



Age and Gender Variations of Visual Impairment in the Distribution of Cataract at Ehime Mbano, Imo State, Nigeria

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ABSTRACT

This study was carried out in Ehime Mbano Local Government Area of Imo state, Nigeria, to assess the age and gender variations in visual impairment among individuals with cataract. Out of 233 subjects examined, 68 males and 68 females were found to have cataract. The mean age of the male subjects was 61.37 ± 13.97 while the mean age of the female subjects was 56.78 ± 14.05 . Results of the best correctable visual acuity of the male and female subjects in the better eye using the WHO classification revealed that 33 (24.26%) males and 28 (20.60%) females were normal with a best correctable visual acuity of 6/6 to 6/18. Twenty four (17.65%) males and 25 (18.38%) females had visual impairment with a visual acuity of $< 6/18 - 6/60$. Severe visual impairment was seen in 5 (3.67%) males and 4 (2.94%) females. Subjects in categories 3, 4 and 5 were labeled blind according to WHO definition with a male frequency of 1 (0.74%), 4 (2.94%) and 1 (0.74%) respectively. The female frequency was 4 (2.94%), 5 (3.67%) and 2 (1.47%) respectively. SPSS statistical software analysis using the paired sample T

test showed that the age and gender variations in visual impairment was statistically significant at 0.05 level of significance and 95% confidence interval, $t(67) = -4.394$, ($p < 0.05$).

Keywords:

Cataract, visual impairment, visual acuity, age, gender

INTRODUCTION

Cataract is defined as “any opacity of the crystalline lens sufficient to cause visual impairment”¹. Visual loss occurs because opacification of the lens obstructs light from passing and being focused on the retina at the back of the eye². Over time, yellow-brown pigment is deposited in the lens, and this, together with disruption of the lens fibers, reduces the transmission of light and leads to visual problems. The main symptoms of cataract are a slowly, progressive, painless decrease in visual acuity, complaint of glare from light, distortion of vision, reduced color vision and yellowing of vision due to the



modification of light reaching the retina as a result of nuclear sclerosis formation³. For the elderly patients, some may complain of a renewed ability to read without glasses despite a decrease in distance visual acuity. This is due to the slow progression of the cataract (nuclear sclerosis), creating acquired myopia or second sight in the process⁴. The severity of cataract formation, assuming no other eye disease is present, is judged primarily by a visual acuity test. The appropriateness of surgery depends on a patient's particular functional and visual needs and other risk factors, all of which may vary widely⁵. Age is the most common cause of cataract as lens proteins denature and degrade over time, and this process is accelerated by diseases such as diabetes and hypertension⁶. Environmental factors, including toxins, radiation, and ultraviolet light, have cumulative effects, which are worsened by the loss of protective and restorative mechanisms due to alterations in gene expression and chemical processes within the eye⁶. Blunt trauma causes swelling, thickening, and whitening of the lens fibers. While the swelling normally resolves with time, the white color may remain. In severe blunt trauma, or injuries which penetrate the eye, the capsule in which the lens sits can be damaged. This allows water from other parts of the eye to rapidly enter the lens leading to swelling and then whitening, obstructing light from reaching the retina at the back of the eye.

Cataracts may develop in 0.7 to 8.0% of cases following electrical injuries⁷. Ultraviolet light, specifically UV-B, has been shown to cause cataracts, and some evidence indicates sunglasses worn at an early age can slow its development in later life⁸. Microwave

radiation has also been found to cause cataracts. The mechanism is unclear, but may include changes in heat-sensitive enzymes that normally protect cell proteins in the lens. Another possible mechanism is direct damage to the lens from pressure waves induced in the aqueous humor⁹. Cataracts have also been associated with ionizing radiation such as X-rays. The addition of damage to the DNA of the lens cells also has been considered⁹. Electric and heat injuries denature and whiten the lens as a result of direct protein coagulation⁶. Cataracts of this type are often seen in glassblowers and furnace workers. Lasers of sufficient power output are known to damage the eyes and skin. The genetic component is strong in the development of cataracts, most commonly through mechanisms that protect and maintain the lens. The presence of cataracts in childhood or early life can occasionally be due to a particular syndrome such as Down's syndrome and Turner's syndrome⁶. Cigarette smoking has been shown to double the rate of nuclear sclerotic cataracts and triple the rate of posterior subcapsular cataracts¹⁰. Some drugs, such as corticosteroids, can induce cataract development¹¹.

