

The Prevalence of Photoconjunctivitis and Conjunctival Lesion among Fishermen in Jazan in Saudi Arabia: And the Association of Its Risk Factors

Ahmed ALIBRAHIM¹, Shamsul BMT², Turki ALGHAMDI³, Yee Guan NG², Faisal SHAIKH,
Nasser ALSSABANI⁴



¹Department of Optometry, Ministry of Health, Prince Mohammed bin Nasser Hospital in Jazan

²Department of Environmental and Occupational Health, Faculty of Medicine and Health Science, Universiti Putra Malaysia

³Department of Ophthalmology, Ministry of defence, Military Hospital in Khamis Mushait

⁴Department of Ophthalmology, Faculty of Medicine, King Khaled University

*Correspondence author - opt.ahmed@hotmail.com

Abstract

Attributable to the nature of their occupation, fishermen are consistently exposed to the hazardous UV radiation which not only affects the skin but also the eye. The objective of this study is to determine the prevalence of photoconjunctivitis and conjunctival lesions among fishermen in Jazan and the association with socio-demographic background and occupational history. This study employed a cross-sectional study design conducted in the Jazan region of Saudi Arabia among 511 fishermen. Data collection using a set of questionnaire was assisted by interviewer which is ensued by an eye examination. The prevalence of the photoconjunctivitis was found to be 4.3% and that of conjunctival lesions at 0.8%. An association was seen between the prevalence of photoconjunctivitis and conjunctival lesions to the exposure of sunlight.

Keywords: *photoconjunctivitis, conjunctival lesion, risk factors, fishermen, Saudi Arabia, Jazan*

Introduction

A high level of exposure to ultraviolet (UV) radiation not only damages the skin as is commonly known, but it also responsible for the deterioration of the health of the eye. It was observed that UV radiation damages the proteins and enzymes in a cell resulting in a large number of free radicals eventually leading to inflammation.^[1] In view of this, ocular diseases affect an approximate 80 million people globally who are either disabled visually or have impaired vision.^[2,3] While several ocular diseases can cause severe damage to the eye, many can be prevented and reversed if diagnosed at the right time or with proper knowledge as to the harmful effects of UV. The most commonly affected population in this regard are those who are repeatedly exposed to UV radiation for long hours and over long periods of time based on their occupation. One such particularly vulnerable population are fishermen who spend long hours in the sun leading to several ocular issues Pascolini and Mariotti.^[4]

Prolonged exposure to sun and subsequently UV rays is very harmful where sunburn of the skin and the eye equivalent for sunburn is the most common outcome Lindfors and Vuilleumier.^[5] It was also observed that being exposed to direct sunlight for longer than four hours in a day can lead to the increased risk of diseases such as cortical cataract with the risk

being especially higher in those who work outdoor over those who work indoors.^[6,7] Here, the case of fishermen in Jazan, Saudi constitute for a “high risk” category due to fishing being the predominant occupation leading to long occupational exposure to direct sunlight. However the exact prevalence and

These studies too have however not measured the ocular issues itself but rather the knowledge, attitude and practices of these fishermen towards skin radiation and other harmful effects of UV radiation AlGhamdi et al.^[8] and Alamri et al.^[9] Based on a study conducted by Hajar et al, the association between diabetes mellitus and diabetic retinopathy in various areas of coastal and mountainous Jazan, Saudi Arabia, showed that more than 58% of the population had eye related problem with several cases being severe and/or leading to blindness.^[10]

Studies related to the eye are very scanty as far as Saudi Arabia is concerned and especially the Jazan region when compared to other parts. This may be attributed to the limitations of conducting the research in Jazan and the dearth in the literature regarding the prevalence of eye related diseases in the area. Globally, several studies have been conducted to discern the prevalence of eye diseases as a result of UV exposure. Sun et al.^[11] showed an association between cataract and exposure to UV-B radiation. Likewise, Nangia et al.^[12] too depicted an association of increased pterygium in the Indian population as a

result of prolonged exposure to direct sunlight. Reinau et al.^[13] on the other hand showed an association of skin disorders to exposure to UV radiation. While several other studies have evaluated the association of pterygium, pinguecula and cataract to UV radiation, none were conducted on fishermen.

