Uptake pattern of training programs over two decades at an International Ophthalmic Training Institute in India

G Krishnaveni[1], Sanil Joseph[1,2,3], Ravilla Thulasiraj[1]

Purpose: Inadequacy of trained human resources is a critical challenge for eye-care delivery worldwide. Recognizing this, the World Health Organization (WHO) and the International Agency for Prevention of Blindness had identified the development of human resources as one of the focal areas in the global initiative "Vision 2020: The Right to Sight." The global action plan of the WHO also emphasized the need for trained workforce for ensuring comprehensive eye-care services. We aimed to present the uptake pattern of training programs offered at a high-volume training institute in India. **Methods:** We did a retrospective analysis of data related to training programs conducted between 2000 and 2019. Trainees included ophthalmologists, allied ophthalmic personnel, and eye-care management professionals from all over the world. We analyzed the overall growth over the 20 years in the WHO regions. The uptake patterns were also analyzed across four segments of 5-year-periods by the type of training. **Results:** Overall, 9091 trainees from 118 countries attended training in over 40 courses that included long- and short-term clinical training for ophthalmologists (54.2%) and short-term training for eye-care managers (29.5%), allied ophthalmic personnel (6.2%), and eye-care technicians (10.2%). The majority of the trainees (81.3%) came from the Southeast Asian region, of which 87.4% were from India. Most (98.3%) of the trainees belonged to developing countries. We found an overall average growth of 4.8% in the training uptake across the four 5-year segments over the 20 years. **Conclusion:** Comparatively better representation of trainees from the developing countries is encouraging as the prevalence of blindness and visual impairment is higher in those countries, warranting improved eye-care delivery. Given the strong influence of distance and associated costs of accessing training, the development of similar institutes in other regions might help enhance the global efforts to eliminate needless blindness.

Key words: Allied ophthalmic personnel, eye-care management training, human resource development in eye care, ophthalmic training, ophthalmologist training

Access this article online

Website: www.ijo.in

DOI: 10.4103/ijo.IJO_1196_22

Quick Response Code:

Globally, an estimated 2.2 billion people have a visual impairment (VI) or blindness, of which at least one billion have a VI that could have been avoided.[1] Nearly 115 million individuals are projected to be blind by 2050 worldwide. The prevalence of distance vision impairment in low- and middle-income countries (LMICs) is estimated to be four times higher than that of high-income countries (HICs).[2] Moreover, the prevalence of bilateral blindness in LMICs of western and eastern sub-Saharan Africa (5.1%) and South Asia (4.0%) is reported to be eight times higher than in all HICs (<0.5%).[2,3] Recognizing this urgent need to address the increasing eye-care burden, the WHO and the International Agency for the Prevention of Blindness (IAPB) together launched a global initiative "Vision 2020: The Right to Sight" in 1999 with the goal to eliminate avoidable blindness by the year 2020.[4] This initiative identified human resource development as one of the three pillars to achieve its goal. The global action plan of WHO (2014–2019) also emphasized the need for trained workforce for ensuring comprehensive eye-care services.[5]

The critical challenges related to eye care worldwide include inadequately trained human resources, an inappropriate mix of cadres, inequitable distribution, and low productivity.[6] There is a significant gap in the need, availability, and distribution of trained eye health workforce in developing countries.[7–9] A well-trained multi-disciplinary team comprising ophthalmologists, ophthalmic assistants, managers, outreach workers, and instrument technicians forms the backbone for providing high-volume, high-quality eye care.[10,11]

The existing health systems, in general, are struggling to maintain the standards of professional education to produce well-trained graduates due to its complexity and high cost. The curricula in many instances would be outdated and fail to develop practical competencies, leading to poor training

[1]Lions Aravind Institute of Community Ophthalmology, Aravind Eye Care System, Madurai, India, [2]Centre for Eye Research Australia, Royal Victorian Eye and Ear Hospital, East Melbourne, Australia, [3]Department of Surgery (Ophthalmology), The University of Melbourne, Melbourne, Australia

Correspondence to: Mr. Sanil Joseph, Lions Aravind Institute of Community Ophthalmology No. 1, Anna Nagar, Madurai, Tamil Nadu - 625 020, India. E-mail: sanil@aravind.org

Received: 14-May-2022 Revision: 29-Jul-2022
Accepted: 19-Sep-2022 Published: 30-Dec-2022

