

## Original Article

# Practice of Trabeculectomy by Ophthalmologists in Nigeria

NN Kizor-Akaraiwe, CE Ogbonnaya<sup>1</sup>

Department of  
Ophthalmology, Enugu  
State University of  
Science and Technology,  
Teaching Hospital Parklane,  
Enugu, <sup>1</sup>Department of  
Ophthalmology, Federal  
Teaching Hospital, Abakiliki,  
Nigeria

### ABSTRACT

**Aim:** To assess the practice of trabeculectomy among ophthalmologists in Nigeria. **Materials and Methods:** This was a cross-sectional study in which structured, self-administered questionnaires were distributed to 80 consenting ophthalmologists present during the 2010 annual scientific session of the Ophthalmological Society of Nigeria. All consenting ophthalmologists treat glaucoma patients. Information obtained were demographic characteristics, glaucoma outpatient load, number of trabeculectomies performed in the preceding 1 year and during residency training, and factors influencing trabeculectomy practice. Data were analyzed with Statistical Package for Social Science version 16.0. Relationships between variables were tested using the  $\chi^2$  test for statistical significance. **Results:** Sixty-five of the 80 consenting ophthalmologists responded to the questionnaires (81.3% response rate); 32 (53.3%) were females and 28 (46.7%) were males (5 non-responders). Ages ranged from 30 to 60 years with a mean of 44 years  $\pm$  SD 7.7. Only 36 (57.1%) performed trabeculectomy in the 1 year preceding the study. There was an overall trabeculectomy rate of 0.9/ophthalmologist/month. Of the 15 respondents who performed more than 15 trabeculectomies during residency, 14 (93.3%) also performed the surgery in the year preceding this study ( $P = 0.001$ ). The main limitation to the practice of the procedure was patients' unwillingness to accept surgery, as identified by 50 (89.3%) respondents. **Conclusions:** A low trabeculectomy rate of 0.9/ophthalmologist/month was found in this study. It was significantly associated with insufficient exposure to the surgery during residency training and patients' poor acceptance of the surgery.

**KEYWORDS:** Glaucoma, Nigeria, ophthalmologists, trabeculectomy

### Date of Acceptance:

21-Oct-2016

## INTRODUCTION

Glaucoma is the leading cause of irreversible blindness worldwide<sup>[1,2]</sup> and the second leading cause in Nigeria with a prevalence of 0.7%.<sup>[3]</sup> Open angle glaucoma is more common and aggressive in black Africans, especially in the West African subregion, with the disease and blindness occurring at an earlier age.<sup>[1-4]</sup> Presentation is also often at an advanced stage with 52% of people presenting blind and 70% presenting with a vertical cup-disc ratio greater than 0.8.<sup>[5-9]</sup>

Management of glaucoma, which could be medical, surgical, or laser, is challenging. With the advent of new generation anti-glaucoma medications, new lasers and aqueous shunting devices, the practice of trabeculectomy has decreased significantly in the developed world.

However, it remains the commonest drainage procedure for glaucoma and the gold standard drainage surgical procedure for the treatment of glaucoma.<sup>[2,10-12]</sup>

In Africa and other developing economies, medical and laser treatments are fraught with challenges of affordability, availability, accessibility, and sustainability of treatment and follow-up care.

The Collaborative Initial Glaucoma Treatment Study (CIGTS) found that at more than 8 years of follow-up, patients with advanced baseline visual field loss (mean deviation  $>10$  dB) had less visual field

**Address for correspondence:** Dr. Nkiru Nwamaka Kizor-Akaraiwe, Department of Ophthalmology ESUT Teaching Hospital Parklane, Enugu, Enugu State, Nigeria. E-mail: nakaraiwe@gmail.com

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: [reprints@medknow.com](mailto:reprints@medknow.com)

**How to cite this article:** Kizor-Akaraiwe NN, Ogbonnaya CE. Practice of trabeculectomy by ophthalmologists in Nigeria. Niger J Clin Pract 2017;20:507-11.

Access this article online	
Quick Response Code:	Website: <a href="http://www.njcponline.com">www.njcponline.com</a>
	DOI: 10.4103/1119-3077.196992

progression if they underwent initial trabeculectomy than if they were treated with medications.<sup>[13]</sup> Following long-term stabilization of visual fields and intraocular pressure (IOP) in the low teens, early surgical intervention is currently advocated for advanced disease,<sup>[13,14]</sup> especially in developing countries.<sup>[15]</sup>

Many authors have also found trabeculectomy with adjunctive anti-fibrotic therapy more effective in IOP control.<sup>[5,7,16,17]</sup>

Considering these and other reasons, a consensus was reached at the first African Glaucoma Summit in 2010, that trabeculectomy remains a first-line option in glaucoma management for Africa.<sup>[18]</sup>

The residency training curriculum for ophthalmology in Nigeria stipulates that trainees acquire demonstrable skills in trabeculectomy as part of their program, with a minimum requirement of twenty trabeculectomies for each of the two levels of the West African examination (Parts I and II).<sup>[19]</sup>

This study was therefore carried out to assess the practice of trabeculectomy among ophthalmologists in Nigeria and factors that influence it.

