International Journal of Medical Science and Clinical Research Studies

ISSN(print): 2767-8326, ISSN(online): 2767-8342

Volume 03 Issue 02 February 2023

Page No: 232-243

DOI: https://doi.org/10.47191/ijmscrs/v3-i2-16, Impact Factor: 5.365

Prevalence of Mask-Associated Dry Eye (MADE) among the General Population of Al-Baha Area, Saudi Arabia

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ABSTRACT

Background: During the coronavirus disease 2019 (COVID-19) pandemic, the utilization of face masks was made mandatory as a protective tool. However, prolonged use of face masks increases the risk of dry eye, which affects people's visual-based activities. The Al-Baha area is a high-altitude area located in the west of the Kingdom of Saudi Arabia in the Hejaz region. As a result, residents of this region are more likely to suffer from dry eyes because of the extreme environmental conditions. Subsequently, the aim of this study is to determine the prevalence of mask-associated dry eye (MADE) and its associated risk factors among the general population of the Al-Baha area, Saudi Arabia.

Materials and Methods: This is a cross-sectional study conducted using an anonymous online questionnaire composed of 56 questions. Data were collected from 480 participants in the Al-Baha area.

Results: The prevalence of MADE among the general population of Al-Baha, Saudi Arabia, was 39.2%, which is higher than the global prevalence. The risk factors for MADE include exposure to dry weather, wind, blepharitis, and ectropion. Moreover, it was determined that females were more likely to develop MADE than males; likewise, people in the age group of 16 to 25 were more likely to have MADE.

Conclusion: The study shows that the prevalence of MADE in Al-Baha is comparatively higher than the worldwide prevalence, which is best explained by this area being at a high altitude. Based on the study's findings, some recommendations to guard against MADE are made to patients, the general public, and ophthalmologists.

ARTICLE DETAILS

Published On:
18 February 2023

Available on:
https://ijmscr.org/

INTRODUCTION

Background

Due to the coronavirus disease 2019 (COVID-19) pandemic, widespread use of face masks and other infection prevention and control (IPC) measures were required to prevent the spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. However, ophthalmologists and the general public should be aware that improper and prolonged mask use has led to an increase in the number of patients reporting dry eye symptoms [2]. A condition known as mask-associated dry eye (MADE) has been identified [3]. Additionally, dry eyes may contribute to an increased risk of SARS-CoV-2 transmission [4]. In the general population, the prevalence of MADE is 18.39%, but the prevalence of this condition in Al-Baha Province, Saudi Arabia, has not yet been described and there are insufficient data in the literature describing the prevalence of MADE and its risk factors in the Al-Baha region, as well as whether there is a correlation between MADE and high altitude. Due to the high altitude of the Al-Baha region and its role in the progression of eye diseases, the purpose of this study is to fill this gap.

The study provides a better understanding of MADE and its factors, which can guide healthcare response to control its factors and prevent the consequences of dry eye. It also provides a better understanding of the COVID-19 pandemic and determines the sequel of precautionary measures related to the eye. In addition, this will allow healthcare systems to determine the need for educational strategies directed to the

general population regarding the proper wearing of a mask and eye care. Similarly, ophthalmologists can also benefit from the findings by understanding better ways of caring for a patient. Finally, the study contributes to an understanding of high-altitude-related illness.

Prevalence of MADE

Since the emergence of the COVID-19 pandemic complications, the prevalence of MADE has become an interesting area of research. In the Middle East region, the prevalence of symptoms has been frequently observed in population studies. Approximately 70% of Jordanian study participants had this condition [5]. In addition, Alharbi et al. reported a prevalence of 32.1% for dry eye disease (DED) in Saudi Arabia [6]. In the ophthalmology setting, this prevalence is of concern to the healthcare community because it may influence visual pathology, the productivity of healthcare workers, and their overall quality of life [6]. Moreover, pandemic trends have resulted in the implementation of effective regulations to prevent the spread of the viral infection, but they have also had some negative underlying effects. For instance, MADE symptoms have been observed frequently [7]. For the Al-Baha region, however, there is no prevalence data available.

Consequences of DED

During mask-wearing, an individual may feel difficulty with exhaled air, which needs to be dispersed and therefore travels in an upward direction near the cornea. However, this may evaporate the corneal tear film, leaving dry spots and causing eye irritation. During the pandemic, the prolonged use of face masks increased the incidence of MADE symptoms [8]. However, a moderate-to-severe symptom condition has developed from the effect on the tear film's mobility. The symptoms may include pain, ocular discomfort, and foreign body sensation; in severe cases, they may cause visual disturbances [9]. Therefore, an evaluation of sociodemographic and risk factors is required to prevent the effects of MADE.

Sociodemographic and risk factors of MADE

The development of MADE in Saudi Arabia varies according to sociodemographic factors such as gender, age, working conditions or occupational status, and place of residence. It is mandatory for healthcare workers to wear a face mask during care practices [8]. Simultaneously, healthcare professionals reported ocular discomfort due to the constant use of masks [8]. However, DED is not exclusive to the health sector, as pandemic-related measures have exposed the vast majority of the population to MADE [10].

Regarding gender, studies have shown that the prevalence of MADE in tertiary care centers is significantly higher in females than in males [11]. In addition, a cross-sectional study of 2527 individuals in Saudi Arabia revealed that 67% of females were exposed to the condition, compared to 22% of males [12].

