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Evaluation of distribution of presbyopic correction through primary health care centres in Zanzibar, East Africa.

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Abstract

A pilot scheme was developed to integrate the distribution of readymade near spectacles into primary eye care (PEC) delivery in 6 primary health care (PHC) facilities in Zanzibar, East Africa. With the aim of scaling it up to national level the scheme was evaluated in terms of relevance, effectiveness, equality, sustainability and replicability,

Methods

Six Medical Officers were trained in ocular anatomy, history taking, blindness definitions, ocular abnormalities, preventable blindness, distance visual acuity (VA), near VA, eye examination, record keeping and referral criteria. Each clinic was supplied with 200 near spectacles. The evaluation team revisited the units six months later to assess the scheme.

Results

The evaluation team recommendations included: a structured approach to planning from the outset, facility selection criteria, raising awareness through community meetings, funding through a revolving fund and the introduction of referral monitoring systems.

372 of the 574 patients attending the facilities had eye complaints; 285 eye infections, 29 distance vision problems and 173 near vision problems. 173 near vision spectacles were dispensed and 74 people were referred. All medical officers and participants recommended continuing with the scheme.

Conclusions

The project is highly relevant and timely given that presbyopia is now a priority with the World Health Organisation. The scheme could easily be adopted at the national level in Zanzibar and other areas in East Africa.

INTRODUCTION

Presbyopia, the age related decline in visual acuity for near objects, is an extremely common condition which is readily correctable by spectacles. It has been estimated that 1.04 billion people in 2005 were presbyopic, 517 million of whom were without adequate spectacle correction.¹ As the world's population increases, ages and becomes more literate the demand for near spectacle correction will increase. Age is overwhelmingly the most important risk factor, but climate, geographic location, gender and ethnicity also contribute to the observed variation in the age of onset and degree of presbyopia.^{1,2,3,4}

In terms of priority setting for provision of services for presbyopia, the World Health Organization (WHO) has recommended that if less than one-third of those affected have near correction, the population would be ranked as a high priority for service delivery.^{5,6} In developing countries, particularly in rural areas, spectacles are available for purchase through optical suppliers and hospitals, but usually located in urban areas where prices are high. Strategies to improve presbyopic spectacle coverage in rural areas of developing countries, include community distribution schemes, using trained "Village Entrepreneurs", a model developed by Vision Spring^{7,8} or "Vision Guardians" used by Vision Centres in India⁹.

In 2007 a study of presbyopia was undertaken within a Rapid Assessment of Avoidable Blindness survey in Zanzibar³. Those with good distance VA and uncorrected presbyopia were given spectacles and the majority were traced and re-interviewed 6 months later⁶. The prevalence of presbyopia among the 381 participants aged 40 years and above was 89.2%, but at baseline less than 1 in 5 had spectacles. Barriers to accessing services included spectacles not being a priority and lack of money. At follow up the mean satisfaction was high at 89.5%. The mean amount participants were willing to pay for spectacles increased from 2.17 USD at baseline to 3.14 USD at follow up. The impact of correcting presbyopia on

visual function (VF) produced an effect size of 2.90 and effect sizes ranging from 1.15 to 3.90 for mean quality of life (QOL) scores.

Zanzibar, which has a population of approximately 1 million, consists of two main islands, Unguja and Pemba, and is situated off the East coast of Tanzania.⁴ Zanzibar has a good primary health system, with Primary Health Care Units (PHCUs) and Centres (PHCCs) spread across the country, the latter being larger with more highly qualified staff. Medical officers (MO) with one year training in PHC, run and generally stay at the facilities and are ideally placed to supply the community with near spectacles and basic eyecare.

The pilot project to incorporate distribution of presbyopic correction was subsequently introduced into 6 randomly selected clinics. The aim of this study was to evaluate the project so as to make recommendations for scaling up across Zanzibar and elsewhere in East Africa.

METHODS:

Establishing the pilot project

Four PHCUs and two PHCCs were randomly selected from 16 facilities with limited PEC training and were trained in dispensing presbyopic correction. This further training (1 day at the tertiary hospital) consisted of power-point presentations, demonstrations, group discussions, case studies and a manual was distributed. Topics included the findings of the presbyopic study, WHO blindness definitions and major causes, basic anatomy of the eye, history taking, and examination skills. Equipment was demonstrated and they were taught record keeping and referral criteria. They underwent refresher training in measuring distance VA using the E chart at 6m. They were instructed to dispense the least binocular add required for participants to read/see N8 font clearly at 40cms using a logMAR E chart

under standard lighting conditions (at least 480 lux by light meter), provided the person had a presenting distance VA of at least 6/18 in both eyes.

