



Knowledge, Awareness and Attitude towards Keratorefractive Surgery among Myopes: A Sub-Saharan African Experience

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Abstract

Objectives: The objective of the study was to determine the knowledge, awareness and attitude towards keratorefractive surgery among myopes attending an Eye hospital in Nigeria.

Materials & Methods: A Single center, descriptive, cross-sectional study was conducted among consecutive consenting new patients diagnosed with any form of myopia at Eye foundation hospital group, Nigeria. Interviewer administered semi-structured questionnaires, in-depth interviews and focused group discussions were used to collect information on socio-demographic characteristics, knowledge, awareness and attitude towards keratorefractive surgery.

Results: Three hundred and two participants were enrolled into the study with mean age of 30.48±8.44 years and an age range of 18 years to 57 years. Two hundred and seventeen (72%) of the participants had not heard about keratorefractive surgery before while 82 (27%) of the participants had heard about it, with social media (62.2%) contributing more to the awareness than the ophthalmologist (35.4%) and optometrist (17.1%). The odds of awareness of keratorefractive surgical procedures increased with urban place of residence (OR = 2.710, 95%CI 1.197-6.137; p= 0.017) and higher income (OR = 2.579, 95%CI 1.309-5.081; p= 0.006). Keratorefractive surgery was also viewed as risky, surgery for the financially privileged and needless.

Conclusion: There was relative low awareness and negative attitude to keratorefractive surgical services in this study and the significant predictors of awareness of keratorefractive surgery were urban residence and annual income of at least N1,000,000. There is a need for patient education to improve awareness and attitude towards keratorefractive surgery.

Keywords: Knowledge; Attitude; Awareness; Keratorefractive Surgery

Introduction

Uncorrected refractive errors are important causes of visual impairment and unequally are distributed among regions of the world [1]. They are as important as cataracts and are recognized as a public health problem. Approximately 2.3 billion people globally have impaired vision due to refractive error [2]. In 2015, an estimated 480 million people worldwide were considered blind or visually impaired because of

uncorrected refractive error [3]. Myopia is the most common visually significant refractive error and a leading cause of vision impairment worldwide with its prevalence increasing globally [4]. Preliminary projections based on United Nations population figures, indicate that myopia and high myopia will affect 52% (4,94s9 million) and 10.0% (925 million) respectively, of the world's population by 2050 [5]. The rising epidemic of myopia, surge in contact lens-related eye problems in our society, sub-optimal spectacle

wear seen among individuals, due to its psycho-social effects (low esteem, teasing by friends, rejection for marriage) [6], poverty, illiteracy as well as type of career, will have far reaching consequences for individuals and society and creates a huge concern. Therefore, there is a need for a one-time solution with aesthetic considerations. Keratorefractive surgeries have undergone extensive advancements in recent years and have evolved from a rudimentary science a few decades ago to an extremely sophisticated and hi-tech branch of Ophthalmology [7]. Major innovations and breakthroughs have helped to make keratorefractive surgery safe, precise, predictable and stable, and improve not only the vision but the quality of life of millions of patients who have benefited from it. The demand for keratorefractive surgery for myopia has increased steadily in recent years, mostly in the developed countries but still an emerging field in Nigeria. Individuals with myopia especially many spectacle wearers are potential beneficiaries of keratorefractive eye surgeries. However, spectacle wearers rarely request for alternatives to eyeglasses in correcting refractive errors in resource limited setting [8]. This study was conducted to determine the knowledge, awareness and attitude towards keratorefractive surgery among myopes in a center that readily offers the services.

Methods

This was a prospective descriptive cross-sectional study conducted at different locations of the Eye Foundation Hospital Group, Nigeria. This study was carried out following the guidelines as contained in the declaration of Helsinki and approval was obtained from the Ethics and Research Committee of the Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria. The participants were patients who came for eye consultations in the eye clinics of the health facility.

Study Design

The criteria for inclusion of the participants in the study

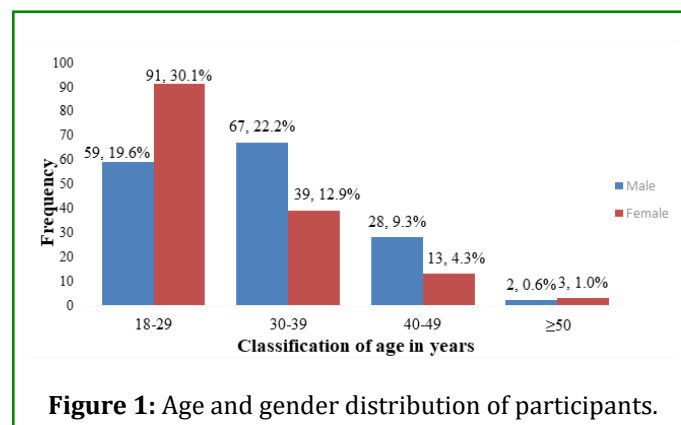
were new consenting adult patients age 18 years and above, diagnosed with any form of myopia. Written consent was obtained after the study had been explained to each participant. This study had both quantitative and qualitative components. The quantitative component was the prospective study while the qualitative component consists of both in-depth interview and focused group discussion (FGD). Each of the participants was interviewed using a pre-tested semi-structured questionnaire (adapted from previous studies) Gupta N, et al. [9,10]. Interviewer administered semi-structured questionnaires, in-depth interviews and focused group discussions were used to collect information on socio-demographic characteristics, knowledge, awareness and attitude towards keratorefractive surgery.

