Occupational Diseases and Environmental Medicine, 2024, 12, 265-272
https://www.scirp.org/journal/odem
ISSN Online: 2333-357X
ISSN Print: 2333-3561

Incidence of Acute Allergic Conjunctivitis in Workers at the Port of Santos

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How to cite this paper: Colombo-Barboza, F.D.P., Oliveira-Sales, E.B., Maquigussa, E., Colombo-Barboza, G.N. and Boim, M.A. (2024) Incidence of Acute Allergic Conjunctivitis in Workers at the Port of Santos. *Occupational Diseases and Environmental Medicine*, **12**, 265-272.
https://doi.org/10.4236/odem.2024.124019

Received: September 4, 2024
Accepted: October 27, 2024
Published: October 30, 2024

Abstract

Objective: To evaluate the incidence of acute atopic conjunctivitis in the port environment. Methods: This is a descriptive, retrospective study involving 365 worker patients from the Port of Santos and 365 patients not related with port activities (control group). All patients were seen at the same private hospital in the city of Santos. Data were obtained by reviewing the electronic medical records of each patient related to the admission exam (initial) and to any assistance due to ocular allergic symptoms (red eyes) between 2019 and 2021. The analyzed data included age, sex, port section (port workers), refraction, time of symptom onset, disease history, treatment, and clinical outcome. Data were statistically assessed by the Chi-square test. Results: All patents were male. The mean age (34 ± 12 vs 35 ± 11 years) and the prevalence of refractive errors were similar between groups. In contrast, ocular allergic symptoms were significantly higher in group of port workers (34%) compared with non-port workers (17%), $p < 0.0001$. Likewise, episodes related to ocular allergy were more frequent in port workers, $p < 0.05$. Workers with activities related to bulk handling were the most affected. Conclusions: The incidence of acute allergic conjunctivitis in port workers requires attention from health authorities. This may lead to prevention and a better understanding of the epidemiology of the disease.

Keywords

Refraction, Allergic Conjunctivitis, Port Activities

1. Introduction

Occupational allergic diseases (OAD) have an essential space among work-related

illnesses. Among the various predisposing and promoting risk factors for occupational allergies, the most important is the exposure time of worker to an allergen [1]-[4]. It is estimated that among all occupational diseases, 15% are characterized by allergic conditions that can affect various organs and tissues, including the eyes [5]. Allergic conjunctivitis is defined as an inflammatory response initiated by type I and type IV hypersensitivity reactions after exposure to an allergen [6] [7].

The severity of the allergic reaction that leads to allergic conjunctivitis is related to a diversity of environmental factors. Differential diagnosis can be made according to clinical findings, although some patients may eventually present findings of more than one type of allergic conjunctivitis, leading to diagnostic doubts [8]-[10].

Among the various work activities, port activity can potentially put the eye health of workers at risk due to its characteristics of handling substances capable of inducing allergic processes such as grains, fuels, fertilizers, chemicals, and other cargo. In particular, studies discussing the ocular health conditions of port workers are relatively scarce despite the economic relevance of this activity and the number of workers usually involved [11]-[14].

The Port of Santos, located in Santos city, is the largest in Latin America in size and diversity of departments and reached 147 million tons of products moved in the years 2019-2021, having a wide variety of products in circulation and employees as well [14] [15]. Thus, Port of Santos represents a broad risk to the health of workers due to conditions that favor the development of ocular problems, especially those related to allergic processes. These factors include a large amount of soot from bulk goods. Solid bulk cargo registered 82.1 million tons transported through the port of Santos in 2022. Also, volatile products from fertilizers, fuels, other chemicals, dust, and possible foreign bodies may affect the eyeball, triggering allergic and inflammatory processes [14] [15].

Ophthalmological problems related to allergic processes have enormous impact on both the health of workers, as they are generally recurrent processes, and also cause financial losses for companies, as they require employees to be away from their activities for days.

Considering the scarcity of data on the ocular health of port workers and the constant contact of these workers with potential allergens that may cause allergic conjunctivitis, it is essential to detect this manifestation in port workers so that protection and prevention measures can be implemented, which can imply better ocular health in this population.

This study aimed to evaluate the main ocular problems in the population of workers at the Port of Santos and the incidence of acute allergic conjunctivitis. A secondary goal is to evaluate refractive errors before and after joining the port environment.

2. Methods

This study was analyzed the medical records of 365 workers linked to the Port of

Santos, in the Santos city, who underwent pre-employment eye exams at the Visão Laser Ophthalmology Hospital in the city of Santos. A group of 365 patients seen at the same hospital whose work activity was unrelated to the Port was considered as the Control group. In addition to the admission exam, port and non-port workers were followed up for one year with periodic medical appointment.

Only patients with no ocular irritation or any ophthalmologic pathologies (except for refractive errors) at the pre-employment exam were included in the study. All exams were performed at the same ophthalmology hospital by experienced ophthalmologists. Due to the diagnostic difficulty, the ocular allergies were considered without their subclassifications.

