

## Prevalence of Low Vision in the Shai-Osudoku District in the Greater Accra Region of Ghana

David Ben Kumah<sup>1</sup>, Benjamin Brifa Bempong<sup>1</sup>, Mohammed Abdul-Kabir<sup>1</sup>, Ronnels Hardour<sup>1</sup>, Pascal Michel Tchiakpe<sup>1</sup>, Emmanuel Boateng Baafi<sup>1</sup>

<sup>1</sup>Department of Optometry and Visual Science, B21 COS Building, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana.

**Corresponding Author:** Benjamin Brifa Bempong, Department of Optometry and Visual Science, B21 COS Building, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana, **Tel:** +233501373363; **Email:** bbempongane@gmail.com

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### ABSTRACT

**Background:** Low vision is a major public health concern that needs to be addressed appropriately. However, there are only a few low vision clinics available to low vision patients in most developing countries. The aim of this study was to determine the prevalence and causes of low vision in the Shai-Osudoku district.

**Methods:** The research was a cross-sectional study. A two-stage random cluster sampling technique was used to select a sample size of 600 people. Ocular examinations performed included: history recording, visual acuity measurement, retinoscopy, subjective refraction, visual field test, internal and external examinations.

**Results:** A total of 600 participants were seen during the period of the study. Their ages ranged between 11 and 95 years. The commonest cause of low vision was cataract (50.85%), with retinal detachment being the least (1.69%). The rest were uncorrected refractive error (18.64%), glaucoma (11.87%), ARMD (8.48%), and Albinism (3.39%). The prevalence of low vision distribution between the two genders was significant ( $P < 0.05$ ).

**Conclusion:** The study showed a high prevalence of low vision in the Shai-Osudoku District. Cataract, uncorrected refractive errors and glaucoma were the major causes of low vision. The high prevalence rate of low vision could be attributed to the inadequate eye care facilities and lack of eye care professionals in the district.

### KEYWORDS

Prevalence; Low vision; Uncorrected Refractive Error; Cataract; Glaucoma.

### INTRODUCTION

Low vision can be defined functionally as an irreversible vision loss that hinders an individual's ability to learn or implement some or all of their usual and age-suitable tasks but still allows some functional use of vision for daily activities [1]. The World Health Organization adopted a working definition for low vision in 1992 in order to help detect individuals who would benefit from low vision services.

The working definition is thus: "A person with low vision is someone who, after medical, surgical and/or optical interven-

tion, has corrected visual acuity in the better eye of less than 6/18 down to and including light perception or a central visual field of less than 20 degrees, but who uses or has the potential to use vision for the planning and / or execution of a task." However, blindness refers to a visual acuity of worse than 3/60 or a corresponding visual field of less than or equal to 10 degrees in the better eye with the best correction [1].

The provision of low vision services can greatly help low vision patients to maximize their visual function and enjoy the same quality of life as those with normal vision. The vision of low vision patients can be improved with low vision devices.

These may include either optical or non-optical devices. Some examples of optical low vision devices are hand magnifiers, stand magnifiers, spectacle magnifiers, telescopes and tele-microscopes. Non-optical low vision aids on the other hand include table lamps, writing guides, typoscopes, large print books, reading stands and tape recorders.

According to the World Health Organization (WHO), 285 million people are estimated to have visual impairment, of which 39 million are blind and 246 million have low vision. About 90% of these visually impaired patients reside in developing countries [2, 3]. However, 75% of visual impairment is preventable and curable [4].

The epidemiology of low vision in this country is little understood, and for that matter it is difficult for stakeholders to prioritize low vision services with regards to allocation of funds and policy making. Therefore, this study was aimed at determining the prevalence of low vision and the ocular disorders causing low vision in a rural area in Ghana.

## MATERIALS AND METHODS

### Study Area

The Shai-Osudoku District is located in the South-Eastern part of Ghana in the Greater Accra Region. The district covers a total land area of about 968.361 square kilometers. It shares boundaries with the Akuapim North District to the West, Ningo Prampram District to the South, Ada West District to the East and North Tongu District to the North-East. The district has a population of 51,913 according to the 2010 Population and Housing Census. Out of this, 51.3 percent are females while 48.7 percent are males. About 76.7% of the population live in rural communities [5].

### Study Population

The research was a cross-sectional study conducted among people aged five years and above in the Shai-Osudoku District between January 10 and March 15, 2015.

