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Improving access to eye care services in Ghana using community health structures

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Background: To improve access to appropriate eye health care services within the community health structures in Ghana, pre- and post-intervention studies were carried out to explore the feasibility of integrating primary eye health into the community health planning services programme.

Aim: To explore the feasibility, accessibility and acceptability of integrating primary eye health care into community health planning services.

Setting: The study was carried out in the Northern, Western and Eastern regions of Ghana.

Methods: A pre- and post-intervention multi-stage cluster randomised design based on two separate cross-sectional surveys with both quantitative and qualitative research techniques were used. The magnitude of change in the dependent variables for the intervention group was compared with those for the comparison group at baseline and endline using a difference-in-difference analysis.

Results: The intervention communities were more likely to visit a community health facility with their eye problems. Improved access to eye care medicines reduced the use of herbal preparations to treat eye disease.

Conclusion: Integrating primary eye care (PEC) into community health planning service (CHPS) was associated with greater utilisation of community health facilities for eye health care services.

Contribution: The results of this study should facilitate the implementation of the vision for everyone integrated into universal health coverage.

Keywords: community health planning service (CHPS); primary eye care (PEC); integrate; baseline study; endline study.

Introduction

Eye care service delivery in Ghana is available mainly in the District, Regional and Teaching Hospitals with a sprinkle of private practice providers in the big towns and cities. Ghana has been implementing primary health care (PHC) aimed at bringing health services closer to clients at the community level, a policy of community-based health planning services (CHPS) system. Most eye diseases are avoidable but eye care service delivery is so far from some communities that rural people do not have easy access to trained eye health personnel resulting in some members in such communities using traditional and harmful medicines to treat their eye diseases.

The World Health Report (WHR) on vision[1] released on World Sight Day 2019 estimated 2.2 billion people are visually impaired or blind of which 1b have a visual impairment that could have been prevented or are yet to be addressed. A majority (99%) of the affected live in low- and middle-income countries (LMIC) where access to eye care services is limited. To improve access to eye care services, the WHR on vision recommends five important actions, two of which relate directly to this study: (1) make eye care an integral part of universal health coverage (UHC); and (2) implement integrated people-centred eye care in health systems. Universal health coverage[2] proposes all people have access to the full range of health services they need, when and where they need them, without financial hardship. It covers the full continuum of essential services which requires health and care workers with optimal skills at all levels of the health system.

To improve access to appropriate eye care services within the community, the study was aimed to explore the feasibility, acceptability, affordability and sustainability of integrating primary eye health into the CHPS programme.

Research methods and design

The study used a pre- and post-intervention multi-stage cluster randomised design and employed both quantitative and qualitative research techniques, which included focus group discussions (FGDs), semi-structured in-depth interviews, household surveys and client studies. To assess the effect of the intervention, the magnitude of change in the dependent variables for the intervention group was compared with those for the comparison group at baseline and at endline, based on 2 separate cross-sectional surveys.

Setting

The study was conducted in 3 regions of Ghana – East Gonja in the Northern Region, Tarkwa-Nsuaem in the Western Region, and Kwahu North in the Eastern Region.

Population

The study population comprised of community members, health facility staff at referral centres, opinion leaders, community health officers (CHOs) and district health management teams (DHMTs) staff whose knowledge of eye health and the referral system was assessed. Non-residents of the study communities were excluded.

Recruitment and data collection process

Training of data collectors

Data collection was preceded by a 1-week intensive training on data collection techniques, study tools, and pretesting of study tools.

Community survey

Three fieldwork teams (A, B and C), each comprising a supervisor and 4 interviewers collected both qualitative and quantitative data. Team A collected data in the Northern region and Teams B and C worked together in the Eastern and Western regions. Data collection for the baseline study commenced on 01 August 2014 and ended on 23 August 2014. Endline data collection was done from 11 January 2016 – 23 January 2016, 3 months after the intervention phase.

Selection of communities for household survey

Three districts, where the CHPS programme had already been introduced but primary-level eye care services were not provided, were purposively selected from each of the regions. The selection was also based on the availability of eye nurse and ophthalmologist services at the referral hospital and proximity to a referral hospital facility.