Data Analysis

The data were collated, entered into, IBM Statistical Package for Social Sciences (IBM-SPSS) version 26 (IBM Corp: Armonk, NY USA) and analyzed. The Chi square was used to test associations between parameters. These include associations between degree of myopia/demographic characteristics and awareness of keratorefractive surgery. Logistic regression was done for variables with significant association. Shapiro-wilk test was used to determine normality of quantitative variables. Student's t-test and Wilcoxin sign ranked tests were used for comparison of continuous variables depending on normality. The results are displayed using tables, pie charts, graph, scatter plots and bar charts. The associations of statistical significance was taken at $P < 0.05$.

Results

A total of 302 participants were enrolled in this study. One hundred and fifty-six (51.7%) were male and one hundred and forty-six (41.3%) were female, with a mean age of 30.48 ± 8.44 (18 to 57) years. The age and gender distribution of participants are shown in Figure 1. The other socio-demographic characteristics of participants are shown in Table 1.



Socio-Demographic Profile of Participants	Frequency	Percentage (%)
Place of Residence		
Urban	230	76.2
Rural	72	23.8
Total	302	100
Level of Education		
None	1	0.3
Primary	1	0.3
Secondary	35	11.6
Tertiary	163	54
Postgraduate	102	33.8
Total	302	100
Occupation		
Student	73	24.2
Unemployed	35	11.6
Employed	193	63.9
Retired	1	0.3
Total	302	100
Income (Annually/Naira)		
<500,000	125	41.4
500,000-1,000,000	54	17.9
1,000,000-3,000,000	55	18.2
>3,000,000	68	22.5
Total	302	100
Type of visual aid in use		
Spectacle	201	66.6
Contacts	9	3
Both Spectacle/Contacts	13	4.3
Pseudophakia	4	1.3
None	75	24.8
Total	302	100

Table 1: Other socio-demographic characteristics of participants.

Two hundred and forty-eight (82.1%) participants had low to moderate myopia in both eyes, 42 (13.9%) had high myopia in both eyes, while 12 (4%) participants had low to moderate myopia in one eye and high myopia in the other eye.

Awareness of Keratorefractive Surgery

The awareness of the participants about keratorefractive surgeries is depicted in Figure 2. Out of the 82 participants who have heard about keratorefractive surgery, the source of

information were Social media 51 (62.2%), Ophthalmologist 29 (35.4%), Optometrist 14 (17.1%) and Family/Friends 11 (13.4%).

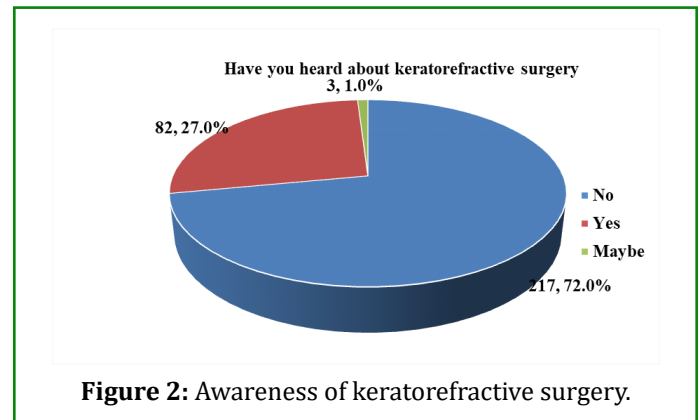


Figure 2: Awareness of keratorefractive surgery.

Knowledge about Keratorefractive Surgeries

Two hundred and nineteen (72.5%) participants had no idea of what keratorefractive surgery entailed, its benefits and complications. The ideas of the remaining 83 (27.5%) are as summarized in Table 2.

What do you Know about Keratorefractive Surgeries	Frequency	Percentage (%)
The use of lasers to correct refractive errors	66	79.5
The surgery is safe, better than spectacle	9	10.9
The surgery is unsafe, prefer spectacles	8	9.6
Total	83	100

Table 2: Knowledge about keratorefractive surgeries.

