Original Article

Residency evaluation and adherence design study: Young ophthalmologists' perception of their residency programs – Clinical and surgical skills

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Background: Residency training is the basis of good clinical and surgical practice. **Purpose:** The aim is to know the demographics, training experience, and perception of young ophthalmologists to improve the present residency programs in India. **Setting:** Young ophthalmologists trained in India. **Methods:** A survey was conducted by the Academic and Research Committee of the All India Ophthalmology Society, in 2014–2016 of young ophthalmologists (those trained between 2002 and 2012, with 2–10 years' postresidency experience) to gauge teaching of clinical and surgical skills during the postgraduate residency program. **Statistical Analysis:** Statistical Package for Social Sciences version 16. **Results:** Of the 1005 respondents, 531 fulfilled inclusion criteria. Average age was 32.6 years (standard deviation [SD] 4). On a scale of 0–10, clinical skills teaching was graded as (mean, SD): Slit lamp examination (7.2, SD 2.8), indirect ophthalmoscopy (6.2, SD 3.3), gonioscopy (5.7, SD 3.4), perimetry (6.2, SD 3.2), optical coherence tomography (4.6, SD 4), and orthoptic evaluation (4.3, SD 3.1). The mean (SD) and median of surgeries performed independently was intracapsular cataract extraction 3.0 (14.9), 0; extracapsular cataract extraction 39.9 (53.2), 18; small incision cataract surgery 75.3 (64.4), 55; phacoemulsification 30 (52.6), 1; pterygium excision 31.5 (43.5), 15; dacryocystectomy 20.3 (38.1), 4; dacryocystorhinostomy 11.7 (26.2), 2; chalazion 46.4 (48.3), 30; trabeculectomies 4 (14.9), 0; strabismus correction 1.4 (4.9), 0; laser-assisted *in situ* Keratomileusis 1.5 (12.2), 0; retinal detachment 1.5 (12.5), 0; vitrectomy 3.0 (17.0), 0; keratoplasty 5.2 (17.8), 0; eyelid surgery 8.6 (18.9), 2 and ocular emergencies 41.7 (52.4), 20. Observed and assisted surgeries were more common. However, the range of grading was 0–10 in all categories. **Conclusion:** Residency training in India varies considerably from program to program. Standardization is needed to assure all graduates are competent and render consistent quality of service.

Key words: Clinical skills, India, residency training, surgical training

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Residency training forms the bedrock of any medical subspecialty training. Various countries and regulatory associations have given considerable thought to make it more valid and comprehensive so as to have the future generation of medical specialists better equipped to deliver the optimum care to the populace/community.[1] Ophthalmology is no exception to this. Residency training starts after the completion of the basic medical degree where the medical doctor now focuses on a single specialty and usually ends with a postgraduate degree and license to practice that specialty independently. The Medical Council of India (MCI) and the National Board of Examinations for the Diplomate of the National Board (DNB) have their own guidelines for better postgraduate training.[2,3] While governments, regulatory authorities, medical college deans and professors, educationists and international organizations have all tried to make the training more meaningful, there are a few reports about how useful the actual end-users (the medical postgraduates) actually find it.[4-10] Articles from the Indian Journal of Ophthalmology say we may be missing the woods for the trees, the hard infrastructures are in place but perhaps not the soft skills.[11-21] A nationwide survey of residency trainers published in this journal showed that while the department heads were generally satisfied by the quality and quantity of training imparted, another regional study of ophthalmology residents in training did not share the complacency of the department heads.[4,22] The residents felt their training was inadequate and perhaps incomplete for them to deal with the patient care they were expected to deliver on completing their residency.[4] This study was criticized on the grounds that residents in training may not have the proper perspective to consider what was adequate and may have had unrealistic expectations.

The All India Ophthalmology Society (AIOS) with over 17,000 plus active ophthalmologists as members is one

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of the largest professional bodies in the ophthalmic world. Its Academic and Research Committee is the guardian for academics and research in ophthalmology practice. While the society and its committee have no statutory authority, they are committed to the improvement of eye care. The AIOS commissioned a survey of all young ophthalmologists who had a minimum of two to maximum 10 years of experience after the completion of their residency, about what they felt regarding their residency training. This group of ophthalmologist was chosen, such that, they would have the perspective, after working independently for a few years, but were still "fresh" enough to remember their training days (young ophthalmologists). Furthermore, the content and demands of training have changed significantly in the past decade. The modern medical profession has become increasingly demanding and competitive, and young physicians need a diverse set of skills to negotiate medical practice.

