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Primary eye care service provision ability of mid-level healthcare providers in southern Ethiopia

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Authors:
Temesgen W. Kentayiso[1]
Naomi L. Nkoane[1]
Kholofelo L. Matlhaba[1]

Affiliations:
[1]Department of Health Studies, College of Human Sciences, University of South Africa, Pretoria, South Africa

Corresponding author:
Temesgen Kentayiso, 58528660@mylife.unisa.ac.za

Background: The provision of eye care services by trained and well-capacitated primary care providers in the rural community will contribute significantly to the reduction of avoidable blindness.

Aim: This study aimed to investigate mid-level healthcare providers' knowledge and skills capacity to provide primary eye care services.

Setting: The study was conducted in four districts of southern Ethiopia.

Methods: An institution-based descriptive cross-sectional study was conducted among randomly selected mid-level healthcare providers from August to October 2023. A self-administered questionnaire was used to collect data. Data entry and analysis were performed using Epi info version 6 and SPSS version 28 software. Descriptive statistics and logistic regression models were used in the analysis.

Results: A total of 103 mid-level healthcare providers were involved in the evaluation with a response rate of 99%. Of the study respondents, less than half (48.5%) were found to have intermediate-level ability to provide primary eye care services. Serving more patients per month ($p < 0.001$), receiving additional training ($p < 0.005$) and having a first degree ($p < 0.001$) were found to have a statistically significant association with the ability to provide primary eye care services.

Conclusion: Most primary eye care service providers had a significant knowledge and skill gap. Capacity-building training aimed at enhancing the ability of primary eye care service providers need the appropriate attention.

Contribution: This study presents the ability of mid-level healthcare workers to provide primary eye care services to support the elimination of avoidable blindness, resulting in improved quality of life.

Keywords: primary eye care; primary eye care service provision ability; knowledge of primary eye care; skill of primary eye care; mid-level healthcare providers.

Introduction

In 2022, the World Health Organization (WHO) reported that blindness and low vision were a problem for more than 2.2 billion people.[1,2] More than three-quarters of global blindness and low vision burden reside in developing countries.[3] Ethiopia is classified as a developing country with a high prevalence of blindness (1.6%) and low vision (3.7%).[4,5] Many eye conditions can be easily diagnosed and treated by qualified eye care providers at the primary level, the lowest eye care service provider in the rural community.[6]

The WHO guide for eye care, divides eye care personnel into three categories: full-time eye care providers, integrated eye care providers, and community eye care providers.[6] Ophthalmologists, ophthalmic clinical officers, ophthalmic nurses and optical technicians were classified as full-time eye care providers.[6,7] The second category includes general practitioners, clinical officers, nurses, midwives and environmental health technicians. Community eye care providers are people who, in the course of their regular work, have close contact with the communities, especially at the village level, including community health providers, traditional birth attendants, volunteers and traditional healers.[6]

Countries such as the United States, the United Kingdom, France, Germany and Australia provide primary eye care (PEC) services through full-time specialised personnel such as ophthalmologists and optometrists.[6,7] Of the low- and middle-income countries, government-

owned PEC units in India provide services through trained paramedical ophthalmic staff who work in contact with medical officers.[7,8]

The WHO Regional Office for Africa categorises mid-level health cadres, such as clinical officers and nurses providing basic eye care services, as PEC providers who work in primary health facilities.[6,9] Primary eye care providers are expected to identify and treat common eye conditions, diagnose other conditions, describe possible interventions, support patients in decision-making and ensure active participation of the individual and family.[10,11]

For ease of use, the WHO Regional Office for Africa guideline categorises the clinical components of the delivery of PEC services into three tasks that PEC providers should perform: case identification, diagnosis and treatment, and referral. Case identification includes cases of common ocular morbidities such as xerophthalmia and conjunctivitis. The key tasks related to diagnosis and treatment include the management of eye conditions such as lid laceration, corneal ulcer and trachomatous trichiasis. The final group of tasks includes referral of conditions such as vision loss, cataracts and pterygium.[12]

The presence of a trained eye care worker who can correctly diagnose, treat and refer patients is the key to the effectiveness of PEC in addition to the availability and functionality of the eye care units.[13] In numerous low- and middle-income countries, eye care providers are scarce or poorly distributed.[14,15]

In many African countries, PEC-related training is provided as part of the basic health worker training curriculum, although its implementation varies between and within countries.[16] With almost 17% of the world's population and a quarter of the global burden of ocular morbidity, Africa has only 3% of the eye health workforce.[16,17] The primary purpose of PEC training is to capacitate primary healthcare providers to diagnose, treat and refer patients with common ocular morbidities.[18] A study to assess the knowledge and level of training of PEC providers in Kenya, Malawi and Tanzania found that the skills of PEC workers are low, with a substantial fraction below the level of basic competency. The study identified very poor service provision as a result of poor quality training.[18]

A study in Malawi found that almost 30% of PEC providers did not have basic eye care training.[18] A pilot study in Zanzibar and Tanzania suggested that primary healthcare providers could correctly distribute reading spectacles.[19] In another study in Malawi, traditional healers were found to play a role in improving cataract surgical uptake.[19] To successfully implement the WHO Africa regional PEC packages, countries (health units) must address the skill and knowledge gap of PEC service providers.[20] Activities that aim to develop infrastructure and human resources for eye health need attention if eliminating and controlling avoidable blindness is a goal.[21]