For age-related differences in symptoms, there are varying results, with some studies reporting a mean participant age of 29 years and others indicating that older people (> 45 or 55 years) have a higher risk of developing dry eye symptoms [13]. However, a pandemic may increase the risk of incidence across a wider age range, necessitating the study of age-specific prevalence uncertainty. Additionally, individuals may experience MADE symptoms as a result of other risk factors like smoking, menopause, environmental factors, use of digital screens, and medications [9,13]. In particular, consistent exposure to digital screens increased the prevalence of dry eye syndrome in Al-Baha region [14].

High altitude is one of the frequent factors examined in the literature, which is linked to physiological and pathological changes as a result of adverse environmental conditions [15]. For instance, dry eye problems are typically reported at higher altitudes, as indicated by studies that found prevalence among soldiers in regions with variable temperature conditions at higher altitudes [15]. Understanding this factor is essential because individuals with preexisting ocular conditions may be more susceptible to developing eye disorders at higher altitudes [16]. In these regions, the eye is exposed to multiple factors, including low temperature and relative humidity, and greater UV radiation. The emergence of symptoms may be influenced by a combination of these factors [16].

As a result of Al-Baha region's higher altitude, studies have reported a high prevalence of eye disorders such as unilateral and bilateral blindness in the Al-Baha region [17]. The prevalence of itching and tearing in the eyes, as reported by the population, indicates a greater need to investigate eye-related diseases in this region [18]. Additionally, wearing a face mask in such a region at a high altitude may increase the risk of developing dry eye syndrome rapidly. Consequently, the purpose of the present research is to identify the sociodemographic and environmental factors that can lead to an increase in the prevalence of MADE among the Al-Baha population.

RESEARCH METHODOLOGY

Research approach and design

This study is an observational, descriptive, population-based cross-sectional study. It was designed to estimate the prevalence of MADE and identify the risk factors among the general population of the Al-Baha area, Saudi Arabia.

Target population and sample size

The target population of this study was the general population of Al-Baha province. Al-Baha region is located in the west of the Kingdom of Saudi Arabia in the Hejaz region, between Mecca, which borders it from the north, west, and southwest, and Aseer, which borders it from the southeast. According to the General Authority for Statistics (GAStat), the population in the Al-Baha region in mid-2017 was 476,172.

The sample size of the study is 359, which was calculated by the following equation:

$$\frac{z^2 \propto pq}{d^2}$$
$$\frac{1.96^2 * 0.183 * 0.817}{0.04^2} = 359$$

In which, Z = the normal standard deviation (level of statistical significance), which is set at 1.96 and corresponds to a 95% confidence level; P = prevalence of MADE in a similar study = 18.3% = 0.183; q= 1-p =1-0.183=0.817; d = degree of accuracy, set to (0.04)
Thus, $(1.96)^2 * 0.183 * (1 - 0.183)/(0.04)^2 = 359$

Data collection and analysis

An anonymous online questionnaire comprising 56 questions was designed to determine whether participants have MADE or not and to assess MADE risk factors. It was distributed through social media platforms including Twitter (Twitter, Inc., San Francisco, California, United States), Telegram Messenger, WhatsApp (Meta Platforms, Inc., Menlo Park, California, United States), and papers distributed to the community containing quick response (QR) code leading to the survey. The data were collected from 480 participants in the Al-Baha area. For data analysis, the authors used IBM SPSS Statistics for Windows, Version 28.0 (Released 2021; IBM Corp., Armonk, New York, United States). The study estimated frequencies, descriptive statistics, odd ratios (with 95% CI) to study the association between potential risk factors and MADE, and p-values < 0.05 for statistical significance to fulfill the objectives. Only the questionnaires without missing data were considered for the analysis.

Ethical considerations

The study was carried out after approval from the Scientific Research & Ethics Committee of the Faculty of Medicine at Al-Baha University, Saudi Arabia (Approval number: REC/SUR/Bu-FM/2022/5). Participants were fully informed of the emphasis of the study. They were also given the subject's right not to participate. The responses were collected with informed consent. In addition, the study maintains the privacy, confidentiality, and anonymity of the collected data.

RESULTS

Sociodemographic characteristics

More than half the participants (n = 254, 52.9%) were between the ages of 16 and 25 years. In addition, 71 (14.6%) participants were between 26 and 35 years of age, while 84 (17.56%) participants were between the ages of 36 and 45 years (Figure *1*).