This study would help us understand how young members view their professional competence and what they feel are the limiting factors in their pursuit for excellence in patient care. Questions on young ophthalmologists' training needs and aspirations would help the AIOS in planning for fellowships, observerships, and the like. It would help the society advice the Government of India, MCI, Vision 2020 India, Universities and the National Board of Examinations on how to make our training programs more effective. The study aimed to know the demographics, training experience, and perception of young ophthalmologists to improve the present residency programs in India.

Methods

The project was discussed and approved by the governing council of the AIOS at its mid-year meeting in 2014. A semi-structured questionnaire [Appendix 1 available with the online version of the manuscript at http://www.ijo.in] was E-mailed and posted to all the participants. The questionnaire was part of a survey monkey link with a forwarding letter requesting the respondents about what was expected from them. The participants were those who had completed their residency training between 2005 and 2012 (Master of Surgery [MS], MD, DNB, Diploma in Ophthalmology (DO), Diploma in Ophthalmic Medicine and Surgery [DOMS]). The sampling was based on convenience. A postal, E-mail, and telephonic reminder were sent after each week. In early 2015 heads of institutions of excellence, senior office bearers of the AIOS and veteran and serving professors were asked to forward the survey link to their former students and residents as a reminder. The participants would have to fill certain demographic details but would not have to disclose their identity, if they so desired. The questionnaire was first validated with three independent researchers and a small pilot run for 2 weeks. The data were entered into Excel worksheets and Statistical Package for Social Sciences (Version 16) IBM, USA was used for statistical analysis. Each part of the questionnaire had to be answered before the respondents could move to the next part, but they had an option of leaving certain fields unanswered if they wanted to.

The questions were pertaining to demographic data, type of institution where residency was completed, clinical examination skills learnt and surgeries observed, assisted, operated under the supervision, and independently. A section dealt with the dissertation done by the young ophthalmologists and whether it was presented and/or published. The immediate plans and the need for further training by the participants was also questioned.

Results

While 4212 potential subjects were contacted repeatedly over 17 months, we had 1005 respondents who answered the complete survey. The sample was representative of the population studied in terms of gender, age, geographic, and academic location. Of the sample of 1005 ophthalmologists, 531 (52.8%) met the inclusion criteria of ≥2 and <10 years of postresidency (young ophthalmologists). Three hundred and twenty-one (32%) were seniors with >10 years of postresidency experience while 107 (10.7%) had just recently passed or had completed the residency and were expecting their results. Forty-six (4.6%) had given incomplete information, nothing beyond demographic data and were not considered.

Demographic details

The mean age of the 531 young Ophthalmologist was 32.6 years (standard deviation [SD] 4) and 325 (61.2%) were males. 304/531 (57.3%) had completed their residency in a government medical college, 90/531 (16.9%) in a private medical college, 60/531 (11.3%) from a nongovernmental organizations (NGO) hospital, 57/531 (10.7%) from a private eye hospital, and 20/531 (3.8%) from a corporate hospital. Their institute of training was located in a metro city 230/531 (43.3%), large city 148/531 (27.9%), district headquarters 110/531 (20.7%), and a small town or village 43/531 (8.1%). Two hundred and ninety-nine (56.3%) had their degrees as MS, 31 (5.8%) as MD, 162 (30.5%) as DNB while 114 (21.5%) were (DOMS/DO). Many had more than 1 degree. Ophthalmology was the top choice of medical postgraduation for 194/531 (36.5%) of the respondents while it was one of the top three choices for 263/531 (49.5%). 74/531 (13.9%) reported it was not among their top three choices at that time. On being quizzed about why they chose Ophthalmology as a specialty, the respondents said 278 (52.4%) chose ophthalmology as a career, 57 (10.7%) for money, and 164 (30.9%) for knowledge.

Three hundred and sixty-one of the 531 respondents completed the personal details section. The respondents gave their first languages (or mother tongue/matru bhasha in India) as Assamese 3, Bangla 39, Chakma 1, English 6, Gujarati 36, Hindi 109 (including Marwari and Bhojpuri), Kannada 28, Khasi 1, Konkani 5, Kutchi 4, Malayalam 15, Marathi 46, Odiya 7, Punjabi 6, Sindhi 1, Tamil 25, Telugu 22, Tulu 2, and Urdu 6. 147/361 (40.7%) had done their residency training in the state of their first language while 214/361 (59.3%) had not. On being asked if they had any problem with communicating with patients, 292/361 (80.9%) replied negatively while 69/361 (19.1%) respondents said that they had difficulty communicating with patients due to the lack of familiarity with the regional language. The states they hailed from is given in Table 1. The second column has the states they currently work in.