In Ethiopia, the PEC service is currently run by Integrated Eye Care Workers (IECW), mid-level eye health cadres who receive 4–6 weeks of additional training in PEC, including trichiasis surgery. These professionals are expected to provide eye health promotion and education in addition to identification, diagnosis and treatment, and referral of common ocular conditions.[4] In its 5-year National Strategic Action Plan for Eye Health (2016–2020), the Ethiopian Ministry of Health planned to train and deploy 3600 integrated eye care providers and 800 ophthalmic nurses to provide the service in PEC units.[4]

Reaching everyone, especially those living in difficult-to-reach areas and those with disabilities, is not easy and is achievable only by trained eye care professionals.[14] Participation and appropriate training of non-ophthalmologist professionals are mandatory to ensure the sustainability of PEC services.[22] Unfortunately, there are limited studies on the knowledge and skills of PEC providers in many sub-Saharan African regions, especially in Ethiopia. Additionally, those studies were conducted 5–15 years ago, making their compliance with current health practices difficult. Therefore, this study evaluated the knowledge and skills of mid-level health providers providing PEC services in the study area.

Research methods and design
Study design

An institution-based descriptive cross-sectional study, which is one of the observational study designs by which descriptive statistics are collected at a single point in time in an institutional setting, was used during this study.[23] This study is the third objective of a larger project that aims to develop a PEC model to improve the provision of PEC services.

Study setting

This study was carried out in South Ari, North Ari, Malle and Bena Tsemay districts of southern Ethiopia, where PEC services are provided in 32 primary healthcare units by mid-level healthcare service providers.[24]

Inclusion criteria

The inclusion criteria used were mid-level healthcare professionals including health officers, clinical nurses, public nurses and IECWs, who provided PEC services for at least 6 months, a permanent employee of the unit and those providing PEC services within the study areas, during the study period.

Sample size, procedure and study population

An online sample size calculator, Rao Soft, was used to estimate the sample size. Before the study, 141 registered mid-level healthcare providers provided PEC services in the study area.[24] Taking into account a 95% confidence interval, a 5% margin of error, a 50% population proportion and a population size of 141, the calculated sample size was 104. A simple random sampling technique was applied to select respondents.

Data collection methods and tools

Data were collected using a pre-tested standardised self-administered questionnaire adopted from the WHO. The tool was developed to assess the knowledge and skills of PEC service providers in Africa.[6] Before the application, the data collection tool was approved by the University of South Africa. The tool was prepared in English and had 35 multiple-choice questions and 3 sections, including 11 sociodemographic and basic educational and professional data, 14 knowledge-based questions and 10 skill assessment questions.

Data management and analysis

Data entry was performed using Epi-info version 6 data management software, and a statistician performed data analysis using IBM SPSS (version 28) software. Descriptive statistics such as means and frequencies were used and presented in tables or graphs. The association of variables was processed using a logistic regression model. The crude odds ratios were calculated to determine the strength of the association, and the adjusted odds ratios were used to control the effect of confounders. In the multivariate analysis, variables that demonstrated a significance level of up to 0.25 in the bivariate analysis were included to ensure that potentially relevant predictors were not overlooked.

Quality assurance

To ensure the reliability of the study, the researcher kept an audit trail for future and interested scholars who would wish to investigate the phenomenon further. Cronbach's alpha was used to evaluate the internal consistency of the scales used. To ensure the validity of the study, an appropriate time for optimal data collection was selected. The method also used scientifically validated sampling and data analysis methods. Ethical considerations were rigorously followed to protect the rights of the respondents. Furthermore, to enhance the content validity of the survey tool, a statistician examined and validated the content and relevance of the questions posed to the respondents.

Operational definitions

For the purposes of this study:

Primary eye care service provision ability was defined as the ability of mid-level healthcare providers in knowledge and skills to provide PEC promotion, preventive and curative services, including the identification and referral of cases to be managed in secondary and tertiary eye care units.[4,6]

Intermediate-level ability was defined as a score of 60% and higher in knowledge and skills evaluation.[6]

Ethical considerations

This study obtained ethical approval from the Research Ethics Review Committee of the School of Human Sciences at the University of South Africa (reference number 58528660_CREC_CHS_2023). Similarly, permission for the study was obtained from the South Omo Zone Health Department and from the four districts involved in the study. Informed consent was collected from all respondents and ensured the application of all ethical principles of autonomy, justice, privacy, confidentiality, anonymity, beneficence and non-maleficence. Data collection was carried out in PEC units, and study respondents were staff of the unit; therefore, respondents did not incur any cost to be part of the study. The procedures followed during this study were fully per the provisions of the Helsinki Declaration on research on human respondents.

During the study, the right to fair treatment was ensured by applying distributive justice to avoid imposing unfair treatment or discriminating unfairly against respondents. The researcher also ensured that the privacy of the respondents was maintained throughout the data collection, analysis and reporting by keeping the collected data in a safe place under the strictest measures to protect them. The safety of the collected data was maintained and protected through encrypted passwords on the soft copy materials, and the hard copies were kept in a locked safe. To protect the anonymity of the study respondents, the researcher used codes to identify respondents.

