

# Assessment of Kenyan Optometrists Knowledge, Skills and Practice on Cataract, Kisumu County, Western Kenya

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## Research article

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# Abstract

## Background

Cataract is a major contributor to avoidable blindness in the world. It is the clouding of the normally clear lens of the eye characterized by reduced vision, increasing difficulty with vision at night and sensitivity to light and glare. The risk factors of cataract include increased age, smoking and excess exposure to sunlight. Though studies have focused on the causes and treatment of cataract, there is no data on optometrist knowledge, skill and practice on cataract in Kenya. The optometrists are the primary health care providers for cataract patients, they are well placed to assess, provide advice and refer cataract patients to the ophthalmologists.

Methods: a cross sectional design was used. Stratified random sampling was used to select sample. Fisher's formula was used.

## Results

A total of 49 optometrists were interviewed over a period of four months, the male to female ratio was 2:1, mean age of 45.8(72%) years, age ranged from 25-39 years with mean duration of practice of one year and maximum of 10 years. One hundred percent optometrists had good knowledge and understanding of importance of slit lamp assessment in making cataract diagnosis. However, our results found that (83.6%) of optometrists used pen torch for assessment of lens changes in patients. On skills, optometrists were classified as having poor skills with thirty nine (79.6%) being unable to diagnose. 61.2% of optometrists did not screen patients aged 40 years and above who attended eye clinics for cataract. The most common challenges reported for not screening was long queues. The study further established that the optometrists had various reasons to refer patients to another hospital including 52.6% for availability of ophthalmologists and 39.5% of optometrists for availability of equipment.

## Conclusion

The study established that despite the good level of knowledge among the optometrist on cataract, there exist gaps in skills in categorizing the type of cataract. Most optometrists do not screen patients aged 40 years and above for cataract. Hence there is need to sensitize optometrists on the significance of screening for cataract to prevent blindness due to cataract.

## Introduction

Cataract can be described as a group of eye diseases characterized by clouding of the eye lens due to body degeneration and deposits of protein on the natural lens of the eye. Decrease in visual acuity is an associated symptom of cataract, but its absence or presence does not preclude cataract. Though cataract is preventable, early detection and treatment can assist in avoiding serious reduced visual acuity

even after a surgery is carried out. (Wilson, 2014) confirmed that the only way for treating cataract is through surgery. However, knowledge of optometrist in Kenya is not known on cataract.

Worldwide cataract is the leading cause of blindness. According to (WHO, 2012) model on blindness, cataract accounts for 6.7 million people being blind as a result of the disease. Cataract affects more than 70 million people worldwide (Lonsway, Cortina, & Magley, 2008). In Africa, America and Hispania it is 6-8 times more prevalent than in Caucasians, while Asians account for less than 10% of all clinical subtypes of the disease (WHO, 2012). Among the different subtypes of cataract nuclear cataract occurs most frequently and accounts for more than 50% of all cases of the disease (Elston & Johnson, 2008). Similarly, cortical cataract is responsible for 0.01- 0.04% of blind people worldwide. Sub-capsular cataract is normally rare but it is the most frequent form of cataract in infants, with more than 80% of cases observed within the first year of life (Zhu, 2017). It affects both eyes in 60-80% of cases, and usually more males (65%) are affected as compared to females (35%) (Arbor, 2018). However, skills and practice of cataract diagnosis and treatment is not known among optometrist in Kenya.

A study by (Phil & Hd, 2013) on assessment of outcomes of referrals of cataract patients' by optometrists from the community hospitals and their private clinics to hospitals with specialist consultant ophthalmologist who reviewed all the patients, found a substantial proportion of patients referred (n=2505) presumed to have cataract, nearly half (n=1148) (45.8%) had no evidence of cataract, with only 510(20.4%) patients confirmed with cataract (Rodríguez, Nussbaum, López, & Sepúlveda, 2010). Cataract is clinically and genetically heterogeneous and includes several different forms. Each of these forms has diverse causes and severities. It is subdivided on the basis of anatomy of the lens and age of onset (congenital, juvenile and adult). In 2010, more than 4.5million individuals were blind due to cataract and the number is forecasted to rise to 5.9 million by 2020 (Reutens, 2016). The magnitude of cataract in Kenya is estimated to be about 240,000 as projected using the American statistics while the crude cataract blindness prevalence in all ages in Kenya is estimated at 0.06% (Polack & Kuper, 2017). However, a referral amongst optometrists in Kenya has not been established.

