IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 25, Issue 7 Ser. 3 (July. 2026), PP 85-88
www.iosrjournals.org

Prevalence And Demographic Correlates Of Refractive Errors Among Young Adults In A Nigerian University Population

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Abstract:
Background: *Refractive errors represent a major global public health challenge, with myopia emerging as a significant concern among young adult populations worldwide. Data on refractive error prevalence and demographic correlates in Nigerian university students remain limited. This study determined the prevalence and demographic correlates of refractive errors among young adults at Abia State University, Uturu, Nigeria.*
Materials and Methods: *A descriptive cross-sectional study was conducted involving 150 participants aged 18-35 years (71 males, 79 females). Refractive status was assessed through autorefraction. Data were analyzed using chi-square tests and independent t-tests at $p<0.05$ significance level.*
Results: *Myopia was the most prevalent refractive error (48.0%, n=72), followed by emmetropia (30.7%, n=46) and hyperopia (21.3%, n=32). Myopia prevalence increased with age, from 40.9% in the 16-20 age group to 66.7% in those above 30 years. Females had a slightly higher mean myopic refractive error than males (-0.85 D vs -0.82 D), but this difference was not statistically significant ($p=0.83$). The chi-square test showed no statistically significant association between refractive status and gender ($\chi^2=0.41$, $p=0.81$) or age group ($\chi^2=8.64$, $p=0.19$).*
Conclusion: *The high myopia prevalence (48%) among university students underscores an urgent need for comprehensive myopia prevention and management programs. The age-related increasing trend in myopia suggests cumulative effects of prolonged near work and visual stress. Gender did not significantly influence refractive status distribution. These findings have important implications for vision screening policies in Nigerian tertiary institutions.*
Keywords: *Refractive Error; Myopia; Prevalence; Young Adults; University Students; Nigerian Population*
Date of Submission: 13-07-2026 Date of Acceptance: 23-07-2026

I. Introduction

Refractive errors represent a predominant cause of vision impairment globally, creating a substantial public health challenge with significant socio-economic impact[1]. Myopia is the most prevalent refractive error globally and constitutes a growing public health concern[2]. The aetiology of myopia is multifactorial, involving a complex interaction between genetic predisposition and environmental exposures. Prolonged near-work activity and limited time spent outdoors have been consistently identified as significant environmental risk factors for myopia onset and progression[3].

The young adult population represents a crucial stage in refractive development, marking the relative stabilization of ocular growth after the adolescent surge. The high visual demands of university education, characterized by prolonged near-work and reduced outdoor activities, may accelerate myopia progression in this population[4]. In Nigeria, data on refractive error prevalence among university students remain limited. Adio and Alikor (2017) reported a myopia prevalence of 32.4% in a comparable Nigerian university setting[5].

This study aims to determine the prevalence and demographic correlates of refractive errors among young adults at Abia State University, Uturu, Nigeria.

II. Materials And Methods

Study Design and Population

This descriptive cross-sectional study was carried out at the Optometry Clinic, Abia State University, Uturu, Nigeria, from November 2024 to February 2025.

Sample Size Determination

Using Cochran's formula, a total of 150 participants were recruited.

Sampling Procedure

Inclusion criteria: (1) individuals aged 18-35 years; and (2) individuals who gave consent. Exclusion criteria: (1) individuals outside the age bracket; (2) individuals who had undergone eye surgery; and (3) individuals with pathological ocular conditions.

Research Equipment

AutoRef/Keratometer (Nidek TONOREF III) was used for refractive assessment.

Data Collection Procedures

Refractive status was obtained using the autorefractor component of the Nidek TONOREF III. Spherical equivalent was calculated using the formula: SE = Sphere + (Cylinder/2) for eyes with astigmatism.

Data Analysis Techniques

Data were analyzed using SPSS version 20. Chi-square tests were used to assess associations between refractive status and categorical demographic variables. Independent t-tests were used to compare mean refractive error between genders. The level $p<0.05$ was considered statistically significant.

Ethical Consideration

Ethical approval was obtained from the Research and Ethics Committee, Department of Optometry, Abia State University. Informed consent was obtained from all subjects.

III. Results

Distribution of Refractive Status

Myopia was the most prevalent refractive error (48.0%), followed by emmetropia (30.7%) and hyperopia (21.3%).

Table 1: Distribution of Refractive Status (n=150)

Refractive Status	Frequency (n)	Percentage
Myopia	72	48.0
Emmetropia	46	30.7
Hyperopia	21	21.3
Total	150	100.0

Distribution of Refractive Status by Age Group

Myopia prevalence increased with age, from 40.9% in the 16-20 age group to 66.7% in those above 30 years.

