

2 **Utilization of eye care services among**  
3 **Ghanaian**  
4 **elderly population: Evidence from a peri-urban**  
5 **community.**

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26 **ABSTRACT**

27  
**Introduction:** Despite being more affected by visual impairment and blindness than any other population age group, the elderly are least likely to seek help when faced with eye problems. Eye care utilization among the aged is influenced by a number of predisposing, enabling and need factors.

**Aim:** To assess the care needs and utilization of eye care services among Ghanaian elderly population.

**Methods:** A cross sectional survey of 170 elderly persons (52.0% of those eligible) aged 60+ years in a peri-urban community in the Central Region of Ghana was conducted. They were purposively sampled and interviewed using a semi-structured questionnaire to collect information regarding demographics, eye care use, barriers and eye care seeking behavior . They also underwent ophthalmic examination.

**Results:** The mean age of the respondents was 70 years with 58.2% of them being females. About one third 61(35.8%) had never had an eye examination in their lifetime. Among 137 (80.5%) individuals identified with eye problems that needed care at the time of the examination, 76.9% self-reported eye problems before examination but only 51.2% had utilized eye services in the previous five years. Nearly three out of four (75%) were registered with the national health insurance scheme (NHIS). Conditions identified were cataract in 117 (29.2%) eyes, uncorrected refractive error 75 (18.8%), pterygium/pinguiculi 55 (13.8%), presbyopia 40 (10.0 %), and retinal disorders in 23(5.8%) eyes. By proportion,

more males (59%) than females (45.5%), increasing age and those with higher level of education utilized eye care. The study showed that sex, education but not age were statistically related to the utilization of eye care services ( $P = 0.05$ ).

**Conclusion:**

A large proportion of the elderly who require eye care are currently not utilizing eye care services. The barriers that lead to the low utilization of eye care services among the elderly should to be explored to reduce the burden of visual impairment.

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*Keywords: Utilization, elderly, population, eyecare, Ghana*

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## 1. INTRODUCTION

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Population ageing is a global phenomenon associated with a range of health care challenges [1]. Ageing results in a number of health conditions including eye diseases and visual impairments that increases the number of elderly persons needing care [2-3]. Age-related eye diseases and resultant visual impairments cause functional impairment among the elderly undermining independence and quality of life [4-5]. Interventions aimed at the timely recognition and treatment of such age-related eye disorders can prevent disability from these conditions.

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Ophthalmic and optometric best practices recommends that older adults visit an eye care professional regularly to have a comprehensive eye examination but some elderly persons are not able to utilize eye care services due to some factors seen as barriers [4-6]. Healthcare utilization is influenced by a number of interactive factors, namely predisposing, enabling and need factors [7]. Predisposing factors subsist before the occurrence of disease and reflect the tendency of a person to use health care services. Enabling factors influence an individual's capacity to utilize healthcare services while need factors describe the use of healthcare in the presence of eye disease or a perceived health state. Barriers to the utilization of eye care among the elderly result in delays in treatment, which cause dissatisfaction and may lead to worsening clinical and patient outcomes [8-10].

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To some extent, utilization of eye care services reflects the effective coverage of eye health services and is a marker of existing eye health system performance [4, 6, 11]. In Ghana, payment for health care is either by cash (cash and carry) or by National Health Insurance Scheme (NHIS). Under the NHIS, operated under the authority of the Government of Ghana, patients who pay an annual renewable subscription fee and elderly persons (70 years and above) receive free selected medical services covered by the scheme, including some ophthalmic services [12]. Payment for health care at private health institutions is by cash and only few people can afford private health care. Records indicate that as many as twice rich people are signed up to the NHIS than the poor and vulnerable persons. Government puts the coverage rate for the NHIS at about 70% of the population but the actual figure could be as low as 18%, and 29% of the poor compared to 64% of the rich are registered with the health insurance [12]. Ophthalmic services in Ghana are provided mainly by ophthalmologists, optometrists and ophthalmic nurses with some general practitioners offering some ambulatory care. There are about 50 Ophthalmologist, 200 Optometrist and 300 ophthalmic nurses in Ghana, serving the over 24 million population [13]. Most rural and peri-urban communities are underserved as majority of ophthalmologists and optometrists practice in larger towns and cities only.