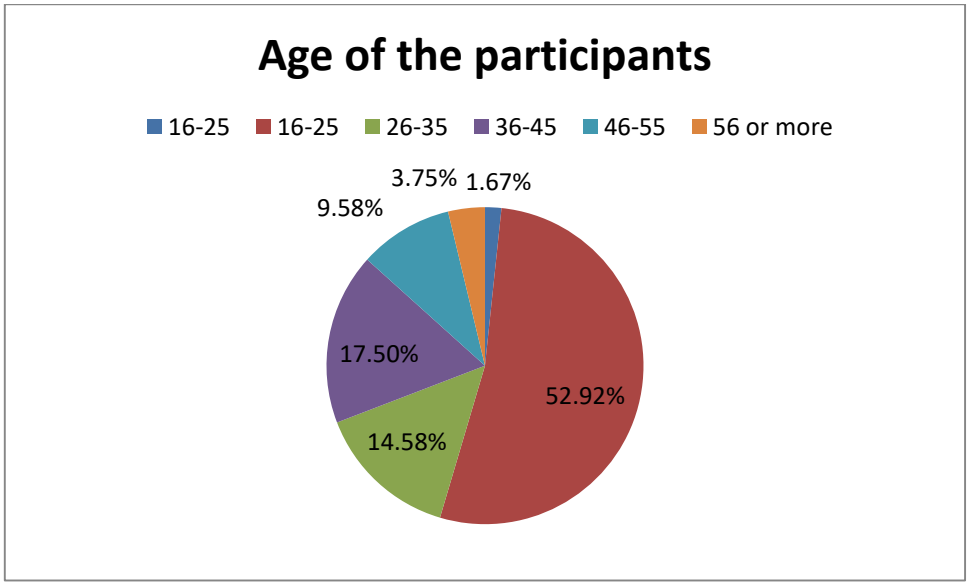

Figure 1: Age of the participants

Regarding participant gender, the majority of participants were female (n = 268; 55.8%), while 212 (44.2%) participants were male (Figure *2*).

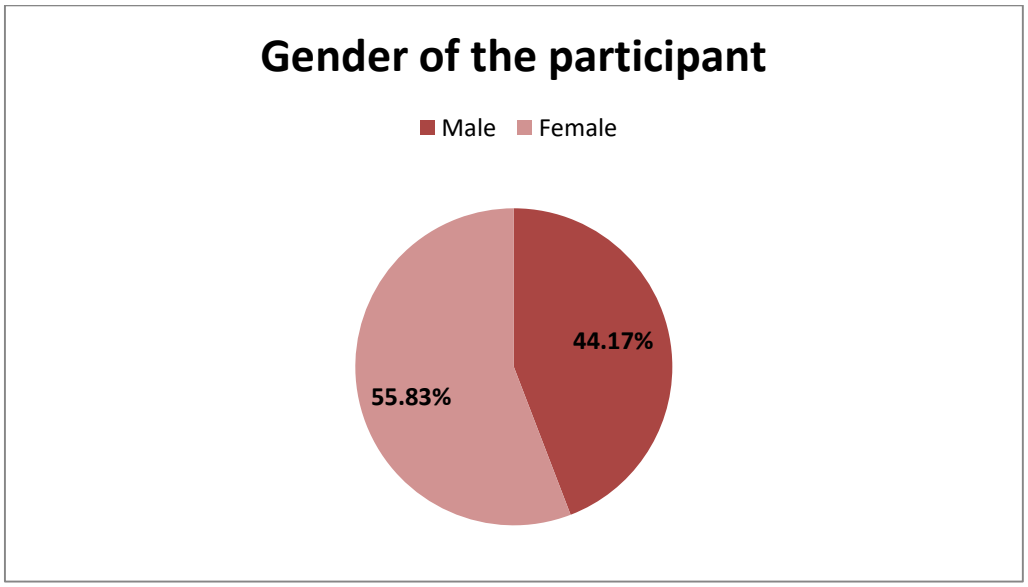

Figure 2: Gender of the participants

Furthermore, 294 (61.3%) were well-educated with a Master's degree, while 102 (21.3%) participants had a primary education, 9% had a diploma, and 8.5% had a Ph.D. degree (Figure *3*). The majority of female participants, aged 36 to 45 years, had a master's degree.

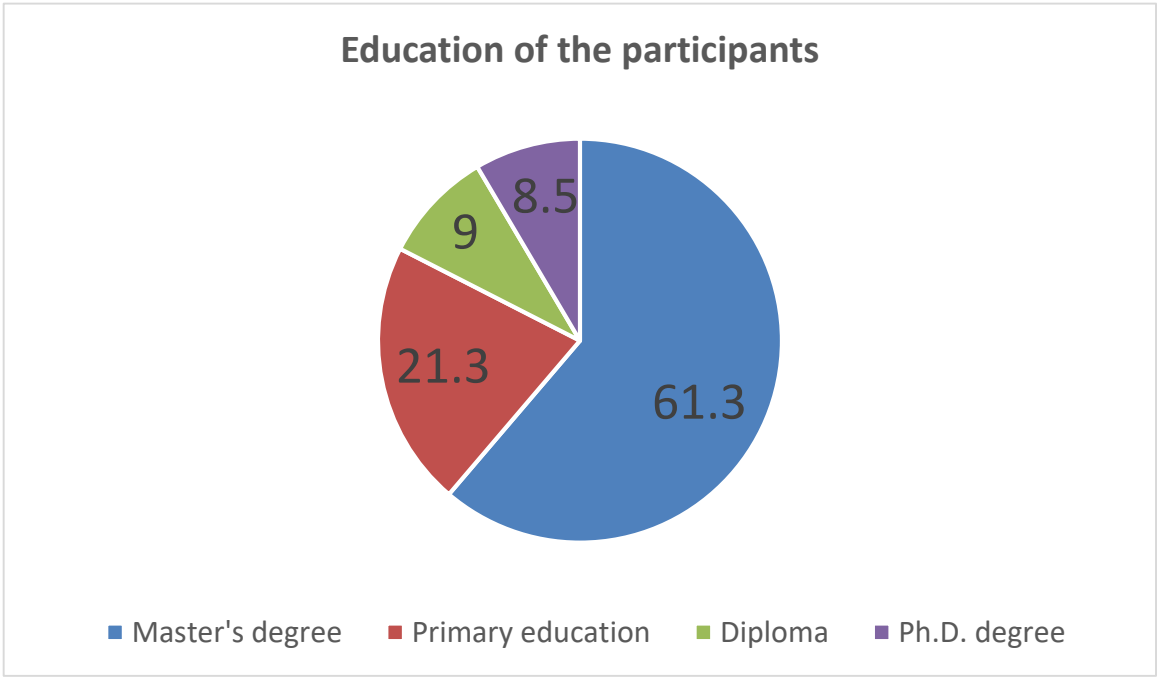

Figure 3: Education of the participants

In addition, more than half of the participants (n= 317; 66.2%) did not belong to the medical field, whereas the remaining participants (33.8%) did (Figure *4*).

