Access to Optometric Education: Challenges in Sub-Saharan Africa

James Loughman  
*Technological University Dublin*, james.loughman@tudublin.ie

V.R. Moodley  
*Technological University Dublin*, moodleyvr@ukzn.ac.za

Brien Holden  
*Vision Institute, South Africa*

K. Naidoo

Follow this and additional works at: [https://arrow.tudublin.ie/otpomart](https://arrow.tudublin.ie/otpomart)

**Recommended Citation**


This Article is brought to you for free and open access by ARROW@TU Dublin. It has been accepted for inclusion in Articles by an authorized administrator of ARROW@TU Dublin. For more information, please contact yvonne.desmond@tudublin.ie, arrow.admin@tudublin.ie, brian.widdis@tudublin.ie.

This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 3.0 License](https://creativecommons.org/licenses/by-nc-sa/3.0/)
Access to Optometric Education: Challenges in Sub-Saharan Africa

VR. Moodley1; J Loughman2; KS Naidoo3
1. University of Kwa-Zulu Natal, South Africa, Dublin Institute of Technology, Ireland
   (Corresponding Author Email: moodleyvr@ukzn.ac.za)
2. Dublin Institute of Technology, Ireland
3. Brien Holden Vision Institute, South Africa

Abstract

Access to education was identified as a key international priority by UNESCO as far back as 1998 when it called for “equality of access”. The profession of optometry has been challenged to educate practitioners in increasing numbers in order to meet the eye care needs. The World Health Organization reported that globally, an estimated 285 million people are visually impaired and in Sub-Saharan Africa (SSA) uncorrected refractive error is the main cause of visual impairment. The number of optometrists trained on the continent is currently insufficient to meet these eye care needs with limited access to education remaining a stark reality for students. A qualitative research design framed in phenomenology was used to conduct structured interviews with academic leaders in optometry across SSA. Finance for tuition and student maintenance, lack of knowledge of optometry and optometrists, high admission criteria, limited spaces at institutions, poor mathematics and science results, gender inequalities and geographical location were cited as barriers to optometric education. Lack of funding was the main contributing factor for the high attrition rate from university in countries where students have to pay their own fees. Where tertiary education is free, the limited number of spaces available in the programmes was the major barrier to access to optometric education for the ever-increasing number of aspiring applicants. The profession of optometry has a key role to play in eye care service delivery in Africa. Therefore educators, policymakers and health professionals must together formulate strategies to increase access to optometric education.

1. Introduction

Despite the numerous healthcare developments on the continent since the turn of the century most people in Africa have never had a visual and eye health examination. Globally, in 2010 an estimated 285 million people were visually impaired, of whom 246 million had low vision and 39 million were blind (Table 1).

Table 1: Global estimate of the number of people visually impaired by age, for all ages in parenthesis the corresponding prevalence (%).

<table>
<thead>
<tr>
<th>Ages (years)</th>
<th>Population (millions)</th>
<th>Blind (millions)</th>
<th>Low Vision (millions)</th>
<th>Visually Impaired (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>1,848.50</td>
<td>17.518</td>
<td>1.421</td>
<td>18.939</td>
</tr>
<tr>
<td>15-49</td>
<td>3548.2</td>
<td>5.784</td>
<td>74.463</td>
<td>80.248</td>
</tr>
<tr>
<td>50 and older</td>
<td>1,340.80</td>
<td>32.16</td>
<td>154.043</td>
<td>186.203</td>
</tr>
<tr>
<td>All Ages</td>
<td>6,737.50</td>
<td>39.365</td>
<td>246.024</td>
<td>285.389  (4.24)</td>
</tr>
</tbody>
</table>


Africa has 15% of the world’s blind population, 8.3% with low vision and 9.2% of visually impaired people with uncorrected refractive error (URE) causing 42% of the visual impairment [16]. Similar findings on URE were reported from studies in Sub-Saharan Africa where URE was the main (43%) cause of visual impairment [9] and was further cited as constituting a major public health problem [12].

