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RESEARCH PAPER

AN ASSESSMENT OF OPHTHALMIC SERVICES IN THE ASHANTI REGION, GHANA

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ABSTRACT

Purpose: *This survey was designed to assess the available ophthalmic service delivery units and the eye health promotion strategy in the Ashanti region of Ghana.*

Methods: *Twenty-four (24) eye care delivery units in 10 districts, randomly selected from the 43 in the Ashanti region, were assessed for this cross-sectional study, using a structured questionnaire adopted from the Questionnaire on Available Human Resources, Infrastructure and Equipment. The structured, pretested questionnaire was used to collect data from the most senior eye cadre in each of the facilities, with respect to the available human resources, infrastructure and service delivery. Thereafter the availability and implementation of eye health promotion tools were determined by interviewing district directors of health services and eye care cadres in the sampled districts.*

Results: *Of the sampled districts, 40% do not have any ophthalmic facilities operated by the Ghana Health Service (GHS) and three (30%) of the sampled districts also do not have any private ophthalmic service delivery units. All sampled eye care facilities were equipped with most of the basic, but essential, diagnostic and refraction equipment, including visual acuity charts, trial lens sets, trial lens frames and ophthalmoscopes. Fewer of the sampled facilities provided specialty services, such as contact lens services (20.8%), low vision services (8.3%), and binocular vision care (25.0%). None of the districts (100%) had a formalised eye health promotion and advocacy strategy.*

Conclusion: *In the Ashanti region of Ghana, there exists an uneven distribution of ophthalmic facilities; limited specialised ophthalmic services; insufficient eye care cadres; and very limited advanced diagnostic equipment. The ratio of eye care cadres to population lags behind the VISION 2020 target. Of the districts, 60% do not have public-funded eye clinics. There is no evidence of existing eye health promotion strategies at the district level in the Ashanti region of Ghana.*

Keywords: Ophthalmic services, eye health, utilisation, Ashanti region, blindness

INTRODUCTION

Visual impairment (VI) and blindness continue to be a global public health issue as 285 million people are affected, of which approximately 246 million are partially sighted, whilst about 39 million are blind (Organization, WHO 2012). The global estimate of VI, according to the World Health Organization (WHO), is 2.2 billion cases; one billion of which could have been prevented or have not yet been addressed (Organization, WHO 2019).

Studies (Brian et al., 2012; Jin & Trope, 2011) have attempted to understand the factors that affect the utilisation of ophthalmic services. This is as a result of the low utilisation of eye care services that has been reported in cross-sectional studies from developing countries (Dandona et al., 2000; Nirmalan et al., 2004). Ophthalmic service utilisation that has been described as less than ideal can also extend to developed countries (Jin & Trope, 2011). Three primary determinants of eye care service utilisation are availability, accessibility, and affordability of the services (Ntsoane & Oduntan, 2010). These factors are, therefore, essential in the worldwide prevention of visual impairment and blindness.

There are variations in the availability of ophthalmic services from province to province, from district to district, even from one community to another. Inadequate facilities; poor practitioner-to-patient ratios; the absence of eye-care personnel; poor state funding; and a lack of educational programmes have been seen as the hallmarks of eye care in Africa, with preventable and treatable conditions being the leading cause of blindness (Naidoo et al., 2006).

In most parts of Africa, there is a shortage of eye care professionals. The few that are available are mostly found in urban centres, which leaves most peri-urban and rural communities underserved (Ocansey et al., 2013; Onyelucheya, 1993). Ghana's eye care team primarily consists of ophthalmologists, optometrists and ophthalmic nurses. In some health facilities, general practitioners provide some basic form of eye care and refer to ophthalmic clinicians when necessary. A recent study in Ghana to assess the progress made towards achieving the goals of VISION 2020 revealed shortages of eye care professionals and inadequate ophthalmic equipment throughout the country (Morny et al., 2019). In 2017, the number of ophthalmologists serving the population of over 29 million was estimated at 91; with 370 optometrists and 500 ophthalmic nurses, respectively (Morny et al., 2019).

A study in Ghana revealed that the eye care sector is among the healthcare areas most affected by an undesirable and inequitable distribution of personnel (Ilechie et al., 2013). The study showed that the eye care provider-to-population ratio in Ghana is grossly inadequate by WHO standards; and their distribution was also disproportionate for the population.

