



Training to meet the need for refractive error services



Hannah Faal

Senior Eye Care Programme Consultant, West Africa, Sightsavers International, PO Box 18190, 58 Patrice Lumumba, Airport, Accra, Ghana.



M Babar Qureshi

Senior Regional Office Advisor: West Asia, North Africa and Eastern Europe, Christian Blind Mission (CBM). CEO and Executive Director, CHEF International, 10 E1 Abadara Road, University Town, Peshawar, Pakistan. Email: cbmpak@pes.comsats.net.pk

In many low- and middle-income countries, there are inadequate refractive error services for the many people who are currently either blind or visually impaired because they lack a pair of spectacles.

The prioritisation of refractive error and low vision services within VISION 2020: The Right to Sight has provided an impetus and framework for the development of refractive error programmes to meet this need for services.

To ensure the success of a refractive error programme, there have to be enough people with the right skills in order to provide refraction services throughout the programme. Therefore, careful thought should be given to setting up an appropriate training programme that will support the human resource needs of a refractive error programme.

The following steps are generally advisable:

- Step 1: Estimate the need for services
- Step 2: Analyse existing resources and services
- Step 3: Determine the tasks, skills, and human resources needed for refractive error services
- Step 4: Devise a training plan.

This article shows how two countries, The Gambia and Pakistan, approached the training and integration of refraction personnel in their respective eye care programmes.

The Gambia

Step 1: Estimating the need for services

We estimated the need for refractive error and low vision services by looking at population trends in different age bands (e.g. 10–15 years or >45 years), patient volumes and patterns of diagnosis in hospitals (who is diagnosed as having what refractive error), and trends in spectacle and lens prescriptions.

In the rural population of The Gambia, the people needing refractive error services are mostly literate adults (such as teachers and religious leaders), men, and school children. The urban population needing refractive error services presented a similar profile, with the addition of civil servants in the public sector and workers in the private sector.

We also investigated the importance attached by different populations to the

cosmetic appearance of spectacles, and we found that it was of more importance to the urban population.

Step 2: Analysing existing resources and services

In The Gambia, a country with a population of just over one million, the national eye care programme had already achieved full national coverage. In this country, therefore, our approach to meeting refractive error needs was to incorporate refractive error services within the national programme, which could easily be done.

We found that refractive error services in The Gambia were being provided by a single private practice shop in the main capital and an optical service centre in the tertiary eye unit of the main teaching hospital.

The eye care resources, human and material, of the existing national eye care programme were also analysed.

Step 3: Determining the tasks, skills, and human resources needed for refractive error services

First, we considered what tasks would have to be carried out, and what competencies and skills were needed for each of these. We then identified different types of eye health practitioners who would be needed to carry out these tasks in the different service delivery areas of the national eye care programme. This ensured that the refractive error service programme would be integrated into existing services (Table 1).

We identified existing staff in the national eye care programme who could receive additional training and expanded their duties to include refractive error tasks. We also identified gaps where new practitioners and workers would be needed.



Momodou Bah

A community member tests her own vision at an outdoor 'vision corridor', a component of the national refractive error programme at community level. THE GAMBIA

Table 1. The various service delivery areas of The Gambia's refractive error programme (within the existing national eye care programme)

Service delivery area	Tasks	Team
Community (urban and rural)	<ul style="list-style-type: none"> Dissemination of information/health education on near vision, the benefit and use of spectacles, and where best to obtain them Counselling on the use of spectacles and low vision aids Making near vision spectacles available The use of vision corridors for self-testing of distance and near vision and for raising awareness, particularly in urban areas 	Community-based vision and eye-oriented workers, e.g. 'friends of the eye' ¹ (usually non-health service personnel, selected by the community and covering a population of 250)
School eye health programme (this covers all primary schools, but the refractive error component is extended to secondary schools as well)	All the above, plus: <ul style="list-style-type: none"> Vision screening using Snellen E chart and occlusion Identification of children (11–15 years) with visual problems Keeping records and tracking children referred for refraction and for their annual or bi-annual follow-up visits as required 	Teachers, school nurses, community ophthalmic nurses
General health facilities, e.g. health centres (frontline health facilities)	<ul style="list-style-type: none"> Self-check for distance and near vision Proper care of own spectacles 	Integrated eye workers
Primary health facilities, where a community ophthalmic nurse serves a population of 10,000–30,000	<ul style="list-style-type: none"> Training and supportive supervision of community-level workers Holding stock of near vision spectacles Tracking referrals, especially of school children, for spectacle wearing and offering support for repairs or replacements Data management of refractive error and low vision as part of comprehensive eye care 	Community ophthalmic nurse as part of community health facility staff
Secondary eye unit covering a population of 100,000–150,000	<ul style="list-style-type: none"> Screening for presbyopia and refractive errors in government ministries, industries, and other work places (in urban areas only) Eye health education Basic refraction Basic dispensing of simple and near spectacles (following strict referral criteria) Tracking, counselling, and supporting patients needing low vision services 	Refractionist* within a secondary eye unit team, which is led by a cataract surgeon
Tertiary eye unit covering a population of about 1,000,000	All of the tasks assigned to the secondary eye unit, plus: <ul style="list-style-type: none"> Basic and complex refractions for walk-in patients and referrals Low vision services Optical workshop services Investigations: visual field tests, keratometry, etc. Training Supportive supervision 	Optical sub-unit of the eye care team made up of: <ul style="list-style-type: none"> Optometrist* Refractionist/optical technician* Receptionist or display shop assistants* Optical stores keeper* Accounts clerk*

