

Assessment of Optometrists' Knowledge, Skills and Practice on Cataract: A Cross-Sectional Study from Kisumu County, Western Kenya

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Research article

Keywords: Visual acuity, cataract, optometrists

Posted Date: June 25th, 2020

DOI: <https://doi.org/10.21203/rs.2.19424/v3>

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Version of Record: A version of this preprint was published on October 7th, 2020. See the published version at <https://doi.org/10.1186/s12886-020-01673-w>.

Abstract

Background: Cataract is a major contributor to avoidable blindness in the world and greatly impact negatively on the quality of life. The prevalence of blindness in Kenya is estimated at 0.7% with cataract contributing 43%. Optometrists being the primary eye care providers for cataract patients, they are well placed to assess and refer cataract patients. Though there is no data on optometrist knowledge, skill and practice on cataract in Kisumu, Kenya.

Methods: A cross-sectional study design was used. The study was conducted from June 2019 to August 2019 using self-administered questionnaire. We collected basic socio-demographic characteristics and investigated participants' knowledge, skills and practice on cataract. The primary outcome measures were the proportions of participants who identified the questions related to knowledge, skills and practice on cataract. Chi-square analysis was performed to look at the association between demographic and practice, knowledge and skills.

Results: A total of 49 optometrists were interviewed with a male to female ratio of 2:1, mean age of 30.4(72%) years and mean duration of practice of one to ten years. Majority of the optometrists had good knowledge on various aspects of cataract. Like 98% had a good knowledge on the types of cataract. Based on skills, 75.5% could diagnose cataract correctly. However, 57.1% could not identify nuclear cataract. Practice among the optometrists was largely low in the sense that, 61.2% of optometrists did not screen patients aged 40 years and above for cataract. Almost half of the optometrists, 52.6% did a routine eye examination but did not know the importance of examining the crystalline lens for patient above 40 years.

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 and practice. The results of this study calls for skills development training for optometrists on cataract and immediate ophthalmic division response for improvement on the scope of training for optometrists. This will ease diagnosis of cataract and its management so as to reduce its burden in Kenya.

Introduction

Cataract can be described as a group of eye diseases characterized by clouding of the eye lens due to lens body degeneration and deposits of protein on the natural lens of the eye Dandona & Dandona, (2006). Decreased visual acuity is an associated symptom of cataract, but its absence or presence does not preclude cataract. Worldwide cataract is the leading cause of blindness. According to World Health Organization 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 Reutens, (2016). 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). In Kenya, with a population of 47 million, avoidable blindness account for 0.7% with cataract contributing 43% and a projection of an increase by

2050 Census, (2019). Though cataract is treatable, early detection and treatment can assist in avoiding serious reduced visual acuity even after a surgical intervention.

Cataract has been shown to impact negatively on the quality of life and may influence daily activities such as driving, walking and economic activities Vision & News, (1960). Though cataract is treatable through surgical interventions optometrists are crucial in making diagnosis to allow the ophthalmologists carry more operations to reduce the burden Wilson, (2014). In Kenya, optometrists are the first line providers of eye care services and they have the responsibility to conduct a comprehensive examination for all patients. The national strategic plan for avoidable blindness of 2014-2018 established that optometrists should work closely with ophthalmologists in delivery of eye care services in Kenya Ministry of Health, (2014). Therefore, their knowledge is significant in cataract management, hence need for assessment. Cataract is clinically and genetically heterogeneous and includes several different forms Bourne et al., (2012). 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). 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). Training optometrists in Kenya is at bachelor level and diploma and the scope of training is different in the sense that the diploma holders are inclined towards optics only. The prevalence of cataract may rise if coordination between optometrists and ophthalmologists is not tightened. This is possible because majority of patients are examined by optometrists and if they do not refer these patients to ophthalmologists then the burden will rise. Hence, there is a need for skills of optometrists to be assessed.