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68 The elderly who live in rural and distant areas of developing countries have limited access  
69 and worse eye care outcomes relative to urban and more modernized towns [6, 9, 14 -15].  
70 The World Health Organization estimates that though the number of people visually impaired  
71 from infectious diseases has greatly reduced in developing countries within the last 20 years,  
72 the lack of access to cataract surgeries in developing countries poses a major challenge to  
73 eradicating needless and avoidable blindness by the year 2020 [16]. Notwithstanding the  
74 fact that the elderly are more affected by visual impairment and blindness than any other  
75 population group, they are least likely to seek care when faced with deterioration of their  
76 vision due to the presence of comorbid conditions [5, 15]. It is estimated that only one in  
77 three older people with cataract actually receives surgery in least developed countries [3,  
78 17]. In addition to eye problems, older people usually have other age-related health  
79 problems, such as hearing impairment, arthritis, cardiovascular disorders, and diabetes [1].  
80 The disabilities caused by such disorders could make some older people reluctant to visit  
81 health facilities. The study assesses the need for and the pattern of eye care service  
82 utilization among the elderly at a peri-urban community and has implications for health  
83 planning considering the emerging aging population in Ghana.

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## 85 2. MATERIAL AND METHODS

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88 The study was a community based cross-sectional survey conducted in 2012 at Yamoransa,  
89 a peri-urban community in the Mfantseman West District of the Central Region of Ghana. The  
90 district has a district hospital which provides primary eye care. The Central Region however,  
91 has three major eye clinics which provide full scope eye care services [13]. The total  
92 population of the town was 5,413 comprising 45.8% males and 54.2% females in 2010<sup>17</sup>.  
93 Using the United Nations age criteria and also the age criteria used to define who an elderly  
94 person is in the last population census in Ghana in 2000, respondents aged 60 years and  
95 above were sampled to take part in the study. A total of 308 persons (5.7% of 5413) aged 60  
96 years and above [18] were initially enumerated to take part in the study but 170 (55.2%)  
97 respondents were purposively sampled and were involved in the study. The minimum  
98 sample size (n) was determined using the formula  $n = [(Z)^2 P(1-P)] / d^2$ . Where, Z = 1.96 for  
99 95% confidence level, P= proportion of population (50%) in percentage expressed as  
100 decimals and d= confidence interval ( $\pm 5$ ) expressed as decimals. After having corrected for  
101 the finite population size with the expression  $ns = n / [1 + (n-1)/pop]$ , where ns = new sample  
102 size and pop = population, a minimum sample size of 110 was calculated but 170 were  
103 sampled using the age inclusion criteria. The district bears demographic characteristics  
104 similar to that of the rest of Central Region and other peri-urban communities in Ghana  
105 making it ideal for the study [18]. Semi-structured questionnaires were administered by three  
106 trained social workers and five Optometrists to collect information on respondents'  
107 demographic background, current and previous use of eye care services in the previous five  
108 years, barriers to uptake of eye care services, satisfaction with previous eye care and eye  
109 care seeking behaviour. The questions were interpreted in the local dialect (Fanti) to allow  
110 for those who could not speak and understand English.

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112 Five experienced Doctors of Optometry also screened respondents for abnormal ocular  
113 conditions and visual impairments. Ophthalmic examinations performed included detailed  
114 ocular history, presented visual acuity (PVA) measured with or without glasses according to  
115 what the patient was wearing at the time of the examination with a tumbling "E" at six  
116 meters, external eye examination using a magnifying loupe under penlight, dilated internal  
117 eye examination using direct ophthalmoscopy to evaluate retinal status, including vessels,  
118 macula and optic disc features and hand-held applanation tonometry to measure intraocular  
119 pressure (IOP) when indicated. Pinhole examination was performed to identify those who  
120 had refractive errors and would benefit from refraction. Ocular conditions identified were

121 verified on subsample at the regional hospital where referrals were sent for treatment by  
122 consultant Ophthalmologist. All the team members also had previously been involved in  
123 community eye screening and so were conversant with their roles. Each questionnaire and  
124 eye examination took about 45 minutes to complete. All elderly persons that met the age  
125 criteria for the study had an equal chance of participating in the research. National Health  
126 Insurance (NHIS) and voter identification cards were used to verify participants' ages.