Cite this article as: Krishnaveni G, Joseph S, Thulasiraj R. Uptake pattern of training programs over two decades at an International Ophthalmic Training Institute in India. Indian J Ophthalmol 2023;71:268-74.

outcomes.[12] The situation is not different in eye care. In spite of an emphasis on standardization of ophthalmology residency programs,[13] there are wide variations in the actual training as this depends greatly on the volume of patient care at the training institutes.[14] This, in turn, impacts the training outcomes[15] and hence demands refresher training programs that provide adequate hands-on experience, to supplement academics. To address this challenge, WHO's action plan for eye-care human resources recommends focusing on well-structured, need-based, and hands-on training programs.[6]

Recognizing this, a leading network of eye hospitals in India has developed an extensive set of training programs over the past 40 years, for supplementary skill development of eye-care professionals. The aim of this study was to evaluate the uptake pattern of long- and short-term structured training programs offered at this institute across two decades (2000–2019).

Methods

We performed a retrospective analysis of data between the years 2000 and 2019 extracted from the institute's training database. The study protocol was approved by the ethical committee of the institute.

This institute, through its eye hospital network,[16] spread across the states of Tamil Nadu and Pondicherry along with its management training institute,[17] offers around 40 courses including long- and short-term, clinical and non-clinical courses[18] for eye-care personnel. These structured courses are supplemented by custom-designed courses, recognizing that the competence needs on the ground would be quite varied. These refresher training programs are well structured and application-oriented for ophthalmologists, allied ophthalmic personnel (AOP), and other supporting cadres.

Design and delivery of the training programs

The structure of various training programs is described in **Table 1.** All courses offered at the institute place a greater emphasis on the practical application of knowledge and skills. The clinical courses are designed with a combination of didactic lectures, hands-on, as well as observational training to prepare the trainees for effective diagnosis and management of clinical conditions. The long-term fellowships for ophthalmologists provide advanced training in ophthalmic subspecialties with varying durations from 12 to 24 months. The short-term clinical courses for practicing ophthalmologists are 2 weeks to 6 months long and provide specialized training. The duration of the short-term courses designed to upgrade the clinical and technical competency of the AOP ranges from 1 week to 6 months.

The eye-care management training programs are designed to provide the managerial staff in eye hospitals and non-governmental organizations (NGOs) with an overview of the management principles in eye-care delivery and exposure to the operational challenges in eye hospitals or eye-care programs. The curricula for the management courses were designed through a formal workshop with participation from international eye-care NGOs, academic experts, and experienced practitioners.

Selection of trainees for all courses is carried out through structured scrutiny of applications based on set eligibility criteria. Considering the participation of trainees from across the world, English is the medium of instruction for all programs. There is a standard fee structure, and the fee is set to be very nominal to maximize participation, especially from the LMICs. Participants are given a formal certificate upon successful completion of the training. To ensure an enabling environment for effective learning, the necessary facilities including well-equipped classrooms, wet lab facilities for surgical training, library, internet connectivity, accommodation, and food services are provided within the campus.

For participants of clinical courses, the lectures, practical training sessions, and case presentations are documented in a logbook that gets reviewed periodically by the training supervisors.

Various knowledge and skill assessment formats are used to evaluate the learning outcomes of the AOP attending the clinical and technical courses. In the management courses, the trainees are encouraged to develop strategies and actionable plans to be implemented at their respective institutions. For operational-level courses, the reporting authorities of the trainees are engaged throughout the training period so that each trainee gets the necessary support to implement their action plans following the training. There is a formal mechanism to capture the trainees' feedback with respect to the learning, design, and delivery of the programs.

Data collection and management

We extracted deidentified data from the training management database—"Aurovikas," related to the trainees enrolled in various calendared and structured training programs conducted at the institute between 2000 and 2019. We analyzed the overall growth over the 20 years in the WHO regions. For the purpose of further analysis, the entire study period was categorized into four segments of 5-year duration: 1 (2000–2004), 2 (2005–2009), 3 (2010–2014), and 4 (2015–2019). The uptake patterns and growth were analyzed in each five-year period by the type of training.