Results

In this study, 104 self-administered questionnaires were distributed, and 103 questionnaires were completed by the respondents with a response rate of 99%.

Sociodemographic data of the study respondents

Of the study respondents, 61 (59.2%) respondents were in the 20–30 years age category. The second age category, 31–40 years, comprised 35 (34%) respondents, and only 7 (6.8%) respondents were over 40 years old. The sex distribution shows that the majority 75 (72.8%) were male, and the remaining 28 (27.2%) were female. The marital status of the study respondents indicated that 62 (60.8%) respondents were married, and 38 (37.3%) respondents were single.

Basic education and professional data of the study respondents

The variables used to evaluate the basic educational and professional data of the study respondents include their profession, education level, service year, source of knowledge, rounds of eye care training, duration of eye care training and the average number of patients seen in a month. In this study, health officers, clinical nurses, public nurses and IECWs were found to provide PEC services. Health officers (public health professionals with a first degree and who are expected to provide basic preventive, promotive, curative and rehabilitative services at the primary healthcare unit level) or B.Sc.-holder nurses, general nurses and integrated eye care providers embrace the top list by sharing 34%, 24.3% and 22.3% of the professionals, respectively.

The educational level of the study respondents showed that 56 (54.4%) respondents had a first degree, 46 (44.7%) respondents were diploma graduates and only 1 (1%) respondent had a master's degree. Most of the study respondents had less work experience. Over a third of the respondents, 39 (37.9%), had between 1 and 2 years of service experience. Twenty-four (23.3%) respondents had 6 months to 1 year of work experience. As described in Figure 1, on the contrary, those with more work experience make up a smaller proportion of study respondents. Only one-fifth of the respondents (20.7%) had work experience of 5 years or more.

The source of knowledge and skills for diagnosis and treatment for 47 (45.6%) respondents was their pre-service (university or college) courses. The second source of knowledge and skill was on-the-job training reported by 34 (33%) respondents (Table 1). More than half (n = 57, 53%) of respondents reported that they had never received training in PEC while providing basic eye care services. As described in Table 1, of those who received additional or on-the-job training, 19 (18.4%) respondents were trained once, and 15 (14.6%) respondents were trained three or more times.

There was an equal distribution (42.7%) of governmental and non-governmental support for PEC training among respondents, while the remaining (14.6%) respondents self-funded their training. Most of the study respondents, 59 (57.3%), stated that they provide PEC services on average for less than 10 patients per month. Only 8 (7.8%) respondents reported seeing an average of 50 or more patients per month (Figure 2).

Result of the knowledge assessment

For the assessment of knowledge, variables related to PEC activities were incorporated and presented in five subsections including the definition and causes of blindness, identification and management of conditions such as trachoma, conjunctivitis and cataracts, referral criteria and basic components of PEC services.

Definition and causes of blindness

Most of the study respondents, 59 (57.3%), defined blindness as loss of light perception. Similarly, blindness was reported as the inability to see in front by 28 (27.2%) respondents, and 7 (6.8%) of them reported that they did not know the working

FIGURE 1: Service time of study respondents.

definition of blindness. Only 27 (26.2%) of the study respondents correctly defined blindness as the inability to see 3/60 in the better eye with the best possible correction. As described in Figure 3, 72 (69.9%) of the study respondents correctly chose at least three of the five (60%) leading causes of blindness in children.

Trachoma: Identification and management

Four variables were used to assess knowledge of trachoma identification and management: identification of risk factors for trachoma, signs and symptoms, prevention strategies and indication for surgery for trachomatous trichiasis. As described in Table 2, only 36 (35%) respondents correctly identified at least three of the five (60%) risk factors for trachoma in the study area. During this study, only 33 (32%) respondents correctly recognised at least four of the six signs and symptoms of trachoma. The WHO-endorsed trachoma elimination strategy (Surgery, Antibiotics, Facial cleanliness and Environmental hygiene – SAFE) is correctly identified by 71 (68.9%) study respondents. Finally, respondents were asked to identify what infectious misdirected eyelashes (interned) indicated. Consequently, 81% of respondents identified the correct answer, trachoma. The remaining respondents identified conjunctivitis, I don't know and cataracts as a reason for misdirected eyelashes by 14%, 3% and 2%, respectively.
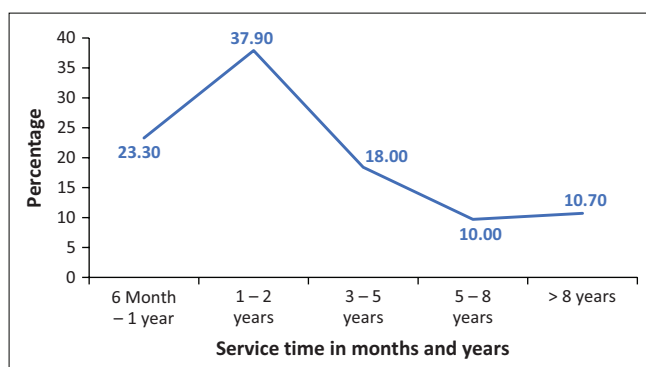
Cataract identification and management

Study respondents were asked to discover what a white pupillary reflex shows in children. Consequently, 70 (68%) respondents correctly identified cataracts (congenital), 22 (21.4%) considered them glaucoma, 8 (7.8%) respondents selected night blindness and 3 (2.9%) reported not knowing

TABLE 1: Source of knowledge and skill in diagnosis and treatment, training rounds and time of the last basic result (refresher training) of the study respondents (N = 103).