The inclusion criteria for the control group patients were not being a worker in the port region, being male with matched age to port workers (between 23 and 55 years), and without comorbidities that could affect ocular health, such as diabetes. Patients with giant papillary conjunctivitis (related to contact lens or prosthesis use) and contact allergy were excluded.

Patients were evaluated through standardized forms that contained identification and demographic data (age, sex, race, origin), medical history (signs, symptoms, intensity, duration, exacerbation periods, and aggravating factors).

All the ophthalmological appointments in the emergency care of the enrolled patients were considered during the period of one year in order to evaluate the episodes of acute ocular allergies. In these occasions, we collected the complaints and diagnoses related to acute allergic allergies. Refractive data were recorded at the beginning and the end of the study period.

Statistical difference in the frequency of atopic allergic conjunctivitis between the two groups was determined using the Chi-square test. The significance level was at least 5% ($p < 0.05$).

3. Results

The average age of the patients was 34 ± 12 years in the control group and 36 ± 11 years in the group of port workers ($p > 0.5$), indicating that both groups were in the same age range. The primary refractive errors found in the control and port worker groups are presented in Table 1. Of the 365 port patients, 207 had eye problems related to refractive errors during the admission exam. The primary refractive errors found were myopia (58), hyperopia (48), presbyopia (56), and astigmatism (64). These values were similar between control and port workers groups and did not differ along the one year follow up (initial and final analyses).

Of the 365 patients from each group analyzed over two years, 123 from the port group and 61 from the control group sought emergency service with complaint of red eyes related to allergies ($p < 0.5$), as represented graphically in Figure 1.

Another difference that drew attention was the number of episodes of acute atopic allergic conjunctivitis presented by the two groups. As shown in Figure 2, of the 123 patients in the port group with red eyes, 78 had at least one episode of acute allergic conjunctivitis (63.4%, $p < 0.5$ vs control), 34 patients had two

episodes (27.6%), and 11 patients had three or more episodes of atopic conjunctivitis (8.9%). Of the 61 patients of the control group, 33 had 1 episode of atopic allergic conjunctivitis (54.1%), 22 patients had two episodes (36%), and six patients had three or more episodes of acute allergic conjunctivitis (9%). These data are represented in Figure 2.

Table 1. Refractive errors presented by Control group and Dockworkers at the first consultation (initial) and after two years followship (final).

	Emmetropia		Presbyopia		Myopia		Hyperopia		Astigmatism	
	initial	final	initial	final	initial	final	initial	final	initial	final
Control group	219*	201	62	78	65	66	52	53	78	81
Dockworkers	207	194	56	59	58	62	48	50	64	68

*Number of patients.

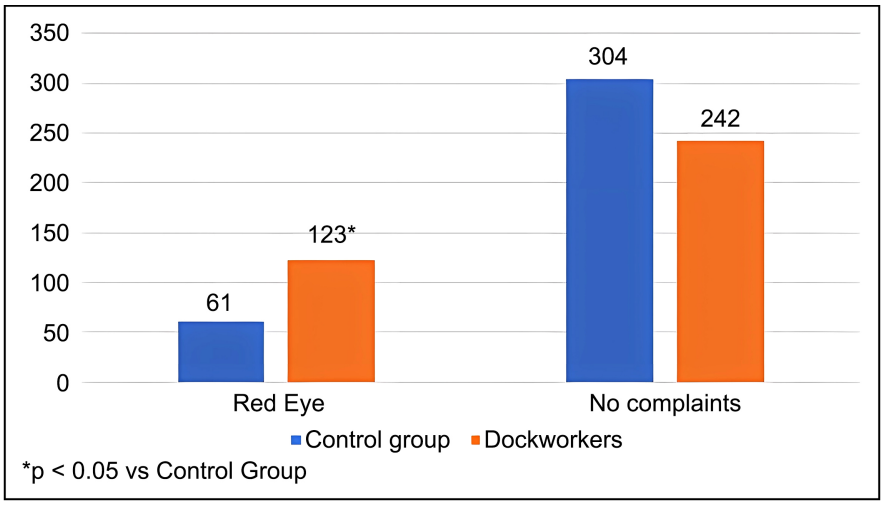

Figure 1. Incidence of red eyes by control group and dockworkers.

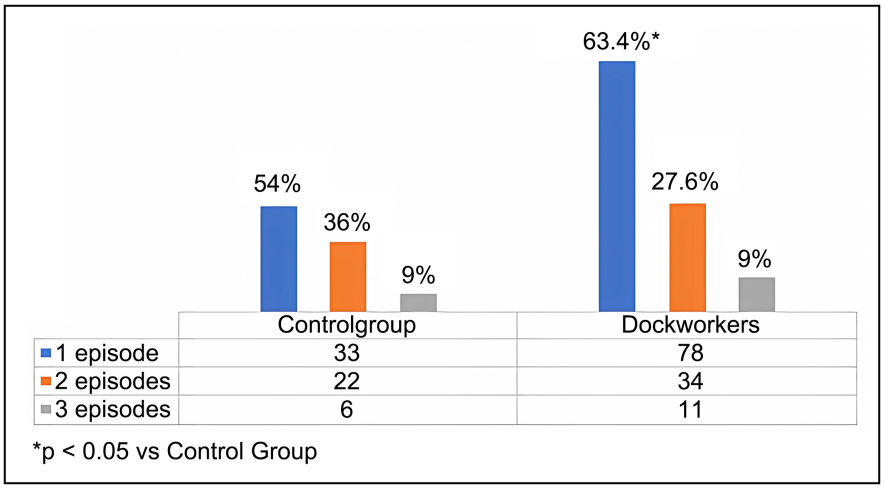

Figure 2. Episodes of allergic conjunctivitis by control group and dockworkers.