A study by Phil & Hd, (2013) in India on assessment of outcomes of referrals of cataract patients. Optometrists referred patients from the community hospitals and their private clinics to hospitals with specialist consultant ophthalmologist. The ophthalmologists 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. Most probably the ophthalmologists had not informed the optometrists on the visual acuity score where surgery is performed. The Kenya Ophthalmic Division view optometry to be more of optics of the eye and this has brought confusion in defining the roles of optometrists in the eye care. However, the roles of optometrists in Kenya are to examine patients, take visual acuity, refract patients and refer patients to ophthalmologists. Similar to United States, where optometrists roles are clearly defined Sokoto et al., (2018). Optometrists are suppose to view all cases and evaluate the ones beyond their scope of practice for referral Polack & Kuper, (2017). In Kisumu, Kenya there is limited evidence in the literature about the optometrist's practice on cataract. Furthermore, cataract care presents major challenges because if a surgical intervention is not sought at the right time, a person's vision may progress to blindness.

Therefore this study was to evaluate optometrist's knowledge, skills and practice on cataract in Kisumu, Kenya.

Study Rationale

- 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 necessary.
- No study has been done before in Kenya to assess the knowledge, skills and practice of optometrist on cataract.
- 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.

Methods

The guideline for conducting a quantitative study proposed by Noyes et al., (2019) were followed to maintain scientific quality and rigor. This was a prospective cross-sectional study in which respondents received the questionnaires face to face with the interviewer. The aim of this study was to assess the optometrists knowledge, skills and practice on cataract as it is one of the main causes of blindness. The questionnaires were given to optometrists practicing in the seven recognized primary eye care facilities in Kisumu County, Kenya by the Ophthalmic Division. Kisumu County was chosen since it was the pioneer county to roll Universal Health Coverage and optometrists were recruited to aid in achieving the Universal Health Coverage objectives. Condition for recruitment was based on registration by Optometrists Association of Kenya and working in facilities recognized by the Ophthalmic Division of Kenya. Kisumu County covers approximately 567km² on water and 2086km² land area, with a population of 1.2 million Census, (2019). The main economic activity is fishing, a clear indication of long exposure to sunlight which is a risk factor for cataract. Kisumu County has nine facilities offering eye care services, however only seven are registered and recognized by Ophthalmic Division. The facilities include: Sabatia eye hospital, Jaramogi Oginga Odinga Teaching and Referral, Iris Ophthalmology Centre, Optic Ophthalmology Centre, Vision Eye centre, Port Florence Clinic and City Centre Optics. The other facilities were excluded since the employed optometrists are not registered by the association.

The participants were recruited from the seven facilities from June 2019 to August 2019. The response rate was 100% and this was enhanced by maintaining constant contact between participants and the researcher at all time during the study period. Simple random sampling was used to recruit participants from respective clinics (n= 7) and demographics. Participant's recruitment was done through an invitation letter sent to the optometrists explaining what the study was all about and what the significance of the study was. Three reminders were sent to the participants through their email informing them on when the study was to be conducted. An online random number calculator was used to generate the possible

participants from the target population of 149 registered optometrists with the Optometrists Association of Kenya. Using standard normal deviate of 1.96; a conservative proportion of computer vision syndrome of 0.5 in the target population (given no previous knowledge, skills and practice reference in Kenya) were estimated to be well conversant with cataract and a level of accuracy required fixed at 0.05; a sample size of 49 participants (using a base population of 149) was determined using formula:. After potential participants were identified, they consented and a copy of the signed consent was given to them. The questionnaires were given to the participants and they were given an option to seek clarification in case of any difficulty from the lead researcher. Seven research assistants who were optometrists were recruited to administer the questionnaires to the respondents. The research assistants were trained on research ethics and how the process was to run. The questionnaires consisted of closed ended questions worded in present tense aiming to explore the participant's knowledge, skills and practice on cataract. The questionnaire had been pre-tested during a pilot to assess for Cronbach's reliability (assessed at level of 0.874, 0.929 and 0.926 for knowledge, skills and practice questionnaire respectively) and validity (assessed by performing a Pearson correlation coefficient and obtained $0.000 < 0.05$, $N=5$).