Category	Variable	n	Valid %
Source of knowledge			
Valid	College or university training	47	45.6
	Postgraduate supplementary training	12	11.7
	On-job training	34	33.0
	Professional colleagues	10	9.7
Rounds of eye care training			
Valid	Once	19	18.4
	Twice	12	11.7
	Three and more than three	15	14.6
	Never (only as part of my college or university mandatory course)	57	55.3
Time of last basic (refresher) training			
Valid	Less than 6 months	13	12.6
	6 months – 1 year	13	12.6
	1–2 years	8	7.8
	3–4 years	4	3.9
	> 5 years	8	7.8
	NA	57	55.3
Who supported the training			
Valid	Government	44	42.7
	NGO	44	42.7
	Self	15	14.6

Note: Exported from IBM SPSS version 28 software.
NGO, Non-Governmental Organizations.

FIGURE 2: Number of patients seen per month by the study respondents.
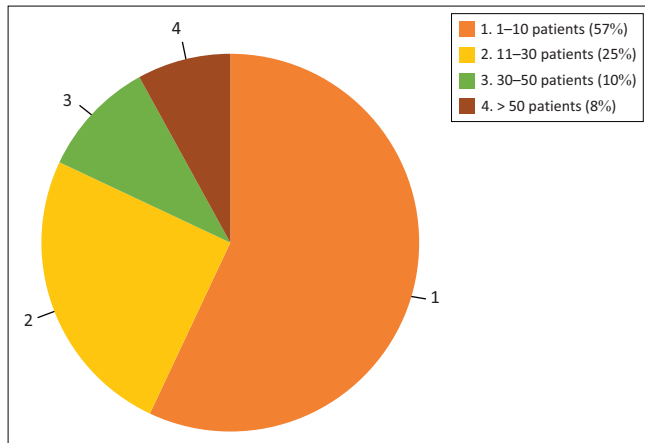
Legend:
1. 1–10 patients (57%)
2. 11–30 patients (25%)
3. 30–50 patients (10%)
4. > 50 patients (8%)
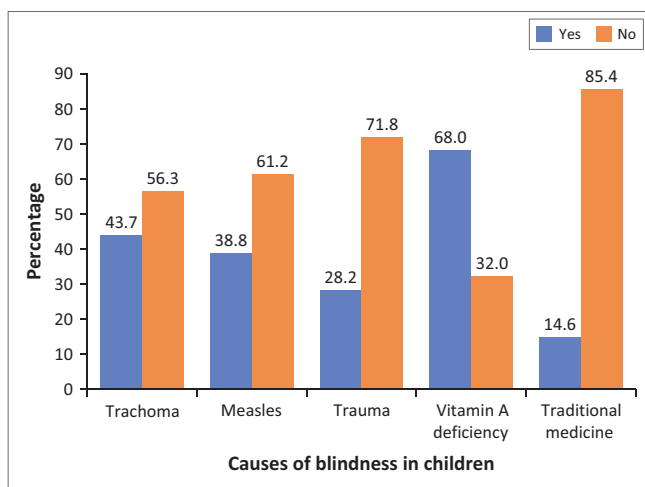
FIGURE 3: Causes of blindness in children, as described by study respondents (N = 103).

TABLE 2: Result of the assessment of signs and symptoms of trachoma (N = 103).

Category	Yes		No	
	n	%	n	%
Mild itching and irritation of the eyes and eyelids	28	27.2	75	72.8
Eye discharge containing mucus or pus	53	51.5	50	48.5
Eyelid swelling	22	21.4	81	78.6
Light sensitivity (photophobia)	50	48.5	53	51.5
Eye pain	32	31.1	71	68.9
Eye redness	37	35.9	66	64.1
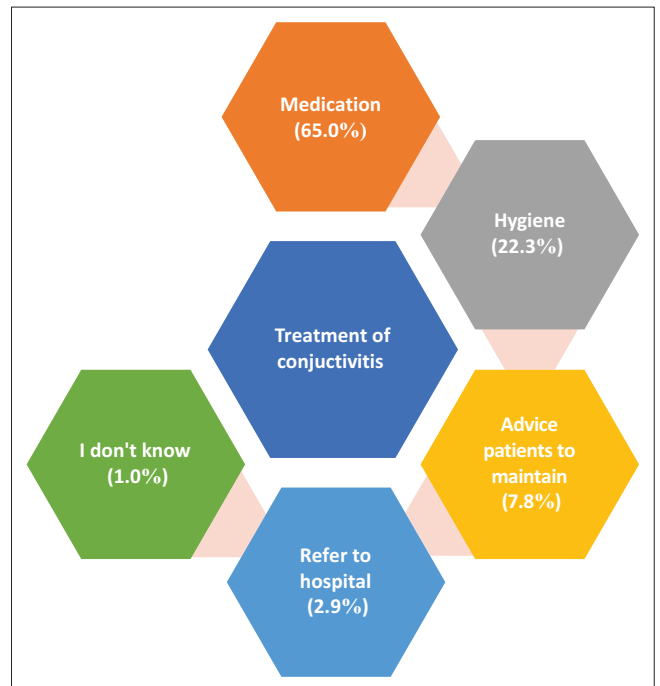
FIGURE 4: Response of study respondents to the treatment of conjunctivitis (N = 103).

