

THESIS

ON

Prevalence of Myopia and Dry Eye Disease among the Digital Device Users of Female Students at North South University

This proposal is prepared for partial fulfillment of the requirements of the Master of Public Health (MPH) Degree of North South University, Dhaka, Bangladesh

Name: Md Tamzid Hasan

ID: 213 5194 080



**MASTER OF PUBLIC HEALTH PROGRAM
DEPARTMENT OF PUBLIC HEALTH
SCHOOL OF HEALTH & LIFE SCIENCES
NORTH SOUTH UNIVERSITY
BASHUNDHARA, DHAKA
BANGLADESH
2022**

The Thesis Entitled

**Prevalence of Myopia and Dry Eye Disease among the Digital
Device Users of Female Students at North South University**

This is submitted to the Department of Public Health, North South University for the partial fulfillment of the requirements of the Master of Public Health (MPH) degree.

Dated:

.....

Name: Md Tamzid Hasan

Student's ID: 213 5194 080

DEPARTMENT OF PUBLIC HEALTH
MASTER OF PUBLIC HEALTH

We, the members of the proposal defense committee certify that we have carefully read the proposal and recommended it to the Dean for approval of the proposal entitled.

Prevalence of Myopia and Dry Eye Disease among the Digital Device Users of Female Students at North South University

Submitted by Md Tamzid Hasan, **Student's ID: 213 5194 080** for partial fulfillment of the requirements of the degree of Master of Public Health (MPH)

.....
Dr. Mohammad Delwer Hossain Hawlader
Ph.D, MPH
Associate Professor & Chairman
Department of Public Health
North South University

.....
Dipak Kumar Mitra
Ph.D., MPH, MBBS
Professor
Department of Public Health
North South University
Supervisor

.....
Dr. Shah Mahmud Mishu
MPH
Lecturer
Department of Public Health
North South University
Member

.....
Professor Dr. Hasan Mahmud Reza
BPharm, MPharm, Ph.D
Dean, School of Health & Life Sciences
North South University

ACKNOWLEDGMENT

This proposal is presenting the devoted presence of many people. I am extremely grateful to the Almighty for the splendid opportunity that has allowed me to pursue the coursework of the MPH program offered by the renowned educational institution North South University, Bashundhara, Dhaka, Bangladesh.

I would like to express my profound gratitude to my learned and experienced supervisor **Dr. Dipak Kumar Mitra**, Ph.D., MPH, MBBS, Professor, Department of Public Health of North South University for his kind supportive supervision and proper guidance.

I sincerely acknowledge the member of my thesis committee **Dr. Shah Mahmud Mishu**, MPH, Lecturer, Department of Public Health for his kind cooperation, valuable advice, continuous guidance, and support.

I am also grateful to all officials in the Department of Public Health office, North South University.

Last but not the least, all the credit goes to my parents who never stopped believing in me.

ABSTRACT

Background: Due to an unhealthy lifestyle and overusing the digital screen, we have developed myopia and dry eye disease in the very early stages of our lives, and prolonged digital device use is significant for DED.

Purpose: To determine the prevalence and associate factors of myopia and dry eye disease (DED) in female students at North South University.

Methods: A non-random quota sampling technique applied among 354 respondents for this study. Face-to-face questionnaires were developed to collect data. Association between myopia and DED was determined by binary logistic regression analysis.

Results: The overall prevalence of myopia and DED among the respondents were 57.91% and 32.5%. Study shows that spent time with digital device 3 to 5 hours (AOR: 0.188, 95% CI: 0.052 – 0.636) and >5 hours (AOR: 0.240, 95% CI: 0.071 – 0.772) were associated with higher odds of myopia. And myopia (AOR: 2.525, 95% CI: 1.113 – 5.992) were associated with higher odds of DED.

Conclusion: Near work induced myopia and more time spend with digital device use had greater relationship to develop myopia.

Keywords: Myopia, Dry Eye Disease, DED

TABLE OF CONTENTS

Content	Page
Title Page	1
Submission Page	2
Evaluation Page	3
Acknowledgement	4
Abstract	5
Table of Content	6-7
Abbreviations	8
LIST OF TABLES	9
LIST OF FIGURES	10
CHAPTER I: INTRODUCTION	11-18
1.1 Introduction	11-13
1.2 Justification of the Study	14-15
1.3 Operational Definition	16-17
1.4 Research Question	18
CHAPTER II: LITERATURE REVIEW	19-26
CHAPTER III: RESEARCH METHODOLOGY	27-32
3.1 Objectives of the Study	27
3.1.1 General Objective	27
3.1.2 Specific Objectives	27
3.2 Conceptual Framework	28
3.3 Study Design	29
3.4 Target Population	29
3.5 Study Site	29

3.6 Study Period	29
3.7 Sample Size	29-30
3.8 Inclusion Criteria	30
3.9 Exclusion Criteria	30
3.10 Sampling Method	30
3.11 Data Collection Tools	30
3.12 Data Management & Analysis Plan	31
3.13 Quality Control and Quality Assurance	31
3.14 Ethical Consideration	31
3.15 Expected Outcomes	32
3.16 Limitation of the Study	32
CHAPTER IV: RESULT	34-52
CHAPTER V: DISCUSSION	53
REFERENCES	54-57
APPENDICES	58-78
APPENDIX – A: Consent Form	58
APPENDIX – B: Consent Form (Bengali)	59
APPENDIX – C: Questionnaire	60-68
APPENDIX – D: Questionnaire (Bengali)	69-78

ABBREVIATIONS

DED	Dry Eye Disease
KCS	Keratoconjunctivitis Sicca
AL	Axial Length
CR	Corneal Radius of Curvature
CVS	Computer Vision Syndrome
OSDI	Ocular Surface Disease Index
TBUT	Tear film break-up time
CVD	Cardiovascular Disease
HTN	Hypertension
VDT	Video Display Terminal
DEQ5	Dry Eye Disease Questionnaire 5
CI	Confidence Interval
SD	Standard Deviation
OR	Odds Ratio
IQR	Interquartile Range
WHO	World Health Organization
NSU	North South University
IRB	Institutional Review Board
SBE	School of Business & Economics
SEPS	School of Engineering & Physical Science
SHSS	School of Humanities & Social Science
SHLS	School of Health & Life Science

LIST OF TABLES

Table 1: Distribution of socio-demographic and economic variables.	P. 34
Table 2: Distribution of clinical variables	P. 35
Table 3: Distribution of refractive error, family history, near work, and outdoor activities Variables	P. 36
Table 4: Prevalence and distribution of outcome variables with socio-demographic and economic variables	P. 39
Table 5: Prevalence and distribution of outcome variables with clinical variables	P. 41
Table 6: Prevalence and distribution of outcome variables with refractive error, family ocular history, near work, and outdoor activities variables	P. 42
Table 7: Factors associated with myopia.	P. 47
Table 8: Factors associated with dry eye disease.	P. 50

LIST OF FIGURES

CHAPTER I

INTRODUCTION

1.1 Introduction

The eye is the essential organ of the human body, and it's visualizing realistic scenarios of the world in front of us. Due to an unhealthy lifestyle and overusing the digital screen, we have developed myopia and dry eye disease in the very early stages of our lives, and prolonged digital device use is significant for Dry Eye Disease (DED) (1). Myopia is a prevalent condition of the eyes to see near objects clearly and blurry for far objects, and it develops rapidly during childhood (2). On the other hand, DED, also known as dry eye syndrome and keratoconjunctivitis sicca, is a multifactorial disease of the ocular surface, and it occurs when tears are unable to provide adequate lubrication to the eye. Myopia can lead to more severe conditions like cataracts, glaucoma, and blindness, while untreated DED may lead to inflammation, abrasion of the corneal surface, Corneal ulcers and vision loss (3). These two play severe etiological roles in losing our vision of the eye (4). By 2050, 5 billion people will develop myopia (5).

Globally, most eye morbidity is caused by refractive error, which comprises myopia, hypermetropia, and astigmatism (6, 7). Uncorrected refractive error is always the leading cause of moderate and severe visual impairment and reduces the quality of life. Nowadays, DED is a significant public health issue globally, and many studies reported that age, sex, and previous ocular surgery are the major risk factors for DED (8). DED is the sixth most common visual disorder in the USA, and its prevalence ranges from 5% to 15%, which is remarkably higher in women (9). In Nigeria, they have found a 17% prevalence of refractive error among the drivers of public institutions. Hypermetropia is associated with increased age, so the majority of adult hypermetropia among the 70 years old citizen population is very much higher than 40 years old citizens (7). In another study, we found the prevalence of dry eye disease in workers who use digital screens ranged from 9.5% to 87.5% (10).

The prevalence of DED is significantly higher in Asia than in North America (11). One study documented that the digital device use rate is very high in Korea, approximately more than 90% (12). And this rate is significantly higher in adolescents because parents easily give them devices to keep them busy (10). In Thailand, the prevalence of DED among the

adult population is 34%, and most myopia is 11.1% (11). Prevalence of myopia depends on geography, ethnicity, sex, and age, and it is varying on country to country. In Japan, many studies showed that the prevalence of severe DED among men and women was 11.5% and 18.7%, respectively, and in Taiwan, the prevalence among the elderly population was 33.7% (13). DED is now a severe health issue; it affects the patient's health, well-being, ocular health, quality of life, and the economic burden on the family (14).

Dry eye syndrome and myopia are overall morbidities in the South Asian population compared to the American and European countries due to lack of Vitamin A deficiency, nutritional deficiency, cigarette smoking, air pollution, humidity, skin allergy, and inappropriate uses of medicine (15). Mobiles, tablets, and other digital devices use rate among the young and adult populations are comparatively very high like Korean people. The young and adult generation is primarily devoted to their additional time on digital devices for using social media, playing online games, watching movies, and online teaching education (16). A 61.2% prevalence of moderate DED among the age group 21-40 years was found in the North Indian population; urban regions and desk jobs were associated with influence on to the development of the DED (17). Several South Asian studies conducted that the prevalence rate for myopia in India was 34.6% among the aged more than 40 years, but in East Asia, this rate is very high; in Singapore, this rate was 38.7%, and in Japan, this was 41.5% among the same aged group (18). In Pakistan, the prevalence of DED was more than 19%, and the majority for myopia was 37% (19, 20).

Bangladesh is one of the most population-density and developing countries worldwide and the second largest in South Asia (21). People of this country live in different socioeconomic conditions with various earning sources. And their lifestyle, nutritional status, and health conditions are different due to their different religious perception, income, and parental medical history. The majority percentage of the people lives in urban slum and lead unhygienic life, which is the cause of acute illness. A quarter of people in urban slums develop eye diseases like dry eye disease, myopia, glaucoma, and other severe eye diseases (22, 23). Three lakh children are diagnosed with eye disorders yearly in Bangladesh according to their parent's previous family history of vision problems (24). Morbidity of dry eye disease among adults after forty years is prevalent globally, and myopia is increased with age (25). The prevalence of myopia among 30-39 years of age is 17.5%, and the age until 70s, this rate is 65.5%. This study also identified that morbidity of myopia is more prevalent in employed people than in unemployed people (25). In Bangladesh, one study

was conducted about dry eye disease among garment workers, and the prevalence was 64.5% (22). Nowadays, myopia and dry eye diseases are significant public health concerns for our country.

Furthermore, no specific investigation has been done on the relation between device usage and the development of myopia and DED in Bangladesh. It is important to conduct a proper investigation into the state of myopia and DED prevalence in Bangladesh because this phenomenon has increased worldwide, especially in countries in Asia (26). Myopia suspected comorbidities like cataracts, glaucoma, hypermetropia, eye allergies, uveitis, age-related macular degeneration, water tearing, and dry eyes are profoundly associated; and other specific disease-related comorbidities which directly affect the eyes like diabetes mellitus, hypertension, blood pressure, hematologic malignancies, and systemic infections (27). Myopia, if left untreated, can lead to much more serious conditions later in life such as cataracts, detached retinas and glaucoma, and even blindness (28), while untreated DED may lead to inflammation, abrasion of the corneal surface, corneal ulcers, and vision loss (2). Understanding where Bangladesh stands in terms of the severity of the problem can then allow doctors and healthcare workers to act accordingly to ensure that the condition does not become dire.