Optometrists are the cadre of eye care workers that are trained to correct refractive errors to prevent visual impairment and blindness so it will be expected that adequate numbers of optometrists will be trained to reduce the prevalence of URE. However, Naidoo highlights the fact that the number of optometrists being produced in Africa is insufficient to effectively meet eye care needs [8]. This bleak picture is not limited to optometrists as confirmed by Naicker et al. who describe the general picture in Africa as having 2.3 healthcare workers per 1000 population, compared with the Americas, which have 24.8 healthcare workers per 1000 population [7]. Effah reported that between 1996 and 2004, only about 25-40% of applicants to higher education in Africa were admitted [3]. To begin to increase the density of healthcare workers there has to be a significant increase in access to higher education in Africa. Shabani (2007) noted that there was an increase in access to primary and secondary schools in Sub Saharan Africa. He predicted that
this, coupled with increasing demographics, will increase the demand for higher education in the years to come [11].

As a potential strategy to address the enormous eye care service delivery challenges in Africa, new optometry programmes were started across the continent. Programmes have commenced in Kenya, Mozambique, Malawi, and Ethiopia, and are planned for a few other countries in the near future. However, a stark reality facing these new schools, as with many of the existing programmes in sub-Saharan Africa, is that potential students experience numerous challenges when attempting to gain access to the optometry programmes. This paper focuses on these challenges to optometric education in sub-Saharan Africa and suggests practical solutions to begin to deal with them.

2. Methodology

The qualitative research approach was framed on phenomenology whereby the emphasis is on the person’s subjective experiences and interpretations of the world. Purposeful sampling was used to identify key stakeholders in academic leadership from schools of optometry based in Malawi (2), Ghana (1), South Africa (5), Ethiopia (1), Tanzania (1), and Mozambique (1). The specific stakeholder sampling strategy involved identifying who the major stakeholders were that will have integral knowledge of the designing, policy formulation and processes involved in the entire programme.

Semi-structured telephonic or face-to-face interviews were conducted with the respective academic leaders. Data was transcribed and thereafter coded, captured and thematically grouped for qualitative analysis and reporting.

3. Results

Twelve heads of departments from optometry programmes in 6 sub-Saharan African countries were interviewed. There were five female and seven male heads of departments and their terms of office ranged from 10 months to 30 years.

BARRIERS TO ACCESS TO OPTOMETRIC EDUCATION

Heads of departments identified barriers to access to optometric education for students as shown in figure 1:

Figure 1: Barriers to access to optometric education as identified by academic leaders

Finance was cited by all the academic leaders as being the major barrier to access to optometric education. The lack of finance, both to get students admitted into university or college as well as to maintain themselves during their years of study, was identified as a huge barrier. Only in three of the 12 institutions (Ethiopia, Ghana, and one of the two institutions in Malawi) are all students fully funded to attend university. Other institutions reported that there is limited funding available from governments and even less in the form of bursaries from the private sector. They confirmed the perspective of recruitment officers previously interviewed that the majority of university applicants in sub-Saharan Africa are unable to self-fund their education. Optometric education programmes also involve students having to purchase some optical equipment for use in their clinical training. As most of these are imported into Africa, the costs are very high, adding an additional burden to the overall costs to the student.

The general decline of standards of secondary school public education and specifically the very poor mathematics and science results obtained by scholars in their exit examinations was cited by most of the heads of departments as being a huge challenge for universities and colleges. This was particularly problematic in a programme like optometry where knowledge and understanding in mathematics and science forms a foundation for many of the optometry courses. However, only one (Malawi College of Health Sciences) of the 12 institutions conduct entry examinations for prospective students and base their selection on the outcome of this test. The reason that the college chose to administer an entry examination for all applicants was to independently determine the competency levels of the students. Some institutions in South Africa request that applicants write the
national benchmarking test (NBT) and submit the results as part of the application. The results of the national benchmarking tests are weighted more than the results of the state examinations. Ethiopia reported that the standard of mathematics at schools in their county is of a high standard so the programme places extra emphasis on mathematics and science and expects applicants to have at least 70% in these subjects to qualify for admission into the programme.

