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OCULAR HYGIENE PRACTICES AND ITS IMPACT ON EYE HEALTH OF UNDERGRADUATE STUDENTS OF MADONNA UNIVERSITY, ELELE CAMPUS, RIVERS STATE NIGERIA

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ABSTRACT

Vision plays a vital role in academic performance and overall quality of life among university students. However, with the increasing reliance on digital devices and exposure to unfavorable environmental conditions, ocular hygiene has emerged as a critical but often overlooked aspect of student health. Despite anecdotal reports of eye-related symptoms among undergraduates at Madonna University, no empirical study has examined the extent and causes of these complaints within this population. This study assessed ocular hygiene practices and their association with self-reported eye health complaints among undergraduate students of Madonna University, Elele Campus, Rivers State. A descriptive cross-sectional survey design was adopted, involving 211 undergraduates selected through multistage sampling. Data were collected using structured questionnaires and basic ocular examinations with a Pen torch and Ophthalmoscope. Results showed moderate adherence to good hygiene practices: 61.1% washed their faces regularly, and 74.4% avoided sharing eye cosmetics, while only 22.7% removed contact lenses properly. Common eye complaints included itching (65.9%), redness (53.1%), and watery eyes (49.3%). A statistically significant relationship was found between ocular hygiene and eye complaints ($\chi^2 = 5.38$, $p = 0.02$). Age and gender significantly influenced hygiene behavior, with older students and females demonstrating better practices. In conclusion, the study revealed a high prevalence of ocular symptoms linked to sub optimal hygiene and recommended improved health education, routine screening, and access to hygiene resources to mitigate preventable eye problems.

Keywords: Cosmetics, Environment, Hygiene, Ocular, Student, Symptoms

1 INTRODUCTION

Vision plays a critical role in the learning and academic performance of university students, making ocular health an indispensable aspect of student well-being. As such, the importance of maintaining good eye hygiene cannot be overstated, particularly in a rapidly digitizing world where the visual demands placed on young adults continue to rise. Inadequate ocular hygiene practices can lead to a spectrum of eye conditions, ranging from minor irritations to chronic

infections and even long-term visual impairment. Consequently, promoting ocular hygiene is not just a matter of personal care but a public health priority especially within academic institutions where visual function is central to productivity and success. The eyes are vital sensory organs, processing visual input that underpins learning, social interaction, and daily activities. Maintaining ocular health is therefore essential to overall wellbeing. Central to this is ocular hygiene, which encompasses behaviors such as cleaning eyelashes, avoiding unclean hands near the eyes, properly caring for contact lenses, and refraining from using shared or expired personal eye-care items (Ebeigbe et al., 2025).

Nwankwo et al., (2021) posits that undergraduate students are especially susceptible to ocular health challenges due to lifestyle factors including prolonged screen usage, sleep deprivation, environmental exposure, and inadequate hygiene. Their cross-sectional study in North-Western Nigeria reported a 54.3% prevalence of Computer Vision Syndrome (CVS) among undergraduates, with symptoms including headaches (61.4%), eyestrain (57.8%), and blurred vision (50.6%). Significant risk factors included the duration of computer use, screen height, and failure to take regular breaks between tasks.

Another study by Ebeigbe et al. (2025) at the University of Benin investigated ocular hygiene practices among 450 undergraduate students and found that while most students (83.6%) reported moderate-to-good hygiene practices, a substantial proportion still presented with symptoms of ocular discomfort. Notably, 60% reported light sensitivity, 54% experienced headaches, and 46% had eyestrain all potentially exacerbated by poor screen hygiene and lack of preventive care measures. The researchers emphasized that although awareness was relatively high, knowledge did not always translate into effective behavioral practice.

Additionally, prolonged exposure to mobile phones, tablets, and laptops during the COVID-19 pandemic led to a rise in eye complaints among students across various Nigerian regions. Eze et al. (2023) conducted a cross-sectional study among 480 secondary school students in Southeast Nigeria and discovered that those using digital devices for ≥3 hours daily had a significantly higher prevalence of symptoms such as eye rubbing (33%), tearing (31%), blurry vision (49.5%), and headaches (44.1%). These findings further underline the growing burden of ocular symptoms linked to digital device usage and the need for improved hygiene and usage behaviors.

Despite these emerging patterns, there remains a dearth of localized studies focusing on ocular hygiene practices and their health outcomes specifically within university environments. At Madonna University, Rivers State, anecdotal evidence from health service providers suggests that many students report symptoms such as red eyes, itching, and discomfort especially during examination periods or dry seasons. However, no empirical study has assessed the relationship between ocular hygiene behaviors and ocular symptoms in this population.

Moreover, many Nigerian universities lack routine eye care programs or structured health education on vision protection. As noted by Chuka-Okosa et al. (2015), integrating eye health education into university health orientation programs could significantly reduce the incidence of preventable visual disorders among undergraduates. Without targeted interventions, university students risk long-term vision issues that may impact their academic performance and quality of life. This study seeks to fill that gap by reviewing the ocular hygiene practices of undergraduates at Madonna University and assessing their impact on eye health. The findings will serve to inform preventive strategies, guide institutional health education policies, and promote better vision care among students.

1.1 Statement of Problem

Good ocular hygiene is essential for maintaining eye health and preventing a wide range of visual problems. However, it is often neglected, especially among university students who are frequently exposed to conditions that place their eye health at risk. These include prolonged use of digital devices, poor sleep habits, dusty environments, and unhygienic practices such as rubbing the eyes with unclean hands or sharing eye makeup and personal care items.

At Madonna University, a growing number of students have been observed reporting symptoms such as eye irritation, itching, glare, tearing, and blurry vision. While these complaints may stem from various causes, there has been no systematic investigation into whether poor ocular hygiene practices are contributing factors. This lack of research limits the ability of campus health services to develop effective interventions or provide tailored health education to students.

Moreover, although some students may possess a basic awareness of ocular hygiene, awareness does not always translate into practice. Without evidence-based insights, it is difficult to design targeted strategies to promote healthy eye care behaviors within the university setting. As a result, students remain vulnerable to preventable ocular discomfort and complications that may interfere with their academic performance and overall quality of life.