This study aims to identify the prevalence of Myopia and Dry Eye Disease among University faculty members and staff. Excessive use of digital devices like computers or laptops, mobile phones, and tablets may have a strong association with developing myopia and dry eye disease, and prolonged use of the digital device would increase the loss of vision and be life-threatening to our life. And some disease-related factors and systemic factors are directly related to inducing our eye vision.

1.2 Justification of the study

The world has become digital, from developing to developed countries. With the rapid digitalization of the world, the threat of DED and myopia are now more concerning than ever. People are more likely to use digital devices than reading books or newspapers. The way we consume knowledge has also changed. We prefer to read online newspapers and e-journals instead of physical copies. It saves time, reduces paper waste, and is much more convenient. This habit of using online media has spread to the younger population, and children these days prefer to enjoy their free time playing online games or watching movies and videos. The rapid urbanization and destruction of playgrounds have limited the option for outdoor recreational activities for children, further pushing them indoors and towards using computers, smartphones, and tablets. In short, it can be said that laptops, smartphones, and tablets have become an integral part of our lives.

In all professions, the computer or laptop use rate is very high; without this device, it's tough to lead a professional life. Every educational institution, like a university, is mandatory; otherwise, we cannot battle with the real world. Everyone now depends on digital devices like laptops or computers, mobiles, and tablets to do their daily work. The researcher is doing their research on a computer, students are doing their homework and lab work, and online classes are familiar to students and teachers. So, we focus our eyes on the digital screen for maximum time in a day.

The excessive use of digital devices, including laptops, smartphones, and tablet screens, results in longer blinking intervals which exacerbates the evaporation of tears which is the ultimate risk of increasing the development of dry eye disease (DED). Previously, the use of digital devices was infrequent, and the prevalence of DED was 5 to 50%, varying with age (29). During the lockdown, screen time increased in a significant way. Now this percentage is likely to have increased massively among younger to older people.

On the other hand, myopia is a significant health issue worldwide. By 2050 half of the population may be myopic, as the World Health Organization estimated. Researchers found that in recent years not spending adequate time in outdoor activities is a major risk factor for developing myopia (30). Outdoor activities have decreased these days as people are increasingly leading a sedentary life and the lockdown worsened the situation. People almost completely stopped going out of the house, staying home, and using their digital

devices excessively. Screen time usage was high among people and the burden of myopia may have worsened during this period.

After ten or twenty years, these would be a severe health issue for our generation. It is an excellent opportunity for all researchers to discover all associated factors and reduce the risk of myopia and dry eye disease. So, given the urgency to control DED and myopia, we chose to conduct a cross-sectional study among teachers and employees from North South University in Dhaka city. The aim is to see how the prevalence of DED and myopia changed over time and how severe the association is between extensive use of the devices, and DED and intolerance.

1.3 Operational Definitions

Myopia: Myopia is a prevalent condition of the eyes to see near objects clearly but blurry for distant objects, and nowadays, it's a pervasive vision problem for all ages (2). It develops rapidly during childhood.

Dry Eye Disease: Dry eye disease (DED) is a multifactorial disease of the ocular surface, and it occurs when tears are unable to provide adequate lubrication to the eye.

Keratoconjunctivitis Sicca: Keratoconjunctivitis Sicca (KCS) is also a multifactorial disease. DED is known as Keratoconjunctivitis Sicca (31).

Multifactorial Disease: Diabetes, asthma, allergy, high blood pressure, arthritis, etc., are the factors of health problems. Gene also includes nutrition, lifestyle, alcohol and tobacco, some medicines, illness, and pollution. When genes and other factors cause health problems, we are called multifactorial diseases (32).

Glaucoma: It's a serious cause to our eyes; it damages the optic nerve with abnormally high pressure on the eyes. Globally, this is the leading cause of blindness and is very common in the elderly (33).

Corneal Ulcer: A corneal ulcer is one of the leading causes of vision loss and blindness, and it's an open sore on the eyes. A corneal ulcer is also known as keratitis. Wearing contact lenses basically during sleeping time, cold sore, shingles, chickenpox, dry eye, etc., are the causes of infections in the eyes, and disease is the most common for corneal ulcer (2).

Systemic Disease: Systemic means it affects the whole body rather than a single organ and tissue. So, systemic diseases like flu affect the whole body part of the human (34).

Systemic Infection: When a body is infected in the bloodstream, it is called a systemic infection.

Refractive Error: It's a type of vision problem and makes the eye see too hard. It happens when the shape of the eye does not bend light correctly to the retina (35).

Hypermetropia is also known as hyperopia, a pervasive vision disorder among young to older adults. It causes the length of the vision to be concise and not strong enough (36).

Astigmatism: It's a prevalent and treatable cause of near vision. It occurs when the cornea or the natural lens of the inside eyes is mismatched with the curves (37).

Keratoconus: When the front surface of dome-shaped eyes gradually swells outward into cone shape eyes. It causes sensitivity of the eyes and blurred vision (38).

Diabetes Mellitus: It refers to a group of diseases and disorders of the body that does not produce enough insulin. It causes abnormally high blood sugar (39).

1.4 Research Question:

1. What is the burden of eye disease among the digital device users of university faculty members and staff?
2. What is the prevalence of myopia and dry eye disease among the digital device users of university faculty members and staff?

CHAPTER II

LITERATURE REVIEW

Badmus SA et al., this study was conducted on the association between axial length (AL) to corneal radius of curvature (CR) ratio and refractive status among the healthy Nigerian senior citizen. The total sample size was 350 and the age was between 18-60 years. This study confirmed that AL has strong determinants of refraction, but CR has no significant differences in the refraction groups. 35.43% were myopic, 22% of participants were hypermetropic, and 82.6% of total participants were astigmatism which ranges between -0.25DC to -4.25DC was revealed from this study. Further study is needed to determine the very high refractive error and other variables which are more associated with this study among the senior citizens (40).

Anajekwu et al., this study was conducted among the staff of Nigerian University to determine the prevalence of uncorrected refractive error. It was a cross-sectional study, and the total sample size was 1,083. A self-administered and interviewer-administered questionnaire was used to collect data from the target population. 13.8% (95% CI = 11.9-15.9) prevalence was counted in this study. The common refractive error was astigmatism, and its prevalence was 8.6% (95% CI = 6.9-10.3) (41).

Uncorrected refractive error is the most common symptom in the non-academic staff than academic staff due to (41)---

1. Nature of their jobs
2. Visual demands of their jobs
3. Academic staff are more aware to seek eye care than non-academic staff

For achieving VISION 2020 (41):

1. The right to sight
2. Needs primary eye care
3. Provide primary eye care support in every university

Verma et al., a study was conducted with the computer operator at a teaching institute to assess computer vision syndrome (CVS) and dry eye disease (DED). The total sample size was 100. It was a cross-sectional study. Ocular surface disease index (OSDI), refraction, Schirmer's test 1, and tear film break-up time (TBUT) questionnaire were used to collect data. From this study,

the prevalence of CVS was found 74%. According to the Schirmer test questionnaire, 59% DED in the right eye and 58% DED in the left eye were found in the target population. From TBUT questionnaire, also found the same prevalence as like Schirmer test. CVS and dry eye have statistically significant also determined from this study (26).

Bourne et al., the main purpose of this study was the correction of refractive error in the adult population of Bangladesh. The total sample size was 12,782 adults age range more than 30 years and all the samples were nationally representative. A total of 11,624 subjects were examined where 22.1% were myopes, and 20.6% were hyperopes. The percentage of the spectacle's coverage was relatively higher in men and urban populations. This study also found that 81% had an inadequate correction of refractive error. The estimation of the national population is 6.7% (1.5 million) adult men and 9.2% (1.8 million) women who have seriously needed refractive correction. The spectacle coverage rate is very low in Bangladesh. Rural areas need more improvement in refractive errors (25).

Data (national blindness and low vision survey) analyzed to (25)---

- Refractive error calculation for the met and unmet needs among the adult population of Bangladesh
- Investigation of the associate factors of spectacle correction and the accuracy of the habitual correction
- Best refractive correction needed for Bangladesh perspective

Findings from this study (25)---

- Unmet needs among 50 years aged, women are higher than for men
- The low level of spectacles coverage is the major finding of this study
- Lower coverage found in the rural area

Pinazo-Duran et al., review the article on eclectic ocular comorbidities and systemic diseases with eye involvement. This study looked at some ocular conditions and mostly relevant systemic disorders which are affecting the eye (27).

Ocular comorbid conditions (27)---

- Keratoconjunctivitis sicca
- Refractive errors

- Glaucoma
- Cataracts
- Uveitis
- Retinopathies

Systemic disorders (27)---

- Ocular disease involvement with some pathologies
- Systemic disorders induced by ocular manifestations

Genetic syndromes (27)---

- Multidisciplinary actions
- Comprehensive evaluation

Some systemic diseases with eye involvement are given below (27):

- Hematologic diseases
- Cardiovascular diseases
- Nutritional disorders
- Metabolic disorders
- Pulmonary diseases
- Renal disorders
- Systemic viral and bacterial infections
- Nematode infections
- Dermatologic pathology
- Phacomatoses
- Collagen diseases
- Granulomatous diseases
- Genetic syndrome
- Hereditary metabolic disorders
- Heritable connective tissue diseases
- Neoplastic diseases
- Ocular complications
- Immunosuppressive agents
- Multisystemic autoimmune diseases
- Vitamins and eye diseases

- Miscellaneous systemic diseases

Ocular involvement in major pathologies (27):

- Diabetes mellitus
- Hypertension blood pressure
- Hyperthyroidism
- Sarcoidosis
- Tuberculosis
- Arthritis
- Psoriasis
- Scleroderma
- Systemic infections
- Diabetic macular edema

Ayub et al., the purpose of this study are the prevalence and risk factors of dry eye disease among the Pakistani population. This is a hospital-based cross-sectional study. The total sample size was 300 and all samples are collected from the department of ophthalmology, Jinnah Hospital, Lahore. All participant's ages were 18 years with various ophthalmic complications. Maximum participants are female. From this study, the prevalence of DED was found at 18.7% (19). Multivariate regression analyses were used to show the risk of developing DED and the following risk factors were found in this study (19)---

- Outdoor workers
- Working in AC
- Housewives
- Diabetics
- Smokers
- Exposed to excessive sunlight
- Wind
- Temperature
- Suffering meibomian gland dysfunction

Hanyuda et al., the aim of this study is physical inactivity, prolonged sedentary behaviors, and use of visual display terminals as potential risk factors for dry eye disease in a population-based cross-sectional study. The total sample size was 102,582 and all participants were aged 40 to 70 years. This study found that in both sexes, physical activities are significant to decrease the DED. Similarly, prolonged uses of VDT were a higher prevalence of developing DED in both sexes (42).

Frequency of physical activity for this study (42)---

- Less than once per month
- 1-3 times per month
- 1-2 times per week
- 3-4 times per week
- Almost everyday

And the duration of physical activity for both sexes (42)---

- Less than 30 minutes
- 30-59 minutes
- 1-2 hours
- 2-3 hours
- More than 4 hours

Limitations of this study (42):

- In a cross-sectional study, not possible to show the causal relationship between physical activity, sedentary behaviors, the digital device using time, and DED.
- Confounding factors were unmeasured in longitudinal observational studies.

Sood et al., the purpose of this study was to assess myopia among medical students in Western India vis-à-vis the East Asian epidemic. It was a cross-sectional descriptive study, and 148 participants were voluntarily recruited from the medical college of western Maharashtra. Myopia was diagnosed by distance visual acuity (DVA). 45% prevalence was found in this study (43).

