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**OPTOMETRISTS KNOWLEDGE AND ATTITUDE TOWARDS PRESCRIBING  
BLUE-LIGHT BLOCKING LENSES**

**BY**

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## ABSTRACT

**Background:** The use of blue-light blocking lenses to decrease the overexposure to blue-light from the visible spectrum has posed to be a controversial topic among optometrists due to the lack of high-quality evidence.

**Purpose:** To observe the knowledge and attitude of optometrists towards prescribing blue-light blocking lenses.

**Method:** Online structured questionnaires were sent to 114 optometrists in Trinidad and Tobago to check their knowledge and attitude towards prescribing blue-light blocking lenses. The data collected were analyzed using the tools provided in the Statistical Package for Social Sciences (SPSS).

**Result:** A total of forty registered optometrists participated in the study. Twenty-seven (67.5%) were females and twelve (30%) were male and one (2.5%) was neutral. Majority (72.5%) of the participants were between the ages of 21 to 30 years. Approximately, 87.5% of the participants believed that blue light does not have any negative effect on persons exposed to it for an extended period of time. A number (42.5%) of them stated that blue light blockers have a positive effect on the patients that utilize them and 12.5% believe that the lenses have a negative effect on the patients. Almost (87.5%) all the optometrists prescribe blue light blocking lenses to their patients in their practices.

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## CHAPTER ONE

### INTRODUCTION

#### 1.0 Introduction

Blue light lenses are lenses that contain surface coatings and filtering materials that aim to partially block the short-wave blue light and ultraviolet light from entering the eye. The extensive exposure to blue light, found in the electronic screens of our phones, televisions, tablets, and laptops, is popularly believed to cause complications to the eyes.<sup>(1)</sup> Artificial blue light is weaker or at a shorter-wavelength than that of the sun's blue light, however, with the world's increased use of electronic devices, the accumulation of exposure to artificial blue light is believed to pose growing problem for the ocular system.<sup>(2)</sup>

As primary eye care professionals, optometrists are expected to know, advise, and prescribe methods that are helpful in reducing effects of extended exposure blue light on the eyes. The opinion on the effects of blue light and the prescribing of blue light lenses by optometrists may vary as some optometrists believe that there may be little or no impact of blue light blocking lenses on the eyes. Therefore, this study aims to investigate optometrists' knowledge and attitude towards prescribing these blue light blocking lenses in Trinidad.

#### 1.1 Background of study

Majority of optometrists who were asked about their attitude towards blue light blocking lenses agreed that the use of these lenses may have a positive effect on the eyes as well as reduce retinal damage.<sup>(3)</sup> However, there were also opinions of some optometrists that stated there was not enough clinical justifications to prove the effectiveness of the use of blue light blocking lenses and so they did not believe these lenses to help prevent any sort of damage to the eye. Whilst other optometrists were unsure of the effects of blue light nor did they have an opinion on the matter.

### **1.1.2 Blue Light**

Blue light is a short wavelength of light that is in the visible region in the light spectrum. Since it is a short wavelength, it produces more energy.<sup>(4)</sup> There is natural blue light and artificial blue light. Natural blue light comes from the sun in the form of Ultraviolet rays and artificial blue light comes from electronic devices and fluorescent lighting.<sup>(4)</sup> Blue light, being a part of the UV rays that come from the sun, can be beneficial in aiding the body with vitamin D production.<sup>(5)</sup>

However, blue light can also be emitted from electronic devices such as phones, tablets, television, computers, and general fluorescein lighting all used often for long amounts of time, contributing to the overexposure to blue light.<sup>(6)</sup>

Over exposure to blue light can cause Digital eye strain. Symptoms include blurry vision, dry eyes, irritated eyes and headaches.<sup>(7)</sup>

### **1.1.3 Blue light lenses**

Blue light lenses are special type of lens that contain surface coatings and filtering materials that aim to partially block the short-waved blue light from entering the eye.<sup>(3)</sup>

## **1.2 Statement of the Problem**

The COVID-19 pandemic has caused an increase in the use of electronic devices globally which has led to high exposure to blue light, which if not well controlled could lead to harmful effects to the visual system. Optometrists are not aware of blue lens blockers and those aware are skeptical about its capability of blocking blue light. Most studies conducted were done outside the Caribbean, there is no study to check the level of awareness and how knowledgeable the Trinidad optometrists are about blue light. Also, the use of blue light blocking lenses is not common in Trinidad despite the increased number of persons complaining of symptoms of Digital Eye Strain and other blue light related problems. The low utilization of blue light blockers in Trinidad and Tobago could be due to lack of awareness or reduced knowledge about the effect of the blue lens blockers. This research therefore aims to assess the opinions and knowledge of Trinidad and Tobago's optometrists on the use of blue light blocking lenses.

### **1.3 Aim of study**

The aim of this study is to investigate optometrists' knowledge of blue light lenses and their attitude towards prescribing these blue light lenses to patients.

### **1.4. Specific objectives of study**

1. To determine the awareness of use of blue light blocking lenses among optometrists in Trinidad
2. To understand their attitude towards prescribing blue light blocking lenses
3. To ascertain the number of optometrists that prescribe blue light blocking lenses
4. To assess the reason and barriers to prescribing blue light blocking lenses
5. To determine other methods used by optometrists for protection against the effects of blue light.

### **1.5 Research Questions**

1. How aware are optometrists about the use of blue light blocking lenses?
2. What attitude do optometrists have towards prescribing blue light blocking lenses?
3. What is the number of optometrists that prescribe blue light blocking lenses to their patients?
4. What are the reasons for prescribing blue light blocking lenses?
5. What other methods do optometrists use for protection from blue light?

### **1.6 Significance of the study**

This study is significant since there is very little research on how optometrists feel about prescribing the very popular blue light blocking lenses that are commonly used to shield eyes from blue light. This is also a controversial topic as some optometrists do not believe there are any helpful effects these lenses offer and believe that there is no evidence-based prescribing. This study can be used to portray the popularity and trends in prescribing blue light blockers in Trinidad and Tobago. As well as reasons and symptoms that may elicit the need of blue light blocking lenses for patients.



## 1.7 Delimitation of the study

The study is primarily focused on registered optometrists that practice in Trinidad and Tobago.

