

# Prevalence of Refractive Error in a Rural Ogoni Community in Southern Nigeria

AA Onua,<sup>1</sup> CN Pedro-Egbe,<sup>2</sup> S Babatunde<sup>3</sup>

<sup>1</sup>Department of Ophthalmology, Braithwaite Memorial Specialists Hospital, Port Harcourt

<sup>2</sup>Department of Ophthalmology, University of Port Harcourt Teaching Hospital, Port Harcourt

<sup>3</sup>Department of Preventive and Social Medicine, University of Port Harcourt

## ABSTRACT

**Background:** Refractive error, though not life-threatening, can negatively affect the quality of the socio-economic life of an individual, especially in a poor-resource setting.

**Objective:** To determine the prevalence and pattern of the distribution of refractive error in Kegbara-Dere community in Gokana local government area of Rivers State, Nigeria.

**Methods:** This study forms part of a baseline ocular health survey among the residents of Kegbara Dere (K-Dere), a community designated for community eye outreach in Gokana local government area of Rivers State, Nigeria. Visual acuity was tested outdoors using the Snellen chart and near vision with a near vision chart. Objective refraction was done in a darkened area with a streak retinoscope, and subjectively refined to determine the refractive status of the subject.

For this study, refractive error is defined as presenting vision  $< 6/6$  and improved by one or more lines on the Snellen chart when looking through the pin-hole or with the aid of a minimum of 0.25D lens. Myopia was diagnosed when the correction of the eye was more than minus 0.25DS; hypermetropia, when the correction of the eye was  $> + 0.25DS$ . All astigmatic refractions were recorded at their spherical equivalent.

**Results:** The prevalence of refractive error was 28.5%. Of this, hypermetropia was seen in 19.2%, while myopia was seen in 9.3% of the cases. Most of the study population (71.5%) were emmetropic. The highest number of emmetropes and hypermetropes occurred in the 20-29 year age group, while most myopes were seen in the 50-59 year age group.

**Conclusion:** Refractive error constitutes a significant cause of ocular morbidity in Kegbara community.

**Key words:** refractive error, rural community

## INTRODUCTION

Refractive error is a common cause of impaired vision, and a leading cause of treatable blindness in many parts of the world,<sup>1,2,3</sup> including Nigeria. Avoidable blindness, including that due to uncorrected refractive error, is one of the world's major ocular health problems.<sup>4</sup>

It is estimated that between 800 million and 2.3 billion people worldwide have errors of refraction.<sup>5</sup> Severe refractive error accounts for about 8 million blind people, and about 90% of all people with uncorrected refractive error reside in low- and middle-income countries.<sup>6,7</sup>

The prevalence of impaired vision due to uncorrected refractive error in a population-based study among Mexican Americans in Arizona, USA, was over 73%.<sup>8</sup> In order to tackle problems of avoidable blindness, the World Health Organization, in collaboration with the International Agency for the Prevention of Blindness (IAPB) and non-governmental organizations (NGOs), launched 'Vision 2020: The Right to Sight' in 1998<sup>4</sup> with the sole objective of eliminating avoidable blindness by the year 2020. Reports suggest that 5-25% of blindness in some countries is caused by refractive error, and as much as 4% of the population sees  $< 6/18$  because of this condition.<sup>7</sup> In Ghana, refractive error was present in 4.8% of the all hospital patients with visual impairment.<sup>2</sup>

The report of the Nigeria National Blindness and Low Vision Survey (2005-2007) showed that 61% of adults aged 40 years and above are visually impaired from uncorrected refractive error.<sup>6</sup> Of these, 50% were moderately visually impaired, 10% had severe visual impairment, and 1% was blind.<sup>6</sup> It was estimated that about 1.5 million Nigerian adults need spectacles for distant vision.<sup>6</sup> Studies in Western Nigeria report a varied prevalence of refractive error, ranging from 37.3%-54.9%.<sup>9,10,11</sup> In eastern Nigeria, the

\*Correspondence: Dr. Azubuike Alfred Onua, Department of Ophthalmology, Braithwaite Memorial Specialists Hospital, Port Harcourt, Nigeria • email: [onuadr@yahoo.com](mailto:onuadr@yahoo.com)

prevalence of refractive error ranges from 20.5% in Enugu<sup>12</sup> to 54.5% in Onitsha,<sup>13</sup> though these are more urban settings.

In rural communities in Rivers State, Nigeria, refractive error was found to be the commonest cause of visual impairment, accounting for 32.1% of all cases of visual impairment.<sup>14</sup> Similarly, a study in Ahoada-East LGA in Rivers State, also largely rural, reported a prevalence of 26.8%.<sup>15</sup> This study aimed to describe the prevalence and pattern of refractive error in a rural Ogoni community in Southern Nigeria as part of a baseline assessment of ocular health, prior to the commencement of a community eye outreach by the University of Port Harcourt Teaching Hospital (UPTH).

### MATERIALS AND METHODS

This was a household-based, cross-sectional study carried out between October and December 2009, among residents of Kegbara-Dere (K-Dere) community in Gokana local government area of Rivers State, Nigeria. K-Dere is one of the communities in the Ogoni ethnic nationality. The community was identified as the eye outreach post for training in the Department of Ophthalmology, UPTH. Participants were selected by simple random sampling from a list of households previously enumerated by the Department of Preventive and Social Medicine, University of Port Harcourt. All consenting participants had visual acuity (VA) tests done outdoors using Snellen chart (literate and tumbling 'E'-chart), and near vision was assessed with a near vision chart. Each eye was tested separately, first at 6 metres, and where the subject could not see 6/60, the test was repeated at 3 metres. The pin-hole was presented when VA was  $\leq 6/9$ . Objective refractions were done in a darkened area with the streak retinoscope (Heine Beta 200-Ce) and then a subjectively refined spherical equivalent. Data entry and analysis were done with the Statistical Package for Social Sciences (SPSS) version 16. Statistical significance was taken as  $P < 0.05$ .