The MOs were given log books to record patient details: eye/visual complaints, gender, age, general health, reason for attendance, presenting distance VA monocularly and binocularly, near vision with and without distance spectacles, power of near spectacles dispensed, frame preference and referral details. They charged a preset value of \$3.50 per pair of spectacles based on the baseline research.

Two days following training each MO was visited for half a day to reinforce training and resolve problems. Each MO was given 200 pairs of plastic or metal ready-made spectacles (powers range +0.50D to +4.00D) and a stock take was carried out. The spectacles were supplied by the International Centre for Eye Education at a cost of 2.7USD. The team met all village leaders to discuss their role in creating community awareness.

Methods used in the evaluation:

The project was evaluated 6 months later by a team of two optometrists, the Zanzibar PEC coordinator and National Eye Care coordinator. The evaluation consisted of an assessment of the planning, process and product of the project by reviewing documents and one to one interviews with the MOs, village leaders and service users. The evaluation team held a final focus group meeting.

Ethical approval was obtained from the London School of Hygiene and Tropical Medicine ethics committee and Zanzibar Ministry of Health, and adhered to the tenets of the Declaration of Helsinki. All participants gave written informed consent and those requiring treatment were treated or referred accordingly.

Data management:

Statistical analyses were carried out using STATA 9 software. Data regarding levels of satisfaction with certain aspects of training, field work or service received were analysed by summing scores of 1 to 5 for each question and producing a total score, linearly transformed to give a score out of 100.⁶

RESULTS.**Evaluation of plan**

The training curriculum was developed by the PEC coordinator and the two optometrists. This project entailed integration into an existing infrastructure and although the logistics had been planned in detail little had been documented.

Recommendations: A structured approach to planning will be required from the outset if the project is to be scaled up, including clearly documented aims and objectives, a plan of action and defined monitoring indicators.

Evaluation of process

Selection criteria: The facilities selected for the study had high attendance and acceptance by the community with the exception of two villages.

Recommendations: Selection for future expansion should consider the following: infrastructure, logistics, population density, capabilities and location.

Training: MOs were very satisfied with the eyecare component of the course and materials provided (Table 1). They were less complementary about training in stock control, accounting and record keeping and felt that more time should have been allocated to reinforce these skills.

Table 1: Medical Officer's level of satisfaction with training, where higher percentages indicate a higher level of satisfaction.

Training	%	95% CI
History taking	96.7	95.2-98.1
Ophthalmic examination	86.7	84.0-89.4
Distance visual acuity	86.7	84.0-89.4
Near visual acuity	90.0	87.6-92.4
Prescribing near spectacles	86.7	84.0-89.4
Referral mechanisms	93.3	91.3-95.3
Stock take	70.0	66.3-73.7
Accounting	66.7	62.9-70.4
Record keeping	76.7	73.3-80.05
Materials	90.0	87.6-92.4
Duration of training	40.0	36.1-43.9

Assessment of training was carried out by observation of examination skills, completion of record cards, history taking and book keeping; any difficulties were raised at the individual facility visit the next day.

Recommendations: Future training should take place over two days allowing for more practical training to reinforce topics taught in the lecture sessions. The training should be formalised, with clear goals, objectives and learning outcomes, with formal assessments, particularly of practical skills and book keeping. As the MOs are not trained in ophthalmoscopy, limitations of their responsibilities should be clarified in any future programme.

Trainees views: All MOs praised the scheme with high satisfaction levels, stating they would like it to continue and recommended adoption by other villages. Their levels of satisfaction with aspects of their work scored highly except stock control, record keeping and referral mechanisms.

Table 2: Level of satisfaction with aspects of field work where higher percentages indicate a higher level of satisfaction.

Field work	%	95% CI
Community awareness	83.3	80.4-86.3
Acceptance by villagers	90.0	87.6-92.4
Examination procedure	93.3	91.3-95.3
Equipment	93.3	91.3-95.3
Referral links	60.0	66.3-73.7
Links with PEC coordinator	100.0	-
Stock take	70.0	76.8-83.2
Spectacles supply	83.3	91.3-95.3
Spectacle prices	100.0	-
Record keeping	73.3	80.4-86.3

Recommendations: More regular follow up was required by the PEC coordinator to provide post training support.

Village leader's views: Awareness was successfully created through community meetings and announcements at the mosque. Village leaders were content with the information they received and their extra responsibilities.