### Sample Size and Sampling

A two-stage random cluster sampling was used in this study. The district was divided into four main regions, namely: northern, southern, eastern and western parts. Two villages were randomly selected from each of the 4 designated regions of the district. Five households were randomly selected from each of the 8 villages making a total of forty homes. Each home had an average of 15 people making the total sample size of 600 people.

### Data Collection Technique

The study team consisted of four optometrists, two ophthal-

mic nurses, two optometry students and a driver. The optometry students helped in the registration of the participants while the optometrists and the ophthalmic nurses performed ocular examination on study participants. The ocular examination included history recording, visual acuity with the Snellen chart, external examination with pen light and ophthalmic loupe, retinoscopy with the Welch-Allyn retinoscope, internal examination with the Welch-Allyn ophthalmoscope, subjective refraction and visual field test.

Subjects with ocular diseases were either given prescriptions or referred to the appropriate facility for further assessment and management when necessary. The classification of low vision and blindness were done based on the W.H.O definition.

### Data Analysis

The data collected was analyzed by the Statistical Package for Social Scientist (SPSS) version 20.0 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics of mean and standard deviation were used. Pearson’s chi-square test was employed to compare differences between categorical groups. A p-value of less than 0.05 ( $p < 0.05$ ) was considered to be statistically significant.

### Ethical Considerations

Permission was sought from the district administration and the district health directorate offices to enable the study team conduct the survey in the district. Informed consent forms were duly signed by patients before participating in the study. All study protocol conformed to the tenets of the Declaration of Helsinki.

## RESULTS

Out of the total number of 600 people sampled for this study, 264 (44%) were males while 336 were females (56%). The participants were between the ages of 11 and 95. The mean age of the entire study population was  $40.74 \pm 2.58$  years; males recording a mean of  $39.54 \pm 2.55$  years whereas females recorded a mean of  $40.24 \pm 2.61$ . The number of females was also higher in all the age groups except the age groups 41-50 and 51-60 years. The demographics of the subjects are shown in Table 1.

**Table 1:** Age and Sex Distribution of sample population.

Age Group (Years)	No. of Subjects		Total (%)
	Males (%)	Females (%)	
11-20	43 (7.2)	48 (8)	91 (15.1)
21-30	46 (7.6)	60 (14)	106 (17.7)
31-40	57 (9.5)	84 (4.5)	141 (23.5)
41-50	39 (6.5)	27 (4.5)	66 (11.0)

51-60	36 (6.0)	33 (5.5)	69 (11.5)
61-70	19 (3.2)	33 (5.5)	52 (8.7)
≥70	24 (4.0)	51 (8.5)	75 (12.5)
Total	264 (44)	336 (56)	600 (100)

(Table 2) shows the distribution of the prevalence of low vision among gender and the various age groups of the study participants. The prevalence of low vision was low in the younger age groups, with a recorded prevalence of zero percent (0%) for the 11-40 year age group. On the other hand, the prevalence was higher in the older age groups. There was also a trend towards a higher prevalence of low vision among females (6.0%) compared to males (3.8%) and the difference was statistically significant ( $X^2 = 2.526$ ;  $p < 0.05$ )

**Table 2:** Prevalence of low Vision by Age and Gender Among the Study Population.

Age Group	No. of subjects	No. of subjects with Low vision n
(Years)	n (%)	(%)
<b>Age:</b>		
11-20	91 (15.1)	0 (0)
21-30	106 (17.7)	0 (0)
31-40	141 (23.5)	0 (0)
41-50	66 (11.0)	6 (1.0)
51-60	69 (11.5)	8 (1.3)
61-70	52 (8.7)	11(1.8)
≥70	75 (12.5)	34 (5.6)
<b>Sex:</b>		
Male	264 (44)	23 (3.8)
Female	336 (56)	36 (6.0)
Total	600 (100)	59 (9.8)

(Table 3) shows the causes of low vision in the study population. It was observed that Cataract was the most common cause of low vision, accounting for a little over half (50.85%) of the causes of low vision identified among the study participants. The other causes of low vision recorded in this study have been detailed in terms of their percentages in table 3 below.