The importance of an investigation into the availability and distribution of ophthalmic services along with the eye health promotion programmes lies in the vital role they play as primary determinants of eye care utilisation, which is a crucial factor in the prevention of avoidable visual impairment and blindness, worldwide. The Ashanti region is the most populous region in Ghana, and home to people of all Ghanian socioeconomic classes and tribes. This is as a result of its central location and as the market hub of the country. Data generated from this region can fairly illustrate the state of Ghanaian ophthalmic services.

Therefore, a better understanding of the availability of eye care services, eye care promotion, and distribution of eye care professionals in the Ashanti region of Ghana will help in the establishment of eye care programmes that would reach the underserved and minimise the unmet

need for services in the region. In view of the insufficient literature available from West Africa on the topic of eye care service utilisation, this survey was designed to describe the availability and distribution of eye care services and eye care human resources in the Ashanti region of Ghana.

METHODS

Data and Sampling

This study used a cross-sectional, descriptive survey design. The setting was eye care delivery units in 10 out of the 43 districts in the Ashanti region of Ghana. Out of the 43 districts, 17 (40%) are classified as urban, while 26 (60%) are rural according to the Ministry of Local Government classification. Therefore, four urban and six rural districts were selected by stratified random sampling to comprise the 10 districts utilised in this study. All ophthalmic service delivery units in the sampled districts were included in this study. An ophthalmic service delivery unit, for this study, is any facility that provides optometric and/or ophthalmological services. A total of 24 ophthalmic delivery units were identified in the 10 sampled districts. The list of ophthalmic facilities in the sample districts was compiled with input from the National Eye Care Unit (NECU) of Ghana and the secretariats of the Ghana Ophthalmological Society (OSG) and Ghana Optometric Association (GOA). Data on the available eye health promotion strategies was collected from the district directors of health services and all eye care services providers within the ophthalmic facilities in the sample districts.

Data Collection

All of the 24 eye care delivery units in the sampled constituencies were visited and assessed with respect to the available human resources, infrastructure, service delivery, and equipment. The structured questionnaire used was adopted from the Questionnaire on Available Human Resources, Infrastructure and Equipment (Manual, 2006). The questionnaire comprised three sections. The first section contained items that elicited detailed information on the facility, such as the location of the facility; the type of facility; ownership; service patterns; service provision and operating hours. The second section of the questionnaire determined the human resources offering eye care in the facility; the facility's main sources of income; the available equipment and the facility's specialty. The third section contained items that sought information on available eye health promotion programmes within the districts.

The structured, pretested questionnaire was used to collect data from the most senior eye cadre (ophthalmologist/optometrist/ophthalmic nurse) in each of the facilities, by trained field workers who were all teaching and research assistants from the Department of Optometry at Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. The same field workers collected data on the available eye health promotion strategies from the district directors and eye care cadres in the districts.

Ethical Considerations

Ethical approval for the study was obtained from the Biomedical Research Ethics Committee (BREC) of the University of KwaZulu-Natal, South Africa (Ref: BREC/00001787/2020) and the Committee on Human Research, Publications and Ethics of the Kwame Nkrumah University of Science and Technology, Kumasi, Ghana (Ref: CHRPE/AP/006/17). Gatekeeper consent was obtained from the Ashanti Regional Directorate of Health Services. Informed written consent/assent was obtained from all survey participants. All study procedures adhered to the tenets of the Declaration of Helsinki.

Data Analysis

Data was entered into Microsoft Excel, double-checked for duplication, and imported into the Statistical Package for the Social Sciences (SPSS), version 25, compatible with Windows 10, for analysis. Descriptive statistics, specifically frequencies, percentages, and graphs were used to summarise the data.

RESULTS

Sample characteristics

The survey identified 24 ophthalmic service delivery units in the 10 sampled districts within the Ashanti region of Ghana. Six were Ghana Health Services (GHS) facilities, three were Christian Health Association of Ghana-owned (CHAG), and 15 were privately owned. Asokwa, an urban district, had the highest number of facilities (5), while Amansie West, a rural district, did not have any eye care delivery facility. Of the facilities, 14 (58.3%) were National Health Insurance Scheme-accredited, whereas seven (29.2%) worked with private health insurance schemes. Of the facilities, 14 (58.3%) provided weekday services, whilst 10 (41.7%) operated on weekdays and on Saturdays. Whilst all offered refractive services, fewer provided specialty services such as contact lens provision (20.8%), low vision services (8.3%), and binocular vision care (25.0%). Only eight (33.3%) facilities provided surgical services. Nine (37.5%) of the facilities reported receiving government grants and five (20.8%) received donations from non-governmental organisations (NGOs). Table 1 shows the percentage distribution of the ophthalmic facilities and related factors, as described above.