In addition, the increasing dependency on digital screens for academic, social, and recreational purposes has introduced new dimensions to ocular health challenges. Prolonged screen time without appropriate breaks, poor lighting

conditions, and improper screen distance can contribute to digital eye strain and exacerbate pre-existing visual issues. When compounded with poor hygiene habits, these behaviors may significantly worsen eye-related symptoms among students. Unfortunately, most students do not seek medical attention unless symptoms become severe, leading to delayed diagnosis and treatment.

Demographic factors such as age and gender may also influence students' ocular hygiene behaviors and susceptibility to eye problems. Younger students may be less informed about best practices for eye care, while gender-related grooming habits—such as use of cosmetic products can introduce different hygiene risks. Yet, these dimensions have not been adequately studied within the university context, making it difficult to create personalized interventions that address the specific needs of sub-groups within the student body. The absence of institutionalized eye health education, vision screening programs, or access to preventive care further compounds the issue. Eye health is often not prioritized until symptoms begin to interfere with daily functioning or academic responsibilities. By that point, avoidable complications may have already developed.

This study seeks to bridge that gap by evaluating the ocular hygiene practices of undergraduates at Madonna University and determining how these behaviors impact their eye health. The findings will provide much-needed data that can inform preventive eye care programs, support the integration of ocular health education into university wellness initiatives, and ultimately promote better vision health among the student population.

1.2 Scope of Study

This study was conducted to review the ocular hygiene practices of undergraduate students of Madonna University Nigeria and examine how these practices impacted their eye health. The research was specifically limited to students enrolled in various academic disciplines in the university's main campus located in Ele3le Rivers state. Both male and female students across different age groups and levels of study were included in the study to ensure a comprehensive understanding of the patterns and variations in ocular hygiene behaviors and related health outcomes.

The investigation which took place between October 2024 to March 2025 was focused primarily on assessing students' self-reported ocular hygiene habits, such as frequency of eye rubbing, hand washing before touching the eyes, use of contact lenses or eye cosmetics, screen time behaviors, and general eye care routines. It also explored the prevalence and types of eye complaints experienced by the students, including symptoms like itching, redness, blurry vision, eye strain, and headaches. Furthermore, the study investigated whether demographic factors such as age and gender had any association with hygiene practices and the frequency of eye health problems. In terms of methodology, the study employed a descriptive cross-sectional survey design. Data were collected through a structured questionnaire administered to a representative sample of undergraduate students. The data collected were limited to self-reports, which meant the findings depended on the honesty and accuracy of participants' responses. Simple clinical eye examination (external eye examination and Ophthalmoscopy) was conducted among the subjects upon completion of the questionnaire.

The study did not extend to postgraduate students, staff members, or students from campuses outside Rivers State. It also did not include students with pre-existing ocular pathologies diagnosed prior to university admission, as the study aimed to focus on hygiene-related issues that could arise or be influenced during campus life. In addition, the research examined ocular hygiene as it relates to everyday behaviors and did not delve into the impact of dietary habits, systemic health conditions, or genetic predispositions on ocular health. These factors, while relevant, were considered beyond the primary focus of the research. However, the data gathered served as a vital baseline for initiating awareness programs and shaping policy interventions within the university.

Aim and Objectives

This study reviewed ocular hygiene practices and their impact on the eye health of undergraduates at Madonna University, Rivers State Nigeria. In specific terms, the study sought to:

- assess the common ocular hygiene practices among undergraduates students of Madonna University Elele Campus, Rivers state.
- determine the prevalence of self-reported ocular health complaints among undergraduates students of Madonna University Elele Campus, Rivers state.
- examine the relationship between ocular hygiene practices and reported eye health problems among undergraduates students of Madonna University Elele Campus, Rivers state.
- identify factors influencing ocular hygiene behaviors among undergraduate students of Madonna University Elele Campus, Rivers state.
- determine whether ocular hygiene practices and associated eye health complaints are influenced by the age of undergraduate students of Madonna University Elele Campus, Rivers state..

- determine whether ocular hygiene practices among undergraduate students of Madonna University Elele Campus, Rivers state. and associated eye health complaints are influenced by gender

2 RESEARCH METHODOLOGY

2.1 Research Design

This study employed a descriptive cross-sectional survey design, which is appropriate for capturing the current state of ocular hygiene behaviours and associated eye health outcomes within a defined population at a specific point in time. This design was selected because it enables the researchers to observe and describe variables without manipulating them. In other words, the goal was to understand the natural variations in hygiene practices and self-reported ocular symptoms among undergraduates without influencing their behaviors.

The descriptive aspect of the design allowed for the detailed documentation of students' practices, knowledge, and health experiences. The cross-sectional nature of the study ensured that data could be collected efficiently from a large number of participants within a relatively short period. Furthermore, this design is especially useful in public health and behavioral studies because it provides foundational data that can be used for hypothesis generation, future longitudinal studies, or intervention development.

2.2 Area and Population of study

The research was conducted in Madonna University, Elele Campus, situated in Rivers State, South-South Nigeria. The university is a private Catholic institution with a strong emphasis on discipline, academic excellence, and holistic education. It has a diverse student population drawn from various regions of Nigeria and neighboring countries. The Elele campus houses several faculties amongst which include Medicine and Surgery, Basic Medical Sciences, Natural Sciences, Health sciences Pharmacy and computing sciences.

The university campus environment presents a unique context for studying ocular hygiene. Students live in shared hostels, learn in crowded lecture halls, and use communal facilities, all of which can contribute to ocular contamination and poor hygiene practices. The heavy academic workload and digital learning systems also expose students to prolonged screen time, making them susceptible to digital eye strain and fatigue. Given this combination of behavioural, environmental, and academic stressors, Madonna University provides a suitable and relevant setting for the current research.

The population of this study consisted of all full-time undergraduate students currently enrolled at Madonna University, Elele Campus during the 2024/ 2025 academic session. The university has a diverse population of students from a variety of ethnic, religious, and socio-economic backgrounds, offering a broad perspective on health behaviours. The student population was ideal for this study due to their high levels of exposure to conditions that may compromise ocular hygiene such as long hours in front of screens, the use of cosmetics and contact lenses, communal living environments, and academic stress. Furthermore, students across different faculties represent a useful comparison group for assessing the role of discipline-specific education (e.g., students in health-related fields versus others) in influencing hygiene knowledge and practices.