## 1.8 Definition of terms

- ❖ Optometrist- an eye care professional who provides a service in regards to the health of the eye as well as vision correction.<sup>(7)</sup>
- ❖ Retinal Detachment- an emergent condition where a thin layer at the back of the eye (retina) peels off from its position.<sup>(7)</sup>
- ❖ Visible spectrum- a section of the electromagnetic spectrum that can be detected by human eyes.
- ❖ Blue light- a part of the visible spectrum, blue light has the shortest wavelength and the highest energy. Extended exposure to blue light has been linked to harmful effects such as insomnia, eye strain, disruption of circadian rhythm and more.
- ❖ Blue light-blocking lenses- are lenses that have been allegedly designed to filter blue light that is emitted from digital devices and electronic screens.
- ❖ Myopia- known as nearsightedness, where a person can see clearly at near, but their distance vision appears blurry.<sup>(7)</sup>
- ❖ Hyperopia- known as farsightedness, where a person can see clearly at distance but their vision at near is blurry.<sup>(7)</sup>
- ❖ Astigmatism- a vision condition that is caused by irregular shaped structures of the eye such as the lens or cornea. This affects the passage of light through the refractive surfaces and will cause distorted images.<sup>(7)</sup>
- ❖ Macular degeneration- the damage and loss of the photoreceptors found at the central region of the retina causing deficient central vision and in extremities blindness.<sup>(7)</sup>

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Introduction

Blue light blocking lenses are popularly believed to aid in protecting the eyes from blue light. Blue light blocking lenses have been a controversial topic amongst the optical community as they believe there is not enough evidence to support if it works to prevent the effects of prolonged exposure to blue light. In this chapter, we have reviewed relevant literature that were available and have analyzed them in relation to the goals of our research. The topics reviewed were based on the study objectives including:

- Effects of blue light
- Optometrist attitude towards prescribing blue light blocking lenses
- Prescribing blue light blocking lenses to patients
- Reasons for prescribing blue light blocking lenses
- Other competing methods of reducing effects of blue light

#### 2.1 Effects of blue light

The extended exposure to blue light is a concerning factor when considering the increased use of electronic devices that emit blue light that may cause damage to the eyes. Bahkir et al<sup>(8)</sup> surveyed 407 people about their increased screen time during the COVID-19 pandemic. 93.6% of respondents reported that their screen time has significantly increased by approximately 5 hours. 95.8% of them also experienced at least one symptom of digital eye strain and 62% of them reporting problems sleeping. <sup>(8)</sup>

Some experts believe that instead of blue light toxicity, people may be experiencing symptoms from overusing technology. Such as computer vision syndrome, or digital eye strain. <sup>(8)</sup>

## **2.2 Optometrist attitude towards prescribing blue light blocking lenses**

Singh et al<sup>(9)</sup> conducted a study on optometrists in Australia to determine their opinions on blue light blocking lenses, using a structured questionnaire. Out of 465 questionnaires distributed, 372 responded. Of all the respondents, 75.3% of the optometrists admitted to prescribing blue-light blocking lenses and 44% were of the opinion that extended exposure to blue light can cause retinal damage.<sup>(9)</sup> Approximately 50% were of the opinion that it may be a placebo effect. Majority (87.9%) of the optometrists who prescribe these lenses do so for their patients who regularly use electronic screens. The trends noticed by the author reflected the lack and inconclusive research that is available on this topic. Blue light blockers, however, have been increasing in popularity since 2010.<sup>(9)</sup>

## **2.3 Prescribing blue light blocking lenses to patients**

Downie<sup>(10)</sup> conducted a study in Australia to investigate evidence that promotes and negates the effects of blue light blocking lenses. The author discussed the claims made describing all the positive effects of blue light blocking lenses by marketing companies as well as discussed, the research that does not prove this. She states that the arguments that are being made for these lenses are based on evidence found in laboratory environments and experiments as opposed to clinical trials where the information would be more applicable and viable to promote the effectiveness of the lenses.<sup>(10)</sup>

She mentioned an incident which occurred in the United Kingdom where the United Kingdom Advertising Standard Authority prohibited the use of an advertisement by an optical company that blue light filtering spectacle lens filters out harmful blue light. It was established that the advertisement was misleading and without validation in clinical environments. The author concluded that extensive clinical trials need to take place in order to investigate in depth the effects of blue light blocking lenses and that any recommendations given to patients by their optometrists should be based on the most recent and most researched evidence.<sup>(10)</sup>

## **2.4 Reasons for prescribing blue light blocking lenses**

Lawrenson et al conducted randomized controlled trials in London on adults to investigate the effect of these lenses on visual performance, eyestrain and fatigue, macular changes and sleep

quality<sup>(11)</sup>. One hundred and thirty-six participants were included. The first of the trial investigated the effect of blue light blocking lenses with clear lenses on contrast sensitivity and colour vision, however, there was no difference observed with the two lenses. The second trial aimed to investigate the effect of fatigue on high and low blue light blocking lenses pre and post a two hour computer task.<sup>(11)</sup> The results proved that there was no difference between the high and low blue light blocking lenses on eye fatigue. The last trial was directed to the effect of high and low blue light blocking lenses on sleep quality. The authors concluded that there was not enough high-quality evidence to support the use of blue light blocking lenses to improve visual performance and sleep quality, or to reduce eye strain and macular damage.<sup>(11)</sup>

## **2.5 Other competing methods of reducing effects of blue light**

Alghamdi et al<sup>(12)</sup> did a study to validate the 20/20/20 rule at the Qassim University in Saudi Arabia. The author included 40 patients aged 21 to 38 years with Computer Vision Syndrome (CVS). Half of the subjects were given an educational booklet on ways to reduce the symptoms of CVS by use of the 20/20/20 rule and the other half was used as a control group and told to reduce their symptoms of CVS by drinking water.<sup>(12)</sup> The investigation included measuring the improvement of symptoms by performing a dry eye test. The results of this investigation revealed that the subjects who utilized the 20/20/20 rule had a noticeable improvement in dry eye symptoms but not in ocular integrity. The author concluded that even with the successful dry eye test results, the 20/20/20 rule does not alleviate all symptoms of Computer Vision Syndrome.<sup>(12)</sup>

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 Introduction**

This chapter covers the methodology steps considered for this research. This includes the ethical considerations, research design, study population, inclusion and exclusion criteria, study population and site, research technique

#### **3.1 Ethical consideration**

Ethical consent was granted by the University of the West Indies, St. Augustine Campus. Information document explaining the reason for the study was sent out to all the optometrists before commencing with the study. Consent from the sample population of registered optometrists was obtained by inquiring their answers for the given survey to be allowed for the purpose of the research study.