The global prevalence of myopia among medical students is mentioned below (43)---

Taiwan- 93% prevalence

Singapore- 82%-90% prevalence

China- 71% prevalence

Pakistan- 58% prevalence

Norway- 50% prevalence

Denmark- 50% prevalence

India- 45% prevalence

Bangladesh- 63.8% prevalence

Turkey- 33% prevalence

Poland- 32% prevalence

This study also found that optometry students were more at risk to developed myopia due to extensive near work. Because excessive near work is the underlined findings of myopia develops gradually. Auto refraction lacking was the main limitation of this study (43).

Gupta et al., the main purpose of this study was to show the association between screen time, quality of sleep, and dry eye in college-going women of northern India. It was a cross-sectional and comparative questionnaire-based study among 547 college-going women. Dry eye was measured by the SPEED questionnaire and quality of sleep was examined by the Mini Sleep Questionnaire. The significant association between dry eye and quality of sleep was shown by multinomial logistic regression (16). These two are major global health issues in the present era.

Five domains were found in the questionnaire (16)---

Demographic domain

General question domain

Screen time domain

Sleep-wake domain

Dry eye domain

This study showed that a total of 65.61% of the women reported they have dry eye symptoms and, they have faced difficulties of sleep (16).

Limitations of this study (16):

- Limitations for the establishment of temporal relation
- Recall bias
- Non-random sampling technique

Tounaka et al., the purpose of this study was to investigate the dry disease is associated with deterioration of mental health in male Japanese university staff. The total sample size was 163 university staff where 99 male and 64 female staff. In Japan, the prevalence of clinically diagnosed dry eye disease was 2.1% and generally, it was 7.9% for both males and females (44).

Findings from this study (44)---

- Contact lens users among females were higher than among males
- No significant differences were found in vision quality, smoking habits, exercise, hypertension, diabetes, hyperlipidemia, and mental diseases between males and females.

Limitations in this study (44)---

- Single organizations don't a representative of the general population
- University staff involved in many digital operations
- Considering the consulting behavior of sex

This study showed that dry eye disease reduced the mental health-related quality of life, and the cause is unclear. DED symptoms treatment improves the mental health-related quality of life (44).

Li et al., the main purpose of this study was to assess dry eye disease and associated risk factors among the hospital-based population in Southeast China. It was a cross-sectional study and a total of 6,657 outpatients were measured for this study who has dry disease presence. 635 patients were clinically diagnosed with defined dry eye disease. Women were higher than men. The dry disease is also associated with a hormonal change in women patients. 163 women patients were found in this study who has hormonal problems and developed dry eye disease. Many factors were associated with dry eye disease, but this study found environmental and occupational factors were seriously associated with dry eye disease to develop dry eye disease

and most of them were from the hospital-based population. Prevalence of symptomatic dry eye disease was found at 9.54% and clinically it was 7.99% (6).

Alkabbani et al., the purpose of this study was to assess the severity and risk factors for dry eye disease in Dubai. It was an analytical cross-sectional survey-based study. From the survey, 452 participants were counted for this study. The survey was conducted online. Most of these surveys were women. Because most of the women used contact lenses and used digital screens for their leisure time. The prevalence of dry eye was found at 62.6%. The main limitation of this study was selection bias because all respondents were not literate in English. And this study was geographically limited to represent the entire population (45).

CHAPTER III

RESEARCH METHODOLOGY

3.1 Study Objectives

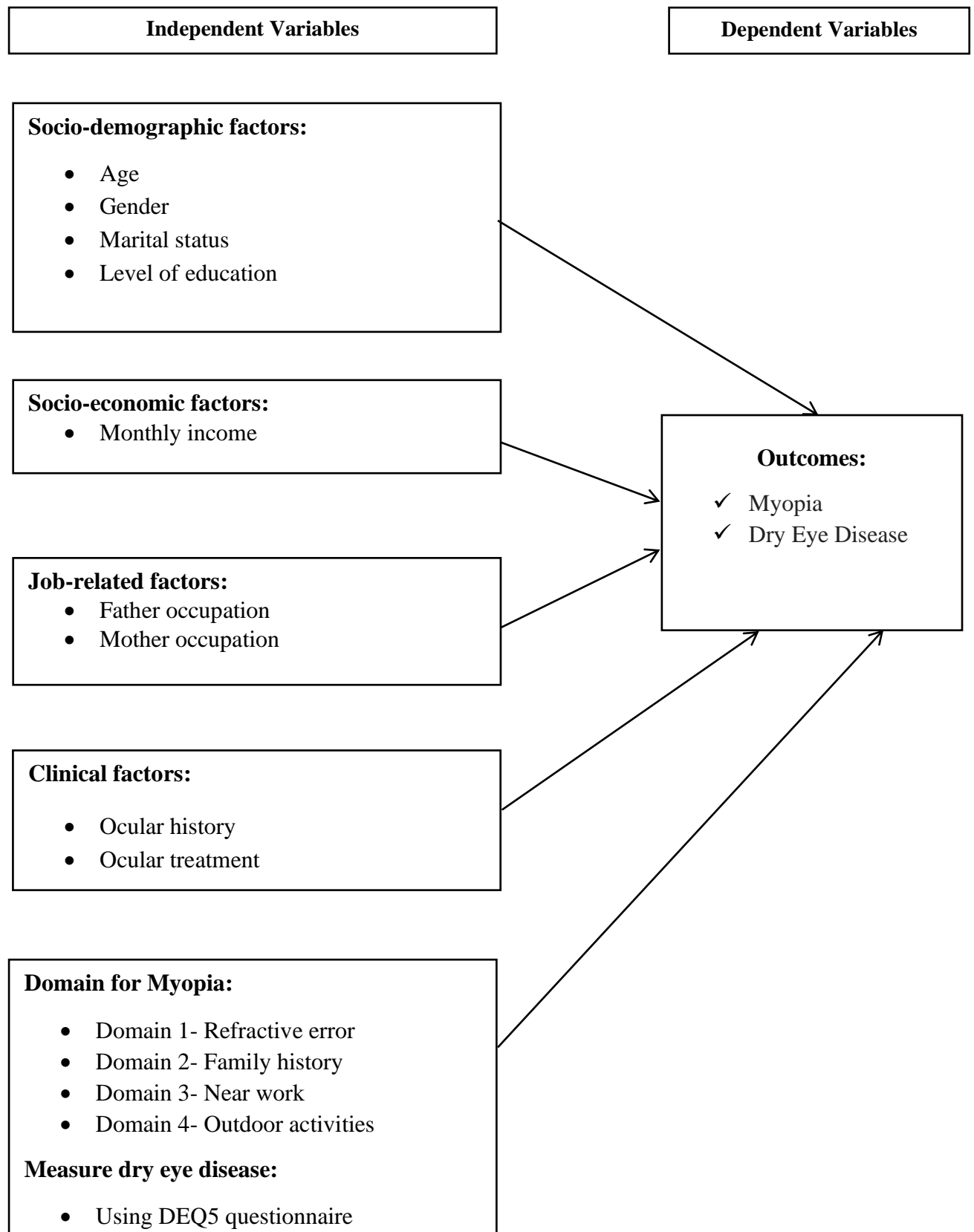
3.1.1 General Objective

To assess the burden of eye disease among the university faculty members and staff.

3.1.2 Specific objective:

1. To determine the prevalence of myopia among the university faculty members and staff.
2. To determine the prevalence of dry eye disease (DED) among the university faculty members and staff.
3. To measure the morbidities and comorbidities with myopia and DED among the university faculty members and staff.

3.2 Conceptual Framework



3.3 Study design:

A cross-sectional study will be conducted

3.4 Target Population

The target population of this study was the female students of North South University.

3.5 Study Site & Area

The study site will be North South University, Dhaka, Bangladesh.

3.6 Study Period

December 2022 to June 2023 (6 months)

3.7 Sample Size

The sample size for this study has been calculated to precisely estimate the prevalence of Dry Eye Disease. After reviewing the literature, we assumed the prevalence in our population about 64.2% and computed the sample size using the following formula:

$$n = \frac{(z_{1-\frac{\alpha}{2}})^2 pq}{d^2} \dots\dots\dots (1)$$

Where n = Expected sample size

z = Statistics corresponding level of confidence

= 1.96 (95% confidence interval for both sided)

p = Anticipated prevalence of DED = 64.2% = 0.642

q = 1-p = 1 – 0.642 = 0.358

d = Precision

= It would be 5% = 0.05

From formula (1),

$$n = \frac{(1.96)^2 \times 0.642 \times 0.358}{(0.05 \times 0.05)^2}$$

$$= 353.175 = 354 \text{ (rounded)}$$

3.8 Inclusion criteria:

- University faculty members and staff of North South University, Dhaka, Bangladesh.

3.9 Exclusion criteria:

- Any history of gross lid abnormalities, life-threatening systemic disease, extra and intraocular surgery within the last 6 months.

3.10 Sampling method:

A nonrandom quota sampling technique will be applied for this study. Participants will be recruited with reasonable representation from each faculty and work unit.

To collect data from the participants, we will enroll 354 female students both undergraduate and master's program from North South University.

3.11 Data collection tools:

An interviewer-administered questionnaire will be developed to collect data from selected respondents of North South University. Firstly, the questionnaire will be developed in English and translated into Bengali. We will use the DEQ5 scale for Dry Eye Disease, which is standard for global use. And four domains used to measure the myopia among the selective female students.

3.12 Data management & analysis plan:

After data collection, all interviewed questionnaires were checked by the editor for their completeness, correctness, and internal consistency to exclude missing or inconsistent data, which were discarded.

Inconsistent data and missing values were examined in the data set. Frequency tables were used to summarize category variables. Data processing and analysis were performed using R (version 4.3.1), a computer program. Binary logistic regression and the chi-square test were used to examine the relationship between outcomes and independent variables. The adjusted odds ratios (AOR) and their 95 percent confidence intervals were used to assess the strength of the relationship. Statistics were considered significant at a p value of <0.05 .

3.13 Quality Control & Quality Assurance

The Department of Public Health will oversee the implementation of the standard research procedure and criteria of North South University for report writing. The supervisor and co-supervisor will continue to offer their regular assistance and will offer this study the necessary information and backing. The supervisor will translate, simplify, and double-check the data collecting questionnaire, and data will be tracked. All the data will be kept on a password-protected device for the sake of secrecy, and only the authorized team will have access to it. During data coding and cleaning, study staff will pay close attention to data quality and correctness.

3.14 Ethical consideration:

Considering specific ethical issues is one of the most important aspects of performing research. The design and conduct of research are guided by a set of ethical issues. The Institutional Review Board (IRB) of North South University will be asked for approval before beginning the research's manual phase. We will ask for permission to gather data from our specific research location. Before any data are collected, each participant in this study will be given a description of the study's goals, and their privacy and confidentiality

will be taken extremely seriously. Each participant will verbally and in writing consent to participate in this study, and they each have the right to withdraw at any time during the interview.

3.15 Expected Outcome:

The prevalence of myopia and dry eye disease among the university female students were determined from this study and identified morbidities and comorbidities associated with myopia and dry eye disease. The duration of Digital Devices using time associated with Myopia and Dry Eye Disease among the Digital Device users of university female students were measured.

3.16 Limitation of the Study:

In this study, magnitude of myopia and dry eye disease has been measured from the primary data. The used statistical analytic technique strengthens the study quality and has given more better result. Our study has some limitations, recall bias, participants didn't provide the correct ocular history of them as well as their parents also. Due to cross-sectional study, we didn't measure the causal relationship between outcome and explanatory variables. Lastly, statistical technique used for this study has some restrictions to consider the other variables.

CHAPTER IV

RESULT

Background characteristics of the study Participants

Table 1: Distribution of socio-demographic and economic variables.