225/361 (62.3%) were first generation medical professionals while 136/361 (37.7%) had a parent who was a doctor. Fifty-two (14.4%) had another Ophthalmologist in the family. 275/361 (76.2%) were married, 77/361 (21.3%) were unmarried

Table 1: States from where the respondents hailed from and their present location of work

State or union territory	Hail from	Presently working
Andhra Pradesh + Telangana	15	36
Assam	6	7
Bihar	16	21
Chhattisgarh	6	13
Chandigarh	0	2
Delhi	10	20
Goa	3	2
Gujarat	19	25
Himachal Pradesh	7	2
Haryana	9	6
Jammu and Kashmir	1	0
Jharkhand	7	4
Karnataka	37	63
Kerala	14	14
Madhya Pradesh	8	18
Maharashtra	89	80
Meghalaya	1	2
Odisha	9	9
Pondicherry	0	11
Punjab	10	7
Rajasthan	11	6
Tamil Nadu	25	73
Tripura	1	1
Uttar Pradesh	21	28
Uttarakhand	3	3
West Bengal	27	48
Out of India	0	7
Unanswered	170	3
Total	531	531

Andhra Pradesh was divided into Andhra Pradesh and Telangana during the study hence both are kept together. There were no respondents from small states like Nagaland, Mizoram, Manipur, Sikkim and Arunachal Pradesh and from Union territories of Daman and Diu, Dadra, Nagar and Haveli, Andaman and Nicobar Islands and Lakshwadeep islands. But each of these have ophthalmologists in single digit numbers

and 3/361 (0.8%) were divorced. 231/531 (43.5%) were married to a doctor or an optometrist. On being asked the number of children they had 37 answered it was not applicable to them, 123 had no children, 121 had one child, 40 had two children while 2 had three children. None reported more than that.

After their residency training 12 had done a cornea fellowship, 28 some form of cataract/intraocular lens implant (IOL)/small incision cataract surgery (SICS)/phaco fellowship, 22 had been trained in vitreoretina, 2 in pediatric ophthalmology, 3 in refractive surgery, 3 in oculoplastics, 4 in glaucoma, while 199 had done some form of training (1 month fellowships, senior residency, short teaching assignment, lasers course, observerships, etc.,). No additional training of any kind had been done by 258/531 (48.6%) young ophthalmologists.

On being quizzed where they wanted to do ophthalmic practice: 176/531 (33.1%) preferred top 8 metro cities, 104/531 (19.6%) reported other metro cities, 111/531 (20.9%) small city while only 17/531 (3.2%) and 4/531 (0.8%) said taluka or village. 48/531 (9%) planned for government service, 55/531 (10.4%) for an NGO hospital, 143/531 (26.9%) for a teaching institute, 196/531 (36.9%) for private practice, and 101/531 (19%) for group practice.

Clinical skills

Table 2 shows how the teaching of each clinical skill was rated by the respondents on a scale of 0 (no exposure/teaching) to 10 (taught comprehensively and exhaustively), the range, mean and median. It also shows the percentage of lowest percentile (rated 0–3) and the highest (rated 8–10). Table 3 demonstrates how the teaching of clinical skills fared depending on the type of the institution, government medical college, NGO hospital, private medical college, and corporate hospital. 152/531 (28.6%) respondents reported being taught contact lens evaluation and fitting in their residency training. The rest were not taught at all. Of the 504 who responded to the question about whether they were satisfied with the clinical skills taught during their residency days, 371 (73.6%) replied in affirmative. On a scale of 0–10, when the young ophthalmologists were asked to rate their exposure to eye banking, the mean was 5.0 (range 0–10, std dev 3.5, median 5). Similarly, for exposure to community ophthalmology, the mean was 6.1 (SD 3.1, range 0–10, median 6) [Fig. 1a and b].