#### **3.2 Research design**

The study design was a survey. It was a survey of all registered optometrists in Trinidad and Tobago to determine their awareness on the use of blue blockers lenses and their attitude towards prescribing these lenses.

#### **3.3 Study population**

The population of this study were Optometrists of different ages, genders and ethnicities who are practicing in Trinidad and Tobago.

##### **3.3.1 Study site**

This study was carried out in optometry practices around Trinidad and Tobago. Trinidad and Tobago are a twin island country that is located in the southernmost part of the Caribbean. Trinidad

is the larger of both islands and contains the majority of optical offices. The optometry practices include both private practices and corporate chain practices.

### **3.3.2 Inclusion criteria**

1. Optometrists that are registered and practicing in Trinidad and Tobago.
2. Optometrists who gave their consent to participate in this research study

### **3.3.3 Exclusion criteria**

1. Optometrists who are registered but not attached to any clinic in Trinidad and Tobago at the time of data collection.

## **3.4 Sample size and sampling technique**

### **3.4.1 Sample size determination**

No sample size determination was used. All the 114 registered optometrists in Trinidad and Tobago were included in the study sample.

### **3.4.2 Sampling technique**

No sampling technique was used as all 114 optometrists were included in the research study.

## **3.5 Tests and instrument/equipment**

For the purpose of data collection, an online survey was created and utilized using the Google form format.

## **3.6 Data collection procedure**

A curated message explaining the basis of the research study was sent to the list of 114 eligible optometrists via their company emails and social handles. When consent was given to participate, the link for the survey was sent to them via the same emails and social handles. Additionally, the researchers visited some of the private practices, while they were open to the public, to invite them to participate. After the online surveys were filled out the results were observed via the Google form collected data page and generated excel sheet.

### **3.7 Data analysis**

When participants filled out the survey, their responses were sent to the Google Form data collector which automatically sorts the data into categories based on the participants' answers to each question. It pools the data into charts so it can be easily analyzed. Data analysis was done via this Google form format since the data collected can be put into information by analyzing each question and answer manually to ensure the quality of answers. The data collected was carefully checked, coded, and analyzed using tools in Statistical Package for Social Sciences (SPSS) software version 24.0 for windows.

## CHAPTER FOUR

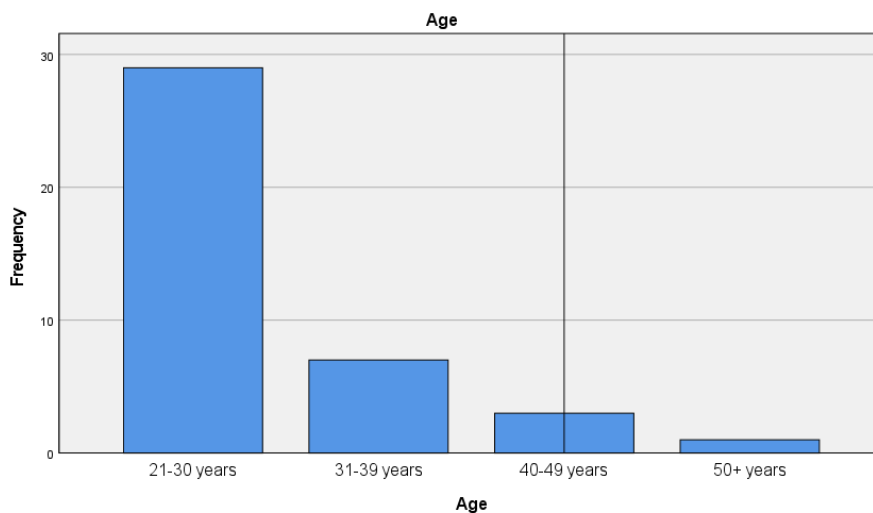
### RESULTS

#### 4.0 Introduction

This chapter presents the results of the forty (40) optometrists that completed the questionnaire, and the findings are represented with tables.

#### 4.1 Demographic Profile of the Trinidadian and Tobagonian Optometrists who partook in investigation

Out of the forty (40) responses received, 27 (67.5%) were female and 12 (30%) were male, with one response missing. Majority (72.5%) of the optometrists were within the age group of 21 to 30 years of age and the minority (2.5%) being of the age bracket of 50+ years of age (Figure 1).



**Figure 1: Distribution of ages of Optometrists included in investigation**



#### 4.1.1 Years of experience of the participants

Most (37.5%) of participants had 2-4 years of experience as registered, practicing optometrists. 32.5% of participants had 4-6 years of experience and 17.5% of participants had <2 years of experience (Table 4.1.1).

**Table 4.1.1: Years of experience of the participants**

Years of experience	Frequency	Percentage frequency
<2 years	7	17.5%
2-4 years	15	37.5%
4-6 years	13	32.5%
7+ years	5	12.5%
Total	40	100

#### 4.2 Awareness of blue light blocking lenses

Of the forty responses, 100% of the optometrists were aware of the effects of blue light to the eyes. However, there was a difference of opinion when it came to the type of effect it was believed to have. From Table 4.2, we can identify that 87.5% believed the effects would be negative and 7.5% believed that extended exposure to blue light would have no effect.

**Table 4.2 Type of effects caused by extended exposure to blue light**

Type of effect caused	Frequency	Percentage frequency (%)
Positive	2	5
Negative	35	87.5
No Effect	3	7.5
Total	40	100

### **4.3 Trinidadian and Tobagonian Optometrists opinion of blue light blocking lenses**

Our questionnaire included an open-ended item where participants were able to explain what they believed blue light blocking lenses were used for. A wide array of answers was obtained, most of which explained the science behind blue light filters whilst also voicing their opinions on whether or not they believe the lenses to be a marketing ploy set out to make money.

Of the forty participants in this investigation, 42.5% believe that blue light blocking lenses have a positive effect on the patients who utilize them. 12.5% of the forty participants believe that the lenses have a negative effect on the patients and 45% of the participants consider the lenses to be partially effective.