Information collected included: socio demographic characteristics, knowledge of various aspects of cataract, their skills on cataract and practice on cataract management. The study had 16 structured questions broadly around respondent's demographic characteristics (3 questions), knowledge on cataract (4 questions), skills on cataract (7 questions) and practice on cataract (2 questions). The questions had two to three responses. One open ended question was on the reason for referral of cataract cases. The questionnaires took 20 minutes to complete with two to three responses of either aware, neutral or not aware on a three point *Likert* scale. A composite scale ranging from 20 to 100 was adopted with knowledge, skills and practice level categorized as: low (score of 20-40), medium (score of 41-79) and high/good (score of 80-100). The participants were to identify the type of cataract based on the photographic sent to them. The questionnaires were administered when participants were free and collected back each and every evening. Frequency distributions of all socio demographic characteristics and the proportion of participants who identified all items related to skills, knowledge and practice were calculated. A chi-square was used to calculate the association between demographic characteristic and knowledge, skills and practice. We conducted multiple logistic regression analysis to compare the knowledge, skills and practice with demographic characteristics. We calculated odds ratios (ORs) and 95% confidence intervals (CIs). There was no missing data as all data obtained were stored manually and in the computer. Statistical Package for Social Sciences version 17 software was used to analyze the data. Values of $p < 0.05$ were considered statistically significant.

Results

Demographic Characteristics

Males constituted 63.3% of the participants interviewed with females being 36.7%. The mean age of the participants was 30.4 (SD 6.9) with an age range of 25-36 years. The maximum year of practice of participants was ten years with a mean of 5.4 (SD 4.2).

Knowledge on Cataract

The majority of participants could correctly answer cataract knowledge questions. For example 61.2% could give the correct definition of cataract; complication of cataract 47%; symptoms of cataract 93.6% and types of cataract 98.0%. But fewer were able to report on inability to read 12.2% as a complication of cataract; floaters as a symptom of cataract 4.1% and traumatic cataract 20.1%. (Table 1)

Skills of Optometrists on Cataract

Majority of the respondents 75.5% based their diagnosis of cataract on reduced visual acuity and Funduscopy examination. One hundred percent of the respondents agreed that Funduscopy was significant in diagnosis of cataract. Fewer respondents 4.1% used pen torch for assessment of cataract. On the assessment of crystalline lens, majority of the respondents 83.7% did direct ophthalmoscopy with only 59.2% doing indirect ophthalmoscopy (Table 2). Majority of the respondents could correctly identify the types of cataract from the stereoscopic photos. For example 65.3% correctly identified sub-capsular cataract, 77.5% cortical cataract and 70.8% for traumatic cataract. However nuclear cataract was only identified by 42.9%.

Practice of Optometrists on Cataract

Majority of the respondents 61.2% did not examine all patients over 40 years for cataract. However, the 38.8% of the respondents who screened, only 47.4% knew the importance of screening while 52.6% just did the screening as a routine eye examination. 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%. However, 2.6% did not refer patients (Figure 1).

Association between Demographic Characteristics and Knowledge on Cataract

There was a good knowledge among participants aged 25-30 years 77.4% as compared to those aged 31-36 years 226%. Based on the duration of practice, participants who had practiced for less than 5 years had a good knowledge of cataract 76.0% similar to qualification where bachelor of optometry holders 71.4% had a good knowledge. The composite awareness score showed that most respondents had a good knowledge on cataract 78.9%. There was no statistically significant difference on knowledge of cataract based on qualification ($p=0.155$). However, age group and duration of practice were significantly different based on knowledge of cataract ($p<0.001$, $p=0.033$ respectively). Table 3

Associations between Skills on Cataract and Demographic Characteristics

Concurrently, on skills a relatively similar scenario was observed. Based on duration of practice, half of the participants who had practiced for less than five years 57.1% had good skills on cataract compared to those who had practiced for more than ten years 21.4%. The average composite awareness score was 40%, a clear indication of deficit on skills among respondents on cataract. However, there was no

statistically significant difference on skills of cataract for those who had practiced for six to nine years ($p=0.256$) similar to qualification of the participants ($p=0.357$). Table 4

Association between Demographic Characteristics and Practice

On practice, proportion of participants who had practiced for less than five years and between six to nine years was the same 35.7%. However, there was no statistically significant difference on the qualification of the participants and those who had practiced for more than ten years ($p=0.202$, $p=0.494$) respectively. Table 5

Discussion

Cataract in Kenya, just like in other country 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 results ascertained that cataract is treatable surgically and depending on the scope of practice, optometrists are well placed to diagnose and refer. However, with the current situation of optometry in Kenya, the burden of cataract will highly affect the quality of life.