The selection of the sub-districts and allocation into either the intervention or comparison arm was done randomly. However, CHPS zones with the highest population were chosen purposively for the study.

The number of respondents interviewed per selected communities in the sub-districts was based on a simple random sampling technique of a probability proportional to size. The formula for the required sample size is documented by Ofosu et al.[3]

Focus group discussions

From a list of all sampled CHPS catchment communities, 2 communities were randomly selected for FGDs in each study arm. Community members assisted in recruiting FGD participants. Each FGD consisted of 8–10 participants.

In-depth interviews

In-depth interviews were conducted for the baseline and endline involving 3 Directors of District Health Administration (DHAs), 2 ophthalmologists, 3 ophthalmic nurses, 1 optometrist, 6 CHOs, 6 assembly members and/or chiefs based on the communities they were heading, 4 chemical sellers and 5 health volunteers.

Client narratives

Client narratives were collected from community members, who had had an eye disease within 2 months prior to the data collection for both baseline and endline. The clients were recruited either through the CHO, the assembly man or woman, community health volunteer (CHV) or FGDs.

Data analysis

Qualitative data

Interviews were recorded digitally in the local languages (Akan, Ewe and Gonja), and audio files were labelled appropriately for easy retrieval. Verbatim transcriptions of the recordings were done in English by the interviewers. Research assistants were engaged to word process the transcripts. The researchers validated the transcripts by listening to a sample of the tapes to check content accuracy and translation quality. The transcripts were analysed using the qualitative analysis software NVIVO. The transcriptions were coded using identified themes from the interview guide and themes that emerged from the data.

Quantitative data

The data screens were designed in Epi data version 3.1. To ensure a high level of data accuracy, double entry was done on each data collection tool by different data clerks. The two datasets were validated and all the discrepancies that came up were cleaned. This process of validation was repeated till the two datasets were the same. Also, internal consistency checks were run to pick out errors which were not noticed or picked during data validation, which provided an inherent consistency in the output of the variables. The data were exported into STATA version 12 and general frequencies and cross-tabulations were run.

Evaluation of the difference between communities at baseline and endline

The difference in proportions between baseline and endline for some variables relating to knowledge and

health care seeking behaviour between the intervention and comparison communities was determined to be statistically significant at $p < 0.05$ using 'N-1' Chi-squared test as recommended by Campbell[4] and Richardson.[5] The confidence interval (CI) calculation used the method recommended by Altman et al.[6]

Eligibility

Women and men aged 18 years and above were eligible to participate in the study. Potential participants who did not give their consent and non-residents were excluded. Focus group discussion participants were excluded from household survey, in-depth interview (IDI) and case narrative.

Ethical considerations

An application for full ethical approval was made to the Ghana Health Service Ethics Review Committee and ethics consent was received on 15 March 2013. The ethics approval number is GHS-ERC: 15/03/13. Participation was completely voluntary. Participants either signed or thumb-printed informed consent form to indicate their willingness to participate.

Results

Baseline

The baseline study found that eye diseases were common in all the study communities. People's knowledge about eye disease was poor and they used potentially harmful substances to treat eye disease as reported by Ofosu et al.

Intervention

The baseline was followed by a 3-month intervention phase in which already identified communities for intervention had the CHOs or community health nurses (CHNs) and volunteers trained in primary eye health by ophthalmic nurses (ONs) who had been trained as trainers. The sub-district and the district health-level supervisors participated in the training. At the end of the training, each CHO and CHN was provided with a kit containing VA chart, torchlight, eye health posters, primary eye health flip chart and a quantity of Tetracycline 1% eye ointment. The volunteers had access to the flipchart for community education and campaigns.

The communities in the comparison arm carried on with health delivery as usual. Monitoring of the intervention was carried out at periodic intervals for 3 months and it covered the availability of the trained CHO and CHN, the availability and correct use of the Visual Acuity (VA) chart and torchlight, information gathered on service delivery (record keeping) and availability of medicines. The role of advocacy and community participation were also monitored.

