

Health Related Quality of Life of Patients with Ocular Disorders in a Nigerian Hospital

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ABSTRACT

Introduction: Patients' subjective assessment of the functional effects of illness and its consequent therapy affects their quality of life. The degree of health literacy however depends on how patients can obtain, process and understand basic health information and services. The aim of this study is to evaluate the health related quality of life and the health literacy level of patients with eye disorders.

Methods: The cross sectional study involved 205 consenting patients with ocular disorders attending the Ophthalmic Clinic of University of Benin Teaching Hospital using a convenient sampling technique. The health related quality of life was assessed using the modified European Quality of Life 5 dimensions-3 levels (EQ5D-3L) questionnaire. The five dimensions were Mobility, Self Care, Usual Activities, Pain/Discomfort and Anxiety/Depression.

Results: Out of 205 patients, 55 (26.8%) had cataract, 48 (23.4%) glaucoma, 47 (22.9%) refractive errors, 23 (11.2%) had other eye disorders and 32 (15.6%) patients did not know their diagnosis. Patients with diabetes as co-morbidity were 15 (7.3%) while 24 (11.7%) had hypertension. There were significant association between eye disorders and socio-demographics except sex. Older patients above 35 years presented with cataract 41 (20%) and glaucoma 28 (13.7%), refractive errors were also more with patients in 18-34 years' age group 37 (18.1%) and students 33 (16.1%). Health literacy was poor. Two (15.6%) patients did not know their disease conditions, its severity or prognosis, some did not know the names of their medication and 148 (72.2%) had no health insurance. Using the Visual Analogue Scale where 100 represented best health and 0 worst health, 29.7% of respondents rated their present health between 50 and 80 and 48.8% rated theirs' between 80 and 100. Eye disorders significantly affected the mobility dimension and patient health status but had no marked effect across the other four dimensions.

Conclusion: Health related quality of life of eye patients was above average but became more impaired in the presence of co-morbidities and patients often experienced mobility problems. Health literacy was poor; many had no health insurance, no knowledge of their diagnosis and names of medications used for their eye disorder.

Key words: Eye Disorders, Health Related Quality of Life, Health literacy

INTRODUCTION

Quality of life (QoL) is the general well-being of individuals and societies but is not equivalent to standard of living, which is based primarily on income. Health related quality of life (HRQoL) is the assessment of the functional effects of illness and its consequent therapy as perceived by the patient. These effects often are displayed as physical, emotional, and social effects on the patient.^[1] Patrick and Erickson (1993) proposed that HRQoL is “the value assigned to duration of life as modified by the impairments, functional states, perceptions, and social opportunities that are influenced by disease, injury, treatment, or policy.”^[2] While Revicki et al. (2000) posited HRQoL as “the subjective assessment of the impact of a disease and treatment across the physical, psychological, social, and somatic domains of functioning and well-being.”^[3] This shows the multidimensionality of HRQoL. The commonly measured domains of HRQoL include physical health and functioning; Mental/emotional health and functioning; Social and role functioning. Measurement of HRQoL usually is achieved through the use of patient-completed questionnaires. Many questionnaires are available, and most are either disease-specific or generic measures of health status such as European Quality of life – 5 Dimension 3 levels (EQ-5D3L), ^[4] EQ-5D™ as a standardized instrument is applicable to a wide range of health conditions and treatments. It provides a simple descriptive profile and a single index value for health status. ^[5]

Human eye disorders vary in prevalence and severity but early detection and treatment increases the chances of cure. Some of the disorders of the human eye include; cataract, glaucoma, corneal abrasion, scleritis, corneal ulcer, hyperopia, myopia, double vision, astigmatism, presbyopia, color blindness, blepharitis, iritis, conjunctivitis, retinal detachment, diabetic retinopathy, uveitis, keratoconjunctivitis, amblyopia, optic neuritis, ptosis ^[6] Glaucoma is clinically characterized intraocular pressure-associated optic neuropathy which can permanently damage vision in the affected eye(s) and lead to blindness. Globally, about 60 million people have glaucomatous optic neuropathy and about 8.4 million people are blind due to glaucoma. Cataract is due to opacification of the lens, which obstruct light from passing and focusing on the retina. ^[7] Cataract is responsible for 51% of world blindness, which represents about 20 million people. Globally, cataracts cause moderate to severe disability in 53.8 million people of which 52.2 million are in low and middle-income countries including Nigeria. ^[8] Refractive errors include myopia, hyperopia and astigmatism. Astigmatism is an optical defect in which vision is blurred due to the inability of the optics of the eye to focus a point object into a sharp focused image on the retina and is a refractive error. ^[9] The global prevalence of refractive errors has been estimated from 800 million to 2.3 billion. The prevalence of myopia has been reported as high as 70–90% in some Asian countries, 30–40% in Europe and the United States, and 10–20% in Africa. Myopia is less common in African people and associated diaspora. In Americans between the ages of 12 and 54, myopia has been found to affect African Americans less than Caucasians.^[10]