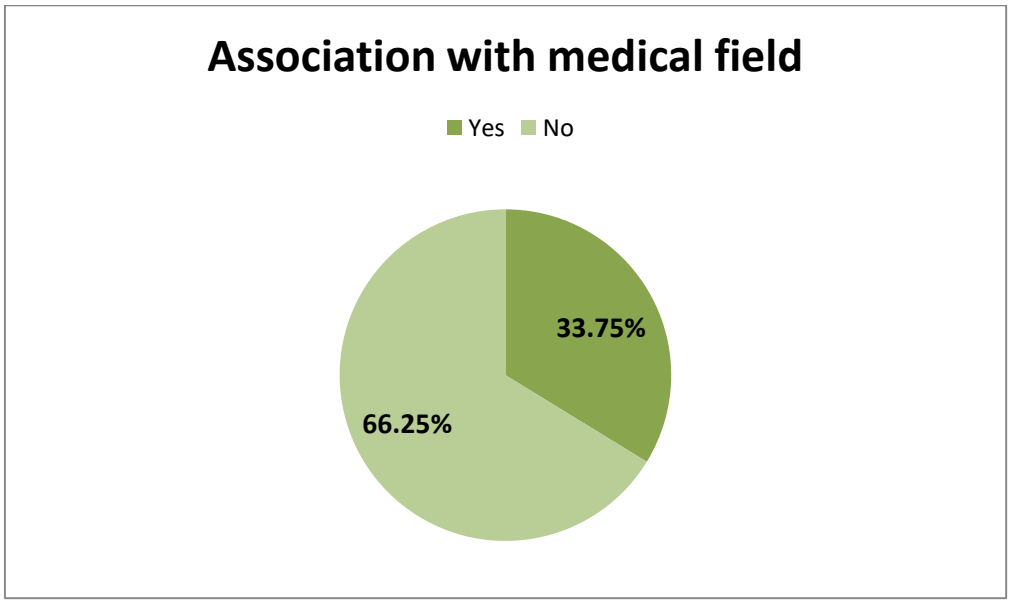

Figure 4: Association with the medical field

Overall, the survey found that 188 (39.20%) participants had MADE (Table *1*). The prevalence of MADE in the general population of Al-Baha, Saudi Arabia, was 39.20%, which is higher than the global prevalence of 18.5% (Figure *5*).

Table 1: Prevalence of MADE among participants

Variable	Value
Total	480
MADE Participants	188
Percentage	39.20%

The figure below is showing that the Prevalence of MADE among the general population of Al-Baha, Saudi Arabia was more frequent compared to global prevalence.

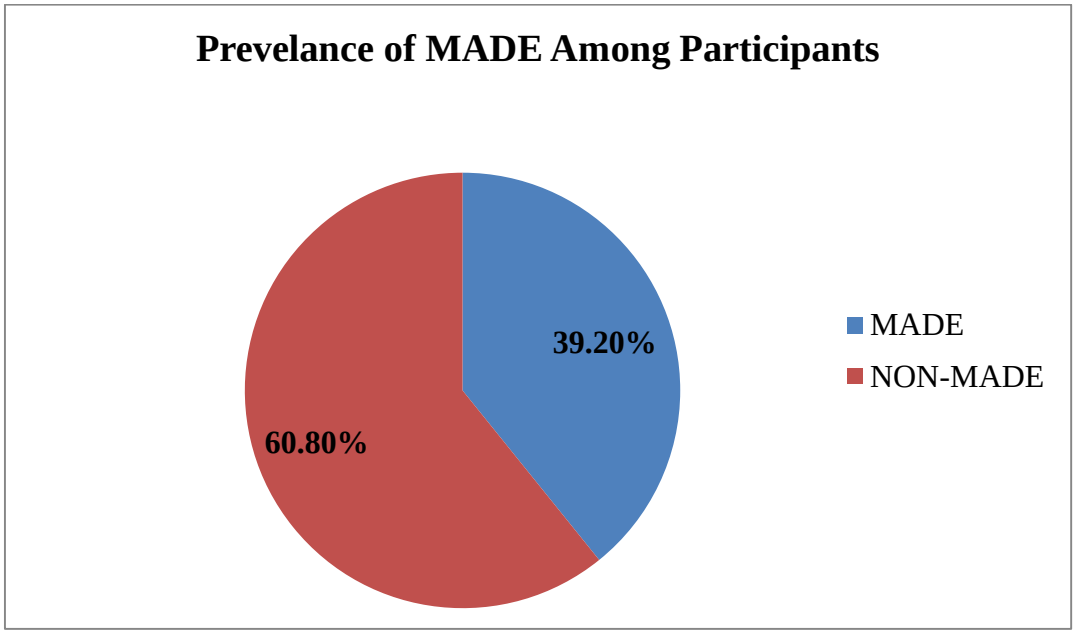

Figure 5: Prevalence of mark-associated dry eye (MADE) among the participants

Risk factors for MADE among study participants

The different risk factor assessments were done using OR. It was found that 35% of the participants, who used glasses, and 13.5% of the participants, who have a history of eye surgery, experienced MADE. Additionally, the value of OR is less than 1 and is significant (OR = 0.868, 95%CI = 0.692-1.088), $p<0.05$. This indicates the negative association of the use of glasses and eye surgery history with MADE. Similarly, OR