The main types of age-related cataracts are nuclear cataract, cortical cataract, and posterior subcapsular cataract. Nuclear sclerosis, the most common type of cataract, involves the central or 'nuclear' part of the lens. Over time, this becomes hard or 'sclerotic' due to condensation of lens nucleus and deposition of brown pigment within the lens. This type of cataract can present with a shift to nearsightedness and causes problems with distance vision, while reading is less



affected¹². Cortical cataracts are due to the lens cortex (outer layer) becoming opaque. They occur when changes in the water content of the periphery of the lens causes fissuring. When these cataracts are viewed through an ophthalmoscope or other magnification system, the appearance is similar to white spokes of a wheel pointing inwards. Symptoms often include problems with glare and light scatter at night¹². Posterior subcapsular cataracts are cloudy at back of the lens adjacent to the capsule in which the lens sits. Because light becomes more focused toward the back of the lens, they can cause disproportionate symptoms for their size. An immature cataract has some transparent protein, but with a mature cataract, all the lens protein is opaque.

Cataracts can be classified by using the lens opacities classification system III (LOCS III). In this system, cataracts are classified based on type as nuclear, cortical, or posterior subcapsular. The cataracts are further classified based on severity on a scale from 1 to 5. The LOCS III system is highly reproducible. A more severe cataract can result in a visual impairment of that eye. Visual impairment is a decreased ability to see to a degree that causes problems not fixable by usual means, such as glasses or medication¹³. Although most cases of cataract observed in patients have not reached the matured stage to cause blindness or severe visual impairment, it still causes some form of reduced visual acuity. The objective of this study is to assess the visual acuity of cataract subjects at Ehime Mbandi local government area, Nigeria, in view to investigate the level of visual impairment of the subjects and to

analyze the age and gender variations in the distribution of cataract.

MATERIALS AND METHODS

This study was carried out between December 2010 and February 2011 at Ehime Mbandi Local Government Area, Imo state, Nigeria. The research was a cross sectional clinical study. Residents from the various communities were assembled at a civic center at the Local Government council. An informed consent was obtained from all the subjects used for this study. Examination of subjects involved taking of case history, external examination using pen light, visual acuity test using the Snellen visual acuity chart, retinoscopy with the Keeler retinoscope, ophthalmoscopy with the Keeler ophthalmoscope, subjective refraction and visual field test. Subjects with cataract who had refractive errors were corrected with ophthalmic lenses before obtaining their best corrected visual acuity. For this study, all cases of lens opacities both the fully matured and immature cataract was recorded. The SPSS statistical software version 17 was used for analysis. The paired sample T test was used to test the age and gender variations in visual impairment at 95% confidence interval and 0.05 level of significance.

RESULTS

A total 233 subjects were examined. One hundred and one subjects were males while 132 subjects were females. Upon examination of the subjects, 68 male and 68 female subjects were found to have cataract. The severity of the cataract varied from a slight lens opacity to a fully matured cataract. The



