REFRACTIVE STATUS AND STATURE

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ABSTRACT

This work aims to study the relationship between stature and refractive status in South-South Nigeria with a view to derive inference from our findings for refraction and counseling. This was a cross-sectional hospital-based study. One hundred and fifty-one subjects with no history of ocular trauma attending the eye clinic of Mercy Hospital, a secondary health center located in Abak Akwa Ibom State, Nigeria were randomly selected for the study. Subjects' height and weight were measured with standometer and a portable weighing machine respectively. Body mass index (BMI) was computed and recorded in kilograms per square meters. Non-cycloplegic objective refraction of each participant was determined using a ViewM autorefractor (South Korea) by one investigator for all the participants. Myopia was defined as SER more than −0.25 D and hypermetropia as >+0.25 D. Emmetropia was SER between −0.25 D and +0.25 D. There was a statistically significant relationship between the refractive status and the different BMI grades among the participants (p=0.01), however, there was no correlation between refractive status and height as well as weight. Although refractive status could be affected by several factors, BMI is an important pointer to the refractive state of subjects.

Keywords: Body mass index, myopia, hypermetropia, emmetropia, stature

INTRODUCTION

Refractive error is a situation where the eyes are unable to focus a clear image on the retina. This can result in blurred vision which sometimes may be severe enough to cause visual impairment.[1] These errors of refraction are of various types including myopia also known as short-sightedness, hypermetropia also known as long-sightedness and astigmatism.

The refractive status of any individual is dependent on many factors, some of which may be genetic or environmental. Higher socioeconomic status, especially educational achievement, has been found to be a risk factor for myopia.[2]

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Date manuscript was received:23/3/24
Date manuscript was accepted:3/9/24

Researchers have tried to analyse the relationship between these errors of refraction, especially myopia and body stature in the past with inconsistent results.[3-8] Although it has been documented that the axial length of the globe is significantly related to the height and the refraction of the individual[9-11] no consistent relationship has been established between the height and refraction in adults.[1]

This makes it necessary to study the relationship between refraction and stature especially in the South, south region of Nigeria where the study was carried out.

MATERIALS AND METHODS

This was a cross-sectional hospital-based study, Subjects attending eye clinic at Mercy Hospital Abak, Akwa Ibom State were randomly recruited for the study. Subjects had no history of ocular trauma. Subjects' heights were measured with standometer in meters (m) with subjects standing and without shoes. Weight in kilograms was measured using one standard portable weighing machine calibrated before the beginning of the study. BMI (in

kilograms per square meters) was computed as the product of the weight divided by the square of the height.

Distance visual acuity was done with Snellen chart at 6 m in a well-lit room, one eye at a time. The above was carried out by a registered Ophthalmic nurse. Non-cycloplegic objective refraction of each participant was determined using a View M autorefractor (South Korea) by one of the investigators for all the participants. Participants were seated comfortably with their chin on the chin-rest and their forehead resting firmly on the headband of the autorefractor and instructed to constantly fixate on the internal fixation target within the autorefractor. Spherical equivalent refraction (SER) was recorded as the sum of the sphere and half of the cylinder in diopters. Myopia was defined as SER more than −0.25 D and hypermetropia as >+0.25 D. Emmetropia was SER between −0.25 D and +0.25 D.

RESULTS

Of the 151 subjects recruited for the study, 64(42.4%) were males while 87(57.6%) were females. The male to female ratio was 1:1.4. The mean age was 49.0±11.6years (range: 22-73years) majority of the participants were aged 41-60years, only 10% were above 60years. Most of the participants 82(54.3%) resided in the urban region, while the rest resided in rural areas (Table 1).

Table 1: age, sex and location distribution of participants

		Frequency	**Percentage (%)**
Sex	Male	64	42.4
	Female	87	57.6
	Total	151	100.0
Age groups	21-40 Years	36	23.8
	41-60 Years	100	66.2
	61-80 Years	15	10.0
	Total	151	100.0
Location	Urban	82	54.3
	Rural	69	45.7
	Total	151	100.0

Astigmatism was the commonest refractive error observed. The distribution of the refractive status of the participants is shown in figure 1.

