

Refractive Errors Among Nigerian Youths

Aguwa U. S.

Ovie F. O

Department of Human Anatomy, Faculty of Basic Medical Sciences, Nnamdi Azikiwe University, Nnewi Campus

Olu S.I.,

Department of Human Anatomy, Faculty of Basic Medical Sciences Madonna University Nigeria

Ezejindu D.N

Department of Optometry, Faculty of Health Sciences, Madonna University Nigeria

Abstract: Genetic, cultural and environmental factors play key roles in the prevalence and distribution of refractive errors. More youths in Nigeria today use medicated glasses to enhance vision than we had in the past decades. This study is aimed at revealing the prevalence of refractive errors among students of Madonna University Nigeria, Elele campus, Rivers state. One thousand (1000) questionnaires were randomly distributed to 3rd year undergraduate students in various departments in the college of medicine, including Anatomy, Physiology, Medical laboratory Science, Optometry, Public health, and Pharmacy. Eight hundred and fifty two (85.2%) out of the 1000 of the questionnaires shared were retrieved and analyzed using simple percentages. Data collected included information on age, sex, state of origin, place of residence and presence of refractive errors. Our results reveal that the incidence of refractive errors was highest in the North-west region of the country having (93.55%). This was followed by South-west (50.51%), South-south (32.88%), South-east (27.67%), North central (18.03%) and North-east (15.79%). The highest occurring refractive error among the six geopolitical regions of Nigeria is myopia (54%), followed by hyperopia (21.01%), astigmatism (15.30%) and presbyopia (9.46%). This work represents the first attempt at having a comprehensive outlook at the statistics of refractive errors among Nigerian youths from across the country.

Keywords: Refractive errors, myopia, hyperopia, astigmatism, presbyopia.

I. INTRODUCTION

The rate at which younger people below the age of 50 years use medicated glasses today in our society is alarming. Traditionally we associate poor eyesight with ageing; hence it looks normal when elderly persons use medicated glasses to support their failing eyesight. However, when a good population of teens and youths wear medicated glasses, it is a pointer to the possibility of rising incidence of refractive errors in the population. This study provides data on the incidence of refractive errors among Nigerian youths. Recent studies done among children and young adults shows that refractive error has been the most prevalent ocular morbidity despite being to a very large extent correctable (Vinay and Shruthi 2016;

Prakash et al, 2015). Refractive errors vary over age, gender, race and ethnicity, level of education, social class and degree of urbanization (Prema 2011).

Reports show that 2.3 billion people worldwide have refractive errors, out of which about 500 million people mostly in developing countries have no access to proper checkup and correction. This has resulted mostly in either blindness or impaired vision (Holden et al., 2000). In Pakistan, 11.4% of the blindness is due to uncorrected refractive errors (National Committee for Prevention of Blindness, Ministry of Health 1994-98; P. 24). Studies indicate that refractive errors are mainly caused by genetic factors, while others suggest interplay between genetics and environmental factors (Feldkamper and Schaeffel 2003). Apart from a positive

history of wearing glasses in the family, environmental factors may include close work or near activity such as prolonged study hours, watching computers / television etc. (Zadnik 1997; Saw et al., 2002).

Tebepa 2 reported 26% prevalence of refractive errors in Port Harcourt, Ayed *et al*, found refractive errors in school children to be 57.2% in a community in Tunisia 3, While Chuka- Okosa reported 1.97% prevalence of refractive errors among students of post primary institution in a rural community in south-eastern Nigeria 4. Askira 13 reported refractive errors of 31.8% in Obafemi Awolowo University Teaching Hospital. These widely differing reports on prevalence of refractive errors may be due to difference in sample size and the nature of the population studied.

Myopia, the most studied refractive error is emerging as a global health problem, due to the costs associated with correction, and its associated pathology such as retinal tears, retinal detachments, and macular degeneration (Curtin, 1985). The prevalence of myopia varies in different parts of the world, being more prevalent in industrialized countries and cities compared to rural areas (Uzma, et al., 2009). Other studies have found an association between socioeconomic status, education, academic achievement, and myopia (Teasdale and Goldschmidt, 1988; Rosner and Belkin 1987; Parssinen, 1987). In the US, the prevalence of myopia for people between the ages of 12 and 54, surged from 25% in the early 1970's to 42% by 2000 (Saw, et al., 2002). In Taiwan and Singapore, myopia is found in approximately 30% of all children 6 and 7 years old, and increases to 80% in young adults (Saw, et al., 2002). The rapid increase in the prevalence of myopia strongly suggests that environmental factors are having a considerable influence on the development of myopia not explainable by the genetic model (Saw et al,1996; Mutti et al,1996).