mean age of the male subjects was 61.37 ± 13.97 while the mean age of the female subjects was 56.78 ± 14.05 . Table 1 shows the age and gender distribution of the subjects with cataract. The frequency of subjects above 70 years was 24 (17.65%) for the males and 12 (8.82%) for the females. Subjects between 60 and 69 years were the age group with the highest frequency for both gender with 25 (18.38%) males and 27 (19.86%) females. For the age group 50-59, 10 (7.35%) were males and 14 (10.29%) were females. Six (4.41%) male subjects and 10 (7.35%) female subjects were between 40 and 49 years. Only 3 (2.21%) male and 5 (3.68%) female subjects were below 40 years. Table 2 shows the distribution of the best correctable visual acuity of the male and female subjects in the better eye using the WHO classification¹⁴. From the table, 33 (24.26%) males and 28 (20.60%) females were normal with a best correctable visual acuity of 6/6 to 6/18. Twenty four (17.65%) males and 25 (18.38%) females had visual impairment with a visual acuity of $<6/18 - 6/60$. Severe visual impairment was seen in 5 (3.67%) males and 4 (2.94%) females. Subjects in categories 3, 4 and 5 were labeled blind according to WHO definition¹⁴ with a male frequency of 1 (0.74%), 4 (2.94%) and 1 (0.74%) respectively. The female frequency was 4 (2.94%), 5 (3.67%) and 2 (1.47%) respectively. The visual impairment for the male and female subjects were presented in a pie chart in figures 1 and 2. The gender comparison is shown in figure 3. SPSS statistical software analysis using the paired sample T test showed that the age and gender variations in visual impairment was statistically significant at 0.05 level of

significance and 95% confidence interval, $t(67) = -4.394$, ($p < 0.05$).

DISCUSSION

Age related cataract is the most common type of cataract found among the subjects which explains why most of the cataract subjects were above 50 years of age. The cataract is usually more pronounced in one eye than the other eye such that the better eye showed a relatively good visual acuity. Other studies¹⁵⁻¹⁸ also revealed age as the most common cause of cataract. Because there are usually no symptoms and the better eye compensates for the poor vision in the other eye, the people are not aware that they have cataract until vision in the better eye begins to deteriorate. Congenital cataract was the type seen among children below 10 years. The parents are usually afraid of taking their child at that young age for cataract surgery for fear of complications which might make the eye worse than it already is. The tropical climate of Ehime Mbano in southeast Nigeria means that the people are exposed to a lot of ultraviolet radiation from the sun which can aggravate the progression of cataract. Mahdi, *et al.*¹⁹ identified ultraviolet radiation in their study as a risk factor of cataract formation. The subjects who were blind or with severe visual impairment admitted that they were interested in performing cataract surgery so that they could see well again but complained of lack of financial resources or lack of awareness on where to get the best possible surgical treatment. This is borne out of the fact that most people who patronized the local hospitals came back unsatisfied with the outcome of the operation thereby discouraging the others. Kolawole, *et al.*²⁰



identified money and lack of awareness as reasons why individuals did not undergo cataract surgery.

Gender variations in visual impairment among the cataract subjects showed a slightly higher number among the female subjects who are blind according WHO definition¹⁴. Praveen *et al.*¹⁸ also found a higher prevalence of cataract in women than in men. This variation was found to be statistically significant. Possible reason for this could be that the women spend more time in the farms and are exposed to ultraviolet radiation. Also the men are more financial buoyant and can afford medical treatment either in the form of antioxidants to slow than the progression of the cataract and/or cataract surgery to reverse the blindness. Rabiun and Muhammed²¹ reported that males are more financially disposed to seek cataract surgical services than the females. Studies²²⁻²⁶ have also shown that finance and lack of awareness has been a major obstacle toward attainment of medical services at rural areas of developing countries. Recently, non-governmental organizations (NGOs) have been offering free cataract surgical services in Nigeria to ensure that the poor can have access to this treatment. While many people in southeast Nigeria have benefited, many are still yet to get the opportunity. Among the people examined in this study, many admitted going for cataract surgery at cities where these NGOs were present. The ophthalmologists included foreigners who come with better equipment and expertise to perform very successful cataract operations with intra ocular lens implant. However not everyone is fortunate as these NGOs usually operate within a period of time and others are not

aware of these NGOs due to lack of information getting to them. In conclusion, cataract remains the leading cause of blindness in Nigeria with age related cataract being the most common type. Age and gender variations were statistically significant with females showing a greater visual impairment. Proper awareness need to be intensified toward sensitizing the people on the availability of cataract surgery and management of cataract.