Supply and revolving fund: The current system for banking in Zanzibar involves one account for the eye department, requiring the eyecare coordinator to permit the release of funds.

Recommendations: A revolving fund would be simpler to organise and monitor as a separate account allowing for the existing PEC infrastructure and funding in place. This would involve three monthly collections of monies by the PEC coordinator from the clinics and depositing in the PEC account. Supply of spectacles requires a bank transfer organised by the eyecare coordinator with the main stock held at the tertiary centre. The cost of spectacles should remain at the current price of 3.50USD.

Referral system: The agreed referral criteria included a distance VA of <6/18 in either eye or a near addition of +4.00D. Participants referred during the pilot study could not be followed up as the tertiary hospital does not differentiate between self-referrals and those who had been referred.

Recommendations: Monitoring mechanisms need to be introduced to track the referral and management of patients through the system.

Evaluation of product

A total of 574 patients presented with eye/vision complaints to the six facilities serving a total population of 15,700; giving an average annual attendance rate of 73/1,000 population/year (Table 3). In two villages the attendance rate was considerably lower, due to lack of service awareness and low population density.

Table 3: Number of patients attending each unit in 6 month study period.

Village	Patients with eye/ vision complaints		Population in village served by PHCU or PHCC		Annual rate of attendance / 1,000 population
	N	%	N	%	
Michamwi	73	12.7	1,292	8.2	113
Uroa	26	4.5	2,387	15.2	22
P/ Michangani	112	19.5	2,227	14.2	101
Machanduchi	92	16.0	5,220	33.3	35
Myuni	57	10.4	876	5.6	130
Kivunge	213	37.1	3,697	23.5	115
Total	574	100	15,699	100	73

More men presented than women although not statistically significant, and the majority of patients were aged 40-50 years (Table 4).

Table 4: Distribution of patients with eye/vision complaints by age group and gender.

	Males		Females		Total		P-value
Age (years)	No.	%	No.	%	No.	%	
0-9	42	15.7	48	15.7	90	16.7	0.434
10-19	37	13.8	36	11.8	73	12.9	
20-29	24	9	37	12.1	61	12.2	
30-39	34	12.7	43	14.1	77	12.5	
40-49	71	26	76	24.9	147	24.9	
50-59	32	11.9	30	9.8	62	9.9	
60-69	21	7.8	24	7.9	46	7.7	
70-79	7	2.2	11	3.6	17	3	
80-100	1	0.37	0	0	1	0.2	
Total	269	100	305	100	574	100	

Only 7.5% of those attending the clinics had reduced distance VA at presentation (i.e. <6/18 in the better eye). In 24 of these 43 individuals, VA improved to 6/18 in one or both eyes with a pinhole (Figure 1).

Figure 1: Distribution of participants according to reasons for attendance and management.

Conjunctivitis was the commonest reason for attending in all age groups (49.7%)(Table 5). Almost a third (30.1%) complained exclusively of reduced near vision; all 173 patients were prescribed near spectacles and 3 individuals were referred.

Table 5: Reasons for attending the clinic according to age group.

Complaints	0-20 years		21-40 years		41-60 years		61+ years		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<u>Visual problems:</u>										
Poor near VA*	2	1.2	29	21.2	129	61.7	13	21.5	173	30.1
Poor distance VA**	5	3.1	7	5.1	9	4.3	5	7.7	26	4.5
Poor near & distance VA**	1	0.6	0	0.0	2	1.0	0	0.0	3	0.5
Poor vision cause unknown***	3	1.8	6	4.4	2	1.0	4	6.2	15	2.6
<u>Diagnoses:</u>										
Conjunctivitis	129	79.1	81	59.1	49	23.4	26	40.0	285	49.7
Trauma & foreign body	13	8.0	7	5.1	6	2.9	2	3.1	28	4.9
Cataract	0	0.0	2	1.5	4	1.9	8	12.3	14	2.4
Vitamin A deficiency	4	2.5	1	0.7	2	1.0	5	7.7	12	2.1
Swelling and pain	1	0.6	3	2.2	2	1.0	0	0.0	6	1.0
Trichiasis	1	0.6	1	0.7	0	0.0	0	0.0	2	0.3
Corneal growth	0	0.0	0	0.0	2	1.0	1	1.5	3	0.5
Other	3	1.8	0	0.0	1	0.5	0	0.0	4	0.7
No problems	1	0.6	0	0.0	1	0.5	1	0.0	3	0.5
Total	163	100	137	100	209	100	65	100	574	100

* Dispensed near spectacles.