An additional specific barrier, identified by the institutions in Malawi specifically, was the poor academic performance of female students, both at secondary school level and in the university admission test. This poor performance in the admission test is most prevalent in the areas of mathematics and science and has thus led to most of the students accepted into the optometry programmes being male. Cultural demands, including expectations of females to focus only on domestic chores within the home, was presented as a possible reason for this trend. Additionally, there are a large number of females that are excluded from going to school or may be allowed by the family to go to primary school only and not to continue into secondary school. This subsequently prevents access into university by these females. Therefore, the enrolment rates into the optometry programmes are evidently skewed in favour of males as these barriers result in females having to endure greater restrictions to access to higher education than their male counterparts.

A lack of awareness of optometry was cited as being very common in most of the countries. Even in countries like South Africa which has over 3,000 optometrists, the knowledge of the profession in the rural areas was very limited as the practitioners are based primarily in urban areas. Academic leaders reported that in their respective countries there are very few optometrists practicing and in some instances the first cohort of optometric students are still in training.

Poor secondary school final examination results obtained in the last year of high school also affects access to the optometry programmes in all the countries. As with most medical programmes, the admission criteria to get into optometry are higher than with other non-medical programmes at the institutions. The majority of the institutions weight mathematics and science higher than other courses and set a minimum acceptable grade for these subjects. None of the universities conduct interviews as part of the selection process and most programmes rely solely on the merit scores with no other factors considered.

Academic leaders at all the institutions agreed that the limited spaces that they have in their various optometry programmes across Sub Saharan Africa were highly inappropriate when the need for optometrists is considered. Most institutions receive far more applications than they have spaces in their programmes for. The number of spaces in optometry was reported as being very limited with the highest intake being 58 in Ghana and the new programmes admitting only 10-20 students. In the countries where the optometry department or the institution is not involved in the selection of students (Mozambique, Tanzania and Malawi), the number of applications received was unknown and could not be reported by the academic leaders. These institutions are administratively informed by the respective departments of health as to how many students have been accepted into their programmes. The optometry departments are thus unable to contribute to the decisions relating to the number of students being accepted. The academic leaders in remaining countries that conduct their own selection processes indicated that the spaces offered are restricted largely due to a lack of infrastructure, limited human and other physical resources.

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>SPECIFIC CHALLENGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>FINANCE</td>
<td>• Poor parents</td>
</tr>
<tr>
<td></td>
<td>• No/limited government funding</td>
</tr>
<tr>
<td></td>
<td>• Minimal private bursaries</td>
</tr>
<tr>
<td></td>
<td>• Expensive optometric equipment</td>
</tr>
<tr>
<td></td>
<td>• High costs of living expenses</td>
</tr>
<tr>
<td>LACK OF AWARENESS OF OPTOMETRY</td>
<td>• Profession is unknown in most countries</td>
</tr>
<tr>
<td></td>
<td>• No career guidance at school</td>
</tr>
<tr>
<td></td>
<td>• Minimal advocacy by profession/education institutions</td>
</tr>
<tr>
<td></td>
<td>• University offerings unknown</td>
</tr>
<tr>
<td></td>
<td>• No known practitioners in local communities</td>
</tr>
<tr>
<td>POOR SECONDARY SCHOOL RESULTS</td>
<td>• Poor secondary school education standards</td>
</tr>
<tr>
<td></td>
<td>• Very poor mathematics and science results</td>
</tr>
<tr>
<td></td>
<td>• Poor results in exit high school examinations</td>
</tr>
<tr>
<td></td>
<td>• High university</td>
</tr>
</tbody>
</table>
admission criteria
• Only overall merit scores used for selection purposes.