REFERENCES

- [1.] Nicholas, P.B. and Patel, C.K. (1994). The status of Vitamins for the Treatment and Preventions of Cataract. *The Optician*. 5473:208.
- [2.] Quillen, D.A.(1999). "Common causes of vision loss in elderly patients". *Am Fam Physician*, 60 (1): 99–108
- [3.] Johnson, G.J., Minassian, D.C., Weale, R.A. and West, S.K. (2003). *The Epidemiology of Eye Diseases*. 1st ed. London:Arnold Publishers.
- [4.] Kanski, J.J. (2006). *Clinical Ophthalmology*. Philadelphia: Elsevier Butterworth Heinemann.
- [5.] Emmett, T. and Cunningham, P. (2005). *Vaughan and Asbury's general ophthalmology*. 18th ed. McGraw-Hill Medical.
- [6.] Duker, J.S. and Myron Y. (2009). *Ophthalmology*. St. Louis: Mosby/Elsevier.
- [7.] Reddy, S.C. (1999). "Electric cataract: a case report and review of the literature." *European journal of ophthalmology*,9 (2): 134–8.
- [8.] Sliney, D.H. (1994). "UV radiation ocular exposure dosimetry". *Doc Ophthalmol*, 88(4): 243–54.



- [9.] Lipman, R.M., Tripathi, B.J. and Tripathi, R.C. (1988). "Cataracts induced by microwave and ionizing radiation". *Surv Ophthalmol*, 33 (3): 200–10.
- [10.] Christen, W.G., Manson, J.E., Seddon, J.M., Glynn, R.J., Buring, J.E., Rosner, B. and Hennekens, C.H. (1992). "A prospective study of cigarette smoking and risk of cataract in men". *JAMA*, 268 (8): 989–93.
- [11.] Spencer, R.W. and Andelman, S.Y. (1965). "Steroid cataracts. Posterior subcapsular cataract formation in rheumatoid arthritis patients on long term steroid therapy". *Arch Ophthalmol*, 74:38–41.
- [12.] Bollinger, K.E. and Langston, R.H. (2008). "What can patients expect from cataract surgery?" *Cleveland Clinic journal of medicine*, 75(3): 193–196.
- [13.] Ardit, A. and Rosenthal, B. (1998). Developing an objective definition for visual impairment. Proceedings of the International Low Vision Conference, Madrid, Spain. 331-334.
- [14.] WHO (2013). Priority eye diseases. Available at: <http://www.who.int/blindness/causes/priority/en/index5.html> (retrieved June 15, 2013).
- [15.] Afonne, J.C. and Amaechi, O.U. (2012). Prevalence of blinding cataract in some rural communities in Abia state, Nigeria. *Blindness Low Vision Journal*, 1:32-34.
- [16.] Ramke, J., Palagy, A. and Naduvilath, T. (2007). Prevalence and causes of blindness and low vision in Timor-Leste. *British Journal of Ophthalmology*, 91:1117-21.
- [17.] Azuamah Y.C., Amadi A.N., Esenwah E.C. and Iloh G.U. (2013). Major Causes of Low Vision and Blindness in Southeast Nigeria, *International Journal of Health Science and Research*, 3(12): 48-52.
- [18.] Praveen, V., Badrinath T., Madhurjya G., Giovanni M. and Monica C. (2011). Prevalence of Cataract in an Older Population in India *Ophthalmology*. 118(2-19): 272–278
- [19.] Mahdi, A.M., Rabiou, M., Gilbert, C., Sivasubramaniam, S., Murthy, G.V., Ezelum C. and Entekume, G. (2014). Prevalence and risk factors for lens opacities in Nigeria: results of the national blindness and low vision survey. *Invest Ophthalmol Vis Sci.*, 55(4):2642-51.
- [20.] Kolawole, O.U., Ashaye, A.O., Mahmoud, A.O. and Adeoti, C.O. (2012). Cataract blindness in Osun state, Nigeria: results of a survey. *Middle East Afr J Ophthalmol.*, 19(4):364-71.
- [21.] Rabiou, M.M. and Muhammed, N. (2008). Rapid assessment of cataract surgical services in Birnin-Kebbi local government area of Kebbi State, Nigeria. *Ophthalmic Epidemiol.* 15(6):359-65.
- [22.] Ahuama, O.C., Awazie, T. and Esenwah, E.C. (2012). Major causes of low vision and blindness in Abia state. *Blindness Low Vision Journal*, 1:40-43.
- [23.] Ahuama, O.C. and Nwala, O.R. (2013). Major causes of preventable blindness among the aged in Enugu East Local Government Area, Enugu state, Nigeria. *Blindness and Low Vision Journal*, 2:49-52
- [24.] Saw, S.M., Husain, R. and Gazzard, G.M. (2003). Causes of low vision and blindness in rural Indonesia. *British Journal of Ophthalmology*, 87:1075-78.
- [25.] Azuamah, Y.C., Amadi, A.N., Esenwah, E.C. (2013). Impact of diabetic retinopathy on low vision in Okagwe Ohafia,