about them. Similarly, most of the study respondents correctly identified cataracts (57.3%) and glaucoma (39.8%) as the causes of loss of vision without pain. The evaluation result showed that only 24 (23.3%) respondents had at least four of the six common risk factors for cataracts in the study area.

Conjunctivitis and night blindness

Of the study respondents, 89 (86.4%) correctly identified vitamin A deficiency and 13 (12.6%) identified the malnourished mother as the cause of night blindness. Similarly, study respondents were encouraged to detect the treatment of conjunctivitis in the PEC unit. Consequently, as presented in Figure 4, 67 (65.7%) respondents correctly identified the medication as a treatment for conjunctivitis.

Need for referral

As part of the knowledge assessment, the study respondents received two case scenarios related to the need for referral. The first scenario was the case of a 2-week-old baby with a swollen eye and discharge of pus. Only 30 (29.4%) respondents correctly identified the start of antibiotics and immediate referral to a secondary eye care facility as the right case management. The second variable used in this category was the need for urgent referral. Study respondents were

asked to identify the need to urgently refer to lists of common ocular morbidities. The majority of the respondents (82%) selected a chemical eye injury that requires urgent referral, followed by 9% of the respondents who selected a red eye with pain. Red eyes with discharge and red eyes with itching were regarded as urgently referable eye conditions by 7% and 2% of the respondents, respectively.

Provision of primary eye care services

More than half, 64 (62.1%), of the study respondents believed that the provision of PEC services ensures early diagnosis and referral before a condition becomes serious. The second reason that was largely identified as a reason for the provision of PEC services was to prevent the community from using harmful substances in the eye, which was selected by 41 (39.8%) respondents. The third reason for PEC service provision identified during this study was related to access; 40 (38.8%) respondents thought that PEC would support the provision of quality eye care services to the community. Thirty-five (34%) respondents believed that PEC can reduce the incidence of blindness at the grassroots level, and 18 (17.5%) respondents believed that it will reduce the patronage of untrained providers for eye care services, as the provision of PEC services advocates for training and engagement of skilled service providers.

TABLE 3: Bivariate and multivariate analysis of the knowledge and skills of primary eye care providers in four districts of the southern Omo zone, Ethiopia.

Variables	Knowledge and skill of PECWs		COR	95% CI	AOR	95% CI
	Yes	No				
Profession						
Others	5	7	1.00	-	1.00	-
Public nurse	1	7	0.20	0.02–2.18	0.30	0.15–5.92
Health officer or B.Sc nurse	15	20	1.87	0.49–7.05	2.72	0.69–107.96
IECW	20	3	9.33	1.76–49.59*	0.65	0.63–6.65
General nurse	4	21	0.27	0.06–1.28	0.18	0.01–6.58
Source of knowledge						
Professional colleagues	1	9	1.00	-	1.00	-
On job training	22	12	16.50	1.86–146.32*	2.68	0.25–28.75
Supplementary training	10	2	45.00	3.46–584.34*	100.49	3.96–2551.58**
Pre-service training	17	30	5.10	0.59–43.78	10.43	0.90–120.46
Rounds of eye care training						
Once	9	10	1.80	0.63–5.17	0.83	0.00–18.69
Twice	9	3	6.00	1.45–24.78*	0.14	0.00–79.62
Three or more times	13	2	13.00	2.66–63.58*	0.09	0.00–33.59
Never	19	38	1.00	-	1.00	-
The average number of patients seen per month						
1–10	21	38	1.00	-	1.00	-
11–30	20	6	3.02	0.66–13.89	10.81	0.73–159.09
30–50	4	6	1.21	0.31–4.76	0.83	0.12–6.06
Above 50	5	3	6.03	2.09–17.35*	25.44	4.06–159.45**
Time of last training						
Less than 6 months	7	6	2.33	0.68–7.92	10.86	0.02–7095.73
6 months – 1 year	11	2	11.00	2.21–54.71*	217.39	0.52–91569.33
1 year – 2 years	4	4	2.00	0.45–8.89	0.14	0.00–41.79
3 years – 4 years	3	1	6.00	0.58–61.62	4.04	0.06–273.46
Above 5 years	6	2	6.00	1.10–32.56*	11.49	0.03–5104.69
Not trained	19	38	1.00	-	1.00	-
Educational level						
Diploma	11	35	1.00	-	1.00	-
Degree	39	17	7.29	3.01–17.69*	23.92	4.88–117.23**
Masters and above	0	1	0.00	-	-	-
Who supported the training						
Government	17	27	1.73	0.47–6.32	2.05	0.20–20.64
NGO	29	15	5.32	1.44–19.57*	0.19	0.01–7.66
Self	4	11	1.00	-	1.00	-

IECW, Integrated Eye Care Workers; NGO, Non-Governmental Organizations; COR, Crude Odds Ratio; AOR, Adjusted Odds Ratio; PECW, Primary Eye Care Workers.
*, $P < 0.25$ in bivariate; **, $P < 0.05$ in multivariate.

