



**PREVALENCE AND FACTORS ASSOCIATED WITH REFRACTIVE  
ERRORS AMONG MEDICAL UNDERGRADUATE STUDENTS AT  
MBARARA UNIVERSITY OF SCIENCE AND TECHNOLOGY,  
UGANDA**

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# Background

- WHO estimated that uncorrected refractive errors(URE) are the leading cause of visual impairment (101.2 million) and the second cause of blindness(6.8 million) among people of all ages worldwide ([Organization, 2012](#)).
- University students are prone to develop refractive errors due to their curriculum that requires a lot of near work in addition to this environmental factor, genetic factors also play a role in the development of refractive errors.

# Justification of the study

- Students with UREs strain to read standard-sized print, overhead projection, computer, color discrimination impacting their learning, academic achievement, and employability (Salih, 2018).
- Screening university students for refractive errors plays an important part in detection and when corrected reduces the impact on their learning process and improves the quality of life (Contreras and Ackland, 2017).
- Information found provides knowledge & can be used to guide in planning for effective screening programs.

# Objectives

## **General Objectives**

- We determined the prevalence and factors associated with refractive errors among students in the Faculty of Medicine at Mbarara University of Science and Technology.

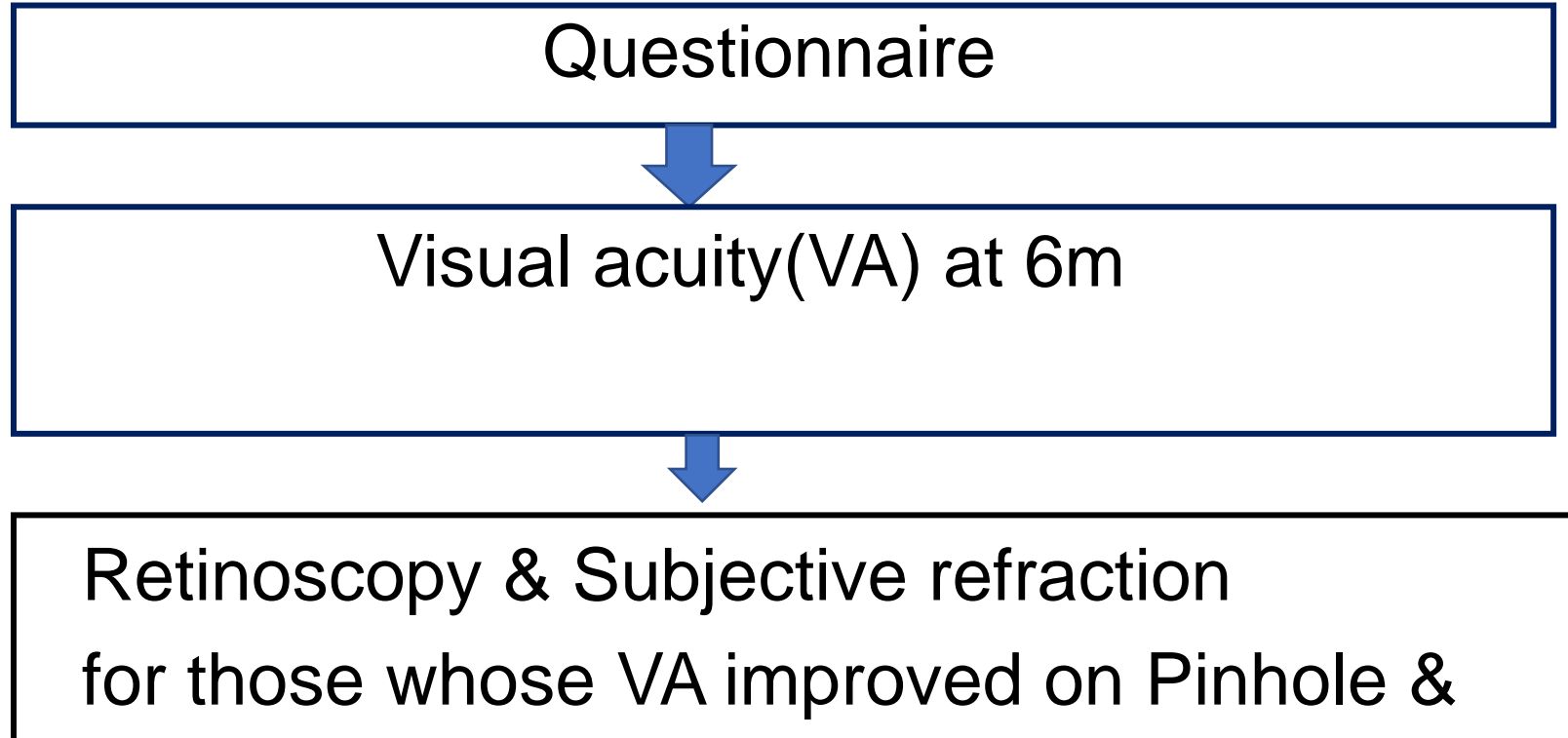
## **Specific objectives**

1. To determine the prevalence and types of refractive errors among students in the Faculty of Medicine at Mbarara University of Science and Technology
2. To determine factors associated with refractive errors among students in the Faculty of Medicine at Mbarara University of Science and Technology.

# Methods

- **Study design:** Institution based cross sectional study.
- **Sample size:** 458 participants
- **Study sites:** (MUST)
- **Study period:** April 2021- July 2021
- **Study population:** Undergraduate students in FOM at **MUST**.
- **Inclusion criteria:** signed the informed consent ,with eyes that could be refracted, & using eyeglasses