LIMITED SPACE IN HEALTH SCIENCES
• Inadequate numbers of tertiary institutions in countries across Africa
• Medicine first choice
• Due to limited resources very few spaces in Optometry

GEOGRAPHICAL DISTRIBUTION
• Poor national spread at universities
• Urban bias in demographic profiles of students
• Parents in urban areas in better financial positions to self-fund
• Exposure to other professionals and role models mainly in urban areas

GENDER DISCRIMINATION
• Females are prevented from going to school due to cultural belief that the role of the female is “to keep the home”
• Males in households given preference over female siblings to attend school

The United Nations Declaration on Human Rights guarantees the right to education [14]. However, in many developing nations and particularly on the African continent access to higher education still remains plagued with numerous and varied barriers. Academic leaders interviewed in this study agreed that there are a few common barriers affecting their respective countries across Sub-Saharan Africa and that working on strategies to increase access to optometric education is critical in addressing the general issues of eye care services delivery across the continent.

In Africa 7300/million people are blind, 25 400/million have low vision and 32 700/million are visually impaired [16]. It is therefore inconceivable that less than 10 of the 48 countries in Sub Saharan Africa, with an estimated population of 800 million, have education programmes in optometry. Hence the first apparent barrier to optometric education is the lack of political will and impetus to develop national eye care plans that include strategies for service delivery and education. To begin to meaningfully address the lack of eye care services that the majority of countries across Africa face, a common understanding of the challenge, coupled with commitments and concrete decisions will have to be made at the highest political and administrative levels in each country. Individual countries must create legislative and regulatory frameworks that will integrate eye care education and services into national health and education policies. This should also be actively advocated and supported by international bodies such as the World Health Organization and the World Council of Optometry. National human resource plans must include eye care personnel including, but not limited to optometrists, dispensing opticians, ophthalmic nurses and ophthalmologists.

As a start, to expand the eye health workforce in each country in Sub Saharan Africa, countries must register an optometric education programme on the education framework with their respective departments of higher education. The optometry education programmes will then need to be incorporated into tertiary institutions in each country as a means to institutionalize the professional training. In those countries where a single programme currently exists, there should be a review of the impact that the graduate output has made on the practitioner to patient ratio and additional programmes be planned to further increase access to optometric education. Additionally, the national departments of health must pass appropriate legislation for the recognition and licensure of optometrists that will graduate with the approved qualifications.

4. Discussion
Manuh et al. have stated that access to tertiary education in Ghana is limited and differentiated by socio-economic status, region of origin and types of location of secondary school[6]. Academic leaders interviewed were requested to identify factors that thwarted efforts to increase access to their existing optometry programmes. There was a considerable level of consensus amongst the academic leaders relating to the factors that most affect access as well as on what may be done to improve the situation.

Finance

The main barrier to optometric education identified by the academic leadership was the lack of finances. An ideal situation will be for students to be fully funded throughout their school and tertiary education periods by their respective governments. However, there is no standard practice amongst the countries represented. Government funding ranges from 100% in some countries such as in Ghana and Ethiopia to less than 20% in countries such as South Africa. Letseka and Breier conducted a survey in South Africa and reported that the principle reason that 40% of students drop out of university in the first year is due to a lack of funding for fees as well as to be able to sustain themselves. Their survey further revealed that 70% of the university drop-outs come from low income families[4]. The world bank in 2010 reported the poverty head count ratios (PPP) in Sub-Saharan Africa as being 48.5% at 1$/day and 69.9% at 2$/day[16]. Most families are thus unable to afford tertiary education fees which place enormous financial burdens on the limited government financial aid resources.

However, there is an untapped multi-billion dollar optical industry serving optometry in the developed world and governments as well as international and national professional organizations should promote and facilitate public-private partnerships to acquire funding for both the setting up of new schools of optometry and supporting financially disadvantaged students. In addition, financial institutions should, as part of their social responsibility programmes, provide unsecured loans with minimal interest rates to needy students that have been accepted into optometry programmes. These loans can be structured in a manner whereby the graduate only begins to pay back on completion of the degree. The payment by employed graduates enables the funding pool to be sustained to ensure that new needy students are able to access funding as well.