Variables	Frequencies	Percentage
Female students	354	100%
Age		
18 – 23 years	232	65.5%
24 – 29 years	94	26.6%
30 – 35 years	28	7.9%
Educational Status		
Undergraduate	208	58.8%
Master's	146	41.2%
Father's Occupation		
Government Job	114	32.2%
Private Job	92	26%
Business	148	41.8%
Mother's Occupation		
Government Job	58	16.4%
Private Job	63	17.8%
Housewife	233	65.8%
Family Monthly Income (BDT)		
Below 100000	110	31.1%
100000 – 200000	150	42.4%
200001 – 400000	71	20.1%
400001 or More	23	6.5%

Out of the total of 354 female students at North South University included in our study the prevalence of digital device users was 100%. The distribution of the socio-demographic and

socio-economic variables. The age of the study participants ranged from 18-35 years of which the highest percentage of respondents was from the age group of 18-23 years (65.5%). 58.8% of the participants were enrolled in the undergraduate program and the rest 41.2% were in the master's program. Nearly half of the respondent's father's occupation was business (41.8%) followed by a government job (32.2%). More than half of their mothers were housewives (65.8%) and around 34% of the respondent's mothers were working mothers. The monthly income of 42.4% of the participants was between 100000-200000 BDT and only 6.5% of the participant's monthly income was >400000 BDT, shown in **Table 1**.

Table 2: Distribution of clinical variables

Variables	Frequencies	Percentage
Acute Ocular Infection		
Yes	88	24.9%
No	266	75.1%
Conjunctivitis		
Yes	142	40.1%
No	212	59.9%
Other Eye Diseases		
Yes	32	9%
No	322	91%
Ocular Medication Use		
Yes	173	48.9%
No	181	51.1%
Household Member Chronic Disease		
Yes	248	70.1%
No	106	29.9%
Who has Chronic Disease		
Mother	46	13%
Father	98	27.7%
Both	122	34.5%
Don't have	88	24.9%

Ocular treatment within last six months of respondents		
Yes	125	35.4%
No	228	64.6%

The distribution of the clinical variables (Table 2). According to our study less than 50% participants had acute ocular infection than participants had no acute ocular infection (75.1%). Most of the participants in our study had not found ocular conjunctivitis (59.9%) and other eye related disease (91%). Nearly half of the participants used ocular medication (48.9%). The higher percentage of participants household member (70.1%) had chronic disease. Lower percentage (13%) of participants mother were chronic disease where maximum (34.5%) was both father and mother. Only 35.4% participants ocular treatment was continued within the last six months, shown in **Table 2**.

Table 3: Distribution of refractive error, family history, near work, and outdoor activities variables

Domain-I Refractive Error		
Wearing Glasses		
Yes	258	72.9%
No	96	27.1%
Purpose of wearing glasses		
Cosmetic Use		
Yes	122	34.5%
No	232	65.5%
Refractive Error		
Yes	173	48.9%
No	181	51.1%
Therapeutical		
Yes	107	30.2%
No	247	69.8%
Wearing Contact Lens		
Yes	124	35%

No	230	65%
Purpose of wearing contact lens		
Cosmetic Use		
Yes	83	23.4%
No	271	76.6%
Refractive Error		
Yes	48	13.6%
No	306	86.4%
Therapeutical		
Yes	21	5.9%
No	333	94.1%
Type of contact lens		
Soft		
Yes	74	20.9%
No	280	79.1%
RGP		
Yes	37	10.5%
No	317	89.5%
Therapeutic		
Yes	36	10.2%
No	317	89.5%
Domain- II Family History		
Parental Myopia		
Yes	212	59.9%
No	142	40.1%
Who has Myopia		
Father	56	15.8%
Mother	77	21.8%
Both	106	29.9%

Don't have	115	32.5%
Domain- III Near Work		
Gadgets at Home		
Computer/Laptop		
Yes	335	94.6%
No	19	5.4%
Mobile		
Yes	353	99.7%
No	1	0.3%
Tablet		
Yes	148	41.8%
No	206	58.2%
Time Spend with Digital Device		
1 – 3 hours	33	9.3%
3 – 5 hours	141	39.8%
>5 hours	179	50.6%
Domain- IV Outdoor Activities		
Outdoor Activities Weekdays		
Below 2 hours	116	32.8%
2 – 5 hours	161	45.5%
5 hours or more	77	21.8%
Outdoor Activities Weekend		
Below 4 hours	177	50%
4 – 8 hours	125	35.3%
8 – 12 hours	36	10.2%
12 hours or more	16	4.5%

The distribution of the refractive error, family ocular history, near work, and outdoor activities variables (Table 3). The prevalence of spectacles use was 72.9% among the digital device users. Nearly 50% participants used spectacles to correct the refractive error followed by the participants who used spectacles for cosmetic (34.5%) and therapeutic (30.2%) purposes.

Among the total participants 35% digital device users wore contact lens. Most of the participants used contact lens for cosmetic use (23.4%) than who used for therapeutic (5.9%) purposes and soft contact lens users (20.9%) were more than RGP (10.5%) and therapeutic type lens users (10.2%), respectively. The majority percentage of respondents (59.9%) had parental myopia. 2.6% less respondents both father and mother had myopia and 32.5% of their parents had no myopia found from our study. Almost half of the respondents had spent time with digital devices more than 5 hours followed by the respondents (9.3%) whose spent 1 to 3 hours. They were spent time with computer (94.6%), mobile (99.7%), and tablet (41.8%) used at their home. Moreover, nearly half of the participants (45.5%) weekdays outdoor activity time was 2 to 5 hours than participants (21.8%) who had 5 hours or more. But in weekend 50% participants outdoor activity time was <4hours followed by the participants (4.5%) whose had >12 hours, shown in **Table 3**.

Prevalence and distribution of outcome variables

Of the two outcome variables, digital device users of female students at North South University were found a higher prevalence in myopia (57.9%). And the overall prevalence of dry eye disease was found 32.5%.

Table 4: Prevalence and distribution of outcome variables with socio-demographic and economic variables

Variable	Myopia		P- value	Dry eye disease		P- value
	Yes	No		No	Yes	
Female students	205 (57.91%)	149 (42.09%)		239 (67.5%)	115 (32.5%)	
Age						
18 – 23 years	131 (56.5%)	101 (43.5%)	0.322	160 (69%)	72 (31%)	0.722
24 – 29 years	60 (63.8%)	34 (36.2%)		61 (64.9%)	33 (35.1%)	
30 – 35 years	14 (50%)	14 (50%)		18 (64.3%)	10 (35.7%)	
Educational Status						
Undergraduate	115 (55.3%)	93 (44.7%)	0.279	147 (70.7%)	61 (29.3%)	0.162
Master’s	90 (61.6%)	56 (38.4%)		92 (63%)	54 (37%)	
Father’s Occupation						

Government Job	67 (58.8%)	47 (41.2%)	0.933	75 (65.8%)	39 (34.2%)	0.743
Private Job	54 (58.7%)	38 (41.3%)		65 (70.7%)	27 (29.3%)	
Business	84 (56.8%)	64 (43.2%)		99 (66.9%)	49 (33.1%)	
Mother’s Occupation						
Government Job	38 (65.5%)	20 (34.5%)	0.342	36 (62.1%)	22 (37.9%)	0.437
Private Job	38 (60.3%)	25 (39.7%)		46 (73%)	17 (27%)	
Housewife	104 (44.6%)	104 (44.6%)		157 (67.4%)	76 (32.6%)	
Family Monthly Income (BDT)						
Below 100000	54 (49.1%)	56 (50.9%)	<0.009	82 (74.5%)	28 (25.5%)	0.072
100000 – 200000	93 (62%)	57 (38%)		100 (66.7%)	50 (33.3%)	
200001 – 400000	49 (69%)	22 (31%)		40 (56.3%)	31 (43.7%)	
400001 or More	9 (39.1%)	14 (60.9%)		17 (73.9%)	6 (26.1%)	

Female students aged 24 – 29 years were found higher myopic students (63.8%) compared to the other 2 age groups whereas students aged 18 – 23 years had slightly higher percentage of myopia (56.5%). Dry eye disease was found to be the highest age group 30 – 35 years (35.7%) compared to the other aged group. With the increase in the level of educational attainment myopia and DED was found to have increased. Around 55.3%, and 29.3% undergraduate students had myopia and DED compared to the higher educated students whose percentage was 61.6% and 37%. A higher percentage of myopia and DED were found to be the students whose father did government job and its percentage was 58.8% and 34.2% compared to whose father did business (56.8%) and private job (29.3). A similar pattern was found in the mother's occupation. Myopia and DED found to be higher whose mother did government job (65.5% and 37.9%) compared to whose mother did business (44.6%) and private job (27%). The percentage of two outcome variable was found among the students whose family monthly income between 200001 BDT and 400000 BDT. And the percentage was 69% and 43.7%. Similarly, lower percentage of myopia (39.1%) and DED (25.5%) found to be '400001 BDT or More' income group and 'Below 100000 BDT' income group, shown in **Table 4**.

Table 5: Prevalence and distribution of outcome variables with clinical variables

Variable	Myopia		P- value	Dry eye disease		P- value
	Yes	No		No	Yes	
Acute Ocular Infection						
Yes	71 (80.7%)	17 (19.3%)	<0.000	46 (52.3%)	42 (47.7%)	<0.001
No	134 (50.4%)	132 (49.6%)		193 (72.6%)	73 (27.4%)	
Conjunctivitis						
Yes	88 (62%)	54 (38%)	0.247	81 (57%)	61 (43%)	<0.001
No	117 (55.2%)	95 (44.8%)		158 (74.5%)	54 (25.5%)	
Other Eye Diseases						
Yes	20 (62.5%)	12 (37.5%)	0.716	18 (56.2%)	14 (43.8%)	0.219
No	185 (57.5%)	137 (42.5%)		221 (68.6%)	101 (31.4%)	
Ocular Medication Use						
Yes	107 (61.8%)	66 (38.2%)	0.174	101 (58.4%)	72 (41.6%)	<0.001
No	98 (54.1%)	83 (45.9%)		138 (76.2%)	43 (23.8%)	
Household Member Chronic Disease						
Yes	148 (59.7%)	100 (40.3%)	0.361	159 (64.1%)	89 (35.9%)	<0.049
No	57 (53.8%)	49 (46.2%)		80 (75.5%)	26 (24.5%)	
Who has Chronic Disease						
Mother	20 (43.5%)	26 (56.5%)	<0.009	41 (89.1%)	5 (10.9%)	<0.000
Father	58 (59.2%)	40 (40.8%)		67 (68.4%)	31 (31.6%)	
Both	83 (68%)	39 (32%)		63 (51.6%)	59 (48.4%)	
Don't have	44 (50%)	44 (50%)		68 (77.3%)	20 (22.7%)	
Ocular treatment within last six months of respondents						
Yes	95 (76%)	30 (24%)	<0.000	65 (51.6%)	61 (48.4%)	<0.000

No	110 (48.2%)	118 (51.8%)		174 (76.3%)	54 (23.7%)	
----	-------------	-------------	--	----------------	------------	--

80.7% and 47.7% of the female students whose had acute ocular infection had higher probability of myopia and DED compared to students with no acute ocular infection (50.4% and 27.4%). Similarly, students who had myopia the prevalence of conjunctivitis and other ocular diseases was 62% and 62.5% compared to who had no exposure of conjunctivitis (55.2%) and other ocular diseases (57.5%). Among the DED students the prevalence of conjunctivitis and other ocular diseases were found 43% and 43.8% compared to who had no conjunctivitis (25.5%) and other ocular diseases (31.4%), respectively. Female students to use ocular medication had found higher prevalence of myopia and DED with a prevalence of 61.8% and 41.6% respectively compared to other counterparts with no use of ocular medication. Around 59.7% and 35.9% female students were myopia and DED whose household members had chronic disease compared to whose household members had no chronic disease and its percentage was 53.8% and 24.5%. A higher percentage of myopia and DED found to be the students whose father and mother both had the chronic disease and these percentage were 68% and 48.4% compared to whose parents had no chronic diseases. Among the female students whose mother had chronic disease found lower prevalence of myopia and DED with prevalence of 43.5% and 10.9%. Continuation of ocular treatment within last six months was given the higher prevalence of myopia and DED among the female students with percentage of 76% and 48.4%. And lower prevalence of myopia and DED found to be who had no ocular treatment within last six months with prevalence of 48.2% and 23.7%, shown in **Table 5**.