Eye health service delivery, during the intervention period, increased. Eye health was included in the school health education programme (SHEP). Teachers were taught how to identify children with eye problems. Some challenges identified during the intervention phase included attrition of trained health staff, either through transfer to other districts or staff going back to school to upgrade themselves. This was one of the challenges. The heavy rains interrupted durbars and community campaigns.

Following the intervention phase, an endline study was conducted to determine the impact of the intervention.

Demographic characteristics of the participants

At baseline, a total of 1760 people (595 and 1165 respondents in the intervention arm and in the comparison arm, respectively) participated in the household survey to determine knowledge, attitude and practices towards eye diseases. The age range was 18 years – 101 years. Most of the study population (82%) were in the 20 year – 59 year age range. Proportions of respondents with some education were 60.7% in the intervention arm and 66.0% in the comparison arm. A little more than half (55.7%) of the respondents were farmers. A total of 36.1% (635/1760) of survey respondents were registered with the national health insurance. Close to 43.0% of respondents were Akan speaking constituting the single largest ethnic group. Most study respondents were not registered with NHIS, 73.8% in the intervention arm and 58.8% in the comparison arm.

At endline, a total of 1760 people (587 respondents in the intervention arm and 1173 respondents in the comparison arm) participated in the household survey to determine their knowledge, attitude and practices towards eye diseases. The age range was 18 years – 89 years. Most of the study population, 83.0%, were in the 20 year – 59 year range. Proportions of respondents with some education were: 57.2% in the intervention arm and 65.4% in the comparison arm. Akan speaking constituted the single largest ethnic group. The proportions of respondents not registered with NHIS were 74.1% in the intervention arm 61.2% in the comparison arm.

Focus group discussion participants

Focus group discussions were conducted separately among females and males in the age groups 25 years – 35 years and 36 years – 55 years at baseline and endline. At baseline, 48 females and 49 males participated, and at endline 41 females and 41 males participated in the FGDs.

In-depth interview participants

At baseline, interviews were conducted with 6 opinion leaders, four CHVs and 4 chemical shop owners. At endline, interviews were conducted with 6 opinion leaders, 6 CHVs and 5 chemical shop owners.

Six CHNs were interviewed at both baseline and endline. In-depth interviews were conducted with district-level health personnel who oversee the activities of CHPS zones and their communities – DHMT, ophthalmic nurses, optometrists and ophthalmologists in the baseline and endline surveys.

Client narratives

Five client narratives were documented at both baseline and endline. Each study period had 3 narrators in the intervention arm and 2 in the comparison arm. Four out of the 5 narrators at baseline and endline were farmers.

Knowledge about common diseases in the community

The survey respondents at baseline and endline mentioned malaria and/or fever, aches and pains, and eye disease as common diseases in the communities. Eye disease was the third most common disease mentioned by the respondents at baseline. But at endline, it was the second most common disease in the comparison arm.

Healthy and unhealthy eyes

At baseline and endline, respondents in the intervention and the comparison arms of the study said the ability to see well and perform normal duties without help were symptoms of healthy eyes. Inability to see, poor vision, red eye and pain in the eye were mentioned as symptoms of unhealthy eyes.

Causes of common eye diseases

The causes of common eye diseases mentioned by respondents at baseline and endline in the intervention and the comparison arms included *kooko* or piles, injury and old age, insect bite, eating inappropriate food, eating too much starchy foods (such as gari and cocoyam), smoking, witchcraft or juju, curse or punishment from God and snake bites. In FGDs and IDIs, participants at baseline and endline added that food crops cultivated with the use of chemicals can cause eye disease, 'we apply chemicals to the things we plant, when you eat them, they have effect on your health' (FGD, male, baseline comparison). Another participant said, 'Chemical fertilisers used in growing tomatoes, when ingested can cause eye problems' (FGD, female, endline). Other causes mentioned by FGD and IDI participants were foreign bodies such as water and sweat entering the eye during diving or working on the farm, carrying heavy loads on the head and trauma during farm work.