Chia *et al* (2004) used the 36-item Short-Form health survey (SF-36) to assess the impact of visual impairment on HRQoL in an older population and compared it with the impact of major medical conditions. They found that non-correctable visual

impairment was associated with reduced functional status and well-being, with a magnitude comparable to major medical conditions. ^[11] Casten *et al* (2004) opined that one of the major causes of blindness is age-related macular degeneration (AMD), with prevalence estimates ranging from 10% to 30% among people aged 65 to 75 and older. Thus, it is a large cause of disability in older people which lowers patients' quality of life and a risk factor for depression. ^[12] Nutheti *et al* (2006) adapted the World Health Organization Quality of life (WHOQoL) instrument for administration to adults with ocular disorders. Their study reported that decreased QoL was associated with the presence of glaucoma or corneal disease independent of visual acuity with cataract or retinal disease as a function of visual acuity. However, visual impairment from uncorrected refractive errors was not associated with decreased QoL. ^[13] Li *et al.* (2011) examined the association between age-related eye disease (ARED), visual impairment, and health-related quality of life (HRQoL) found that the prevalence of visual impairment and physical impairment increased with increasing number of eye diseases thus ARED was found to be associated with visual impairment and poorer HRQoL. ^[14]

In Nigeria there are no studies relating to HRQoL of patients with eye disorders hence the objective of this study is to evaluate the health related quality of life and the health literacy level of patients with eye disorders.

METHODS

Study design and setting: This was a descriptive cross-sectional study. About 205 consecutive consenting patients visiting the Ophthalmic Unit of the University of Benin Teaching Hospital (UBTH), Edo state, Nigeria were interviewed. UBTH is a tertiary healthcare facility with over 500 bed-spaces and caters for the health care needs of the residents of the state and neighboring states.

Study Instrument: The quality of life of patients was assessed using a modified self-administered EQ5D-3L questionnaire that was in three sections. The first section was the socio-demographic of the study participants containing questions on sex, age, marital status, health insurance, occupation, educational level, income per month, disease conditions present and diagnosis. While the second section assessed the quality of life in five domains with 3 levels on Mobility, Self-Care, Usual Activities, Pain/Discomfort and Anxiety/Depression. The respondent was asked to indicate his/her health state by ticking in the box against the most appropriate statement in each of the 3 dimensions which resulted in a 1-digit number that represented the level selected for that dimension. Their health state was defined by combining 1 level in each of the 3 dimensions. The third section consisted of questions relating to patient's general health as at the time of filling the questionnaire and health status on the Visual Analogue Scale numbered from 0-100. 100 representing 'best imaginable health state' and 0 'worst imaginable health state'. The questionnaire was pretested before administration. A total of 210 questionnaires were distributed to eligible participants who gave their verbal informed consent. The questionnaires were self administered by literate respondents while those with little or no formal education and very poor eyesight were interviewed in vernacular by trained interviewers. Ethical approval was obtained from the ethical committee of UBTH.

Data were collected, coded and entered into Microsoft Excel for sorting and thereafter loaded into Statistical Package for Social Sciences (SPSS) version 17.0

and Graph pad InStat (version 2.05a, GraphPad. Software, Inc. La Jolla, California) for inferential analysis. Results of data as a health profile was presented as a table with the frequency or the proportion of reported problems for each level for each dimension and it was also dichotomized the EQ5D-3L levels into no problems (i.e level 1) and problems (i.e levels 2 and 3) The level of statistical significance was set at $p < 0.05$. Categorical data were expressed in percentages.