For this study, refractive error was defined as presenting vision  $< 6/6$ , and improved by one or more lines on the Snellen chart when looking through the pin-hole or with the aid of a minimum of 0.25D lens. Myopia was diagnosed when the correction of the eye was more than minus 0.25DS; hypermetropia, when the correction of the eye was more than plus 0.25DS. All astigmatic refractions were recorded at their spherical equivalent value.

Funduscopy was carried out by the author with a direct ophthalmoscope in a chosen dark area. Where small pupils prevented a good view of the fundus, they were dilated with mydriacyl 0.5%. Subjects with prolonged dilated pupils were treated with topical pilocarpine and reassured before

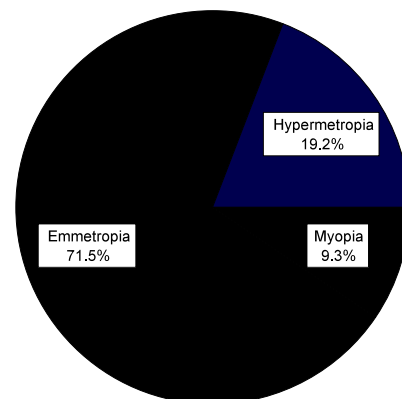
discharge. Ethical clearance for this study was obtained from the University of Port Harcourt Teaching Hospital Ethics Committee.

### RESULTS/ DISCUSSION

A total of 1562 subjects (3124 eyes) were studied; 812 (52%) were males and 750 (48%) were females, giving a male:female ratio of about 1.1:1. The mean age of the study subjects was  $36.3 \pm 2.6$  years. The youngest was 15 years old, while the oldest was 89 years old. About 65% (1018) were less than 40 years old. Below age 40, there were 472 males and 546 females, but above age 40, males outnumbered females by a ratio of 1.7:1. The prevalence of refractive error was found to be 28.5% (445) of the study population; of this, hypermetropia was seen in 19.2% (299), while myopia was found in 9.3% (146). Most of the study population, 71.5%, were emmetropic. The highest number of emmetropes and hypermetropes occurred in the 20-29 years age group, whereas the largest number of myopes was seen in the 50-59 age group.

**Table 1.** Age and sex distribution of study population

| Age group | Male (No) | Male % of total | Female (No) | Female % of total | Total | %    |
|-----------|-----------|-----------------|-------------|-------------------|-------|------|
| 15-19     | 52        | 3.3             | 58          | 3.7               | 110   | 7.0  |
| 20-29     | 204       | 13.1            | 295         | 18.9              | 499   | 31.9 |
| 30-39     | 216       | 13.8            | 193         | 12.3              | 409   | 26.2 |
| 40-49     | 182       | 11.6            | 111         | 7.1               | 293   | 18.8 |
| 50-59     | 122       | 7.8             | 58          | 3.7               | 180   | 11.5 |
| 60-69     | 27        | 1.7             | 30          | 1.9               | 57    | 3.6  |
| 70-79     | 7         | 0.4             | 4           | 0.3               | 11    | 0.7  |
| 80-89     | 2         | 0.13            | 1           | .06               | 3     | 0.2  |



**Figure 2.** Pattern of refractive status of study population

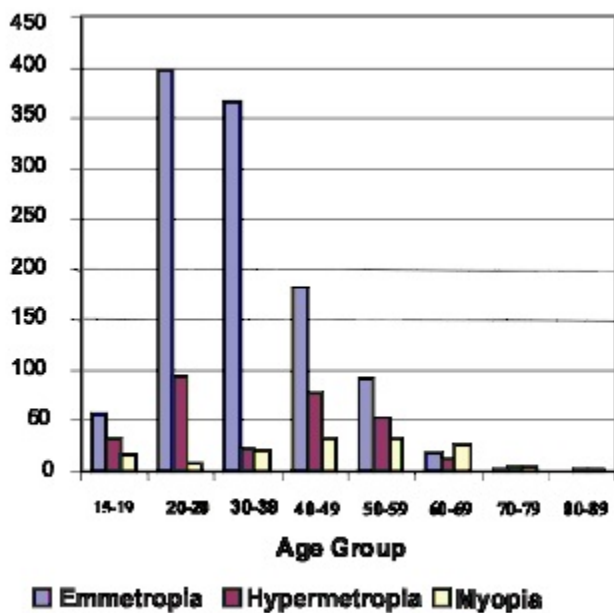


Figure 3. Distribution of refractive status according to age

The prevalence of refractive error from this study was 28.5%, which is similar to other population-based studies in Nigeria, in which the prevalence of refractive error ranged between 22.0-41.1%.<sup>13,14,15</sup> These studies were carried out in rural areas of similar socio-cultural background in the eastern and southern parts of Nigeria. Moreover, the inhabitants of these rural areas were less exposed to any form of reading culture (near work), a predisposing factor to myopia.

In this study, 9.3% of the study population was myopic. It was the leading cause of refractive error in those aged 60 years and above. Myopia is thought to be commoner in this age range because of the aging changes that occur in the lens and its attendant myopic shift.<sup>16</sup>

## CONCLUSION

This study has shown that uncorrected refractive error is a significant cause of visual impairment in the study community, even though most of the study population was emmetropic.

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