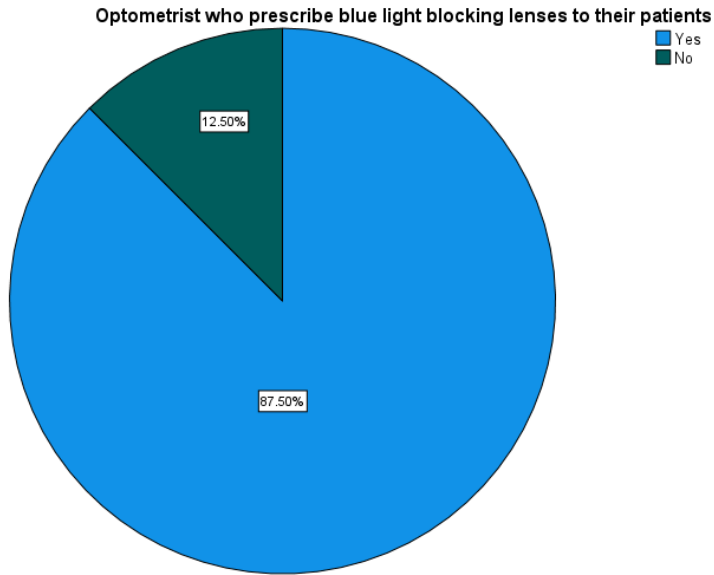
**Table 4.3 The effect that optometrist believe blue light blocking lenses have on patients**

Effect of Blue Light Blockers	Frequency	Percentage frequency (%)
Positive	17	42.5%
Negative	5	12.5%
No Effect	18	45%
Total	40	100

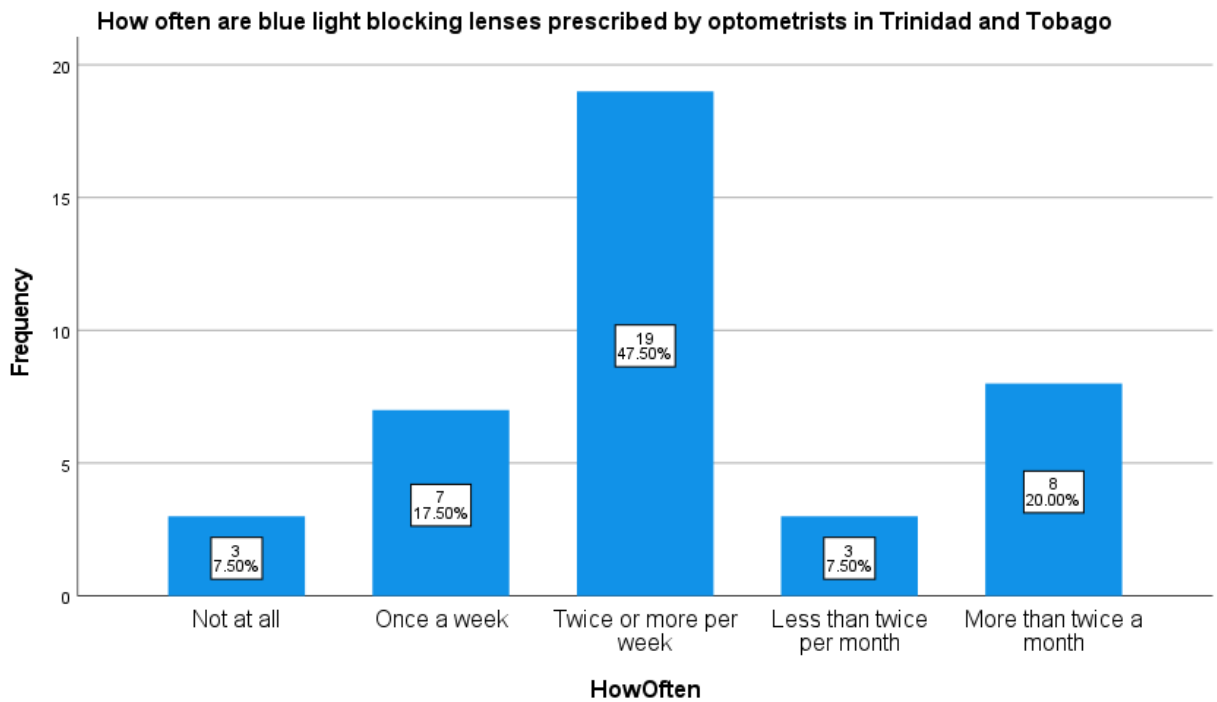
#### **4.4 Optometrists that prescribe blue light blocking lenses to their patients**

Of the forty participants in this investigation, 35 (87.5%) optometrists prescribe blue light blocking lenses to their patients in their practices (Figure 2).

Further investigating the frequency at which blue light blocking lenses are prescribed, we inquired how often they were being prescribed. Majority (47.5%) of the participants prescribed blue light blocking lenses twice or more per week, 20% prescribed the lenses more than twice a month and 17.5% prescribed them once a week (Figure 3).



**Figure 2: Optometrists who prescribe blue light blocking lenses to their patients**



**Figure 3: How often blue light blocking lenses are prescribed by the optometrists**

#### 4.5 Reasons for prescribing blue light blocking lenses

Table 4.5 below, illustrates the percentage of participating optometrists that believe certain conditions or symptoms may be aided by blue light blocking lenses. From this table, we can observe that 75% of participants consider sleep deprivation to be aided by the lenses.

Similarly, Table 4.5.1 depicts the symptoms that patients experience that may initiate the investigation for the need of blue light blocking lenses.

Majority (46.15%) of participants agree that university students would most benefit from blue light blocking lenses. 35.9% of the optometrists that took part in this investigation believed that office/ administrative workers would most benefit and 12.82% chose to believe that school children would most benefit. The minority (5.13%) believe that other persons would benefit (Figure 4.5.1).

**Table 4.5 Conditions participating optometrists believe blue light blocking lenses can aid**

Conditions	Yes	No
Sleep Deprivation	75%	25%
Retinal Damage	32.5%	67.5%
Eye pain/ Irritation	50%	50%
Myopia/ Hyperopia	0%	100%
Astigmatism	5%	95%
Dry eye Syndrome	17.5%	82.5%
None	10%	90%
*Other	Computer usage, computer users, digital eye strain, PC glare, placebo, prolonged digital usage.	