Table 1. Description of the sampled facilities

Assessed Variables (N=24)	n (number of facilities)	%
Districts		
Amansie West	0	0.0
Amansie South	1	4.1
Asokore Mampong	2	8.3
Asokwa	5	20.8
Atwima Nkwabiagya	4	16.7
Bosomtwe	2	8.3
Ejisu	4	16.7
Kumawu	2	8.3
Offinso North	2	8.3
Old Tafo	2	8.3
Setting		
Rural	11	45.8
Urban	13	54.2
Facility type		
GHS	6	25.0
CHAG	3	12.5
Private	15	62.5
Service patterns		
Weekdays only	14	58.3
Weekdays and on Saturdays	10	41.7
Operating hours		
7:00 am - 2:00 pm	10	41.7
8:00 am - 5:00 pm	14	58.3
NHIS Coverage		
Yes	10	41.7
No	14	58.3
Available ophthalmic services		
Slit lamp eye examination	13	54.2
Refraction	24	100.0
Contact lens practice	5	20.8
Low vision	2	8.3
Binocular vision	6	25.0
Eye surgery	8	33.3

Financing		
Fee for service	24	100.0
Government grants	9	37.5
Donations from NGOs	5	20.8
National health insurance (NHIS)	10	41.7
Private health insurance scheme	7	29.2

N, total sample per category; **n**, frequency; **%**, percentage frequency of facilities; **GHS**, Ghana Health Service; **CHAG**, Christian Health Association of Ghana

Available ophthalmic services by district

Table 2 presents the distribution of facility-based, specialised ophthalmic services by district. Slit lamp biomicroscopes were available in 13 facilities located in eight out of the 10 (80%) sampled districts. A low vision service was accessible in two out of the 10 (20%) districts.

Only five facilities provided contact lens services, and four (80%) of them were located in Asokwa. Ophthalmic surgical services were not performed in four (40%) of the districts. Six facilities provided binocular vision services and were found in three districts, as seen in Table 2.

Table 2. Distribution of specialised ophthalmic services by district

	Specialised Ophthalmic Services				
District	**Slit lamp biomicroscopy**	**Low vision**	**Contact lens**	**Surgery**	**Binocular Vision**
	n = 13	n = 2	n = 5	n = 8	n = 6
Amansie West	-	-	-	-	-
Amansie South	1	1	-	1	-
Asokore Mampong	1	-	-	-	1
Asokwa	2	1	4	2	3
Atwima Nkwabiagya	2	-	-	1	-
Bosomtwe	2	-	-	1	-
Ejisu	3	-	1	2	2
Kumawu	1	-	-	1	-
Offinso North	-	-	-	-	-
Old Tafo	1	-	-	-	-

n, number of facilities

Ophthalmic services delivery units

Table 3 shows the number and distribution of the ophthalmic service delivery units by type. Twenty-four eye care service delivery units operated in the 10 sampled districts, of which six (25%), three (12.5%), and 15 (62.5%) were GHS, CHAG and private facilities, respectively. Amansie West had no eye care facility, whilst Amansie East had only one facility. The rest of the districts had between two and five eye care facilities.

Four (40%) of the 10 districts did not have any ophthalmic facility operated by the Ghana Health Service (GHS) and three (30%) of the districts also did not have any private ophthalmic service delivery unit. Table 3 also shows that all three eye care facilities operating under the auspices of the Christian Health Services Association of Ghana (CHAG) were located in rural districts (Amansie South and Bosomtwi).

Table 3. Distribution of eye care facilities in 10 sampled districts in Ashanti Region

District	GHS	CHAG	Private	Total
Amansie West	-	-	-	-
Amansie South	-	1	-	1
Asokore Mampong	-	-	2	2
Asokwa	1	-	4	5
Atwima Nwabiagya	1	-	3	4
Bosomtwe	-	2	-	2
Ejisu	1	-	3	4
Kumawu	1	-	1	2
Offinso North	1	-	1	2
Old Tafo	1	-	1	2
Total	**6**	**3**	**15**	**24**

GHS, Ghana Health Service; **CHAG**, Christian Health Association of Ghana

Human resources for eye care

There were nine ophthalmologists, 22 optometrists, and 23 ophthalmic nurses working in the 10 sampled districts within the Ashanti region of Ghana (see Table 4). Table 4 shows that four (44%) of the ophthalmologists worked full-time, whilst five (56%) were part-time in the various districts. Table 4 also shows the number of optometrists practising in the sampled districts to be 22, of which 16 (73%) worked full-time. All of the 23 (100%) ophthalmic nurses in the sampled districts worked full-time.