RESULTS

Out of the 210 questionnaires distributed 205 (97.6%) were properly filled and therefore used in analysis. Of the respondents, 96 (46.8%) were males and 107 (52.2%) females. Then 72 (35.1%) earned below N30, 000 per month and 34 (16.6%) earned above N50, 000 per month; 91 (44.4%) respondents were married, 86 (42.0%) were single, 18 (9.3%) were widowed and 5 (2.5%) were divorced/separated. Of the eye disorders that were reported, cataract, glaucoma and refractive errors occurred in 55 (26.8%), 48 (23.4%) and 47(22.4%) of the respondents respectively, Details of the study participants are shown in Table1.

Table 1: Socio-Demographics of the Respondents

Variables		Frequency	Percentage
Sex	Male	96	46.8
	Female	107	52.2
Age	<18yrs	29	14.1
	18-34yrs	77	37.5
	35-64yrs	64	31.2
	>65yrs	35	17.1
	>65yrs	35	17.1
Income per month*	<N29,999 (<\$152. 27)	72	35.1
	N30,000-39,999(\$152.28-203.04)	12	5.9
	N40,000-49,999 (\$203.05-253.80)	10	4.9
	>N50,000(>\$253.81)	34	16.6
Educational level	No formal	30	14.6
	Primary	30	14.6
	Secondary	40	19.5
	Post-secondary	102	49.8
Co-morbidity	Diabetes	15	7.4

Diagnosis	Hypertension	24	11.8
	Cataract	55	26.8
	Glaucoma	48	23.4
	Refractive errors	47	22.9
	Other eye disorders	23	11.2
	Eye disorder unknown	32	15.6

***\$1 was equivalent to ₦197.00 as at the time of reporting**

Proportion of patients reporting problems in the different domains

Patients self-reported health status was good for most of the respondents. Majority of respondents (48.8%) reported their health state to be between 80 to 100 on the visual analogue scale of 0-100. With regards to mobility, 73.7% respondents had no problem walking about while 1 (0.5%) respondent was confined to bed. For self-care, 79.5% of respondents had no problem washing and dressing themselves while 1.5% were unable to get it done. However, 45.4% of the respondents claimed they felt moderate pain or discomfort due to their eye disorder(s) while 5.4% felt extreme pain or discomfort. Using the Visual Analogue Scale, 29.7% of respondents rated their present health to be between 50 and 80 and 48.8% rated theirs' to be between 80 and 100. Others are as shown in **Table 2**. The health state of majority of the respondents was 1111, which indicates no problems on any of the 5 dimensions. Defining the health state of the respondent on levels of problems showed that majority had no problem with mobility, self-care and performing usual activities as shown in figure 1.

Influence of demographic factors on susceptibility to eye disorders

There were significant association between the eye disorders and socio-demographics except sex. Older patients above 35 years presented with cataracts, 41 (20%) and glaucoma 28 (13.7%). Refractive errors were also more with patients in 18-34 years' age group, 37 (18.1%) and students 33 (16.1%). Health literacy was poor, many of the respondents 32 (15.6) did not know their disease conditions, its severity or prognosis, some did not know the names of their medication and majority 148 (72.2%) also did not have health insurance. The frequency of eye disorders in relation to patients socio-demographic factors is as shown in **Table 3**.

Eye Disorders and Patients' Quality of Life.

Eye disorders significantly impacted on all measured health dimensions except for the pain / discomfort dimension ($P = 0.02$). Majority of the respondents irrespective of eye disorder reported their health status to be between fair and excellent as shown in **Table 4**.

Proportion of reported problems with Eye Disorders.

Comparing the sum of reported problems across the different dimension for the 5 different age groups. The older respondents (65years) reported more problems in the mobility and pain/discomfort dimensions while the younger respondents (19-34 years) had more problems with pain/discomfort and anxiety as shown in figure 1.