With regard to knowledge of optometrists on cataract, the study findings established that 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. This is a clear implication that optometry training in Kenya has not narrowed only on optics of the eye but pathology has been incorporated in the training. In this study, 95.9% of 49 optometrists knew of the ocular complications of cataract. 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. 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 and refer patients to ophthalmologists. 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. 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. The good knowledge of optometrists on cataract will only be significant if they put it on practice.

On assessment of skills and practice among optometrists on diagnosis, treatment of cataract, the study found that 75.5% of participant's 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) which established that 90.6% of all cataract diagnosis was based on reduced visual acuity. Visual acuity may not be sufficient to ascertain cataract as there are several ocular related causes of reduced visual acuity. However, combining Funduscopy and reduced visual acuity will ascertain presence or absence of cataract. Hence the optometrist's scope of practice in Kenya should be inclined towards clinical practice so as to enhance their skills. Optometrists had good understanding of other risk factors of cataract which is essential in improving vigilance of practitioners among patients at risk. This calls for a need for clear definition of the roles of optometrists in Kenya. The study established that nearly half of the optometrists referred cataract patients mainly for ophthalmologic review. The choice of hospital where patients were referred depended on availability of ophthalmologist and cataract equipment. The author compared the study findings with other results regarding the knowledge, skills and practice rate as there was limited published literature on skills on cataract among optometrists Smith, Frick, Holden, & Naidoo, (2009). However, we ascertained that this study presented issues that require a lot of attention to address the role of optometrists in cataract management in other developing countries.

In this study, 61.2% of optometrists did not screen patients age 40years and above who attended eye clinics. This was possible because optometrists find it hard to relate with optometrist and as a results they don't see the need of referring cataract patients to the ophthalmologists, hence they major on optics. 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 interest in pathology of the eye with a lot of interest in optics. In the Kenyan context, optometrists' roles are confusing as they are capable of performing most procedures in relation to their scope of training. However, the Ophthalmic Division requires the optometrists to only do refraction when optometrists roles are well stipulated. So this translate that the burden of cataract may rise in Kenya as the first line eye care providers who meet majority of the patients are inclined towards optics. Hence, the Ophthalmic Division should streamline funds in management of eye care services and ensure that they restructure the roles of optometrists. The possible reason for the low skills among optometrists is attributed to lack of interest by the practitioners due to the division frustrations.

This study has some limitations: firstly, there are more than 300 optometrists in Kenya although only 149 are registered with Optometrists Association of Kenya. The sample size would have been larger if the author would have included all optometrists, however being that they are not interested in joining the association for reasons best known to them, accessing their email addresses proved futile. At the same time, Ophthalmic Division does not allow unregistered optometrists to engage in any activity. Secondly, as the respondents were only optometrists, the view of the Ophthalmic Division was not included in the study. Getting the opinion of stakeholders would have better the study. Future studies to be conducted should include the Ophthalmic Division, ophthalmologists in Kenya to confirm the study findings.

Conclusions

The present study demonstrates substantial deficit in the skills and practice of cataract among optometrists in Kisumu County, Kenya. Therefore, continuous training of optometrist on cataract is necessary. This can be done through supportive supervision, continuous medical education at health facilities and regular skills update workshops. Encourage optometrists to routinely check the lens of all patients above 40 years attending eye clinics. Encourage optometrist to counsel cataract patients as this improves compliance. There is need for ophthalmologists to inform optometrists on the visual acuity score to refer a cataract patient for a surgical intervention. This will ensure that the burden of cataract is greatly reduced due to improved skill development and knowledge among optometrists.

Declarations

Ethics approval

Ethical approval was obtained from the institution review board of Maseno University and authority to conduct the study from Ministry of Health. Participation was voluntary, and the respondents could withdraw from the survey at any time during the study period. The responses were kept confidential, and the data were de-identified before data analysis. The study adhered to the tenets of the Declaration of Helsinki.

Consent for publication

Not applicable.

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.

Competing interests

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

Funding

This research did not receive any funding.

