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Availability of refractive error correction services in selected Zambian hospitals: a cross-sectional quantitative study

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ABSTRACT

Objective To assess the availability of refractive error correction services (RECS) in selected Zambian hospitals.

Methods Between October 2021 and March 2022, we conducted a cross-sectional study design among 20 eye health service providers selected from 20 public health facilities offering RECS in 20 districts from 8 provinces of Zambia. A stratified random sampling technique was used to select study participants. A questionnaire was developed based on the access to healthcare services framework and distributed via email to respondents to collect their perspectives on the availability of RECS.

Results All 20 respondents returned the completed questionnaires. Most facilities met the Ministry of Health recommended equipment requirement, though tonometers were lacking in some facilities. Out of the 20 facilities, 75% reported having optometry technologists as the main staff offering eye health services; 10% had an ophthalmologist; no facility had an optometrist; none conducted school-based programmes and only 1 facility (5%) was able to dispense spectacles soon after refraction because it had a spectacle manufacturing workshop.

Conclusion These findings show limited availability of RECS in the 20 health facilities. They also confirm that challenges in staffing levels, insufficient equipment and low rate of spectacle dispensing negatively affect availability of these services. Furthermore, insufficient infrastructure undermines service delivery. Addressing these challenges is cardinal to improving RECS delivery and enhancing universal eye healthcare coverage in Zambia.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Use of a data collection instrument adapted from the accessibility to healthcare services framework and the 2017–2021 National Eye Health Strategic Plan as a reference document increased internal validity of the study findings.
⇒ Use of a cross-sectional study conducted in eight provinces among both public and faith-based health facilities supported by OneSight organisation ensured uniformity of study units.
⇒ Selecting health facilities from an already existing database of health facilities supported by OneSight minimised selection bias.
⇒ Measuring accessibility to refractive error correction services (RECS) was only based on the provider's perspective; service users' perspectives were not measured.
⇒ Findings are based on a small selected sample of 20 health facilities supported by OneSight and may not reflect the true representation of all RECS in Zambia.

INTRODUCTION

Background

Vision impairment is a significant public health concern globally[1 2] with at least 2.2 billion people living with some form of vision impairment.[3] More than 80% of the people with vision impairment suffer from preventable causes such as uncorrected refractive error (UREs).[4] UREs are the most common cause of vision impairment[5] and result from the abnormal shape or/and length of the eyeball, which makes it hard to see clearly.[6] Vision impairment has a devastating social and economic impact on individuals, families and the community at large. An individual suffering from vision impairment may have limited access to education, social networks and employment opportunities. Vision impairment may affect the ability to produce an income, contribute economically to society.[7] A study by Smith *et al*[8] showed that US$269 billion in productivity is lost annually by the global economy due to UREs.[8] Vision impairment and access to healthcare services have also been closely linked to poverty.[9] This argument has also been demonstrated by the disproportionate burden of UREs between countries in different regions of the world.[10] For example, 90% of visually impaired people live in low-income and middle-income countries (LMICs)[11] where the burden of the problem is estimated to be four times higher compared with high-income countries.[12] In Sub-Saharan African countries, where poverty and poor health status are more common, vision impairment is ranked among the leading preventable causes of disability.[13]

It is especially worse among women, migrants, those in rural communities and other underserved populations.[13]

A 2012 rapid assessment of avoidable blindness (RAAB) survey carried out in the southern province of Zambia ranked UREs second (29.2%) after cataract (34.9%) as a leading cause of vision impairment in the country.[14] The 2017–2021 National Eye Health Strategic Plan (NEHSP)[15] estimated the prevalence of blindness at 2% in the Zambian population and attributed 15.3% of vision impairment to UREs.[16] Blindness due to UREs in any population may suggest that eye care services in that population are inadequate. RAAB surveys carried out in Rwanda, Malawi[17] and India[18] have shown similar results for UREs.

Nevertheless, 80% of vision impairment is avoidable[19] and cost-effective interventions exist for prevention and treatment of the major causes.[20] For example, refractive error correction with spectacles is a simple and cost-effective form of treatment.[21 22] To prevent and mitigate vision impairment as a public health concern, the WHO and other international partners have developed and supported various global efforts since 1999. Some of the strategies are the VISION 2020, the Right to Sight initiative developed in collaboration with the International Agency for the Prevention of Blindness (IAPB) and the most recent, 'universal eye health, a global action plan 2014–2019'.