Table 2: Frequency of reported problems

Variables		Frequency	Percentage
Mobility	No problems walking about	151	73.7
	Some problems walking about	48	23.4
	Confined to bed	1	0.5
Self care	No problems with self-care	163	79.5
	Some problems washing and dressing self	37	18.0
	Unable to wash or dress self	3	1.5
Usual activities	No problems performing usual activities	160	78.0
	Some problems performing usual activities	37	18.0
	Unable to perform usual activities	4	2.0
Pain/discomfort	No pain or discomfort	99	48.3
	Moderate pain or discomfort	93	45.4
	Extreme pain or discomfort	11	5.4
Anxiety/depression	Not anxious or depressed	147	71.7
	Moderately anxious or depressed	51	24.9
	Extremely anxious or depressed	5	2.4
Health status	Excellent	44	21.5
	Good	103	50.2
	Fair	43	21.0
	Poor	7	3.4
Health today	10-49	20	9.8
	50-79	61	29.7
	80-100	100	48.8

TABLE 3: Frequency of Eye Disorders and Patients Socio-Demographic Factors

Variables	Cataract 55 (26.8%) Frequency	Glaucoma 48(23.4%) Frequency	Refractive Errors 47(22.9%) Frequency	Other Eye Disorders 23(11.2%) Frequency	Eye Disorder Unknown 32(15.6%) Frequency	P Value
Sex						
Male	26(12.7%))	23(11.2%)	19(9.3%)	12(5.8%)	16(7.8%)	0.87
Female	29(14.1%))	25(12.2%)	27(13.2%)	10(4.9%)	16(7.8%)	
Age						
<18yrs	8(3.9%)	5(2.4%)	7(3.4%)	6(2.9%)	3(1.5%)	0.0001
18-34yrs	6(2.9%)	15(7.3%)	37(18.1%)	6(2.9%)	13(6.3%)	
35-64yrs	20(9.8%)	19(9.3%)	2(1.0%)	11(5.4%)	12(5.8%)	
>65yrs	21(10.2%))	9(4.4%)	1(0.5%)	0(0%)	4(1.9%)	
Income/ Month						
<N30,000	15(7.3%)	17(8.3%)	37(18.1%)	4(1.9%)	9(4.4%)	0.0033
N30,000-40,000	4(1.9%)	2(1.0%)	5(2.4%)	3(1.5%)	2(1.0%)	
N40,000-50,000	4(1.9%)	2(1.0%)	0(0%)	2(1.0%)	2(1.0%)	
>50,000	8(3.9%)	6(2.5%)	5(2.4%)	7(3.4%)	6(2.9%)	
Marital Status						
Married	32(15.6%)	25(12.2%)	9(4.4%)	9(4.4%)	16(7.8%)	

Single	13(6.3%)	17(8.3%)	36(17.6%)	9(4.4%)	11(5.4%)	0.0001
Widowed	10(4.9%)	5(2.4%)	1(0.5%)	2(1.0%)	1(0.5%)	
Divorced/Separated	0(0%)	1(0.5%)	0(0%)	1(0.5%)	3(1.5%)	
Occupation						
Student	9(4.4%)	11(5.4%)	33(16.1%)	7(3.4%)	11(5.4%)	0.0001
Government Worker	5(2.4%)	12(5.8%)	4(1.9%)	5(2.4%)	5(2.4%)	
Unemployed	10(4.9%)	5(2.4%)	2(1.0%)	0(0%)	0(0%)	
Self Employed/Private Sector	12(5.8%)	12(5.8%)	4(1.9%)	7(3.4%)	8(3.9%)	
Retired	15(7.3%)	6(2.9%)	0(0%)	2(1.0%)	6(2.9%)	
Educational Level						
Nil	15(7.3%)	9(4.4%)	1(0.5%)	2(1.0%)	3(1.5%)	0.0001
Primary	14(6.8%)	6(2.9%)	2(1.0%)	3(1.5%)	5(2.4%)	
Secondary	12(5.8%)	10(4.9%)	6(2.9%)	7(3.4%)	5(2.4%)	
Post Secondary	13(6.3%)	23(11.2%)	37(18.1%)	11(5.4%)	18(8.8%)	
Insurance						0.0398
Yes	11(5.4%)	6(2.9%)	16(7.8%)	8(3.9%)	12(5.8%)	
No	42(20.5%)	41(20.0%)	31(15.1%)	15(7.3%)	19(9.3%)	
Co Morbidity						0.0001
Diabetes	8(3.9%)	0(0%)	0(0%)	0(0%)	6(2.9%)	
Hypertension	12(5.8%)	8(3.9%)	1(0.5%)	1(0.5%)	1(0.5%)	

Table 4: Proportion of reported problems with Eye Disorders.