An in-depth interviewee said, 'Most elderly people complain of poor vision and some are also blind' (Assembly, female, endline comparison). Another said, 'Some say it is hereditary, people are born with it' (Chemical shop owner, endline intervention).

'Sometimes people apply herbs on the eyes when there is a problem, and this can also cause infection in the eye' (FGD, female, endline comparison). Others said wearing unprescribed spectacles causes eye disease.

General symptoms of eye diseases

Focus group discussion and IDI participants across all the study arms at baseline and endline said that the general symptoms of eye diseases included: red eye, itchy eyes, tearing or watery eyes, blindness, swollen eyes, difficulty threading a needle, looking at the sun, painful eyes and whitish substance on the eye. Other symptoms mentioned included: retarded movement, walking with assistance, headache, squinting and growth in the eye. The survey respondents said symptoms of worsening eye disease included: vision getting worse; severe eye pain; increasing redness; and disease not improving with treatment.

Symptoms of some specific eye diseases

The survey respondents at baseline and endline mentioned reddish eyes, eye discharge, itchy eyes and foreign body sensation as some symptoms of conjunctivitis. Focus group discussion and IDI participants referred to conjunctivitis variously as Apollo, red eye and *kooko*. They said conjunctivitis was the most common eye condition in the study communities. Most participants in all the intervention and comparison communities at endline said Apollo is very infectious because it is easily transmissible.

Some symptoms of glaucoma mentioned by the respondents in the two study arms at baseline and endline included poor vision (< 15%) and blindness (< 5%). Knowledge of glaucoma was poor in all the study communities at baseline and endline. At endline, the difference in knowledge of glaucoma between comparison and intervention communities had narrowed significantly, although overall percentages for both had declined (CI 0.001–0.015, $p = 0.031$, cf. Table 1). Most of the FGD participants said that they had neither heard of nor seen glaucoma before; one participant at endline said that she was diagnosed with glaucoma:

> 'When I went to the hospital, I was told I had glaucoma but I still didn't believe it so I didn't go back; but my eyes itch and I can't see when the sun is up, so I went for the spectacles which I used for some time.' (FGD, female, baseline comparison)

In the two study arms, at baseline and endline, survey respondents said symptoms of refractive error included poor vision, reddish eyes, headache, squinting, painful eyes and blindness. The symptoms of trachoma mentioned by the respondents included: reddish eyes, itchy, painful eyes, eye discharge, poor vision and blindness. Focus group discussion participants' knowledge of trachoma was the same at baseline and endline. Some participants indicated that though they had heard of the name, they had no idea of what it was. A few participants related its cause to '*tiny organisms*' on the eye which cause itching, excessive tearing or formation of whitish substances that cover the eye.

The symptoms of cataracts mentioned by the respondents included poor vision, blindness and a whitish substance in the eyes. 'The black part of the eye becomes white, and the person may not be able to see with that eye' (FGD, male, endline comparison).

Focus group discussions and IDIs at endline identified cataracts as 'Torzi (Ewe name for cataract) can be on the eye for a long time. It does not resolve even when we use the

TABLE 1: Comparing the intervention and the comparison communities at baseline and endline.

Variable	Baseline (%)		Endline (%)				Overall DID (%)	CI	*p*
	Intervention (*N* = 595)	Comparison (*N* = 1165)	Intervention (*N* = 587)	Comparison (*N* = 1173)	Baseline difference	Endline difference			
Knowledge about common disease in community – mention of eye disease	64.00	68.50	63.90	76.60	4.50	12.70	8.20	0.006–0.027	0.021
Symptoms of Glaucoma	14.80	20.30	10.10	12.30	5.50	2.20	-3.30	0.001–0.015	0.031
Initial action taken for eye disease	18.30	22.80	15.80	30.40	4.50	14.60	10.10	0.008–0.031	0.001
Facility attended mention CHPS	44.30	17.10	39.30	8.30	-27.20	-31.00	-3.80	0.002–0.017	0.042
Medicine used in managing eye disease – respondents using herbs	31.90	32.00	39.00	44.80	0.10	5.80	5.70	0.007–0.029	0.041
Challenges associated with eye care at the CHPS zones – no provision of eye services	20.20	25.10	11.30	24.80	4.90	13.50	8.60	0.003–0.020	0.025
Services provided by CHPS – mention eye disease	10.50	7.30	32.30	23.30	-3.20	-9.00	-5.80	0.003–0.020	0.005
Facility visited by respondents for eye care – CHPS	82.50	80.60	92.10	65.30	-1.90	-26.80	-24.90	0.028–0.062	0.002