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128 The research was done according to the Helsinki Declaration on Research regarding Human  
129 Subjects. This study was reviewed and approved by the Department of Population and  
130 Health, University of Cape Coast on behalf of the Institutional Review Board of University of  
131 Cape Coast (UCCIRB). Participants were made to sign informed consent forms attached to  
132 the questionnaires after the processes had been explained to them. Confidentiality was  
133 assured at all times.

134 Visual impairment was determined using PVA (with or without spectacles) less than 6/18 to  
135 6/60 in the better eye and blindness using visual acuity of less than 3/60 in the better eye  
136 based on the guidelines drafted by the World Health Organization (ICD-10) [19]. Likewise,  
137 respondents self reported vision was graded according the visual acuity criteria 6/4- 6/5  
138 (Excellent, 6/6-6/18 (Good), 6/24-6/60 (Poor), 3/60 or worse (Very poor), no perception of  
139 light (completely blind) [20]. Criteria for identification of abnormal ocular conditions have  
140 been described in other studies [11]. Data obtained was analyzed using the Statistical  
141 Product for Service Solutions (SPSS v 16) application to carry out descriptive statistics and  
142 chi-square to test the hypothesis that utilization of care services has an independent  
143 relationship on selected socio-demographic variables. Independent variables included age,  
144 sex, and education level while dependent variable utilization was defined as the ability to  
145 see an eye care professional or a qualified health professional when in need of eye care  
146 service or had an episode of eye condition that requires treatment in a 5-year period.  
147 Statistical significance was defined at an alpha level of 0.05. We categorized people  
148 requiring eye care/treatment in our study population as people with PVA worse than 6/18  
149 in the better eye and/or identified ocular pathology/disease after examination.

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### 151 3. RESULTS

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153 Out of a total of 170 elderly persons who were interviewed, 41.8% were males and 58.2%  
154 were females (Table 1). The distribution shows that half of the respondents (50.6%) were  
155 aged between 60-69 years (young old), 31.8% were aged between 70-79 years (older old)  
156 and those aged 80+ (oldest old) accounted for 17.1%. The mean age of the respondents  
157 was 70 years (SD = +/-8.7, Range = 60 - 101).The data showed that respondents who had  
158 had primary education were 58.3% for both sexes (78.8% among females and 31% among  
159 males) and 31.7% had had middle or secondary education. Over half of males, (66.2%) had  
160 had more than primary education compared to only 20.2% females. Only 8.2% had had  
161 post-secondary education.

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163 Using their PVA, 25 (14.7%) exhibited unilateral visual impairment, 113 (66.5%) bilateral  
164 impairment, 39 (22.9%) unilateral blindness, and 10 (5.9%) had bilateral blindness.  
165 Regarding visual acuity in the better eye, it was indicated that 58.7% had visual impairment  
166 and 5.9% were found to be blind in at least one eye. Respondents were asked to grade their  
167 perception about how well they could see and this is matched to the PVA in Table 2 to show  
168 discrepancies in respondents self perception of their vision and measured vision. Overall,  
169 only 6.5% said the eye sight was excellent, whilst a third of them (34.1%) said the health  
170 was fair and about the same number (32.3%) graded the vision as worse poor or worse.

171 **Table 1: Background characteristics of respondents in percentages**

	Male				Female				Grand
	60-69*	70-79	80+	Total	60-69	70-79	80+	Total	Total
Education									
No education	5.0	-	-	2.8	2.1	-	-	1.0	1.8
Primary	12.5	35.3	78.6	31.0	63.0	89.2	100	78.8	58.3
Middle Sch./JSS	17.5	11.8	-	12.7	8.7	2.7	-	5.1	8.2
Secondary/Tech/Voc ational	45.0	47.1	14.3	39.4	21.7	2.7	-	11.1	23.5
Post secondary	20.0	5.9	7.3	14.1	4.3	5.4	-	4.0	8.2
Total	100	100	100	100	100	100	100	100	100
Total number	40	17	14	71	46	37	16	99	170

