Research Article

Evaluation of occupational eczema and work-related risk factors in sea fishers on the Mediterranean Coast of Turkey: A cross-sectional study

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Abstract

Background: Eczema is one of the most prevalent occupational skin diseases, with sea fishers being particularly vulnerable due to their harsh working conditions.

Objective: This study aimed to assess the prevalence of occupational eczema among fishers and identify risk factors contributing to its development.

Methods: A total of 119 fishers participated in this cross-sectional study, which was conducted in a single center on the Mediterranean coast of Turkey. Data were collected using two instruments: a "General Characteristics of Fishers Form," developed by the researchers based on relevant literature, and the Turkish version of the Nordic Occupational Skin Questionnaire-Long (NOSQ-2002/Long). Univariable analysis of eczema status was performed using the chi-square test, while a multivariable binary logistic regression model assessed the factors associated with eczema.

Results: All participants were male, with a mean age of 40.13 (±11.62) years. The median daily working time was 15 (12–16) hours, and their median experience in fishing was 17 (10–25) years. The prevalence of eczema in the last six months was 52.9% (n = 63). Significant risk factors for eczema included being under 40 years of age, being married, poor health status, and having a family member who was a fisher.

Conclusion: This study highlights the high prevalence of eczema among sea fishers and identifies work-related risk factors that contribute to its development. Future large-scale studies are recommended, along with preventive interventions to raise awareness and reduce the occurrence of occupational eczema.

Keywords

occupational exposure, skin disease, fisheries, prevention, contact dermatitis, hand eczema

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Introduction

Occupational skin diseases represent significant public health issues that require careful attention. These conditions encompass a wide range of diseases, including occupational allergic contact dermatitis, contact urticaria, vitiligo, skin cancers, and other occupational skin disorders.[1] They are generally classified into two categories: "skin cancers and precancerous skin conditions" and "non-cancerous skin diseases," such as eczema or contact dermatitis.[2]

In Turkey, at least 100,000 new cases of occupational skin diseases are expected to be diagnosed annually; however, many cases go unreported due to challenges in diagnosis.[3] For instance, an occupational safety and

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health profile study conducted in Turkey in 2014 found that only six out of 494 documented cases of occupational diseases involved skin disorders.[4]

Contact dermatitis accounted for approximately 90% of all occupational skin diseases in the 1990s.[5] As anticipated, commercial fishers are considered a high-risk group for these conditions. Local studies have indicated that at least half of commercial fishers experience skin diseases, such as contact dermatitis.[6,7]

The causes of dermatitis are varied, including exposure to ionizing radiation, chemicals, animal waste, extreme temperatures, and infectious diseases.[3] Commercial fishers are routinely exposed to these risk factors in their daily work. As primary providers of fish, which is vital for human nutrition, the health of fishers—including their susceptibility to skin diseases—has significant implications not only for their well-being but also for public health.

Turkey, located in the Middle East, is surrounded by seas on three sides, making commercial fishing a widespread industry across the country. Thus, diagnosing and preventing occupational skin diseases among fishers is critical for public health. However, studies examining occupational eczema in fishers are scarce. The aim of this study is to assess the prevalence of occupational eczema among commercial fishers and to identify factors associated with its occurrence, while also suggesting methods to raise awareness of occupational skin diseases.

Methods

Selection of study sample

This cross-sectional study was conducted in Karataş district, located in Adana province on the Mediterranean coast of Turkey, where fishing serves as one of the primary sources of income. A total of 193 fishers were registered with the Karataş District Aquaculture Cooperative. The target sample size was calculated as 128 fishers, based on an expected frequency of 50%, a 95% confidence interval, and a 5% Type I error margin. Ultimately, 119 fishers participated in the study.

Data collection tools

Data for the study were collected through face-to-face interviews conducted by two public health resident physicians. Two instruments were used: the "General Characteristics of Fishers Form," developed by the researchers based on relevant literature, which captured sociodemographic details such as age, gender, education level, and marital status; and the Turkish version of the Nordic Occupational Skin Questionnaire-Long (NOSQ-2002/Long). The NOSQ-2002/Long was employed to assess occupational skin diseases. Developed by the Nordic Working Group, the questionnaire consists of 57 questions divided into 10 distinct dimensions: General (G) – demographic and occupational history; Atopy (A) – history of atopic symptoms; Dermatitis (D) – self-reported hand and forearm eczema; Factors (F) – impact of dermatoses on quality of life; Consequences (C) – effects of dermatoses on quality of life; Urticaria (U) – self-reported contact urticaria on hands or forearms; Symptoms (S) – skin symptoms; Tests (T) – skin tests; Exposure (E) – exposures; and Health/Household (H) – general health and household size.[8] Esin and Aktaş adapted the questionnaire into Turkish, making it suitable for use in the Turkish adult population under the name Turkish NOSQ (T-NOSQ).[9]