** Improvement with pinhole and referred for refraction.

***No improvement with pinhole.

Spectacle powers of +1.50Ds and +2.00Ds and metal frames (61.9%) were most frequently dispensed (Table 6).

Table 6: Power of near spectacles dispensed according to age group

	Age group															
	20-30		30-40		40-50		50-60		60-70		70-80		80-90		Total	
Power	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
+1.00	1	2.6	13	33.3	20	51.3	4	10.3	1	2.6	0	0.0	0	0.0	38	100.0
+1.50	1	1.4	9	12.3	51	69.9	7	9.6	4	5.5	1	1.4	0	0.0	73	100.0
+2.00	0	0.0	6	12.8	23	48.9	14	29.8	4	8.5	0	0.0	0	0.0	47	100.0
+2.50	0	0.0	0	0.0	5	45.6	6	54.6	0	0.0	0	0.0	0	0.0	11	100.0
+3.00	0	0.0	0	0.0	2	33.3	1	16.7	3	50.0	0	0.0	0	0.0	6	100.0
Total	2	1.1	28	15.9	101	57.4	32	18.2	12	6.8	1	0.6	0	0.0	173	100.0

All individuals complaining of both reduced distance and near vision were referred for refraction (3/3) as were 25/26 with reduced distance VA. A total of 74 patients were referred; cataract (14/14), trauma/foreign bodies (17/28), poor vision of unknown cause (2/15), the

remainder being treated with vitamin B complex. Topical tetracycline was prescribed for 300 patients.

Recommendations: Medication to treat common conditions should be available for each clinic and spectacles stocks need to be replenished regularly.

Participant views on the scheme

Of the 173 participants given near spectacles, 41 individuals were traced; all still had their spectacles and always had them with them. Satisfaction rates were high (Table 7) and all recommended adoption in other villages.

Table 7: Level of satisfaction with aspects of service provided by the clinics.

Aspect of service	%	95% CI
History	99	98.7-99.3
Exam	94.6	93.9-95.3
Outcome	98.5	95.5-96.7
Referral*	NA	NA
Near vision	100	100
Price	94.1	93.4-94.9
Frame choice	97	96.6-97.6
Accessibility	98	97.6-98.5
Staff availability	99	98.7-99.3
General experience	99.5	99.3-99.7

*Poor referral mechanisms and no data to evaluate.

CONCLUSIONS

The implications of this evaluation in terms of scaling up the provision of near spectacle correction across Zanzibar will be considered in relation to relevance, effectiveness, equality, sustainability and replicability.

Relevance

The project is highly relevant and timely given that correction of presbyopia is now a priority with WHO and the global magnitude and need is increasing.

Effectiveness

Due to good planning, training in the Eye Department was effective. A large number of patients attended the service and had been provided with spectacles, or referred. However, a system for monitoring referral mechanisms will be required.

Equality

Gender: Both male and female MOs were randomly selected for training. On reviewing the patient figures no significant difference was found.

Location: All facilities in the pilot scheme were, by chance, located in rural areas. In future, selection will be based on location, population density and infrastructure.

Sustainability

Human resources: MOs are well placed in the community in Zanzibar and many already have PEC awareness. Those interviewed during the evaluation were highly motivated and content to provide an additional service.

Management and equipment: Future management of the project will be the responsibility of the PEC coordinator. All the equipment required is inexpensive and readily available.

Financial: The project used a revolving fund which promotes financial sustainability as long as the small profit is reinvested. Scaling up could either take place slowly by this means or more rapidly with injection of additional capital.

Replicability

In keeping with VISION 2020 priorities, the aim is to reduce the unmet need for presbyopic correction to less than one third of the population and make this a long term sustainable outcome. This will have an impact on PEC and refractive error provided the referral mechanisms and infrastructure are in place. The plan to scale up the project to the national level will require operational research and modification as the project evolves (Figure 2). This project has demonstrated how programmes can build on existing health systems and provides an example of integration of service delivery through increased capacity building of existing staff.

Figure 2: Planning process at the national level.

Selection of PHCUs and PHCCs based on location, population density, infrastructure and capabilities.
Development of standard training curriculum and materials, which would include a pre and post training evaluation of the trainees.
Development of standard forms for recording clinical findings and accounting and stock take.
Organising regular visits and follow up to each PHCU.
Development of referral links and more frequent refraction outreach.
Development of monitoring and reporting systems.
Organising a revolving financial fund, stock take and delivery at the tertiary hospital.

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Competing Interest: None to declare.

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