Abia state, Nigeria. *Blindness and Low Vision Journal*, 2:45-48.

[26.] Wong, T.Y., Loon, S.C. and Saw, S.M. (2006). The epidemiology of age related eye

diseases in Asia. *British Journal of Ophthalmology*, 90:506-511

TABLES

Table 1: Age and gender distribution of cataract subjects

Age range	Male frequency	%	Female frequency	%
1-9	0	0.00	2	1.47
10-19	1	0.74	0	0.00
20-29	2	1.47	0	0.00
30-39	0	0.00	3	2.21
40-49	6	4.41	10	7.35
50-59	10	7.35	14	10.29
60-69	25	18.38	27	19.86
≥70	24	17.65	12	8.82
TOTAL	68	50.00	68	50.00

Table 2: Distribution of the best correctable visual acuity among cataract subjects

Category	Corrected Visual Acuity	WHO Definition	Male Frequency	%	Female Frequency	%
5	NLP	Blind	1	0.74	2	1.47
4	<1/60 - LP	Blind	4	2.94	5	3.67
3	<3/60 – 1/60	Blind	1	0.74	4	2.94
2	<6/60 – 3/60	Severe visual impairment	5	3.67	4	2.94
1	<6/18 – 6/60	Visual impairment	24	17.65	25	18.38

0	6/6 – 6/18	Normal	33	24.26	28	20.60
Total			68	50.00	68	50.00

FIGURES

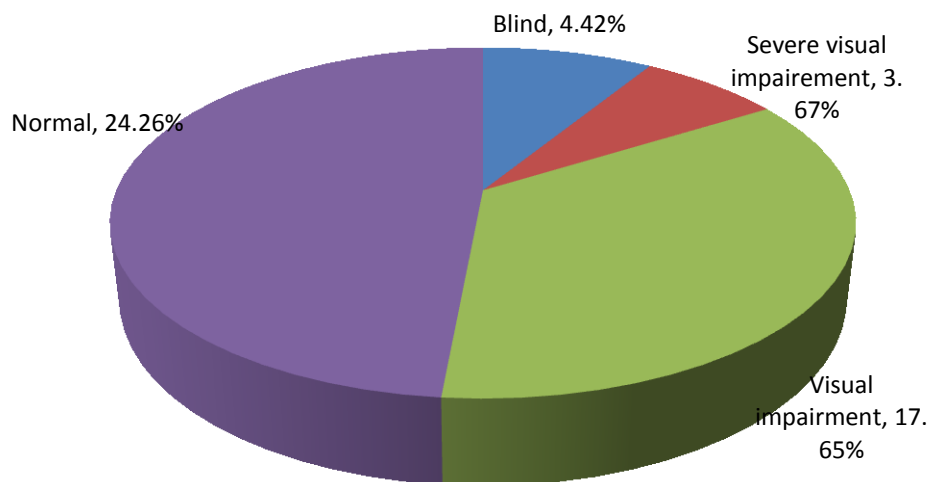


Figure 1: Visual Impairment among male cataract subjects according to WHO classification