Additionally, the high costs of optometric equipment required by students for clinical training can be reduced if universities in sub-Saharan Africa undertake research and innovation projects aimed at developing appropriate, affordable equipment locally. At government level, there must be innovation funding allocations made to encourage academics and entrepreneurs to engage in design and development of optical equipment. Consideration should also be given to designing equipment that will easily function in under-resourced contexts such as areas with no electricity.

Knowledge of the profession of optometry

It is indeed a concern that the optometric profession has been in existence for centuries and yet many students do not hear of optometrists until they arrive at the university, most having arrived there seeking to do medicine. In Ethiopia it is reported that students do meet the minimum entry criteria but do not apply for optometry because they have no knowledge of the profession. Countries such as Mozambique and Malawi highlighted the fact that most students just apply to do medicine as it is the most commonly known profession. The trend is more prevalent with students from rural areas who, in almost all the representative countries, do not have any optometrists practicing in their areas. However, in South Africa and Ghana, the programmes are oversubscribed due to the lengthy period of existence of the profession and the general advocacy conducted by the education and professional bodies within these two countries.

With the advent of mobile technologies and its recognized value in health promotion with expansive reach, universities, professional associations and international bodies could utilize this cost effective platform to conduct advocacy programmes for the profession of optometry. The use of mobile phones is exponentially increasing and can be explored by government departments as a means of conducting large scale advocacy and career education programmes amongst prospective university students. Universities can additionally contribute by recruiting existing students and alumni to conduct awareness programmes and serve as role models within their communities.

Geographical Distribution

Academic leaders in countries where the government selects and funds students reported that there is a better geographical spread of students gaining access to the optometry education programmes. This however was not evident in countries where the majority of students self-fund their education. A typical example of this phenomenon exists in Malawi where, in the Malawi
College of Health Sciences almost two thirds of the
students come from rural communities and a third
from urban areas whereas this is the opposite for
Mzuzu University where the majority of students are
from urban areas. This thus lends support to the
theory that when government funds tertiary
education it creates greater access for students from
rural areas whereas where students self-fund their
education, the programmes attract mainly urban
students. This is most likely due to the better
socioeconomic status of urban families as compared
to rural families.

Government funded students recruited and
selected from rural areas also help to improve access
to eye care services in these underserved rural areas
as they are usually expected to return to work in
those areas as part of the bursary conditions. These
arrangements help to improve the geographical
spread of optometrists. Apart from being placed in
areas that government has identified as being most
needy of eye care services, students on bursaries from
the Malawi College of Health Sciences are also
compelled to work for the government for a
minimum of 5 years before they may work privately.
This model serves both to provide the student the
necessary funding to access optometric education as
well as provide the country with the much needed
human resources for eye care service delivery.

There is however still very limited
government funding made available for optometry
students in all the countries participating in this
study. The more established health programmes,
such as medicine, tend to get the bulk of the
bursaries. In Malawi, due to the limited funding
made available, only 20 students may be admitted
annually at the college. The high costs of optometric
education at universities, with few government
bursaries being made available, therefore creates a
major barrier for students from poor rural families as
reflected in the low numbers of rural students in the
majority of the other university programmes
included in the study.

Almost all of the universities use
advertisements in national newspapers as a
recruitment strategy. Since most of the students
interviewed only found out about the optometry
programme when they arrived at the universities, this
strategy seems not to be reaching most learners.
This may be due to these national publications not
being available in rural areas as well as the fact that
many parents may not be literate or able to afford the
newspaper on a daily basis. Hubley and Gilbert
highlighted that a limitation of newspapers is that
they only reach the literate, newspaper reading
section of society, but they are particularly useful if
the aim is reach professional and middle class
groups, which might be important for advocacy. The
relative importance of radio and television varies
from region to region. It is thus important to find out
what media are available and who accesses them,
and base the choice of media on the local pattern of
use. Hence, universities should evaluate their
recruitment strategies, with an assessment conducted
on whether their current strategies are achieving the
geographical distribution they desire. Government
bursaries should be allocated for each region of the
country to ensure a national spread of students and
eye care practitioners.