Variables	Cataract	Glaucoma	Refractive Errors	Other Eye Disorders	Unknown Eye Disorders	P-Value
	55 (26.8%) Frequency	48 (23.4%) Frequency	45 (21.9%) Frequency	23 (11.2%) Frequency	32 (15.6%) Frequency	
Mobility						
No problems walking about	35(17.1%)	38(18.5%)	38(17.1%)	16(7.8%)	24(11.7%)	0.1014
Some problems walking about	20(9.8%)	10(4.9%)	7(3.4%)	7(3.4%)	5(2.4%)	
Self Care						
No problems with	40(19.6%)	40(19.6%)	41(20.0%)	15(7.5%)	27(13.2%)	

self care)					
Some problems washing and dressing self	15(7.3%)	8(3.9%)	5(2.4%)	8(3.9%)	4(2.0%)	0.0676
Usual Activities						
No problems performing usual activities	38(18.5%)	40(19.6%)	40(19.6%)	17(8.3%)	25(12.2%)	
Some problems performing usual activities	16(7.8%)	8(3.9%)	6(2.9%)	6(2.9%)	5(2.4%)	0.2403
Pain/Discomfort						
No pain or discomfort	21(10.2%)	29(14.2%)	28(13.7%)	6(2.9%)	15(7.3%)	
Some problems with pain/discomfort	34(16.6%)	19(9.3%)	19(9.3%)	17(8.3%)	15(7.3%)	0.0172
Anxiety/Depression						
Not anxious or depressed	40(19.5%)	36(17.6%)	37(18.1%)	14(6.8%)	20(9.8%)	
Some problems with anxiety or depressed	15(7.3%)	12(5.9%)	10(4.9%)	9(4.4%)	10(4.9%)	0.5362
Health Status						
Excellent	7(3.4%)	10(4.9%)	15(7.3%)	5(2.4%)	7(3.4%)	
Good	23(11.2%)	22(10.7%)	27(13.2%)	13(6.3%)	18(8.8%)	
Fair	21(10.2%)	12(5.8%)	4(1.9%)	3(1.5%)	3(1.5%)	
Poor	1(0.5%)	2(1.0%)	1(0.5%)	2(1.0%)	1(0.5%)	
Health Today						
10-50	9(4.4%)	3(1.5%)	3(1.5%)	4(1.9%)	1(0.5%)	
50-80	17(8.3%)	13(6.3%)	14(6.8%)	5(2.4%)	10(4.9%)	
80-100	23(11.2%)	29(14.2%)	22(10.7%)	14(6.8%)	12(5.8%)	