## MATERIALS AND METHODS

This was a cross-sectional analytical study. The study participants were purposively selected to include all consenting (80) consultant ophthalmologists present at the 2010 congress of the Ophthalmological Society of Nigeria (OSN).

A self-administered questionnaire was used to elicit information on respondents' demographic characteristics, practice of trabeculectomy 1 year preceding the study and during residency training (actual numbers of surgeries performed), current glaucoma outpatient load, reasons for low surgical output of trabeculectomy wherever applicable, and willingness to improve. Data were also collected on the respondents' year of completion of the residency training program, and their skill in, and use of releasable sutures for trabeculectomy.

Data were analyzed using Statistical Package for Social Science (SPSS) version 16.0. Results were presented with tables showing frequencies and percentages. Considering the small sample size and for ease of analysis, the glaucoma outpatient load, and number of trabeculectomies performed during residency and 1 year preceding the study were presented in groups of fives and tens, respectively. The relationships between the performance of and number of trabeculectomies

performed in the preceding 1 year and the number of trabeculectomies performed during residency training and outpatient load of glaucoma patients were compared and tested using  $\chi^2$  test. The anonymity of respondents was maintained and the study abided by the tenets of Declaration of Helsinki.

## RESULTS

Sixty-five of the 80 consenting ophthalmologists (81.3%) responded to the questionnaires; 32 (53.3%) were women and 28 (46.7%) were men [Table 1]. Age ranged from 30 to 60 years with a mean age of 44 years  $\pm$  SD 7.7.

Thirty-six (57.1%) respondents performed trabeculectomy in the 1 year preceding the study [Table 2]. About one-third of respondents (31.7%) performed one to 10 trabeculectomies in the preceding 1 year, with an average of 0.5 trabeculectomy/month. Seven (11.1%) performed between 11 and 20 trabeculectomies while nine (14.3%) performed more than 20 trabeculectomies in the preceding year, with an average of 1.3 and 1.8 trabeculectomies/month, respectively. This gave an overall trabeculectomy rate of 0.9/ophthalmologist/month.

Forty-eight (81.4%) respondents indicated they had hands-on exposure to trabeculectomy during residency training [Table 3]. Of these, 29 (60.4%) had also performed it in the 1 year preceding this study. Number of trabeculectomies performed during residency varied from one to more than 15. Fifteen (25.4%) respondents completed more than 15 cases, 14 (93.3%) of whom had performed the surgery in the preceding 1 year.

**Table 1: Age and sex distribution of respondents**

Age (years)	Sex		Total
	Female	Male	
30-40	12 (57.1%)	9 (42.9%)	21 (100%)
41-50	15 (51.7%)	14 (48.3%)	29 (100%)
51-60	5 (50%)	5 (50%)	10 (100%)
Total *	32 (53.3%)	28 (46.7%)	60 (100%)

\*No response from five participants.

**Table 2: Number of trabeculectomies performed by ophthalmologists 1 year preceding the study and average number performed per month**

Number of trabeculectomies in the preceding one year	Frequency of response	Average number of trabeculectomies per month
None	27 (42.9%)	0
1-10	20 (31.7%)	0.1 - 0.8 (0.45)
11-20	7 (11.1%)	0.9 - 1.6 (1.25)
>20	9 (14.3%)	>1.8 (2)
Total *	63 (100%)	0- >1.8 (0.93)

\*No response from two participants.

**Table 3: Number of trabeculectomies done during residency training compared with performance of trabeculectomy in the preceding 1 year of the study**

Number of trabeculectomies performed during residency training	Performance of trabeculectomy in the preceding one year		
	Yes	No	Total
None	2 (18.2%)	9 (81.8%)	11 (18.6%)
1-5	4 (26.7%)	11 (73.7%)	15 (25.4%)
6-10	7 (58.3%)	5 (41.7%)	12 (20.3%)
11-15	4 (66.7%)	2 (33.3%)	6 (10.3%)
>15	14 (93.3%)	1 (6.7%)	15 (25.4%)
Total *	31 (52.5%)	28 (47.5%)	59 (100%)

\*No response from six participants.