In Kenya the most likely first line eye care personnel for cataract patients would be the optometrists; yet there is limited evidence in the literature about the optometrist's knowledge, skills and practice on cataract in Kenya. Furthermore, cataract care presents major challenges because if not treated properly then the vision will still reduce. The aim of this study was to evaluate optometrist's knowledge, skills and practice on cataract in Kenya.

## **Study Rationale**

1. With increasing prevalence of cataract in Kenya which can potentially outstrip the current capacity within hospital based cataract care, knowledge of optometrists of cataract management will be
2. No study has been done before in Kenya to assess the knowledge, skills and practice of optometrist on cataract.

3. The findings of this study will inform on areas that need to be tackled by policy and necessitate for in house courses that will promote knowledge, skills and practice on cataract.

## Methodology

### Study Area

This study was conducted in one mission eye hospitals (Sabatia Eye Hospital), five selected optical shops (Trinity Optical, OPTICA, Baus Optical, Dlight Optical and Port Optical) and one teaching and referral hospitals (Jaramogi Oginga Odinga). All in Kisumu County

### Study Design

Across-sectional hospital based study

### Study Population

The study participants included all optometrist in Kisumu County.

### Sample Size

Optometrists are estimated at 149 (Registered) countrywide. The minimum sample size that was required for this study was calculated as; (Araoye MO, 2004)

$$n' = \frac{NZ^2P(1-P)}{d^2(N-1) + Z^2P(1-P)} \longrightarrow$$

#### Where

$n'$  = sample size with finite population correction,

$N$  = size of the target population = 149

$Z$  = Z statistic for 95% level of confidence = 1.96

$P$  = Estimated proportion with good knowledge on cataract = 50% (no previous study on the same).

$d$  = margin of error = 2.5%

$$\begin{aligned} &= \frac{149 \times 1.96^2 \times 0.5 \times 0.5}{0.025^2 (149-1) + 1.96^2 \times 0.5 \times 0.5} \\ &= \mathbf{49 \text{ Optometrists}} \end{aligned}$$

### Inclusion criteria

All the optometrists practicing within Kisumu County

### Exclusion criteria:

Optometrists who declined to be interviewed

## **Data collection instruments and technique**

A guided questionnaire was used; the questionnaires were administered by the researcher in person to the respondents. The questions for the study were validated once the questionnaires were prepared. The validation was aimed at assessing the ease of comprehension, relevance to their intended topics, effectiveness in providing useful information, and the degree to which the questions are interpreted and understood by the study population. Validation was conducted by a pre-testing on a representative group of optometrists in Kakamega eye clinic.

## **Data Analysis**

Data collected was coded, entered and managed in a pre- designed Microsoft access database at the end of data entry, data was cleaned then analyzed using SPSS version 17.0 software. Level of knowledge on cataract was obtained by summarizing the various questions on knowledge and score given to determine the level of optometrist's knowledge as either adequate or low. Skills were determined using various stereoscopic lens photos and finally practice was analyzed based on various questions related to screening and management of cataract. The results were presented in tables and graphs and all statistical tests were performed at 5% level of significance (95% confidence intervals).

## **Results**

In this study, thirty (61.2%) of the forty nine optometrists correctly defined cataract as opacity in lens of the eye which reduces visual acuity and can results to blindness.

In this study, thirty seven (75.5%) participants made diagnosis based on reduced visual acuity and Funduscopy for lens change.

Thirty two (65.3%) participants correctly identified normal sub-capsular cataract with thirty eight (77.5%) for nuclear cataract. Finally, Thirty eight (77.5%) identified traumatic cataract.

Majority of participants (52.6%) admitted that they referred to a particular hospital due to availability of ophthalmologist followed by those with ophthalmology equipments at 39.5%.

In the study, there was a statistically significant association between age, duration of practice and good level of knowledge on cataract.

In the study, there was no statistically significant association between duration of practice, age, qualification with good skills on cataract.

In the study, there was no statistically significant association between duration of practice, qualification of participants with good practice on cataract.

## Discussions

Cataract in Kenya, just like in other countries in sub-Saharan Africa remains a devastating condition. It is the leading cause of avoidable blindness worldwide, with nearly 50-90% true cataract patients remaining undiagnosed (Ubah, Isawumi, & Adeoti, 2013). With these figures it is obvious that in Kenya; where there is lack of strong institutional capacity for cataract; care can be a big challenge. This study recruited forty nine optometrists working in Kenya and sought to assess knowledge, skills and practice on cataract. The male to female ratio was 2:1, while the range was 25-39 years.