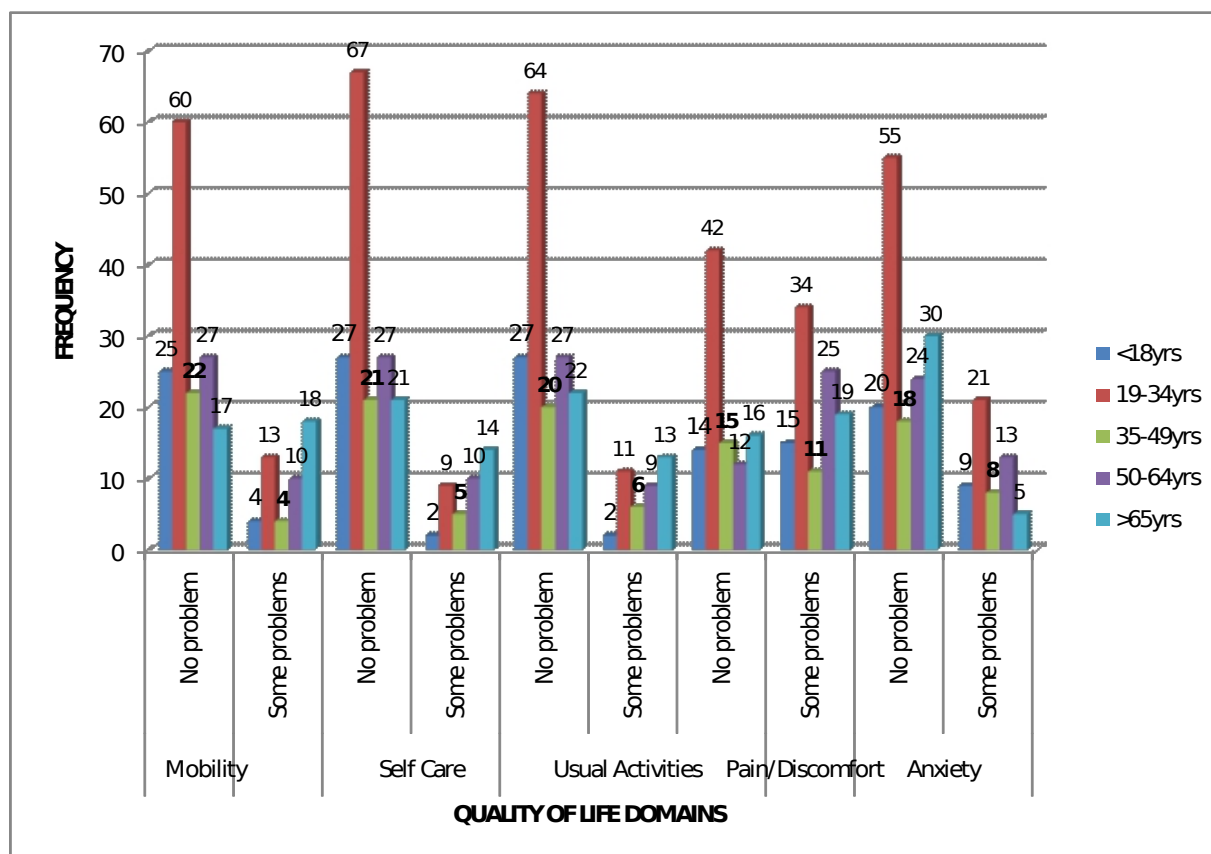


Figure 1: PROPORTION OF REPORTED PROBLEMS BY AGE GROUP IN EYE PATIENTS

DISCUSSION

In this study, eye disorders were more prevalent in the middle age group (18-34 years) and this was particularly true for refractive errors. Similarly, reports from a survey in Nigeria showed that individuals of age group of 35-44 years had the highest prevalence of visual impairment of 45.5%, followed by those that were 25-34 years with 22.7% respectively. [11] Also the prevalence of eye disorders was highest among the low-income workers and hence, susceptibility to eye disorders could be said to be influenced by economic status. An appreciable percentage of high-income workers were also prone to various eye disorders. In consonance with this observation, a survey carried out in Abuja, Nigeria showed that out of the 88 Public Servants screened, 88.7% had refractive errors, 1.1% had cataract, 2.3% had pterygium, 3.4% had disc cupping, 1.1% had chalazion and 3.4% had conjunctivitis. This finding suggests that refractive errors were the leading complaint amongst civil servants in Abuja thus provision of services such as affordable, reasonable-quality spectacles to individuals who need them after being identified through vision screening is as important as the vision screening itself. [11]

The refractive errors (myopia, hyperopia, astigmatism) were highest among school goers. Cline *et al.* (1997) found that Youth onset myopia occurs in early childhood or teenage and ocular power can keep varying until the age of 21. School myopia

appears during childhood, particularly the school-age years and this form of myopia is attributable to the use of the eyes for reading at a close range during school years. [12,13] According to an American study nearly three in 10 children (28.4%) between the ages of 5 and 17 have astigmatism. [14] A recent Brazilian study found that 34% of the students in one city were astigmatic [15] while in Bangladesh nearly 1 in 3 (32.4%) of those over the age of 30 had astigmatism. [16]

Poor health literacy is a major issue affecting the healthcare system of Nigeria and other under-developed and developing countries, as was observed in this study. Majority of respondents had little or no knowledge of their condition, its severity, prognosis, drugs used for treatment, the availability of health insurance; what it entails and its benefits. This observation correlates with a study which attributes poor health literacy to the under developed Nigerian Health System. In their study 43 (14.3%) of the respondents did not understand the instructions on how to use their drugs. [17]