Additionally, the uptake patterns were compared between training programs for "cataract" and "subspecialities." The training programs were broadly categorized into five groups: 1: long-term fellowships for ophthalmologists, 2: short-term clinical courses for ophthalmologists, 3: short-term courses for AOP, 4: short-term technical skill training, and 5: eye-care management training. The association of the trainees' home location with training uptake was compared across three geographic categories—India, the rest of the Southeast Asian regions, and other countries. A two-sample proportion test was used to compare the percentage of trainees attending cataract and other subspecialty courses. P values < 0.05 were considered statistically significant. The statistical analyses were performed using STATA ver. 14 (Texas, USA) software.

Results

Between 2000 and 2019, a total of 9,091 eye-care professionals from 118 countries underwent various courses, and 61.7% (5,608) were male participants. The distribution of trainees across the five categories of courses was as follows: long-term fellowships for ophthalmologists: 1,243 (13.7%), short-term clinical courses for ophthalmologists: 3,683 (40.5%), short-term courses for

Table 1: Structure of the long and short-term certificate training program at AECS

Category	Objective and Target participants	Duration
For Ophthalmologists		
Long-term clinical fellowships	Advance training to ophthalmologists to enhance their clinical skills in general ophthalmology or subspecialties	Ranges from 12 to 24 months
Short-term clinical courses	Specialized training for practicing ophthalmologists to improve their surgical or clinical skills in cataract or subspecialties	Ranges from 2 weeks to 6 months
For supporting personnel		
Short-term allied ophthalmic courses	Refresher training to practicing AOP to improve their clinical skills and to get oriented in preferred practices in specific areas such as refraction, operation theater assistance, pediatric ophthalmology, patient counseling, ocular prosthetics, and orthoptics	Ranges from 3 weeks to 6 months
Technical skill training	Need-based training in technical areas such as ophthalmic instruments maintenance, optical dispensing, eye bank management, and vision center management.	Ranges from 1 week to 3 months
Eye-care management training	Management training for heads of eye hospitals, program managers, hospital administrators, project managers, and community workers and for setting up allied ophthalmic training programs	Ranges from 5 days to 1 month

AOP: 556 (6.1%), short-term technical skill training: 930 (10.2%), and eye-care management training: 2,679 (29.5%).

Geographic distribution of trainees

Among the 6 WHO regions, we found that the South East Asia Region (SEAR) had the most representation (81.3%). The proportion of trainees from Africa, Western Pacific, Europe, Eastern Mediterranean, and American regions were 8.3%, 5.5%, 1.8%, 1.7%, and 1.4%, respectively [Fig. 1]. Within the SEAR, most trainees (87.4%) belonged to India and the rest came from Bangladesh (6.1%), Nepal (3.9%), and other countries (2.6%). Overall, most (98.3%) of the trainees were from the LMICs.

Growth in the uptake of training programs

We found an average growth rate of 4.8% in the uptake of the training programs across the four 5-year segments over the 20 years. There was a steady growth from 7.4% to 47.5% between the first and the fourth 5-year periods in the uptake of long-term fellowships for ophthalmologists [Fig. 2]. The growth trend for the short-term clinical courses for ophthalmologists was high (35.79%) between the first and second 5-year periods and steadily went down to 21.3% by 2019. Enrollment in the 'short-term allied ophthalmic courses' grew constantly from 12.5% to 33.3% between the first and third 5- year periods and saw a slight fall to 30.8% during 2015–2019. The uptake trend for technical skill training increased up to 31.7% during the second 5-year period and steadily went down to 28.1% toward the end of the study period. The eye-care management training had a fluctuating uptake pattern across the 5-year periods, and the growth ranged from 18.5% to 33.4% over the two decades.

Whereas the uptake pattern of cataract-related training programs showed a downward trend across the 5-year periods, the subspecialty courses showed an upward trend [Table 2]. Cataract training that predominantly included short-term training on surgical techniques (ECCE, SICS, and phacoemulsification) was attended by over 91.25% of the trainees. The average growth in the uptake of overall subspecialty training across the four 5-year segments was 8.2%. In the first 5-year period (2000–2004), the proportions of cataract and subspecialty trainees were 60% and 40%, respectively, and these proportions were reversed to 30% and 70%, respectively, in the fourth 5-year period. Among the long-term subspecialty fellowships, retina-vitreous, cornea, and glaucoma fellowships