Regarding the working area, most of the 123 patients, 50% worked with bulk product handling, 27% of the patients worked with containers, and 23% worked in administrative roles (Figure 3).

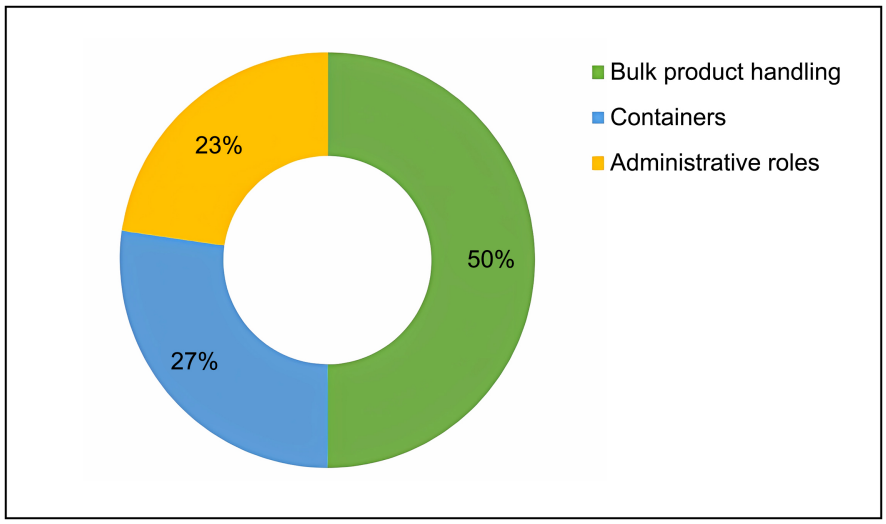

Figure 3. Percentage of patients evaluated who work in different port areas.

4. Discussion

The port environment, including Port of Santos, can be a very conducive place for the appearance of factors and sanitary conditions that favor the development of ocular problems. Particularly, handling a large amount of soot from bulk goods, volatile products from fertilizers, fuels, and other chemicals, as well as dust and possible foreign bodies that may meet the eye globe, the port environment is a high-risk location for the development of allergic and traumatic ocular processes [16]-[20].

In our port population, we found 34% of patients with at least one acute episode of ocular allergy and this prevalence was significantly higher than that observed for the control non-port workers (17%), which was similar to observed in the Brazilian population (20%) [20]. Taken together our results clearly showed that the prevalence of acute ocular allergy is higher in the port worker than in general Brazilian population.

Previous studies conducted in other ports in Brazil and abroad, also reported that the port environment may be an important risk factor for the development of atopic conjunctivitis. A study published in 2019 evaluated port workers in southern Brazil [21] and showed a similar percentage of manifestations of "red eye" symptoms (36%) in dockworkers found in the present study.

These results may reflect not only the presence of aggressive agents to the eye, typical of the port environment, but also the requirements regarding the use of personal protective equipment (PPE), the resistance and inadequacy in the use of this equipment by workers, as well as its use in different port environments. However, these assumptions need further evaluation.

In this context, it was interesting to observe in our study that the highest incidence of allergic processes occurred in the group of workers who work in the bulk area (50%), followed by the container area (27%) and administrative (22%). This result is expected because the dust of bulk products consists mainly of particulate matter, which can harm the eye in a relevant way. Particulate matter encompasses a set of pollutants consisting of dust, fumes and all kinds of solid and liquid material that remains suspended in the atmosphere because of its small size. Thus, the probability of these particles coming into contact with the eye and harming it is high, especially if the worker is not properly using PPE.

Safety equipment, such as sealed goggles, can reduce the number of particles on the eye's surface, promoting better prevention of the inflammatory condition compared to goggles without seals in the port environment. Therefore, it is essential to monitor the use of PPE, especially individual protective goggles, as this is a way to prevent the injuries that this type of environment can cause, which implies a work of awareness among these professionals. This awareness work is relevant because the risk of injury increases exponentially when PPE is not used in daily work [20] [21].

Regarding the refractive errors, we did not find any differences in one-year follow-up between groups, indicating that the port activity does not interfere with refractive problems.

5. Conclusion

The incidence of ocular allergic episodes was higher in port workers than in the general population, indicating that the environment of the Port of Santos, as well as other ports, provides a higher risk of developing atopic conjunctivitis.

In order to improve eye health in this population, is essential to adopt some safety measures, such as the continuous and proper use of protective equipment, screening the population predisposed to the development of problems related to allergic processes and adequacy of ophthalmological treatment are recommended.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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