Table 4. Distribution of the eye care workforce in 10 sampled districts in the Ashanti region

CADRES	AMW	AMS	AM	ASK	ATN	BST	EJ	KW	OFN	OT	TOTAL
Full time	-	-	-	1	1	1	-	-	-	1	**4**
Part time	-	1	-	1	-	1	1	1	-	-	**5**
Total	**-**	**1**	**-**	**2**	**1**	**2**	**1**	**1**	**-**	**1**	**9**
OPTOMETRISTS											
Full time	-	1	-	4	2	2	2	2	1	2	**16**
Part time	-	-	2	1	1	1	1	-	-	-	**6**
Total	**-**	**1**	**2**	**5**	**3**	**3**	**3**	**2**	**1**	**2**	**22**
OPHTHALMIC NURSES											
Full time	-	2	-	5	4	4	3	2	1	2	**23**
Part time	-	-	-	-	-	-	-	-	-	-	-
Total	-	2	-	5	4	4	3	2	1	2	**23**

AMW, Amansie west; **AMS**, Amansie South; **AM**, Asokore Mampong; **ASK**, Asokwa; **ATN**, Atwima Nwabiagya; **BST,** Bosomtwe; **EJ**, Ejisu; **KW**, Kumawu; **OFN**, Offinso North; **OT**, Old Tafo

The distribution of eye care cadres working in the three types of facilities (GHS, CHAG, and private) were: ophthalmologists: six (67%), two (22%) and one (11%) respectively; optometrists: seven (32%), four (18%) and 11 (50%) respectively; and ophthalmic nurses: 16 (70%), six (26%) and one (4%), respectively, as shown in Figure 1.

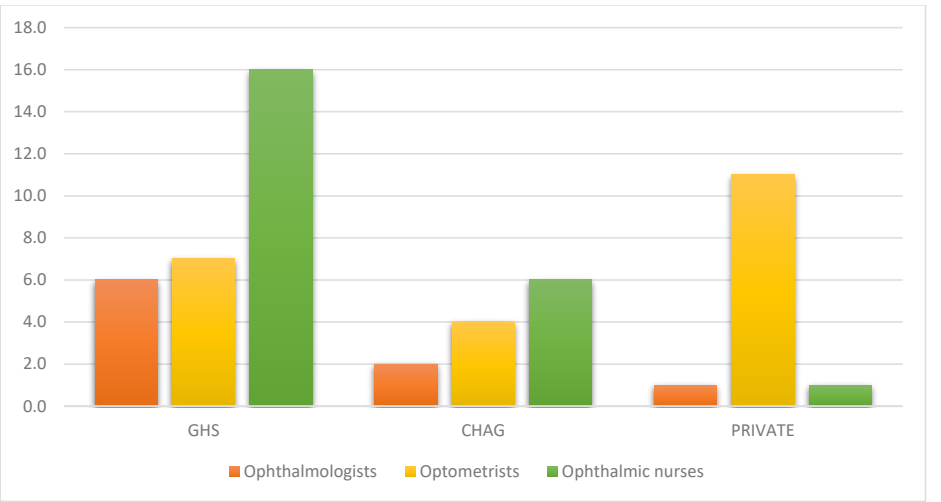

Figure 1. Distribution of eye care human resources, by type of facility. GHS: Ghana Health Service; CHAG: Christian Health Association of Ghana

Table 5 shows the performance of the districts with respect to the type and number of eye care human resources, compared to the Vision 2020 target. Amansie West district, which has no eye care facility scored 0% on 'need met', in all three categories of eye care human resources (ophthalmologists, optometrists and ophthalmic nurses) considered for this study. Seven districts (Amansie South, Asokwa, Atwima Nwabiagya, Bosomtwi, Ejisu, Kumawu, and Old Tafo) met the VISION 2020 target ratio of ophthalmologists-to-population of 1:250,000. In addition to Amansie West which has no eye care facility, two other districts (Asokore Mampong and Offinso North) also scored 0% on 'need met' for ophthalmology. Two districts (Asokwa and Kumawu) met the target ratio of 1:50,000 for optometrists, whilst one district (Amansie West) scored 0% for 'need met. Amansie West, Asokore Mampong and Offinso North were at 0% of 'need met' as far as the Vision 2020 target ration of 1:100,000 for ophthalmic nurses is concerned. Table 5 also shows that seven of the districts met the target for ophthalmic nurses.