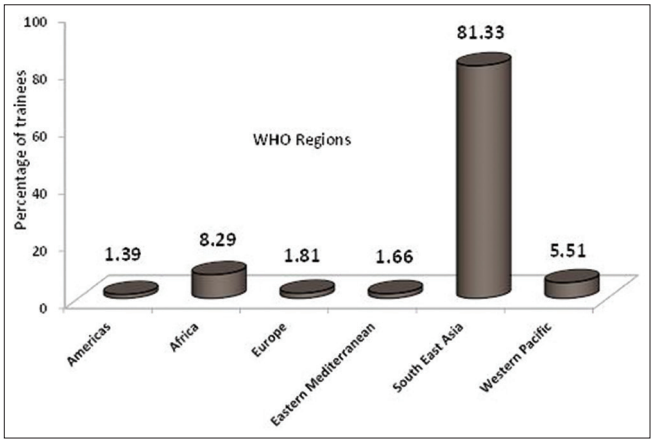

Figure 1: Distribution of trainees across the WHO regions

were attended by more participants compared to the others. Among the short-term subspecialty courses, the lasers in diabetic retinopathy and clinical observership in glaucoma had higher participation. However, the upward growth trend in overall subspecialty training was consistent for every specialty. The difference between the proportions of training in cataract and subspecialty training was found to be statistically significant, in both overall and within each 5-year period ($P < 0.001$).

Table 3 describes the association of trainees' home location and gender with the uptake of training. Overall, 71% of the trainees were from India, 10% from other SEAR countries, and 19% from other countries. Although the proportions varied across countries, Indians significantly dominated in all categories. For the long-term clinical fellowships and short-term clinical courses, the proportions of Indian participants were 95% and 75%, respectively. For the other three categories, the proportion of Indians was around 60%. The proportion of participants from the rest of SEAR was around 17% for the short-term allied ophthalmic courses, technical skill training, and eye-care management training. The proportions of participants for the above three programs from other countries, were 23%, 25%, and 22%, respectively.

More men (61.7%) compared to women attended the training programs, overall. There was a statistically significant male

Table 2: Comparison of uptake patterns of trainees in cataract and subspecialty training programs over 2 decades (2000-2019)

Name of the Course	Years				Total *n* (%)
	2000-2004 *n* (%)	2005-2009 *n* (%)	2010-2014 *n* (%)	2015-2019 *n* (%)	
Cataract—overall	466 (100)	851 (100)	527 (100)	405 (100)	2249 (100)
Cataract: long-term fellowship					
Anterior segment/Intraocular Lens Microsurgery	38 (8.15)	47 (5.52)	54 (10.24)	58 (14.32)	197 (8.75)
Cataract: short-term courses	428 (91.85)	804 (94.48)	473 (89.76)	347 (85.68)	2052 (91.25)
ECCE	387 (83.04)	244 (28.67)	84 (15.9)	4 (0.98)	719 (31.96)
SICS	41 (8.79)	312 (6.6)	170 (32.2)	157 (38.7)	680 (30.23)
Phacoemulsification	0	248 (29.14)	219 (41.5)	186 (45.9)	653 (29.03)
Subspecialty—overall	308	690	711	970	2679
Subspecialty: Long-term Fellowships	54 (100)	176 (100)	284 (100)	532 (100)	1046 (100)
Comprehensive Ophthalmology	2 (3.70)-	26 (14.77)	21 (7.39)	112 (22.93)	171 (14.35)
Glaucoma	6 (11.11)	30 (17.05)	61 (21.48)	79 (14.85)	176 (16.83)
Retina—Vitreous	19 (35.18)	44 (25.00)	68 (23.94)	104 (19.55)	235 (22.47)
Neuro-ophthalmology	-	-	1 (0.35)	-	1 (0.10)
Cornea	11 (20.37)	27 (15.34)	63 (22.18)	114 (21.43)	215 (20.55)
Orbit and Oculoplasty	4 (7.41)	16 (9.09)	22 (7.75)	38 (7.14)	80 (7.65)
Pediatric Ophthalmology and Strabismus	12 (22.22)	31 (17.61)	46 (16.20)	72 (13.53)	161 (15.39)
Uvea	-	2 (1.14)	2 (0.70)	3 (0.56)	7 (0.67)
Subspecialty: Short-term Courses:	254 (100)	514 (100)	427 (100)	438 (100)	1633 (100)
Pediatric Ophthalmology	7 (2.76)	4 (0.78)	-	-	11 (0.67)
Cornea	-	3 (0.58)	2 (0.47)	1 (0.23)	6 (0.37)
Glaucoma	51 (20.08)-	220 (42.80)	151 (35.36)	131 (0.23)	553 (33.86)
Orbit and Oculoplasty	1 (0.39)	3 (0.58)	10 (2.34)	7 (1.60)	21 (1.29)
Retina—Vitreous	-	1 (0.19)	1 (0.23)	1 (0.23)	3 (0.18)
Neuro-Ophthalmology	-	2 (0.39)	5 (1.17)	14 (3.20)	21 (1.29)
Lasers in Diabetic Retinopathy	189 (74.41)	245 (47.67)	186 (43.56)	215 (49.09)	835 (51.13)
Low vision	3 (1.18)	28 (5.45)	1 (0.23)	1 (0.23)	33 (2.02)
Vitrectomy (Virtual)	-	-	38 (8.90)	8 (1.83)	46 (2.82)
Pediatric Ocular Anesthesia	3 (1.18)	8 (1.56)	6 (1.41)	3 (0.68)	20 (1.22)
Retinopathy of Prematurity and Pediatric Retinal Disorders	-	-	27 (6.32)	57 (13.01)	84 (5.14)