Table 6: Prevalence and distribution of outcome variables with refractive error, family ocular history, near work, and outdoor activities variables

Variable	Myopia		P- value	Dry eye disease		P- value
	Yes	No		No	Yes	
Domain-I Refractive Error						
Wearing Glasses						
Yes	202 (78.3%)	56 (21.7%)	<0.000	159 (61.6%)	99 (38.4%)	<0.000
No	3 (3.1%)	93 (96.9%)		80 (83.3%)	16 (16.7%)	
Purpose of wearing glasses						
Cosmetic Use						

Yes	91 (74.6%)	31 (25.4%)	<0.000	83 (68%)	39 (32%)	0.975
No	114 (49.1%)	118 (50.9%)		156 (67.2%)	76 (32.8%)	
Refractive Error						
Yes	145 (83.8%)	28 (16.2%)	<0.000	102 (59%)	71 (41%)	<0.001
No	60 (33.1%)	121 (66.9%)		137 (75.7%)	44 (24.3%)	
Therapeutical						
Yes	99 (92.5%)	8 (7.5%)	<0.000	55 (51.4%)	52 (48.6%)	<0.000
No	106 (42.9%)	141 (57.1%)		184 (74.5%)	63 (25.5%)	
Wearing Contact Lens						
Yes	96 (77.4%)	28 (22.6%)	<0.000	72 (58.1%)	52 (41.9%)	<0.008
No	109 (47.4%)	121 (52.6%)		167 (72.6%)	63 (27.4%)	
Purpose of wearing contact lens						
Cosmetic Use						
Yes	65 (78.3%)	18 (21.7%)	<0.000	50 (60.2%)	33 (39.8%)	0.138
No	140 (51.7%)	131 (48.3%)		189 (69.7%)	82 (30.3%)	
Refractive Error						
Yes	37 (77.1%)	11 (22.9%)	<0.006	26 (54.2%)	22 (45.8%)	0.050
No	168 (54.9%)	138 (45.1%)		213 (69.6%)	93 (30.4%)	
Therapeutical						
Yes	18 (85.7%)	3 (14.3%)	<0.015	11 (52.4%)	10 (47.6%)	0.198
No	187 (56.2%)	146 (43.8%)		228 (68.5%)	105 (31.5%)	
Type of contact lens						
Soft						
Yes	53 (71.6%)	21 (28.4%)	<0.011	45 (60.8%)	29 (39.2%)	0.213

No	152 (54.3%)	128 (45.7%)		194 (69.3%)	86 (30.7%)	
RGP						
Yes	30 (81.1%)	7 (18.9%)	<0.004	24 (64.9%)	13 (35.1%)	0.859
No	175 (55.2%)	142 (44.8%)		215 (67.8%)	102 (32.2%)	
Therapeutic						
Yes	33 (91.7%)	3 (8.3%)	<0.000	18 (50%)	18 (50%)	<0.029
No	171 (53.9%)	146 (46.1%)		221 (69.5%)	97 (30.5%)	
Domain- II Family History						
Parental Myopia						
Yes	121 (57.1%)	91 (42.9%)	0.781	144 (67.9%)	68 (32.1%)	0.932
No	84 (59.2%)	58 (40.8%)		95 (66.9%)	47 (33.1%)	
Who has Myopia						
Father	28 (50%)	28 (50%)	0.157	45 (80.4%)	11 (19.6%)	<0.045
Mother	39 (50.6%)	38 (49.4%)		50 (64.9%)	27 (35.1%)	
Both	68 (64.2%)	38 (35.8%)		63 (59.4%)	43 (40.6%)	
Don't have	70 (60.9%)	45 (39.1%)		81 (70.4%)	34 (29.6%)	
Domain- III Near Work						
Gadgets at Home						
Computer/Laptop						
Yes	195 (58.2%)	140 (41.8%)	0.810	224 (66.9%)	111 (33.1%)	0.399
No	10 (52.6%)	9 (47.4%)		15 (78.9%)	4 (21.1%)	
Mobile						
Yes	204 (57.8%)	149 (42.2%)	1.000	238 (67.4%)	115 (32.6%)	1.000
No	1 (100%)	0 (0.0%)		1 (100%)	0 (0.0%)	
Tablet						

Yes	93 (62.8%)	55 (37.2%)	0.138	87 (58.8%)	61 (41.2%)	<0.004
No	112 (54.4%)	94 (45.6%)		152 (73.8%)	54 (26.2%)	
Time Spend with Digital Device						
1 – 3 hours	9 (27.3%)	24 (72.7%)	<0.002	28 (84.8%)	5 (15.2%)	<0.007
3 – 5 hours	86 (61%)	55 (39%)		102 (72.3%)	39 (27.7%)	
>5 hours	109 (60.9%)	70 (39.1%)		109 (60.6%)	71 (39.4%)	
Domain- IV Outdoor Activities						
Outdoor Activities Weekdays						
Below 2 hours	65 (56%)	51 (44%)	0.293	84 (72.4%)	32 (27.6%)	0.389
2 – 5 hours	100 (62.1%)	61 (37.9%)		105 (65.2%)	56 (34.8%)	
5 hours or more	40 (51.9%)	37 (48.1%)		50 (64.9%)	27 (35.1%)	
Outdoor Activities Weekend						
Below 4 hours	106 (59.9%)	71 (40.1%)	0.603	120 (67.8%)	57 (32.2%)	0.412
4 – 8 hours	68 (54.4%)	57 (45.6%)		82 (65.6%)	43 (34.4%)	
8 – 12 hours	23 (63.9%)	13 (36.1%)		28 (77.8%)	8 (22.2%)	
12 hours or more	8 (50%)	8 (50%)		9 (56.2%)	7 (43.8%)	

Prevalence of myopia and DED among the students who wore glasses were 78.3% and 38.4%. Maximum prevalence found from who had myopia and similarly, lower prevalence found 3.1% and 16.7%. A higher percentage of students who had myopia used glasses for cosmetic, correcting the refractive error, and therapeutic purposes compared to who had not used glasses these purposes, respective percentage was 74.6%, 83.8%, and 92.5%. DED also followed the similar pattern. Students who had DED used glasses for cosmetic, correcting refractive error, and therapeutic purposes were higher compared to who had not used glasses these purposes and this percentage was 32%, 41%, and 48.6%.

Prevalence of wearing contact lens among the students who had myopia and DED was 77.4% and 41.9%. Most of the contact lens users who had myopia used lens for cosmetic, correcting refractive, and therapeutic purposes were higher than who were not used glasses for these purposes and percentage was 78.3%, 77.1, and 85.7%. The percentage of users who had no DED but used contact lens for cosmetic, refractive error, and therapeutic purposes were higher than who had DED and respective percentage was 60.2%, 54.2%, and 52.4%. 71.6%, 81.1%, and 91.7% contact lens users who had myopia their lens type was soft, RGP, and therapeutic compared to whose contact lens type were not. DED exposed students whose contact lens type were like myopia exposed students they were less prevalent. Similarly, 39.2%, 35.1%, and 50% students who had DED and their lens type was soft, RGP, and therapeutic found to be higher than whose lens types were not soft (30.7%), RGP (32.2%), and therapeutic (30.5%).

According to our study family ocular history had no longer association with myopia and DED. A lower percentage of myopia (57.1%) and DED (32.1%) exposed students had parental myopia compared to myopia (59.2%) and DED (33.1%) exposed students whose had no parental myopia in their ocular history. 64.2% of the female students whose had exposed to myopia were found to have their both father and mother had myopia compared to whose parents had no myopia (60.9%). Similarly, DED found to be higher with both father and mother (40.6%) were myopia compared to whose parents had no myopia (29.6%).

The percentage of all outcome variables increased with the increase of duration of time spend with digital device. The percentage among lowest group '1 – 3 hours' was 27.3% and 15.2% for the female students who had myopia and DED. Highest percentage of myopia were found '3 – 5 hours' (61%) and '>5 hours' (60.9%) group and DED found to be '>5 hours' group and this percentage was 39.4%. And significant percentage of students had computer (58.2%), mobile (57.8%), and tablet (62.8%) whose were myopia compared to who had not computer/laptop, mobile, and tablet. On the other hand, students whose were DED among them 33.1%, 32.6%, and 41.2% had computer/laptop, mobile, and tablet to spend their time compared to who had not any digital devices.

Outdoor activities in weekdays and weekend were more important for preventing myopia and DED. From our study we found that, students who had myopia their weekdays activities were 3 to 5 hours and this percentage 62.1% compared to other two groups 'Below 2 hours' and '>5 hours', percentage of this group was 56% and 51.9%. Besides, 34.8% students who had DED they had spent more than 5 hours for outdoor activities in weekdays compared to other two

groups where 27.6% and 34.8% found to be 'Below 2 hours' and '2 – 5 hours' groups. In weekend, maximum percentage of myopia exposed students (63.9%) average outdoor activities duration was 8 to 12 hours compared to other three groups where the percentage of 'Below 4 hours' groups (59.9%) slightly higher than remaining two groups '4 – 8 hours' (54.4%) and '12 hours or more' (50%). Similarly, DED exposed students who had spent more time for outdoor activities were found to be 43.8% compared to other counterparts with lower time to spend for outdoor activities in weekend, shown in **Table 6**.

Factors associated with the outcome variables

Table 7 shows the binary logistic regression analysis result where our outcome variable was myopia and significant independent variables were found from bivariate analysis. After analysis we found wearing glasses for refractive error, purpose for wearing glasses, and time spend with digital device were more significant for digital device users to develop myopia disease.

Table 7: Factors associated with myopia.

Variables	Myopia vs Digital Device Users	
	AOR	95% CI
Socio Demographic & Economic		
Family Monthly Income (BDT)		
Below 100000 (RC)	1	
100000 – 200000	0.797	0.347 – 1.826
200001 – 400000	0.639	0.214 – 1.821
400001 or More	3.015	0.662 – 13.663
Clinical Treatment Information		
Acute Ocular Infection		
Yes	0.687	0.258 – 1.763
No (RC)	1	
Who has Chronic Disease		
Mother	1.034	0.329 – 3.201
Father	1.538	0.592 – 4.073
Both	0.861	0.303 – 2.429

Don't have (RC)	1	
Ocular treatment within last six months of respondents		
Yes	0.864	0.384 – 1.916
No (RC)	1	
Domain-I Refractive Error		
Wearing Glasses		
Yes	0.046***	0.008 – 0.204
No (RC)	1	
Purpose of wearing glasses		
Cosmetic Use		
Yes	1.112	0.429 – 2.768
No (RC)	1	
Refractive Error		
Yes	0.179***	0.065 – 0.452
No (RC)	1	
Therapeutical		
Yes	0.091***	0.029 – 0.242
No (RC)	1	
Wearing Contact Lens		
Yes	0.594	0.081 – 4.405
No (RC)	1	
Purpose of wearing contact lens		
Cosmetic Use		
Yes	0.302	0.033 – 2.407
No (RC)	1	
Refractive Error		
Yes	0.625	0.075 – 4.549
No (RC)	1	
Therapeutical		

Yes	0.353	0.031 – 3.306
No (RC)	1	
Type of Contact Lens		
Soft		
Yes	3.070	0.403 – 19.961
No (RC)	1	
RGP		
Yes	0.884	0.092 – 7.229
No (RC)	1	
Therapeutic		
Yes	1.799	0.181 – 12.508
No (RC)	1	
Domain- III Near Work		
Time Spend with Digital Device		
1 – 3 hours (RC)	1	
3 – 5 hours	0.188**	0.052 – 0.636
>5 hours	0.240*	0.071 – 0.772
Dry Eye Disease (DED) for Myopia		
Dry Eye Disease		
No (RC)	1	
Yes	0.552	0.229 – 1.279
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		
AOR: Adjusted Odds Ratio; CI: Confidence Interval; RC: Reference Category		

According to result shows in **Table 7**, we found that participants who wore glass (AOR: 0.046, 95% CI: 0.008 – 0.204) were 95.4% lower likelihood to myopia disease compared to who did not wear glass. Myopia disease was 82.1% lower for participants who used glass to correct the refractive error (AOR: 0.179, 95% CI: 0.065 – 0.452) compared to who did not. Similarly, participants who therapeutically used the glass (AOR: 0.091, 95% CI: 0.029 – 0.242) were 0.091 times lower chance to develop myopia compared to who used glass in other purposes. Moreover, myopia disease was higher among the participants whose daily digital device spent

time were 3 to 5 hours (AOR: 0.188, 95% CI: 0.052 – 0.636) and more than 5 hours (AOR: 0.240, 95% CI: 0.071 – 0.772) compared to those who were spent time 1 to 3 hours, shown in **Table 7**.