Table 5. Eye care personnel in the districts compared to the Vision 2020 recommendations

Cadre	Population	Number	Vision 2020 target	Number needed	Deficit	Need met
Amansie West	109416					
Ophthalmologists		0	1:250,000	1	1	0%
Optometrists		0	1:50,000	3	3	0%
Ophthalmic nurses		0	1:100,000	2	2	0%
Amansie South	116366					
Ophthalmologists		1	1:250,000	1	0	100%
Optometrists		1	1:50,000	3	2	33%
Ophthalmic nurses		2	1:100,000	2	0	100%
Asokore Mampong	191402					
Ophthalmologists		0	1:250,000	1	1	0%
Optometrists		2	1:50,000	4	2	50%
Ophthalmic nurses		0	1:100,000	2	2	0%
Asokwa	125642					
Ophthalmologists		2	1:250,000	1	0	100%
Optometrists		5	1:50,000	3	0	100%
Ophthalmic nurses		5	1:100,000	2	0	100%
Atwima Nwabiagya	161893					
Ophthalmologists		1	1:250,000	1	0	100%
Optometrists		3	1:50,000	4	1	75%
Ophthalmic nurses		4	1:100,000	2	0	100%
Bosomtwe	165180					
Ophthalmologists		2	1:250,000	1	0	100%
Optometrists		3	1:50,000	4	1	75%
Ophthalmic nurses		4	1:100,000	2	0	100%
Ejisu	180723					
Ophthalmologists		1	1:250,000	1	0	100%
Optometrists		3	1:50,000	4	1	75%
Ophthalmic nurses		3	1:100,000	2	0	100%
Kumawu	64396					
Ophthalmologists		1	1:250,000	1	0	100%
Optometrists		2	1:50,000	2	0	100%
Ophthalmic nurses		2	1:100,000	1	0	100%

Offinso North	83440					
Ophthalmologists		0	1:250,000	1	1	0%
Optometrists		1	1:50,000	2	1	50%
Ophthalmic nurses		0	1:100,000	1	1	0%
Old Tafo	114368					
Ophthalmologists		1	1:250,000	1	0	100%
Optometrists		2	1:50,000	3	1	75%
Ophthalmic nurses		2	1:100,000	2	0	100%

Availability of essential equipment

Table 6 shows the list of essential equipment available in the eye care facilities. All 24 eye care facilities were equipped with most of the basic, but essential, diagnostic and refraction equipment, including visual acuity charts, trial lens sets, trial lens frames and ophthalmoscopes. A high proportion of the facilities also had equipment such as retinoscopes (83%); lens meters (71%); autorefractors (63%); tonometers (63%); and slit lamps (54%). Only seven (29%) of the facilities had a visual field analyser, of which four were based in private clinics. Only two (8%) facilities had optical coherence topography (OCT) devices. They were located in private clinics. There were no laser treatment devices or A-scan ultrasound in any of the facilities.

Table 6. Essential equipment and the number of eye units that have such equipment

Clinic equipment	Total (N=24)	GHS (N=6)	CHAG (N=3)	Private (N=15)
	n (%)	n (%)	n (%)	n (%)
Visual acuity chart	24 (100)	6 (100)	3 (100)	15 (100)
Trial frame	24 (100)	6 (100)	3 (100)	15 (100)
Trial lens set	24 (100)	6 (100)	3 (100)	15 (100)
Lens meter	17 (71)	3 (50)	2 (67)	12 (80)
Ophthalmoscope	24 (100)	6 (100)	3 (100)	15 (100)
Retinoscope	20 (83)	5 (83)	2 (67)	13 (87)
Autorefractor	15 (63)	1 (17)	2 (67)	12 (80)
Phoropter	6 (25)	0	1 (33)	5 (33)
Colour vision text chart	10 (42)	1 (17)	2 (67)	7 (47)
A-Scan	0	0	0	0
Tonometer	15 (63)	3 (50)	3 (100)	9 (60)
Slit lamp	13 (54)	4 (67)	2 (67)	7 (47)
Visual Field Analyser	7 (29)	1 (17)	2 (67)	4 (27)
OCT	2 (8)	0	0	2 (13)

Gonio lens	2 (8)	0	0	2 (13)
YAG laser	0	0	0	0

N, total sample per category; **n**, frequency; **%**, percentage frequency; **GHS**, Ghana Health Service; **CHAG**, Christian Health Association of Ghana

Eye care advocacy and promotion

A total of 49 participants made up of 10 district directors of health services and 39 eye care professionals were interviewed on eye health promotion and advocacy strategy in their district. Table 7 shows proportions of their responses on the evidence of eye health promotion and advocacy in their districts.