- **Exclusion criteria:** ocular co-morbidities affecting refraction procedure

# Data Collection



# Data management & analysis

- Questionnaire was checked for completeness before data entry.
- Data was entered into a database using Epi info software version 7.2
- Data was cleaned and validated before data analysis. The complete data set was imported in STATA 14.0 for analysis.

# RESULTS



# Table 1: Social Demographics

Category	Frequency (368)	Percentage%
<b>Age</b>		
<b>18-29</b>	<b>335</b>	<b>94</b>
30-45	21	6
<b>Sex</b>		
<b>Male</b>	<b>240</b>	<b>65</b>
Female	128	35
<b>Program</b>		
Medicine	127	34
Nursing	64	17
Physiotherapy	39	11
<b>Pharmacy</b>	<b>138</b>	<b>38</b>
<b>Year of study</b>		
1	105	29
2	112	30
<b>3 -4</b>	<b>151</b>	<b>41</b>

# Table 1: Social Demographics

Category	Frequency (368)	Percentage%
<b>Region address</b>		
Central	114	31.
Eastern	64	17
Northern	43	12
Western	140	38
Others	7	2
<b>Family History (Eye glass use)</b>		
Yes	163	44
No	205	56
<b>Students' life style</b>		
Daily Reading Time		
8 hours	308	84.9
More than 8 hours	55	15.2

# Table 1: Social Demographics

Category	Frequency (368)	Percentage%
<b>Reading Time</b>		
Day	138	37.60
Night	229	62.40
<b>Sleep Time</b>		
Before Midnight	165	44.9
After Midnight	202	55.0
<b>Preferred Leisure Activity</b>		
<u>Indoor</u>	195	<u>53.3</u>
Outdoor	171	46.7

# Table 2: Prevalence & Types of refractive errors (RE)

Type	Frequency		Percentage
<b>Normal</b>	271		73.64
<b>Refractive errors</b>			
Myopia	58(60%)	<b>97</b>	<b>26.36</b>
Astigmatism	36(37%)		
Hyperopia	3(3%)		
<b>Total</b>	<b>368</b>		100

# Table 3: Bivariate analysis results of factors associated with RE.

Factor		RE		UOR (95%CI)	P value
		Yes (97), n (%)	No (271), n (%)		
Sex	Male	56(23.33)	184(76.67)	1.0	
	<b>Female</b>	41(32.03)	87(67.97)	<b>1.5(0.96- 2.49)</b>	<b>0.072</b>
Age (years)	18-29	87(25.97)	248(74.03)	1.0	
	<b>30-45</b>	8(38.10)	13(61.90)	<b>1.75(0.70-4.37)</b>	0.228
Study Year	1	29(27.62)	76(72.38)	1.0	
	2	26(23.21)	86(76.79)	0.79 (0.42-1.46)	0.456
	3-4	42(27.81)	109(72.19)	1.00(0.57-1.76)	0.973