With regard to knowledge of optometrists on cataract, the study findings established that thirty (61.2%) of the forty nine optometrists knew the correct definition of cataract. They possessed knowledge on the various types of cataract, Symptoms of cataract and complications of cataract. Majority of participants (67.3%) mentioned family history of cataract as major risk factor for cataract this is important as they should encourage first degree relatives to be assessed. In this study, forty seven (95.9%) of 49 optometrist knew of the ocular complications of cataract. This high percentage of awareness about conditions associated with or complications of cataract is important as it would positively motivate optometrist in an effort to detect early, treat and conduct proper follow up of patients.

On the assessment of the skills and practice among the optometrist of diagnosis, treatment of cataract, the study found out that 75.5% of participants diagnosed cataract based on reduced visual acuity. This is comparable to what was found in a study at Light house eye hospital by (Shahsuvaryan, 2016) established in his study that 90.6% of all cataract diagnosis was based on reduced visual acuity. Optometrists had good understanding of other risk factors of cataract which is essential in improving vigilance of practitioners among patients at risk.

In this study, 61.2% of optometrists did not screen patients age 40years and above who attended eye clinics. However, we also established that 52.6% of the optometrists who screened were not aware of what they were looking for. This is similar to a study by (Krishna, 2014) who found that even though 50% of optometrists screened patients above 40years, they were not aware of increased sensitivity to light as symptoms of cataract. The lack of screening awareness is probably attributed to lack of proper training. Furthermore the study established that 83.6% of participants preferred direct ophthalmoscope in examining cataract patients attending eye clinics, stereoscopic assessment requires use 90D/78D loupe together with slit lamp are expensive and also requires sufficient training to use them. Unavailability of these loupes may be linked to insufficient funds pumped to eye care programs.

Counseling is of utmost importance in management and follow-up of any chronic illness. It has been adopted as a standard part of care in the management of cataract. The results found that 47(95.9%) did counsel patients before initiation of treatment (AOA, 2019). A study done in South India showed that lack of recollection of being counseled on cataract was an independent predictor of poor follow-up (Dawson

& Schwab, 2012). There was a statistically significant association between age and duration of practice of optometrist with knowledge on cataract. Better knowledge among young optometrist could be explained by the fact that they recently graduated from school. There was no statistically significant association between the level of qualification with good knowledge, skills and practice on cataract. This could be explained by the fact that the only difference in training between optometrist and optometry technologist is duration of training but the syllabus is the same.

## Conclusions

1. This study established that despite the good level of knowledge among the optometrist, there exists a gap in skills in interpretation of type of cataract.
2. There was a significant relationship between good cataract knowledge, age and duration of practice. Optometrists that had practiced for less than five years were associated with good knowledge on cataract.
3. The study established that majority of optometrist do not screen patients aged 40years and above who attended eye clinics for cataract.
4. The study established that all optometrists referred cataract patients mainly for ophthalmologist review.
5. The choice of hospital where patients were referred depended on availability of ophthalmologist and cataract equipment.

## Recommendations

- Continuous training of optometrist on cataract as there exists a gap in skills among the optometrist. This can be done through supportive supervision, continuous medical education at health facilities and regular skills update workshops.
- Encouraging the optometrist to routinely check the lens of all patients above 40 years attending eye clinics
- Encourage optometrist to counsel cataract patients as this improves compliance.

## Declarations

### Acknowledgement

We wish to thank all the optometrists who participated in this study and the research assistants.

### Author's contributions

SM is a B. Optometry holder and MPH. He initiated the research concept, developed the proposal, did the data collection, analyzed the data and wrote the manuscript. SO improved the research concept, assisted

with proposal development and reviewed the proposal, thesis and the manuscript. All authors contributed equally to the research work.

### **Availability of data and materials**

The dataset for the optometrists generated and analyzed during the current study are available from the corresponding author upon reasonable request.

### **Consent for publication**

Not applicable.

### **Ethics Approval**

The study obtained ethical clearance from Maseno University Ethics and Review Committee and Ministry of Health. Eligible participants signed written consent. Names were not used to safeguard the privacy of the participants but only relevant demographic information as well as random number code was used. A separate document that links the study code to participants identifying information was only accessible to the researcher.

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### **Competing interests**

SM declares that they have no competing interest related to this study.