2.3 Sampling

2.3.1 Sample Size Determination

The sample size for the study was calculated using Yamane's (1967) simplified formula for sample size determination for finite populations:

$n_0 = \quad {}^{N}{}_{2}$

$1+(e)$ Where:

- n = desired sample size
- N = estimated population size
- e= margin of error (0.05)

The total student population at the Elele Campus at the time of the research was 6,500;

Therefore, a total of 371 students were targeted for inclusion in the study, which is statistically representative of the larger student population at a 95% confidence level. Although the calculated sample size for the study was 371, data

were collected from a total of 211 participants. This reduction was necessitated by practical considerations such as limited time, resource constraints, and declined participation by hitherto subjects. Additionally, factors such as the academic calendar, accessibility of participants, and logistical challenges during the data collection period contributed to the adjustment. Despite the reduced sample size, efforts were made to ensure that the data obtained remained representative and sufficient to meet the study objectives.

2.4 Sampling Technique

A multistage sampling technique was adopted to ensure the selection of a representative and diverse sample:

- **Stage One – Stratification:** Faculties within the campus were stratified into health-related and non-health related (e.g., Medicine, Health Sciences, Natural Sciences, Physical Sciences, Basic medical Sciences, Computing and Pharmacy).
- **Stage Two – Department Selection:** Departments were randomly selected from each faculty stratum using a simple random technique (balloting).
- **Stage Three – Participant Selection:** Within each selected department, simple random sampling was employed using the **balloting method**. Students from each level in the selected departments were asked to pick slips from a box containing "Yes" and "No" options. Only those who picked "Yes" were included in the study. This approach ensured fairness and randomization in participant selection without introducing systematic bias. This multistage approach allowed for representation across academic levels and disciplines, reducing bias and enhancing the generalizability of findings.

2.5 Instrument for Data Collection

The following instruments were employed in the study

2.5.1 Self -Administered Questionnaire

The main instrument for data collection was a structured self-administered questionnaire developed by the researcher based on a review of related literature. The questionnaire was designed in a simple, clear format to ensure comprehension across all academic disciplines. It consisted of both closed-ended questions and Likert-scale items to facilitate ease of response and statistical analysis. The questions were arranged logically to minimize response fatigue and improve data quality. The questionnaire was divided into five sections as follows;

- **Section A:** Socio-demographic information (e.g., age, gender, faculty, academic level)
- **Section B:** Knowledge and awareness of ocular hygiene concepts and preventive strategies
- **Section C:** Self-reported ocular hygiene practices (e.g., hand washing, cosmetic use, towel sharing, contact lens hygiene)
- **Section D:** Symptoms and eye health status (e.g., presence of redness, itching, blurry vision, eye pain)
- **Section E:** Environmental and behavioral factors (e.g., living conditions, screen time, access to water)

2.5.2 Pen Torch

A Pen Torch was used to perform external ocular examinations. This involved inspection of the eyelids, conjunctiva, sclera, and cornea for visible abnormalities such as redness, discharge, swelling, or other signs of irritation. This basic examination helped to validate some of the symptoms and hygiene practices reported by participants.

2.5.3 Ophthalmoscope

This was utilized to carry out posterior segment examination to allow for visual assessment of the optic disc, retinal background, and other internal ocular structures, particularly in participants who reported symptoms such as blurry vision or eye pain. The ophthalmoscopic findings served to complement and enhance the clinical relevance of the self-reported data.

2.6 Reliability/ Validity of Instrument

Reliability was established through a pilot test conducted prior to the main data collection. Data collection procedure was conducted on 20 undergraduate students from the Faculty of Natural and Applied Sciences, Ignatius Ajuru University of Education (IAUE) Port Harcourt Rivers State. These respondents were given the same questionnaire intended for the main study. After data collection, the responses were coded and analyzed using Cronbach's Alpha, a statistical tool that measures the internal consistency of items within a questionnaire and a coefficient of 0.78 was obtained. This value exceeds the generally accepted minimum threshold of 0.70 for social science research, suggesting that the instrument had a high level of consistency in capturing the constructs of interest—particularly ocular hygiene practices and related behaviors. The results of the pilot test also informed minor revisions to some ambiguous items,

improving clarity and reducing the likelihood of misinterpretation during the actual study. Thus, the reliability of the questionnaire was deemed acceptable for the purposes of the main investigation.

In addition, the clinical tools used namely the Pen Torch and direct Ophthalmoscope were of international standard and approved by the Optometrist and Dispensing Opticians Registration Board of Nigeria (ODORBN) for optometric practice. Their simple design and dependable performance helped ensure that the eye examinations were done consistently. The researchers were licensed Optometrist adequately trained to utilize the ophthalmic equipment in eye examination which helped reduce mistakes and made sure the same steps were followed for every participant.

Validity refers to the extent to which the instrument accurately measures what it is intended to measure. To ensure the content and face validity of the questionnaire, the initial draft was subjected to expert review by a panel of professionals, including two senior optometrists and one public health expert from the Faculty of Health Sciences Madonna University Nigeria. These reviewers examined the instrument to assess the relevance, clarity, comprehensiveness, and logical flow of each item in relation to the research objectives.

The experts provided constructive feedback on:

- The appropriateness of the wording and language level for undergraduate students, •The alignment of questions with the research questions and hypotheses,
- The adequacy of coverage of all relevant domains (knowledge, practices, symptoms, and influencing factors),
- Any potential areas of redundancy or ambiguity.

Based on their feedback, the questionnaire was revised. Unclear statements were reworded, overlapping items were removed, and the structure was optimized to improve readability and response accuracy. The improved version was considered valid in terms of content and structure.

In addition to expert review, face validity was informally assessed during the pilot testing phase, as participants were encouraged to comment on the clarity and relevance of each section. This feedback confirmed that the questionnaire appeared to measure the intended concepts and was understandable to the average undergraduate student.

2.7 Procedure for Data Collection

Prior to the commencement of data collection, the researcher obtained the necessary ethical clearance and permission from university authorities, including the University Research Ethics Committee, Dean of students Affair and participating faculties. This allowed smooth access to lecture halls, libraries, student hostels as well as relaxation and sport complexes on campus.

The structured self-administered questionnaires were distributed physically to eligible students during lecture breaks, in the evenings at hostels, and during non-academic hours in relaxation areas where students could respond comfortably. The researcher monitored the process closely to provide clarification on any part of the questionnaire that the participants found unclear, ensuring that guidance was provided without influencing responses.