The researcher in this regard, thus has chosen to conduct a study in the Jazan region of Saudi Arabia, due to the fishermen forming a vulnerable population and also because no study has thus far been conducted to evaluate the same in the region to the best of the researcher's knowledge. The aim of the study is to determine the prevalence of photoconjunctivitis and conjunctival lesions along with the association of its risk factors among fishermen in Jazan, Saudi Arabia.

Methods

This is a cross-sectional study conducted across five selected regions in the district of Jazan; Jazan port, Farasan Islands, Alswarmah and Almdhaya and Baish known locally for the fishing activities. A total of 511 fishermen consented and participated in this study involving both Saudi and non-Saudi nationals aged between 18-53 years old and a minimum work experience of 5 months. Those who had underlying chronic medical conditions specifically cardiovascular disease, diabetes mellitus, history of posterior segment eye disorders such as retinitis, uveitis, and retinopathy, ocular infection, history of eye related surgery or uses contact lenses were excluded from the study. Socio-demographic background, occupational exposures, medical history and lifestyle of respondents were collected using a set of validated interviewer-assisted questionnaire.

Following the interview, an eye examination was carried out to determine and ascertain vision impairment and prevalence of photoconjunctivitis and conjunctivitis.

Inclusion criteria

- Saudi and Non-Saudi male fishermen
- 18-53 years of age
- Work experience more than 5 months

Exclusion criteria

- Underlying medical conditions such as cardiac failure, diabetes mellitus and hypertension for more than five years
- History of posterior segment eye disorders such as retinitis, uveitis, and retinopathy
- Ocular infection
- Use of contact lenses or history of surgery

Sample size

The sample size was chosen carefully based on past literature. The precision and confidence interval (CI) of 95% was considered as per the study by Naing et al.^[14] The calculation of the sample size was carried out according to the study by Taylor et al.^[15] An informed consent was obtained from all the

participants prior to the conduct of the study. Therefore a total of 511 fishermen were included as a part of the study.

Conduct of the study

Questionnaires were handed out to the fishermen after which a comprehensive eye examination was carried out. An eye occlude was used to check for the visual acuity of the respondents. A screen chart was also used for the same purpose. A portable slit lamp was used in the investigation of the conjunctiva to achieve the objective of the study. The letter E is shown to the respondents from different angles following which the respondents progressed to a test using the slit lamp. A written diagnosis was then recorded by the investigator.

Ethical Consideration

This study has obtained approval from the ethics committee approval from Jazan University and Medical ethics board from Universiti Putra Malaysia.

Statistical Analysis

Statistical Package for Social Sciences (SPSS) version 22 was used to perform descriptive analyses and logistic regression to determine the prevalence and association respectively.

Results

The age of the fishermen were divided into distinct ranges such as 21-31 years, 32-41 years and 42-53 years. It was found that 28.4% fell into the first category, with 44% and 27.6% in the second and third categories respectively. Besides this, 11.9% of the population was of Saudi origin with 13.7% who were Bangladeshi, 32.1% Indian, 9.4% Filipino, 5.1% Yemeni, 21.9% Egyptian and 5.9% who were Sri Lankan.

Besides this, occupational data of the respondents, prevalence of photoconjunctivitis and conjunctival lesions, association of working experience and UV related anterior eye segments, association of work hours in a day and days of the week has been represented in Tables 1-5.

Table 1: Occupational data of respondents

Variables	Categories	Frequency	Percent (%)
Number of experience years as fishermen	≤ 10	166	32.5
	10-20	219	42.9
	> 20	126	24.7
Hours of working in a day	≤ 8	111	21.7
	> 8	400	78.3

Table 2: Prevalence of photoconjunctivitis and conjunctival lesions

Diseases	Frequency	Percent (%)
Overall	22	4.3
Photoconjunctivitis		
Overall Conjunctival lesion	4	0.8

Table 3: Association between the working experiences and UV-related anterior segment eye disorders

		Experience (Years)				χ^2	P	POR	95% CI	
		< 10		≥10					Lower	Upper
		N	%	N	%					
Overall photoconjunctivitis	Yes	7	31.8	15	68.2	0.01	0.946	0.97	0.39	2.42
	No	159	32.5	330	67.5					
Overall conjunctival lesions	Yes	3	75.0	1	25.0	3.32	0.068	6.33	0.65	61.33
	No	163	32.1	344	67.9					

*p value less than 0.05, **p value less than 0.0, I***p value less than 0.001

Table 4: Association of the load of work hours in a day with anterior segment eye disorders