Skill assessment

During this study, 10 variables derived from the WHO clinical skill protocol for PEC providers were used to assess the skills of study respondents.[6]

Skill in instrument use

The first skill-related variable used during this study was the identification of the instrument needed to evert the upper eyelid. Only 33 (32%) respondents correctly identified the clean cotton bud as the instrument required to evert the upper eyelid. For the second variable, 61 (59.2%) respondents correctly recognised the epilation forceps as an instrument needed to remove a misdirected eyelash. Identifying the correct instrument needed to remove foreign bodies from the eye was the third variable used in this study. Consequently, 56 (54.4%) respondents correctly identified the cotton bud.

Skill in performing the procedure

Study respondents were asked to identify the correct procedure to follow during an acid burn to the eye. Almost three-quarters of the respondents, 76 (73.8%), identified irrigating the eye as the correct procedure. The second variable for the evaluation of the skill of the procedure was what to use for irrigation. In summary, 97.1% of the study respondents correctly identified saline or clean water and/or both as a fluid to use for irrigation. The third request was to identify the correct procedures to be followed by a caregiver while instilling eye drops in the eye. Consequently, 68 (66%) respondents said that the caregiver should wash his hands before pouring eye drops. Similarly, 53 (51.5%) respondents identified the installation of drops in the correct eye as the exact duty of a caregiver. Finally, study respondents were requested to identify the correct measurement distance of visual acuity in a PEC unit. The majority, 84 (81.6%), of respondents identified 6 m as the correct distance to measure visual acuity.

Basic skills needed for a primary eye care worker

Study respondents were asked to identify the skills needed by PEC providers. Consequently, screening, health education and promotion, and medical treatment were selected by 64.10%, 59.20% and 48.5% of the respondents, respectively. Similarly, surgical treatment and referral were identified by 37.9% and 34.1% of the respondents. Study respondents were also asked to identify conditions in which to skip a detailed history of the five options presented. Only 29 (28.2%) respondents correctly identified chemical eye injury or burn as ocular conditions where a detailed case history was not necessary.

As discussed, a total of 22 variables were used to assess the knowledge and skills of mid-level healthcare providers providing PEC services to measure their ability to provide PEC services. Respondents received a score of 1 for correct responses and a score of 0 for incorrect responses for each of the selected variables. Consequently, the mean score was 13.63 with a standard deviation of 3.03. Of the study respondents, less than half of the respondents (48.5%) had intermediate-level (60% and above) ability to provide PEC services.

Bivariate and multivariate logistic regression

Bivariate and multivariate logistic regression was performed to assess the association of the dependent variable, the ability to provide PEC services, with the independent variables. During the bivariate analysis, seven variables with a $p < 0.25$ were selected as candidates for the multivariate analysis. The multivariate association showed that receiving additional training ($p = -0.005$), serving more patients per month ($p < 0.001$) and having a first degree ($p < 0.001$) had a significant statistical association with the ability to provide PEC services. Consequently, those who served more than 50 patients per month were 25.44 [AOR 25.44; 95% CI 4.06 – 159.45] times more likely to have an intermediate ability to provide PEC service than those who served 1–10 patients per month. As described in Table 3, those who received additional training were 100.5 [AOR 100.49; 95% CI: 3.96 – 2,551.58] times more likely to have an intermediate ability to provide PEC service than those who learnt to provide PEC service from their professional colleagues. Those with a first degree were 23.92 [AOR 23.92; 95 % CI 4.88 – 117.23] times more likely to have an intermediate ability to provide PEC service than diploma holders.

Discussion

In this study, different professionals were found to provide PEC services. The presence of diverse professionals providing PEC services in the study area aligns with the WHO African region category of PEC service providers.[6] The source of knowledge and skills for diagnosis and treatment for almost half of the respondents (45.6%) was their preservice college or university courses. This finding is consistent with a study conducted in Ethiopia where pre-service and on-the-job training was the source of knowledge for 52% and 48% of the respondents.[12] This study found that 53% of the study respondents had never received training in PEC while providing basic eye care services. This finding is higher than a finding in Malawi, where almost 30% of PEC service providers did not have basic eye care training.[18]

The proportion of trained personnel in this study area was much lower than that of service providers in Pakistan, where 89.6% of primary health providers received training in PEC.[25] This finding is also less than a result of a study conducted in Kenya, Malawi and Tanzania where 35.3% of mid-level professionals provided PEC services without receiving additional training on PEC service provision.[18]

More than half of the study respondents (57.3%) reported providing PEC services on average for less than 10 patients each month. This finding is consistent with a study conducted in Tanzania in which PEC providers see less than one patient per week.[26] During this study, 26.2% of the respondents correctly identified the working definition of blindness. This result is slightly higher than the result of a study performed in Ethiopia, where 87% of the study respondents were found to have a poor understanding of the functional definition of blindness.[12] The level of training received by the study respondents and the engagement of diverse health professionals during this study were identified as a reason for the good understanding of the working definition of blindness.

