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Addressing vision impairment in Mozambique and the Africa region

Stephen Thompson
University of Sussex

Kovin Naidoo
University of KwaZulu Natal, South Africa,

Joel Bambamba
Universidade Lúrio, Mozambique

See next page for additional authors

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Authors

Stephen Thompson, Kovin Naidoo, Joel Bambamba, Vanessa Moodley, Diane van Staden, Amanda Forde, Kajal Shah, Luigi Bilotto, and James Loughman



Addressing vision impairment in Mozambique and the Africa region

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| Abstract: | The Mozambique Eyecare Project was an international partnership to implement and research eye health education in Mozambique and the Africa region. An optometry degree was developed at Universidade Lúrio, Mozambique. In addition, existing eye health workers were upskilled with training. Researchers from various disciplines evaluated the project and its potential for impact on eye health in the region. The body of evidence generated from the research provides useful lessons for development programmes in general, as well as specific lessons for delivering eye health education and service delivery models for low income settings. |
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Addressing avoidable vision impairment in Mozambique and the Africa region

Abstract

The Mozambique Eyecare Project was an international partnership to implement and research eye health education in Mozambique and the Africa region. An optometry degree was developed at Universidade Lúrio, Mozambique. In addition, existing eye health workers were upskilled with training. Researchers from various disciplines evaluated the project and its potential for impact on eye health in the region. The body of evidence generated from the research provides useful lessons for development programmes in general, as well as specific lessons for delivering eye health education and service delivery models for low income settings.

Key words

Capacity development, Partnership, Disability, Poverty reduction, Economics, Education, Health, Sub-Saharan Africa

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Introduction

There are an estimated 253 million people living with vision impairment (VI) in the world. Over 80% of all VI can be prevented or cured (WHO 2017). Refractive error (RE) occurs when the eye cannot clearly focus light on the retina, which left uncorrected, results in blurred vision. Uncorrected refractive error (URE) refers principally to the conditions of myopia, hyperopia, and astigmatism. Presbyopia is a related, and age dependent, inability to focus clearly on near objects (Thompson et al. 2014). Globally, URE is the main cause of VI, responsible for 53% of cases (WHO 2017).

As in many countries in the Africa region, there is a dearth of data on eye health in Mozambique. To gain a better understanding of the situation, a rapid assessment of refractive error (RARE) was undertaken in Nampula, Mozambique (Loughman et al. 2015). RAREs are an established simple and cost-effective research method for conducting population-based cross-sectional studies on RE. Their purpose is to provide a quick and cheap, yet scientifically rigorous, estimation of URE. As part of the study, 3,453 subjects between the ages of 15 and 50 years were interviewed (45.5% male, 54.5% female). A total of 106 (3.1%) were found to have moderate VI, 16 (0.5%) had severe VI, and 19 (0.6%) were classified as blind. The prevalence of URE (excluding presbyopia) was found to be 2.6% (95%, CI 2.1–3.2%), and was established as the primary cause of VI among 64.5% of cases. Despite the fact that most cases of RE can be addressed with spectacles dispensed after an eye test, spectacle coverage was found to be 0%, meaning none of the participants with URE (excluding presbyopia) had appropriate spectacles that could improve their visual acuity to normal levels. The prevalence of Presbyopia was found to be 25.8% (95%, CI 12.0–30.5%), with 2.2% spectacle coverage, meaning that of the 316 participants identified with presbyopia, only seven had their vision adequately corrected (Loughman et al. 2015).

The prevalence of URE (2.6%) and presbyopia (25.8%) reported in Mozambique was found to be low compared to prevalence reported in similar RARE studies from Eritrea (6.4% and 32.9%, Chan et al. 2013), India (4.3% and 63.7%, Marmamula et al., 2009), and Tanzania (7.5% and 46.5%, Mashayo et al., 2014). Despite the relatively low prevalence of URE compared to other low income settings, the number of adequately trained professionals present in Mozambique was found to be insufficient to address the burden (Moodley, Loughman, and Naidoo 2014). The spectacle supply system was also reported as inadequate. The demand for eye health services and a dearth of appropriate human resources (HR) in Mozambique and other countries in the Africa region have motivated the establishment of optometry training programmes (Moodley, Loughman, and Naidoo 2015). High URE prevalence and the low level of spectacle coverage in Mozambique indicated an urgent need for the development and delivery of a comprehensive RE service (Loughman et al. 2015). The Mozambique Eyecare Project (MEP) was a North-South partnership between Dublin Institute of Technology (DIT), University of Ulster (UU), Universidade Lúrio (UniLúrio) and Brien Holden Vision Institute (BHVI). It ran from 2009 to 2014, receiving €1.5 million in funding from Irish Aid. The MEP was