CHPS, community-based health planning service; DID, in-depth interview; CI, confidence interval.

herbs. The herbs rather cause us to go blind eventually' (FGD, male, endline intervention).

The most frequently mentioned symptoms of poor vision by survey respondents in the 2 study arms included cannot read, wearing spectacles and difficulty threading needles. Symptoms of blindness mentioned were retarded movement, being led around and being able to identify people only by their voice. The participants said blindness makes the affected unable to care for themselves, unable to see danger around them, unable to socialise and often suffer depression.

Mode of transmission

Knowledge of the FGD participants about the transmission of eye disease at baseline and endline remained the same. Some said either by looking directly into the eye of a person with Apollo or sharing a drinking cup with an affected person, one can be infected. For others, eye conditions could be spread from person to person by insects such as houseflies. Some said eye disease can be hereditary.

Use of spectacles

Most of the survey respondents at baseline and endline in the two study arms said spectacles were mostly worn by persons with eye disease. Close to a third of the respondents said anyone could wear spectacles. Focus group discussion participants said people used spectacles on medical recommendations, though motorbike riders wear spectacles to prevent particles and flying insects from falling into their eyes. Some wear it just for fashion.

Eye health-seeking behaviour

Sources of eye health care: Eye health care available to the communities includes CHPS, chemical shops, churches, prayer camps and herbal medicine sellers. Other facilities available to community members but not readily accessible are district, regional and teaching hospitals.

At baseline, out of 595 respondents interviewed in the household survey in the intervention arm, 290 members had an eye disease and in the comparison arm, out of 1165 respondents interviewed, 549 members had an eye problem. At the endline household survey, out of 587 respondents in the intervention arm interviewed, 241 had eye disease while in the comparison arm out of 1173 respondents interviewed, 497 members had an eye disease.

Initial action taken: Respondents who had eye disease in the 2 study arms at baseline and endline sought initial help at a health facility for their eye problem. At endline, communities in the comparison arm were more likely to use a health facility as an initial action than in the intervention arm (CI 0.008–0.031, $p = 0.001$, Table 1).

Type of facility attended: The facility used for eye disease showed a significant difference between the 2 study arms, more so at endline. A significantly higher proportion of the intervention communities used the CHPS compound at endline for eye care than in the comparison communities (CI 002–0.017, $p = 0.042$, cf. Table 1).

All the 3 district health directors interviewed said community members reported eye diseases to the CHPS zones in the study communities. They said the CHO and CHN who were given training in primary eye care (PEC) can manage people with eye disease and refer those who need specialists to the district hospital. The trained health volunteers send people with health problems to the CHPS facility when people report to them.

Medicines used in managing eye disease and their effectiveness: The main treatment received by household individuals who had eye problems was either eye drops or ointment. Other treatments mentioned included pain medication and spectacles. Some individuals also used herbs. While community members and health providers said that herbal medicine patronage for eye problems existed in the study communities, some opinion leaders affirmed the use of herbs in the communities in the past. There was a slight increase in the number of herb users in both the intervention and the comparison communities at endline, though, a significantly higher use of herbs to treat eye diseases among respondents

in the comparison communities (CI 0.007–0.029, $p = 0.041$, cf. Table 1).

The client narratives and some FGD participants said that the treatment, either with orthodox, herbal medications or with prayers was sometimes ineffective or their diseases even worsened with treatment. Some commenced treatment with herbs and sought orthodox care when the herbs were ineffective; for others, the treatment depended on the perceived cause of eye disease.