172 \*Age group

**Table 2: Matching PVA against self-evaluation by respondents**

Self-Evaluation	Presenting better eye VA								Total
	>=6/6	6/9	6/12	6/18	6/24	6/36	6/60	<=3/60	
Excellent	3(17.6)	3(10.0)	2(15.4)	0(0.0)	0(0.0)	2(5.0)	1(4.3)	00(0.0)	11(6.5)
Good	3(17.6)	10(33.3)	4(30.8)	9(37.5)	7(53.8)	10(25.0)	3(13.0)	00(0.0)	46(27.1)
Fair	6(35.3)	11(36.7)	4(30.8)	8(33.3)	4(30.8)	18(45.0)	7(30.4)	00(0.0)	58(34.1)
Poor	3(17.6)	5(16.7)	2(15.4)	6(24.0)	2(15.4)	6(15.0)	9(39.1)	00(0.0)	33(19.4)
Very poor	2(11.8)	1(3.3)	1(7.7)	1(4.2)	0(0.0)	4(10.0)	3(13.0)	2(20.0)	14(8.2)
Completely blind	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	8(80.0)	8(4.7)
Total	100	100	100	100	100	100	100	100	100
Total number	17	30	13	24	13	40	23	10	170

173 *Percentages are in parenthesis*

174 Of the 340 eyes of the 170 participants examined, 400 conditions were observed (Table 3).  
 175 Cataract was the most occurring condition, affecting 117 (29.2%) eyes, followed by  
 176 uncorrected refractive error in 75 (18.8%), pterygium/pinguiduli in 55 (13.8%), presbyopia  
 177 among those who could read in 40 (10.0 %), and retinal disorders in 23(5.8%) eyes. Among  
 178 137 (80.5%) individuals who were identified as either having impairment or a condition that  
 179 required seeing an eye care provider, 76.9% affirmed that they had an eye problem before  
 180 ophthalmic examination whilst 4.2% perceived that they did not have any condition or the  
 181 condition was minor, or normal, and that it did not warrant seeing an eye care provider.  
 182 There was no statistically significant difference between respondents who perceived they  
 183 had eye problems and those identified as requiring treatment after eye examination (p,  
 184 0.127) (Table 4).

185  
 186 **Table 3: Prevalence of Ocular conditions among respondents**

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Condition	Frequency	Percentage
No abnormalities	2	0.5
Refractive error	75	18.8
Cornea opacity/scar	7	1.8
Cataract	117	29.2
Suspected glaucoma	16	4.0
Chronic/Acute conjunctivitis	34	8.5
Pseudophakia	18	4.5
Pterygium/ Pingueculae	55	13.8
Strabismus/Squint	1	0.2
Trauma	3	0.8
Presbyopia**	40	10.0
Retinal disorders (RT)*	23	5.8
Blind eye***	9	2.2
Total	400****	100.0

\*RT = Hypertensive retinopathy (2.5%), chorio-retinal degeneration (1.0%), Macular scar (0.5%) and Diabetic retinopathy (0.2%). \*\*Presbyopia = Among those with reading ability (those with near impairment were 33.5%). \*\*\*Blindness due to loss of eye.

\*\*\*\*Multiple diagnosis among 170 persons

188 Among those who had ever had their eyes checked, 36.7% visited eye clinics when they had  
 189 a problem with their eyes and 27.5% visited a general hospital or health centre to consult  
 190 general physician or general health for eye care services. The rest resorted to self-  
 191 medication, herbalist treatment (traditional healer) or pharmacy or chemical shops to treat  
 192 their eye problems. Others depended on 'friends' or 'family relations' advice (Figure 1). One  
 193 person who was reportedly aged 101 had never had an eye examination, indicating the lack  
 194 of regular eye check up among the study population.  
 195

196 The study also sought to find out the reasons or barriers to the up-take of regular eye care  
 197 services among the respondents. Table 5 shows first and second reasons for not seeking  
 198 eye care service when they had eye problems. The most reported obstacle to the uptake of  
 199 eye care services was lack of money (35.4%), followed by those who 'did not think it was  
 200 important' (22%), 'advised by others to do something else' (13.4%) and time constraints  
 201 (12.2%).