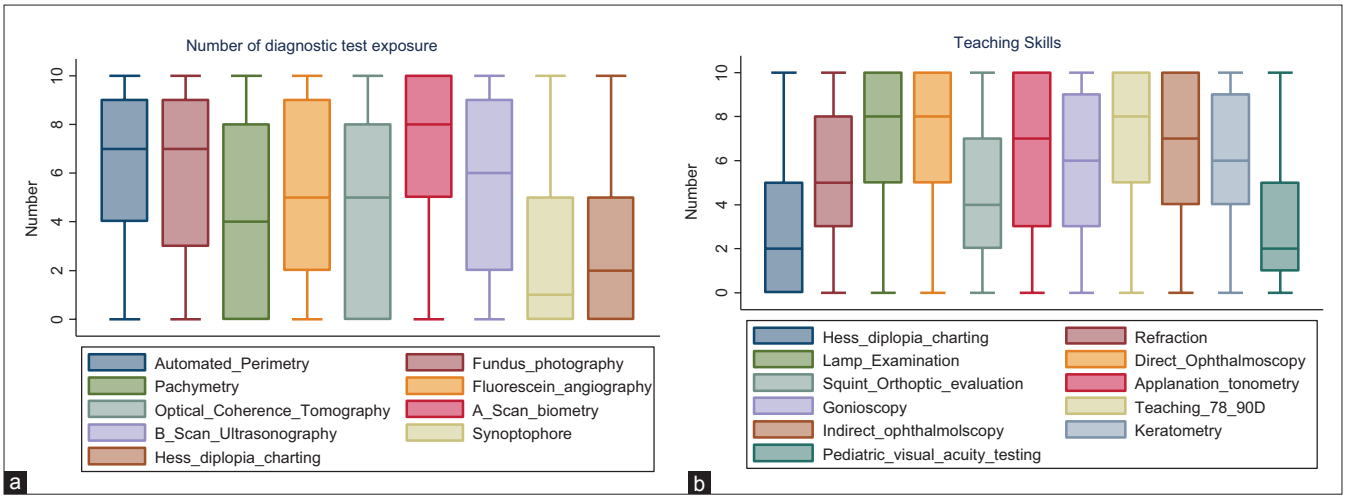

Figure 1: (a and b) Rating of clinical skills teaching by the respondents

Table 2: Young ophthalmologists' perception of the adequacy of their clinical examination skills

	Lowest percentage	Top percentage	Range of actual responses	Mean (SD)	Median
Refraction	167 (32)	150 (30)	0-10	5.2 (3.1)	5
Slit lamp examination	54 (10.1)	269 (50.7)	0-10	7.2 (2.8)	8
Automated perimetry	80 (15)	227 (43.3)	0-10	6.2 (3.2)	7
Fundus photography	132 (24.8)	227 (42.7)	0-10	6.0 (3.5)	7
Direct ophthalmoscopy	48 (9.1)	303 (57)	0-10	7.4 (2.8)	8
Pachymetry	231 (43.5)	157 (29.5)	0-10	4.2 (3.9)	4
Orthoptic evaluation	228 (42.9)	99 (19.8)	0-10	4.3 (3.1)	4
Fluorescing angiography	161 (30.4)	183 (34.5)	0-10	5.4 (3.5)	5
Applanation tonometry	148 (27.9)	227 (50.8)	0-10	6.0 (3.7)	7
Optical coherence tomography	224 (42.2)	171 (32.3)	0-10	4.6 (4.0)	5
Gonioscopy	153 (28.7)	190 (35.8)	0-10	5.7 (3.4)	6
A-scan biometry	65 (12.2)	267 (50.2)	0-10	7.0 (2.9)	8
+18/+19D	87 (16.3)	259 (48.8)	0-10	6.8 (3.2)	8
B-scan ultrasonography	171 (32.1)	189 (35.6)	0-10	5.4 (3.6)	6
Indirect ophthalmoscopy	123 (23.2)	181 (42.1)	0-10	6.2 (3.3)	7
Synoptophore	338 (63.6)	41 (7.7)	0-10	2.5 (2.9)	1
Keratometry	116 (21.8)	209 (39.4)	0-10	6.1 (3.2)	6
Hess charting	305 (57.5)	34 (13.3)	0-10	3.2 (3.2)	2
Paediatric visual acuity testing	307 (57.9)	60 (11.3)	0-10	3.2 (2.9)	2
YAG laser capsulotomy	152 (28.7)	214 (40.3)	0-10	5.8 (3.6)	6
Retinal lasers	312 (58.8)	81 (15.2)	0-10	3.1 (3.5)	1
YAG iridotomy	253 (47.7)	127 (23.9)	0-10	4.1 (3.7)	3