**Table 4.5.1 Symptoms patients portray that indicate the need for blue light blocking lenses**

<b>Symptom</b>	<b>Yes</b>	<b>No</b>
Lack of sleep	55%	45%
Inability to focus on lettering	7.5%	92.5%
Increased sensitivity to light from electronic devices	70%	30%
Discomfort when looking at television	47.5%	52.5%
Inability to keep eyes open while doing a specific task	15%	85%
Blurriness	7.5%	92.5%
Headaches	42.5%	57.5%
Dry/ Itchy eye	0%	100%
No symptom	10%	90%

#### **4.6 Optometrists who prescribe other methods of protection from blue light**

The most common method chosen by the optometrists to reduce damage done to the eyes by blue light is the 20/20/20 rule. Most partaking optometrists (80%) do not believe that the use of blue light blocking lenses is more effective than using the 20/20/20 rule.

## CHAPTER FIVE

### DISCUSSION, CONCLUSION AND RECOMMENDATION

#### 5.0 Introduction

This chapter will cover the discussion about the study results presented in chapter 4 in comparison to articles in chapter 2. It is going to look at the awareness of optometrists about blue light and blue light blocking lenses, their attitude towards prescribing them and their various opinions on the harmful effects the lenses can prevent. This chapter also includes the conclusion and the recommendation.

#### 5.1 Discussion

##### 5.1.1 The awareness of optometrists about blue light lenses

The aim of this study was to assess the knowledge and attitude of Trinidad and Tobago optometrists towards prescribing blue-light blocking lenses. All (100%) the respondents are aware of the effects of blue light and blue light blocking lenses to the eye. Most (87.5%) of them believe the effects of blue light were negative. Similar findings were recorded by Singh et al<sup>(9)</sup> in Australia, Fry<sup>(13)</sup> in Washington, and Lawrenson et al<sup>(11)</sup> in London. The authors also believe that blue light causes dry eye, irritation, and sleep deprivation since over exposure to blue light has been linked to decreased melatonin and disruption in circadian rhythm.

Thirty-four (34) of optometrists from this study believed that blue light blockers are used to prevent potentially harmful blue light from damaging the eye. Similar findings were recorded by Downie in Australia. Also, most optometrists believe that the over exposure to blue light does not actually cause retinal detachment<sup>(10)</sup>

##### 5.1.2 Attitude Optometrists have towards prescribing blue light blocking lenses.

More than 50% of the participants in this study have a positive attitude towards prescribing blue light blocking as they believe it helps to prevent ocular complications. Similar findings were recorded by Lawrenson<sup>(11)</sup> et al. It could be because most people prescribe it for the wrong reasons

as there is still lack of evidence regarding its efficacy. Also, some optometrists did not believe in the harmful effects of blue light

### **5.1.3 Optometrists that prescribe blue-light blocking lenses to patients in their practice**

From the results, 35 out of 40 optometrists do indeed prescribe these lenses in their practice as nineteen (19) of them prescribing them as often as twice or more per week. Similarly, to the study done by Singh et al in Australia <sup>(9)</sup>, 75.3% of all participating optometrists prescribe blue-light blocking lenses or blue-light filters to their patients.

### **5.1.4 Reasons for prescribing blue light blocking lenses**

The most common indicated conditions were sleep deprivation (75%), retinal damage (35.2%) and eye pain/irritation (50%) with 5 persons adding digital screen over-usage. For this reason, optometrists are inclined to prescribe the blue light blockers despite the lack of research. Singh et al <sup>(9)</sup> recorded a similar result in Australia. The author also found that practitioners were also more likely to prescribe based on symptoms of the patient

### **5.1.5 Other prevention methods utilized by optometrists to reduce the effects of blue light**

Most (80%) respondents concurred that the 20/20/20 rule can be more effective in preventing ocular symptoms, like blurriness and dry eye, than the blue-light blockers. Since the 20/20/20 rule involves taking breaks and blinking, respondents believe that it provides better relief from these symptoms. Lawerenson et al <sup>(11)</sup> and Alghamdi et al <sup>(12)</sup> recorded similar findings. They also stated that screen hygiene or way in which the screen is used is more likely to cause ocular problems than the light coming from the screen. In addition, persons who utilize this 20/20/20 rule were also found by Singh et al <sup>(9)</sup> to have a relief of dry eye symptoms compared to persons not utilizing the rule.

## **5.2 Conclusion**

We can conclude that the results from this study show many similarities with the limited studies about optometrists' knowledge and attitude towards prescribing blue light blocking lenses around



the globe. Similarities being that the majority of the population of optometrists prescribe blue light blocking lenses in their practices. Those who are more knowledgeable about the topic have a positive attitude toward prescribing blue light blocking lenses for the purpose of reducing sleep problems, digital eye strain and retinal detachment.

### **5.3 Limitation of the study**

1. Use of an online survey method due to the pandemic is a limitation because it might not show a true reflection of the participants' opinions.
2. The findings from the study cannot be generalized as only 40 out of the 114 registered optometrists participated in the study.
3. There was no literature from the Caribbean to compare with our findings

### **5.4 Recommendations**

Since there are no other studies in Trinidad and Tobago done to observe the knowledge and attitude of optometrists towards prescribing blue-light blocking lenses, we recommend the following:

- To conduct a similar study in other Caribbean countries
- Further studies to include opinions of not only optometrists but ophthalmologists, opticians, and other eye-care specialists.

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## APPENDICES

### Appendix 1: Exemption letter



THE UNIVERSITY OF THE WEST INDIES  
ST. AUGUSTINE, TRINIDAD AND TOBAGO, WEST INDIES  
CAMPUS RESEARCH ETHICS COMMITTEE  
TELEPHONE: (1-868) 662-2002 ext. 82755 E-mail: [campusethics@sta.uwi.edu](mailto:campusethics@sta.uwi.edu)

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January, 29 2021

**Ngozika Ezinne**  
**Ariel Rampersad, La Shaunda Joseph**  
Optometry Unit  
Department of Clinical Surgical Sciences  
Faculty of Medical Sciences  
The University of West Indies St Augustine  
Email: [Ngozika.ezinne@sta.uwi.edu](mailto:Ngozika.ezinne@sta.uwi.edu)

Dear Ngozika Ezinne,

**Ref: CREC-SA.0636/11/2020**

**Title: Optometrists' Knowledge and Attitude towards prescribing Blue Light-Blocking Lenses.**

I am pleased to advise that your application for research on the above captioned topic has met the criteria for Exemption from Review from the Campus Research Ethics Committee, St. Augustine.