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## Tables

**Table1. 1: Social-Demographic characteristics (N=49)**

Variable	Number (%)
<b>Age</b> (years) Mean (SD) Min –Max	41.8 (SD6.9) 25 – 36
<b>Gender</b> Male Female	31 (63.3) 18 (36.7)
<b>Years of practice</b> Mean (SD) Median (IQR) Minimum– Maximum	10.3 (SD 8.4) 8 (3 – 16) 1 – 10

**Table1.2: Knowledge on definition, signs, symptoms and complication of cataract (N=49)**

Variable	Number (%)
<b>Cataract definition</b>	
Opacification of the crystalline lens of the eye	30(61.2)
Presence of a white coating on the lens	12((24.5)
Poor vision in the eye	6((12.2)
Absence of the lens of the eye	1(2.0)
<b>What types of cataract do you know?</b> Nuclear cataract	48 (98.0)
Sub-capsular cataract	20 (40.8)
Cortical cataract	30 (61.2)
Traumatic cataract	10 (20.4)
<b>Symptoms of cataracts</b> Reduced Visual acuity	46 (93.6)
Light sensitivity	38 (77.6)
Blurred vision	12 (24.5)
Red eye	9 (18.4)
Floaters	2 (4.1)
Others*	21(42.8)
<b>Complications of cataract</b>	
Blindness	47(95.9)
Blurred vision	13(26.5)
Inability to read	6(12.2)

**Table1. 3: Knowledge on diagnosis of cataract.**

Variable	Number (%)
<b>How do you make a Diagnosis of cataract?</b> Reduced vision and Funduscopy	37(75.5)
Slit lamp assessment	10(20.4)
Pen torch assessment	2(4.1)
<b>Do you think Funduscopy is important?</b>	49 (100)
Yes	49 (100)
To make a diagnosis of cataract To determine which surgery For Follow up	20 (40.8)
	30 (61.2)
<b>How can lens be assessed</b>	
Direct ophthalmoscope	41 (83.7)
Indirect ophthalmoscope with 90D and 78D.	29 (59.2)

**Table1.4: Interpretations of stereoscopic lens photos (N= 49)**

Variable:	Number (%)
Lens A: Sub-capsular.	
Correct response.	32 (65.3)
Incorrect response	17 (34.7)
<b>Total</b>	<b>49(100)</b>
Lens B: Nuclear cataract	
Correct response.	21 (42.9)
Incorrect response.	28 (57.1)
<b>Total</b>	<b>49 (100)</b>
Lens C: Cortical cataract	
Correct response.	38 (77.5)
Incorrect response.	11 (22.4)
<b>Total</b>	<b>49 (100)</b>

Lens D: Traumatic cataract

Correct response.	34 (70.8)
Incorrect response	15 (30.6)
<b>Total</b>	<b>49 (100)</b>

**Table1.5: Screening patients for Cataract.**

	Number (%)
<b>Do you examine all patients over 40 years for cataract?(N=49)</b>	
Yes	19 (38.8)
No	30 (61.2)
<b>Why do you screen patients over 40 years (N=19)</b>	
Those who knew importance of screening.	9 (47.4)
Those who screened as routine eye examination.	10 (52.6)

**Table 1.6: Association between the age, qualification and duration of practice on knowledge on cataract**

Variable	Knowledge		OR(95% C.I)	P-value
Age group( N=49)	Good	Poor		
< 25	24 (77.4%)	4 (22.2%)	12.0 (3.0-51.6)	<0.001
26-39	7 (22.6%)	14 (77.8%)	1.0	
Duration of practice				
< 5	19(76.0%)	6 (25.0%)	1.0	0.033
6-9	3(12.0%)	5 (20.8%)	0.2 (0.0-0.9)	
>10	3(12.0%)	13(54.2%)	0.1 (0.0-0.3)	
Qualification				
BSc Optometry	25(71.4%)	7 (50%)	2.5 (0.7-9.2)	0.155
Dip Optometry	10(28.6%)	7(50%)	1.0	