A third of the respondents (32%) correctly recognised at least four of the six signs and symptoms of trachoma in the study area. The knowledge of PEC service providers about the correct signs and symptoms of trachoma in the study area was below a similar study result in the Gurage zone of Ethiopia, where most of the respondents (89%) correctly mentioned the signs and symptoms of trachoma.[12] During this study, 68.9% of the respondents correctly identified the WHO-endorsed trachoma elimination strategy. This finding is higher than that in the Gurage study, where only 10% of the respondents recognised the trachoma prevention strategy.[12] The level of training received by the study respondents and the engagement of diverse health professionals during this study were presented as a reason for the good understanding of the WHO-endorsed trachoma elimination strategy.

Misdirected infectious eyelashes (interned) were correctly identified as trachoma complications by 81% of the respondents. This finding is consistent with a study conducted in northern Nigeria in which 83.1% of the respondents correctly identified the problem.[27] Congenital cataracts were correctly identified by 68% of the study respondents. This result is relatively higher than the finding in Pakistan, where 55.7% of the respondents identified cataracts, red eye and glaucoma correctly, and it is consistent with a study result in Tanzania, where 67.3% of the respondents correctly identified cataracts.[25,26]

The evaluation also showed that less than a quarter of the respondents identified at least four of the six common risk factors for cataracts. The result of this study is less

than the result of a study carried out in Malawi, which reported that 34% of respondents correctly identified risk factors for cataracts.[18] Medication was presented as a treatment for conjunctivitis by 65.7% of the study respondents. This finding is consistent with a study conducted in Tanzania, where 67.3% of study respondents correctly identified the treatment of conjunctivitis.[26] During this study, 81.6% of the respondents presented 6 m as the correct distance to measure visual acuity. This finding is much higher than a study conducted in Tanzania, where only 6% of the study respondents considered taking a visual acuity at 6 m as the right distance.[26]

In summary, less than half of the study respondents, 48.5%, were found to have intermediate ability (60% and above) to provide PEC services. This finding is relatively higher than a similar study conducted in Nigeria, which showed that only 26.4% of community health providers who participated in the assessment of knowledge and skills had a knowledge and skill assessment score of 50% and above.[27] The overall result of the study is consistent with a finding in three African countries. The result of a study carried out in Kenya, Malawi and Tanzania to assess the knowledge and level of training of PEC providers found that the skill of PEC workers is low, with a substantial fraction below the level of basic competency.[18]

The overall findings of this study show similar results to a study conducted in Western Kenya that concluded the presence of a skill gap among PEC service providers.[28] In both studies, the presence of knowledge and skill gaps was found to significantly affect the provision and use of PEC services.

Limitations of the study

Because of the low number of mid-level health providers providing PEC services in the study area, the sample size used was small. This may affect the generalisation of the study findings.

Conclusion

This study found that more than half of mid-level healthcare providers have no intermediate-level ability to provide PEC service according to the minimum knowledge and skill assessment standard set for the sub-Saharan African region. Supplemental training, earning a first degree and serving more patients per month were found to have a statistically significant association with the ability to provide PEC services. The identified ability gap needs interventions and further studies investigating reasons for the knowledge and skill gaps as well as the introduction of training programmes. The provision of new and refresher training, routine knowledge and skill evaluation for service providers will improve the provision of PEC services. This, in turn, will contribute to the reduction of avoidable blindness and the improvement of quality of life.

Acknowledgements

Data availability

The data set for this study is available from the corresponding author, T.W.K., upon reasonable request.

Disclaimer

References

1. World Health Organization. World health statistics. Monitoring health for the SDGs, sustainable development goals [homepage on the Internet]. Geneva, 2022 [cited 2022 Nov 21]; p. 1–131. Available from: https://www.who.int/publications/i/item/9789240051157

2. World Health Organization. Eye Care Indicator Menu (ECIM): A tool for monitoring strategies and actions for eye care provision. Geneva: World Health Organization, 2022; p. 1–56.

3. International Agency for the Prevention of Blindness. Vision atlas [homepage on the Internet]. [cited 2023 Jan 23]. Available from: https://www.iapb.org/learn/vision-atlas/

4. Ethiopian Ministry of Health. National strategic action plan for eye health 2016–2020 [homepage on the Internet]. Addis Abeba: Ministry of Health; 2016 [cited 2022 Nov 21]. Available from: http://www.dataverse.nipn.ephi.gov.et/handle/123456789/1488

5. Morka ED, Yibekal BT, Tegegne MM. Eye care service utilization and associated factors among older adults in Hawassa city, South Ethiopia. PLoS One. 2020;15(4):1–15. https://doi.org/10.1371/journal.pone.0231616

6. World Health Organization – Africa Region. Primary eye care training manual course to strengthen the capacity of health personnel to manage eye patients in primary health facilities in the African region [homepage on the Internet]. Brazzaville: World Health Organization Regional Office for Africa; 2018 [cited 2023 Feb 02]. Available from: http://www.afro.who.int/