Despite being easily detected, measured and corrected, the burden of UREs remains high, especially in LMICs, due to limited access to care.[22] In Africa, for example, less than 30% of those in need of care have access to eye health services. A refractive error and visual impairment study carried out among children in Durban, South Africa, found that only 20% of those in need of spectacles actually had them. Access to healthcare services is a multidimensional concept[23] with various contributing factors such as availability of resources, geographical location of the facility, affordability of the services, as well as supply-side challenges relating to understanding the precise meaning and lack of consensus on appropriate measurement methods, despite substantial research on the subject.[23–27]

There is dearth of information on the accessibility of eye care services in the country. A 2011 situation analysis study showed insufficient data on accessibility to eye care services in Zambia.[28 29] The study identified insufficient human resource, equipment and infrastructure as major challenges affecting access to eye care. However, this information is old and much has changed in the delivery of eye health services in the country.[29] Considering the magnitude of visual impairment in the country, there is a need to assess the accessibility of refractive error correction services (RECS) in health facilities.

Objective

This study aimed to assess the availability of RECS in selected Zambian Hospitals. Information is important to provide up-to-date evidence on the situation and availability of RECS in selected facilities. The study will also help identify possible barriers to the uptake of eye care services and provide research evidence for service delivery in Zambia.

METHODS

Study design

This was a quantitative cross-sectional study design conducted between October 2021 and March 2022 among 20 eye health service providers selected from 20 public health facilities offering RECS in 20 districts from 8 provinces (Eastern, Luapula, Lusaka, Muchinga, Northern, North-western, Southern and Western) of Zambia.

Study setting

The study was conducted in 20 health facilities (that is, 19 public and 1 faith-based health facilities) providing RECS in the country. The selected health facilities were those providing RECS in collaboration with OneSight Zambia, an independent non-governmental organisation. As a result of this collaboration, RECS centres were established within Zambia's primary and secondary-level hospitals. In addition to supporting RECS services, OneSight provided smartphones, computers and internet in the health facilities. The 20 selected health facilities included 14 (70%) primary-level and 6 (30%) secondary-level facilities from 8 provinces (table 1). No tertiary-level hospitals were included in the study because there was no tertiary-level facility offering RECS in collaboration with OneSight organisation at the time of the study.

Study participants and sampling techniques

A stratified random sampling technique was used to select a sample of 20 health facilities that were working in collaboration with OneSight organisation to provide RECS. First, the database for all the health facilities that provide RECS in the eight selected provinces was obtained. After inspecting the database, health facilities were stratified into public, private and faith-based ones. A separate list was created for government and faith-based health facilities. For each list, we indicated the level of care provided by the health facility (primary or secondary level). A third column was created to show whether a health facility was supported by OneSight or not. A list of government and faith-based health facilities that were supported by OneSight was created to serve as a sampling frame. A random sample of 20 health facilities was selected from this list. RECS health facilities were selected because based on the advice from the Ministry of Health (MOH) team that wanted to know the status of the RECS in the OneSight-supported health facilities. Following results of this study, a second and larger survey would be conducted to include health facilities not supported by OneSight.

Study participants comprised eye health facility supervisors from the selected health facilities that provided RECS in collaboration with OneSight. All the eye health facility staff were government workers; OneSight only supported

Table 1 Selected refractive error correction services facilities and the projected 2022 provincial population

Province	Population	Government		Faith based		Total
		Primary	Secondary	Primary	Secondary	
Eastern	2 065 590	3	1	0	0	4
Southern	2 135 794	1	1	0	0	2
Luapula	1 276 608	1	1	0	0	2
Western	1 076 683	1	1	0	0	2
Lusaka	3 360 183	1	0	0	0	1
Muchinga	1 095 535	3	0	0	0	3
Northern	1 520 004	1	1	0	0	2
North-western	950 789	3	0	0	1	4
Total	13 481 186	14	5	0	1	20

Source: Zambia Population and Demographic Projections, 2011–2023.

provision of the RECS services in the health facilities and did not send in their employees. The research team recruited the study participants with support from the provincial and district health managers. First, the list of selected health facilities was shared with the provincial and district health managers. Next, the health managers provided the contact details for the managers and eye healthcare staff in each selected RECS health facility. The research team contacted consulted the health facility managers on the eye healthcare staff to be selected. After reaching consensus with the health facility managers, the research team contacted the selected participants on phone and email to inform them about the study. Participants were easy to reach via phone and email who were connected to the internet provided by OneSight.