Sincerely,

Professor Jerome De Lisle  
Chair  
Campus Research Ethics Committee

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Digitally generated by UWIScholar

## Appendices 2: Data analysis using Statistical Package for the Social Sciences (SPSS)

The screenshot displays the Variable View window in IBM SPSS Statistics. The window title is "Data View Variable View". The main area shows a list of 25 variables with their properties. The columns are: Name, Type, Width, Decimals, Label, Values, Missing, Columns, Align, Measure, and Role. The variables listed are:

Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1 Gender	Numeric	8	2		{1.00, Male}...	None	8	Right	Nominal	Input
2 Age	Numeric	8	2		{1.00, 21-30}...	None	8	Right	Nominal	Input
3 Location	String	30	0		None	None	8	Left	Nominal	Input
4 Experience	Numeric	8	2		{1.00, < 2 y}...	None	8	Right	Nominal	Input
5 AwareofEffe...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
6 TYpeofEfect	Numeric	8	2		{1.00, Positi}...	None	8	Right	Nominal	Input
7 AwareofBLB	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
8 UseofBLB	String	800	0		None	None	8	Left	Nominal	Input
9 Effective	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
10 Howdoyouk...	Numeric	8	2		{1.00, Perso}...	None	8	Right	Nominal	Input
11 KnowofBLB...	String	40	0		None	None	8	Left	Nominal	Input
12 Dpyoupresc...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
13 HowOfTen	Numeric	8	2		{1.00, Not a}...	None	8	Right	Nominal	Input
14 SleepDepriv...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
15 RetinalDam...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
16 Eyepainlrit...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
17 MyopiaHyp...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
18 Astigmatism	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
19 DryEyeSyn...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
20 None	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
21 Other	String	80	0		None	None	8	Left	Nominal	Input
22 Lackofsleep	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
23 Inabilitytofo...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
24 IncreasedS...	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input
25 Discomfort	Numeric	8	2		{1.00, Yes}...	None	8	Right	Nominal	Input

At the bottom of the window, there is a status bar with the text "IBM SPSS Statistics Processor is ready" and "Unicode: ON".