**Table 3:** Causes of Low vision Among the Study Population.

Causes	No. of Cases	Percentage (%)
Refractive error	11	18.64
Cataract	30	50.85
ARMD	5	8.48
Glaucoma	7	11.87
Retinal Detachment	1	1.69
Albinism	2	3.39
Retinitis Pigmentosa	1	1.69
Cornea Opacity	2	3.39

## DISCUSSION

### Prevalence of Low Vision

The prevalence of low vision was determined to be 9.8% in this study population. This value is higher than that recorded for similar studies conducted in the Wenchi district (3.7%) and Volta region (7.2%) in Ghana [6, 7]. Even though sample size was lower in our study, we recorded a higher prevalence. This could be due to the inadequate eye care service provision in the district, thus making the inhabitants seek eye care alternatively from untrained traditional herbalists. They only attended eye clinics or hospitals when their sight had deteriorated to irreversible stages.

The prevalence recorded in our study was also higher when compared to related studies in some states in Nigeria. Zubair [8] recorded the prevalence of low vision and blindness to be 7.5% in Kwara state and Ezepue [9] also found the prevalence of low vision and blindness to be 5.3%. These differences could be due to the availability of eye care services in these states and the difference in sample sizes.

### Distribution of Low vision Among Gender

There was a significant difference ( $P < 0.05$ ) between the prevalence of low vision in males and females. Twenty-three (38.9%) of the low vision patients were males while 36(61.1%) were females. Based on our interactions with the people in the district, we realized that seeking healthcare in general was prioritized for males more than for females, hence placing females at a higher risk of developing low vision. These results agree with a study conducted in Ci Count, Hebei province in northern China which showed that low vision was more common in females than in males [10]. However, our findings contradict the results reported by Fasina in the Yewa-North local government area of Ogun state in Nigeria whereby low vision was more prevalent in males than in females [11].

### Distribution of Low Vision Among Age Groups

In this study, the age distribution of low vision and blindness showed that most of such patients were above 60 years. Similar results have been recorded in several studies among different study populations [10, 13-16]. Age has also been stated as a major contributing factor for low vision in other related studies [17-20]. The reason for this high prevalence of low vision and blindness in this age group (above 60 years) could be due to the fact that age is a predisposing factor for the occurrence of low vision. Cataract, macular degeneration, hypertensive retinopathy and diabetic retinopathy which are major causes of low vision or blindness are all age-related.

### Causes of Low Vision

In this study, senile cataract was the major cause of blindness

in most of the low vision patients. This result is consistent with the findings recorded by two studies that were conducted in the Wenchi district and Volta region of Ghana [7, 6]. It is also similar to findings in other parts of developing countries like Gambia, Nigeria, Saudi Arabia, Indonesia, Pakistan, India and Iran [20-26]. Most ophthalmologists in Ghana reside in the urban parts, as a result making it difficult for people in rural areas to get access to cataract extraction services. Since our study site was in a rural setting, a backlog of cataract surgery was anticipated. However, this preventable cause of blindness and low vision could be reduced if low cost facilities for cataract surgery are provided in this district and other similar districts in Ghana.

The second leading cause of low vision in the study population was uncorrected refractive errors, accounting for 18.4% of the subjects. Uncorrected refractive errors have been reported by Ferris et al [27] and Zainal et al [28] to be a major cause of both bilateral and unilateral visual impairment in developing countries. This cause of visual impairment can easily be prevented by the provision of suitable optical services. However, optical services are usually found in the cities; the few that are quite close to the study site also provide optical services at a rather high cost especially in the sale of optical aids like spectacles, thereby deterring patronage by most inhabitants within the district.

Glaucoma was the third most common cause of low vision, affecting 7(11.87%) out of the 59 low vision patients. Cofie et al [29] reported that 10% of the unilaterally blind patients and 27% of the bilaterally blind patients in the ophthalmic unit in the Agogo hospital in Ghana had glaucoma. Tackling the problem of glaucoma in this part of the country will be difficult since many glaucoma patients usually report to the eye clinic at the latter stages of the disease. This notwithstanding, the implementation of proper education on glaucoma, and better screening methods may reduce the prevalence of low vision caused by glaucoma.

## CONCLUSION

This study showed a high prevalence of low vision in the Shai-Osudoku District. Cataract was the major cause of low vision in the Shai-Osudoku district. This suggests that a great number of the low vision patients may benefit from cataract surgery. Glaucoma was the second leading cause of low vision in this district. The provision of ophthalmic services to the people of this district will help reduce the prevalence of low vision.

## CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests concerning the publication of this paper.

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