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4 focused around developing eye health services in Mozambique and Africa. It involved developing optometry
5 as a profession in Mozambique through the establishment of a degree course, upskilling of existing eye health
6 workers in refraction, and undertaking research to gain an understanding of eye health in Mozambique and
7 the region. Collaboration between the project partners, and in particular the research element of the
8 programme, continued after the initial Irish Aid funding had ended.
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11 12 **Methodology and research objective** 13

14 Under the MEP, an international team of researchers from various disciplines including vision science, public
15 health and social sciences undertook a series of investigations into higher education for eye health in the
16 Africa region. The findings of these investigations were published as peer reviewed articles (Moodley,
17 Loughman, and Naidoo 2014; Thompson et al 2014; Chan et al. 2015; Loughman et al. 2015; Moodley,
18 Loughman, and Naidoo 2015; Shah et al 2015; Thompson et al 2015; Moodley, Loughman, and Naidoo 2016;
19 Shah, Naidoo, Loughman 2016; Shah et al 2016; Wallace, Loughman, and Naidoo 2016; Shah et al. 2017).
20 The research objective of this practical note is to synthesize the evidence from the portfolio of research that
21 was published under the MEP. The findings could inform the design of future eye health education
22 programmes and other development programmes being implemented in low income contexts.
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29 **Lessons from the Mozambique Eyecare Project** 30