# Table 3: Bivariate analysis results of factors associated with RE.

Factor		RE		UOR (95%CI)	p
		Yes (97), n (%)	No (271), n (%)		
Preferred sleep time	Before midnight	45(27.11)	121(72.89)	1.0	
	After midnight	52(25.74)	150(74.26)	0.93(0.58-1.48)	0.767
Family history of using eye glasses	NO	46(22.44)	159(77.56)	1.0	
	<b>Yes</b>	51(31.29)	112(68.71)	1.57(0.98-2.50)	<b>0.056</b>

# Table 3: Bivariate analysis results of factors associated with RE.

Factor		RE		UOR (95%CI)	p
		Yes (97), n (%)	No (271), n (%)		
Program	Medicine	30(23.62)	97(76.38)	1.0	
	Nursing	17(26.56)	47(73.44)	1.16(0.58-2.33)	0.656
	Physiotherapy	11(28.21)	28(71.74)	1.27(0.56-2.85)	0.562
	Pharmacy	39(28.26)	99(71.74)	1.27(0.73-2.21)	0.390
Preferred Leisure activity	Indoor	55(27.64)	144(72.36)	1.0	
	Outdoor	42(24.85)	127(75.15)	0.86(0.54-1.38)	0.546
Reading time duration	<=8 hours	80(25.97)	228(74.03)	1.0	
	>8 hours	15(27.27)	40(72.73)	1.06(0.56-2.03)	0.84

# Table 3: Bivariate analysis results of factors associated with RE.

Factor		RE		UOR (95%CI)	p
		Yes (97), n (%)	No (271), n (%)		
Time spent watching TV	<= 3hours	86(25.83)	247(74.17)	1.0	
	>3	11(31.43)	24(68.57)	<b>1.31(0.61-2.79)</b>	0.475
Time spent on phone	<= 3hours	10(23.26)	33(76.74)	1.0	
	>3	87(26.7)	238(73.23)	<b>1.2(0.57-2.55)</b>	0.624
Time spent using computer	<= 3hours	45(23.32)	148(76.68)	1.0	
	>3	52(29.71)	123(70.29)	<b>1.3(0.87-2.21)</b>	0.165



# Table 3: Bivariate analysis results of factors associated with RE.

Factor		RE		UOR (95%CI)	p
		Yes (97), n (%)	No (271), n (%)		
Sleep duration	6<=hours	66(24.63)	202(75.37)	1.0	
	>6	31(31.0)	69(69.0)	<b>1.37(0.828-2.28)</b>	0.218
Region of origin	Western	39(28.06)	100(71.94)	1.0	
	Central	29(25.66)	84(74.34)	0.88(0.50-1.55)	0.670
	Eastern	13(20.63)	50(79.37)	0.66(0.32-1.36)	0.265
	Others	16(30.77)	36(69.23)	1.13(0.56-2.28)	0.713

# Table 4: Multivariate analysis results of factors associated with RE.

Factor		AOR (95%CI)	P (0.0498)
Family History of using eye glasses	NO	1.0	
	Yes	1.68(1.04-2.72)	0.032
Age category	18-29	1.0	
	30-45	1.99(0.78-5.04)	0.145

# DISCUSSION

AUTHOR, YEAR/COUNTRY	STUDY TITLE/ DESIGN	RESULTS/FINDINGS
MUST 2021, Denis KAMARA	Prevalence and factors associated with refractive errors among medical undergraduate students in the Faculty of Medicine at Mbarara University of Science and Technology.	N = 368 <b>Prevalence = 26.36%</b>
(Basu et al., 2016), <b>India</b>	Refractive Errors and its Determinants among Medical Students of Kolkata: A Descriptive cross-sectional Study.	n = 244 Prevalence = <b>26.23%</b> <b>Smaller sample size, a lot of near work ,genetics &amp; ethnicity.</b>
(Gopalakrishnan et al., 2011), <b>Malaysia</b>  (Salih, 2018), <b>Iraq</b>	A Study of Refractive Errors among Medical students in AIMST University, Malaysia; cross-sectional descriptive study  Prevalence and Progression of Refractive Errors Among El-Mustansiriyah Medical Students: A cross-sectional study	n = 425 Prevalence = <b>32.24 %</b> <b>Larger sample size, a lot of near work ,genetics &amp; ethnicity.</b> n = 330 Prevalence = <b>33%</b> <b>smaller sample size</b>