Author's contributions

SM initiated the research concept, developed the proposal, did the data collection and wrote the manuscript. SO improved the research concept assisted with proposal development and reviewed the proposal, analyzed data and the manuscript. All authors contributed equally to the research work.

Acknowledgement

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

References

1. Arbor Using Social Epidemiology to Understand who Stays Blind and Who gets Operated for Cataract. 2018; 27: 553–558.
2. Bourne RRA, Stevens GA, White R A, et al. Causes of vision loss worldwide , 1990 – 2010 : a systematic analysis. 2012; doi.org/10.1016/S2214-109X(13)70113-X
3. Census 2019 Kenya Population And Housing Census Volume I: Population By County And Sub-County (Vol. I). 2019.
4. Dandona L, Dandona R. What is the global burden of visual impairment?, 10. 2006; doi.org/10.1186/1741-7015-4-6
5. Elston RC, Johnson WD. *Basic Biostatistics for Geneticists and Epidemiologists: A Practical Approach. Basic Biostatistics for Geneticists and Epidemiologists: A Practical Approach.*2008; doi.org/10.1002/9780470740781
6. Krishna JRA06.pdf. 2014
7. Ministry of Health. Kenya Health Policy 2014-2030, 1 Kenya Health Policy 2014-2030. 2014; doi.org/10.1017/CBO9781107415324.004
8. Noyes J, Booth A, Moore G, Flemming K, Tunçalp Ö, Moore G. Synthesising quantitative and qualitative evidence to inform guidelines on complex interventions: clarifying the purposes , designs and outlining some methods. 2019; doi.org/10.1136/bmjgh-2018-000893
9. Phil AM, Hd ITP. Human cataract prevalence study in the district of Alappuzha, 8(4), 5–8. 2013
10. Polack S, Kuper H. The Cataract Impact Study Summary report. *Journal of Current Ophthalmology.* 2017; 2:1–28.
11. Reutens DC. Care of the Adult Patient with. *Evid. Based Med. Healthc.* 2016; 1:1–6.
12. Shahsuvaryan M. The Management of Cataract: Where We Are?. 2016;3: 304–308.
13. Smith TS, Frick KD, Holden BA, Naidoo KS. Potential lost productivity resulting from the global burden of uncorrected refractive error, (March), 431–437. 2019; doi.org/10.2471/BLT.08.055673
14. Sokoto IN, Olatunji K, Oche OM, et al. Research Article Visual Impairment And Its Relationship To Academic Performance Among Primary. 2018; 5:3770–3774.
15. Ubah JN, Isawumi MA, Adeoti CO. Barriers to Uptake of Cataract Surgery : An Eye Camp Account, 2(1), 1–3. 2013; doi.org/10.5923/j.opthal.20130201.01
16. Vision I, News S. Research to Prevent Blindness Advances In Eye Research : Cataract.1960
17. Round Table Cataract blindness – challenges for the 21st century, 79(3). 2012
18. Wilson SJ. Is the cost the primary barrier for cataract surgery in Paraguay?, 77(3), 5–8. 2014

19. Zhu Barriers related to the uptake of cataract surgery and care in Limpopo province , South Africa : Professional Ophthalmic Service Providers ' perspective CURRENT STATUS : POSTED. *Journal of Current Ophthalmology*. 2017; 2:1–20.doi.org/10.21203/rs.2.13172/v1

Tables

Table 1 Knowledge of Optometrists on Cataract (N=49)

Variable	Number (%)
Cataract definition	
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)
What types of cataract do you know?	
Sub-capsular cataract	20 (40.8)
Cortical cataract	30 (61.2)
Traumatic cataract	10 (20.4)
Nuclear Cataract	48 (98.0)
Complications of cataract	
Blindness	47 (95.9)
Blurred vision	13 (26.5)
Inability to read	6 (12.2)

Table showing the number of respondents who could correctly define cataract, knew the types of cataract and were aware of the complication of cataract

Table 2 Skills of Optometrists on Cataract

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

Table above shows the skills of the respondents on diagnosis, significance of Funduscopy and lens assessment.