Table 2: Distribution of Refractive Status by Age Group (n=150)

Age Group	Myopia n (%)	Emmetropia n (%)	Hyperopia n (%)	Total
16–20	18 (40.9)	15 (34.1)	11 (25.0)	44
21–25	36 (50.7)	22 (31.0)	13 (18.3)	71
26–30	14 (48.3)	7 (24.1)	8 (27.6)	29
>30	4 (66.7)	2 (33.3)	0 (0.0)	6
Total	72	46	32	150

Association between Refractive Status and Gender

Myopia appeared slightly more common among females (48.1% vs 47.9%), but the difference was not statistically significant ($\chi^2=0.41$, $p=0.81$).

Table 3: Association between Refractive Status and Gender

Refractive Status	Male n (%)	Female n (%)
Myopia	34 (47.9)	38 (48.1)
Emmetropia	23 (32.4)	23 (29.1)
Hyperopia	14 (19.7)	18 (22.8)
Total	71 (100)	79 (100)

Mean Refractive Error by Gender

Females had a slightly higher mean myopic refractive error (-0.85 D vs -0.82 D), but the difference was not statistically significant (p=0.83).

Table 4: Mean Refractive Error by Gender

Gender	Mean RE (D)	SD	t-value	p-value
Male	-0.82	0.91		
Female	-0.85	0.94	-0.21	0.83

Chi-Square Test Results

The chi-square test showed no statistically significant association between age group and refractive status (χ^2=8.64, p=0.19) or gender and refractive status (χ^2=0.41, p=0.81).

Table 5: Chi-Square Test Results

Association	χ^2	df	p-value
Age vs Refractive Status	8.64	6	0.19
Gender vs Refractive Status	0.41	2	0.81

IV. Discussion

This study found a myopia prevalence of 48.0% among 150 young adults at Abia State University, Uturu. This figure is substantially higher than the 32.4% reported by Adio and Alikor (2017) in a comparable Nigerian university setting[5], a discrepancy most plausibly explained by the current sample's more concentrated academic demands and heavier near-work load—factors identified as the principal behavioural drivers of myopia[6,7].

The current figure is lower than the 52.7% reported by Wang et al. (2019) in urban Chinese young adults, a population with historically elevated myopia burdens attributable to extreme academic pressure and East Asian genetic predispositions[8]. The findings align more closely with the multi-ethnic Singapore cohort studied by Majithia et al. (2021), which reported myopia prevalence of 52.0% in adults aged 40-49 years[9].

Age-Related Trends

Age showed a rising trend in myopia from 40.9% in the 16-20 age group to 66.7% in those above 30 years, consistent with the age-related myopia progression documented by the Singapore Epidemiology of Eye Diseases study [9]. The trend also aligns with the Raine Study findings by Lee et al. (2022), who demonstrated that axial elongation continues into the third decade of life with a mean increase of 0.02 mm per year[10]. However, the chi-square test (χ^2=8.64, p=0.19) did not reach statistical significance, suggesting that the current sample lacked sufficient statistical power to confirm the association definitively.

Gender-Related Trends

Gender had no significant effect on refractive distribution (χ^2=0.41, p=0.81; mean difference p=0.83), in agreement with Hammond et al. (2001) and the CLEERE Study (Mutti et al., 2025), which established that in

populations sharing equivalent environmental exposures, biological sex does not independently determine refractive status[11,12]. This finding is supported by the Australian GEM twin study (Dirani et al., 2006), which demonstrated that genetic factors account for the majority of variance in spherical equivalent refractive error[13].

The Canadian Longitudinal Study on Aging (Aljied et al., 2018) further supports the current findings, demonstrating that after multivariate adjustment, female sex was not significantly associated with visual impairment in adults[14].

V. Conclusion

This study demonstrates a high myopia prevalence of 48% among university students in Abia State University, Uturu. The age-related increasing trend in myopia suggests cumulative effects of prolonged near work and visual stress. Gender did not significantly influence refractive status distribution.

Implications

The high myopia prevalence underscores an urgent need for comprehensive myopia prevention and management programs in Nigerian tertiary institutions.

Recommendations

1. University health authorities should implement mandatory vision screening for all newly admitted students.
2. Student affairs offices should develop targeted awareness campaigns on myopia risk and protective behaviors.
3. University management should upgrade academic environments to include adequate natural lighting and outdoor recreational spaces.
4. The Federal Ministry of Education should formulate national guidelines mandating vision health programs in all Nigerian tertiary institutions.

Limitations

Cross-sectional design prevents causal inference. Study population limited to university students. Environmental risk factors were not assessed.

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