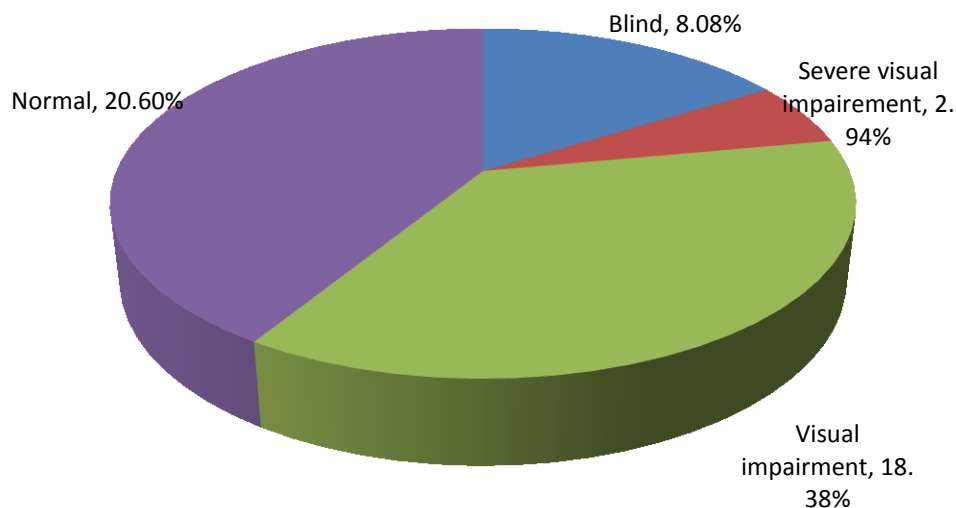


Figure 2: Visual Impairment among female cataract subjects according to WHO classification

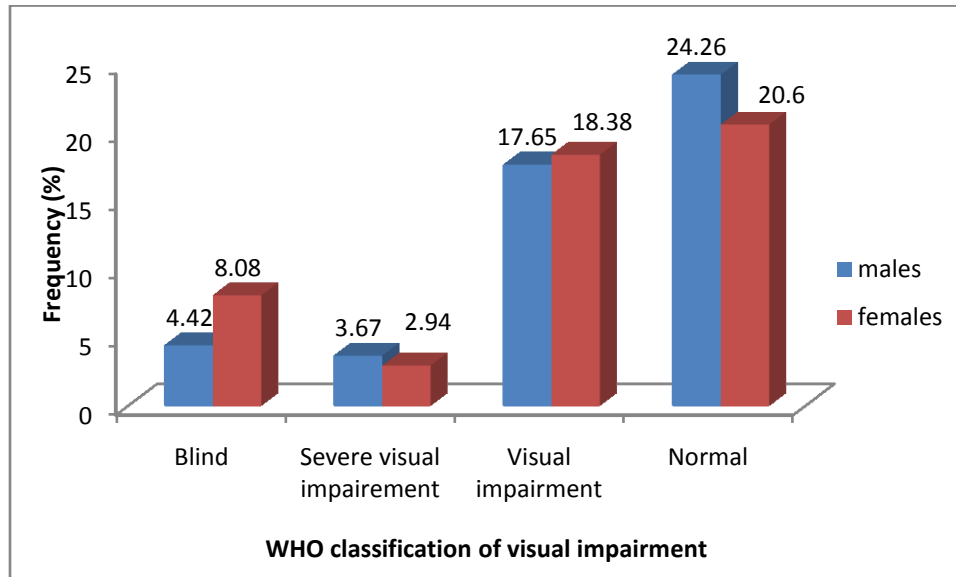


Figure 3: Gender comparison of visual impairment among cataract subjects according to WHO classification