31 To date, as a result of the MEP, 61 Mozambican students have graduated with optometry degrees from
32 UniLúrio (34 male and 27 female). The optometry course is now fully embedded within UniLúrio's systems and
33 continues to recruit new students every year. Importantly, optometry is now registered as a profession in
34 Mozambique, and is recognised through membership of African Council of Optometry (AFCO). Of the
35 graduates, 26 are now working in public hospitals. In addition, 10 have university teaching posts (5 male and 5
36 female). Seven of the graduates have enrolled on post graduate programmes (5 male and 7 female). Five
37 doctoral research degrees have been awarded (1 male and 4 female). Since the start of the MEP, through
38 health campaigns and visits to vision clinics at both the university and health centres, an estimated 150,000
39 patients have received RE services in Mozambique.
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45 The optometry undergraduate degree program implemented at UniLúrio was based on a curriculum
46 developed by BHVI with competencies drawn from the global competency-based model of the World Council
47 of Optometry (WCO) and the Association of Regulatory Boards of Optometry (ARBO) (Shah et al. 2017). Prior
48 to the MEP, there were no appropriately qualified optometrists in Mozambique (Wallace, Loughman, and
49 Naidoo 2016). Aside from functional and health benefits, the development of an optometry system in
50 Mozambique was shown to be economically justifiable through a Cost Benefit Analysis. It indicated that by
51 correcting URE in 24.3 million potentially economically productive persons in Mozambique over the next four
52 decades, a net present value of societal benefit of up to \$1.1 billion is possible by 2049. This represents a
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4 Benefit-Cost ratio of 14:1 (Thompson et al. 2014). The economic modelling illustrated that the net present
5 value of societal benefits of the optometry programme would be negative until the first optometrists
6 graduated and began to treat URE. The net present value of societal benefits for the first 10 years of the
7 programme are illustrated in Table 1. From the moment the first students graduated in 2013 and started
8 working, the net present value of societal benefit was positive for every year included in the analysis, until
9 2049. The study concluded that in low income contexts such as Mozambique, appropriately trained personnel
10 can unlock the potential for improved economic productivity by eliminating avoidable VI (Thompson et al.
11 2014).
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19 An evaluation into the MEP found that the establishment of optometry as a new profession presented several
20 challenges in terms of integration with the existing national eye health system. Failure to address professional
21 regulatory requirements for new programs (where equal or similar qualifications do not already exist) could
22 result in the profession not being officially recognised by the relevant health authorities, restricting its
23 integration into public health services. Recognition of qualifications and the mainstreaming of service provision
24 are essential to protect the public from unscrupulous health care practices (Wallace, Loughman, and Naidoo
25 2016).
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30 When developing health programmes, training standards and scope of practice must be appropriate to local
31 needs (Wallace, Loughman, and Naidoo 2016). This can be achieved by ensuring that educational quality
32 assurance standards are prioritised, and by underpinning the optometric education programme in principles of
33 social accountability. Socially accountable programmes ensure that local health needs and social
34 determinants inform programme design, governance, curriculum, HR, quality assurance and research. A
35 socially accountable quality assurance framework for optometric education was developed to assist
36 institutions in the Africa region to implement and self-monitor the integration of social accountability into their
37 optometry programmes (Moodley, Loughman, and Naidoo 2016).
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43 Although Mozambique had no optometrists, the profession of ophthalmic technician (OT) was found to exist.
44 Despite refraction being a core OT competency, on inspection, the existing OTs demonstrated inadequate
45 refraction skills. Their confidence and competence in refraction varied depending on training, location of work,
46 clinical load, availability of equipment and other eye care personnel. Upskilling was found to have a significant
47 positive impact on OT confidence and competence levels in refraction (Shah et al. 2016).
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51 Under the MEP, a comprehensive framework of competency standards for OTs and optometrists in
52 Mozambique was developed using a modified Delphi consensus approach involving local and international
53 experts. Once the optometry degree program was operational, studies were undertaken to inform the design
54 of the competency assessment process (Shah et al. 2015; Shah et al. 2017). Only four students out of 15
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4 optometry degree students were graded as clinically competent in refraction. Analyses indicated that student
5 learning context, teaching context, clinic conditions and assessment, and the existing operating health care
6 context were important determinants of student refraction competencies. This competency framework has
7 informed the curricula for both cadres in relation to important aspects of training including communication,
8 patient evaluation, patient management, community, technical, and research and training. In addition, it has
9 improved the structure of teaching and learning environments by recommending a preparatory year, a review
10 of the curriculum and clinic structure, more transparent entry requirements and better internet infrastructure
11 (Shah et al. 2015). The framework has the potential for replication in other regions where there is a need to
12 develop socially responsive education for eye health professionals (Shah, Naidoo, and Loughman 2016).
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18 Limited access to education is a stark reality for many students in the Africa region. Qualitative research was
19 undertaken to investigate access to optometric education in the Africa region. A total of 12 heads of optometry
20 programmes from six African countries (Malawi, Ghana, South Africa, Ethiopia, Tanzania and Mozambique)
21 were interviewed. The results report that barriers to optometric education in the region included cost, lack of
22 knowledge of optometry, high admission criteria, limited student spaces, poor mathematics and science
23 results, gender inequalities and geographical challenges. All of the academic leaders interviewed cited finance
24 as being a major barrier to access to optometric education. At the institutes in South Africa, Tanzania,
25 Mozambique and one of the two institutes analysed in Malawi, where students had to pay their own fees, a
26 lack of funding was identified as the main contributing factor for high attrition rates from university. At the
27 institutes in Ethiopia, Ghana and the other institute analysed in Malawi, where students were fully funded to
28 attend university, the limited number of spaces available was identified as the major barrier to access.
29 However, in these locations, despite a lack of fees, an inability for students to financially support themselves
30 during their years of study was also highlighted as a problem (Moodley, Loughman, and Naidoo 2014). Low
31 awareness of optometry as a profession was found to impact on student recruitment and expectations (Shah
32 et al. 2015). Despite these findings, when 27 Mozambican optometry students (15 male, 12 female) were
33 interviewed about why they had selected the course, 24 of them replied that optometry is necessary to solve
34 the eye problem in Mozambique since there is a lack of optometrists. Understanding prospective student
35 perceptions and expectations can assist the development of student support systems and awareness
36 strategies for eye health professional training (Chan et al. 2015). For optometric education programmes in
37 Africa to have a meaningful impact, geographical, gender, economic and educational disparities must be
38 addressed (Moodley, Loughman, and Naidoo 2015).
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49 Inadequate HR to address RE is a key supply-side barrier to eye health services. A study of the perceptions of
50 over 1,000 Mozambicans with VI indicated that cost was the most frequently cited demand-side barrier, as
51 identified by 53% of participants. Other barriers included lack of felt need (20%), distance to travel (15%), and
52 lack of awareness (13%). These critical barriers to RE services in Mozambique must be considered to ensure
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4 service uptake by the general population and to inform decision-making for improved service delivery
5 (Thompson et al. 2015).
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8 The MEP experience provides useful lessons for the planning of future development programmes. The
9 lessons will have particular resonance for those responsible for planning future eye health education and
10 service delivery models for low income settings. Figure 1 summarises the MEP outputs and achievements
11 against the objectives of the World Health Organization's Global Action Plan for Universal Eye Health (World
12 Health Organization 2013). With a goal of achieving a measurable reduction of 25% of avoidable VI by 2019,
13 the objectives focused on the generation of evidence through multi-sectoral partnerships to strengthen eye
14 health systems.
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19 [Figure 1]
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21 **Conclusion**