Table 8 shows the binary logistic regression analysis result for dry eye disease (DED) and only significant variable was myopia.

Table 8: Factors associated with dry eye disease.

Variables	Dry Eye Disease vs Digital Device Users	
	AOR	95% CI
Clinical Treatment Information		
Acute Ocular Infection		
Yes	0.988	0.488 – 1.978
No (RC)	1	
Conjunctivitis		
Yes	1.701	0.903 – 3.205
No (RC)	1	
Ocular Medication Use		
Yes	1.183	0.563 – 2.464
No (RC)	1	
Household Member Chronic Disease		
Yes	1.496	0.449 – 5.424
No (RC)		
Who has Chronic Disease		
Mother	0.192	0.033 – 0.992
Father	0.697	0.182 – 2.444
Both	1.133	0.249 – 4.794
Don't have (RC)	1	
Ocular treatment within last six months of respondents		
Yes	1.556	0.786 – 3.085
No (RC)	1	

Domain-I Refractive Error		
Wearing Glasses		
Yes	0.645	0.230 – 1.741
No (RC)	1	
Purpose of wearing glasses		
Refractive Error		
Yes	1.412	0.742 – 2.710
No (RC)	1	
Therapeutical		
Yes	1.444	0.725 – 2.877
No (RC)	1	
Wearing Contact Lens		
Yes	1.139	0.575 – 2.240
No (RC)	1	
Type of contact lens		
Therapeutic		
Yes	1.387	0.543 – 3.553
No (RC)	1	
Domain- II Family History		
Who has Myopia		
Father	0.542	0.221 – 1.262
Mother	1.198	0.573 – 2.496
Both	0.918	0.462 – 1.807
Don't have (RC)	1	
Domain- III Near Work		
Gadgets at Home		
Tablet		
Yes	1.388	0.814 – 2.362
No (RC)	1	

Time Spend with Digital Device		
1 – 3 hours (RC)	1.373	0.467 – 4.687
3 – 5 hours	2.612	0.908 – 8.826
>5 hours	1	
Myopia and Dry Eye Disease (DED)		
Myopia		
Yes	2.525*	1.113 – 5.992
No (RC)	1	
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		
AOR: Adjusted Odds Ratio; CI: Confidence Interval; RC: Reference Category		

According to result we determined that, participants whose had myopia disease (AOR: 2.525, 95% CI: 1.113 – 5.992) were 2.525 times likely to be dry eye disease compared to participants who had no myopia (**Table 8**).

CHAPTER V

DISCUSSION

Aimed of this study to determine the prevalence of myopia and dry eye disease among the digital device users of female students at North South University. Our study found that using spectacles, purpose of using spectacles, and time spend with digital device had significant association with myopia. And dry eye disease was highly associated with who had myopia.

This study showed that participants who had used spectacles for correcting refractive error and therapeutic purpose they had lower chance of myopia compared to who had not use spectacles and participants who used spectacles for different purposes (like cosmetic use). Our study findings did not in line any study findings because data were few, and it is unclear if elements that affect peripheral retinal defocus, such as the power profile of the spectacle lenses (46). Though it is a more powerful and relevant indicator than the prevalence of spectacle usage and has importance in planning services, an increase in the prevalence of spectacle use may or may not have an impact on the prevalence of uncorrected refractive errors among the population (47).

Near work induced myopia and more time spend with digital device use had greater relationship to develop myopia. Our study found that time spend with digital device used rate higher among the participants who had used more than 5 hours compared to 1 to 3 hours digital device users as well as the participants who had used digital device 3 to 5 hours. For instance, one Chinese study reported that screen time was not associated with spherical equivalent but it did predict decreased visual acuity (48), whereas from another study, more axial length and myopic spherical equivalent were linked to higher screen time, but not to prevalent myopia (49). Although our study findings found in line with two Indian studies (50, 51). Notable reason was exposure of digital screen had 4 to 8 times higher prevalence of myopia (50). One meta-analysis also found the same result that screen time on computers, cellphones, tablets, or both, alone or in combination, was linked to myopia (52).

Myopic participants had more chance to develop dry eye disease and our study found the significant result compared to participants who had no myopia disease. Few research has looked at the relationship between DED and myopia thus far (53, 54). One study reported that, high myopia in adult patients was associated with a greater incidence of DED (54). The prevalence of DED from this study was found 32.5% by assessment of DEQ5 questionnaire.

REFERENCES:

1. Fjærvoll H, Fjærvoll K, Magno M, Moschowits E, Vehof J, Dartt DA, Utheim TP. The association between visual display terminal use and dry eye: a review. *Acta Ophthalmologica*. 2022;100(4):357-75.
2. Corneal Ulcer: Symptoms, Causes & Treatment. Cleveland Clinic.
3. Al-Mohtaseb Z, Schachter S, Shen Lee B, Garlich J, Trattler W. The Relationship Between Dry Eye Disease and Digital Screen Use. *OPHTH*. 2021;Volume 15:3811-20.
4. Roni M Shtein M. Dry eye disease: Wolters Kluwer; 2023 [updated September].
5. Hazra D, Yotsukura E, Torii H, Mori K, Maruyama T, Ogawa M, et al. Relation between dry eye and myopia based on tear film breakup time, higher order aberration, choroidal thickness, and axial length. *Sci Rep*. 2022;12(1):10891.
6. Xu L, Zhuang Y, Zhang G, Ma Y, Yuan J, Tu C, et al. Design, methodology, and baseline of whole city-million scale children and adolescents myopia survey (CAMS) in Wenzhou, China. *Eye and Vis*. 2021;8(1):31.
7. Ayse KOA, Aslihan U. GME For an Uncommon Neurosurgical Emergency in a Developing Country, 2017.
8. Ahn JH, Choi Y-H, Paik HJ, Kim MK, Wee WR, Kim DH. Sex differences in the effect of aging on dry eye disease. *CIA*. 2017;Volume 12:1331-8.
9. Dana R, Meunier J, Markowitz JT, Joseph C, Siffel C. Patient-Reported Burden of Dry Eye Disease in the United States: Results of an Online Cross-Sectional Survey. *American Journal of Ophthalmology*. 2020;216:7-17.
10. Öztürk H, Özen B. The Effects of Smartphone, Tablet and Computer Overuse on Children's Eyes During the COVID-19 Pandemic. *jpr*. 2021;8(4):491-7.
11. Tangmonkongvoragul C, Chokesuwattanaskul S, Khankaew C, Punyaseevee R, Nakkara L, Moolsan S, Unruan O. Prevalence of symptomatic dry eye disease with associated risk factors among medical students at Chiang Mai University due to increased screen time and stress during COVID-19 pandemic. *PLOS ONE*. 2022;17(3):e0265733.
12. Moon JH, Kim KW, Moon NJ. Smartphone use is a risk factor for pediatric dry eye disease according to region and age: a case control study. *BMC Ophthalmol*. 2016;16(1):188.
13. Uchino M, Nishiwaki Y, Michikawa T, Shirakawa K, Kuwahara E, Yamada M, et al. Prevalence and Risk Factors of Dry Eye Disease in Japan: Koumi Study. *Ophthalmology*. 2011;118(12):2361-7.

14. Long Y, Wang X, Tong Q, Xia J, Shen Y. Investigation of dry eye symptoms of medical staffs working in hospital during 2019 novel coronavirus outbreak. *Medicine*. 2020;99(35):e21699.
15. Abdulmannan DM, Naser AY, Ibrahim Ok, Mahmood AS, Alyoussef Alkrad J, Sweiss K, et al. Visual health and prevalence of dry eye syndrome among university students in Iraq and Jordan. *BMC Ophthalmol*. 2022;22(1):265.
16. Gupta P, Rana M, Ratti M, Duggal M, Agarwal A, Khurana S, et al. Association of screen time, quality of sleep and dry eye in college-going women of Northern India. *Indian Journal of Ophthalmology*. 2022;70(1):51.
17. Balasopoulou A, Kokkinos P, Pagoulatos D, Plotas P, Makri O, Georgakopoulos C, et al. Symposium Recent advances and challenges in the management of retinoblastoma Globe-saving Treatments. *BMC Ophthalmol*. 2017;17(1):1.
18. Pan C-W, Wong T-Y, Lavanya R, Wu R-Y, Zheng Y-F, Lin X-Y, et al. Prevalence and Risk Factors for Refractive Errors in Indians: The Singapore Indian Eye Study (SINDI). *Invest Ophthalmol Vis Sci*. 2011;52(6):3166.
19. Ayub A, Akhtar FM, Saleem N, Ali MH, Ayub H, Butt NH. Frequency and Risk Factors of Dry Eye Disease in Pakistani Population, A Hospital Based Study.8.
20. Shah SP, Jadoon MZ, Dineen B, Bourne RRA, Johnson GJ, Gilbert CE, et al. Refractive Errors in the Adult Pakistani Population: The National Blindness and Visual Impairment Survey. *Ophthalmic Epidemiology*. 2008;15(3):183-90.
21. Statista. Population density of Bangladesh from 2005 to 2020 2021 [Available from: <https://www.statista.com/statistics/778381/bangladesh-population-density/>].
22. Rashid MAKM, Teo CHY, Mamun S, Ong HS, Tong L. Prevalence and Risk Factors of Severe Dry Eye in Bangladesh-Based Factory Garment Workers. *Diagnostics*. 2020;10(9):634.
23. Dineen BP. Prevalence and causes of blindness and visual impairment in Bangladeshi adults: results of the National Blindness and Low Vision Survey of Bangladesh. *British Journal of Ophthalmology*. 2003;87(7):820-8.
24. Saif. Many children in BD suffer from eyesight problems: The Financial Express; 2017 [updated Oct 21, 2017. Available from: <https://thefinancialexpress.com.bd/health/many-children-in-bd-suffer-from-eyesight-problems-1502770815>].
25. Bourne R. Prevalence of refractive error in Bangladeshi adults*1Results of the National Blindness and Low Vision Survey of Bangladesh. *Ophthalmology*. 2004;111(6):1150-60.