Inclusion and exclusion criteria

To be included in the study, health facilities were:

- MOH or faith based collaborating with OneSight organisation to offer RECS.
- Working for more than a year since their establishment at the time of the study (2020) and no longer in the pilot phase of their operation were included in the study.

Public facilities that were not benefiting from OneSight organisation support were excluded from the study. Despite being supported by OnseSight, public health facilities that had been operating for less than a year since their establishment were excluded from the study because they were still in the pilot phase of operation. Private for-profit facilities were also excluded from the study because they were deemed not to be a good representation of the general population. Prior evidence suggested that most patients sought care from public facilities.[30] In addition, private facilities were left out because they were likely to be in big cities where they operated on a profit basis and served high-income-level patients. This would make them less comparable with the rest of the study population.[31] Moreover, facilities that were considered inactive on the OneSight cloud system were also excluded from the study.

Data collection instrument and procedure

Data was collected using a self-administered questionnaire (online supplemental material 1) adapted from the accessibility to healthcare services framework. It consisted of questions on various aspects of RECS and their availability in each facility. The 2017–2021 NEHSP was used as a reference document with which to compare some of the service characteristics of RECS in Zambia. The availability of services was defined as having the right type of care available to those who need it at the right time and place. This was measured by considering the number and type of human resources and equipment available at the facility. The definition also included having the right type of care and appropriate infrastructure available for delivery of RECS both within the health facility and outreach activities conducted by the facility. Together, these service characteristics were considered an essential component determining the availability of RECS and were as therefore measured.

The questionnaire was sent via email and/or WhatsApp messenger to respondents from each RECS facility through smartphones and computers provided by the OneSight organisation. Respondents were allowed a minimum of 3 days within which to complete the questionnaire. To ensure optimal response rate, daily reminders were sent via text messages. Non-respondents were followed up by phone call. Completed questionnaires were returned via email to the principal investigator.

Patient and public involvement

The study design was determined by the research team. Participants and the public were not directly involved in the conceptualisation and design of the study. However, selection of the study sites was done in consultation with stakeholders from the MOH and OnseSight. Selection of study participants was done in collaboration with the provincial and district health managers. A dissemination meeting was held, and study findings shared with key stakeholders, including the MOH, OneSight and community leaders in the health facilities where the study was

Table 2 Descriptive characteristics of refractive error correction services facilities in the study

Variable	Facility type	
	Primary (n=14) n (%)	Secondary (n=6) n (%)
Weekly number of patients		
Below 10 patients	2 (14.3)	1 (16.7)
10–20 patients	10 (71.4)	3 (50.0)
More than 20 patients	2 (14.2)	2 (33.3)
Waiting duration for refraction		
Less than 30 min	12 (85.7)	6 (100)
More than 30 min	2 (14.2)	0 (0)
Working hours per day		
Up to 8 hours	9 (64.3)	4 (66.7)
More than 8 hours	5 (35.7)	2 (33.3)
Working days per week		
5 days	12 (85.7)	5 (83.3)
7 days	2 (14.2)	1 (16.7)
Total human resources for eye health		
More than 1	4 (28.6)	5 (16.7)
Only 1	10 (71.4)	1 (16.7)
Other human resource (non-ophthalmic)		
1 or more	10 (71.4)	5 (83.3)
None	4 (28.6)	1 (16.7)
Facilities with essential refraction equipment (retinoscope, trial case, trial frame, VA chart, ophthalmoscope)	13 (92.9)	5 (83.3)

VA, visual acuity.

conducted. A final report was also written and shared with the funding organisation.

Statistical analysis

Responses from the returned questionnaires were entered into Microsoft Excel, cleaned up and saved on a computer. Data analysis was done using Stata/SE V.14. Descriptive statistics, frequencies and proportions were computed.

RESULTS

Description of refractive error correction service provision

A total of 13 (65%) facilities recorded a weekly patient number of between 10 and 20; 4 (20%) reported more than 20 patients; 3 (15%) reported a weekly patient number below 10. All facilities (100%) met the opening time of 08:00 hours as per government regulation and remained open for the required eight working hours per day. A total of 7 (35%) facilities opened earlier than 08:00 hours and closed later; they offered services beyond the required eight working hours (table 2).

