Factors associated with the uptake of cataract surgery among adults identified with operable cataract in South Western Uganda

Kanji R[1], Onyango J[1], Twinamasiko A[1], Arunga S[1,2]

[1]Department of Ophthalmology, Mbarara University of Science and Technology, P.O. Box 1410, Mbarara, Uganda
[2]International Centre for Eye Health, London School of Hygiene & Tropical Medicine, London, UK

Corresponding author: Dr Raheel Kanji, Catholic University of Health and Allied Sciences, Uganda. Email: raheelkanji@gmail.com

ABSTRACT

Objective: To determine the factors associated with the uptake of cataract surgery among adults identified with operable cataract in South Western Uganda.
Methods: In a hospital-based cross-sectional study, patients presenting with operable cataract at two large tertiary level eye hospitals in south-western Uganda were prospectively consecutively enrolled between, October 2020 to January 2021. Operable cataract was defined, as a best-corrected visual acuity equal or less than 6/60 where the principal cause is cataract. The outcome of interest was undergoing a cataract surgery within 3 months of diagnosis. In a multivariable logistic regression model, we tested for social demographic and other baseline features associated with uptake of a cataract operation.
Results: During the study period, a total of 400 patients with operable cataract were enrolled out of a total outpatient attendance of 1692 in the two hospitals (23.6%). The median age was 71 (IQR 65-80, full-range 30-102) and 222 (55.5%) were female. Most were married 242 (60.5%), the majority with no formal education 184 (46%). The most common occupation was being a peasant 256 (64%). The majority of the patients were household heads 285 (71.2%) and a large proportion required an escort to the hospital 384 (87%). Bilateral operable cataract was present in 146 (36.5%). Within the study period, the uptake of cataract surgery was 64% 95% CI (59- 68). In a multivariable logistic regression model, <50 years (OR 3.0, 95% CI (1.26 – 7.23) P-value = 0.021), female gender (OR 1.5, 95% CI (1.04 – 2.34) P-value=0.032) and bilaterally affected eyes (OR 2.95, 95% CI (1.8 – 4.8) P-value 0.001) were associated with uptake of cataract surgery.
Conclusion: This study showed that younger patients compared to older ones, females compared to males and bilaterally affected patients compared to unilateral were more likely to uptake cataract surgery. This provides useful background information for planning improvements in the uptake of cataract services.

Key words: Cataract, Factors associated, Uptake, Gender, Age, Bilateral cataract, Hospital-based

INTRODUCTION

Cataract is clouding of the lens of the eye which prevents clear vision. Although most cases of cataract are related to the ageing process, occasionally children can be born with the condition, or a cataract may develop after eye injuries, inflammation, and some other eye diseases. It develops slowly and can affect one or both eyes. Symptoms may include faded colours, blurry or double vision, halos around light, trouble with bright lights, and trouble seeing at night. Furthermore, there are different types of cataract among these are nuclear, cortical and Posterior Subscapular (PSC)[1].

Blindness and visual impairment are unequally distributed throughout the world and vary with place of residence, race, religion, occupation, gender, age, socioeconomic status, and literacy levels, accompanied by other disabilities such as hearing, walking, cognition, self-care, and communication. Cataract distribution patterns are more commonly prevalent among older age groups and in people residing in developing compared to developed countries[2].

According to the world vision report 2019, the prevalence of cataract was 65.2 million people amongst 2.2 billion people with visual impairment worldwide. Cataract surgery is one of the most commonly performed procedures, offering significant improvement in the quality of life for patients of all ages[3].

Cataract blindness is avoidable and surgical intervention can effectively restore visual impairment in the population. Socially disadvantaged population groups have a higher prevalence of poor uptake of

cataract services than their more privileged counterparts, primarily due to lower uptake of good quality services. For example: across the globe in 2015, women were 1.21 times more likely than men to be blind or visually impaired from cataract[4]. Gender difference could be due to gender-defined social roles, which could be confounded by factors like literacy rate, socioeconomic status as well as urban-rural differences. Women in countries with lower cataract surgical uptake are likely less educated, have other domestic responsibilities and are not the main earning member of the house, thus having less access to eye care as well as other health care services[5].

Despite the gradual rise of cataract surgical uptake and cataract surgical coverage in recent years with regard to advances in technology, safer practices of procedures show that the provision of cataract surgery is the most effective option of combating this imbalance in the socially disadvantaged groups[6].