Table 3: Association of trainees' location and gender with the update of training programs over two decades (2000 - 2019)

Parameters	Course category					Total *n* (%)
	Long-term clinical Fellowships *n* (%)	Short-term clinical courses *n* (%)	Short-term allied ophthalmic courses *n* (%)	Technical skill training *n* (%)	Eye care management training; *n* (%)	
Duration of the training	12 months - 2 years	2 weeks - 6 months	3 weeks - 6 months	1 week - 3 months	1 week - 1 year	
Location:						
India	1,184 (95.25)	2,780 (75.48)	1,603 (59.84)	321 (57.7)	572 (61.5)	6,460 (71.1)
SEAR (except India)	18 (1.45)	208 (5.65)	456 (17.02)	97 (17.44)	155 (16.6)	934 (10.3)
Other countries	41 (3.30)	695 (18.87)	620 (23.14)	138 (24.82)	203 (21.8)	1,697 (18.7)
Gender:						
Male	675 (54.30)	2,100 (57.02)	1,840 (68.68)	293 (52.69)	700 (75.3)	5608 (61.7)
Female	568 (45.70)	1,583 (42.98)	839 (31.32)	263 (47.30)	230 (24.7)	3483 (38.3)
	P=0.003	*P*<0.001	*P*<0.001	*P*=0.20	*P*<0.001	*P*<0.001

dominance ($P < 0.01$) in all the course categories except in the technical skill training for which the proportions were comparable for men (52.6%) and women (47.3%). Eye-care management training was the category that had the highest male dominance of 75.3%.

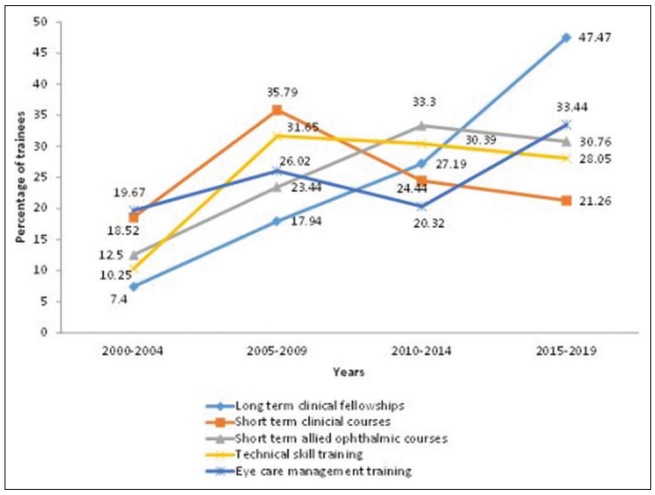

Figure 2: Growth in the number of trainees by course category from 2000–2019 across a 5-year period

Discussion

A significant gap in the availability and distribution of trained manpower has already been established in all regions of the world.[5-9] Need-based, well-structured training programs have been proposed as a solution to address this challenge by the WHO and VISION 2020: The Right to Sight initiative.[4,6] In spite of considerable progress in the availability of trained ophthalmic human resources in all WHO regions, there still is a need for more to meet future challenges, especially in developing countries.[19]

The high number of participants, from 118 countries, attending various training programs in the study setting reflects the high demand for regular, structured capacity building of eye-care personnel across regions. Over 80% of the trainees coming from SEARs and close to 90% of them from India denotes the influence of geographical proximity to a training institute on the uptake of its programs. Visa formalities and other travel requirements that vary across countries over time and the increasing cost of travel could have been a barrier to the uptake of the courses by international participants.