was found to be significant for screen time and MADE prevalence. The value of OR was also significant for exposure to dry weather, exposure to wind, blepharitis, and ectropion. The value of OR for exposure to the wind was 0.764 (95%CI= 0.608-0.96; p<0.05), exposure to dry weather is 0.786 (95%CI = 0.619-0.998; p<0.05), blepharitis is 0.616 (95%CI= 0.432-0.879; p<0.05), and for ectropion is 0.542 (95%CI= 0.334-0.877; p<0.05). Moreover, 59.8% of the participants with MADE experienced exposure to wind and dry weather, 4.4% of the participants with MADE were diagnosed with blepharitis, and 1.5% of participants were diagnosed with ectropion. An insignificant relationship was discovered between exposure to hot or cold weather, smoking (cigarettes, electronic cigarettes, sheesha), and diseases such as Sjogren's syndrome, rheumatoid arthritis, hypothyroidism, hyperthyroidism, atopic dermatitis, psoriasis, and entropion (p-value > 0.05). However, the OR was greater than 1 for hypothyroidism, indicating a positive effect of hypothyroidism on MADE. (Table *2*).

Table 2: Odds Ratio of Risk Factors for MADE among Study Participants

Risk factor	N (%)	Odds ratio (95% CI)
Use glasses	168(35)	0.868(0.692-1.088)*
History of eye surgery	65(13.5)	1.246(0.86-1.805)*
Use of screens		
Less than 2 hours	15(3.1)	
2-4 h	64(13.3)	
4-6 h	108(22.5)	0.785(0.609-1.013)
6-8 h	104(21.7)	
8-10 h	90(18.8)	
More than 10	99(20.6)	
Expose to wind	287(59.8)	0.764 (0.608-0.96) *
Expose to dry weather	287(59.8)	0.786 (0.619-0.998) *
Exposed to hot weather	140(29.2)	0.971(0.761-1.237)
Exposed to cold weather	320(66.7)	1.473(0.991-2.191)
Smoker (cigarette, electronic, sheesha)	89(18.5)	0.995(0.747-1.325)
Other diseases		
Sjogren's syndrome	16(3.3)	0.892(0.506-1.572)
SLE	1(0.2)	---
Rheumatoid arthritis	15(3.1)	0.834(0.48-1.45)
Hypothyroidism	24(5)	1.047(0.617-1.777)
Hyperthyroidism	11(2.3)	0.858(0.445-1.656)
Rosacea	4(0.8)	----
Atopic dermatitis	49(10.2)	0.858(0.615-1.196)
Psoriasis	13(2.7)	0.72(0.43-1.206)
Blepharitis	21(4.4)	0.616(0.432-0.879) *
Entropion	4(0.8)	0.782(0.291-2.096)
Ectropion	7(1.5)	0.542(0.334-0.877) *

Association of MADE with socioeconomic, demographic characteristics, screen hours

The associations between socioeconomic and demographic characteristics such as age, education, etc., and screen hours and patients with dry eye were examined using the Chi-square test (Table *3*).

Table 3: Association of MADE with Socioeconomic, and Demographic Characteristics, Screen Hours, and Patients with Dry Eye.

Variable	N=188	P value
Gender		
Male	73	0.011*
Female	115	
Age		

5-15	4	
16-25	100	
26-35	23	0.041*
36-45	33	
46-55	20	
56 or more	7	
Education		
Primary	46	
Diploma	15	0.327
Master	108	
Doctorate	19	
Time on screen		
Less than 2 h/day	6	
2-4 h/day	19	
4-6 h/day	45	0.029*
6-8 h/day	37	
8-10 h/day	29	
More than 10h	52	
Diagnosed with dry eye		
Yes	54	0.03*
No	134	

From the result, it has been examined that only screen time has a significant association with MADE; p=0.029 (<0.05). 45 participants spent four to six hours per day on screen, 37 participants spent six to eight hours per day on screen, 29 participants spent 8-10 hours per day on screen, 19 participants spent two to four hours per day on screen, and six participants spent less than two hours per day on screen, whereas 52 participants spent more than 10 hours per day on screen. This indicates that spending more time on screen time is more likely that participants have MADE.

Factors associated with symptomatic DED

Multivariate logistic regression analysis is used to examine the risk factors associated with symptomatic DED (Table *4*).

Table 4: Multivariate logistic regression analysis of factors associated with symptomatic DED

Factor	Odds ratio	95% confidence interval of odds ratio	P value
Gender			
Male	Reference		
Female	1.435	0.988-2.084	0.058
Age			
5-15	0.839	0.145-4.86	0.845
16-25	0.578	0.196-1.698	0.318
26-35	0.51	0.162-1.6	0.249
36-45	0.649	0.212-1.98	0.449
46-55	0.872	0.269-2.833	0.82
Use glasses			
Yes	Reference		
No	0.78	0.535-1.153	0.218
Time on screen			
Less than 2 h/day	0.95	0.28-3.24	0.94
2-4 h/day	0.85	0.414-1.75	0.661
4-6 h/day	1.42	0.78-2.57	0.251
6-8 h/day	1.13	0.618-2.07	0.687
8-10 h/day	---	---	---
More than 10h	2.367	1.304-4.295	0.005*