Table 7. Evidence of eye health promotion and advocacy from 49 respondents in 10 districts of the Ahanti region of Ghana

Assessed Variable (N=49)	n	%
Is there information on the prevalence and causes of visual impairment, including blindness, in the district?		
Yes	0	0.0
No	23	46.9
Don't Know	26	53.1
Are there plans for epidemiological surveys of the extent and causes of visual impairment, including blindness, in the district?		
Yes	7	14.3
No	11	22.4
Don't Know	31	63.3
Has there been a recent, major district advocacy initiative to give priority and allocate additional resources to eye care?		
Yes	1	2.0
No	33	67.3
Don't Know	15	30.6
Has there been major activities to increase public awareness about preventing vision loss?		
Yes	5	10.2
No	27	55.1
Don't Know	17	34.7
Is World Sight Day observed in the district?		
No	47	95.9
Don't Know	2	4.1
Rating of eye care awareness creation in the district is:		
Very poor	2	4.1
Poor	36	73.5
Good	11	22.5
Rating of eye care utilization in the district is:		
Very poor	2	4.1
Poor	39	79.6
Good	8	16.3
What in your opinion should be done to improve eye care utilisation in this district		
Eye health education and promotion?	41	83.7
Outreaches	25	51.0
Improve NHIS coverage	9	18.4
Increase number of facilities	4	8.2

N, total sample per category; n, frequency; %, percentage frequency

Of the 49 respondents, 23 (46.9%) reported no information on the prevalence and causes of VI in their district whilst 26 (53.1%) admitted to having no knowledge. Only 7 (14.3%) of the participants reported plans for an epidemiological survey regarding the extent of VI and blindness in their district, whilst 31 (63.3%) admitted to no knowledge. Two thirds (67.0%) of the respondents acknowledged that there had not been any major advocacy initiatives in their districts to give priority and allocate additional resources to eye care. Table 7 also showed only 5 (10.2%) of the respondents reported of a major activity to increase public awareness regarding vision loss in their districts. Forty-seven respondents (95.9%) reported no observation of the annual World Sight Day in their district, whilst the remaining 4.1% had no idea. Table 7 goes on to show that majority of the respondents (73.5% and 79.6%) rated eyecare awareness creation and eye care services utilisation respectively, in their districts as being poor. Table 7 also indicated that, the majority (83.7%) and more than half (51.0%) of the respondents felt that eye health education and outreach eye care could improve the utilisation of ophthalmic services in their districts.

DISCUSSION

The study presents an assessment of ophthalmic services in the Ashanti Region of Ghana, and provides evidence on their availability and distribution in the region. The results suggested an uneven distribution of ophthalmic facilities; limited specialised ophthalmic services; insufficient eye care cadres; and limited advanced diagnostic equipment

Eye care delivery setting, health insurance coverage, and special services

The promotion of universal eye health for all people requires an adequate distribution of ophthalmic facilities to provide efficient eye care service delivery. The study identified the uneven distribution of ophthalmic facilities in the Ashanti region of Ghana. Amansie West did not have any eye care delivery units, while Amansie East district had only one, which is CHAG-owned. This result is consistent with similar nationwide studies in Ghana (Morny et al., 2019) and other low-to-middle-income countries (LMIC) such as Sri-Lanka (Piyseana & Murthy, 2020), which have identified positive skewness in eye care services towards urban centres. This pattern is concerning, in light of the fact that a significant percentage of ocular morbidity and blindness can be found in rural areas. Our study also showed that only 40% of the districts have eye facilities belonging to the GHS. This implies that 60% of the districts do not have public-funded eye clinics, which are more affordable than private facilities. Private facilities constituted 62% of the eye care facilities in the Ashanti region. This finding does not augur well for the efficiency of the eye care delivery system in the region, as private eye care services are found to be more costly compared to public services, and are often beyond the means of the poor in

most lower-income countries (Morny et al., 2019).