The prevalence of myopia is about 20% in the United States.5, 6. In Sumatra, Indonesia Saw et- al 7 reported 26.1% prevalence of myopia while Raju *et-al* 8 in India reported 26.99%. Askira 13 reported 21.1% and Adegbehingbe et-al 9 reported myopia as the commonest spherical error constituting 22.7% of their series in a study on the pattern of refractive errors at Obafemi Awolowo University Teaching Hospital, Ile-Ife, in the western part of Nigeria. The prevalence of myopia is about 20% in the United States, but varies with age, sex, race , ethnicity , occupation , environment, and other factors in various sampled populations.5,6 In Sumatra, Indonesia Saw et-al7 reported 26.1% prevalence of myopia while Raju *et-al*8 in India reported 26.99%. Adegbehingbe et-al9 reported myopia as the commonest spherical error constituting 22.7% of their series in a study on the pattern of refractive errors at Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria.

Myopic youths tend to be bookworms and introverts which could be as a result of the inability to see properly at far distances thereby making near work a favourable and safer routine. Hyperopia has usually been found to be less prevalent than myopia among youths. This could be as a result of the still high accommodative state present in youths which compensates for any latent hyperopia. (Megbelayin et al, 2014) though in young children hyperopia and astigmatism

may be found to be higher than myopia (Jimenez et al, 2012, Krishnamurthy et al 2014).

In young children hyperopia and astigmatism may be found to be higher than myopia (Jimenez et al, 2012, Krishnamurthy et al 2014). Hypermetropia is considered to be the most common refractive error in infants. Faderin 10 reported hypermetropia constituting 52.2% of refractive errors in primary school children in Nigeria while Montes-Mico11 reported 35.6% prevalence of hypermetropia in Spain. In a survey of the prevalence of refractive errors among children in lower primary school in Kampala district, Kawuma 12 reported astigmatism as the commonest single refractive error accounting for 52% of all errors of refraction while Adegbehingbe 9 reported 52.8 in Ile-Ife, Nigeria, Askira 13 reported 22.9% while Presbyopia accounted for 51.3% of patients with refractive errors.

II. METHODS

This study was carried out among 2nd year students of Madonna University Nigeria, Elele campus.

This population was chosen to ensure that whatever visual problems seen were not acquired within the period as a student but was already present before the individual came into the school. This was also ensured further by using only respondents who have used medicated glasses for at least five years. Meaning that usage must have commenced before studentship. One thousand (1000) questionnaires were randomly distributed to undergraduate students in various departments in the college of medicine, including Anatomy, Physiology, Medical laboratory Science, Optometry, Public health, and Pharmacy. Also, our distribution of students according to the states of Nigeria is based on residency, not place of origin. As such, this work leans more towards environmental rather than genetic causes. Future analysis will consider the genetic factors. 930 of these questionnaires were retrieved (93%). Out of that number, 864 (86.4%) met with the conditions stated above and were used for the study. The remaining 66 were discarded. Data were analyzed using simple percentages. Data collected included information on age, sex, state of origin, place of residence with duration and presence of refractive errors.

III. RESULTS

Region	Total Respondents	Number using medicated glasses	Percentage
North West	31	19	61.29%
South West	97	49	50.51%
South South	295	97	32.88%
South East	300	83	27.67%
North Central	122	22	18.03%
North East	19	3	15.79%

Table 1: Incidence of Refractive errors across the regions of Nigeria

Table 1 shows the incidence of use of refractive North-west and south-west had the highest incidences of refractive errors with 61.29% and 50.51% respectively. North east and North central had the least incidences with 15.79% and 18.03% respectively.

S/N	Refractive Error	Number	Percentage
1	Myopia	148	54.21 %
2	Hypermetropia	77	28.21 %
3	Presbyopia	5	1.83 %
4	Astigmatism	43	15.75 %
	Total	273	100 %

Table 2: Distribution of refractive error cases

From table 2, myopia had the highest occurrence with 54.21% of all cases, followed by hypermetropia (28.21%), Astigmatism (15.75%) and presbyopia (1.83%).