Similar to the result of the Chi-square, the result of the multivariate logistic regression analysis showed that only time spent on screen has a significant association with symptomatic DED. The p-value for more than 10 hours is

0.005 with an OR value of 2.367, indicating that participants, who spend more than 10 hours on screen, are more likely to experience the symptoms of dry eye. However, there is no significant association found between the other time ranges spent on screen and symptoms of dry eye. Moreover, the OR value for each of the demographic characteristics is approximately similar for each of the factors. Furthermore, the OR result shows that females are more likely to experience symptoms of dry eye than males (OR=1.435, 95%CI=0.988-2.084). However, OR value for the age is smaller than 1, indicating an insignificant but inverse relationship of age with symptomatic dry eye syndrome.

Precautionary strategies

As shown in Figure *6*, 45.6% of the participants use lubricant eye drops to relieve the symptoms of the MADE, while most of the participants (52%) do not use any protective measures. Moreover, 77.4% of the participants used medical masks while 20.2% did not use any medical mask. (Figure *7*).

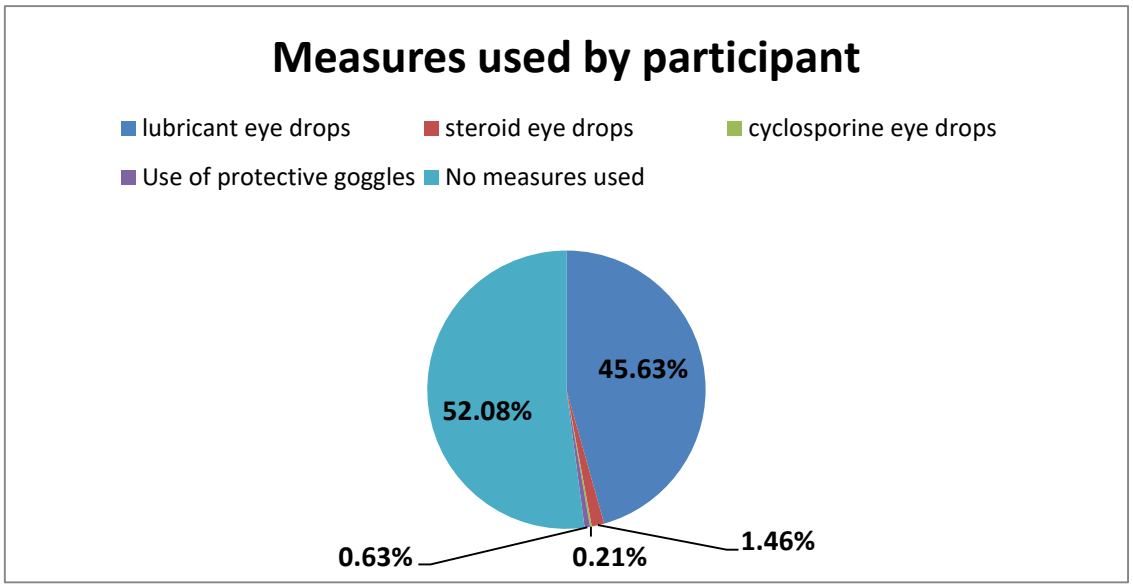

Figure 6: Q1 measures used by a participant to relieve symptoms of MADE (480)

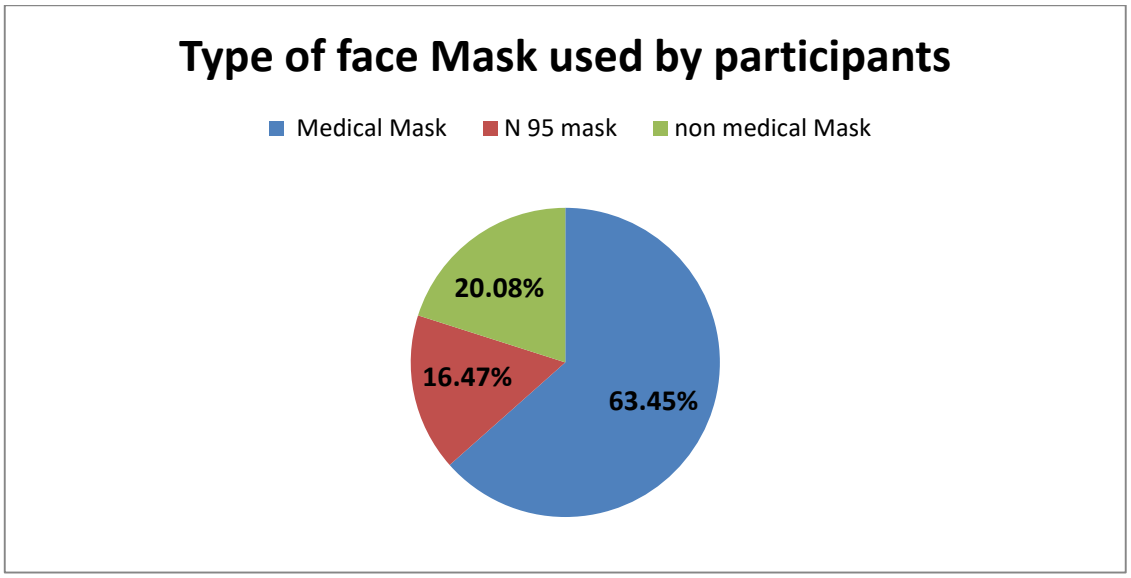

Figure 7: Q 2 Type of face Mask used by participants (372)

Of the participants, 26.7% believed that face masks might be a contributing reason for dry eyes and 53.7% of participants believed that a face mask can cause dry eyes when it's poorly fitted. Additionally, according to 56.4% of the participants, up to one hour of wearing a mask causes them to develop symptoms of MADE, while according to 17.86% of participants, it takes more than two hours of wearing a mask for MADE to develop and 14.6% of the participants develop MADE symptoms when wearing a mask for one to two hours (Figure *8*).