Statistical analysis

All analyses were performed using SPSS 28.0 for MacOS. Descriptive statistics for categorical variables were expressed as number (n) and percentage (%). Continuous variables were assessed for normality using the Kolmogorov-Smirnov test and reported as median and interquartile range (25th–75th percentiles) [for the age variable, both mean (standard deviation) and median (25th–75th percentiles) were provided]. The chi-square test was used for univariable analysis of eczema status, while ordinal data were analyzed using the chi-square trend test. Fisher's exact test was employed for variables not meeting the assumptions of the chi-square test. A multivariable binary logistic regression model was used to assess factors related to eczema. Independent variables with a p-value of less than 0.250 in the univariable analysis were included in the model. Two models were generated using the backward stepwise-conditional method: Model 1 included all variables with $p < 0.250$ from the chi-square analysis (age, marital status, health status, other fishers in the family, history of an occupational accident, daily working hours, use of protective gloves, and use of long-sleeved clothing), while Model 2 was the final model, including only the variables found to be significant. Model 2 comprised age, marital status, health status, and having another fisher in the family. Risk was measured using odds ratios (OR) with 95% confidence intervals (CI), and a Type I error (α) of 0.05 was considered statistically significant.

Results

All fishers were male, with a mean age of 40.13 ($\pm$11.62) years. The median daily working time was 15 (12–16) hours, and their median experience in fishing was 17 (10–25) years. The prevalence of eczema within the last six months was 52.9% ($n = 63$). Significant risk factors for eczema included being under 40 years old, being married, having a history of poor health, and having a family member who was also a fisher.

Based on the NOSQ-2002 questionnaire, 51 participants (42.9%) reported having had skin lesions in the past six

months, with 19 (40.4%) of these lesions remaining unresolved since their onset. At the time of the study, 63 participants (52.9%) had eczema. Eczema was present on both the hands and forearms in 28 participants (23.5%), on the hands only in 19 participants (16.0%), and on the forearms only in 16 participants (13.4%). A seasonal analysis revealed that these cases of eczema occurred most frequently in summer (31 cases, 70.5%), while no instances were reported in autumn (0 cases, 0%) [n = 44].

The reported causes of hand eczema included exposure to seawater (15 participants, 31.9%), animal waste (11 participants, 23.4%), the use of protective gloves (12 participants, 25.6%), temperature (6 participants, 12.8%), fishing nets (2 participants, 4.2%), and unknown etiology (1 participant, 2.1%), based on the responses of 47 fishers. Similarly, the perceived causes of forearm eczema were seawater (23 participants, 52.2%), temperature (10 participants, 22.8%), animal waste (9 participants, 20.5%), and fishing nets (2 participants, 4.5%), according to 44 fishers.

Table 1. Comparing eczema Status with sociodemographic features of participants.

	Eczema				
	Present		Absent		
Variables	n	%	n	%	p
Age					
<40 years	37	61.7	23	38.3	0.054
≥40 years	26	44.1	33	55.9	
Education					
Primary school or less	39	51.3	37	48.7	0.966
Middle school	15	62.5	9	37.5	
High school or more	9	47.4	10	52.6	
Marital Status					
Married	51	56.0	40	44.0	0.222
Single	12	42.9	16	57.1	
Having Children					
≤2 children	39	52.0	36	48.0	0.788
>2 children	24	54.5	20	45.5	
Health Status					
Good	10	40.0	15	60.0	**0.003**
Medium	35	47.9	38	52.1	
Bad	18	85.7	3	14.3	
Chronic Diseases					
Present	21	58.3	15	41.7	0.438
Absent	42	50.6	41	49.4	
Drinking Alcohol					
Yes	42	54.5	35	45.5	0.635
No	21	50.0	21	50.0	
Smoking					
Yes	31	56.4	24	43.6	0.488
No	32	50.0	32	50.0	
Other Fisher(s) in the Family					
Present	56	58.3	40	41.7	**0.016**
Absent	7	30.4	16	69.6	

Bold values are statistically significant.

Sociodemographic features and eczema status were compared in Table 1. Eczema was more common in fishers under 40 years of age compared to older participants (p = 0.054). Eczema status was also significantly associated with health status, with healthier fishers having a lower risk of eczema (p = 0.003). For other variables, no significant differences in eczema prevalence were observed (p > 0.050).

Occupational features and eczema status were compared in Table 2. Eczema was significantly more common among fishers with a history of occupational accidents compared to those without (p = 0.019). Additionally, fishers who had at least one other family member working as a fisher had a higher frequency of eczema than those without (p = 0.016). Other occupational factors were not significantly associated with eczema status (p > 0.050).

