioner, to wear spectacles. Overall 30.7% (427/1390) had been advised to wear spectacles while 62.4% (867/1390) had not. In response to a direct question on 'do you use spectacles', 148 (10.5%) of the 1390 students indicated that they use spectacles. This shows that 279 (65.3%) of the 427 students who knew that they needed spectacles were not using them. A further question on whether they had a pair of spectacles, 170 (39.8%) of the 427 needing one said they had their spectacles with them. This represents 257 (60%) of the students who needed a pair of spectacles but did not have one.

*Adherence to spectacles use:* On being questioned on the frequency of wearing the spectacles, only 45% (76/170) with spectacles wore them all the time, with 55% (90/170 students) wearing them sometimes. Thus, only 76 (16.1%) of the 427 students who needed spectacles had correction for their refractive error all the time.

*Barriers to use of spectacles:* When we enquired from all the study participants reasons students with poor vision did not wear spectacles, 529 (38.1%) of 1390 said they feared being teased, 488 (35.1%) thought cost was the barrier. A sub-analysis was carried out among the 245 of 427 students who had been advised to use spectacles and who did not own a pair or did not wear one. The reasons for not using the spectacles was that they were expensive as reported by 124 (50.6%) of 245 students, 118 (48.2%) felt that the spectacles did not make much difference in vision, another 35 (14.3%) felt that they worsened the vision while 25 (10.2%) feared being teased. Four (1.6%) students reported that the spectacles were either lost or broken.

*Attitudes towards spectacle use:* As summarized in Figure 1, attitudes towards spectacle use were investigated to detect psychological barriers towards correction. The median score was used to identify the majority opinion to a number of questions. The study participants were of the opinion that refractive error should be corrected. On the question as to whether young people do not need spectacles, more than half of the students strongly disagreed or disagreed with the statement (median score-2), showing an appreciation that young people can also require spectacles for correction of refractive error.

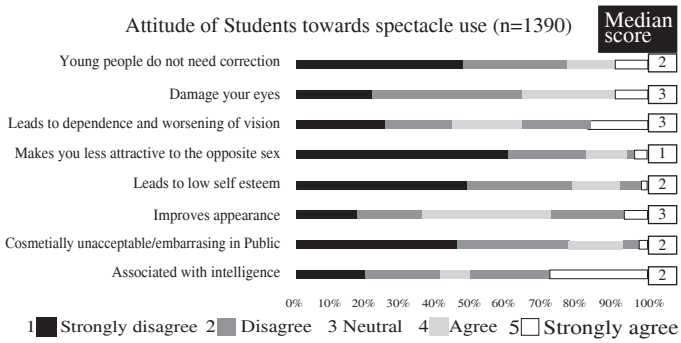


**Figure 1:** Attitude of students towards spectacle use

Student opinion was divided on two questions assessing the detrimental effect of spectacles, that is 'do spectacles damage your eyes' and 'do spectacles lead to dependence and worsening of eyesight'. The median score to both this questions was 3, or neutral, with roughly half the students agreeing to the statements and the other half disagreeing.

Attitudes towards the effect of spectacles on the outward appearance of the wearer were assessed. Students strongly disagreed (median score-1) wearing spectacles makes you less attractive to members of the opposite sex and they disagreed (median score 2) spectacles are cosmetically unacceptable and embarrassing in public. However, they were neutral (median score-3) as to whether spectacles improve appearance. Students were asked on possible inward effects of spectacles. They disagreed to the statements that spectacles lead to low self-esteem and wearing spectacles is associated with intelligence with median Likert score= 2 each.

*Alternatives to spectacles in correction of visual defects:* As shown in Table 1 students were assessed on their receptiveness to alternative methods of correcting visual defects other than spectacles. Students who were currently using spectacles (n=170) were asked whether they preferred an alternative to correcting vision and 72.3% (n=123) replied in the affirmative, while 21.8% were comfortable with spectacles as their primary method of correcting poor vision. Of the methods, 69.1% preferred contact lenses, while 31.7% preferred surgery done to correct their poor vision.