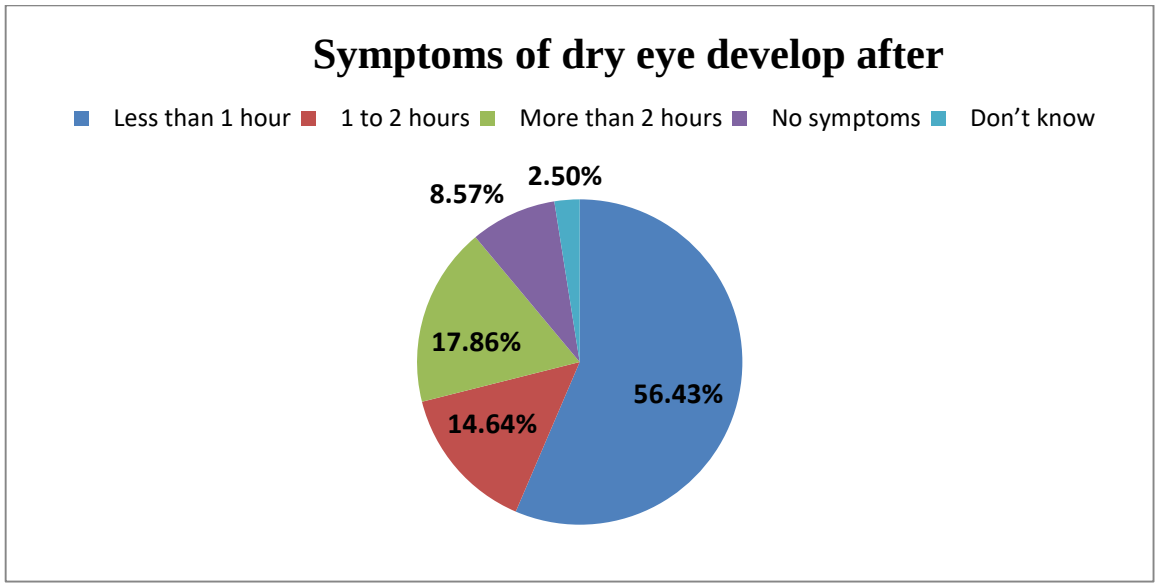

Figure 8: Q5: After wearing the mask, symptoms of dry eye develop after

The majority of participants with MADE symptoms (85%) admitted that they altered their mask type because of MADE problems. Most participants used lubricant eye drops more frequently due to MADE and 55% of participants with MADE symptoms agreed that dry eye symptoms caused them to rub their eyes more frequently. Of the participants with MADE symptoms, 32.3% stopped wearing a mask as a result of MADE. A total of 25.8% of the participants with MADE symptoms were diagnosed with COVID-19, and 56.7% of these participants believed that the dry eye symptoms had been present even before they were infected with COVID-19 infection and remained the same. However, 19.36% of the participants with MADE symptoms who had been diagnosed with COVID-19 were certain that their symptoms worsened after being infected with COVID-19 (Table 5).

Table 5: frequency distribution of the response

Question (N)	(%)
Q3 Generally, Do You think a face Mask can cause dry eye? (372)	
Yes	(26.7)
No	(19.6)
Don't know	(53.7)
Q4, Do You think a face Mask can cause dry eye when it's poorly fitted (exhaled air pass over the ocular surface)?	
Yes	(53.7)
No	(11.3)
Don't know	(35)
Q6 Did dry eye symptoms make you change the type of mask you wear?	
Yes	(85)
No	(15)
Q7 Did wearing a face mask make you use lubricant eye drops more frequently?	
Yes	(18)
No	(40.3)
Don't use	(41.7)
Q8 Did dry eye symptoms while wearing a face mask make you rub your eyes more frequently?	
Yes	(55)
No	(45)
Q9 Did dry eye symptoms make you stop wearing the mask sometimes?	
Yes	(32.3)
No	(67.7)

Q10 Have you been diagnosed with COVID-19?	
Yes	(25.8)
No	(74.2)
Q11 relation between COVID-19 and MADE?	
-Dry eye symptoms began after I get a COVID-19 infection	(24)
-Dry eye symptoms were present before I get the COVID-19 infection but aggravated after the infection	(19.3)
-Dry eye symptoms were present before I get the COVID-19 infection and didn't change after the infection	(56.7)

According to the analysis, the prevalence of MADE in the general population of Al-Baha, Saudi Arabia, was higher than the global prevalence. Exposure to dry weather, exposure to wind, blepharitis, and ectropion are significant risk factors for MADE in the general population of Al-Baha, Saudi Arabia. Age and gender of the participants were also found to have a significant relationship with MADE frequency. Moreover, only screen time was seen to have a significant association with MADE among all the sociodemographic factors examined. The more time participants spent looking at a screen, the more likely they were to have MADE. Similarly, participants who spend more than 10 hours looking at a screen are more likely to experience MADE symptoms.