202 Among the respondents, (61) 35.8% had never had an eye examination in their lifetime.  
 203 Within the previous five years however, many of them (51.2%) had visited an eye care  
 204 professional compared to those who had not (48.8%). By proportion, more males (59%)  
 205 than females (45.5%) increasing age and increase in level of education was associated with  
 206 the use of eye care service. The characteristics of eye care utilization in the 5-year period  
 207 are shown in Table 6. Self-perceived eye problem, sex and education showed statistical  
 208 significance at an alpha level of 0.05

**Table 4: Association between self evaluation and identified eye problems**

Personal evaluation	Eye examination		Total	Number
	Eye problem	No eye problem		
Eye problem	76.9	16.6	93.5	158
No eye problem	4.2	2.3	6.5	12
Total	81.1	18.9	100	
Total number	137	32		170

$\chi^2 = 2.328$ ; df = 1; p-value = 0.127

209 Overall 75% were registered under the national health insurance scheme (NHIS). Though  
 210 the scheme is free for persons 70 years and above, (49.4% of study population), just over  
 211 42% of this age group had registered with the scheme and therefore could access eye care  
 212 services under it.  
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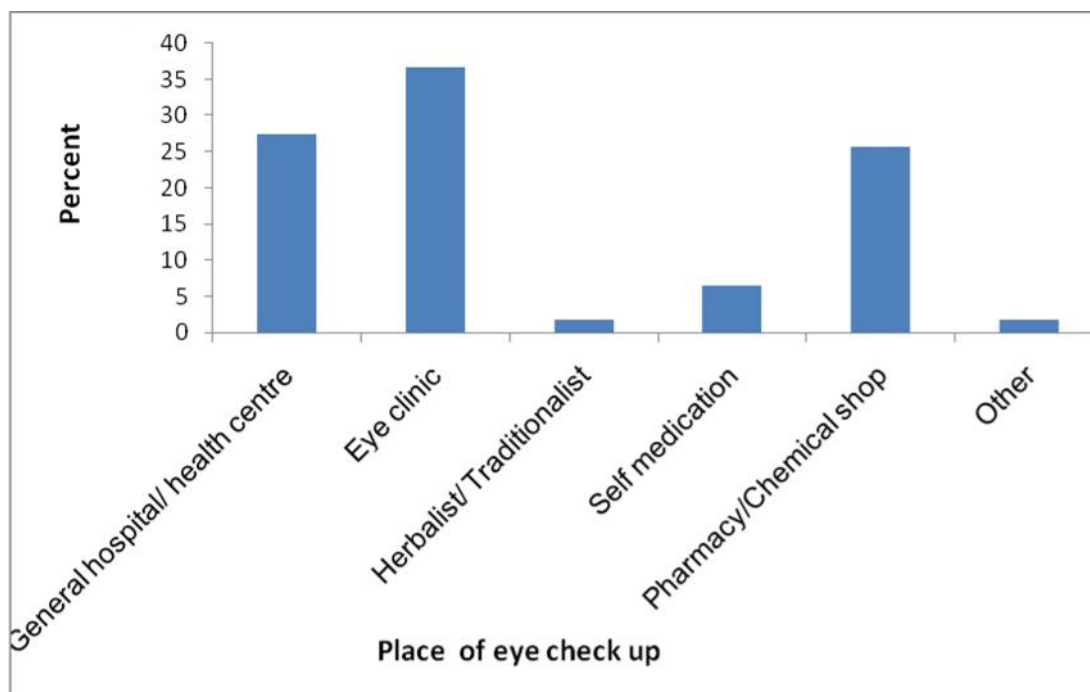
214 The study also sought to find out how the lack of utilization to eye care services due to the  
 215 varied reasons, in the face of manifest or perceived eye problems and visual impairment  
 216 affected the general disposition and patients satisfaction with eye care services and  
 217 programmes available to them in the community. Overall, about 85% percent indicated that  
 218 they had spent some time in the past worrying about their eyesight. They included 20



219 (42.3%) who had spent 'little' or 'sometime' worrying about the eye sight, 12.4% who spent  
 220 'all the time' worrying' about their eyes and 30% who spent 'most of the time' worrying about  
 221 the eye sight. Only 15.3% spent 'no time' worrying about their eyesight.

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Respondents, who had ever had an examination during their lifetime, were asked to grade the impression of eye care services available to the elderly in the community. About 12.4% of them were 'very satisfied' with care that they had received and about 3 fold that number (43.2%) were satisfied. Another 18.1% were dissatisfied, 4.5% were very dissatisfied and 15.3% were partly satisfied and partly dissatisfied.