## DISCUSSION

The objectives of this study were to determine knowledge, attitude, and practice of refractive error in adolescent boys and girls a year before completion of their high school education. The most significant finding in this population was that only 39% of students had ever had an eye check-up and one in four students did not know whether

or not they had normal vision. Prevalence of refractive error ranges between 4.7%-80% with wide geographic variability and low coverage of screening services even in developed nations, similar to our own findings[10-27]. These studies show that there is need for universal eye screening in school going children. In most settings there is a dearth of skilled ophthalmology personnel which can be overcome by task-shifting screening to pre-trained school nurses, school teachers and students. Evaluation of this approach has shown that lay staff achieve acceptable validity in picking up refractive errors[28-31].

Knowledge of eye disease is a curriculum requirement in the Kenyan educational system, and therefore most students could identify the causes of poor vision from a list. However a large majority (37%), attributed wrongly poor nutrition being a major cause of visual impairment, perhaps reflecting the myth that carrots can help one avoid glasses or the tenuous food security that these students and their families face. Thus there was little knowledge among high school students of refractive error as a cause of poor vision despite of it being the major cause of poor vision in this age group. Possibly, the curriculum has not been updated to reflect refractive error as the major cause of poor vision in this age group. The inclusion of regular vitamin A supplementation to vulnerable populations has reduced poor nutrition as a cause of visual impairment[32-34].

Spectacles were the most well-known method for correcting visual defects. One third of the students had been advised to wear spectacles after previous encounters with eye healthcare professionals. A major finding was that only 17% (76/427) of the students with diagnosed refractive error were visually corrected all the time. This was because, 60% of students needing spectacles, did not own a pair and therefore were not using them. Half of these students, who did not own a pair of spectacles, said that the cost was prohibitive and this is similar to other studies in more affluent societies[35]. Another reason stated, was that spectacles did not improve vision and some reported it made their vision worse. In this study half of the students who had spectacles prescribed and did not wear them, experienced no improvement in vision. This might have been due to incorrect prescription or non-deserving children being given glasses.

In addition to the low refractive error correction rate, was low adherence to the prescription with < 50% of the students who had a pair of spectacles using them all the time. Poor adherence to treatment is a well-documented phenomena among adolescents living with chronic disease. Mid adolescence (age 15-17 years) maybe characterized by feelings of invincibility leading to increased risk taking behaviour[36]. In this instance the students and their parents were under-rating the effect of refractive errors on the academic performance even though the end of high school exams in Kenya undoubtedly determines your future social status and ability to meet the basic needs of living.

There is a growing trend to question traditional management of myopia amongst ophthalmologists as it has been shown to worsen myopia in teenagers. Management of myopia in teenagers is now focused on prevention of myopic shift with orthokeratoplasty at the forefront of new technology. This mixed messages regarding management of myopia, which can be found in various print media affects adherence to spectacles.[37-42]. Some studies have found that improving knowledge around refractive error may increase the rates of correction[43]. Nevertheless there is a higher rate of correction of refractive errors in this population compared to previous studies[2].

The quality of refraction may also have contributed to the poor adherence to spectacles. Half of students, who had been advised to wear spectacles, had found no difference in their vision while 14% reported worsened vision. It is not possible to validate these observations of worsening eye sight using this cross-sectional study design. In this study, we did not find out in detail where the spectacles were procured and therefore we do not know the extent this was a contributing factor to non-adherence. Improved refractive services may have a large impact in uptake of spectacles for correction of refractive error in this population since some could afford spectacles. It should be emphasized that students with refractive error should not generally expect improvement of their vision without intervention as the cause is of a physical nature[44].

Adolescence is a stage where conforming to the group is the norm, and wearing spectacles maybe a source of teasing. However, only one in ten students who had been advised to wear spectacles identified this as a major factor preventing them from taking up spectacles. When compared to similar populations, the students in Nairobi, Kenya were generally less averse to negative peer pressure. Most students perceived spectacles positively, did not have an adverse effect on the image of the user, enhanced a scholarly look making the user seem more intelligent while others insisted they made one more attractive to the opposite sex. This positive attitudes could be attributed to the growing trend of spectacles among celebrities popular to this age group. On the downside, the positive views on spectacles use were not shared by spectacle users with majority preferring contact lenses.