Table 3 Associations between Demographic Characteristics and Knowledge on Cataract

Variable	Knowledge		OR(95% C.I)	P-value
Age group(N=49)	Good	Poor		
25-36	24 (77.4%)	4 (22.2%)	12.0 (3.0-51.6)	<0.001
31-36	7 (22.6%)	14 (77.8%)	1.0	
Duration of Practice				
< 5	19(76.0%)	6 (25.0%)	1.0	
6-9	3(12.0%)	5(20.8%)	0.2 (0.0-0.9)	0.033
>10	3 (12.0%)	13(54.2%)	0.1 (0.0-0.3)	<0.001
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	

Table above shows the association between demographic characteristics and the respondent's knowledge on cataract with a confidence interval and a p value

Table 4 Associations between Demographic Characteristics and 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
Qualifications				
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	

Table above show the association between demographic characteristic and the respondent's skills on cataract with a confidence interval and the p value

Table 5 Associations between Practice and Demographic Characteristics

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
Qualifications				
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	

Table above shows respondents association between demographic characteristics and practice with a confidence interval and a p value

Figures

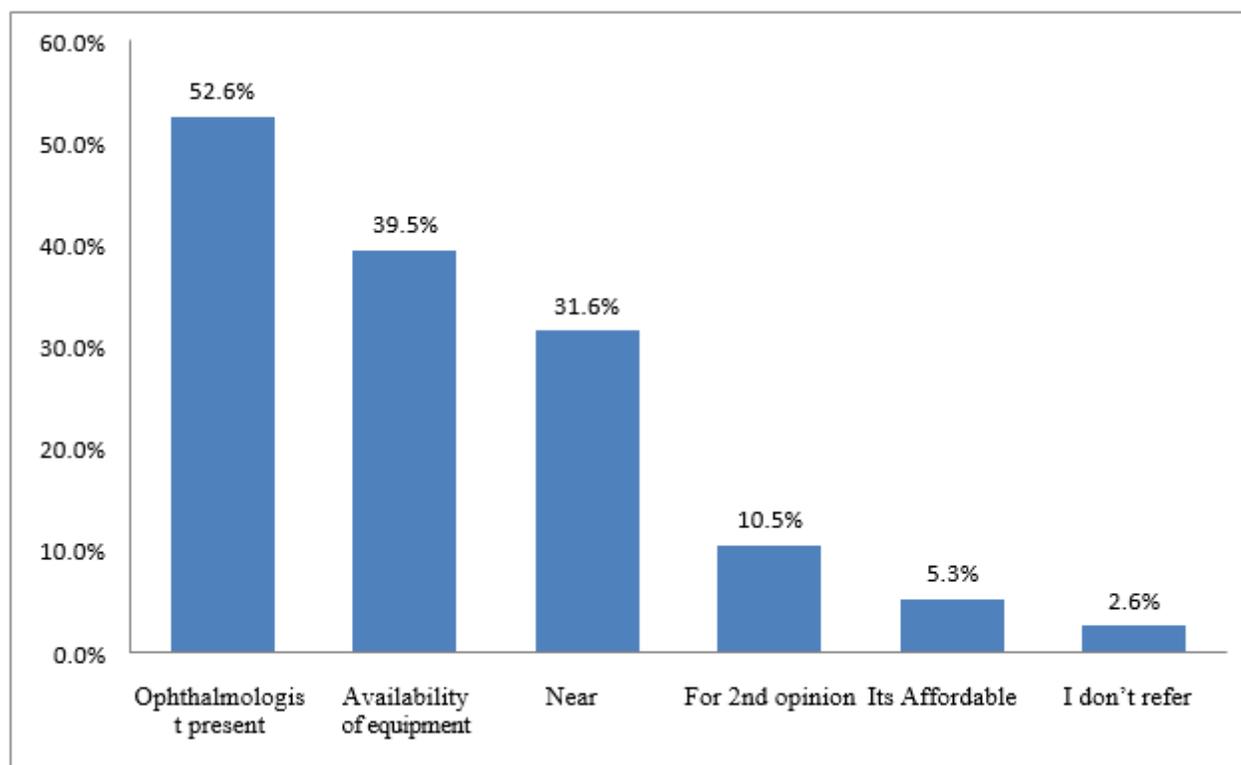


Figure 1

Reasons for Referral

Supplementary Files

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