SD: Standard deviation

Surgical skills

Table 4 demonstrates the young ophthalmologists' perception of their taught surgical skills. Respondents were asked to write the actual number of surgeries observed, assisted and performed under supervision by them till 25. If they had done more than 25 in any of the categories, it was entered as >25. For the number of surgeries independently performed, they were asked to write the number till 100. If they had done >100 surgery of any type, it was entered as >100. The mean (SD) and median of surgeries performed independently was: Intracapsular cataract extraction (ICCE) 3.0 (14.9), 0; extracapsular cataract extraction (ECCE) 39.9 (53.2), 18; SICS 75.3 (64.4), 55; phacoemulsification 30 (52.6), 1; pterygium excision 31.5 (43.5), 15; dacryocystectomy 20.3 (38.1), 4; dacryocystorhinostomy 11.7 (26.2), 2; chalazion 46.4 (48.3), 30; trabeculectomies 4 (14.9), 0; strabismus correction 1.4 (4.9), 0; laser-assisted *in situ* Keratomileusis 1.5 (12.2), 0; retinal detachment 1.5 (12.5), 0; vitrectomy3.(17.0), 0; keratoplasty 5.2 (17.8), 0; eyelid surgery 8.6 (18.9), 2 and ocular emergencies 41.7 (52.4), 20. While residents observed and assisted many surgeries, few operated under supervision or independently [Fig. 2].

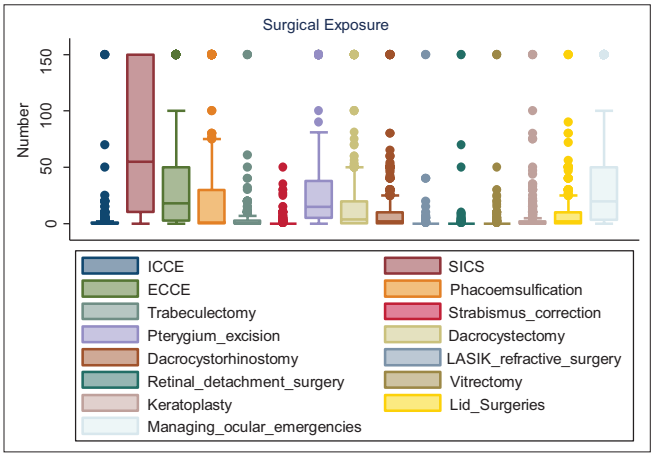

Figure 2: Types of surgeries performed independently by the young ophthalmologists during their residency training

Discussion

Feedback was collected from ophthalmologists who have passed 2–10 years earlier, as they would be "young" enough to remember the pluses and minuses of their training program and yet "old" enough to appreciate what was needed to practice modern ophthalmology. The results were based on responses of young ophthalmologists about their residency that was completed on an average half a decade ago, and hence there would be some recall bias. However, they had been quizzed about the salient points of their postgraduate residency program that had stretched for 2–3 years and was the foundation of their present ophthalmic career. Thus, the responses were likely to be honest and accurate. The respondents had the choice of anonymity. As rating scales were used, they would have had the floor and ceiling effect. The respondents came from diverse backgrounds spread over most Indian states. Ophthalmology was one of the top specialty choices for most young ophthalmologists (86%). More than half had done their residency training in institutions where

Table 3: Comparison of residents perception of clinical skills taught to them across different type of teaching institutions

Possible range (0-10)	Clinical skill												P
	Government institute			NGO hospital			Private medical college			Corporate hospital			
	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	Minimum	Maximum	Median	
Refraction	0	10	5	0	10	4	0	10	5	0	10	5	0.073
Slit lamp examination	0	10	7	1	10	9	1	10	8.5	1	10	8.5	0.008
Direct ophthalmoscopy	0	10	9	0	10	7	0	10	8	0	10	7.5	0.182
Squint/orthoptic evaluation	0	10	4	0	10	4	0	10	4	0	10	5	0.345
Applanation tonometry	0	10	5	1	10	9	0	10	7	0	10	8	<0.001
Gonioscopy	0	10	5	0	10	9	0	10	6	0	10	6.5	0.002
+78/+90D rating	0	10	7	1	10	10	0	10	8	0	10	8.5	<0.001
Indirect ophthalmoscopy	0	10	6	1	10	9	0	10	6.5	0	10	7.5	0.048
Keratometry	0	10	6	0	10	6	0	10	7	0	10	6.5	0.974
Pediatric visual acuity testing	0	10	2	0	10	3.5	0	10	3	0	10	3	0.006

NGO: Nongovernmental organization

the spoken language was different from theirs, but a few had problems communicating with patients. Private practice and working in large cities were the most common choice of young ophthalmologists. More than half had taken some training after the completion of their residency indicating that they did not find the skill set complete just by doing the residency training.