Our study went on to show that only 41.7% of the eye care facilities have National Health Insurance coverage. Even though the NHIS in Ghana does not pay fully for the cost of eye care, it covers a substantial portion of the fee, which reduces the financial burden of seeking ophthalmic care. Studies (Akuffo et al., 2020) and (Emamian et al., 2014) have reported a positive association between patients having health insurance and the probability of having their eyes examined. This, by implication, suggests ophthalmic service utilisation should improve if the NHIS coverage extends to more facilities, including the private ones.

The delivery of specialised services, including low vision, contact lenses and binocular vision care, was definitely poor in the region. This finding agrees with a study conducted in the Brong Ahafo and Ashanti regions of Ghana , which showed that over two-thirds of patients who sought low vision care were not served as a result of unavailable services (Kyeremeh & Mashige, 2021). Our study showed that 8.3% of all surveyed facilities offered a low vision service, which was the least available service, by comparison. Given the link between untreated vision loss and psychological distress (Akuffo et al., 2021), increased accessibility to low vision services within the region could promote mental health among such visually impaired patients.

Human resources for eye care

One key element in the eye care system is the availability of human resources for eye health. The eye care cadres in Ghana usually consist of ophthalmologists, optometrists, and ophthalmic nurses; each with a specific role, but collectively working together to achieve patient satisfaction. Our study found a disproportionate distribution of eye care cadres across ophthalmic facilities and districts in the region concerned.

The predominant eye care practitioners in the study area were ophthalmic nurses (42.6%), followed by optometrists (40.7%), and then ophthalmologists (16.7%). Seventy percent (70%) of ophthalmic nurses worked in GHS facilities, compared to 32% and 67% of optometrists and ophthalmologists, respectively. On the other hand, only 4% of ophthalmic nurses worked in private facilities, compared to 50% and 11% of optometrists and ophthalmologists, respectively. This shows that ophthalmic nurses readily accept postings to public eye care facilities, whilst optometrists readily join private facilities. This agrees with a nationwide study conducted in Ghana (Morny et al., 2019), which reported a higher proportion of optometrists working in private than in public facilities, compared to ophthalmologists and ophthalmic nurses. This suggests that refractive services may be difficult to access in public facilities, and may also explain why contact lens, low vision and binocular vision services were inadequately available in the region.

Our study also found that only 40% of the districts had full-time ophthalmologists (GHS, CHAG, and private); whilst 30% did not have any ophthalmologists. This corroborates a study in 2019 by Resnikoff et al., (2020), that reported a significant shortfall in the projected number of ophthalmologists required in 198 countries (94% of the global population). Considering the specialised services each cadre provides, fewer ophthalmologists, for instance, could potentially imply a lack of surgical services, including cataract extraction, for patients in the affected districts and regions.

The Vision 2020 target ratios for ophthalmologists, optometrists and ophthalmic nurses were 70%, 20%, and 70%, respectively, for the surveyed districts. These observations further affirm the inadequacy and uneven distribution of eye care human resources in Ghana (Ilechie et al., 2013; Potter et al., 2013; Ovenseri-Ogbomo et al., 2011). Other studies

also reported an uneven distribution of health care personnel in various developing countries similar to Ghana: that is Zambia (Bozzani et al., 2014), Nigeria (Eze & Maduka-Okafor, 2009), Tanzania (Munga & Mæstad, 2009) and Afghanistan (Husainzada, 2007). Furthermore, the study identified the disproportionate, and/or uneven accessibility to surgical services across the districts. In many low-income countries, more than 50% of blindness is as a result of untreated cataracts, which has been attributed to a shortfall of ophthalmic surgeons and other eye health human resources. Given the unique roles of the ophthalmologists and optometrists in the provision of cataract surgery, and screening for uncorrected refractive errors, respectively, the absence of surgical services could cause an increase in the burden of eye diseases and impede the achievement of the goal of Universal Eye Health.

A significant proportion of the cadres practice part-time, rather than full-time. This is consistent with a study in Iran which revealed that none of the 16 eye care delivery units within a district had a practicing full-time ophthalmologist (Katibeh et al., 2015). This could result in a shortfall in emergency ophthalmic services, such as trauma and other ocular anterior and posterior chamber emergencies, for which delay in management could result in VI and/or blindness.