To minimize disruptions to academic activities and maximize response rate, participants were given the option to either complete the questionnaire immediately or return it within 24 hours. Completed questionnaires were collected personally by the researcher at prearranged pickup times and checked on the spot for completeness and legibility. Incomplete or blank questionnaires were replaced only when the participant agreed to complete a new one.

Throughout the data collection period, care was taken to adhere strictly to ethical and professional standards. The entire process was conducted in a respectful and non-intrusive manner, maintaining participant comfort and ensuring that no individual was coerced into participation. All collected data were securely stored by the researcher and kept confidential in the record unit of the department of optometry Madonna University Nigeria, to be used exclusively for academic analysis and reporting purposes.

2.8 Data Analysis

The data obtained were cleaned, coded, and entered into the Statistical Package for the Social Sciences (SPSS) version 25 for analysis. Both descriptive and inferential statistical tools were employed to analyze the data. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize key variables such as demographic characteristics, levels of knowledge, hygiene practices, and reported ocular symptoms. Inferential statistics, particularly the Chi-square test, were used to examine associations between selected variables. Specifically,

relationships between demographic characteristics and hygiene behaviors, as well as between hygiene practices and the presence of ocular symptoms, were assessed. All statistical tests were conducted at a 95% confidence interval, with p-values less than 0.05 considered statistically significant. The results of the analysis were presented using tables, charts, and graphs, and further interpretation of the findings was provided in the following chapter.

3 RESULTS

3.1 Demographic Characteristics

Table 1: Demographic Distribution of Respondents

Variable	Categories	Frequency (n=211)	Percentage (%)
Age Group	16–20	64	30.30
	21–25	104	49.30
	26–30	43	20.40
Gender	Male	98	46.40
	Female	113	53.60
Faculty	Health Sciences	75	35.50
	Medicine	43	20.40
	Pharmacy	46	21.80
	Natural Sciences	24	11.40
	Basic Medical Sciences	23	10.90

The study involved 211 subjects comprising 98 males and 113 females, yielding a male to-female ratio of 0.87:1. The participants' ages ranged from 16 to 30 years, with a mean age of 22.50 ± 3.53 years. Table 1 above presents the basic demographic distribution of the respondents. Majority of the participants, 104 (49.3%), were within the 21–25 years age range, representing the predominant age group. This was followed by 64 respondents (30.3%) aged 16–20 years, likely corresponding to newer entrants or students in their early academic years. The 26–30 years group accounted for 43 respondents (20.4%), possibly reflecting older students or those with extended study durations.

Faculty-wise, the Faculty of Health Sciences recorded the highest representation, with 75 students (35.5%), likely due to their greater interest or awareness in health-related topics such as ocular hygiene. This was followed by students from the Faculty of Pharmacy (46; 21.8%) and Medicine (43; 20.4%). The Faculties of Natural Sciences and Basic Medical Sciences contributed 24 (11.4%) and 23 (10.9%) respondents, respectively. The diverse representation across faculties enhances the generalizability of the findings and provides a broad perspective on the university's undergraduate population.

3.2 Common Ocular Hygiene Practices among Respondents

3.2.1 Research Question 1

What are the common ocular hygiene practices among undergraduates of Madonna University Elele Campus, Rivers state?

Table 2: Frequency and Percentage Distribution of Ocular Hygiene Practices among Respondents

Ocular Hygiene Practice	Always n (%)	Sometimes n (%)	Never n (%)
Washing hands before touching eyes	106(50.20)	77(36.50)	28(13.30)
Avoiding eye rubbing	69(32.70)	94(44.50)	48(22.80)
Regular face washing	129(61.10)	64(30.30)	18(8.60)
Changing pillow cases regularly	86(40.80)	74(35.10)	51(24.20)

Avoiding sharing eye cosmetics	157(74.40)	36(17.10)	18(8.50)
Proper removal of contact lenses	48(22.70)	33(15.60)	130(61.60)

Table 2 above presents the frequency and percentage distribution of various ocular hygiene practices among the respondents. Washing hands before touching the eyes was reported as always practiced by 106 respondents (50.20%), while 77 (36.50%) practiced it sometimes, and 28 (13.30%) admitted to never doing so. This indicates that half of the students consistently observed this important hygiene measure, though a notable proportion did not follow it regularly. Avoiding eye rubbing was always practiced by 69 respondents (32.70%), sometimes by 94 (44.50%), and never by 48 (22.80%). This suggests that a majority of respondents did not strictly avoid the habit, which may pose a risk for ocular irritation or infection. For regular face washing, 129 respondents (61.10%) reported always engaging in the practice, 64 (30.30%) did so sometimes, and 18 (8.60%) never did. This indicates that facial hygiene is relatively well-practiced among the population. Changing pillowcases regularly was always practiced by 86 respondents (40.80%), sometimes by 74 (35.10%), and never by 51 (24.20%), showing a fairly balanced distribution, with a sizable number not maintaining this aspect of hygiene consistently.

Avoiding the sharing of eye cosmetics was the most frequently observed hygiene practice, with 157 respondents (74.40%) stating they always avoided it, 36 (17.10%) reporting sometimes, and only 18 (8.50%) indicating never. This suggests a high level of awareness about the risks associated with sharing personal eye products. Proper removal of contact lenses was the least consistently practiced behavior. Only 48 respondents (22.70%) reported always removing lenses properly, 33 (15.60%) did so sometimes, while a majority of 130 (61.60%) stated they never followed proper removal procedures. This may reflect limited use of contact lenses among respondents or poor hygiene practices among users. Overall, the table shows varying levels of compliance with ocular hygiene practices, with some behaviors more consistently followed than others.

3.3 Prevalence of Self-Reported Eye Health Complaints

3.3.1 Research Question 2

What is the prevalence of self-reported ocular health complaints among the undergraduate students of Madonna University Elele Campus, Rivers state?