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**Figure 1:** Places where respondents sought eye care service

**Table 5:** Reasons for not visiting eye clinics

Reasons	First reason	Second reason
Cost	35.4	-
Time constraints	12.2	-
Transportation/No escort	6.1	5.9
Thinks problem was minor	22.0	35.3
Fear	6.1	5.9
Advised by others to do something else	13.4	52.9
Do not know where to go	3.7	-
No improvement from previous visit	1.2	-
Total	83	17

**Table 6: Eye care utilization among respondents**

Demographic characteristics	Eye care utilization			Chi-square(p-value)
	Sought care N= 87(51.2%)	Did not seek care N= 83(48.8%)	Total N=170(100%)	
<b>Sex*</b>				4.721(0.013)
Male	42 (48.3)	29 (34.9)	71 (42.0)	
Female	45 (51.7)	54 (65.1)	99 (58.0)	
<b>Age group</b>				1.405(0.317)
60-69	43 (49.4)	43 (52.4)	86 (50.6)	
70-79	27(31.0)	27(31.7)	54 (31.8)	
80+	17(19.5)	13(15.9)	30 (17.6)	
<b>Educational level*</b>				3.441(0.021)
No formal education	1(1.1)	2(2.4)	3(1.8)	
Primary	54(62.1)	45(54.2)	99 (58.3)	
Middle school/JHS	9(10.3)	5(6.1)	14 (8.2)	
Secondary/Tech/ Vocational	18(20.7)	22(26.5)	40 (23.5)	
Post-secondary	5(5.7)	9(10.8)	14(8.2)	
<b>Self-perception of eye problem *</b>				5.309(0.012)
Yes	81(93.1)	77(92.8)	158(92.9)	
No	6(6.9)	6(7.2)	12(7.1)	
<b>Presence of VI</b>				1.528(0.376)
Yes	57(65.5)	58(69.9)	115(67.6)	
No	30(34.5)	25(30.1)	55(32.4)	

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#### 4. DISCUSSION

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In the present study, a history of eye care use in previous five years was considered as the determinant of eye care service utilization. Some studies have examined the rate of eye care utilization among the elderly in other countries [3-5]. We found that elderly persons in peri-urban communities do not utilize eye care services to a large extent despite the presence of eye condition needing treatment. Over one third (35.8%) had never used eye care though 80.5% of respondents were identified with eye conditions that needed eye care attention. The rate of eye care utilization (51.2%) in the study population was higher than the average of 18% found in developing countries [6], 35.5 % found in Cameroon [15], 45.5% found in India [11] but lower than 64% among older America [4] and over 90% found in older Australians [5]. Some other studies in other countries among the elderly have also focused on utilization and ageing [5, 21], elderly diabetics [22] and elderly glaucoma patients [23]. Depending on the geographical variation, the target population and period used to define

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251 utilization different rates of eye care utilization have been reported. Extrapolation of these  
252 results should therefore be carefully applied.

253 Sight is essential in everyday activities therefore it is clear that any disturbance in vision or  
254 symptom associated with the use of the eyes will easily be noticed and lead to eye care  
255 visits, yet we found only half (50.4%) of those with visual impairment had not sought for eye  
256 care in the previous five years. Although majority of respondents (76.9%) identified as  
257 having conditions that needed treatments were much aware of their visual status, more than  
258 one third had never had an eye examination in their lifetime for persons 60 years and above.

259 Increasing age has been associated with increased utilization of eye care due to the high  
260 risk of blindness and visual impairment at old age. In the study, though there was increase in  
261 utilization of eye care with increasing age by proportion we did not find statistically significant  
262 relationship between age and utilization. More males than females utilized eye care services.  
263 In general, women have substantially worse eye care outcomes than men due to the lower  
264 rate of eye care utilization [24 -25]. Two- thirds of the world's blind and vision impaired  
265 people are women [24]. The differences in the occurrence of eye disorders and treatment  
266 outcomes in women have been attributed to the lack of access and utilization of eye care  
267 due lower economic status and early change in the physiology of women [26]. The  
268 relationship between gender and utilization of eye care in this study is at variance with other  
269 studies that showed women are more likely to seek eye care [7, 9] but comparable to a study  
270 where men sought eye care more than women in Cameroon [15]. Other studies have  
271 reported no significant difference found between the gender in Ireland [8] and in India [11].