Table 3 Frequency of outreach activities in refractive error correction services facilities

Outreach activity	Frequency per year	
	Primary level=14	Secondary level=6
Community screenings		
More than 5 times	7	0
2–4 times	7	5
Once	0	1
Never	0	0
Awareness programmes		
More than 5 times	4	0
2–4 times	9	4
Once	1	2
Never	0	0
School-based screenings		
More than 5 times	1	1
2–4 times	7	1
Once	2	1
Never	4	3

Service characteristics

All facilities attended to patients as and when they presented to the facility (walk-in service), and none fixed an appointment for another day; 17 out of 20 health facilities (85%) reported working 5 days a week (Monday to Friday); the other 3 (15%) reported working 7 days a week.

Waiting times

With regard to waiting time, 18 (90%) health facilities reported that their patients waited less than 30 min before they could be seen for refraction (table 2); 2 (10%) reported that patients waited more than 30 min before they could be seen for refraction. All facilities reported that patients waited more than 2 weeks before receiving their spectacles.

Outreach activities

All health facilities in the study reported carrying out at least one community screening and one awareness programme per year. However, seven health facilities (35%) reported that they did not participate in school-based programmes (table 3).

Infrastructure

Of the 20 health facilities in the study, 18 (90%) reported having a dark room for objective refraction. Among these, 6 (33%) were second-level facilities and 12 (67%) were first-level facilities; only one health facility (second level) (5%) reported having a cutting and edging laboratory appropriate for the work. All primary-level and secondary-level facilities reported having a spectacle dispensary unit within their facilities.

Table 4 Availability of equipment in comparison to the NEHSP recommendations

Type of equipment	First level (n=14)		Second level (n=6)	
	Minimum number of equipment recommended by the NEHSP	Facilities meeting NEHSP recommendation, n	Minimum number of equipment recommended by the NEHSP	Facilities meeting NEHSP recommendation, n
Distance vision chart	5	4 (28.6)	6	1 (16.7)
Near vision chart	5	0 (0.0)	8	0 (0.0)
Trial set	2	3 (21.4)	4	2 (33.3)
Adult trial frame	2	4 (28.6)	2	3 (50.0)
Children's trial frame	0	NA	2	0 (0.0)
Retinoscope	2	4 (28.6)	5	0 (0.0)
Lensmeter	0	14 (100)	1	6 (100.0)
Direct ophthalmoscope	2	2 (14.3)	4	0 (0.0)
Autorefractometer	0	14 (100)	1	5 (83.3)
Slit lamp	1	14 (100)	4	0 (0.0
Tonometer	2	0 (0.0)	4	0 (0.0)

NEHSP, National Eye Health Strategic Plan.

Availability of equipment in the study

According to the 2017–2021 NEHSP, eight different types of equipment have been recommended as a requirement for primary health facilities offering RECS in Zambia. On the contrary, 11 types of equipment have been recommended for second-level health facilities offering RECS (table 4).

All the health facilities in the study reported having distance visual acuity (VA) charts and five (25%) met the recommended number of distance VA charts. All except one (95%) reported having near vision reading charts. None of the facilities met the recommended number of near vision charts. Of the 19 facilities that reported having trial sets, 5 (25%) met the number recommended by the NEHSP. All facilities reported having adult trial frames. Of these, 7 (35%) met the recommended number of adult trial frames. Children's trial frames were not a requirement for primary health facilities but were reported to be present in 2 (14.3%) facilities.

Of the second-level health facilities, none met the recommended number of children's trial frames; four (66.7%) health facilities met the recommended number of retinoscopes. All the 20 facilities in the study met the recommended number of lensmeters; 2 (10%) met the recommended number of direct ophthalmoscopes. Overall, 19 (95%) met the recommended number of autorefractometers, 14 (70%) met the NEHSP recommended number of slit lamps. None of the facilities in the study met the recommended number of tonometers. The six facilities that had tonometers did not meet the number recommended by the NEHSP.

Availability of human resource

According to the NEHSP, ophthalmologists, optometrists, optometry technologists, registered ophthalmic nurses (ONs), ophthalmic clinical officers and registered nurses (RNs) are the recommended type of human resources for eye healthcare required to deliver RECS in Zambia.[15] These health workers are all specialised in eye and vision care. There was a total of two (10%) ophthalmologists reported in the study; both were in the secondary-level health facilities. There was no ophthalmologist reported among the primary-level health facilities, which was not a requirement for primary-level facilities. None of the health facilities met the required number of optometrists. However, 75% of the health facilities in the study had an optometry technologist. The NEHSP recommended number of optometry technologist was met in 15 facilities (table 5). Eight facilities reported having registered ONs but none of them met the recommended number per facility. There were eight (40%) health facilities that reported having RNs and five (25%) of them met the required number of RNs per primary facility as shown in the table below.