In this study, myopia, was implicated in a variety of other eye disorders. Several studies confirm the presence of harmful co-morbidities in eye patients. Diabetes Mellitus can cause a variety of eye problems, the most common being diabetic retinopathy which is the commonest cause of blindness among people of working age in England, Wales and Scotland. [18] In South India, hypertension and Diabetes Mellitus were the most encountered chronic diseases among patients with cataract. [19]

Cataract and glaucoma were highly prevalent in this study population and refractive errors (myopia, hyperopia and astigmatism) were also quite common. Age-related cataracts are responsible for 51% of world blindness. In many countries surgical services are inadequate, cataracts cause more vision problems globally than any other eye condition or disease especially in developing countries. It is particularly more common among poor people, according to a study carried out in Kenya, Philippines and Bangladesh. [20]

In the study, eye disorders caused more mobility problems in older patients. In a study on age-related eye diseases and mobility limitations in older adults it was discovered that patients with glaucoma had worse mobility limitations, were less likely to drive and more likely to have poor balance than the control group. [21] In our study however, majority of eye patients did not have problems with self-care. This also in agreement with several published studies on early-stage eye diseases/disorders. Majority of eye patients have adjusted to their condition and do not need help with self-care. With degeneration of the disorder, some problems may arise. Those with cataract commonly experience difficulty in appreciating colours and changes in contrast, driving, reading, recognizing faces, and experience problems coping with glare from bright lights. [7] Due to the important role of the visual system in maintenance of balance and posture in human beings, glaucoma patients should consider themselves at greater risk of falls, and would be advised to take the necessary precautions to help prevent any accidents. We found that eye disorders rarely interfered with respondent's usual activities. Interference could however, occur when the condition degenerates significantly. Studies have confirmed that cataract develops very slowly hence, most people may not know they have it, eventually the vision impairment affects the patient's ability to carry out everyday tasks. [20]

In the dimension of pain/discomfort, cataract did not cause any significant pain. Some research has pointed to the link between astigmatism and higher prevalence of migraine headaches. [22] Discomfort is usually caused by conjunctival (e.g. conjunctivitis) or corneal disorder, severe ocular pain is often caused by glaucoma and mild pain by optic neuritis.

However, eye disorders did not have significant association with anxiety or depression dimension. Most patients may have developed anxiety/depression due to continuous worry about their condition. Some studies have indicated that eye disorders such as cataracts, macular degeneration, eye injury, myopia, astigmatism, glaucoma and presbyopia are all associated with anxiety. [23]

Eye disorders did not significantly influence the health status of patients in this study. Majority of respondents, believe they have good health. Very few respondents thought their health status was poor. This maybe because many of the respondents think it is wrong to speak negatively about their health status.

On the Visual Analogue Scale (VAS) in this study, irrespective of the severity and state of their eye disorders, most patients rated their health as either average or high. Studies have shown that patient-reported health status on the Visual Analogue Scale may differ widely from the true health status of the patient. Two major concerns about the Visual Analogue Scale are; difficulties with the data because patients may fail to respond to it according to instructions and there is substantial differences between patient responses on the EQ-VAS versus EQ-5D profile. These issues raise fundamental questions about the use of EQ-VAS in EQ-5D instrument. [24]

Limitation of study: The demographics of our study sample may limit the generalization of our findings. Some of the respondents had very poor eyesight and thus the questionnaire had to be read out to them. In addition, a large percentage of the respondents were illiterate and all questions had to be read out to them in *vernacular* sometimes with the aid of an interpreter. There were also low response rates to certain questions (e.g income per month).

CONCLUSION

Health related quality of life of respondents with eye disorders was above average but became more impaired in the presence of co-morbidities. However, patients often experienced mobility problems. Health literacy was poor; many had no health insurance, no knowledge of their diagnosis and names of medications they use for their eye disorder.

Competing interest: The authors declare no competing interests.

Contribution of authors: We declare that the authors named in this article did this work and all liabilities pertaining to claims relating to the content of this article will be borne by them. SFU conceived and designed the study, SFO collected the data, SFU and VUO analyzed the data, SFO, SFU, wrote the initial manuscript and VUO and AOO reviewed the manuscript.

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