		Working Hour/Day				χ^2	P	POR	95% C	
		< 8 hours		≥8 hours					Lower	Upper
		N	%	N	%					
Overall photoconjunctivitis	Yes	6	27.3	16	72.7	0.42	0.519	1.37	0.52	3.59
	No	105	21.5	384	78.5					
Overall conjunctival lesion	Yes	3	75.0	1	25.0	6.73	0.009**	11.08	1.14	107.62
	No	108	21.3	399	78.7					

*p value less than 0.05, **p value less than 0.0, I***p value less than 0.001

Table 5: Association between the days of work per weeks and UV-related anterior segment eyes disorder

		Number of Days work per week				χ^2	P	POR	95% CI	
		< 5		≥5					Lower	Upper
		N	%	N	%					
Overall photoconjunctivitis	Yes	8	36.4	14	63.6	0.25	0.618	0.80	0.33	1.94
	No	204	41.7	285	58.3					
Overall conjunctival mass	Yes	2	50.0	2	50.0	0.12	0.729	1.41	0.20	10.12
	No	210	41.4	297	58.6					

*p value less than 0.05, **p value less than 0.01, ***p value less than 0.001

Discussion

Jazan is a tropical place that records high UV index scale all year round. The fishermen in this study were also recorded to work outdoors for extended periods of time in direct sunlight. In this study a total of 4.3% of the fishermen projected to have photoconjunctivitis. Generally, photokeratitis and photoconjunctivitis is seen after just 30 minutes for up to a day in direct sunlight.^[16] Treating keratitis in this regard is restricted to ceasing exposure to the sun and protection of the eyes from the sunlight with the use of sunglasses and wide brim hats. It was observed that taking these measures resulted in the reversal of the condition with minimal effects.^[17] A study conducted by Kumah et al showed a prevalence rate of 22.6% with photoconjunctivitis.^[18] However, the main difference between this study and the present research is that in the case of the study in Ghana the UV exposure was due to industrial UV rays as opposed to UV from sunlight. Moreover, in this case, it is easier to record accurate data as the welders work

in the same area. As per the researchers own experience with the fishermen, it was at times challenging to carry out the study as the fishermen would be gone at sea for several days. This made it particularly challenging as photoconjunctivitis is essentially a self-healing disease.

As for the case of conjunctival lesions, Mondal et al. (year),^[19] observes that 25% of all respondents presented with conjunctival lesions. An American study depicted 12% of the studied population had conjunctival lesions.^[20] This study however depicts only 0.8%. Several studies in this regard have shown associations between working outdoors and higher rates of conjunctival abnormalities.^[21-23] An association between UVB exposure and conjunctival disorders has also been depicted.^[24] Oliva and Taylor^[25] have made observations that prolonged exposure to UV radiations can result in conjunctival discomfort coupled with inflammatory variance. McBride^[26] had shown that participants by the age of 20 had received exposure that was equivalent of sixty years of life. The present study too is in

line with the previous studies and shows an association to prolonged exposure of direct sunlight. More recently research has shown links between the knowledge of UV exposure and its risk and the decrease in UV exposure. It has been deemed that these people are likely to take precautionary measures before working in direct sunlight.^[27]

STUDY LIMITATIONS

The study may not be specifically generalizable to other coastal regions even though a contextual crossover does exist. Several fishermen did not agree to participate in the study due to their busy work schedule. Even those who did participate were gone to sea for several days (2-6 days) and on their return were still busy preparing for the next fishing trip. This made it difficult to communicate with the fishermen and it was not known whether the fishermen answered all questions truthfully or not. The follow-up and appointments were constantly affected as a result. Additionally, even though the questionnaire was translated into several languages, many fishermen did not know how to read which made administration of the questionnaire challenging.

Conclusion

When compared to the prevalence of photoconjunctivitis and conjunctival lesions, this study has showed a lower prevalence when compared to previous research. To the best of the researcher's knowledge this is the first study that is conducted to determine the prevalence of conjunctival abnormalities among fishermen in the Jazan region. However, increased associations to a higher exposure of UV were denoted here. Even so, further studies are recommended to be carried out in the region of Jazan with more intervention as to the knowledge and awareness of the fishermen to be given. Besides this, the legislation of the law of compliance to protective protocol must also be implemented.

Conflict of Interest

The author and the respective declare that no conflict of interest is involved in the conduct and publication of this study.

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