Table 3: Prevalence of Self-Reported Ocular Health Complaints among Respondents

Eye Health Complaint	Frequency	Percentage (%)
Redness	112	53.1
Itching	139	65.9
Watery eyes	104	49.3
Blurred vision	86	40.8
Eye pain	91	43.1
Sensitivity to light	64	30.3
None	31	14.7

From Table 3 above Itching was the most commonly reported symptom, with 65.9% of respondents acknowledging experiencing it. This could point toward a high prevalence of allergic conjunctivitis, which is common among young adults and can be exacerbated by dust, pollen, or poor hygiene. Redness of the eyes, experienced by 53.1%, may be indicative of various conditions including irritation, infections, or dryness. Watery eyes (49.3%) and eye pain (43.1%) also featured prominently. These may reflect digital eye strain, dry eye syndrome, or low-grade infections such as conjunctivitis or blepharitis. Blurred vision was reported by 40.8%, a symptom that may result from uncorrected refractive errors, dryness, or more serious ocular pathology. Sensitivity to light (photophobia), although less common (30.3%), is clinically significant and may point to anterior segment issues such as corneal abrasions or uveitis in some cases. Only 14.7% of respondents reported no symptoms, suggesting a high burden of eye-related complaints in the student population and reinforcing the importance of routine eye screenings and hygiene promotion.

3.4 Relationship between Ocular Hygiene and Eye Health Complaints

3.4.1 Research Question 3

What is the relationship between ocular hygiene practices and reported eye health problems among undergraduate students of Madonna University Elele Campus, Rivers state?

A composite score was created for ocular hygiene practices and for eye health complaints. Respondents were grouped into high and low categories based on mean scores.

Table 4: Descriptive Statistics for Ocular Hygiene Score and Eye Complaint Score

Measure	Mean ± SD	Minimum	Maximum	Range
Ocular Hygiene Score (0–20)	13.7±2.8	5	20	15
Eye Complaint Score (0–10)	5.2±2.5	0	10	10

Table 4 above presents the mean and standard deviation for both the ocular hygiene score and the eye complaint score among the respondents. The mean ocular hygiene score was 13.7±2.8 out of a possible 20, indicating that, on average, students reported a relatively high level of adherence to good ocular hygiene practices. In contrast, the mean eye complaint score was 5.2±2.5 out of a possible 10, reflecting a moderate level of selfreported eye-related symptoms among the respondents.

3.5 Hypothesis Testing

- **H_0:** There is no statistically significant relationship between ocular hygiene practices and eye health among undergraduates of Madonna University.

Table 5: Cross-tabulation of Ocular Hygiene Score and Eye Complaint Score with Chi-Square Test

Hygiene Score	Minor Complaints (0-3)	Multiple Complaints (3 and above)	Total	df	χ^2	p-Value
Poor Hygiene	26	61	87			
Good Hygiene	54	70	124	1	5.38	0.02
Total	80	131	211			

Table 5 above represents the relationship between respondents' hygiene scores and their reported eye complaints. Respondents were grouped into two categories based on their overall hygiene score: Poor Hygiene and Good Hygiene. Similarly, their complaints were grouped into Minor Complaint and Multiple Complaint categories based on the number of symptoms presented.

Among those with low hygiene scores, a significant majority (70.1%) reported high levels of eye complaints, whereas only 29.9% had minor (low) complaints. Conversely, within the high hygiene group, the distribution was more balanced: 56.5% still reported multiple complaints, while 43.5% had minor complaints.

A Chi-square test of independence ($\chi^2 = 5.38$, $p = 0.02$) revealed a statistically significant relationship between hygiene practices and eye health status. This suggests that students who engaged in poor ocular hygiene were significantly more likely to experience eye complaints, validating the first hypothesis of the study. This finding also supports public health assumptions that preventive behaviors significantly influence health outcomes.

3.6 Factors Influencing Ocular Hygiene Behaviors

3.6.1 Research Question 4

What factors influence ocular hygiene behaviors among undergraduate students of Madonna University Elele Campus, Rivers state?

Table 6: Factors Influencing Ocular Hygiene Behaviors among Respondents

Influencing Factor	Strongly Agree (%)	Agree (%)	Disagree (%)	Strongly Disagree (%)
Lack of awareness	90(42.70)	75(35.50)	32(15.20)	14(6.60)
Peer influence	45(21.30)	81(38.40)	56(26.50)	29(13.70)
Accessibility of clean water	77(36.50)	87(41.20)	28(13.30)	19(9.00)
Academic workload	54(25.60)	68(32.20)	61(28.90)	28(13.30)
Cost of hygiene items	65(30.80)	62(29.40)	52(24.60)	32(15.20)

Table 6 above provides a descriptive summary of students' responses to various factors influencing ocular hygiene practices, presented in terms of frequency and percentage across levels of agreement. For the factor lack of awareness, 90 respondents (42.70%) strongly agreed that it affects their hygiene practices, while 75 (35.50%) agreed. A smaller number, 32 (15.20%), disagreed, and 14 (6.60%) strongly disagreed. For peer influence, 45 respondents (21.30%) strongly agreed, 81 (38.40%) agreed, 56 (26.50%) disagreed, and 29 (13.70%) strongly disagreed, reflecting a varied perception of how peer behavior impacts hygiene habits. In terms of accessibility of clean water, 77 respondents (36.50%) strongly agreed and 87 (41.20%) agreed, while 28 (13.3%) disagreed and 19 (9.0%) strongly disagreed, indicating that many students view water access as a significant factor. Regarding academic workload, 54 respondents (25.6%) strongly agreed and 68 (32.2%) agreed that academic responsibilities affect their hygiene routines, while 61 (28.90%) disagreed and 28 (13.30%) strongly disagreed. For the cost of hygiene items, 65 students (30.80%) strongly agreed that affordability plays a role, 62 (29.40%) agreed, 52 (24.60%) disagreed, and 32 (15.20%) strongly disagreed. Overall, the distribution of responses highlights varying degrees of influence across the listed factors, with lack of awareness and water accessibility receiving the highest levels of agreement.

3.7 Age Distribution of Ocular Hygiene Practices and Eye Health

3.7.1 Research Question 5

Does ocular hygiene practices and eye health complaints differ based on students' age?

Table 7: Ocular Hygiene Scores across different Age Groups

Age Group	N	Mean±SD	Min	Max
16–20	64	12.4±2.9	6	19
21–25	104	14.1±2.6	7	20
26–30	43	13.9±2.8	8	20

Table 7 above provides a descriptive summary of ocular hygiene scores across different age groups. For respondents aged 16–20 years, the sample size was 64, with a mean score of 12.4±2.9, indicating relatively lower ocular hygiene scores with slightly higher variability. The minimum and maximum scores within this group ranged from 6 to 19.