The American Academy of Ophthalmology has adopted the six core competency curriculum for better residency training.[23] Indian education system still works on the "Gurukul" model in which the "apprentice" learns from the master. The teaching is person dependent.[1] There was a huge diversity in the clinical and surgical skills taught to residents. One of the most striking results of our survey was that the bottom of the range reported in every single category of clinical and surgical experience was zero. This highlights the extreme variability of ophthalmology training in India. Some had absolutely no exposure to most equipment and hardly performed any independent surgery while others were trained to become competent and comprehensive ophthalmologists.

Clinical skills

Many basic procedures like slit lamp examination (mean 7.2), A-scan biometry (7.0), +78/+90 D fundus evaluation (6.8), Direct ophthalmoscopy (7.4) and applanation tonometry (6.0) were taught well to majority of the resident doctors, but some basic clinical skills such as refraction (5.2), orthoptic evaluation (4.3), diplopia charting synoptophore (2.5), and pediatric visual acuity testing (3.2) were graded <6 out of 10 by majority of the respondents. Diagnostic modalities such as optical coherence tomography and B-scan were not adequately taught. Residents reported that they were not adequately exposed to retinal LASERS, Nd:YAG iridotomies and fluorescein angiography. Table 1 shows the enormous variation that is there in Indian residency programs. Some programs scored 8–10 in most clinical skills, but there are others who score <3 on a scale of 0–10. The worrying aspect was that some residency programs were ranked 0 or 1 by young ophthalmologists for many clinical skills, even for basic clinical skills like refraction, slit lamp examination and fundoscopy. Table 2 shows that though there was a difference in teaching clinical skills across various types of institutions, there was an enormous variation in each type. NGO hospitals teaching programs were rated higher for slit lamp training and use, applanation tonometry, +78/+90 D lens, gonioscopy, and indirect ophthalmoscopy followed by corporate hospitals running residency programs. Yet, 73.6% of young ophthalmologists were satisfied with the clinical skills learnt during their residency. In keeping with Indian ophthalmic tradition of charity and community work, many residents were involved in some eye camps, school health check-ups, and the like.

An evaluation of 19 medical college departments of Ophthalmology in the country to understand the impact of the provision of modern instrumentation and training was scathing in its criticism of the systems.[11] IOL implant surgery had become common and students were satisfied with the theoretical teaching. However, routine comprehensive clinical examination skills were not taught nor was surgery performed under proper supervision. Residents were not confident of dealing with surgical complications.[11] This manuscript had elicited several letters to the editor.[12-18] Many tertiary teaching hospitals like a center for excellence in South India had a month