Preferred treatment source: At baseline and in both study arms, 99% of the respondents preferred health facilities for the treatment of eye disease. Community members preferred hospital treatment for eye problems The reason being the availability of skilled personnel, the opportunity of referrals for expert care, the availability of diagnostic tests and the availability of drugs. Reasons for dissatisfaction ranged from the lateness of health staff to work and shortage of drugs, as seen in the following statements: 'They complain of lacking drugs. Why would a whole Health Centre give such complaints, then what is your use?' (FGD, male, baseline and endline intervention). 'They are not punctual at all, especially on weekends' (FGD, male, baseline and endline intervention).

Prevention of eye diseases: At baseline, less than 5% of respondents in both study arms said having an eye check in a hospital can help prevent eye disease. At endline, more than 40% of the respondents in both study arms said eye check-ups in hospitals can prevent eye disease. Less than 5% of respondents in both study arms at baseline mentioned avoiding foreign bodies in the eye in preventing eye disease, and at endline, this was mentioned by 40.5% in the intervention arm and 35.6% in the comparison arm.

A CHV in the intervention group said they advised community members, especially farmers, to take proper care of their eyes.

Challenges associated with seeking eye care: At baseline, some of the challenges mentioned by the respondents associated with seeking eye care included the lack of drugs for eye care, no visiting eye specialist, no provision of eye health services, and expensive service. Other barriers mentioned were the lack of transport, ill-equipped health facility, and health worker absenteeism. Comparing the intervention communities to the comparison communities at baseline and endline, the challenge of no provision of eye care services at the CHPS compound was significantly reduced in the intervention communities (CI 0.003–0.020, $p = 0.025$, Table 1).

Other challenges were financial constraints, provider attitude and time spent at the health facility. Participants unhappy with the providers' attitude complained: 'Some of the nurses will shout at you; so if a nurse behaves like this to me next time I won't go there' (FGD women, Baseline and Endline Intervention).

For some clients, language was a barrier when seeking help in the facility: 'If you are not educated and because they don't understand your language, that's our major problem' (FGD, male, intervention, baseline and endline intervention).

Some FGD participants said that 'Some health staff don't take their time with you, but these herbal sellers talk to you humbly and joke with you' (FGD, female, comparison, baseline and endline intervention).

Suggestions on primary eye care integration: One major suggestion by both FGD and IDI respondents was that as the training of CHOs to provide PEC services requires additional work, it would be better to either increase the number of staff at the various facilities or train some community members to assist the nurses to help reduce the workload. However, a chemical shop owner was of the view that the integration would not merit an increase in the number of staff. Others suggested the provision of an eye specialist and the needed drugs for the various eye diseases.

At endline, comparing the intervention communities where CHOs were trained to provide eye care to the comparison communities, eye care was significantly mentioned as one of the services offered at the CHPS compounds at the endline compared to the baseline intervention. (CI 0.003–0.020, $p = 0.005$, cf. Table 1).

Discussion

Although eye health contributes to overall health and wellbeing, social inclusion and the quality of life of people, over the years the CHPS strategy has not included eye health. Data on eye diseases in Ghana are routinely generated at the facility level and sent monthly to the District Health Directorate (DHD) for population into the web-based District Health Information Management System (DHIMS2), which is built on the District Health Information System (DHIS2) platform.[7] On average, across the three study districts, hospital data on eye diseases constituted about 20% of total disease conditions seen at the outpatient department (OPD). At the level of CHPS, it constitutes between 9% and 13% of the total diseases seen by the CHO and is a distant ninth disease condition seen at that level. This may reflect the fact that the community members have realised that CHPS is not able to deal with their eye diseases, confirming the service gap for eye care at CHPS. The Ghana National population-based Blindness and Visual Impairment (GBVI) study[8] found that while the prevalence of blindness in the urban area was 0.67%, in the rural area the blindness prevalence was 0.79%. This underscores the fact that rural populations' access to quality eye care is poor.