Table 3 showed that the multivariable analysis of eczema related factors. In the final model (Model 2), four risk factors were found to be statistically significant. Fishers under 40 years of age had a higher risk of developing eczema compared to older participants (OR = 3.360, p = 0.015). Married fishers had a greater risk of eczema than single fishers (OR = 3.983, p = 0.014). Poor health status was strongly associated with an increased risk of eczema

Table 2. Comparing eczema status with occupational features of participants.

	Eczema				
	Present		Absent		
Variables	n	%	n	%	P
History of Occupational Accident					
Present	30	66.7	15	33.3	**0.019**
Absent	33	44.6	41	55.4	
Social Insurance					
Present	25	46.3	29	53.7	0.186
Absent	38	58.5	27	41.5	
Income Status per Month					
Minimum Wage or less	21	60.0	14	40.0	0.319
More Than Minimum Wage	42	50.0	42	50.0	
Title					
Captain	23	53.5	20	46.5	0.928
Crew	40	52.6	36	47.7	
Using Hat in Working					
Yes	36	52.2	33	47.8	0.844
No	27	54.0	23	46.0	
Using Protective Gloves in Working					
Yes	59	54.6	49	45.4	0.248
No	4	36.4	7	63.6	
Using Long Sleeve Outfits					
Yes	29	46.8	33	53.2	0.160
No	34	59.6	23	40.4	
Using Sun Protection Cream					
Yes	2	100.0	0	0.0	0.498*
No	61	52.1	56	47.9	

*Fisher exact test.
Bold values are statistically significant.

Table 3. Multivariable analysis of eczema related factors.

	Model 1[a]			Model 2[b]		
Variables	OR	95%CI	p	OR	95%CI	p
Age						
≥40 years	1 (ref)			1 (ref)		
<40 years	**3.122**	**1.153–8.452**	**0.025**	**3.360**	**1.268–8.902**	**0.015**
Marital Status						
Single	1 (ref)			1 (ref)		
Married	**3.688**	**1.158–11.743**	**0.027**	**3.983**	**1.330–11.930**	**0.014**
Health Status						
Good	1 (ref)			1 (ref)		
Medium	1.804	0.629- 5.172	0.273	1.886	0.678–5.241	0.224
Bad	**11.328**	**2.171–59.107**	**0.004**	**12.043**	**2.483–58.414**	**0.002**
Other Fisher(s) in the Family						
Absent	1 (ref)			1 (ref)		
Present	3.102	0.951–10.118	0.060	**3.279**	**1.081–9.946**	**0.036**
History of Occupational Accident						
Absent	1 (ref)					
Present	1.334	0.518–3.439	0.551			
Working Time per day						
<15 h	1 (ref)					
≥15 h	1.100	0.416–2.909	0.848			
Using Protective Gloves in Working						
No	1 (ref)					
Yes	1.901	0.427–8.461	0.399			
Using Long Sleeve Outfits						
Yes	1 (ref)					
No	1.837	0.769–4.387	0.171			
Model Fit Indexes (Method: Backward Stepwise-Conditional)	$R^2 = .227$(Cox&Snell), .303(Nagelkerke), $X^2(8) = 4.530$ p > .05 (Hosmer&Lemeshow)			$R^2 = .205$(Cox&Snell), .273 (Nagelkerke), $X^2(7) = 2.664$ p > .05 (Hosmer&Lemeshow)		

[a]Model 1: Age, Marital Status, Health Status, Other Fisher(s) in the Family, History of Occupational Accident, Working Time per day, Using Protective Gloves in Working, Using Long Sleeve Outfits.
[b]Model 2: Age, Marital status, Health status, Other Fisher(s) in the Family.
OR: Odds Ratio; CI: Confidence Interval; ref: Reference.
Bold values are statistically significant.

compared to good and moderate health (OR = 12.043, p = 0.002). Moreover, having at least one other family member who was a fisher also increased the risk of eczema (OR = 3.279, p = 0.036).

Discussion

Fishers are at an elevated risk of developing occupational skin diseases, such as eczema, due to their exposure to harsh environmental conditions. In this cross-sectional study, the prevalence of skin lesions among fishers was found to be 42.9%, with a substantial portion (40.4%) of these lesions being persistent.