**Table 4: Comparison of monthly glaucoma patient load with performance of trabeculectomy in the preceding 1 year**

Monthly glaucoma patient load	Performance of trabeculectomy in the preceding one year		
	Yes	No	Total
0-10	1 (20%)	4 (80%)	5 (8.2%)
11-20	5 (45.5%)	6 (54.5%)	11 (18.0%)
21-30	5 (62.5%)	3 (37.5%)	8 (13.1%)
31-40	4 (36.4%)	7 (63.6%)	11 (18.0%)
41-50	1 (20.0%)	4 (80.0%)	5 (8.2%)
>50	15 (71.4%)	6 (28.6%)	21 (34.4%)
Total *	31 (50.8%)	30 (49.2%)	61 (100%)

\*No response from four participants.

**Table 5: Reasons for low surgical rate of trabeculectomy**

Reasons for not performing trabeculectomy	Trabeculectomy performed in the preceding year		
	Yes	No	Total
Poor patient acceptance	22 (44%)	28 (50%)	50 (89.3%)
Prefer medical treatment	2 (66.7%)	1 (33.3%)	3 (5.4%)
Not confident of skill/outcome	3 (5%)	0 (0%)	3 (5.4%)
Total *	27 (48.2%)	29 (51.8%)	56 (100%)

\*No response from nine participants.

On the other hand, only two (18.2%) of the eleven who did not carry out any trabeculectomy during residency training practiced trabeculectomy in the preceding 1 year. The likelihood of having performed trabeculectomy in the preceding year was significantly higher in people that had performed the surgery during residency training [ $\chi^2(4, N = 60) = 19.88, P = 0.001$ ].

Concerning glaucoma outpatient clinic load, about one-third of the respondents (34.4%), managed more than 50 glaucoma patients monthly [Table 4], with an estimate of  $\geq 600$  clinic visits/year. Of these, 15 (71.4%) performed trabeculectomy in the preceding year. Only one (1.6%) respondent who examined less than 10 glaucoma patients

in a month performed trabeculectomy in the preceding 1 year. Although those who examined more than 50 glaucoma patients per month performed the highest number of trabeculectomies in the preceding year, the difference was not statistically significant ( $P = 0.1$ ).

Most respondents (89.3%) indicated poor acceptance of trabeculectomy by patients as the reason for their low trabeculectomy practice [Table 5]. Among this group, 27 (48.2%) performed trabeculectomies in the preceding 1 year.

Only 3 (5%) of those who practiced trabeculectomy attributed their low practice to lack of confidence in skill/outcome. Majority of respondents ( $n = 54/60, 90\%$ ) indicated willingness to perform more trabeculectomies if their success rates improved. Fifty-three (98%) of these expressed their willingness to take up a short training to improve their skill.

Furthermore, only 14 (21.5%) respondents were proficient in the use of releasable sutures for trabeculectomy. Of this number, 7 (50%) used this technique regularly for their trabeculectomy procedures.

Being skilled in the use of releasable suture, year of graduation and age of respondents did not significantly affect the practice of trabeculectomy [ $\chi^2(2, N = 56) = 2.64, P = 0.2$ ;  $\chi^2(5, N = 56) = 6.35, P = 0.2$ ;  $\chi^2(5, N = 56) = 3.42, P = 0.6$ , respectively].

## DISCUSSION

Trabeculectomy with an adjunctive anti-fibrotic agent is the commonest glaucoma surgical procedure in Nigeria and has been found to be more effective than medical treatment in IOP control.<sup>[7,14,20]</sup>

This notwithstanding, the overall rate of trabeculectomy from this study was 0.9/ophthalmologist/month. This surgical rate is relatively low for a country of 160 million people for which the prevalence of glaucoma blindness among people aged 40 years and older is 0.7%.<sup>[3]</sup> In 2009 (published in 2014), Adekoya *et al.*<sup>[20]</sup> found the rate of the procedure to be one/ophthalmologist/month in Lagos, Nigeria. Other studies have also reported a generally low trabeculectomy rate.<sup>[8,16]</sup> This was before the 1st African Glaucoma Summit in 2010, which emphasized the need for adequate skills and equipment for eye care teams to be able to provide prompt and adequate treatment for diagnosed cases.<sup>[18]</sup> The level still remained relatively low from this present study, 2 years after the summit. This suggests that the decisions of the summit may not have affected the surgical practice of the ophthalmologists.