The intervention phase of the study involved the training of the CHOs/CHNs in primary eye health, equipping them with basic tools for the delivery of eye health at the primary level and provision of information on eye diseases through health information sessions.

Knowledge of eye disease

Knowledge about eye diseases was significantly better (CI 0.006–027, p = 0.021, cf. Table 1) in the comparison communities than in the intervention communities. The intervention covered only 3 months and community members' exposure to knowledge and empowerment was short. Nonetheless, the comparison communities' access to other sources of knowledge about eye disease cannot be discounted.

Community members knew that avoiding contact with persons with eye infections would prevent eye disease; injury to the eye could cause eye disease. The farmers added that chemicals used in agriculture can cause eye disease. As has been reported by Kumar et al.,[9] residues of pesticides in food items can accumulate in the human body fats and bloodstream causing various health problems including tremors and blurred vision. Nicolopoulou-Stamati and colleagues[10] discuss the urgent need for a new concept in agriculture.

Overall, knowledge of glaucoma was low in the two study arms at both baseline and endline. The only person diagnosed with glaucoma failed to seek treatment. The long-term effect of glaucoma on vision had, obviously, not been explained to her. Shetty and Umarani,[11] in a study among final-year nursing students in India, reported that the students lacked adequate knowledge regarding glaucoma-related blindness. The same poor knowledge has been reported in Nepal by Shrestha et al.[12]

Health-seeking behaviour

Initial action taken when one gets an eye infection

Respondents in the comparison arm, at endline, were significantly more likely to go to a health facility, as their initial action when they get an eye disease (CI 0.008–0.031, $p < 0.001$, cf. Table 1). In the intervention communities with CHPS, where the community health nurses do home visits as part of the services offered, respondents were more likely to stay at home and wait to seek the opinion of the nurse as their initial action.

Types of facility attended by respondents

Community-based health planning service was significantly the most common facility attended in the intervention communities compared to the comparison communities, for both the baseline and endline. Comparing the baseline to endline, the use of CHPS for eye care services was significantly increased (CI 0.002—0.017, p = 0.042, cf. Table 1). Where CHPS is strong, it presents a great opportunity for integrating PEC into PHC.

Medicine used in managing eye disease

One of the challenges to eye care is the inappropriate use of herbs and other medicines in treating eye diseases. In this study, this problem was addressed through health education provided by the CHOs in the intervention communities. At endline, all communities in both study arms still used herbs for treating eye disease. It would seem entrenched habits are difficult to change, especially when that which should support change is neither available nor accessible. The herbalists are readily available in the community. Medicine provision for eye care was a challenge for all study communities at baseline. The trained CHOs/CHNs were provided with Tetracycline 1% eye ointment and so had medicine for CHPS attendants. The use of herbs for treating eye conditions was significantly less in the intervention communities compared to the comparison communities at the endline (CI 0.007–0.029, p = 0.041, cf. Table 1).

Challenges associated with eye care at the community-based health planning services zones

Some community members complained of poor road network and lack of transportation to access health facilities. The lack of eye service provision at the CHPS was a challenge mentioned by respondents at baseline in both intervention and comparison communities. The difference between the comparison and endline for 'no provision of eye services' was significant (CI 0.003–0.020, p = 0.025, Table 1).

The NHIS was said to be the most preferred mode of payment for treatment at baseline. At baseline, 73.8% in the intervention arm and 58.8% in the comparison arm had not registered with NHIS; at endline, 74.1% in the intervention arm and 61.2% in the comparison arm had not registered with NHIS. The NHIS[13] covers treatment for some eye diseases and includes cataract surgery and refraction. Given the high cost of eye care, which is a source of concern in most developing countries, NHIS paying for eye care will complement the PEC integration and ensure greater access to eye care at the community level.