Availability of essential and specialised equipment

Adequate ophthalmic equipment is necessary for the provision of comprehensive ophthalmic care. The identified eye care facilities in the study area were equipped at different levels to offer eye care services. The majority of the facilities were adequately equipped with basic essential equipment for refraction and fundoscopy. However, there was poor availability of specialised equipment across the facilities, which limits their ability to perform specialised services within the region. For instance, A-Scan and YAG laser were not available in any of the facilities, and only two facilities (both private) had gonioscopy lenses and an OCT. This is consistent with a study conducted in Ghana (Morny et al., 2019), which reported the nonavailability of OCT in any government institutions. This poor availability of specialised equipment could affect the diagnosis and management of optic nerve head and retinal pathologies in most of the facilities. These observations are consistent with other studies in Ghana, which found an uneven distribution of diabetic retinopathy (DR) treatment services (Mensah-Debrah et al., 2021), as well as a lack of low-vision treatment equipment (Kyeremeh & Mashige, 2021). The increase in non-communicable eye diseases, such as glaucoma, and hypertensive and diabetic retinopathy, calls for the increased availability of current best-practice point-of-care diagnostics, as this remains paramount in the timely diagnosis and treatment of eye conditions, where any delays or misdiagnosis could potentially lead to irreversible vision loss.

Eye health promotion and advocacy

Eye health promotion and education are among the factors that can contribute to increased uptake of eye care services. However, the results of this study revealed that there is very little health promotion in the field of eye health in the Ashanti region of Ghana. The results showed insufficient advocacy initiatives to resource the eye sector. It also showed unsatisfactory eye health awareness creation at the district level. This finding is concerning as similar findings have been observed in other low and middle-income countries where eye health promotion receives less attention and investment compared to the field of treatment (Sithole & Oduntan, 2010 and Hobday et al., 2011). A noteworthy observation was that most respondents felt that eye health education and outreach eye services can potentially improve eye care utilisation. This may be a

lost opportunity as it can be inferred that the stakeholders will be ready to support any eye health promotion initiative when established. Hobday et al. also reported in a Fijian study that eye care and health care personnel considered eye health promotion a beneficial component of eye care (Hobday et al., 2011).

LIMITATIONS

Data was generated from only 10 out of the 43 districts in the region, due to logistical constraints and having to collect data while observing the COVID-19 protocol. Nonetheless, the results from this study will assist in developing strategies to improve the availability of, and accessibility to, ophthalmic services in the Ashanti region of Ghana. Furthermore, this study did not include opticians, who are found in a number of facilities in urban centres. Although they also contribute to eye care services, especially in dispensing spectacles, their inclusion may have skewed the results towards over-estimating eye cadres in urban districts.

RECOMMENDATIONS

The government of Ghana should take steps to have the NHIS coverage extended to private eye care facilities to make them affordable and therefore easily accessible to needy and vulnerable people. Efforts should be made by the government to resource the GHS facilities to enable them provide expanded (specialised) ophthalmic services, including YAG lasers, OCT and A-and-B scans (ultrasonography), to aid in the timely diagnosis of ophthalmic conditions that have the potential to cause irreparable vision loss. The government of Ghana and the various stakeholders in eye care in Ghana need to focus on strategies to ensure the equitable distribution of human resources, equipment and infrastructure across all districts in the country. The National Eye Care Unit (NECU) should advocate to have every district in the region meet the VISION 2020 target for eye care human resources to ensure equitable services. District Health Management Teams (DHMTs) must develop eye health promotion programmes as part of the eye health care management system as a strategy to strengthen the eye health services.

CONCLUSION

This study revealed the inadequate and uneven distribution of eye care facilities and eye care cadres in the Ashanti region of Ghana. There was an unmet need for essential eye care cadres to achieve Vision 2020 and the Universal Eye Health Coverage targets. Two-fifth (40%) of the districts do not have public-funded eye clinics, which could prevent under-privileged individuals from lower-income socioeconomic classes from having access to eyecare services. The limited specialised services could increase the overall burden of vision impairment from untreated cataract and uncorrected refractive errors. Altogether, limited specialised services, and inadequate numbers and uneven distribution of eye care cadres, remain an impediment to achieving Universal Eye Health.

There is no dedicated strategy to eye health promotion in the Ashanti region of Ghana.

DATA AVAILABILITY

The data supporting the conclusion of this study are available from the corresponding author upon request.

DECLARATIONS

There is no conflict of interest associated with this article.

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