Table 4: Young ophthalmologists' perception of their taught surgical skills

Type of surgery	Observed			Assisted			Performed under supervision			Operated independently		
	Range	Mean (SD)	Median	Range	Mean (SD)	Median	Range	Mean (SD)	Median	Range	Mean (SD)	Median
ICCE	0->25	3.36 (6.0)	0	0->25	2.5 (5.4)	0	0->25	1.2 (4.0)	0	0->100	3.0 (14.9)	0
ECCE	0->25	17.1 (9.9)	25	0->25	14.9 (10.6)	18	0->25	11.8 (10.7)	10	0->100	39.9 (53.2)	18
SICS	0->25	22.2 (7.1)	25	0->25	20.1 (8.7)	25	0->25	15.6 (10.6)	25	0->100	75.3 (64.4)	55
Phacoemulsification	0->25	20.4 (8.9)	25	0->25	16.1 (11.2)	25	0->25	8.4 (10.8)	0	0->100	30.0 (52.6)	1
Trabeculectomy	0->25	16.5 (9.6)	25	0->25	11.5 (10.7)	8	0->25	3.3 (6.9)	0	0->100	4.0 (14.9)	0
Strabismus	0->25	11.9 (10.2)	10	0->25	8.9 (10.1)	5	0->25	2.0 (5.5)	0	0->100	1.4 (4.9)	0
Pterygium	0->25	19.9 (8.1)	25	0->25	16.4 (10.0)	25	0->25	11.4 (10.5)	6	0->100	31.5 (43.2)	15
DCT	0->25	12.9 (10.2)	10	0->25	10.9 (10.3)	8	0->25	7.0 (9.3)	2	0->100	20.3 (38.1)	4
DCR	0->25	14.7 (10)	12	0->25	12.5 (10.4)	10	0->25	5.7 (8.8)	1	0->100	11.7 (26.2)	2
Chalazion	0->25	18.8 (9.1)	25	0->25	16.2 (10.2)	10	0–>25	14.1 (10.3)	10	0->100	46.4 (48.3)	30
LASIK and refractive	0->25	4.9 (9.1)	0	0->25	2.8 (7.3)	0	0->25	1 (4.2)	0	0->100	1.5 (12.2)	0
Retinal detachment	0->25	10.6 (10.8)	5	0->25	7.3 (10)	2	0->25	1.6 (5.7)	0	0->100	1.5 (12.5)	0
Vitrectomy	0->25	11.5 (11)	7	0->25	8 (10.4)	2	0->25	2.1 (6.3)	0	0->100	3.1 (17)	0
Keratoplasty	0->25	12.8 (10.6)	10	0->25	10.0 (10.7)	5	0->25	3.2 (7.0)	0	0->100	5.2 (17.8)	0
Eyelid surgery	0->25	14 (9.5)	10	0->25	10.6 (10)	6	0->25	5.2 (8.1)	1	0->100	8.6 (18.9)	2
Ocular emergencies	0->25	18.6 (9.2)	25	0->25	16.4 (10)	25	0->25	12.9 (10.7)	10	0->100	41.7 (52.4)	20

Respondents were asked to write the actual number of surgeries observed, assisted, and performed under supervision by them till 25. If they had done more than 25 in any of the categories, it was entered as >25. For the number of surgeries independently performed, they were asked to write the number till 100. If they had done >100 surgery of any type, it was entered as >100. SD: Standard deviation, ICCE: Intracapsular cataract extraction, SICS: Small incision cataract surgery, ECCE: Extracapsular cataract extraction, DCT: Dacryocystectomy, DCR: Dacryocystorhinostomy, LASIK: Laser-assisted *in situ* Keratomileusis

long intensive training program for ophthalmology residents and practitioners to improve their clinical skills to bridge this gap in competency and confidence.[24]

Surgery

ICCE seems to have become a surgery of the past. For the cohort of young ophthalmologists who started training in the 21st century, the median number of ICCE performed was 0. While conventional ECCE was common (median18), manual SICS was the most common form of cataract surgery in Indian ophthalmic residency programs (median 55). Phacoemulsification was observed, assisted and done under supervision, but there were a few independent surgeries (median 1). There was a significant percentage of respondents who had hardly done any surgery in their residency. Lowest range even for cataract, chalazion, and pterygium surgeries was zero. Other surgeries such as strabismus correction, keratoplasty, trabeculectomies, and lid surgeries were not routinely taught to residents. This is of concern as glaucoma, and corneal conditions still constitute a significant burden of blindness and visual impairment.[25] In a country where many advanced glaucoma patients are poor and illiterate with poor compliance of medications, filtering surgeries offer a significant alternative to preventing blindness.[26] Only chalazion incision and curettage, sac surgeries, pterygium excision and managing lid and corneal tears in emergencies were given to residents. Expectedly, vitreoretinal and refractive procedures were few and far in between.

Earlier studies from Maharashtra and Karnataka in India showed that there was a huge gap in the number of surgeries residents thought they needed to be performed and had actually been performed by them;[4,5] a feeling not shown by their heads and faculty.[22] A survey of final year residents from Karnataka in 2015 found their surgical training to be fair or satisfactory. Half had undergone wet laboratory and most had started hands on surgery in 1st year itself.[6]