## CONCLUSION AND RECOMMENDATION

The study has shown that high school students have limited access to refraction, and among those diagnosed with a refractive error there is limited access to the treatment because of the high cost of spectacles and poor attitude and knowledge on the effectiveness of refractive error. There is enough information in this survey to justify further investment into strengthening of refractive error screening into the school health program. There is need for further studies to better document the challenges students with refractive errors are facing and to develop adherence support services for students with refractive errors.

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# Lid reconstruction after tumour excision in a patient with seborrhoiec keratosis: A case report

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## ABSTRACT

Seborrhoiec Keratosis (SK) is one of the most common benign neoplasia of the eyelids, usually affecting elderly females. Typically, the lesions start as discrete, tan-dark brown, flat lesions starting on the face and progressing to other sun-exposed areas. The natural progression is generally an increase in size, thickness and pigmentation of these lesions. A variant of SK, Dermatosis Papulosa Nigra (DPN), has been described in black people, characterized by an earlier and more severe manifestation with multiple, profuse lesions. The diagnosis is clinical, although histopathological examination may be sought to confirm the diagnosis.

These lesions are benign and usually only removed for cosmetic reasons. However, in some patients, concern or discomfort may warrant removal. Cryosurgery, electrodesiccation, curettage or shave excision are all effective methods of management. When eyelid lesions are excised, the resulting anterior lamellar defect can be repaired by primary closure, local skin flaps or Full-Thickness Skin Grafts (FTSG).

We report a 60 year old female patient who presented with DPN and thick pigmented lesions on the eyelids of both eyes, causing mechanical ptosis, left lower lid ectropion and interfering with vision. She was successfully managed with excision and lid reconstruction for both eyes.

**Keywords**: Seborrhoiec keratosis, Dermatosis papulosa nigra, Eyelid tumours, Eyelid reconstruction, Eyelid excisional biopsy, Glabellar flap

## INTRODUCTION

Seborrhoeic Keratosis (SK) is one of the most common benign neoplasia of the eyelids[1]. It usually affects elderly people, with a female preponderance and some cases of reported family history[2]. The exact cause is unknown and has been linked to sunlight exposure[3]. Typically, lesions are small, discrete and tan-brown flat macules, most frequently on the face and trunk[4]. With time, these lesions exhibit increase in size, thickness and level of pigmentation[5]. As they grow, the lesions become papules with the characteristic verrucous "stuck-on" appearance[4]. A variant of seborrhoiec keratosis, Dermatosis Papulosa Nigra (DPN) has been described in black people[2]. This variant manifests earlier, with multiple and profuse lesions which are larger, thicker and exhibit a more chronic and worsening course than classic SK.

SK lesions are benign and do not usually require removal[5]. However, many patients present to dermatologists due to concern about possible skin malignancy when there is growth or increased pigmentation of the lesions[6]. Reasons for removal include cosmetic reasons, discomfort, itchiness or documented growth in the lesions. The diagnosis is clinical in majority of cases. However, especially if lesions are going to be removed, histopathological confirmation of the diagnosis may be sought. Histology of lesions is characterized by hyperkeratosis, papillomatosis, acanthosis with intraepithelial horn or pseudohorn cysts[3].

There are several options for management including cryosurgery, electrodesiccation, curettage or shave excision[5]. Complications of treatment include hypopigmentation, hyperpigmentation and scarring[7]. In the eyelids, conservative surgical excision, followed by lid reconstruction to repair the ensuing anterior lamellar defect is preferred to preserve lid structure and function[6]. The type of repair depends on the size of the defect and whether the upper or lower lid is affected. Lower lid repairs usually utilize local flaps from adjacent upper eyelid, temple/cheek, and glabellar region, whilst upper lid defects may be repaired by flaps from the temple/supra-brow or glabellar regions[8]. Alternatively, Full Thickness Skin Graft (FTSG) may be harvested from the contralateral eyelid or the peri-auricular region may be used for both upper and lower eyelid reconstruction[9].