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24 The supply of adequately trained eye health professionals to meet the demand for refraction in Mozambique
25 is currently insufficient (Moodley, Loughman, and Naidoo 2014). As with many countries in Africa, there is an
26 urgent need for the development and delivery of a comprehensive RE service in Mozambique (Loughman et
27 al. 2015). International collaborative approaches to develop HR to address URE have been shown to be
28 economically justifiable and should be considered in countries where HR are similarly deficient (Thompson
29 et al. 2014).
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34 Eye health projects (and development projects in general) must address issues of professional identity.
35 Developing adequate health profession regulations is necessary, so that graduate qualifications are
36 legitimised through official recognition by relevant local authorities (Wallace, Loughman, and Naidoo 2016).
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40 To address barriers to optometric education (cost, lack of knowledge, high admission criteria, limited student
41 spaces, poor results, gender inequalities and geographical challenges) educators, policymakers and health
42 professionals must together formulate strategies to increase access (Moodley, Loughman, and Naidoo
43 2014). Student awareness of optometry can promote its development as a primary healthcare profession
44 (Chan et al. 2015). For optometry education programmes in Africa to have a meaningful impact on meeting
45 societal needs, universities must integrate social accountability in all facets of education, including
46 curriculum design, research, recruitment and selection (Moodley, Loughman, and Naidoo 2015).
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51 Socially responsive, competency-based approaches can enable coordinated training and development for all
52 mid-level eye care personnel and optometrists in low income contexts (Shah, Naidoo, and Loughman 2016).
53 Guidance on the selection of competency assessment methods would assist institutions to adopt models
54 that can be sustained locally, giving due regard to limited available resources (Shah et al. 2017). Identifying
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4 factors affecting refraction competence, in collaboration with the academic faculty, can strengthen teaching
5 and improve learning environments for optometric education (Shah et al. 2015). The upskilling of existing
6 eye health workers in low income contexts can also effectively improve confidence and competence levels
7 for refraction (Shah et al. 2016).
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10 The development of HR for eye health alone is not sufficient to address the burden of avoidable VI – a
11 comprehensive approach must be taken to strengthen all aspects of eye health and the broader health
12 system. To be effective, refractive services must consider the demand-side implications of cost, affordability
13 and geographical inequalities. They must also have a clear strategy for overcoming lack of felt need through
14 improved advocacy and health promotion (Thompson et al. 2015).
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20 **Disclosure statement**

21 No potential conflict of interest was reported by the authors.
22

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Table 1 – Net Present Value of societal benefits (\$) for the first 10 years of the optometry programme.

| Year | Net Present Value of societal benefits (\$) |
|-------------|--|
| 2009 | -273,596 |
| 2010 | -529,534 |
| 2011 | -630,384 |
| 2012 | -595,349 |
| 2013 | -308,291 |
| 2014 | 1,069,098 |
| 2015 | 3,641,100 |
| 2016 | 6,589,276 |
| 2017 | 9,558,510 |
| 2018 | 12,403,620 |
| 2019 | 15,002,333 |

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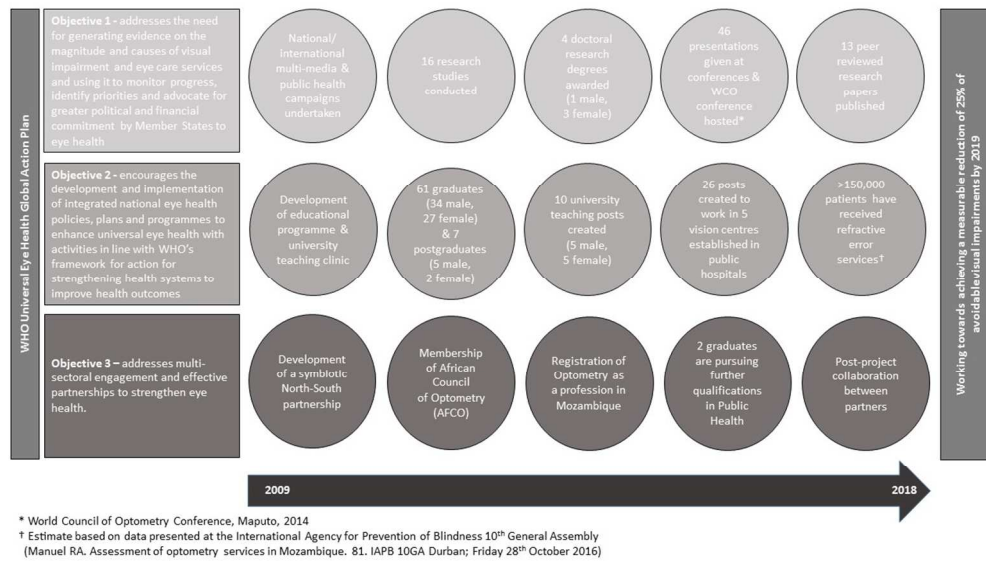


Figure 1 – Outputs and achievements of the MEP in relation to the Global Action Plan objectives

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