# Appendices 3: Raw data

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB		
1	Timestamp	Do you go	Gender	What age	Where is	How long	Are you a	What typ	Are you a	What do I	Do you be	How did I	Do you pr	How ofte	What con	What sym	What age	Who are	Do you w	If yes, do	What kin	Do you th	During th	Do you be	Would you	Upon further	research, would		
2	2021/03/	Yes	Female	21-30	ye San Ferns	4-6	years	Yes	Negative	Yes	Reduce t	Partially	Personal	Yes	More th	Sleep dep	Lack of sl	16-20;21	university	Yes	Yes	Undecide	Strongly	Agree	Yes	No	Yes		
3	2021/03/	Yes	Male	21-30	ye Couva	2-4	years	Yes	Negative	Yes	To reduce	Yes	Through	Yes	Once a w	Sleep dep	Lack of sl	<9;10-15	university	No	Yes	Positive	Strongly	Agree	Strongly	Agree	No	Yes	No
4	2021/03/	Yes	Female	21-30	ye POS	2-4	years	Yes	Negative	Yes	Filter out	Yes	Personal	Yes	Less th	Sleep dep	Lack of sl	16-20;21	Office/Ad	No	Yes	Positive	Agree	Agree	Yes	Yes	Yes	Yes	
5	2021/03/	Yes	Female	21-30	ye Sangre Gr	<2	years	Yes	Negative	Yes	Decrease	Yes	Conferen	Yes	Twice or	Sleep dep	Lack of sl	<9;10-15	Office/Ad	Yes	Yes	Positive	Agree	Agree	Strongly	Agree	Yes	Yes	Yes
6	2021/03/	Yes	Male	21-30	ye Grenada	<2	years	Yes	Negative	Yes	Decrease	Yes	During yo	Yes	Twice or	Retinal di	None of tl	<9;10-15	Office/Ad	Yes	Yes	Positive	Strongly	Agree	Strongly	Agree	No	No	Yes
7	2021/03/	Yes	Male	21-30	ye Rio claro	2-4	years	Yes	Negative	Yes	Reducing	Yes	During yo	Yes	More th	Sleep dep	Lack of sl	<9;21-25	Office/Ad	Yes	Yes	Positive	Agree	Agree	No	No	No	Yes	
8	2021/03/	Yes	Female	21-30	ye San Ferns	2-4	years	Yes	Negative	Yes	To reduce	Partially	Personal	Yes	Twice or	Sleep dep	Lack of sl	<9;10-15	Office/Ad	No	Yes	Positive	Agree	Agree	No	No	My opinion would not change		
9	2021/03/	Yes	Female	21-30	ye Central	<2	years	Yes	Negative	Yes	To filter o	Yes	During yo	Yes	Twice or	Sleep dep	Lack of sl	10-15;16	university	Yes	Yes	Undecide	Strongly	Agree	Strongly	Agree	No	No	Yes
10	2021/03/	Yes	Female	21-30	ye San Ferns	2-4	years	Yes	Negative	Yes	To prevent	Partially	Personal	Yes	Less th	Sleep dep	Lack of sl	<9;21-25	university	No	Yes	Undecide	Strongly	Agree	Strongly	Agree	No	Yes	Yes
11	2021/03/	Yes	Male	21-30	ye Chaguani	2-4	years	Yes	Negative	Yes	to fill No	During yo	Yes	Twice or	Sleep dep	Lack of sl	10-15;16	Office/Ad	No	Yes	Positive	Agree	Agree	No	Yes	Yes	My opinion would not change		
12	2021/03/	Yes	Female	21-30	ye Penal	2-4	years	Yes	Negative	Yes	Blue light	Partially	During yo	Yes	Twice or	Sleep dep	None of tl	10-15;16	Office/Ad	No	Yes	Positive	Strongly	Agree	Strongly	Agree	No	Yes	Yes
13	2021/03/	Yes	Female	21-30	ye San Ferns	2-4	years	Yes	Negative	Yes	Filtering t	Partially	During yo	Yes	Once a w	Sleep dep	Lack of sl	<9;10-15	university	Yes	Yes	Undecide	Strongly	Agree	Agree	No	No	Yes	Yes
14	2021/03/	Yes	Female	21-30	ye Port of Sp	4-6	years	Yes	Negative	Yes	Help with	Partially	CET articl	Yes	Twice or	Sleep dep	increase	<9;10-15	university	Yes	Yes	Undecide	Positive	Agree	Agree	No	No	Yes	Yes
15	2021/03/	Yes	Female	21-30	ye Tobago	4-6	years	Yes	Negative	Yes	The sun a	Yes	During yo	Yes	Twice or	Sleep dep	Inability t	Oct-15	School ch	Yes	Yes	Positive	Agree	Agree	Yes	Yes	My opinion would not change		
16	2021/03/	Yes	Female	21-30	ye Arima	4-6	years	Yes	Negative	Yes	To filter a	Partially	Work pre	Yes	Twice or	Sleep dep	Discomfo	<9;10-15	university	Yes	Yes	Positive	Neutral	Agree	No	No	Yes	Yes	
17	2021/03/	Yes	Male	21-30	ye San Ferns	2-4	years	Yes	Negative	Yes	Digital ey	Partially	Personal	Yes	Twice or	Eye pain/	increase	10-15;16	School ch	No	Yes	Positive	Agree	Agree	Yes	No	My opinion would not change		
18	2021/03/	Yes	Male	21-30	ye San Ferns	4-6	years	Yes	No effect	Yes	Honestly	No	Conferen	No	Not at all	None of tl	None of tl	21-25;26	Other	No	Yes	Undecide	Neutral	Agree	No	Yes	Yes	Yes	
19	2021/03/	Yes	Female	21-30	ye Arima	2-4	years	Yes	Negative	Yes	Filter blu	Yes	Conferen	Yes	More th	Sleep dep	increase	10-15;16	School ch	No	Yes	Undecide	Agree	Agree	No	Yes	Yes	Yes	
20	2021/03/	Yes	Female	21-30	ye Port of Sp	4-6	years	Yes	Negative	Yes	They are	Partially	Personal	Yes	Once a w	Sleep dep	Lack of sl	10-15;16	university	Yes	Yes	Undecide	Undecide	Neutral	Agree	Yes	Yes	Yes	Yes
21	2021/04/	Yes	Female	21-30	ye San Ferns	2-4	years	Yes	Negative	Yes	Improve	Partially	During yo	Yes	Twice or	Sleep dep	Lack of sl	10-15;16	university	Yes	Yes	Undecide	Undecide	Agree	Agree	No	No	Yes	Yes
22	2021/04/	Yes	Male	21-30	ye Chaguani	2-4	years	Yes	Negative	Yes	To block	Partially	During yo	Yes	Less th	None of tl	None of tl	<9;10-15	School ch	No	Yes	Undecide	Neutral	Agree	No	Yes	No	Yes	No
23	2021/04/	Yes	Female	21-30	ye Penal	2-4	years	Yes	Negative	Yes	Reduces	Partially	Personal	Yes	Twice or	Compute	increase	21-25;26	Office/Ad	No	Yes	Positive	Agree	Agree	No	Yes	Yes	Yes	
24	2021/04/	Yes	Female	21-30	ye Valsayn	4-6	years	Yes	Negative	Yes	To reduce	Partially	During yo	Yes	More th	Retinal di	increase	10-15;16	School ch	No	Yes	Undecide	Agree	Agree	No	Yes	Yes	Yes	
25	2021/04/	Yes	Male	21-30	ye San Ferns	7	years	Yes	Negative	Yes	Alterin g	Yes	During yo	Yes	Twice or	Sleep dep	Lack of sl	26-30	Office/Ad	Yes	Yes	Positive	Agree	Agree	No	Yes	Yes	Yes	
26	2021/05/	Yes	Female	21-30	ye Point lisa	<2	years	Yes	Negative	Yes	Protectio	Yes	During yo	Yes	Twice or	Eye pain/	increase	16-20;21	university	Yes	Yes	Positive	Agree	Agree	No	Yes	Yes	Yes	
27	2021/05/	Yes	Male	21-30	years	<2	years	Yes	Positive	Yes	Preventir	Yes	During yo	Yes	Once a w	Sleep dep	Discomfo	<9;10-15	Office/Ad	Yes	Yes	Positive	Agree	Agree	No	No	My opinion would not change		