26. Verma S, Midya U, Gupta S, Shukla Y. A cross-sectional study of the prevalence of computer vision syndrome and dry eye in computer operators. *TNOA J Ophthalmic Sci Res*. 2021;59(2):160.
27. Pinazo-Durán MD, Zanón-Moreno V, García-Medina JJ, Arévalo JF, Gallego-Pinazo R, Nucci C. Eclectic Ocular Comorbidities and Systemic Diseases with Eye Involvement: A Review. *BioMed Research International*. 2016;2016:1-10.
28. Cataracts: What They Are, Causes, Symptoms, Surgery, Recovery Time. Cleveland Clinic.
29. Neti N, Prabhasawat P, Chirapapaisan C, Ngowyutagon P. Provocation of dry eye disease symptoms during COVID-19 lockdown. *Sci Rep*. 2021;11(1):24434.
30. Holden BA, Wilson DA, Jong M, Sankaridurg P, Fricke TR, Iii ELS, Resnikoff S. Myopia: a growing global problem with sight-threatening complications.1.
31. Trent Tsun-Kang Chiang TT. Dry Eye Disease (Keratoconjunctivitis Sicca): Practice Essentials, Background, Anatomy. 2022.
32. Medical Genetics: Multifactorial Inheritance. 1970.
33. Glaucoma - Symptoms and causes. Mayo Clinic. 1970.
34. Systemic: MedlinePlus Medical Encyclopedia. 2023.
35. Refractive Errors | National Eye Institute.
36. Hypermetropia Symptoms, Causes and Treatment. OCL Vision. 1970.
37. Astigmatism - Symptoms and causes. Mayo Clinic. 1970.
38. Keratoconus - Symptoms and causes. Mayo Clinic. 1970.
39. Diabetes Mellitus (DM) - Hormonal and Metabolic Disorders. MSD Manual Consumer Version. 1970.
40. Badmus S, Ajaiyeoba A, Adegbehingbe B, Onakpoya O, Adeoye A. Axial length/corneal radius of curvature ratio and refractive status in an adult Nigerian population. *Niger J Clin Pract*. 2017;20(10):1328.
41. Anajekwu C, Kizor-Akaraiwe N. Uncorrected refractive error in a university community. *Niger J Clin Pract*. 2022;25(3):361.
42. Hanyuda A, Sawada N, Uchino M, Kawashima M, Yuki K, Tsubota K, et al. Physical inactivity, prolonged sedentary behaviors, and use of visual display terminals as potential risk factors for dry eye disease: JPHC-NEXT study. *The Ocular Surface*. 2020;18(1):56-63.
43. Department of Physiology PDDYPMCH, Research Center PPI, Sood RS, Sood A. Prevalence of myopia among the medical students in western India vis-à-vis the east Asian epidemic. *IOSRJDMS*. 2014;13(1):65-7.

44. Tounaka K, Yuki K, Kouyama K, Abe T, Tsubota K, Kawabe H, Yokoyama K. Dry Eye Disease Is Associated with Deterioration of Mental Health in Male Japanese University Staff. *Tohoku J Exp Med*. 2014;233(3):215-20.
45. Alkabbani S, Jeyaseelan L, Rao AP, Thakur SP, Warhekar PT. The prevalence, severity, and risk factors for dry eye disease in Dubai – a cross sectional study. *BMC Ophthalmol*. 2021;21(1):219.
46. Sankaridurg P, Conrad F, Tran H, Zhu J. Controlling Progression of Myopia: Optical and Pharmaceutical Strategies. *Asia Pac J Ophthalmol (Phila)*. 2018;7(6):405-14.
47. Marmamula S, Khanna RC, Narsaiah S, Shekhar K, Rao GN. Prevalence of spectacles use in Andhra Pradesh, India: rapid assessment of visual impairment project. *Clin Exp Ophthalmol*. 2014;42(3):227-34.
48. Guan H, Yu NN, Wang H, Boswell M, Shi Y, Rozelle S, Congdon N. Impact of various types of near work and time spent outdoors at different times of day on visual acuity and refractive error among Chinese school-going children. *PLoS One*. 2019;14(4):e0215827.
49. Liu S, Ye S, Xi W, Zhang X. Electronic devices and myopic refraction among children aged 6-14 years in urban areas of Tianjin, China. *Ophthalmic Physiol Opt*. 2019;39(4):282-93.
50. Saxena R, Vashist P, Tandon R, Pandey RM, Bhardawaj A, Menon V, Mani K. Prevalence of Myopia and Its Risk Factors in Urban School Children in Delhi: The North India Myopia Study (NIM Study). *PLOS ONE*. 2015;10(2):e0117349.
51. Singh NK, James RM, Yadav A, Kumar R, Asthana S, Labani S. Prevalence of Myopia and Associated Risk Factors in Schoolchildren in North India. *Optom Vis Sci*. 2019;96(3):200-5.
52. Foreman J, Salim AT, Praveen A, Fonseka D, Ting DSW, Guang He M, et al. Association between digital smart device use and myopia: a systematic review and meta-analysis. *The Lancet Digital Health*. 2021;3(12):e806-e18.
53. Yotsukura E, Torii H, Inokuchi M, Tokumura M, Uchino M, Nakamura K, et al. Current Prevalence of Myopia and Association of Myopia With Environmental Factors Among Schoolchildren in Japan. *JAMA Ophthalmol*. 2019;137(11):1233-9.
54. Nilufer Ilhan M, Ozgur Ilhan M, Esra Ayhan Tuzcu M, Mutlu Cihan Daglioglu M, Mesut Coskun M, Nihan Parlakfikirer M, and Ugurcan Keskin M. Is There a Relationship Between Pathologic Myopia and Dry Eye Syndrome? *CLINICAL SCIENCE*. 2014;33:169–71.

APPENDICES

APPENDIX-A

Inform Decision Making Consent Form

Serial No.....

Date

Name of Respondent

I, **Md Tamzid Hasan**, student of MPH program of North South University, am conducting research on “**Prevalence of Myopia and Dry Eye Disease among the Digital Device Users of Faculty Members and Staff of North South University**”

As a part of this study, your participation would be highly appreciated and would contribute a lot to this research study. You will be asked to answer several questions. Your identity will not be disclosed and will be kept confidential.

Your participation in this study will not involve any inconvenience or risks. If any questions asked to you during the study poses embarrassment or discomfort, you are free to refuse to answer those questions. Your participation is voluntary. Refusal to participate or withdrawal of your consent or discontinuing participation in the study will not result in any penalty or loss of benefits. The results of this study will be presented anonymously.

North South University has reviewed and approved the procedures of this study. If you have any questions about this study, you should feel free to ask now or anytime throughout the study. If you have understood the nature of the study and have agreed to participate, please sign in the place, indicated below. Thanking you,

.....

Participant’s signature & date

.....

Investigator’s signature & date

Appendix-B

CONSENT FORM (BENGALI)

কোডঃ.....

তারিখঃ.....

নামঃ.....

প্রিয় সুহৃদ, মোঃ তামজীদ হাসান, নর্থ সাউথ বিশ্ববিদ্যালয়ের এমপিএইচ প্রোগ্রামের ছাত্র। আমি একটি গবেষণা কর্ম করছি যার শিরোনাম হল “Prevalence of Myopia and Dry Eye Disease among the Digital Device Users of Faculty Members and Staff of North South University”। আমি আপনাকে এই গবেষণায় অংশগ্রহণের আমন্ত্রণ জানাচ্ছি। আপনাকে উক্ত গবেষণা কর্মে কিছু প্রশ্নের উত্তরও দিতে হবে যা এই ফর্মে উল্লেখ করা আছে।

আমি আপনাকে জানাতে চাই যে এটি সম্পূর্ণরূপে একটি একাডেমিক গবেষণাকর্ম এবং আপনার প্রদত্ত তথ্য সমূহ অন্য কোন উদ্দেশ্যে ব্যবহৃত হবে না। আপনার নাম প্রকাশনায় গোপন থাকবে।

এই গবেষণা কর্মে আপনার অংশগ্রহণ ঐচ্ছিক এবং গবেষণাকর্মের যেকোন সময় এতে অংশ নেয়া থেকে বিরত থাকতে পারবেন। ইন্টারভিউ চলাকালীন কোন নির্দিষ্ট প্রশ্নের উত্তর না দিতে চাইলে, প্রশ্নের উত্তর না দেয়ার অধিকার আপনি সংরক্ষণ করেন।

আমি আপনার সহযোগিতায় কৃতজ্ঞ থাকব। আপনি যদি গবেষণায় যোগ দিতে সম্মত হন, তবে অনুগ্রহ পূর্বক নির্দিষ্ট স্থানে স্বাক্ষর করুন।

তথ্য গ্রহণকারীর স্বাক্ষর ও তারিখঃ

গবেষণায় অংশগ্রহণকারীর স্বাক্ষর ও তারিখঃ

Appendix-C

Questionnaire – English

Name:

Identification No:

Department:

******Are you suffering from any of the following problems?**

		Yes	No
1	Gross lid abnormalities		
2	Life-threatening systemic disease		
3	Extra and intraocular surgery within the last six months		

PART A: Socio-demographic information

1. What is your age (in years)?

..... Years

2. Where is your home district?

.....

3. What is your status in university?

1	Student	
2	Faculty	
3	Administration	
4	Others	

4. What is your highest education level?

1	Graduation	
2	Post-Graduation	
3	PhD	
4	Others (specify):	

5. What is your father's education level?

1	Primary Education	
2	Secondary Education	
3	Higher Education	
4	No Education	

6. What is your father's occupation?

1	Government Job	
2	Private Job	
3	Business	
4	NGO	
5	Other (Specify):	

7. What is your mother's education level?

1	Primary Education	
2	Secondary Education	
3	Higher Education	
4	No Education	

8. What is your mother's occupation?

1	Government Job	
---	----------------	--

2	Private Job	
3	Business	
4	NGO	
5	Housewife	
6	Other (Specify):	

9. What is your (faculty/administration/other) or your family's (student) monthly income?
..... (In Taka)

10. What is your marital status?

1	Married	
2	Widowed	
3	Separated/Divorced	
4	Unmarried (skip to question 13)	

11. How many children do you have?

.....

12. Are you currently pregnant?

1	Yes	
2	No	
3	Not Applicable	

13. What type of family do you live in?

1	The nuclear family (With your husband and children only)	
2	Joint Family (With your brother and sisters-in-law)	

3	Extended family (With your father and mother-in-law)	
4	Other (specify):	

14. How is the financial condition of your family?

1	Very much solvent	
2	Quite solvent	
3	Fairly solvent	
4	Poor/ Ill-off	
5	Not Applicable	

15. To your knowledge, are you suffering from any of the following problems?

		Yes	No
1	Hypertension	1	2
2	Diabetes Mellitus	1	2
3	Acute ocular infections	1	2
4	Allergic Conjunctivitis	1	2
5	Others (specify):		

16. Systemic medication history is known to cause dry eyes and steroid use history.

		Yes	No
1	Antihistamine	1	2
2	Anticholinergic	1	2
3	Topical steroids	1	2
5	Anti-glaucoma	1	2
6	Others (specify):		

17. Do you have to continue any ocular treatment within the last six months?

Yes ☐ No ☐

PART B: Myopia Questionnaire

Domain 1: Refractive Errors

18. Are you wearing glasses?

Yes ☐ No ☐

If "Yes"

What is the purpose of wearing glasses?

1	Cosmetic Use	
2	Refractive Error	
3	Therapeutical	

19. Are you wearing contact lenses?

Yes ☐ No ☐

If "Yes"

What is the purpose of wearing glasses?

1	Cosmetic Use	
2	Refractive Error	
3	Therapeutical	

What type of contact lens do you use?

1	Soft	
2	RGP	
3	Therapeutic	

20. Pattern of your refractive error

1	Myopia	
2	Hypermetropia	
3	Astigmatism	

Glasses Rx

	Sph	Cyl	Axis	Add	PD
OD					
OS					

Domain 2: Family History

21. Parental myopia history

Yes ☐ No ☐
If "Yes"

1	Father has myopia	
2	Mother has myopia	
3	Both have myopia	

22. Is there a family member with previous ocular history?

		Yes	No
1	Glaucoma	1	2
2	Cataract	1	2
3	Retinal Disease	1	2
4	Keratoconus	1	2
5	Other (Specify)	1	2

Domain 3: Near Work (multiple answers available)

23. Gadgets available at your home

1	Computer or Laptop	
2	Internet Access	
3	Tablet	
4	Mobile	

24. Time to spend doing near work (daily)

		(1-3) hrs	(3-5) hrs	5 hrs>
1	Duration of laptop use			
2	Duration of tablet use			
3	Duration of mobile use			
4	Social media use			
5	Duration of playing games on mobile			
6	Duration of the device used in the darkroom			

25. Do you or your parents have concerns about the near work-induced myopia?

1	Near work can induce myopia	
2	Face close to the book while reading	
3	Face close to the book while writing	

Domain 4: Outdoor activities

26. Duration of outdoor activities on weekdays

..... (in hours)

27. Duration of outdoor activities on holidays/weekend

..... (in hours)

28. Types of outdoor activities (multiple answers available)

1	Exercise/GYM	
2	Jogging	
3	Swimming	
4	Cycling	
5	Running	
6	Playing sports (Football, Cricket, Badminton, etc)	
7	Participate in religious activities	
8	Others	

PART C: DEQ 5 for Dry Eye Disease (DED) questionnaire

Questions about “Eye Discomfort”

29. During a typical day in the past month, how often did your eyes feel discomfort?

Never	Rarely	Sometimes	Frequently	Constantly
0	1	2	3	4

30. When your eyes felt discomfort, how intense was this feeling of discomfort at the end of the day, within two hours of going to bed?