Other human resources in the study

Though not among the recommended human resources for eye healthcare, the study reported having other types of human resources working in the various health facilities providing RECS. For example, one primary health facility (5%) reported having one general clinical officer; three health facilities (15%) reported having classified daily employees; one (5%) primary-level health facility reported having a physiotherapist attached to work in the eye department.

Challenges affecting access to RECS as highlighted by the study participants

Table 6 below summarises the major reported challenges faced in the provision of RECS in the sampled health facilities. Most respondents (50%) reported lack of spare parts for equipment as the major challenge; other challenges

Table 5 Availability of human resource in comparison to the NEHSP recommendations

Type of human resource	First level (n=14)		Secondary level (n=6)	
	Recommended number by NEHSP	Facilities meeting NEHSP recommendation, n	Recommended number by NEHSP	Facilities meeting NEHSP recommendation, n
Ophthalmologists	0	N/A	2	0 (0.0)
Optometrists	1	0 (0.0)	1	0 (0.0)
Optometry technologists	1	10 (71.4)	1	5 (35.7)
Registered ophthalmic nurses	3	0 (0.0)	6	0 (0.0)
Registered nurses	1	5 (35.7)	5	0 (0.0)

NEHSP, National Eye Health Strategic Plan; VA, visual acuity.

were insufficient space allocated to refractive services (40%); faulty equipment in need of repair (30%); lack of technicians to repair equipment (20%), insufficient and lack of skill mix for human resources (20%).

DISCUSSION

This study assessed availability of RECS in selected health facilities in Zambia. Overall, the study findings show that there has been significant improvement in the delivery of eye care services in Zambia since the last situation analysis carried out in 2011. The establishment of new vision centres and procurement of new equipment shows improved availability of RECS and progress towards achievement of the VISION 2020 initiative goals. However, various factors including low staffing levels and insufficient skill mix for eye care, insufficient infrastructure and equipment, and low rate of spectacles dispensing negatively affected availability of RECS and undermine service delivery in the health facilities.

These findings are in accordance with previous studies,[32] which reported availability of RECS and highlighted various factors such as service availability, health facility operating hours with no patient appointment systems, as well as short waiting time to be important enablers for patient satisfaction, especially for those who require urgent attention. Extended working hours and days make services available for working patients and parents/guardians who may have been unable to access services during normal working hours.

Table 6 Challenges affecting access to refractive error correction services as highlighted by the study participants

Challenges	n (%)
No spare parts for equipment	10 (50%)
Insufficient space allocated to refractive services	8 (40%)
Some equipment faulty and in need of repair	6 (30%)
Lack of technicians to repair equipment	4 (20%)
Insufficient and lack of skill mix for human resources	4 (20%)
Delay in receiving spectacles	3 (15%)
Lack of utility vehicles and funding for outreach	2 (10%)
Resources unable to support multiple activities	1 (5%)

Our findings also highlight important factors which limit availability of RECS in the assessed health facilities. For example, insufficient number of school-based outreach activities were found to undermine early detection and treatment of eye conditions—a key strategy to preventing future visual impairment in children.[32] The unmet need for outreach activities, particularly school-based programmes, have also been confirmed among school-going children in another study elsewhere.[33] According to previous studies[33] including the NEHSP, eye health outreach activities in Zambia were inadequate and segmented to only certain parts of the country. A lack of outreach programmes has been shown to have a negative effect on the awareness of available eye care services in Zambia, which in turn undermines utilisation,[33 34] which also observed in our study.

Availability of and access to RECS goes beyond the service characteristics and physical structure but also requires that patients have access to sufficient and fully functioning equipment that meets the patient demand. However, in line with a previous Zambian study, limited availability of spectacle manufacturing negatively affected access to RECS infrastructure. Consequently, refracted patients who received a spectacle prescription and had no immediate access to spectacles were unable to carry out their daily economic activities. Insufficient space to conduct refraction reported in almost half of the facilities in the study compounded the already poor infrastructural development. Thus, patients had limited access to an environment that favoured quality RECSs and were unable to access comprehensive RECS.