## CASE REPORT

A 45-year old female presented to the ophthalmology clinic as a referral from the dermatology clinic with a history of pigmented itchy lesions on the face and trunk since childhood. The lesions originated in the face and later involved the neck and trunk and upper extremities. Recently, they started increasing in size especially around the eyes, and interfered with her vision. She sought care at a local dermatology clinic, from where she was referred to our eye clinic. She had no past ocular disease and had some mental impairment since childhood, but no specific

diagnosis has ever been made. She was a mother of 2 children, now adults and well with no family history of a similar illness.

On examination, her vision was 6/60 and CF @ 2M for RE and LE respectively. She had multiple pigment lesions on the eyelids, face, neck, trunk and upper limbs (Figure 1). They were of varying sizes, raised, with greasy, corrugated, "stuck on" appearance. The lesions on the lids were of particular concern, as they were big enough to cause mechanical ptosis in both eyes, thus interfering with vision. The left eye also had lower lid ectropion from the weight of the lesion, with trichiasis and a corneal epithelial defect. There was inferior corneal pannus, suggesting the corneal irritation was a long-standing problem. Based on these findings, a clinical diagnosis of SK, the (DPN) variant, was made. Due to the threat to vision, she was planned for excisional biopsy of lesions with lid reconstruction for both eyes, starting with the LE (Steps 1-7).


**Figure 1:** SK lesions

(A) Hyperpigmented lid lesions causing mechanical ptosis

(B)Hypo- and hyperpigmented lesions on the trunk

Left eye shave excisional biopsy for both upper and lower lid lesions was done, leaving anterior lamellar defects in both lids. The lower lid defect was repaired by advancing a nasojugal flap (Figure 2).

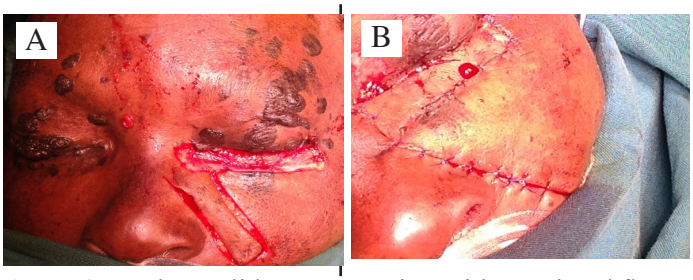


**Figure 2:** LE lower lid reconstruction with nasojugal flap (A) STEP 1- Lower lid lesion excised and nasojugal flap prepared. (B) STEP 2- Nasojugal flap in place

A glabellar flap was fashioned to cover the medial canthal defect and a full thickness skin graft from the preacuricular area used to cover the upper eyelid defect temporally (Figure 3). 6-0 nylon sutures were used for all skin repair.

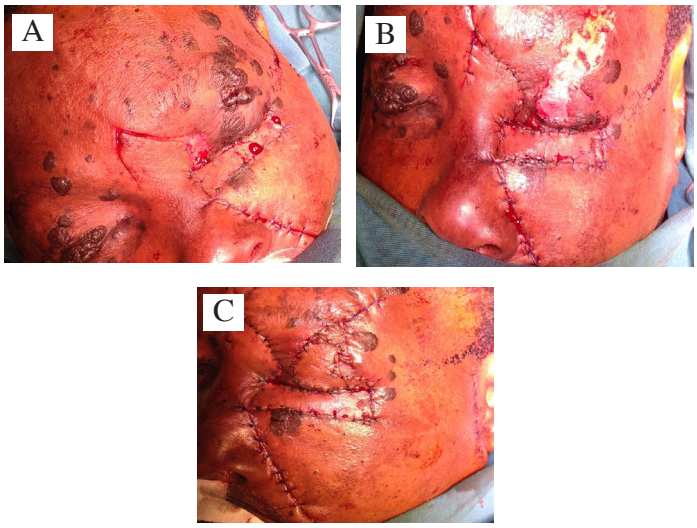


**Figure 3**: LE upper lid reconstruction with glabellar flap (A) STEP 3- Upper lid lesion excised and glabellar flap prepared. (B) STEP 4- Glabellar flap in place. (C) STEP 5- FTSG used for upper lid temporal defect

The right upper eyelid lesions were excised 3 weeks later also leaving an anterior lamellar defect. A FTSG from the pre-auricular area used to repair the ensuing anterior lamella defect (Figure 4).