The large range and SDs show that while same programs are generous and well rounded, others do not offer even basic surgical training to their residents. Some residency programs were very liberal with their students' surgeries, but most were ungenerous. Teaching phacoemulsification to residents under supervision was found to be safe in Vellore India and USA.[27,28] An article in Ophthalmology comparing resident cataract surgery outcomes under novice versus experienced supervising surgeons found that complications reduced after the first 25 surgeries of the novice supervisors.[29] A large series from Aravind Eye Hospital Madurai, India showed that learning manual SICS was safer than learning phacoemulsification for inexperienced surgeons.[30] However, an article by Khanna *et al*. on complications during training of cataract surgery had more complications for SICS – as it was done on older patients and in those with more advanced cataract.[31] Residents also mastered toric IOL well, when given a chance.[32]

Residency training programs in China still do not teach cataract surgery in a way to produce confident cataract surgeons, but the scenario is changing[10,33,34] a survey of Ophthalmology residents in mainland China and Hong Kong found considerable differences in their approach, hands on training and satisfaction levels.[10] The number of cataract surgeries by Hong Kong Special Administrative Region trainees (ECCE, median 80, inter-quartile range30–100; phacoemulsification, median 200, inter-quartile large 0–100) exceeded that of Chinese residents (ECCE: Median 0, $P < 0.0001$, phacoemulsification: Median 0, $P < 0.0001$).[10] The Chinese trainees spent more time completing medical charts and received less supervision. They were more likely to feel underpaid and did not want their children to practice medicine.

A survey of skill assessment and competency-based training in cataract surgery in European Board of Ophthalmology countries found great heterogeneity in concept and organization of training cataract surgery in European countries.[35] There was a lack of awareness and skepticism toward objective structured assessment of technical skills. Few like UK, Ireland, Switzerland and the Netherlands used skills assessment tools and competency-based education for cataract surgery. Only certain countries considered cataract surgery training mandatory.[35]

A national survey of Canadian ophthalmology residency training had 41% respondent rate among 2nd–5th year residents. The mean number of full cases performed by 5th year residents was 324 cataracts, 9 trabeculectomies, and 48 horizontal muscles squint surgery. Subspecialty volumes varied and were lowest for scleral buckle, refractive procedures, penetrating keratoplasty, and floor fracture. Most residents attended at least one funded conference annually and met the program director twice a year. Nearly 46% had fellowship plans.[8]

The mean for the number of trabeculectomies performed independently was 4, the median was 0 in our survey. This is in spite of glaucoma being a significant cause of blindness in India.[25] Gedde and Vinod *et al*. found an increase in shunting and decrease in filtering procedures for glaucoma surgery in the developed world.[36]

Sivachandran *et al*. studied trends in subspecialty training by Canadian Ophthalmology graduates over the past 25 years and found that 63.5% pursued fellowship training with males and females equally likely to pursue it. Vitreo-retinal surgery (24.5%), glaucoma (16.7%), and anterior segment (16.7%) were the most popular choices. More males pursued vitreo-retinal surgery and oculoplasty, whereas females were more likely to train in pediatric ophthalmology and strabismus.[37] Anterior segment followed by vitreo-retina were the most popular fellowship choices for the young ophthalmologists from India.

Indian ophthalmology has grown tremendously in the past two decades, and some centers in major cities can be considered to be truly world class and have patients coming from worldwide, with many international doctors vying for training. The cataract surgical rate has increased more than 4-fold in the past 15 years and district hospitals boast of IOL implant surgeries. Cataract as a cause of avoidable blindness has declined.[25] Many states have ophthalmologists practicing at taluka/tehsil level. Young ophthalmologists in India are expected to contribute to the National Program for the Prevention of Blindness, which was earlier very cataract focused. This study shows that more than half of them need some training postresidency before they practice independently. Our data show there is room for improvement in the standardization of expectations and experience across programs to help assure that all graduates are competent.

The American Academy of Ophthalmology has its own core competencies.[23,38] The Royal College of ophthalmologists of the United Kingdom has its 7-year higher specialty training.[39] The International Council of Ophthalmology through its various for a tries to make ophthalmology curricula more comprehensive and useful for member organizations.[40,41] More emphasis on actual clinical skills learnt, their visible demonstration during the exit examination would go a long way rather than just viva voce. The resident should also actually participate in surgical training by assisting, operating under the supervision and then independently and her participation should be considered in granting recognition, and its renewal, to a teaching institute.

Residency training in India varies considerably from program to program, across all sectors. A standardized structured residency training program that focuses on resident doctors' skill acquisition and competency is the needed to ensure all graduates are competent and render consistent quality of service.

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Conflicts of interest

There are no conflicts of interest.

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