AUTHOR, YEAR/COUNTRY	STUDY TITLE/ DESIGN	RESULTS/FINDINGS
(Rajdeep and Patel, 2013), <b>India</b>	A study of refractive errors on students of Baroda Medical College, An institution based cross sectional study	n = 283 Prevalence = <b>54.06%</b> Genetic predisposition
(Rizyal et al., 2019), <b>Saudi Arabia</b>	Refractive Errors among Northern Border University Medical Students, A cross-sectional study	n = 167 Prevalence = <b>67.1%</b> Genetic predisposition
(Megbelayin et al., 2014), <b>Nigeria</b>	Refractive Errors and Spectacle Use Behavior among Medical Students in a Nigerian Medical School, A cross-sectional study	n = 83 Prevalence = <b>79.5%</b> Genetic predisposition, 5 <sup>th</sup> year

AUTHOR, YEAR/COUNTRY	TYPES of RE	REASONS
Mbarara University of Science and Technology, Uganda,2021, Denis KAMARA	<b>Myopia 60 %</b> <b>Astigmatism 37%</b> <b>Hyperopia 3%</b>	Medical students have intense studying and exposure to performing <b>near work</b> that could explain the high prevalence of myopia
<b>High Myopia as the commonest type</b> This study  (Akhanda et al., 2010), <b>Bangladesh</b> (Garg et al., 2018) <b>India</b> , (Gopalakrishnan et al., 2011) <b>Malaysia</b>	<b>60%</b>  81.70% 77.7% 87.6%	Medical students have intense studying and exposure to performing <b>near work</b> that could explain the <b>high prevalence of myopia</b>

AUTHOR, YEAR/COUNTRY	TYPES OF REFRACTIVE ERRORS	REASONS
<p><b>Astigmatism</b></p> <p>(Astigmatism this study (Woo et al., 2004) ,<b>Saud Arabia</b> (Halari et al., 2016),<b>Dominica</b></p>	<p><b>Astigmatism</b></p> <p><b>37%</b> 53.7% 33.5%</p>	<p><b>Similar methods of refraction and classification</b></p>
<p><b>hypermetropia</b></p> <p>this study hypermetropia</p> <p>(Alruwaili et al., 2018b), <b>Saudi Arabia</b> (Garg et al., 2018),<b>India</b> (Gopalakrishnan et al., 2011) <b>Malaysia</b> (Salih, 2018).<b>Iraq</b></p>	<p><b>hypermetropia</b></p> <p><b>3%</b></p> <p>3.483% 4.5% 7.3% 2.73%</p>	<p><b>Present at birth due to less power</b></p> <p><b>Present at old ages &gt;50yrs due to inflexible lens</b></p> <p><b>Disappears or is avoided by flexible lens in between.</b></p>

# Factors Associated with Refractive Errors

STUDIES	FACTORS
<p>This study, Mbarara University of Science and Technology, Uganda, 2021.</p>	<p>This study found students who had a <b>positive family history</b> of parents or siblings having refractive errors to be associated with refractive errors</p> <p>Which could be due to <b>genetic predisposition</b>.</p>
<p>(Economics and Jabir, 2017), <b>Pakistan</b></p> <p>(Al-Batanony, 2016), <b>Saudi Arabia</b></p> <p>(Basu et al., 2016), <b>India</b></p>	<p>All reported similar findings</p> <p>Which could be due to <b>genetic predisposition</b></p>



# Conclusion

- The prevalence of refractive errors among medical undergraduate students in the Faculty of Medicine at Mbarara University of Science and Technology was **26.36%**.
- **Myopia of 60%** was the predominant refractive errors detected which could be explained by a lot of near work during their study and daily routine. **Astigmatism of 37%** and **hyperopia of 3%** were found among medical students.
- **Family history** of refractive error was significantly associated with refractive errors among students statistically.

# Recommendations

- Early childhood and regular screening for refractive errors for all persons at risk can help detect them in time and once treated improves the quality of life of those individuals.
- Screening of university students upon entry and regular checkup during their study helps detect and differentiate those who already have refractive errors before joining university from those who develop them during the University study.
- Further studies should be carried out on students to determine the genetic predisposition to having refractive errors since family history was associated with having refractive errors.

# Acknowledgement

- To Lord Almighty for the Grace, Mercy and Salvation.
- To entire team

# Thanks

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