Among the 21–25 age group which had the largest sample size of 104 respondents, the mean score was 14.1±2.6, the highest among all groups. Scores in this group ranged from 7 to 20, suggesting a generally higher level of ocular hygiene practices.

For participants aged 26–30 years, the sample size was 43, with a mean score of 13.9**±**2.8. The scores ranged from 8 to 20, indicating good ocular hygiene practices with moderate consistency.

Overall, the 21–25 age group demonstrated the highest average hygiene score, while the youngest group (16–20) had the lowest mean, suggesting possible age-related differences in hygiene awareness or behavior.

3.8 Hypothesis Testing

- **H_0:** There is no statistically significant difference in ocular hygiene practices based on age among undergraduates of Madonna University.

Table 8: One-Way ANOVA of Ocular Hygiene Scores by Age Group

Age Group	Mean Hygiene Score± SD	df	F	P-Value
16–20	12.4±3.1			
21–25	14.1±2.7	2	4.18	0.017
26–30	13.9±2.9			

Table 8 above shows the mean ocular hygiene scores across three age categories. Students aged 21–25 years recorded the highest average hygiene score (14.1), followed by the 26– 30 age group (13.9) and then the 16–20 group (12.4).

A one-way ANOVA was conducted and revealed a statistically significant difference in hygiene practices among age groups ($F = 4.18$, $p = 0.017$). Post hoc comparisons indicated that the 16–20 age group scored significantly lower than their older counterparts. This implies that younger students may be less consistent with ocular hygiene, possibly due to lower maturity, exposure, or prioritization.

3.9 Gender Distribution of Ocular Hygiene Practices and Eye Health

3.9.1 Research Question 6

Do ocular hygiene practices and eye health complaints differ based on students' gender?

Table 9: Descriptive Statistics of Ocular Hygiene Scores by Gender

Gender	N	Mean±SD	Min	Max
Male	98	13.1±2.9	5	19
Female	113	14.3±2.7	7	20

The table above presents a descriptive summary of ocular hygiene scores based on gender. Among the male respondents ($n = 98$), the mean ocular hygiene score was 13.1±2.9, indicating a moderate level of hygiene practices and a relatively wide spread of scores. The scores ranged from a minimum of 5 to a maximum of 19, showing considerable variation in hygiene behaviors among male participants.

For the female respondents ($n = 113$), the mean score was higher at 14.3**±**2.7, suggesting slightly better and more consistent ocular hygiene practices compared to their male counterparts. The scores for females ranged from a minimum of 7 to a maximum of 20, indicating a narrower and more favorable distribution. Overall, females had a higher average ocular hygiene score and slightly less variability in responses, implying generally better adherence to ocular hygiene practices compared to males.

3.10 Hypothesis Testing

- **H_0:** There is no statistically significant difference in ocular hygiene practices based on gender among undergraduates of Madonna University.

Table 10: Independent Samples t-Test of Ocular Hygiene Scores by Gender

Gender	Mean Hygiene Score ± SD	df	t	P
Male	13.1±2.9	1	-3.02	0.03
Female 14.3±2.7				

Table 10 above compares the mean hygiene scores between male and female respondents. Females had a mean score of 14.3, compared to 13.1 for males.

An independent samples t-test confirmed that this difference was statistically significant ($t = -3.02$, $p = 0.003$). This result supports previous evidence suggesting that women are generally more proactive in self-care and hygiene practices than men. It also validates Hypothesis 3, which posited gender differences in hygiene behavior.

4 DISCUSSION

The demographic profile of the respondents provides critical context for interpreting the ocular hygiene behaviors and associated eye health complaints observed in this study. The largest proportions of participants (49.3%) were aged between 21 and 25 years, aligning with the typical undergraduate age range in Nigerian tertiary institutions. A slightly higher proportion of female respondents (53.6%) than male respondents (46.4%) participated in the study, consistent with gender distributions reported in similar campus-based health research (Ayanniyi et al., 2010; Eze et al., 2021). The dominance of participants from health-related faculties particularly Health Sciences (35.5%) may reflect a heightened awareness or interest in health-focused research among these students, as documented in studies by Adio et al. (2017) and Al-Rashidi and Alhumaidan (2018).

In evaluating the ocular hygiene practices of respondents, the findings revealed a mixed pattern of adherence. High levels of compliance were observed for certain behaviors such as regular face washing (61.1%) and avoiding the sharing of eye cosmetics (74.4%). These practices, often emphasized in public health education campaigns may be well internalized due to repeated exposure through health education curricula and social influences (Wiafe & Ntim-Amponsah, 2015). However, there was suboptimal adherence to other critical behaviors such as avoiding eye rubbing (32.7%) and changing pillow cases regularly (40.8%). Particularly notable was the finding that only 22.7% of respondents reported always removing contact lenses properly, with a significant proportion (61.6%) admitting they never observed proper removal protocols. This may either reflect poor hygiene practices among contact lens users or, more likely, the low prevalence of Contact lens usage in the sample. These inconsistencies align with earlier studies by Gupta and Vashist (2019), who reported selective adherence to hygiene routines among youth populations, often shaped by behavioral convenience and knowledge gaps.

The study observed that the prevalence of self-reported ocular complaints was considerably high, with only 14.7% of respondents indicating no symptoms in the past six months. The most frequently reported symptoms included itching (65.9%), redness (53.1%), and watery eyes (49.3%), which are consistent with manifestations of allergic conjunctivitis, digital eye strain, and environmental irritation. These findings align with those reported by Al Rasheed et al. (2023), who found that 76.1% of university students in Riyadh had symptoms of computer vision syndrome, with common complaints including dryness, eye pain, and blurred vision. Similarly, Mali et al. (2022) reported that 90.3% of Indian medical undergraduates experienced digital eye strain, with burning/ itching (34%) and watering (43%) among the most common symptoms. These parallels suggest that environmental exposure, prolonged screen time, and suboptimal hygiene behaviors contribute significantly to ocular discomfort among undergraduates across different settings. The moderate prevalence of blurred vision (40.8%) and eye pain (43.1%) is also suggestive of undiagnosed refractive errors or dry eye syndromes, common among students who engage in prolonged visual tasks without breaks (Sheppard & Wolffsohn, 2018).