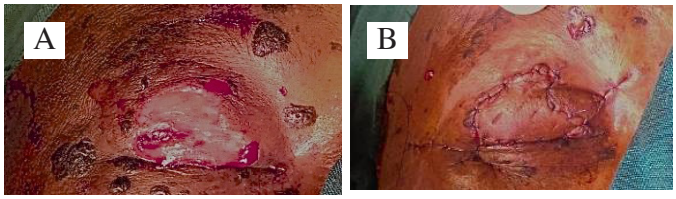


**Figure 4:** STEP 6-Right upper lid lesion excised (A) and STEP 7- Lid defect repaired with a FTS (B)

Shave excision of smaller lesions without any repair was also done. Biopsy sample was sent to histopathology laboratory and the results confirmed the diagnosis of SK. two weeks after the right eyelid surgery, the patient was discharged home, with good cosmetic and functional results for both eyelids. She stopped attending the eye clinic one month after the right eye surgery.

## DISCUSSION

SK is a common benign neoplasia of the eyelids[1]. It usually affects elderly females, who may have a family history of SK[2]. The lesions typically start on the face, and progress to involve other sun-exposed areas such as the neck, trunk and limbs[3]. Our patient exhibited the characteristic clinical presentation but with no documented family history. SK lesions start as flat to slightly elevated, tan-brown, discrete lesions, but with time exhibit increasing size, thickness and pigmentation[5]. DPN, a more severe variant of SK, has

been described in black people characterized by multiple and profuse, elevated, hyperpigmented papules on the face, neck, trunk and limbs[2]. Our patient presented with the classic description of DPN.

Treatment of SK is usually not warranted until patients request removal of lesions for cosmesis or histopathological evaluation to rule out skin malignancy[6]. Our patient sought medical care due to lesions affecting vision in both eyes. Treatment options include cryosurgery, electrodessication, cautery and excision[5]. Most procedures are complicated by hypo/hyperpigmentation or scarring[7]. In the eyelids, scarring may significantly interfere with normal lid structure and function. Thus, conservative shave excision with repair of ensuing lid defects is usually preferred[6]. Our patient had two indications for urgent treatment. Firstly, she had lesions on upper eyelids causing mechanical ptosis in both eyes, thus interfering with vision. Furthermore and of greater concern, was the left lower lid lesion causing an ectropion and trichiasis with a corneal epithelial defect and pannus.

Our patient was admitted immediately for shave excisional biopsy of eyelid lesions and lid reconstruction, starting with the LE. The resultant medial canthus defect was repaired by a glabellar flap and the upper lid defect with a full thickness skin graft from the peri-auricular area. The lower lid defect was repaired by advancing a nasojugal flap. In elderly people due to increased skin laxity, local flaps from adjacent areas are often employed in lid reconstruction of defects up. These flaps bring their own blood supply and so have a faster healing and no chance of rejection. The glabellar flap can effectively be used to repair lid defects in the medial canthal area, with good cosmetic results[10]. It has the added advantages of a wide base and minimal collateral damage since the area lacks any vital structures. For our patient, the LE lower lid defect was repaired with a nasojugal flap. Lower lid repairs usually utilize local flaps from adjacent upper eyelid, temple/cheek, and glabellar region[6].

Regional flaps can be used alone, or in conjunction with other lid reconstruction procedures for larger defects. Skin from the contralateral upper eyelid or peri-auricular area are readily available sources for FTSG[9]. Disadvantages of FTSG include contraction and risk of rejection. The right upper eyelid lesions were excised 3 weeks later and a FTSG from the pre-auricular area used to repair the entire resulting eyelid defect. The resultant cosmetic and functional result was good and the patient was satisfied with the result. She stopped attending our clinics one month after the right eye surgery.

## CONCLUSION

Seborrhoeic Keratosis (SK) is one of the most common benign tumour of the eyelids, showing a predilection for black, elderly females. When lid lesions are excised, appropriate techniques of lid reconstruction are important so as to preserve adequate eyelid structure and function. Regional skin flaps and FTSG can be employed successfully to repair eyelid defects after conservative tumour excision.

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