Although the prevalence of cataract is high, the services available do not match the needs of the people. Several studies on factors associated with the barriers of uptake of these services have been done; however, few studies have assessed the factors that determine the motivation and willingness of undergoing cataract surgical services.

MATERIALS AND METHODS

This was a hospital based cross-sectional study of all patients with cataract that presented to Ruharo Eye Centre (REC) and Mbarara University and Referral Hospital Eye Centre (MURHEC) during the period from October 2020 to January 2021. MURHEC is a government owned tertiary eye unit established in 2013. It provides mostly free services and sees about 6,000 - 10,000 patients/year. REC is a church-based fee-paying tertiary eye hospital founded in the 1960's. It offers eye care services to about 20,000 - 25,000 patients/year. Both hospitals are located in Mbarara Municipality, South-Western Region, Uganda, approximately four hours' drive from Kampala. The two units are about 5km apart and work closely together.

The study included all patients who are greater or equal to 18 years of age with operable cataract and who provided written consent to participate in the study at MURHEC and REC and excluded patients with any mental condition that deters them to consent or clearly respond to study questions and with ocular comorbidities that make them surgically unsuitable like a dense corneal scar, retinal detachment with afferent pupillary defects, advanced glaucoma, diabetic retinopathy.

All patients had their Visual Acuity (VA) recorded with a Snellen (E) chart at 6 meters or counting fingers between 5 and 1 meter, then hand movement and perception of light. Patients were classified as operable cataract blind if their best-corrected visual acuity of less than 6/60 (severe visual impairment) where the principal cause is cataract. The ophthalmologist used a direct and/or indirect ophthalmoscope, as well as a slit lamp with condensing lens.

Face to face interview was done using pre-tested structured questionnaire, which consists of information on socio-demographic, ocular and medical history of the participants.

After checking completeness and consistency of the data; it was coded and entered into EPI info version 7.2, and then exported into STATA version 15 software for analysis. Descriptive and analytical statistics were performed for analysis of the entered data. Binary logistic regression was used to determine the significance of socio-demographic factors associated with uptake of operable cataract. The strength of association was expressed by using an adjusted odds ratio at a 95% confidence interval. The model of fitness was assured using goodness of fit. A variable with a P-value of less than 0.05 was considered as statistically significant. Finally, the analysed data was organized and presented with tables and text form as necessary.

Ethical approval was obtained from the Department of Ophthalmology (MUST), Clinical Director of Ruharo Eye Centre, Faculty Research and Ethics Committee (MUST) and Institutional Ethical Review Committee of Mbarara University of Science and Technology After a full explanation of the objective of the study, written informed consent was obtained from each study participant during data collection. The right of discontinuing or refuse to participate in the study was informed for all study subjects. Confidentiality was maintained by omitting any personal identifier. Generally, the study was conducted in tenet of the Principle of Declaration of Helsinki. The examination was done using tools and drugs usually used in routine practice at REC and MURHEC.

RESULTS

A total of 400 participants were consented and enrolled in the study between October 2020, to January 2021. Of the 1692 patients that came to MURHEC and REC during the study period, 69 and 331 patients were enrolled at MURHEC and REC respectively.

Table 1: Sociodemographic of the participants

Characteristic	Overall, (n)	(%)
Gender		
Female	222	(55.5)
Male	178	(44.5)
Age (years) (median = 71, IQR= 65 – 80, full range 30-102)		
<50	36	(9.0)
50-69	134	(33.5)
70 or more	230	(57.5)
Districts (median = 53, IQR= 33 – 103, full range 5-494)		
0 - 50 km	147	(36.7)
50 -100 km	141	(35.3)
100 -150 km	87	(21.7)
> 150 km	25	(6.3)
Marital status		
Unmarried [a]	158	(39.5)
Married	242	(60.5)
Education level		
None	184	(46.0)
Primary	174	(43.5)
Higher education	42	(10.5)
Occupation		
None	66	(16.5)
Peasant	256	(64.0)
Others	78	(19.5)
Household size		
0 - 4	125	(31.2)
5 or more	275	(68.8)
Need for escort to hospital on the appointment day		
No	52	(13.0)
Yes	348	(87.0)
Being head of household		
No	115	(28.8)
Yes	285	(71.2)
Affected eye		
Unilateral	254	(63.5)
Bilateral	146	(36.5)
Another patient disability		
Yes [b]	134	(33.5)
No	266	(66.5)