Overall upward growth in the training uptake could be an indication of the increase in demand for additional skill development among eye-care personnel, globally. A greater emphasis on practical application and the quality of the training might also have enhanced participation over the years. However, a downward trend in participation was observed in three categories—short-term clinical courses, short-term allied ophthalmic courses, and technical skill training. The decline in short-term clinical courses is mainly due to the decreasing participation in cataract surgical training over the years. Unlike doctors who mostly organize funding to support their training themselves, the AOP and technicians would depend on their respective institutions for funding support for refresher training. In most settings, it might not be feasible to have these cadres of the personnel go away for training for 1–2 months. These could be the reasons for the decline in the number of trainees from these cadres.

We found a downward trend in the uptake of cataract surgery training and an upward trend in subspecialty fellowships across the study period. This could be an indication that institutions in most countries have started their own cataract surgery training programs[20] as cataract is the predominant cause of blindness worldwide.[19,21] Hands-on training for cataract surgery has increasingly been included in the ophthalmology residency programs in many countries,[22,23] thereby minimizing the necessity for additional training.

The upward trend in the uptake of subspecialty fellowship training indicates that eye-care institutions are focusing more on building subspecialty services in recent years.[24] Great efforts have been made over the past decade to strengthen the capacity of the eye-care training centers in Africa through various programs.[10] The "VISION 2020 Links program" established in 2004 was a similar initiative that focused on improving the capacity of the training institutes in developing countries, mainly in Africa.[25] Several eye hospitals in developing countries are linked to a training institute in the United Kingdom to facilitate knowledge and skill transfer for a particular period. Similarly, the Queen Elizabeth Diamond Jubilee Trust through the commonwealth eye health consortium sponsored around 140 ophthalmologists and other eye-care personnel from sub-Saharan Africa to undertake clinical fellowships at centers of excellence, predominantly in Asia including 42 trainees in the study setting.[26] These initiatives have enabled a large number of eye-care personnel to build their competence within a short period. More such initiatives are necessary to achieve the required skill enhancement in the developing world.

It will be challenging for smaller countries with very few ophthalmologists and eye-care professionals to offer such training, especially in subspecialty areas. Therefore, there is a need for more regional institutes similar to the study setting to offer skill development training to personnel from countries with inadequate training capabilities. Improvised teaching methods and the use of appropriate technology such as online education platforms can further enhance the reach of the training.

We found the trainees' home location and gender to be associated with the uptake pattern of the training programs. The long-term clinical fellowships were taken predominantly by the Indian participants, whereas comparatively more foreign participants were found to have taken the short-term clinical training programs. This trend, in fact, is also a reflection of the organizational policy that admits only domestic candidates to long-term clinical training, considering multiple factors. Firstly, it has been found impractical for foreign candidates to be away from their clinical practice for long durations of 18 to 24 months. Secondly, the long-term trainees will have to be involved in regular clinical activities requiring close interaction with the patients and attendants. These challenges are minimized to some extent in short-term training, and this could have led to a higher uptake of short-term programs by foreign trainees.

The overall male dominance among the trainees could possibly be a reflection of the higher proportion of men in the eye-care workforce in general. Studies have reported varying reasons for the lower proportion of women in the eye-care workforce.[27–29] The fact that women find it difficult to travel long distances and stay away from home due to challenges such as family commitments[30] might also be a reason for lower uptake by women. Comparatively higher gender disparity

among the participants of eye-care management training might be due to the general trend of more men than women taking up leadership and managerial roles in eye-care institutions.