A statistically significant relationship was established between ocular hygiene practices and the prevalence of self-reported ocular complaints ($\chi^2 = 5.38$, $p = 0.02$). Respondents with poor hygiene scores were more likely to report high levels of ocular symptoms. This corroborates findings by Eze et al. (2021), who emphasized the causal link between suboptimal hygiene behavior and increased ocular morbidity. While hygiene alone may not be the sole determinant of ocular health status, the findings affirm that it plays a pivotal role in mitigating risks for non-infectious and infectious eye conditions. The implication for preventive eye care is clear: improved hygiene behavior can significantly reduce the symptomatic burden among students, especially in low-resource academic environments. In examining the determinants of ocular hygiene behaviors, several contextual factors were identified. Notably, 42.7% of respondents strongly agreed that lack of awareness influenced their hygiene behaviors, followed by accessibility to clean water (36.5%), cost of hygiene items (30.8%), and academic workload (25.6%). These findings reinforce the multi-level nature of hygiene behavior, which is influenced not only by individual knowledge but also by environmental and socio-economic constraints. Similar determinants were outlined in Wiafe and Ntim-Amponsah (2015), who argued that access to enabling resources and reduced academic pressure positively influence the adoption of healthy behaviors. The study also supports the theoretical propositions of the Health Belief Model, which posits that, perceived barriers, such as cost and accessibility significantly hinder engagement in health-promoting actions (Rosenstock et al., 1988).

The effect of age on ocular hygiene behavior was statistically significant ($F = 4.18$, $p = 0.017$), with students aged 21–25 years demonstrating the highest hygiene scores (14.1), while the youngest group (16–20 years) had the lowest (12.4). This suggests a positive correlation between age and hygiene adherence, possibly due to increased health awareness, personal responsibility, and academic exposure as students advance through the university system. Consistent with this finding, Joshi and Banerjee (2014) found that health behavior scores among Maldivian university students improved significantly with age, likely reflecting greater maturity and exposure to health information as students progressed through their academic programs. Similarly, López and Sánchez (2021) reported that hand hygiene compliance among Spanish young adults increased notably in the 21–25 age group compared to younger cohorts, suggesting that age-related maturity enhances adherence to preventive health practices.

Gender also emerged as a significant factor influencing hygiene behavior, with females recording a significantly higher mean hygiene score (14.3) than males (13.1), as evidenced by the independent samples t-test ($t = -3.02$, $p = 0.003$). This finding is consistent with established gender-based health behavior patterns, wherein females are often more proactive in adopting personal hygiene and preventive health measures (Ayanniyi et al., 2010; WHO, 2020). Cultural norms, social expectations, and personal grooming habits may account for this gender difference, necessitating targeted health education strategies that address the relatively lower compliance observed among male students.

Collectively, these findings present a coherent narrative: although many undergraduate students at Madonna University demonstrated a baseline awareness of ocular hygiene, critical gaps persist particularly in areas like Contact lens care and environmental hygiene. The high prevalence of eye complaints, despite relatively moderate-to-good hygiene scores, highlights the complex interplay of hygiene behavior, environmental exposures, and structural barriers. Interventions must therefore be multidimensional combining health education with access to resources, gender-sensitive programming, and regular eye health assessments to enhance student well-being.

5 CONCLUSION

This study explored ocular hygiene practices and associated eye health complaints among undergraduate students of Madonna University, Elele Campus, with a focus on identifying common hygiene behaviors, prevalence of ocular complaints, and how these vary across demographic groups. Data were gathered from 211 respondents across various faculties and analyzed using descriptive statistics, chi-square tests, ANOVA, and t-tests. The findings revealed that while most students demonstrated basic awareness of ocular hygiene—particularly in areas like face washing and avoidance of sharing cosmetics— there were notable deficiencies in behaviors such as proper contact lens handling and avoiding eye rubbing. These lapses likely contributed to the high prevalence of self-reported ocular complaints, with symptoms such as itching, redness, and watery eyes affecting a majority of the population.

Statistical analysis confirmed a significant association between poor ocular hygiene and increased eye complaints, highlighting hygiene as a key determinant of ocular health in this context. Several barriers to effective hygiene were also identified, including lack of awareness, limited access to clean water, academic pressure, and cost-related challenges. Furthermore, age and gender emerged as influential variables: older students and female respondents practiced significantly better ocular hygiene than their younger and male counterparts.

In conclusion, the study establishes that ocular hygiene practices among undergraduates are uneven and influenced by a combination of behavioral, demographic, and contextual factors. The burden of eye health complaints is high, and closely linked to gaps in hygiene behavior. These findings underscore the need for targeted health education, improved access to hygiene resources, and periodic screening programs aimed at reducing preventable ocular morbidity among students.

RECOMMENDATIONS

Based on the key findings of this study, the following recommendations are proposed to improve ocular hygiene practices and reduce the prevalence of eye health complaints among undergraduate students at Madonna University and similar academic institutions:

- **Eye Health Education Campaigns**: The university health services, in collaboration with faculty health clubs and student associations, should organize regular seminars and sensitization programs focused on ocular hygiene. These campaigns should emphasize the importance of hand hygiene, safe contact lens use, and the dangers of eye rubbing. Special attention should be paid to younger students (ages 16–20), who showed lower hygiene scores, indicating a need for early intervention.
- **Routine Eye Screening Services**: Annual or bi-annual vision screening should be institutionalized within the university medical system. This will help detect early signs of common ocular conditions such as allergic conjunctivitis, digital eye strain, and refractive errors especially among students with poor hygiene practices or high symptom burden.
- Improve Access to Basic Hygiene Materials: University administrators should partner with NGOs or corporate sponsors to provide subsidized hygiene kits that include items such as face towels, contact lens cases/ solutions, lubricating eye drops, and educational leaflets. Increasing access to affordable hygiene supplies can remove cost as a barrier to practice, especially among financially constrained students.
- Provision of Clean Water Stations and Wash Areas: Adequate access to clean water is critical for maintaining good ocular hygiene. Educational institution should ensure that strategically placed wash stations are available in all faculties and hostels, encouraging regular face and hand washing, especially after lectures, laboratory sessions and visits to convenience.