DISCUSSION

A mask is one of the necessary protective measures against COVID-19. Numerous researchers and studies emphasize the significance of masks in combating the COVID-19 pandemic [19]. However, the widespread use of face masks for extended periods initiates another epidemic of mask-associated dry eyes. Dry eye has the potential to affect human visual, mental, and physical health, which can have an impact on daily societal activities such as reading, watching, etc. [20]. This study indicates that the prevalence of MADE in the general population of Al-Baha, Saudi Arabia, is greater than the global prevalence. This is indicated by the fact that 39.20% of the participant had MADE, which is approximately 21% more than the global prevalence of MADE. This is best explained by this area being at a high altitude. A high prevalence (70.9%) was also discovered in Jeddah, Saudi Arabia [7]; however, these results were observed among healthcare professionals.

In addition, the prevalence of MADE was found to be significantly associated with wind and dry weather exposure. In addition, participants' age and gender were found to be significantly associated with the occurrence of MADE. Females were found to be more susceptible to MADE than males, and those between the ages of 16 and 25 were found to be more susceptible to MADE. Existing literature in this context support that the females are more prone to have dry eyes such as the studies by Garg et al. [11] and Al-Amri et al. [12]. In addition, In the study by Fan et al., they find that dry environments are significantly linked to MADE in China [21]. In addition, they find a positive association between MADE and longer mask use, non-standardized mask use, a reduction in outdoor activities, a reduction in reading time, a short-term visual display, etc. [21].

Additionally, the findings of Morris et al., support the influence of a dry environment on the development of dry eye [16]. Their research also indicates a correlation between MADE and age, gender, level of education, and the use of eyewear such as glasses and contact lenses. In Al-Baha, Saudi Arabia, the current study found no correlation between education and MADE. Changes in social and demographic characteristics may account for the difference in the outcome. Similar to this study's findings, Abdulmannan et al. found that the prevalence of MADE is increasing among university students from Iraq and Jordan [22]. In addition, their result is comparable to ours, as their analysis demonstrates a negative association between the lenses and the development of mask-associated dry eye [22]. In addition, this study documents the negative impacts of screen time on eye health. Participants who spent more time in front of an electronic display were more likely to exhibit MADE symptoms. Similarly, Garca-Ayuso et al., 2021 [23] found that students who spend more time looking at screens are more likely to experience dry eye symptoms.

The current study also demonstrated a positive relation between MADE and ectropion and blepharitis. Patients with ectropion and blepharitis have a greater likelihood of developing MADE. This study found no evidence of an association between Sjogren's syndrome, systemic lupus erythematosus, rheumatoid arthritis, hypothyroidism, Rosacea, or atopic dermatitis with the development of MADE. The positive association between ectropion and blepharitis demonstrates that as a result of increased surface exposure in the case of ectropion and meibomian gland dysfunction in blepharitis, these individuals were susceptible to the mask's affection and, consequently, developed MADE. Similarly, this study's findings indicate that the participants who have been diagnosed with COVID-19 believe that COVID-19 infection did not affect MADE.

The existence and prevalence of MADE in the general population suggest that wearing face masks requires caution [24]. Effectively educating healthcare professionals and other workers about the potential consequences of dry eye is required [25]. Face masks that are not properly fitted have the potential to increase the risk of MADE. Moreover,

awareness programs must be implemented to correct improper mask use. Therefore, the standard use of masks could be used as a protective measure to lessen their adverse effects. It is crucial to realize that the mask is important, but improper use is the reason for the issue [26]. Thus, additional caution and awareness are required. This can include eye protection like lubricating eye drops and other equipment like goggles [27]. However, the analysis also reveals that the majority of participants are unaware of the use of the effective eye protector, whereas the majority are aware of the mask's effect on dry eye. Similarly, the majority of participants replace their masks when they develop mask-associated dry eye.

Recommendations

Given the potential risk factors and widespread prevalence of MADE, the following is recommended: In cases of dry weather or windy conditions, patients with MADE should avoid going outside, and ophthalmologists should warn the general public about these circumstances. If a patient has blepharitis, ophthalmologists must effectively treat it. In addition, they should educate patients and encourage them to use lubricant eye drops as additional care and to recover from DED. Patients should also learn how to wear mask properly. Additionally, blinking exercises may be beneficial in this instance. Females are more likely than males to develop MADE, so ophthalmologists should prioritize the care and education of female patients. Similarly, individuals between the ages of 16 and 25 require increased attention. Additionally, they should advise their patients to avoid screens as much as possible. The public should be educated about the effects of digital eyestrain, such as dry eyes, eye fatigue, and nearsightedness. Moreover, the general public and patients with dry eye syndrome require additional education regarding eye care and MADE.

Limitations of the study

The lack of objective physical examination and confirmation of dry eye is the primary limitation of our current study, which may have an impact on the total documented prevalence.

CONCLUSION

Overall, this study sheds light on the prevalence of MADE among the general public in the Al-Baha area in Saudi Arabia. It indicates that the prevalence of MADE in Al-Baha is significantly higher than the global prevalence. Some potential MADE risk factors include dry and windy weather and diseases such as blepharitis and ectropion. In addition, the study demonstrated a significant association between MADE and both gender and age. Likewise, the study showed that screen time is also a risk factor that positively affects the prevalence of MADE. The use of use lubricant eye drops as additional care, blinking exercises, and avoidance of screens is recommended

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