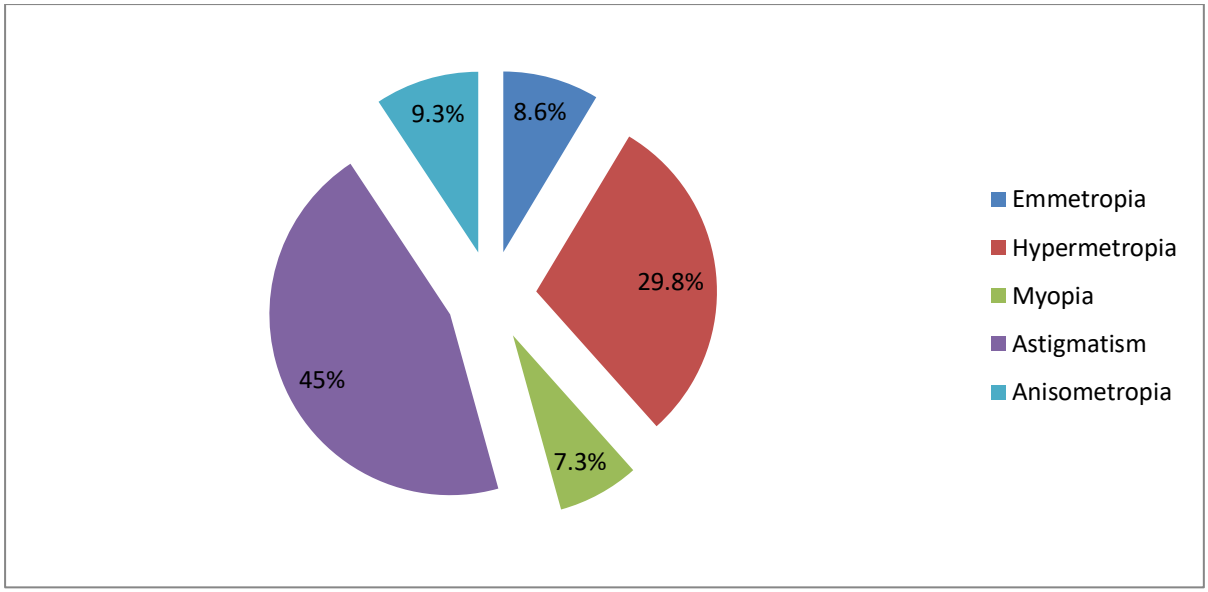

Figure 1: Distribution of the refractive status of the participants

The mean height, weight and body mass index (BMI) were 1.60±0.10m, 69.82±16.63kg and 27.48±5.84 respectively. The distribution of the BMI of the participants is shown in figure 2. Most of the participants had normal weight while almost one third of them 48(31.7%) were obese.

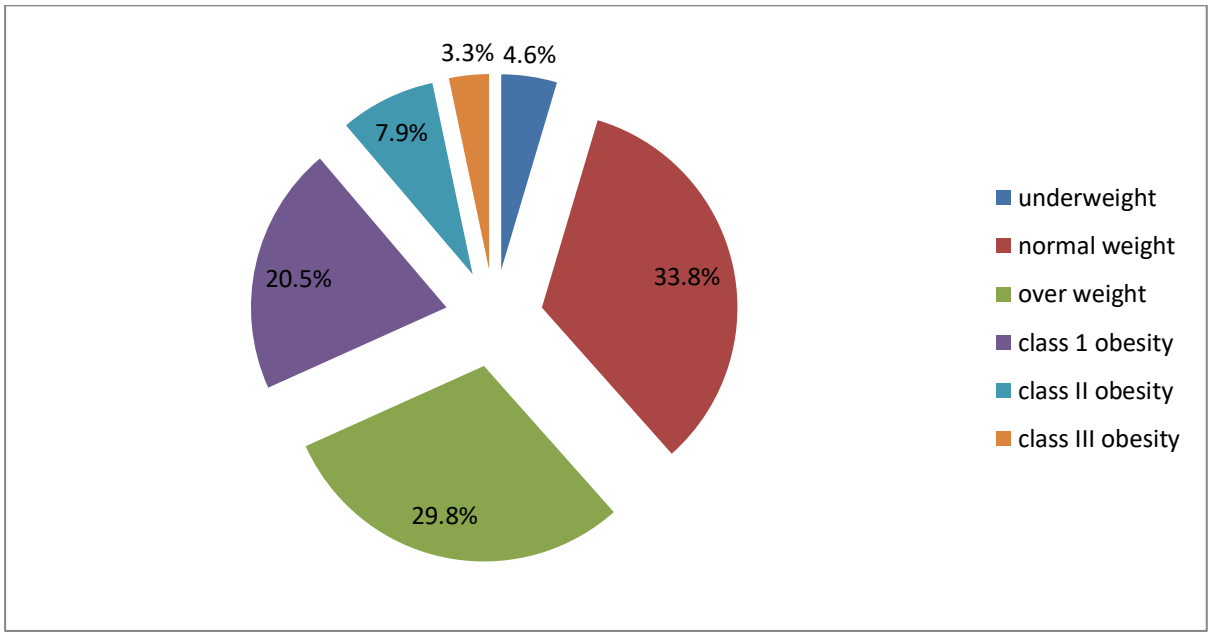

Figure 2: Distribution of the body mass index (BMI) of the participants

Figure 3 shows the distribution of the refractive status against the BMI of the participants. There was a statistically significant relationship between the refractive status and the different BMI grades among the participants (p=0.01), however, there was no correlation between refractive status and height as well as weight.