Even though academic programs intended to train ophthalmologists and optometrists are available in almost all regions,[13] lack of structured curricula and appropriate training infrastructure tend to undermine the quality and productivity of these programs.[12] Our study findings suggest that the uptake of training programs can be maximized when offered locally. Therefore, setting up localized training institutes that can offer structured training programs is essential to ensure continuous professional development of eye-care human resources, especially in LMICs.[31] Recognizing this ardent need, the study institute, in collaboration with Seva Foundation USA has initiated "Eyexcel", a training program to support organizations in setting up training programs.[32] This program has trained over 100 teams from across the world over the past 14 years.

The strength of our study includes a large data set covering a variety of training programs conducted over two decades. The participants came from all 6 WHO regions and represented a wide range of cadres. Because our study was based on retrospective data available in the training database, the scope of our analysis was restricted. There is a scope for conducting a prospective study by which this limitation can be addressed.

Conclusion

A good representation of participants from developing countries in the training programs is encouraging as it corresponds to the higher eye-care needs in those counties. The higher growth in clinical subspecialty training could be an indication of a welcome trend toward comprehensive eye care. Given the strong influence of distance in accessing training, the development of institutes similar to the study setting in other regions would, hopefully, enhance global efforts to eliminate needless blindness. It is also important that governments and NGOs become proactive in promoting and supporting such skill development training programs and thereby enhance the quantum and quality of eye care.

Abbreviations

WHO: World Health Organization; SEAR: South East Asia Region; AECS: Aravind Eye Care System; AOP: Allied Ophthalmic Personnel

Ethics approval and consent to participate

The study used retrospective data. However, as mandated by our institutional policy, the study with the project code RET200000319 was presented to the "Institutional Ethics Committee—Aravind Eye Hospital" and was approved (ECR/182/INST/TN/2013/RR-19) on November 27, 2020.

Availability of data and materials

The datasets generated and analyzed during the current study are available in the Harvard Dataverse repository [10.7910/DVN/PTYQOQ].

Authors' contributions

KG conceptualized the idea, KG and SJ designed the study, managed the collection and analysis of the data, and prepared the manuscript. TR provided significant inputs to the study design and did a substantial revision of the manuscript. All authors read and approved the final manuscript.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. WHO. Blindness and Vision Impairment. 2021 Oct. Available from: https://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment. [Last accessed on 2022 Jan 28].
2. Bourne RRA, Flaxman SR, Braithwaite T, Cicinelli MV, Das A, Jonas JB, *et al*. Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: A systematic review and meta-analysis. Lancet Glob Health 2017;5:e888–97.
3. Ackland P, Resnikoff S, Bourne R. World blindness and visual impairment: Despite many successes, the problem is growing. Community Eye Heal J 2018;30:71–3.
4. Foster A. Vision 2020-the Right to Sight. Trop Doct 2003;33:193–4.
5. WHO. Universal Eye Health: A Global Action Plan 2014-2019. Geneva: World Health Organization; 2013. 1–22 p. Available from: https://www.who.int/blindness/AP2014_19_English.pdf. [Last accessed on 2022 Feb 25].
6. WHO. Comprehensive Planning of Human Resources for Eye Care to Meet the Goals of Vision 2020 : The Right to Sight. Report of an Intercountry Consultation, WHO, SEARO, New Delhi. New Delhi; 2002. Available from:http://v2020eresource.org/content/files/HR_OPHTHAL_WHO1.pdf. [Last accessed on 2022 Feb 25].
7. Palmer JJ, Chinanayi F, Gilbert A, Pillay D, Fox S, Jaggernath J, *et al*. Mapping human resources for eye health in 21 countries of sub-Saharan Africa: Current progress towards VISION 2020. Hum Resour Health 2014;12:44.
8. Furtado JM, Lansingh VC, Winthrop KL, Spivey B. Training of an ophthalmologist in concepts and practice of community eye health. Indian J Ophthalmol 2012;60:365–7.
9. Resnikoff S, Felch W, Gauthier TM, Spivey B. The number of ophthalmologists in practice and training worldwide: A growing gap despite more than 200 000 practitioners. Br J Ophthalmol 2012;96:783–7.
10. Corbett MC, Mathenge W, Zondervan M, Astbury N. Cascading training the trainers in ophthalmology across Eastern, Central and Southern Africa. Global Health 2017;13:46.
11. Lewallen S, Kello AB. The need for management capacity to achieve VISION 2020 in Sub-Saharan Africa. PLoS Med 2009;6:e1000184.
12. Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, *et al*. Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. Lancet 2010;376:1923–58.
13. Golnik K, Mayorga E, Spivey B, Ritch R, Gauthier TM. The International Council of Ophthalmology: Refocusing Ophthalmic Education in the Asia-Pacific Region and Beyond. Asia-Pacific J Ophthalmol (Phila) 2012;1:255–8.
14. Gupta S, Haripriya A, Vardhan SA, Ravilla T, Ravindran RD. Residents' Learning Curve for Manual Small-Incision Cataract Surgery at Aravind Eye Hospital, India. Ophthalmology 2018;125:1692-9.
15. Wang YE, Zhang C, Chen AC, Pineles S, Hou J. Current status of ophthalmology residency training in China: The experience from well-structured centers around the country. Asia-Pacific J Ophthalmol (Phila) 2020;9:369–73.