Equipment for the identification and correction of UREs was present in the majority of facilities. However, our study found that, despite the reported availability of equipment, the quantities of some types of equipment did not meet the NEHSP recommendation and thus may have been unable to meet the population demands. The low availability of functional equipment reported in this study confirms previous study findings in Zambia

and elsewhere.[22 35–38] Insufficient and poor state of some RECS equipment could be attributed to the absence of maintenance technicians, a human resource challenge previously reported in Zambia and observed in 20% of the study facilities in the current study. Having insufficient and faulty equipment limits the availability of and access to RECSs and comprises quality of services as service providers are forced to work without the essential equipment.

Although optometry technicians perform refractions and provide the basic RECS in Zambia, the lack of optometrists reported in the current study shows a gap in the provision of RECSs. In addition to refraction, optometrists are able to offer specialised services such as low vision, vision rehabilitation services that may be of great benefit to the provision of RECSs in Zambia. The absence of optometrists may therefore compromise the provision of a comprehensive service and limit access to specialised RECSs. Our findings also show that the contribution of non-eye health workers in the delivery of RECS is an important aspect. Their active participation is likely to improve early diagnosis and treatment—which are critical in the delivery of effective eye health services in the country.

In line with efforts that have been made to mitigate the shortage of human resource for eye healthcare in Zambia, training for mid-level eye health personnel was introduced in 2006 for ONs; and 2010 for optometry technologists at Chainama College of Health Sciences—now Levy Mwanawasa Medical University. Success in this development has been shown in our study where 75% of the facilities did not only have an optometry technologist but also met the recommended number in line with the NEHSP. OneSight has also supported human resource development by employing project coordinators, logistics managers and other non-health workers to ensure efficient running of RECS facilities. However, this may not be true for other RECS facilities that do not receive support from OneSight. It is anticipated that the shortage of ophthalmologists, optometrists, ONs and RNs will be addressed by the newly introduced eye health training courses at the new Levy Mwanawasa medical University in coming years.

Study limitations

Potential limitations of our study should be acknowledged. First, measuring accessibility to RECS was only based on the providers' perspective; we did not explore service users' perspectives. Second, these findings are based on a small, selected sample of 20 health facilities supported by OneSight. The findings may not reflect the true situation in other RECS and thus may have limited generalisability to other facilities in the entire country. Moreover, some OneSight-funded facilities could not be included in the study since they were still in the pilot phase of their establishment.

Nevertheless, we believe that our findings provide important information on the availability of RECS that were being offered in the country at the time of the study. First, our sampling of study participants from public facilities which serve majority of the Zambian population and sending the questionnaires through email and/or WhatsApp message, as opposed to face-to-face interviews minimised information bias. Moreover, selection of public facilities that receive support from the OneSight organisation from 8 out 10 provinces of Zambia makes our findings representative of the whole country. Additionally, making phone calls before sending the questionnaire to respondents, ensuring that all participants received the same information and that potential questions were answered before the questionnaire was distributed all increased the internal validity of the findings. We believe that investigating into user perspectives on the accessibility of RECS in selected health facilities in the country provided useful evidence to inform strategies for the development of RECS in the country.

CONCLUSION

These findings show significant improvement in the delivery of eye care services in Zambia. Nevertheless, challenges in staffing levels, insufficient infrastructure, equipment and low rate of spectacle dispensing negatively affect availability and delivery of RECS in the country. Addressing these challenges would improve enhance coverage and quality of eye healthcare services in Zambia. Since RECSs form a major part of eye care service delivery,[36] these findings provide evidence for possible policy and strategies to improve delivery of eye care services in Zambia, including (1) prioritising eye care services as an essential component of the NEHSP, (2) improving staffing levels by creating funded positions for eye health workers, particularly optometrists, (3) developing appropriate infrastructure for eye health services and (4) initiation of collaborative efforts with partners to optimise use of resources and lessen dependence on external support for provision of services. We believe these strategies would ultimately help improve availability and delivery of RECS in the country.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Consent obtained directly from patient(s).

Ethics approval This study involves human participants and was approved by Levy Mwanawasa Medical University Research Ethics Committee (LMMU-REC

00004/20). Participants gave informed consent to participate in the study before taking part. In addition, an informed consent form (online supplemental material 2) was emailed to the respondents.

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