In our study, the prevalence of eczema among fishers over the past six months was 52.9%. Logistic regression analysis revealed that being under 40 years old, being married, having a history of poor health, and having a family member who was a fisher significantly increased the risk of developing eczema. Similarly, a study involving 110 fishers in Indonesia reported a contact dermatitis prevalence of 45.5%.[6] Another study conducted in Italy using the NOSQ found that fishers commonly experienced transient itchy wheals, particularly on their hands, wrists, and forearms, with an eczema prevalence of 8.4%.[10] In our study, the prevalence of hand eczema was 16.0%. In contrast, a community-based cross-sectional study conducted in Denmark in 2022 reported a hand eczema prevalence of 7.3%.[11] A study from Norway examining the general population aged 20 years and older found a hand eczema prevalence of 11.3%, with 4.8% of cases being work-related.[12] Among workers in the agricultural sector, a study using the NOSQ reported that the frequency of hand dermatitis was 13.4%.[13] In a one-year study conducted in Turkey at a single dermatology centre, it was found that the prevalence of contact dermatitis was 8.5% in patients of all age groups.[14] In our study, eczema prevalence was notably higher among participants who rated their health as poor and those with family members in the fishing industry. A

study by Yüksel et al. in Denmark similarly highlighted that the prevalence and severity of eczema negatively impacted health-related quality of life.[15] Although there is limited data on the increased occurrence of eczema among individuals with family members in the fishing industry, it is hypothesized that earlier and more frequent exposure to fishing environments may contribute to this elevated risk. As seen in recent studies, the prevalence of eczema has been high in fishers compared to the general population. This has been thought to be due to a few factors, including harsh environmental conditions and work-related factors.[16,17]

Our study also assessed the working conditions and occupational factors of fishers. It was observed that fishers worked up to 15 h per day, with limited use of personal protective equipment, such as gloves and hats. Among participants, 37.8% reported having experienced an occupational accident, and eczema was significantly more prevalent among those with a history of such accidents. The primary factors contributing to eczema among fishers were identified as exposure to seawater, the use of gloves, animal waste, temperature, and fishing nets. Similarly, a study conducted in Morocco on the occupational risk perception and psychological status of fishers reported an average daily working time of 11.2 h.[16] Another study on Norwegian fishers found that they worked continuously for 9 to 12 h during the busy season, with 11.6% reporting occupational injuries and 5.6% suffering from skin problems, including eczema and rashes.[17] Fishers are not only at a disadvantage for skin diseases, but also for diseases that have higher rate of morbidity and mortality. It was found that fishers were at higher risk of developing 11 of 14 diseases, including hypertension, diabetes mellitus, dyslipidaemia, and depression, compared to farmers and working laborers in a retrospective cohort study conducted in Taiwan.[18] Our study and recent other studies have suggested that fishers have unfavourable and high-risk working conditions.

Our study revealed that the use of personal protective equipment among fishers was insufficient. Protective gloves were the most commonly used equipment, with 90.8% of fishers reporting their use. This was followed by the use of hats (58%) and long-sleeved clothing (52.1%). The use of sunscreen or protective creams was extremely rare, reported by only 1.7% of participants. Similar to our findings, there are studies reporting that the use of personal protective equipment is not sufficient. In a community-based investigation investigating occupational hand skin diseases in seafood workers, hand dermatitis was found to be significantly higher in seafood workers than in the control group, and it was stated that not wearing waterproof gloves increased the frequency of hand dermatitis together with long daily working hours and long occupational history.[19] Studies using the NOSQ among agricultural workers have demonstrated that regular glove use is protective against hand eczema, while those not using personal protective equipment have a 2.5-fold increased risk of developing occupational dermatitis.[13,20] However, in some cases, improper or prolonged glove use may increase the risk of hand eczema. In our study, hand eczema was seen more in those who used gloves regularly than in those who did not (54.6% vs 36.4%). The mean daily glove use time was 7.24 h and 53.8% used gloves for 8 h or more per day. Similarly, studies conducted on healthcare workers using the NOSQ indicate that 76% of participants stated that protective glove material made of natural rubber/latex would worsen contact dermatitis and that excessive daily glove use increases the risk of hand dermatitis by 3.22 times.[21,22] The availability of personal protective equipment while working, as well as their proper use, is important for the protection of skin health and public health.

Strengths and limitations

The strength of the present study is that it is one of the few studies investigating occupational eczema in the work environment of fishers with a standard valid scale. It can provide public health and occupational disease professionals and dermatologists with up-to-date data on fisher's working conditions and exposure to occupational eczema.

Limitations of the study include its single-center nature, relatively small sample size, some questions being self-assessment, and being based on memory.

Conclusion

This study demonstrated that certain sociodemographic factors, extended working hours, insufficient use of personal protective equipment, unsafe working environments, and harsh environmental conditions are directly and indirectly linked to an increased risk of occupational eczema among fishers. Given the limited research on occupational skin diseases such as eczema in this population, further studies are urgently needed to better understand and address these risks.

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Statements and declarations

Ethical approval

Ethical approval was obtained from the Noninvasive Clinical Research Ethics Committee of Çukurova University Faculty of Medicine (2018/83).

Informed consent

The participants voluntarily agreed to participate in present study.

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Declaration of conflicting interests

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