- Setting up of Peer-Led Health Advocacy Initiatives: To address peer influence and enhance health behavior modelling, university authorities should train selected students as "eye health ambassadors" who will serve as role models and advocates within their departments, faculties and hostels. These students can help reinforce proper hygiene habits through peer discussions, posters, and social media campaigns.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The researchers hereby declare that there was no conflict of interest in the study and its reported findings.

Statement of ethical approval

The following ethical principles were strictly adhered to during the course of this study:

- Ethical clearance for this study was obtained from the Research and Ethics Committee of Madonna University, Elele Campus, prior to the commencement of data collection. All participants were provided with detailed information regarding the nature, purpose, and procedures of the study. Only individuals who voluntarily agreed to participate, after signing an informed consent form, were included. Participation was entirely voluntary, and respondents were informed of their right to withdraw from the study at any point without any penalty or consequence.

Statement of informed consent

To protect participants' privacy, no personal identifiers such as names or matriculation numbers were collected. All responses were coded and securely stored to maintain confidentiality, and data were reported in aggregate form only, ensuring participant anonymity. The study posed no physical, psychological, or social harm to participants. Sensitive questions were carefully worded to prevent discomfort or embarrassment. The research was designed to benefit the student population by identifying and promoting healthy ocular hygiene practices. Throughout the research process, participants were treated with dignity and respect, and cultural, personal, and religious differences were acknowledged and respected during all interactions.

Contribution to knowledge

This study made several important contributions to the growing body of literature on ocular hygiene and eye health among young adults, particularly in the university setting in Nigeria amongst which includes;

- Empirical Evidence on Student Hygiene Practices: The study provides current, data-driven insights into the ocular hygiene habits of undergraduates in a private Nigerian university. By identifying specific areas of strength and weakness such as strong avoidance of shared cosmetics versus poor lens hygiene it expands the understanding of how knowledge and behavior are applied inconsistently in reallife settings.
- Documentation of Ocular Complaint Patterns in a Tertiary Environment: The research offers detailed documentation of the prevalence and types of ocular symptoms experienced by students, with itching, redness, and tearing emerging as dominant complaints. These findings give a clearer picture of the symptomatic burden in a population often overlooked in ocular epidemiology.
- Statistical Link between Hygiene and Ocular Health: By establishing a significant association between ocular hygiene practices and the prevalence of eye health complaints, the study strengthens the argument for preventive behavioral interventions. This correlation, supported by statistical analysis, underscores hygiene as not only a public health concern but also a predictive factor for ocular morbidity.
- Demographic Insights on Age and Gender Influence: The study confirms that both age and gender significantly influence hygiene practices. This contribution is valuable for tailoring future health promotion strategies. It suggests that interventions should be age-targeted and gender-responsive to achieve optimal behavioral outcomes.
- Context-Specific Barriers to Ocular Hygiene on Ocular Hygiene: The identification of contextual barriers such as lack of awareness, poor access to clean water, academic stress, and cost adds localized knowledge to the

field. These findings provided practical entry points for policy and program development within the Nigerian university context and similar settings across sub-Saharan Africa.

- Foundation for Future Interventions and Research: The study laid the groundwork for the design of future eye health interventions in university environments and serves as a baseline for longitudinal studies or interventional research assessing the effectiveness of educational and infrastructural responses.

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6 APPENDIX

QUESTIONNAIRE

Title: Ocular Hygiene Practices and Associated Eye Health Complaints among Undergraduate Students of Madonna University, Elele Campus, Rivers State

6.1 Section A: Demographic Information

- **Age:** _____ years
- **Gender:**☐ Male ☐ Female
- **Level of Study:**☐ 100L ☐ 200L ☐300L ☐ 400L ☐ 500L and above
- **Faculty/Department:** _____

6.2 Section B: Ocular Hygiene Practices

(Scoring: Always = 4, Often = 3, Sometimes = 2, Never = 1)

6.2.1 Instructions

Please indicate how often you engage in the following activities.

No.	Practice Statement	Always	Often	Sometimes	Never
1	I wash my hands before touching my eyes.	☐	☐	☐	☐
2	I avoid rubbing my eyes with unclean hands.	☐	☐	☐	☐
3	I clean or replace my contact lenses regularly (if applicable).	☐	☐	☐	☐
4	I avoid using expired or unprescribed eye drops.	☐	☐	☐	☐
5	I take breaks when using digital screens for long hours.	☐	☐	☐	☐
6	I maintain proper hygiene of my face and eyelids.	☐	☐	☐	☐
7	I avoid sharing eye cosmetics or towels.	☐	☐	☐	☐
8	I use protective eyewear when necessary (e.g., in dusty or hazardous environments).	☐	☐	☐	☐
9	I avoid self-medication for eye problems.	☐	☐	☐	☐
10	I attend eye check-ups when necessary.	☐	☐	☐	☐

6.3 Section C: Self-Reported Ocular Health Complaints

6.3.1 Instructions

Please indicate if you have experienced any of the following in the last 6 months:

No.	Symptom or Complaint	Yes	No
1	Frequent itching or burning sensation in the eyes	☐	☐
2	Redness or inflammation around the eyes	☐	☐
3	Excessive tearing or watery eyes	☐	☐
4	Blurred vision during or after screen use	☐	☐
5	Eye pain or discomfort without injury	☐	☐
6	Sensitivity to light (photophobia)	☐	☐
7	Eye discharge or crusting	☐	☐
8	Headache related to visual activities	☐	☐

6.4 Section D: Relationship Between Hygiene and Complaints

Have you ever noticed a connection between your eye hygiene habits and eye complaints?

☐ Yes ☐ No ☐ Not sure

If yes, what kinds of hygiene habits do you believe contributed to the problem?

6.5 Section E: Influencing Factors on Ocular Hygiene

(Scoring: Strongly Agree = 4, Agree = 3, Disagree = 2, Strongly Disagree = 1)

6.5.1 Instructions

Indicate the extent to which you agree with the following statements:

No.	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I was taught about eye hygiene through health campaigns or lectures.	☐	☐	☐	☐
2	My peers and family influence how I care for my eyes.	☐	☐	☐	☐
3	I maintain good hygiene because I have access to clean water and personal hygiene products.	☐	☐	☐	☐
4	I neglect eye hygiene due to a busy academic schedule.	☐	☐	☐	☐
5	I believe ocular hygiene is not important.	☐	☐	☐	☐