* New staff (not part of the existing national eye care programme)

Certain new staff, such as the receptionist or display shop assistant, the optical stores keeper, and the accounts clerk, could be recruited from the existing human resource pool in The Gambia, while an optometrist could be recruited from another country in the sub-region.

However, customised training would be required to meet the need for refractionists, also known as optical technicians. These eye health practitioners would be based in the secondary and tertiary units, but they would offer specific intermittent population-based services.

The refractionist/optical technician would perform the following tasks:

- refraction services (including simple subjective and retinoscopic refraction)
- low vision services (including assessment and prescription of low vision aids)
- optical workshop services (including glazing lenses of all kinds into frames)
- investigations (including visual field tests, colour vision tests, and keratometry)
- community services (including screening for refractive errors and presbyopia, prescription and dispensing of simple

presbyopic spectacles, and eye health education)

- referral of non-refractive error visual loss and eye problems, as well as complex refractive errors, to the ophthalmologist and the optometrist, respectively.

Step 4: Devising a training plan

Based on the task and skill analysis (Step 3), a training programme was developed and implemented.

Existing staff

The skills of existing staff in the national eye care programme needed to be updated. In addition, existing training programmes had to be expanded to include refractive error components.

The following steps were taken:

- Community-level eye care training** was expanded to include refractive error components. This was at most 1–2 hours.
- The **pre-service training modules** for general nurses, community ophthalmic

nurses, medical students, and other health workers were reviewed and improved to include refractive error and low vision components.

- In-service training:** The existing eye care programme staff, service delivery staff, and faculty received customised training to consolidate their skills in refractive error services and training.

Training refractionists/optical technicians

The tertiary unit was made responsible for the training course for refractionists/optical technicians. An optometrist was recruited from Nigeria to join the eye team at the tertiary unit and, with the help of the eye programme senior staff, to develop the training modules.

This new course trained refractionists/optical technicians to provide services where there are no optometrists in the community. Their role would also include assisting the optometrist or ophthalmologist where there was one.

Community eye health, primary eye care,

Continues over page ►

and optical dispensing components were included in the module in order to equip the refractionists to provide optical and primary eye care at an affordable price. It was decided that the refractionists would work as members of an eye care team and at the following service delivery points: refraction clinics, low vision clinics, optical workshops, and secondary and tertiary units.

The criteria for enrolment were:

- twelve years of schooling (general certificate of education or equivalent)
- passes in English, mathematics, physics and/or biology or equivalent.

Practical experience in an eye unit was considered to be an advantage.

Candidates for this training programme were nominated by a supervising optometrist or ophthalmologist and sponsored by government and non-government agencies. To accept a candidate from the private sector would be an exception. (For improved integration, absorption and career growth, the programme is currently recruiting from the now sizeable pool of community ophthalmic nurses who already work in rural areas at the secondary eye units.)

The duration of the course was six months, consisting of three months of intensive studying and practical experience at the base hospital and three months of practical experience in the community.

Continuous assessment was carried out and logbooks were used to track the skills the candidates had learnt. This was followed by a final written and practical exam. Certification was done by the Regional Ophthalmic Training Programme, which conducts all mid-level eye care training in The Gambia.

Existing faculty and staff, such as optometrists, ophthalmologists, residents, and cataract surgeons, as well as existing tertiary unit facilities, were used to conduct training. The practical experience component included work in secondary units, schools, community screening, and eye camps. This practical work was mainly supervised by the optometrist.