[a] Unmarried included single divorced and widowed

[b] other patient disabilities included, challenges seeing with glasses (1.3%); Hearing disabilities (16.3%); Movement disabilities (15.3%); Difficulties in remembering (14.5%); Difficulties in self-care (5.3%); Community ability (3.8%)

The baseline characteristics of the study participants are presented in Table 1. The participants were predominantly aged 50 years and above (91%), with slightly more females (56%) than males and with a median age of 71 years. The majority had primary or no formal education (90%). A fairly large proportion was married (61%) and with a house occupancy of five or more people (69%). The majority had been accompanied at the current visit (87%) and (71%) were the heads of their families.

The majority (63.5%) of the participant's presented with unilateral eyes with operable cataract compared to bilateral and (33.5%) of the patients had other physical disabilities.

Among the 222 females in the study, 70% were willing to uptake cataract surgery among 120 being the heads of the household and compared to 178 males in the study with 59% willing to uptake cataract surgery among 165 being the head of households. Of 1692 patients that attended the two hospitals within the study period, 400 had operable cataract hence giving an overall prevalence of 23.6%.

Overall, of the 400 patients who enrolled with operable cataract, 256 took up cataract surgery. This gives an overall uptake of cataract surgery of 64% (95% CI: 0.59 – 0.68), with no significant disparities across sites.

In a bivariable analysis as shown in Table 2, the factors significantly associated with uptake of cataract surgery were; age < 50 years, female gender, need for an escort to hospital on the appointment day, those with bilaterally affected eyes, individuals with peasant and professional occupations and those married, P-value < 0.2 were considered for multivariate analysis.

After adjusting for confounders, the final model had; Age < 50 years (aOR=3.0, 95% CI: 1.26 – 7.23, P-value 0.0102). Being female (aOR = 1.5, 95% CI: 1.04 - 2.34, P-value 0.032) and having bilateral cataract (aOR = 2.95, 95% CI: 1.8 – 4.8, P-value 0.001), P-value <0.05 were the factors significantly associated with the uptake of cataract surgery.

Table 2: Factors associated with uptake of cataract surgery among operable cataract (N=400)

Variable	Univariate analysis			Multivariate analysis		
	Crude Or[a]	(95% CI)	P-value	Adjusted Or[b]	(95% CI)	P-value
Age categories (years)						
50 - 69	1.0		0.045	1.0		0.0102
< 50	2.6	(1.00 -5.24)		3.0	(1.26 – 7.23)	
> 70	1.5	(0.98 -2.35)		1.6	(0.97 – 2.6)	
Gender						
Male	1.0		0.062	1.0		0.032
Female	1.5	(0.98 - 2.23)		1.5	(1.04 – 2.34)	
Need for escort to hospital on the appointment day						
No	1.0		0.024	1.0		0.212
Yes	1.95	(1.1 – 3.5)		1.5	(0.8 – 2.9)	
Affected eyes						
Unilateral	1.0		0.0001	1.0		0.001
Bilateral	2.97	(1.8 – 4.7)		2.95	(1.8 – 4.8)	
Marital status						
Unmarried	1.0		0.093	1.0		0.392
Married	0.7	(0.5 – 1.1)		0.8	(0.48 – 1.33)	
Occupation						
None	1.0		0.177	1.0		0.661
Peasant	0.9	(0.5 – 1.6)		1.1	(0.57 – 2.0)	
Others	0.6	(0.3 – 1.1)		0.8	(0.36 – 1.9)	
Distance (kilometres)						
0 – 50	1.0		0.487			

50 – 100	1.4	(0.9 – 2.3)	
100-150	1.3	(0.76 – 2.3)	
>150	1.4	(0.6 – 3.6)	
Education level			
None	1.0		0.469
Primary	0.87	(0.6 - 1.3)	
Higher education	1.3	(0.7 – 2.8)	
House hold size			
0 – 4	1.0		1.0
5 or more	1.0	(0.64 – 1.6)	
Being head of house hold			
Yes	1.0		0.890
No	0.97	(0.62– 1.52)	
Other patient disability			
No	1.0		0.698
Yes	0.92	(0.6 – 1.41)	

Legend
[a]All crude estimates were adjusted for age and sex
[b]Final predictive model adjusted for age and sex

DISCUSSION

In this study, about 23.6% of participants had operable cataracts. This finding was much lower than other hospital-based studies, from our literature search on the prevalence of operable cataract, we found that a large number of hospital-based studies recruited patients with any lens opacity regardless of their visual impairment, giving a general dissimilar prevalence of operable cataract.