Association between Awareness of Keratorefractive Surgery and Socio-Demographic Variables/Degree of Myopia

The following variables showed significant associations with awareness of keratorefractive surgery: place of residence (chi-square $p < 0.001$); occupation (chi-square $p < 0.001$) and income (chi-square $p < 0.001$). However, there were no significant associations between age, gender, level of education, degree of myopia and awareness of keratorefractive surgery.

Multivariate Analysis (Logistic Regression) for Factors Influencing Awareness of Keratorefractive Surgery

The factors identified to be significantly associated with

awareness of keratorefractive surgical procedures in bivariate analysis were obtained and subjected to multivariate analysis. The result of the multiple logistic regression analysis for awareness of keratorefractive surgical procedures is shown in Table 3. Participants whose annual income was at least N 1,000,000 were 2.6 times more likely to be aware of

keratorefractive surgery than participants whose annual income was less than N1,000,000. Also, participants who were resident in urban areas were 2.7 times more likely to be aware of keratorefractive surgery than participants who were resident in the rural areas.

Variables	Odds Ratio	95%CI	p-value
Place of residence			
Rural	1		
Urban	2.71	1.197-6.137	0.017*
Occupation			
Unemployed	1		
Employed	1.355	0.630-2.915	0.436
Income (Annually/Naira)			
<1,000,000	1		
≥1,000,000	2.579	1.309-5.081	0.006*

* Statistically significant (p<0.05)

Table 3: Logistic Regression Analysis of associated predictor variables for awareness of keratorefractive surgery.

Focused Group Discussion/In-Depth Interview

Fifteen (15) participants were enrolled in the focus group while twenty-one (21) participated in the in-depth interview. The following themes emerged from the analysis: general

thoughts and attitudes towards keratorefractive surgery; knowledge of keratorefractive surgery and improving awareness and acceptance of keratorefractive surgery with subcategories in education, advocacy and capacity building as shown in Table 4.

Theme	Description
General thoughts and attitudes towards keratorefractive surgery	Fear of blindness or worsening of refractive errors
	High cost
	Surgery for the financially privileged
	Lack of awareness of the success rates in Nigeria
	Poor knowledge and publicity by medical doctors in general
	New innovations risky
	Spectacles, safer and cheaper
	Want it, tired of spectacles
Knowledge of keratorefractive surgery	Use of spectacles after the surgery makes it needless
	Use of laser to correct refractive errors
Improving awareness of keratorefractive surgery	Good treatment for refractive errors
- Education	Keratorefractive surgeries should be taught in medical schools
	Update courses for ophthalmologists
	Surgical training and re-training of specialists
	Proper patient education on the procedure and safety (i.e., include surgical videos showing the procedure being done and videos with patient testimonies in the clinic)

- Advocacy	Get the ministry of health involved to improve awareness
	Incorporate into health insurance schemes
	Involving well-meaning individuals and society for sponsorship of surgeries
- Capacity Building	Infrastructural developments in government owned hospitals
	Addition of keratorefractive surgery as part of service delivery in government hospitals
	Manpower development/skill acquisition

Table 4: Focused group discussion/in-depth interview emergent themes with descriptions.

General Thoughts and Attitudes towards Keratorefractive Surgery

The participants in this study mostly reported negative attitudes and perceptions towards keratorefractive surgery. When the participants were asked about what came to mind when they heard keratorefractive surgery, many participants responded with the words such as 'high cost', 'fear of damage', 'poor knowledge', 'risky' and 'surgery for the rich'.

- Participant from focus group: 'I can't allow my eyes to be tampered with, am fine with my glasses'
- Participant from in-depth interview: 'I prefer to do the surgery abroad'

Although keratorefractive surgeries were perceived to be expensive, one participant stated that in trusted hands, he would do the surgery because he was tired of spectacles.

- Participant from in-depth interview: 'I never liked wearing glasses, so when I heard about the surgery, I quickly opted for it'
- Participant from focus group: 'It's amazing functioning without glasses'

Knowledge of Keratorefractive Surgery

Some of the participants interviewed seemed to have good knowledge about keratorefractive surgery. Those that were aware of it & felt it was a good treatment for refractive errors.

- Participant from in-depth interview: 'Use of laser to correct refractive error'. Participant from focus group 1: 'makes one to discontinue spectacle wear'
- Participant from in-depth interview: 'well, I read that the refractive errors may reoccur and that makes me a bit worried.....but its fine'
- Participant from focus group: 'I read from social media that it treats refractive errors permanently'
- Improving awareness of keratorefractive surgery

Improving awareness and acceptance of keratorefractive surgery were sub-categorized into education, advocacy and capacity building. The participants generally agreed that there is poor patient education about the surgery from the doctors, both ophthalmologists and non-ophthalmologists.