Each student received a kit and textbooks, which would become part of the equipment at their posts on graduation and not the personal property of the students. Graduates also received extensive post-training support for at least six months in order to help them set up services, to ensure these are of the required standard and quality, and to help the graduates integrate their work into existing services.

The following lessons were learnt:

- having a community-oriented optometrist with excellent training and management skills is absolutely essential for successful management of such a training programme
- the training has to be competency-based and intensely practical, with continuous emphasis on quality assurance
- to ensure the continued job satisfaction of the refractionists/optical technicians, it would be necessary to provide opportunities for further training. A multi-entry and multi-exit scheme would allow for the

coverage of population needs, as well as enable the further training of the smaller number of refractionists who could progress to other aspects of service delivery, such as that provided by ophthalmic technologists or optometrists

- it is essential to maintain quality assurance by providing full, supportive supervision to the refractionist and any allied health practitioner
- in many countries in West Africa, it may be necessary to advocate and work with the ministry of health to establish a council for allied health practitioners, as only the traditional medical and nursing councils exist.

Pakistan

Step 1: Estimating the need for services

Pakistan has a high prevalence of refractive error: 63.5 per cent in adults, according to the national blindness survey of 2002.

In addition, four per cent of children below the age of 15 have refractive errors.

Given that 40 per cent of the population is younger than 15 and 34 per cent is older than thirty, we calculated that a minimum of 230,200 people per million population would need refractive error services (the figures for the age group 15–30 are not yet known). This figure excludes those with presbyopia.

Step 2: Analysing existing resources and services

There were few existing optometrists in Pakistan, and they were practising only in cities. Most of the optometrists were trained abroad and worked in tertiary eye care institutions. There were no institutions in Pakistan that ran accredited and certified training programmes for optometrists. Most people in need of refraction saw opticians in the local market place. Few of these opticians had received any certified training in Pakistan; they were mostly operating as family businesses. Other patients had to

travel to ophthalmologists in the city for refractive error services.

Step 3: Determining the tasks, skills, and human resources needed for refractive error services

It was determined that refractive services had to be integrated at the district level. Therefore, the National Committee for the Prevention of Blindness decided to train ophthalmic technicians and refractionists who could serve in the districts and have clear career pathways. Optometrists, orthoptists, and ophthalmic technologists would be trained to assist ophthalmologists in tertiary eye care institutions and to meet the need for eye care teaching, training, and research in Pakistan.

The role of refractionists, in particular, was considered to be very important. At district or secondary level, they could carry out simple and complex refraction, as well as provide support to the ophthalmologists. They could also take part in school screening programmes and outreach clinics, providing refraction to those being screened.

Step 4: Devising a training plan

The National Committee for the Prevention of Blindness approved job descriptions and tasks for ophthalmic technicians, refractionists, optometrists, orthoptists, and ophthalmic technologists (Table 2).

In order to train these practitioners, it was decided to upgrade the ophthalmic technician course offered at the Pakistan Institute of Community Ophthalmology into a four-year, multi-tiered curriculum. The content of the curriculum was based both on the tasks the practitioners would be required to perform and on the needs of the community at different levels. The multi-tiered approach allowed human resources to be produced for each level of eye care.

At present, three additional institutions are offering this four-year programme.



Students practising refraction on a model of an eye. PAKISTAN

PICO

Table 2. Tasks and areas of work for different eye care personnel

Qualification	Tasks	Level
Ophthalmic technician	<ul style="list-style-type: none"> • Detection and referral • Providing vitamin A capsules and tetracycline at primary eye care level • Providing services for simple refraction • Using mydriatics and local anaesthetics cautiously and responsibly • Removing superficial conjunctival/corneal foreign bodies • Providing health education and counselling 	Primary and secondary eye care
Refractionist	All the functions of ophthalmic technicians, plus: <ul style="list-style-type: none"> • Using cycloplegics • Undertaking advanced refraction • Prescribing contact lenses and contact lens solutions (depending on infrastructure available) • Prescribing simple low vision aids (depending on infrastructure available) 	Secondary eye care (district level: vision centres and district hospitals)
Optometrist	All the functions of ophthalmic technicians and refractionists, plus: <ul style="list-style-type: none"> • Assisting ophthalmologists at tertiary level with simple and complex refractions • Carrying out low vision assessments and prescribing low vision devices • Running a contact lens practice • Assisting in data entry and analysis using computers • Acting as faculty members (teaching others) 	Tertiary eye care (hospital)
Orthoptist	All the functions of ophthalmic technicians and refractionists, plus: <ul style="list-style-type: none"> • Assisting ophthalmologists at tertiary level with assessment and management of advanced visual functions • Carrying out squint assessment and optical management (the management of squint by providing optical devices, spectacles, or patches) • Assisting in data entry and analysis using computers • Acting as faculty members (teaching others) 	Tertiary eye care (hospital)
Ophthalmic technologist	All the functions of ophthalmic technicians and refractionists, plus: <ul style="list-style-type: none"> • Assisting ophthalmologists at tertiary level with sophisticated ophthalmic diagnostic and therapeutic procedures • Assisting in data entry and analysis using computers • Acting as faculty members (teaching others) 	Tertiary eye care (hospital)