Services provided by community-based health planning services facilities

One of the key objectives of the intervention study was to support the CHPS zones in the intervention communities to provide eye care. Integrating PEC into PHC is a good strategy for improving access to eye care. The World Health Organization's world report on vision[1] proposes to address the challenges in eye care through integrated people-centred eyecare (IPEC) embedded in health systems and based on strong PHC. A study by Abdul-Kabir and colleagues[14] among staff in a university community reported that factors enabling utilisation of eye care services included easier means of transport to the facility, awareness of the facility near the place of residence and accessibility to services. The CHPS strategy is aimed at bringing health services closer to the community. The mention of eye diseases managed at the CHPS compounds by respondents was significantly higher in the intervention communities than in the comparison communities at both the baseline and endline (CI 0.003–0.020, p = 0.005, cf. Table 1).

From the 5 client reports, it was deduced that having facilities close by that can manage eye conditions is essential for eye care for the population. Even for those who had health insurance, the fact that they needed to travel to access care was a barrier that discouraged them from going for care when they were referred. Harmful practices with regards to eye care were common, but from the case studies, it appeared this can be changed by providing the relevant

information in the right linguistic media and preferred information source to the public on harmful eye care practices, other eye health promotion, and prevention of eye disease and blindness. The incorporation of eye care into CHPS appears to be an approach that is supported by all the client studies. They believed it would improve access to eye care and improve outcomes.

At endline, a significantly higher number of respondents in the intervention communities compared to the comparison communities visited CHPS zones for eye care services (CI, 0.028–0.062, $p = 0.002$, cf. Table 1). This shows that providing eye care services at the primary care level can improve utilisation of eye care services. Eye diseases that cannot be managed at CHPS are referred to the next level of care, thus, ensuring the continuum of service delivery. At the United Nations General Assembly in 2021, all 193 countries adopted the resolution (A/RES/75/310)[15] on vision that commits members to 'Vision for everyone: Accelerating Action to Achieve the Sustainable Development Goals', which has been championed by International Agency for the Prevention of Blindness (IAPB) and its members.[16] It is the first agreement designed to tackle preventable sight loss to be adopted at the United Nations. The resolution identifies five key actions for governments, donors and financial institutions, United Nations Secretary General and the private sector. Following this, the Ghana Government is expected to adopt 'a-whole-government' approach to eye health and link vision to other development priorities.

Conclusion

Evaluation of the intervention, comparing the intervention arm and the comparison arm at both the baseline and endline, underscores the proposition that integrating PEC into CHPS is associated with greater utilisation of CHPS for eye care service. If vision is linked to other development goals, eye health will be visible. Sustained eye health education in communities will help reduce dangerous health practices and the use of inappropriate preparations to treat eye diseases. It is possible to integrate PEC into CHPS to facilitate access to eye care. Ghana, having signed the United Nations General Assembly Resolution on Vision, should be encouraged by this study to accelerate the implementation of the resolution.

Recommendations

To improve access to PEC, the following recommendations are made:

- The Ghana government should adopt the United Nations General Assembly Resolution on Vision and ensure that eye health provision is linked to other development priorities.
- Community education on eye health and disease should be integrated into other health programmes, and be sustained to empower community members to take care of their general health and eye health.
- Eye health services should be available and accessible at the primary level of care and integrated into the health system.
- Primary level health care providers should be trained and retrained, especially community level health staff, to recognise, manage and refer people with eye disease.
- Health providers at the primary level of care and the referral centres should all be adequately equipped to provide comprehensive quality eye health service.
- Community members should be educated and encouraged to register with the NHIS to ensure that they can afford eye care.
- Herbalists and traditional healers in the community should be trained and involved in eye health delivery to appreciate and understand the need to refer eye diseases to the appropriate facilities.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

I.O., L.B., M.H. and A.O. conceived and designed the study. A.K.A., A.O., I.O., M.H., L.B. and B.W. reviewed the proposal. L.B. and I.O. conducted the study. I.O., M.H., L.B., A.K.A. and A.O. analysed the data. A.O., I.O. and M.H. monitored the intervention phase. The draft of the manuscript was written by A.O., M.H., I.O., L.B. and A.K.A. The manuscript was reviewed and edited by A.O., I.O., M.H., A.K.A., L.B. and B.W.

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Data availability

The data that support the findings of this study are available from the corresponding author, M.H, on reasonable request.

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