Furthermore, the number of trabeculectomies performed during residency training was found to have significantly affected its practice postqualification. The observed low



rate may adversely affect skills transfer in tertiary centers. A comparison of rate of trabeculectomies performed in tertiary, private and secondary eye care centers in Lagos, Nigeria, showed a lower rate of 0.5/month in the former.<sup>[20]</sup> Adegbehingbe and Majemgbasan<sup>[16]</sup> also reported that only 8% of glaucoma patients in a Nigerian teaching hospital had surgery performed on them. The use of simulators in ophthalmology residency training may be an immediate strategy to improve skills while encouraging short-term trabeculectomy training programs for qualified ophthalmologists to enhance their skills.

The glaucoma outpatient burden was also found not to affect the number of trabeculectomies performed by respondents. This was similar to the finding in Lagos<sup>[20]</sup> where the tertiary institution with an average of 75 glaucoma consults/ophthalmologist/month (three times the load in a private eye hospital) had a trabeculectomy rate of about three times less, comparatively.<sup>[20]</sup> This suggests that other factors are contributory, besides the glaucoma outpatient clinic burden. More than 30% of the respondents in this study saw more than 50 glaucoma patients per month indicating that many centers have sufficiently high clinic burden of the disease to justify a higher rate of trabeculectomy than presently practiced. This burden is likely to increase with increasing awareness and glaucoma screening activities in the country. It is, therefore, important to have eye care teams which are fully equipped to offer prompt and adequate glaucoma treatment once diagnosis is made.<sup>[18]</sup>

Most respondents indicated unwillingness of patients to accept the surgery as the major reason for low trabeculectomy rate, as was also reported in other studies. Cost of surgery or fear of blindness postsurgery have been suggested as reasons for poor uptake.<sup>[8,21]</sup> However, some studies have shown that cost may not be the most important reason for poor uptake as in Quigley *et al.*<sup>[17]</sup> in which acceptance rate was 46% when offered free of charge, and Adio and Onua<sup>[21]</sup> with zero acceptance even when cost of surgery was less than that of medical treatment.

A randomized controlled clinical trial by Anand *et al.*<sup>[22]</sup> suggested an interplay of both patient and surgeon factors in the acceptance of trabeculectomy. A study reported that uptake of trabeculectomy increased from 35 to 65% with improved patients' education. Others revealed that patients' willingness to accept primary surgery is significantly related to their comprehension of their medical condition and its treatment. Misunderstanding of these factors constituted significant barriers.<sup>[23,24]</sup>

A surgeon's skill and confidence may directly influence both the outcome of surgery and the surgeon's ability to prescribe the procedure to his patients. Egbert<sup>[8]</sup>

had reported uncertain surgical outcome as one of the reasons for reluctance on the part of West African ophthalmologists to offer trabeculectomy to their glaucoma patients. The findings in this study indirectly corroborate this, as 90% of respondents indicated a willingness to offer more trabeculectomies if their success rates improved. The fact that 98% ( $n = 53/54$ ) of these were also willing to undertake further short-term training further buttresses this point. This suggests that surgeon factors may play more significant roles than the respondents chose to directly acknowledge. It is understandable that as a surgeon's skill improves, so does confidence, resulting in more convincing offer of the procedure and increased uptake.

The findings in this study are likely a reflection of the situation in the country as the study involved ophthalmologists from different parts of Nigeria. This may, however, be undermined by potential bias from the nonparticipants and nonresponders to some questions, as the questionnaires were self-administered.

## CONCLUSION

A trabeculectomy rate of 0.9 trabeculectomy/ophthalmologist/month was found in this study. It was significantly associated with insufficient exposure to trabeculectomy during residency training and unwillingness on the part of patients to accept glaucoma surgery. There was no significant relationship between higher glaucoma outpatient burden and number of trabeculectomies carried out by respondents. Ophthalmologists were willing to offer more trabeculectomies to patients if they were certain of improved outcome and to improve their trabeculectomy skills through short-term skill-enhancement courses. It is therefore recommended that more emphasis be laid on adequate hands-on trabeculectomy exposure as stipulated in the residency curriculum using both simulators and live patients to ensure that ophthalmologists are confident to perform it postsurgery. Improved patient education on trabeculectomy should be integrated into patient care. More research is also needed on patients' perceptions about trabeculectomy and factors affecting uptake in this environment.