Poor Standards of Secondary School
Education

All the heads of departments interviewed,
apart from the academic leader in Ethiopia, indicated
that the standard of education at secondary schools is
not very high. This serves as a barrier to access into
tertiary education and many of those who do acquire
the necessary admission points find that they are
inadequately prepared to cope with first level
university courses, a phenomenon that is exacerbated
in mathematics and science. Ottevanger et al.
undertook case-studies from ten Sub-Saharan
African countries and identified a number of huge
challenges in science, mathematics, and ICT
education (SMICT): poorly -resource schools; large
classes; a curriculum hardly relevant to the daily
lives of students; a lack of qualified teachers; and
inadequate teacher education programs. The
education sectors need to address these problems
which are common to almost all countries on the
continent with specific attention being given to the
improvement of the standards of mathematics and
sciences at school level. Universities should actively
engage their respective governments on this issue as
well as, in the interim, introduce bridging
programmes that can serve to upgrade the school
leaver’s knowledge and competencies to enable them
to gain access into optometry.

Of the twelve programmes included in the
study, only one utilizes an admissions test. To
ensure that students with the necessary competencies
are accepted into the programme and to address the
huge gaps in secondary and tertiary level education,
it is advised that optometry programmes across the
sub-continent collectively design and implement an
entry examination for the profession.

Gender Distribution
Females were very poorly represented at both institutions in Malawi despite the fact that 49.9% of the population in the country is female. This is of additional concern when one considers that the WHO indicates that in every region of the world, and at all ages, females have a significantly higher risk of being visually impaired than males [15]. Unesco Institute for Statistics in 2010 reported that contrary to global trends, women remain disadvantaged in terms of access to tertiary education in sub-Saharan Africa where the growth enrolment ratio for women is 4.8%, compared to 7.3% for men. The report goes on to state that women face significant barriers to tertiary education in countries with the lowest levels of national wealth such as Central Africa Republic, Democratic Republic of the Congo, Ethiopia, Malawi and Niger [13].

Academic leaders interviewed in Malawi cited poor academic performance of females as the main reason for non-acceptance into the programmes and that fewer applications are received from females. Other possible reasons are traditional cultural roles defined for women to prioritize domestic duties and respect hierarchy in the homes where education for males takes priority over females. Thus the number of females completing secondary school and going on to tertiary level is thus significantly reduced.

Noting that females have to endure additional socio-cultural barriers to education to those experienced by males, it is important that governments embark on programmes to address the gender disparities in education with females being encouraged to take mathematics and science subjects at school level. Tertiary institutions should institute affirmative action policies which actively recruit female students. Other additional strategies that could be used are: setting aside a specific number of spaces for females in each intake, offering bursaries specifically for females and providing bridging programmes and ongoing academic and social support to female students accepted into the optometry programmes. Additionally, gender organizations should engage in advocacy programmes in communities to highlight the impact of the discrimination of females in education.

5. Conclusion

To begin to meaningfully address issues of eye care services delivery on the continent and reverse the visual impairment and blindness statistics in sub-Saharan Africa, human resource development must be prioritized. As the profession of optometry has a key role to play in eye care service delivery, global, national and regional educators and health professionals must come together to develop strategies to remove the barriers to optometric education that students currently experience. The ultimate aim should be to have optometry graduates of both genders, from across the geographical, economic and social spectra in each sub-Saharan African country. It is urged that we remain cognisant of the warning by Anyangwe and Mtongathat “only when enough health workers can be trained, sustained and retained in sub-Saharan African countries will there be meaningful socio-economic development and the faintest hope of attaining the Millennium Development Goals in the sub-continent”[1].

10. References

in Sub Saharan Africa: review of recent population based studies. *Br J Ophthalmol* 2012 96 7 927-0