Region	Myopia		Hypermetropia		Presbyopia		Astigmatism	
	N	%	N	%	N	%	N	%
South east	47	31.76	21	27.27	1	20.00	11	25.58
South south	52	35.13	33	42.86	0	0.00	9	20.93
South west	27	18.24	7	9.09	2	40.00	11	25.58
North east	3	2.03	0	0.00	0	0.00	0	0.00
North central	11	7.43	9	11.69	1	20.00	5	11.63
North west	8	5.41	7	9.09	1	20.00	7	16.28
Total	148	100	77	100	5	100	43	100

Table 3: Distribution of Refractive errors across the regions of Nigeria

Table 3 shows the distribution of refractive errors across the 6 geopolitical zones of the country. Myopia was highest in south south and least in North east. South east and South west had high values. Hypermetropia was also highest in South south, followed by South east and North central. It was lowest South west and North west.

S/N	State	Number	Percentage	S/N	State	Number	Percentage
1	Rivers	27	18.12 %	11	Ondo	3	2.01%
2	Lagos	22	14.80 %	12	Osun	2	1.34 %
3	Delta	21	14.10 %	13	Bauchi	2	1.34 %
4	Anambra	15	10.10 %	14	Kano	2	1.34 %
5	Imo	12	8.05 %	15	Ebonyi	1	0.67 %
6	Enugu	11	7.38 %	16	Oyo	1	0.67 %
7	Abia	9	6.04 %	17	Borno	1	0.67 %
8	FCT	8	5.37 %	18	Kogi	1	0.67 %
9	Cross River	5	3.36 %	19	Sokoto	1	0.67 %
10	Kadunna	4	2.68 %	20	Katsina	1	0.67 %
	Total				Total	149	100%

Table 4: Distribution of Myopia according to states in Nigeria

Table 4 shows the frequency of myopia according to individual states of Nigeria. This frequency however only represents a direct numerical counting, comparing a state with the total number of cases. So as expected, states in the south will have more frequency than those in the North as the

University is located in Rivers state, south south part of the country.

S/N	State	Number	Percentage	S/N	State	Number	Percentage
1	Rivers	19	24.67 %	10	Kogi	2	2.60 %
2	Delta	8	10.40 %	11	Kano	2	2.60 %
3	Imo	7	9.09 %	12	Cross River	1	1.30 %
4	Anambra	6	7.79 %	13	Sokoto	1	1.30 %
5	Edo	6	7.79 %	14	Plateau	1	1.30 %
6	Lagos	6	7.79 %	15	Kadunna	1	1.30 %
7	FCT	6	7.79 %	16	Niger	1	1.30 %
8	Abia	5	6.49 %	17	Osun	1	1.30 %
9	Enugu	4	5.19 %				
	Total				Total	77	100 %

Table 5: Distribution of Hypermetropia according to states in Nigeria

Table 5 shows the frequency of hypermetropia by states. As in above, states in the southern part of the country had the highest frequency by number.

S/N	State	Number	Percentage
1	Lagos	2	50 %
2	Anambra	1	25 %
3	FCT	1	25 %
	Total	4	100%

Table 6: Distribution of Presbyopia according to states in Nigeria

Table 6 Shows the distribution of presbyopia according to states where cases were recorded in our work.

S/N	State	Number	Percentage	S/N	State	Number	Percentage
1	Lagos	11	25.58 %	8	Katsina	2	2.33%
2	Imo	7	16.28 %	9	Abia	1	2.33%
3	Delta	6	13.95 %	10	Anambra	1	2.33%
4	FCT	5	11.63 %	11	Osun	1	2.33%
5	Enugu	3	6.98 %	12	Plateau	1	2.33%
6	C. River	2	4.65 %	13	Kadunna	1	2.33%
7	Rivers	2	4.65 %				
	Total				Total	43	100%

Table 7: Distribution of Astigmatism according to states in Nigeria

Table 7 shows the distribution of Astigmatism according to states in Nigeria.

IV. DISCUSSION

Our results reveal that out of the total of 864 respondents used for this study, 31.60% (273) had a refractive error. It means from our results that the incidence of refractive errors among Nigerian youths in tertiary institution stands at 31.60%. This is comparable to the 37.39 % reported by Prema 2011 in

a study carried out in India. Our results reveal that North-west region had the highest prevalence of the use of medicated glasses among youths at 61.29%. This is followed by south-west (55.67%), south-south (36.27%), south-east (31.67%), north-central (19.67%) and north-east (15.79%).