The four tiers of the training programme are as follows (Figure 1):

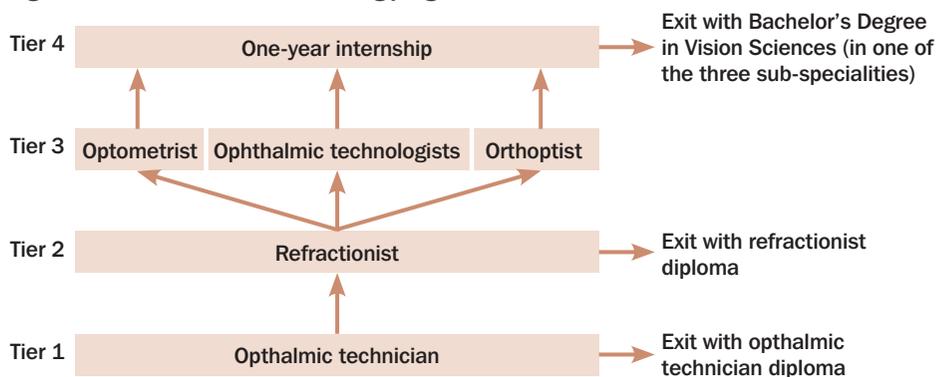
Tier 1. A one-year ophthalmic technician course. Entry requirement: 12 years of schooling (with science subjects). After one year, students can exit with an ophthalmic technician diploma. They may come back within five years to continue to the next tier. Those attaining marks of 70 per cent or more overall and wishing to continue can go on to the next level.

Tier 2. A one-year refractionist course. Entry requirement: 12 years of schooling (with science subjects) and successful completion of the one-year ophthalmic technician course. After one year, students can exit with an ophthalmic technician diploma. They may come back within five years to continue to the next tier. Those attaining marks of 70 per cent or more overall and wishing to continue can go on to the next level.

Tier 3. A choice of one-year courses in one of the following sub-specialities: optometrist, ophthalmic technologist, or orthoptist. Entry requirement: 12 years of schooling (with science subjects) with the successful completion of both the one-year ophthalmic technician course and the one-year refractionist course.

Tier 4. A one-year internship that would give students training under supervision and entitle them to receive a Bachelor's Degree in Vision Sciences in one of the three sub-specialities.

Figure 1. Pakistan's four-tier training programme



For these graduates to successfully deliver services, there has to be a sense of ownership; candidates must be well equipped to put in practice the skills they have learnt. Therefore, a kit is provided to ophthalmic technicians, refractionists, and optometrists on their exit (Table 3), so that they can start to practise what they have learnt. (Orthoptists and ophthalmic technologists don't receive a kit – their specialised equipment is provided by the hospital where they will work.)

There is also a refresher course every five years, which allows graduates to come back and share their experiences, and to receive any new knowledge in the field. The institute continues to provide graduates with whatever institutional support they may require, including sending them the *Community Eye Health Journal*.

Table 3. Professional kit provided on exit from the course for different qualifications

Ophthalmic technician	Ophthalmoscope, Snellen charts, torch, and Binomag
Refractionist	<ul style="list-style-type: none"> • Refraction box • Retinoscope • Cross cylinders • Trial frame • <i>The practise of refraction</i> by Steward Duke-Elder • <i>The ophthalmic assistant</i> by Harold A Stein
Optometrist	Same kit as for refractionist, plus low vision assessment and contact lens kit

Reference

1. Kanyi S. Evaluation of the impact of Nyateros "Friends of the eye" in the delivery of eye care services after one year of its implementation in Lower River Division, The Gambia. *Community Eye Health J* 2005;18(56): 131.