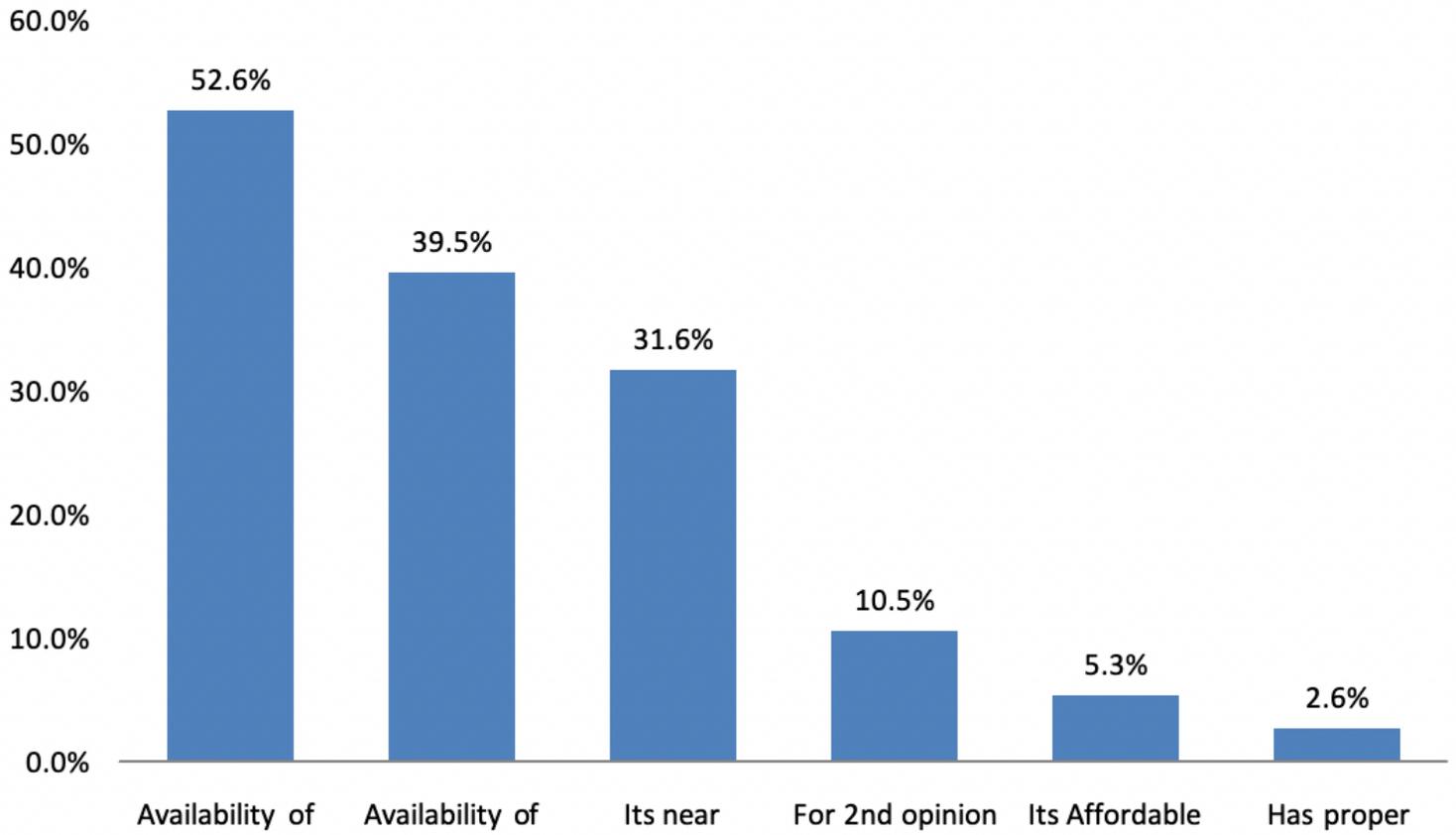
**Table1.7: Association between qualification and duration of practice of optometrists on skills on cataract**

Variable	Skills		OR(95% C.I)	P-value
Duration of practice	Good	Poor		
< 5	16(57.1%)	6(28.6%)		
6-9	6(21.4%)	4 (19.0%)	0.4 (0.1-1.8)	0.256
>10	6(21.4%)	11(52.4%)	0.2 (0.1-0.8)	0.019
Qualification				
BSc Optometry	27(77.1%)	9(64.3%)	1.9 (0.5-7.2)	0.357
Dip Optometry	8(22.9%)	5(35.7%)	1.0	

**Table1.8: Association between qualification and duration of practice of optometrist on practice on cataract**

Variable	Practice		OR(95% C.I)	P-value.
Duration of practice	Good	Poor		
< 5	10(35.7%)	12 (57.1%)	1.0	
6-9	10(35.7%)	3 (14.3%)	4.0 (0.9-18.6)	0.069
>10	8(28.6%)	6 (28.6%)	1.6 (0.4-6.2)	0.494
Qualification				
BSc Optometry	18 (64.3%)	17 (81.0%)	0.4 (0.1-1.6)	0.202
Dip Optometry	10 (35.7%)	4 (19.0%)	1.0	

## Figures



**Figure 1**

Reasons for choosing to refer to a another hospital