272 Some studies have found an inverse relationship between both income and education and  
273 ability to utilize eye care services and visual impairment. Utilization among persons with low  
274 education and income has been found to be almost twice as low compared to those with  
275 higher income [3, 26 -28]. This study showed significant differences in eye care utilization  
276 and level of education. Education is an important factor in the determination of visits to eye  
277 care professionals. Those with lower educational levels may be unaware of the need for  
278 regular eye examinations with increasing age. The finding suggests that even in the  
279 presence of perceived eye problems, close to half of them had not sought care. Socio-  
280 economic background was not included in this study because of the homogeneity of subjects  
281 used as respondents; they were elderly persons who had similar economic background.

282 Consistent with other studies, the main barriers preventing uptake of eye care service  
283 identified in the study were related to medical costs of the services, time constraints,  
284 transportation and escort and poor knowledge about eye disease [4, 11, 14]. Respondents  
285 expressed that they thought the episodes of eye conditions they previously experienced  
286 were not serious to merit an eye care service. This could be inherently explained by the low  
287 level of education among the study population.

288 A study of the health profile and emerging aging issues in Ghana confirms that access to  
289 medical care remains problematic for the elderly in Ghana, especially for those without  
290 medical insurance and particularly those considered vulnerable [29]. In Ghana, eye care  
291 services are available in public hospitals and private clinics where medical insurance cover  
292 part of the fees incurred. However, unequal distribution of Ophthalmologists, Optometrists  
293 and Ophthalmic nurses in Ghana deprive eye care access to people in remote and rural  
294 areas. About a quarter of the study population were not registered with the national health  
295 insurance scheme. The elderly, due to their lower socio-economic status find the cost of  
296 health care especially eye care high in comparison with their mean income and it seems  
297 some cannot afford even where it is available.

298 **5. CONCLUSION**

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300 The study examined the eye care seeking behavior and barriers to the uptake of eye care  
301 services among an elderly population in Yamoransa, a peri-urban community in Ghana. A  
302 number of the respondents who were diagnosed of various ocular health conditions had not  
303 utilized eye care services in the last five years preceding the survey. The associations  
304 between utilization of eye care services and sex and educational level of respondents were  
305 statistically significant. Efforts should be made by the Ghana Health Service to investigate  
306 the barriers to up-take of eye care services and educate the elderly about their eye health to  
307 increase the utilization of eye care services. Since we used cross sectional data one needs  
308 to be cautious when interpreting the results. Also, because the clinical examination was  
309 conducted on site, some equipment needed for certain clinical or investigative procedures  
310 could not be conveyed to the site. Despite employing more than the minimum required  
311 sample size, the prevalence of eye problems may be over or underestimated assuming that  
312 respondents were more or less likely to suffer from ocular disorders than those who did not  
313 take part in the study. Utilization was also self-reported and was not verified by  
314 crosschecking from the places respondents claimed to have visited. The study also covered  
315 5-year retrospective periods and may be subject to recall errors by respondents. In spite of  
316 these, the results provide valuable insight into the extent of eye care utilization among the  
317 aging population in the Ghana. The results of this study are very informative and indicate  
318 that a considerable proportion of the studied population had never utilized eye care services,  
319 even among those who had eye problems.

320

321 **CONSENT**

322 All authors declare that written informed consent was obtained from the respondents before  
323 their participation

324

325 **ETHICAL APPROVAL**

326

327 All authors hereby declare that this study was approved by the appropriate ethics committee  
328 and have therefore been performed in accordance with the ethical standards laid down in the  
329 1964 Declaration of Helsinki.

330

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332

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336

337

338 **COMPETING INTERESTS**

339 Author(s) disclose no potential conflicts of interest.

340

341 **AUTHORS' CONTRIBUTIONS**

342 Stephen Ocansey, Akwasi Kumi-Kyereme and Kofi Awusabo-Asare designed the study,  
343 Akwasi Kumi-Kyereme and Stephen Ocansey performed the statistical analysis, Stephen  
344 Ocansey, Alex Azuka Ilechie and Samuel Bert Boadi-Kusi wrote the protocol, Stephen  
345 Ocansey wrote the first draft of the manuscript. Kofi Awusabo-Asare, Akwasi Kumi-Kyereme  
346 and Alex Azuka Ilechie managed the analyses of the study. Carl Halladay Abraham and  
347 Samuel Bert Boadi-Kusi managed the literature searches. All authors read and approved the  
348 final manuscript.

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