28	2021/05/	Yes	Female	21-30	ye Chaguani	<2	years	Yes	Negative	Yes	They filed	Yes	Personal	Yes	Twice or	Sleep dep	Lack of sl	16-20;21	university	No	Yes	Undecide	Positive	Agree	Strongly	Agree	No	Yes	Yes
29	2021/05/	Yes	Female	21-30	ye Penal	2-4	years	Yes	Negative	Yes	To reduce	Partially	Personal	Yes	Twice or	Compute	increase	26-30;30	Office/Ad	No	Yes	Positive	Neutral	Strongly	Agree	No	Yes	My opinion would not change	
30	2021/05/	Yes	Female	40-49	ye Price Plat	7	years	Yes	Negative	Yes	For Comp	No	Personal	No	Not at all	None of tl	None of tl	above		No	Yes	Undecide	Agree	Strongly	Agree	No	Yes	Yes	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB		
14	2021/03/	Yes	Female	21-30	ye Port of Sp	4-6	years	Yes	Negative	Yes	Help with	Partially	CET articl	Yes	Twice or	Sleep dep	increase	<9;10-15	university	Yes	Yes	Undecide	Positive	Agree	Agree	No	No	Yes	Yes
15	2021/03/	Yes	Female	21-30	ye Tobago	4-6	years	Yes	Negative	Yes	The sun a	Yes	During yo	Yes	Twice or	Sleep dep	Inability t	Oct-15	School ch	Yes	Yes	Positive	Agree	Agree	Yes	Yes	My opinion would not change		
16	2021/03/	Yes	Female	21-30	ye Arima	4-6	years	Yes	Negative	Yes	To filter a	Partially	Work pre	Yes	Twice or	Sleep dep	Discomfo	<9;10-15	university	Yes	Yes	Positive	Neutral	Agree	No	No	Yes	Yes	
17	2021/03/	Yes	Male	21-30	ye San Ferns	2-4	years	Yes	Negative	Yes	Digital ey	Partially	Personal	Yes	Twice or	Eye pain/	increase	10-15;16	School ch	No	Yes	Positive	Agree	Agree	Yes	No	My opinion would not change		
18	2021/03/	Yes	Male	21-30	ye San Ferns	4-6	years	Yes	No effect	Yes	Honestly	No	Conferen	No	Not at all	None of tl	None of tl	21-25;26	Other	No	Yes	Undecide	Neutral	Agree	No	Yes	Yes	Yes	
19	2021/03/	Yes	Female	21-30	ye Arima	2-4	years	Yes	Negative	Yes	Filter blu	Yes	Conferen	Yes	More th	Sleep dep	increase	10-15;16	School ch	No	Yes	Undecide	Agree	Agree	No	Yes	Yes	Yes	
20	2021/03/	Yes	Female	21-30	ye Port of Sp	4-6	years	Yes	Negative	Yes	They are	Partially	Personal	Yes	Once a w	Sleep dep	Lack of sl	10-15;16	university	Yes	Yes	Undecide	Undecide	Neutral	Agree	Yes	Yes	Yes	Yes
21	2021/04/	Yes	Female	21-30	ye San Ferns	2-4	years	Yes	Negative	Yes	Improve	Partially	During yo	Yes	Twice or	Sleep dep	Lack of sl	10-15;16	university	Yes	Yes	Undecide	Undecide	Agree	Agree	No	No	Yes	Yes
22	2021/04/	Yes	Male	21-30	ye Chaguani	2-4	years	Yes	Negative	Yes	To block	Partially	During yo	Yes	Less th	None of tl	None of tl	<9;10-15	School ch	No	Yes	Undecide	Neutral	Agree	No	Yes	No	Yes	No
23	2021/04/	Yes	Female	21-30	ye Penal	2-4	years	Yes	Negative	Yes	Reduces	Partially	Personal	Yes	Twice or	Compute	increase	21-25;26	Office/Ad	No	Yes	Positive	Agree	Agree	No	Yes	Yes	Yes	
24	2021/04/	Yes	Female	21-30	ye Valsayn	4-6	years	Yes	Negative	Yes	To reduce	Partially	During yo	Yes	More th	Retinal di	increase	10-15;16	School ch	No	Yes	Undecide	Agree	Agree	No	Yes	Yes	Yes	
25	2021/04/	Yes	Male	21-30	ye San Ferns	7	years	Yes	Negative	Yes	Alterin g	Yes	During yo	Yes	Twice or	Sleep dep	Lack of sl	26-30	Office/Ad	Yes	Yes	Positive	Agree	Agree	No	Yes	Yes	Yes	
26	2021/05/	Yes	Female	21-30	ye Point lisa	<2	years	Yes	Negative	Yes	Protectio	Yes	During yo	Yes	Twice or	Eye pain/	increase	16-20;21	university	Yes	Yes	Positive	Agree	Agree	No	Yes	Yes	Yes	
27	2021/05/	Yes	Male	21-30	years	<2	years	Yes	Positive	Yes	Preventir	Yes	During yo	Yes	Once a w	Sleep dep	Discomfo	<9;10-15	Office/Ad	Yes	Yes	Positive	Agree	Agree	No	No	My opinion would not change		
28	2021/05/	Yes	Female	21-30	ye Chaguani	<2	years	Yes	Negative	Yes	They filed	Yes	Personal	Yes	Twice or	Sleep dep	Lack of sl	16-20;21	university	No	Yes	Undecide	Positive	Agree	Strongly	Agree	No	Yes	Yes
29	2021/05/	Yes	Female	21-30	ye Penal	2-4	years	Yes	Negative	Yes	To reduce	Partially	Personal	Yes	Twice or	Compute	increase	26-30;30	Office/Ad	No	Yes	Positive	Neutral	Strongly	Agree	No	Yes	My opinion would not change	
30	2021/05/	Yes	Female	40-49	ye Price Plat	7	years	Yes	Negative	Yes	For Comp	No	Personal	No	Not at all	None of tl	None of tl	above		No	Yes	Undecide	Agree	Strongly	Agree	No	Yes	Yes	
31	2021/05/	Yes	Female	31-39	ye Chaguani	7	years	Yes	No effect	Yes	For pxx	Partially	Conferen	Yes	More th	Sleep dep	increase	21-25;26	Office/Ad	Yes	No	Undecide	Agree	Agree	No	Yes	My opinion would not change		
32	2021/05/	Yes	Female	40-49	ye St James	7	years	Yes	Negative	Yes	To block	Yes	Conferen	Yes	More th	Sleep dep	Lack of sl	21-25;26	university	No	Yes	Undecide	Agree	Strongly	Agree	No	Yes	No	
33	2021/05/	Yes	Male	21-30	ye Sangre Gr	4-6	years	Yes	Negative	Yes	Protectio	Partially	Personal	Yes	Twice or	Sleep dep	Lack of sl	16-20;21	Office/Ad	Yes	No	Positive	Agree	Neutral	No	Yes	Yes	Yes	
34	2021/05/	Yes	Female	50+	years Trinity	7	years	Yes	No effect	Yes	No	Conferen	No	Not at all	None of tl	None of tl	above	Other	No	Yes	Yes	Negative	Disagree	Neutral	No	Yes	Yes	Yes	
35	2021/05/	Yes	Female	21-30	ye Arima	4-6	years	Yes	Negative	Yes	They are	Partially	During yo	No	Less th	Sleep dep	Lack of sl	21-25	university	No	Yes	Undecide	Agree	Agree	No	Yes	Yes	Yes	
36	2021/05/	Yes	Female	40-49	ye San Ferns	4-6	years	Yes	Negative	Yes	Suppose	No	Online	No	Once a w	Eye pain/	increase	10-15;16	Office/Ad	No	Yes	Undecide	Undecide	Agree	Agree	No	Yes	Yes	
37	2021/05/	Yes	Female	21-30	ye Couva	<2	years	Yes	Positive	Yes	Help with	Yes	During yo	Yes	Once a w	Sleep dep	Lack of sl	<9;10-15	university	Yes	Yes	Positive	Agree	Agree	No	Yes	Yes	Yes	
38	2021/05/	Yes	Female	21-30	ye San Ferns	4-6	years	Yes	Negative	Yes	They are	Yes	Personal	Yes	Twice or	Sleep dep	Lack of sl	16-20;21	university	No	Yes	Undecide	Positive	Neutral	Strongly	Agree	No	Yes	Yes
39	2021/05/	Yes	Male	31-39	ye Chaguani	4-6	years	Yes	Negative	Yes	Reduces	Yes																	