Never have it					Very intense
0	1	2	3	4	5

Questions about “Eye Dryness”

31. During a typical day in the past month, how often did your eyes feel dry?

Never	Rarely	Sometimes	Frequently	Constantly
0	1	2	3	4

32. When your eyes felt dry, how intense was this feeling of dryness at the end of the day, within two hours of going to bed?

Never have it					Very intense
0	1	2	3	4	5

Questions about “Watery Eyes”

33. During a typical day in the past month, how often did your eyes look or feel excessively watery?

Never	Rarely	Sometimes	Frequently	Constantly
0	1	2	3	4

Score	Q. 29	Q. 30	Q. 31	Q. 32	Q. 33	Total

Appendix-D

Questionnaire – বাংলা

নাম:

পরিচিতি নাম্বার:

ডিপার্টমেন্ট:

আপনার নিম্নোলিখিত কোনো দীর্ঘমেয়াদী রোগ আছে কি?

		হ্যাঁ	না
১	শেষ ৬ মাসে এক্সট্রা ও ইন্ট্রাওকুলার অপারেশন হয়েছে কিনা		
২	গ্রস লিড অ্যাবনর্মালাটিস		
৩	জীবন হুমকি নাশক সিস্টেমিক রোগ		

ক বিভাগঃ RbwgwZ msµvš— Z "

১। আপনার বয়স কত?

.....

২। আপনার নিজ জেলা কোথায়?

.....

৩। আপনি কোন পেশায় নিয়োজিত আছেন?

১	ছাত্র	
২	ফ্যাকাল্টি	
৩	প্রশাসনিক	
৪	অন্যান্য	

৪। আপনার সর্বোচ্চ শিক্ষাগত যোগ্যতা কি?

১	গ্রাজুয়েশন	
২	পোস্ট-গ্রাজুয়েশন	
৩	পিএইচডি	
৪	অন্যান্য	

৫। আপনার পিতার সর্বোচ্চ শিক্ষাগত যোগ্যতা কি?

১	প্রাথমিক শিক্ষা	
২	সেকেন্ডারী শিক্ষা	
৩	উচ্চতর শিক্ষা	
৪	শিক্ষা নেই	

৬। আপনার পিতার পেশা কি?

১	সরকারী চাকুরী	
২	বেসরকারী চাকুরী	
৩	ব্যাবসা	
৪	এন জি ও	
৫	অন্যান্য	

৭। আপনার মাতার সর্বোচ্চ শিক্ষাগত যোগ্যতা কি?

১	প্রাথমিক শিক্ষা	
২	সেকেন্ডারী শিক্ষা	
৩	উচ্চতর শিক্ষা	
৪	শিক্ষা নেই	

৮। আপনার মাতার পেশা কি?

১	সরকারী চাকুরী	
২	বেসরকারী চাকুরী	
৩	ব্যাবসা	
৪	এন জি ও	
৫	গৃহিনী	
৬	অন্যান্য	

৯। আপনার অথবা আপনার পরিবারের মাসিক আয় কত?

..... (টাকা)

১০। আপনার বৈবাহিক অবস্থা কি?

১	বিবাহিত	
২	বিধবা	
৩	বিবাহবিচ্ছেদ/তলাক	
৪	অবিবাহিত (১৩ নং প্রশ্নে যান)	

১১। আপনার সন্তান সংখ্যা কতজন?

.....

১২। আপনি কি বর্তমানে গর্ভবতী?

১	হ্যাঁ	
২	না	
৩	প্রযোজ্য নয়	

১৩। আপনি কিরূপ পরিবারে বাস করেন?

১	একক পরিবার (স্বামী ও সন্তানসহ)	
২	যৌথ পরিবার (ভাসুর-দেবর ও ননদ সহ)	
৩	যৌথ পরিবার (শ্বশুর-শ্বাশুড়ি সহ)	
৪	অন্যান্য	

১৪। আপনার পরিবারের অর্থনৈতিক অবস্থা কিরূপ?

১	অনেক বেশি সচ্ছল	
২	বেশ সচ্ছল	
৩	মোটামুটি সচ্ছল	
৪	অসচ্ছল	
৫	প্রযোজ্য নয়	

১৫। আপনার জানামতে আপনার নিম্নোলিখিত কোনো রোগ আছে কি?

		হ্যাঁ	না
১	অ্যালার্জিক কনজাক্টিভাইটিস	১	২
২	অ্যাকিউট ওকুলার ইনফেকশন	১	২
৩	ডায়াবেটিস মেলিটাস	১	২
৪	হাইপারটেনশন	১	২
৫	অন্যান্য		

১৬। এমন কোন পদ্ধতিগত ঔষধ সেবন করা হয় যার জন্য চোখ শুষ্ক হয় এবং তার জন্য স্টেরয়েড ব্যবহার করা হয় কিনা

		হ্যাঁ	না
১	অ্যান্টিহিস্টামাইন	১	২

২	অ্যান্টিকোলিনার্জিক	১	২
৩	টোপিক্যাল স্টেরয়েড	১	২
৫	অ্যান্টি-গ্লুকোমা	১	২
৬	অন্যান্য:		

১৭। শেষ ছয় মাস ধরে আপনার চোখের কোন চিকিৎসা চলতেছে কিনা?

হ্যাঁ ☐ না ☐

খ বিভাগ: মাইওপিয়া সংক্রান্ত তথ্য

ডোমেইন ১ঃ রিফ্রাক্টিভ এরোর

১৮। আপনি কি চশমা পড়েন?

হ্যাঁ ☐ না ☐

যদি হ্যাঁ হয়-

চশমা পরার কারন কি?

১	কসমেটিক হিসেবে	
২	রিফ্রাক্টিভ এরোর	
৩	থেরাপিউটিক্যাল	

১৯। আপনি কন্টাক্ট লেন্স পরেন?

হ্যাঁ ☐ না ☐

যদি হ্যাঁ হয়-

কন্টাক্ট লেন্স পরার কারন কি?

১	কসমেটিক হিসেবে	
২	রিফ্র্যাক্টিভ এরোর	
৩	থেরাপিউটিক্যাল	

কোন ধরনের কন্টাক্ট লেন্স ব্যবহার করেন?

১	সফট	
২	আর জি পি	
৩	থেরাপিউটিক	

২০। রিফ্র্যাক্টিভ এরোর এর প্যাটার্ন

১	মাইওপিয়া	
২	হাইপারমেট্রোপিয়া	
৩	অ্যাস্টিগম্যাটিজম	

Glasses Rx

	Sph	Cyl	Axis	Add	PD
OD					
OS					

ডোমেইন ২ঃ পারিবারিক তথ্য

২১। পিতামাতার মাইওপিয়া আছে কি না

হ্যাঁ ☐ না ☐
যদি হ্যাঁ হয়-

১	পিতার মাইওপিয়া আছে	
২	মাতার মাইওপিয়া আছে	
৩	দুইজনেরই আছে	

২২। পরিবারের কারো পূর্ব থেকেই ওকুলার হিস্টরি আছে কিনা?

		হ্যাঁ	না
১	গুলুকোমা	১	২
২	ক্যাটার্যাক্ট	১	২
৩	রেটিনাল ডিজিস	১	২
৪	কেরাটোকোনাস	১	২
৫	অন্যান্য	১	২

ডোমেইন ৩ঃ নিকটবর্তী কাজ (একাধিক উত্তর গ্রহণযোগ্য)

২৩। কোন ধরনের গ্যাজেট বাসায় আছে

১	কম্পিউটার/ল্যাপটপ	
২	ইন্টারনেট	
৩	ট্যাবলেট ডিভাইস	
৪	মোবাইল	

২৪। প্রতিদিন কতক্ষন সময় ব্যয় করা হয়

	(১-৩) ঘন্টা	(৩-৫) ঘন্টা	৫ ঘন্টা>
--	----------------	----------------	----------

১	ল্যাপটপ ব্যবহারের সময়			
২	ট্যাবলেট ডিভাইস ব্যবহারের সময়			
৩	মোবাইল ব্যবহারের সময়			
৪	সোশ্যাল মিডিয়া			
৫	মোবাইল গেমস			
৬	অন্ধকার কক্ষে ডিভাইস ব্যবহারের সময়			

২৫। ডিভাইস নিকটবর্তী কাজ মাইওপিউয়াকে প্রভাবিত করে, এই সম্পর্কে অবগত কিনা?

১	নিকটবর্তী কাজ মাইওপিউয়াকে প্রভাবিত করে	
২	পড়ার সময় মুখ বইয়ের খুব কাছে রাখেন	
৩	লেখার সময় মুখ খুব কাছে রাখেন	

ডোমেইন ৪ঃ আউটডোর অ্যাক্টিভিটিস

২৬। প্রতিদিন কতক্ষন আউটডোর অ্যাক্টিভিটিস করা হয়

.....(ঘন্টা)

২৭। ছুটির দিন কতক্ষন আউটডোর অ্যাক্টিভিটিস করা হয়

.....(ঘন্টা)

২৮। কোন ধরনের আউটডোর অ্যাক্টিভিটিস করা হয়

১	অনুশীলন/জিম	
২	হাটা	
৩	সাতার	

৪	সাইক্লিং	
৫	দৌড়	
৬	খেলাধুলা (ফুটবল, ক্রিকেট, ব্যাডমিন্টন, ইত্যাদি)	
৭	ধর্মীয় অনুষ্ঠানে অংশগ্রহণ	
৮	অন্যান্য	

গ বিভাগঃ DEQ 5- DED সংক্রান্ত তথ্য

“Eye Discomfort” সংক্রান্ত প্রশ্ন

২৯। গতমাসে একটি সাধারণ দিনে আপনার চোখ কতবার অস্বস্তি অনুভব করেছিল?

কখনই না	কদাচিৎ	কখনও কখনও	ঘন ঘন	ক্রমাগত
০	১	২	৩	৪

৩০। যখন আপনার চোখে অস্বস্তি অনুভূত হয়, তখন ঘুমানোর দুই ঘন্টার মধ্যে দিনের শেষে এই অস্বস্তি অনুভূতি কতটা তীব্র ছিল?

কখনই নেই					খুবই তীব্র
০	১	২	৩	৪	৫

“Eye Dryness” সংক্রান্ত প্রশ্ন

৩১। গতমাসে একটি সাধারণ দিনে আপনার চোখ কতবার শুকিয়ে গিয়েছিল?

কখনই না	কদাচিৎ	কখনও কখনও	ঘন ঘন	ক্রমাগত
০	১	২	৩	৪

৩২। যখন আপনার চোখে শুষ্ক অনুভূত হয়, তখন ঘুমানোর দুই ঘন্টার মধ্যে দিনের শেষে এই শুষ্কতা অনুভূতি কতটা তীব্র ছিল?

কখনই নেই

খুবই তীব্র

০

১

২

০

১

২

“Watery Eyes” সংক্রান্ত প্রশ্ন

৩৩। গতমাসে একটি সাধারণ দিনে আপনার চোখ কতক্ষণ অতিরিক্ত জল অনুভব করত?

কখনই না

কদাচিৎ

কখনও
কখনও

ঘন ঘন

ক্রমাগত

০

১

২

৩

৪

স্কোর	প্রশ্ন ২৯	প্রশ্ন ৩০	প্রশ্ন ৩১	প্রশ্ন ৩২	প্রশ্ন ৩৩	মোট