Participant from focus group (medical doctor): 'Am a medical doctor, yet I don't know much about this surgery. I only know it's the use of lasers on the eye and that sounds scary'

Participant from focus group (medical doctor): 'I never heard of it in medical school. I never knew it is possible to correct refractive errors through surgery until I visited your hospital. If I don't know about it, how will I talk to a patient about it. I think, the education about keratorefractive surgery should start with medical doctors and from medical school, which would go a long way in patient education.'

Participants also unanimously agreed that keratorefractive surgery should be part of the service delivery module in the teaching hospitals and also called for total infrastructural developments in the General Hospitals.

Discussion

In this study, only 27% of the participants had heard about keratorefractive surgeries. This finding is contrary to the observations of Ayanniyi AA, et al. (52.8%) [8] and Robert ET, et al. (51%) [1]. The low level of awareness observed in this study may be due to the evolving nature of this field of Ophthalmology in Nigeria with the availability of this service in few centers. Ayanniyi AA, et al. [8] included participants with any type of refractive error. Participants with hyperopia may become symptomatic and seek possible solutions, thereby increasing awareness of the surgery. This study included only myopes with 82.1% of the participants within low to moderate myopia with relatively good range near vision, which may make them not interested in seeking solutions. The mean age in this study population is 30.48±8.44 years, while Ayanniyi AA, et al. [8] study population was 40.2±15.8 years. Ayanniyi AA, et al. [8] study population were averagely within the presbyopic age range with a possibility of spectacle dependence for reading, which may irritate and make them seek ways to get rid of their reading glasses, thereby increasing the awareness of keratorefractive surgical services. Half of the participants who have heard about keratorefractive surgeries got to know about it from social media. This may reflect the status of social media as an easy

source of information especially among the youths more so that 98.3% of the participants in this study were less than 50 years. The lower level of awareness from Ophthalmologists and Optometrists may be due to the paucity of sub-specialist in this regard coupled with perceived possible loss in the income flow from spectacles and contact lens.

On multivariate logistic regression, there was a statistically significant positive relationship between place of residence (OR = 2.710, 95%CI 1.197-6.137; $p= 0.017$), income (OR = 2.579, 95%CI 1.309-5.081; $p=0.006$) and awareness of keratorefractive surgery. This was similar to the findings of Robert ET, et al. [1] and indicates that urban dwellers and higher income earners were approximately three times more likely to be aware of keratorefractive surgical procedures compared to rural dwellers and lower income earners. These findings may be attributable to urban dwellers and higher income earners, having more funds to access good health care, easy access to social media/information, better social amenities, infrastructure and residing closer to the tertiary hospitals to access specialized ophthalmic care, thereby increasing the awareness of keratorefractive surgery. This study found that 27.5% of the participants had some ideas about keratorefractive surgery, its benefits and complications. This is lower than the observations in previous studies (57.8% to 65%) Gupta N, et al. [9,11-13]. This may be related to the low level of awareness observed among participants in this study. Participants, who had some knowledge, understood refractive surgeries to be mainly the use of laser to correct refractive errors and a good treatment for refractive errors.

With respect to the focus group discussion and in-depth interview, keratorefractive surgery was mainly viewed as a new innovation, risky, surgery for the financially privileged and needless since some patients may still need spectacles after the surgery while a few saw it as a welcome development, if it would make them to stop using spectacles. Participants indicated that ophthalmologists and other medical doctors rarely talk about the surgery during clinic visits with limited records of success rates in keratorefractive surgery in Nigeria and lack of trust in the health system, thereby doubting the capacity of such surgery been done in Nigeria. This may be due to the systemic failure of the Nigerian health sector with low annual budget allocation for capacity building and infrastructural development, leading to the underdevelopment of the general health facilities in the country and mistrust seen among individuals.

Conclusion

There was relative low awareness and negative attitude to keratorefractive surgical services in this study. The significant predictors of awareness of keratorefractive surgery were

urban residence and annual income of at least N 1,000,000. Target audience education towards keratorefractive surgery, allaying fears on their complications and affordable cost could enhance awareness and positive attitudinal change.

Recommendation

- There is a need for patient education to improve awareness, attitude and surgical uptake. Service providers should be equipped with educational materials (videos and leaflets) on the procedure and safety, including the testimonies of patients, who have had the surgery. This would go a long way to build trust, allay fears and enhance awareness and positive attitudinal change.
- Public-private partnerships should be encouraged, to enhance infrastructural developments towards keratorefractive procedures in government and private owned hospitals. This would help increase the number of centres offering the procedures and appeal more ophthalmologists to be interested in the sub-specialty training.
- There is a need to increase the level of awareness about keratorefractive surgeries among health workers especially medical doctors with respect to it, being a therapeutic option in refractive error treatment.

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