However, other hospital-based studies in sub Saharan African showed a higher prevalence of operable cataracts reported in Malawi by Sherwin *et al*[7] (52.8%), in Ethiopia by Mengistu *et al*[8] (57%), Wale *et al*[9] and Tegegn *et al*[10] (49.5%). In these studies, all patients with any lens opacity regardless of its impact on vision were included contrasting our study where we recruited only patients with vision-impairing lens opacities. Our case definition was a patient with vision equal to and below 6/60.

In comparison with the high-income countries, Gupta *et al*[11] reported lower prevalence (9.2%) in Singapore and (1.92%) in Los Angelis[12]. This was expected considering these countries are quite developed with advanced cataract surgical services where they operate mostly on incidence cases, contrasting to our set up where we are still operating on the large backlog of operable cataracts.

The overall proportion of uptake of cataract surgery among patients with the operable cataract was 64%. From our literature search on the proportions of uptake of operable cataract, we found few hospital-based studies, most of the studies done were community and population-based studies, the hospital-based studies recruited patients with any lens opacity regardless of their visual impairment, giving a general dissimilar proportion of uptake of operable cataract.

A study done in Kenya reported a similar proportion of uptake of cataract surgery (58.6%). This was comparable to our study due to the fact that the majority of patients who up took cataract surgery were younger aged, breadwinners with high visual and occupational needs[13].

This study had a relatively higher uptake compared to other studies in sub Saharan Africa. For example, one study from Ghana reported uptake of 48.5%[14], in Madagascar 24.6%14[15] and in Tanzania 24.4%[16]. This was clearly due to the fact that these studies enrolled patients aged 50 years and above, contrasting to our study where we enrolled all patients aged 18 years and above. As we have already noted above, younger aged patients are more willing to uptake cataract surgery due to their need for better vision for daily routine activities therefore a higher proportion of cataract surgical uptake.

This study found that the most important factors associated with the uptake of cataract surgery were aged less than 50 years, female gender and bilaterality of the cataract.

We found, those aged less than 50 years were three times more likely to uptake cataract surgery, than those above 50 years. This was similar to other studies in sub Saharan Africa, reported in Kenya[12] and Nigeria by Abubakar *et al*[17] with higher uptake of cataract surgery

among the lower aged group (below 50 years) compared to the higher aged group (above 70 years). This was probably due to the visual functional needs desired among the younger age group for their occupational needs as they are the main breadwinners of the family than the older aged group.

In our study, females were one and a half times more likely to uptake cataract surgery compared to males and the majority being the heads of the household, this was similar to studies done in Ethiopia by Mehari *et al*[18] and in Nigeria by Kurawa *et al*[19]. This may be due to the fact that the majority of females who up took cataract surgery were heads of the household which might have influenced the decision-making for the uptake of cataract surgery in these studies.

However, compared to many studies in sub-Saharan Africa, male patients showed to have a higher proportionate of uptake compared to females. For example, in Nigeria Abubakar *et al*[17] and Geneau *et al*[20] in Tanzania this may have been due to the fact that the majority of males were heads of households and involved in the decision-making for the uptake of cataract surgery in these studies.

In this study, patients who had bilateral cataracts were three times more likely to uptake surgery than those who had unilateral cataracts. This was similarly seen in studies done in Malawi by Msamati *et al*[21] at Queen Elizabeth Central Hospital, in Nigeria[18] and India by Sobti *et al*[22]. This was due to the fact that the patients were more encouraged to seek cataract surgical treatment in the absence of a good eye (functional vision). Our observation is that compared to people with unilateral visual impairment, people with bilateral operable cataract are more motivated to have at least one of their eyes done so that they regain their vision.

CONCLUSION

The overall prevalence of operable cataract among patients seen at MURHEC and REC is low (23.6%). The proportion of uptake of cataract surgery among patients with operable cataract at MURHEC and REC was high (64%). Factors associated with the uptake of cataract surgery among patients with operable cataract were being less than 50 years of age, female gender, bilaterality of the cataract.

Funding: Self.

Consent for publication: All authors have consented.

Availability of data and materials: Yes

Competing interests: The authors declare that there are no competing interests

Authors' contributions: All authors have contributed to the work.

Acknowledgement: None.

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