16. Aravind Eye Care System. Aravind Eye Care System. 2021. Available from: https://aravind.org. [Last accessed on 2021 May 05].
17. Lions. LAICO. p. 2021. Available from: https://laico.org. [Last accessed on 2021 May 05].
18. Why train at Aravind?. Aravind Eye Care System. 2021. Available from: https://aravind.org/training-overview/. [Last accessed on 2021 May 05].
19. WHO. World Report on Vision. Switzerland: World health Organization; 2019. 1–160 p. Available from: https://www.who.int/publications/i/item/9789241516570. [Last accessed on 2022 Mar 12].
20. Broyles JR, Glick P, Hu J, Lim YW. Cataract blindness and simulation-based training for cataract surgeons: An assessment of the HelpMeSee approach. Rand Health Q 2013;3:7.
21. Williams LB, Prakalapakorn SG, Ansari Z, Goldhardt R. Impact and trends in global ophthalmology. Curr Ophthalmol Rep 2020;8:136-43.
22. Lotfipour M, Rolius R, Lehman EB, Pantanelli SM, Scott IU. Trends in cataract surgery training curricula. J Cataract Refract Surg 2017;43:49–53.
23. Biswas P, Gogate PM, Maskati QB, Natarajan S, Verma L, Bansal PK. Residency evaluation and adherence design study III: Ophthalmology residency training in India: Then and now–Improving with time? Indian J Ophthalmol 2018;66:785–92.
24. Cai CX, Wang J, Ahmad S, Klawe J, Woreta F, Srikumaran D, *et al*. National trends in surgical subspecialisation in ophthalmology in the USA. Br J Ophthalmol 2022;bjophthalmol-2021-320295. doi: 10.1136/bjophthalmol-2021-320295.
25. Mwangi N, Zondervan M, Bascaran C. Analysis of an international collaboration for capacity building of human resources for eye care: Case study of the college-college VISION 2020 LINK. Hum Resour Health 2017;15:22.
26. Improving Ophthalmology Sub-Specialty Clinical Skills. Commonwealth Eye Health Consortium. 2021. Available from: https://cehc.lshtm.ac.uk/clinical-fellowships-2/. [Last accessed on 2021 May 05].
27. Danesh-Meyer HV, Deva NC, Ku JYF, Carroll SC, Tan YW, Gamble G. Differences in practice and personal profiles between male and female ophthalmologists. Clin Exp Ophthalmol 2007;35:318–23.
28. Xierali IM, Nivet MA, Wilson MR. Current and future status of diversity in ophthalmologist workforce. JAMA Ophthalmol 2016;134:1016–23.
29. Aguwa UT, Srikumaran D, Green LK, Potts JR 3rd, Canner J, Fountain TR, *et al*. Analysis of sex diversity trends among ophthalmology match applicants, residents, and clinical faculty. JAMA Ophthalmol 2021;139:1184–90.
30. Saurabh K, Sarkar K, Roy R, Majumder P. Personal and practice profile of male and female ophthalmologists in India. Indian J Ophthalmol 2015;63:482–6.
31. Gilbert SS, Courtright P, Ramasamy D. Expanding and optimizing human resources for eye care. In: Khanna RC, Rao GN, Marmamula S, editors. Innovative Approaches in the Delivery of Primary and Secondary Eye Care. Cham: Springer; 2019. p. 39–55.
32. Ramasamy D, Gilbert SS. How to "do" CPD with your team (from the organisation's perspective). Community Eye Heal J 2017;30:9–10.