7. Khanna RC, Sabherwal S, Sil A, et al. Primary eye care in India – The vision centre model. Indian J Ophthalmol. 2020;68(2):333–339. https://doi.org/10.4103/ijo.IJO_118_19

8. World Health Organization (WHO). World report on vision [homepage on the Internet]. 2019 [cited 2023 Feb 13]. Available from: https://apps.who.int/iris/handle/10665/328717/

9. Lilian RR, Railton J, Schaftenaar E, et al. Strengthening primary eye care in South Africa: An assessment of services and prospective evaluation of a health systems support package. PLoS One. 2018;13(5):1–16. https://doi.org/10.1371/journal.pone.0197432

10. Moyegbone JE, Nwose EU, Nwanjei SD, Agege EA, Odoko JO, Igumbor EO. Integration of eye care into primary healthcare tier in Nigeria health system: A case for Delta State. Clin Med Rev Rep. 2020;2(6):1–6. https://doi.org/10.31579/2690-8794/038

11. Tariq M, Kawish AB, Wajahat M, Tariq A, Butt T. Knowledge, attitude, and practices towards eyecare among primary healthcare providers in District Chakwal. Int J Nat Med Health Sci. 2022;1(4):13–18. https://doi.org/10.52461/ijnms.v1i4.941

12. Hailu Y, Tekilegiorgis A, Aga A. Know-how of primary eye care among health extension providers (HEWs) in Southern Ethiopia. Ethiopian J Health Dev. 2010;23(2):127–132. https://doi.org/10.4314/ejhd.v23i2.53229

13. International Agency for the Prevention of Blindness. IAPB Africa human resources for eye health strategic plan 2014–2023 [homepage on the Internet]. 2014 [cited 2023 Jan 26]. Available from: http://www.iapb.org/

14. Gilbert C, Faal H, Allen L, Burton M. What is primary eye health care? Community Eye Health J. 2021;34(113):70–72.

15. Mabey D, Antwi-Boasiako S, Moloa C, Mmuari V, Hennelly M, Zondervan M. Capacity building for ophthalmic nursing in Ghana, Botswana, and Tanzania. Eye News. 2019;26(4):2–5.

16. Graham R. Facing the crisis in human resources for eye health in sub-Saharan Africa. Community Eye Health. 2017;30(100):85–87.

17. Nikpoor N, Hansen ED, Oliva MS, Tabin G, Ruit S. Elimination of preventable blindness: Can success in Nepal be replicated in Africa? Innov Entrepreneurship Health. 2018;5(1):27–39. https://doi.org/10.2147/IEH.S133527

18. Kalua K, Gichangi M, Barassa E, Eliah E, Lewallen S, Courtright P. Skills of general health workers in primary eye care in Kenya, Malawi, and Tanzania. Hum Resour Health. 2014;12(1):1–9. https://doi.org/10.1186/1478-4491-12-S1-S2

19. Bright T, Kuper H, Macleod D, et al. The population needs for primary eye care in Rwanda: A national survey. PLoS One. 2018;13(5):1–15. https://doi.org/10.1371/journal.pone.0193817

20. Aghaji A, Burchett H, Oguego N, Hameed S, Gilbert C. Human resource and governance challenges in the delivery of primary eye care: A mixed-method feasibility study in Nigeria. BMC Health Serv Res. 2021;21(1321):1–14. https://doi.org/10.1186/s12913-021-07362-8

21. Ebeigbe J, Ovenseri-Ogbomo G. Barriers to utilisation of eye care services in rural communities in Edo State, Nigeria. Borno Med J [serial online]. 2014;11(2):98–104. Available from: https://www.researchgate.net/publication/272215889_Barriers_To_Utilization_of_Eye_Care_Services_in_Rural_Communities_in_Edo_State_Nigeria

22. Cicinelli MV, Marmamula S, Khanna RC. Comprehensive eye care: Issues, challenges, and way forward. Indian J Ophthalmol. 2020;68(2):316–323. https://doi.org/10.4103/ijo.IJO_17_19

23. Creswell JW, Creswell JD. Research design qualitative, quantitative, and mixed methods approach. 3rd ed. Los Angeles, CA: SAGE; 2018.

24. South Omo Zone Health Department. Annual health sector performance report. Jinka: South Omo Zone Health Department; 2023.

25. Rehman N, Sharif H. Awareness regarding primary eye care among primary healthcare workers of Pakistan: A way to revitalise health for all! Pak J Ophthalmol. 2021;7(2):161–167. https://doi.org/10.36351/pjo.v37i1.1146

26. Byamukama E, Courtright P. Knowledge, skills, and productivity in primary eye care among health workers in Tanzania: Need for reassessment of expectations? Int Health. 2010;2:247–252. https://doi.org/10.1016/j.inhe.2010.07.008

27. Abdul Rahman AA, Rabiu MM, Alhassan MP. Knowledge and practice of primary eye care among primary healthcare providers in northern Nigeria. Trop Med Int Health. 2015;20(6):766–772. https://doi.org/10.1111/tmi.12486

28. Med HKR, Macleod D, Bastawrous A, Wanjala E, Gichangi M, Burton MJ. Utilisation of secondary eye care services in Western Kenya. Int J Environ Res Public Health. 2019;1(3371):1–16. https://doi.org/10.3390/ijerph16183371