## Acknowledgments

We wish to acknowledge the technical assistance of our teacher and mentor, Professor S.N.N. N wosu who graciously read through this manuscript and made very useful input. We thank our colleagues who attended the annual congress for consenting to participate as respondents for this study. We also acknowledge the assistance of Rebecca and Chinwe who helped with data entry.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Quigley H, Broman A. The number of people with glaucoma worldwide. *Br J Ophthalmol* 1996;80:389-93.
2. Lewallen S, Courtright P. Blindness in Africa: Present situation and future needs. *Br J Ophthalmol* 2001;85:879-903.
3. Abdull M, Sivasubramaniam S, Murthy G, Gilbert C. Causes of blindness and visual impairment in Nigeria: The Nigeria national blindness and visual impairment survey. *Invest Ophthalmol Vis Sci* 2009;50:4114-20.
4. Racette L, Wilson R, Zangwill L, Weinreb R, Sample P. Primary open-angle glaucoma in blacks- A review. *Surv Ophthalmol* 2003;48:295-313.
5. Bowman R, Kirupananthans S. How to manage a glaucoma patient in Africa. *Community Eye Heal J* 2006;19:38-9.
6. Mafwiri M, Bowman R, Wood M, Kabiru J. Primary open-angle glaucoma presentation in a tertiary unit in Africa: Intraocular pressure levels and visual status. *Ophthalmic Epidemiol* 2005;12:299-302.
7. Verrey J, Foster A, Wormald R, Akuamoaa C. Chronic glaucoma in Northern Ghana: A retrospective study of 397 patients. *Eye (Lond)* 1990;4:115-20.
8. Egbert P. Glaucoma in West Africa: A neglected problem. *Br J Ophthalmol* 2002;86:131-2.
9. Ogbonnaya C. Profile of blindness and low vision at Ebonyi State University Teaching Hospital, Abakiliki. *Ebonyi Med J* 2012;11:13-9.
10. Ramulu P, Corcoran K, Corcoran S, Robin A. Utilization of various glaucoma surgery procedures in medicare beneficiaries from 1995 to 2004. *Ophthalmology* 2007;114:2265-70.
11. Strutton D, Walt J. Trends in glaucoma surgery before and after introduction of new topical glaucoma pharmacotherapies. *J Glaucoma* 2004;13:221-6.
12. Bateman D, Clark R, Azuara-Blanco A. The effects of new topical treatment on management of glaucoma in Scotland: an examination of ophthalmological health care. *Br J Ophthalmol* 2002;55:1-4.
13. Musch D, Gillespie B, Lichter P. Visual field progression in the Collaborative Initial Glaucoma Treatment Study-The impact of treatment and other baseline factors. *Ophthalmology* 2009;116:200-7.
14. Jay J, Allan D. The benefit of early trabeculectomy versus conventional management in primary open-angle glaucoma relative to severity of disease. *Eye (Lond)* 1989;3:528-35.
15. Weinreb R, Crownston J. Glaucoma surgery-open angle glaucoma: reports and consensus statements of the 2nd global AIGS consensus meeting on glaucoma surgery. The Hague, The Netherlands: Kugler Publications.2005.
16. Adegbehingbe B, Majemgbasan T. A review of trabeculectomies at a Nigerian teaching hospital. *Ghana Med J* 2007;41:176-80.
17. Quigley H, Buhmann R, West S. Long-term results of glaucoma surgery among participants in an east African population survey. *Br J Ophthalmol* 2000;84:860-4.
18. Melamed C, Herndon L, Shaarawy T. The 1st African glaucoma summit August 6-7 2010 [Internet]. World Glaucoma Assoc. Available from: [www.worldglaucoma.org/africasummit](http://www.worldglaucoma.org/africasummit). [Last accessed on 2013 Mar 29].
19. West African College of Surgeons. Minimum requirements for practical skills/training for pre-part 1 and pre-part 11 examinations. Faculty of Ophthalmology log book for residents.
20. Adekoya B, Onakoya A, Shah S, Adepoju F. Surgical output and clinic burden of glaucoma in Lagos, Nigeria. *J Glaucoma* 2014;23:41-5.
21. Adio A, Onua A. Economic burden of glaucoma in Rivers State, Nigeria. *Clin Ophthalmol* 2012;6:2023-31.
22. Anand A, Neji S, Khokar S, Kumar H. Role of early trabeculectomy in primary open angle in the developing world. *Eye (Lond)* 2007;21:40-5.
23. Leighton P, Lonsdale A, Tildsley J, King A. The willingness of patients presenting with advanced glaucoma to participate in a trial comparing primary medical versus primary surgical treatment. *Eye (Lond)* 2012;26:300-6.
24. Mohamed E, Bayoumi O, Draz S. Impact of an educational programme on knowledge, beliefs, practices and expectations about care among adolescent glaucoma patients in Cairo. *East Mediterr Heal J* 2011;17:960-8.