The incidence of refractive errors according to the different regions of the country shows that North-west had the highest incidence with 61.29%, South-west 50.51%, South-south 32.88%, South-east 27.67%, North central 18.03% and North-east 15.79%. This could be associated with the reported high level of poverty and living conditions in this region of the country. It is in line with the report of Feldkamper and Schaeffel (2003) which shows that environmental factors is associated with the frequency of refractive errors.

The highest occurring refractive error among the six geopolitical regions of Nigeria is myopia (54.21 %), followed by hyperopia (28.21%), astigmatism (15.75%) and presbyopia (1.83%). This is similar to the report of Adeoti and Egbewale, 2008 in a study carried out in Ado ekiti where myopia constituted 39.33%, hypermetropia 23.33% and astigmatism 21.80%. The increasing incidence of refractive errors and consequent use of medicated glasses may be associated with the longer time our youth spend reading books, working on the computer and watch television according to the report of Prema (2011). This may explain why the incidence was higher in more developed cities and states of the country than the less developed places. Our study population is undergraduates in one of Nigeria's foremost private university. This population has no difficulty with access to eye clinic or basic medical treatment. South-east and south-south had the highest frequency of myopia. These regions are among the most urbanized in the country. This is in line with previous works that shows a positive correlation between myopia and urbanization/industrialization (Saw, et al., 2002).

V. CONCLUSION

Our results suggests that there is a rise in the incidence of refractive errors among our youths, leading to increase in the use of medicated glasses, a phenomenon that was more common among the elderly in our society.

VI. RECOMMENDATION

- ✓ We therefore recommend that government and its agencies should pay attention to those environmental factors that predispose our youths to visual impairments.

- ✓ This study can be extended to specific regions of the country, especially those with observed high incidence from this study.
- ✓ Also, attention should be paid to sexual disparity in the manifestation of these refractive errors.

REFERENCES

- [1] Dunaway D, Berger I. Worldwide distribution of visual refractive errors and what to expect at a particular location. Presentation to the International Society for Geographic and Epidemiologic Ophthalmology; p1-9
- [2] Tebepah T. Pattern of eye diseases in Port Harcourt and an oil producing rural community; Nig J Ophthalmol 1995;3(2): 6-8
- [3] Ayed T, Sokka M, Charfi O, Matri EI. Epidemiologic study of refractive errors in school children in socioeconomically deprived regions in Tunisia. J Fr Ophthalmol,2002; 25(7): 712-717
- [4] Chuka-Okosa CM. Refractive errors among students of a postprimary institution in a rural community in Southeastern Nigeria. West Afr J Med 2005; 24(1): 62-65
- [5] Curtin BJ: The Myopias: Basic Science and Clinical Management. Harper & Row, Philadelphia, 1985; 39-59
- [6] Mutti DO, Zadnik K. Age related decreases in the prevalence of myopia: longitudinal change or cohort effect? Invest Ophthalmol Vis Sci 2000; 41: 21032107
- [7] Saw SM, Gazzard G, Koh D, et-al. Prevalence rates of refractive errors in Sumatra, Indonesia. Invest Ophthalmol Vis Sci 2002; 43(10): 3174-3180
- [8] Raju P, Ramesh SV, Arvind H, Gearge R, et-al. Prevalence of refractive errors in South Indian Population. Invest Ophthalmol Vis Sci 2004; 45(12): 4268- 4272
- [9] Adegbhingbe BO, Majekodunmi AA, Akinsola FB, Soetan EO. Pattern of refractive errors at Obafemi Awolowo University Teaching Hospital, Ile-Ife, Nigeria. Nig J of Ophthalmol 2003; 11(2): 76-79
- [10] Faderin MA, Ajaiyeoba AI. Refractive errors in primary school children in Nigeria. Nig J Ophthalmol, 2001; 9(1): 10-14
- [11] Montes-Mico R, Ferrer-Blasco T. Distribution of refractive errors in Spain. Doc Ophthalmol 2000; 101(1): 25-33
- [12] Kawuma M, Mayeku R. A survey of the prevalence of refractive errors among children in lower primary schools in Kampala district. Afr Health Sci 2002; 2(2): 69-72
- [13] Askira BH AND Akobundu MN (2006). REFRACTIVE ERRORS IN MAIDUGURI BOMJ, (3): 2.