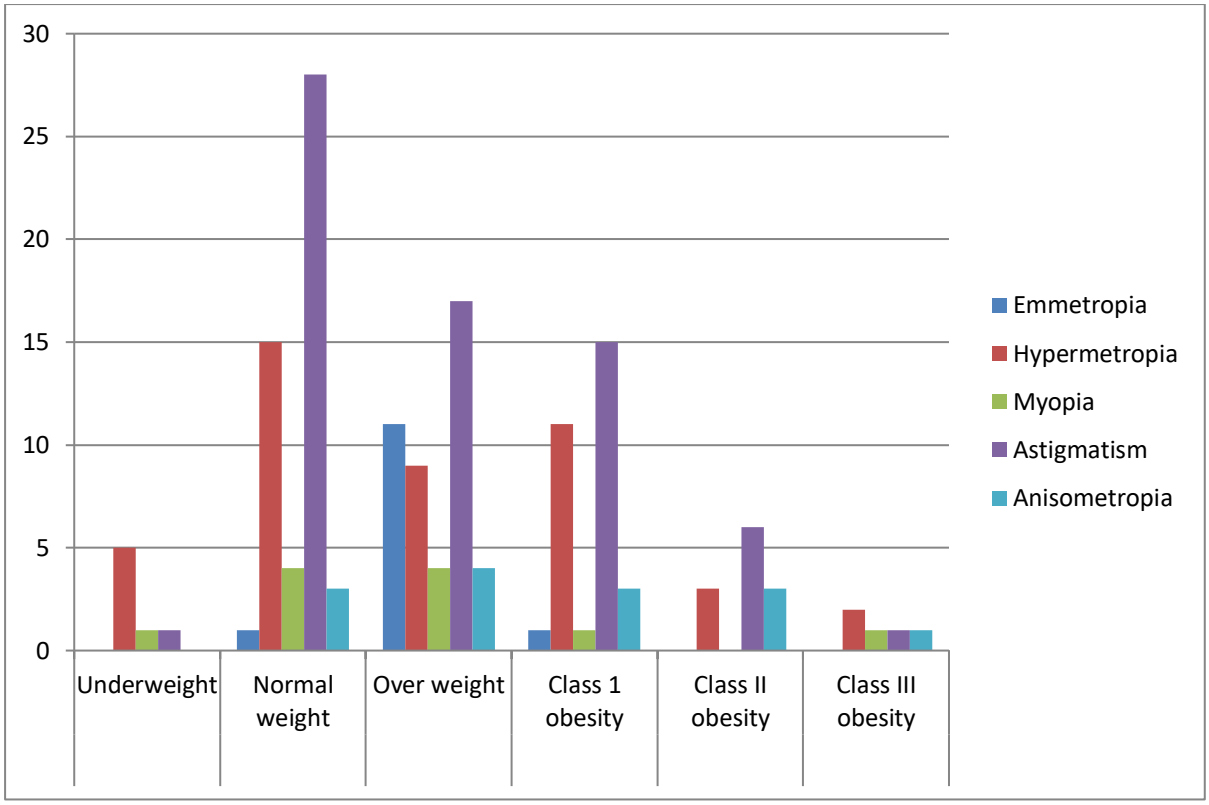

Figure 3: Relationship between BMI and refractive error among the participants

DISCUSSION

The prevalence of refractive error in the study population was quite high unlike the findings of some other researchers. The commonest refractive error observed in the study was astigmatism. This is similar to the report of other researchers in Bayelsa,[12] but unlike the findings of other researchers in other parts of Nigeria who noted myopia to be the commonest type of refractive error.[13-15] Similar to the observation by researchers in Kaduna,[16] hypermetropia was the commonest spherical ametropia in our study. These differences in prevalence of refractive errors and the distribution of the errors of refraction may be a reflection of the varied criteria for the definition of the types of refractive errors observed in the various studies.

The relationship between refractive status and body stature has been explored by some researchers with varying results. Some of these studies suggested a relationship between body stature and refraction based on the observation that myopic persons were found to be taller and heavier than non-myopic persons. [17-19] This finding has been attributed to the possibility that taller persons have larger globes and longer axial lengths.[3,7,20-22] There was no statistically significant relationship between height and refractive status in our study. Reports from previous studies have shown inconsistent relationship between height and refractive status.[6,23,24] Similarly, no statistically significant relationship existed between weight and refractive status in our study, however, increased weight was reported to be a risk factor for hypermetropia[2,3] and myopia in females[25] by other researchers. Similar to the findings of our study, studies done in other parts of the world showed no relationship between weight and refractive status.[6,22,24] Our study showed statistically significant relationship between refractive status and BMI, like the findings of another study in singapore[7] but unlike that of some other researchers.[25] These observations suggest that refractive status may be influenced by several factors. Refractive status has been said to be a complex phenomenon affected by factors such as

genetics and environmental factors like education, occupation and social status.[26]

CONCLUSION

Although refractive status could be affected by several factors including genetic and environment, BMI is also an important pointer to the refractive state of subjects.

Limitation

This study captures subject that were dominantly from one region. Collaboration across different regions would have been better to obviate the effect of environmental factors which could affects refraction.

Implication for future study

We will recommend that a multi-center approach be undertaken for this study to cover the six geopolitical zones of Nigeria so that it gives a broader picture of relationship between Refractive error and stature. This is important since environmental factors affect refraction.

Conflicts of interest

There are no conflicts of interest.

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