

## Research Article

# Prevalence and Factors Associated with Perioral Lesions in Beach Workers

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Received: July 25, 2014; Accepted: December 10, 2014; Published: January 05, 2015

## Abstract

**Background:** The ultraviolet radiation is the principal cause of appearance of skin diseases, especially in the face. The perioral region is one of the most neglected areas in regards to sunscreen.

**Objectives:** To evaluate the prevalence and potential factors associated with perioral lesions resulting from sun exposure in beaches workers.

**Methods:** Workers from urban beaches of a city in Northeast Brazil completed a questionnaire containing personal, occupation and health data. Clinical examinations were performed in the perioral region to identify lesions due to sun exposure.

**Results:** 362 workers were examined and approximately one third (36.8%) were affected by perioral lesions. Male workers (66.3%) and light brown skin workers (35.5%) were diagnosed with lesions. Photoprotection was reported by 81.8%, among which sunscreen (44.9%) and cap / hat (67.4%) were related. Approximately 26.2% smoke and 41.7% consume alcoholic drinks. Gender was associated with perioral lesions.

**Conclusion:** It was observed high prevalence of perioral lesions in subjects exposed to the sun and the female gender was the only variable associated with its occurrence.

**Keywords:** Prevalence studies; Ultraviolet radiation; Perioral lesions

## Introduction

Many climatic and geographical factors may further increase the number of cases of skin cancer and other diseases related to sun exposure. Urban and tourist centers located in regions near the Equator may be cited among the geographical factors. Rio Grande do Norte, located in the “corner” of the South American continent’s east coast, is known for its sunny days. The incidence of harmful UVB is greater in tropical countries, with Brazil exhibiting the highest UV ray levels in the world [1]. This favors the development of oral and perioral lesions, such as skin cancer, actinic cheilitis, and epidermoid carcinoma of the lips [2].

Workers from various occupational groups stand out as being more susceptible to photodamage. People who work outdoors can receive 6-8 times more the dose of UV radiation than individuals working in closed places [3]. Consequently, they are most susceptible to the development of dermatological entities. “Outdoor workers” have been linked to higher risk of being affected by squamous cell carcinoma and possibly other forms of skin cancer [4,5,6,7]. In general, Occupational Medicine and Dentistry does not use this epidemiological knowledge enough as a starting point for prevention programs in the workplace.

Even before the volume of data and studies on skin lesions and labial mucosa resulting from sun exposure, the pathogenesis of these diseases was not clear. The consensus, however, is that the development of these entities is not a simple process. The natural history of these diseases is the result of several intrinsic factors and extrinsic risk to

humans; acting independently, synergistically or antagonistically to produce or not produce changes. As a result of long, repeated, intermittent exposure to these risk factors, potentially malignant lesions may progress into invasive cancers. In this perspective, this study aimed to determine the prevalence of perioral lesions resulting from sun exposure in workers of urban beaches of Natal / RN - Brazil and investigate potential associations to sociodemographic, occupational and general health.

## Methods

Workers from the beaches of Ponta Negra, Redinha, Meio, Forte and Artistas of Natal / RN - Brazil were the subjects enrolled in the study. The research project was submitted to and approved by the research ethics committee from the Federal University of Rio Grande do Norte, protocol No. 122/09. The sample was composed of both males and females, since they also are involved in a good proportion of the activities likely to receive sunlight and actively participate in the work, whether formal or informal. After signing the consent form, a previously validated questionnaire containing information concerning personal data, occupation information and health was completed according to the responses of volunteers. The validation process involved three steps. The first step was conducted for by searching the literature followed by an evaluation of pathologists, dermatologists and epidemiologists, and finally a trans-cultural adaptation of the form to be a part of the survey (50 subjects).

Students currently enrolled in the course of Dentistry and Medicine were responsible for identifying perioral lesions (Kappa

0.68-1.00). They participated in standardized/regulated/corroborated workshops to ensure uniformity in diagnosis. After completing the questionnaire, clinical examinations were performed by researchers, the region bounded by the nose-labial folds and chin area, through inspection and palpation, in clockwise order to identify and clinically diagnose the lesions. The patients diagnosed with malignant or potentially malignant lesions were sent to service for probable histopathology diagnoses. Cameras were used to improve the visibility to ratify the diagnosis. During the clinical examination, the following factors were considered: dryness, atrophy, scaly lesions, swelling, erythema, ulceration, blurred demarcation between the lip vermilion and skin, white patches or plaques, crusts or stained areas with pallor.

A pilot study was done considering 10 % of the sample size. We took the observation of individuals who worked for two consecutive weekends last summer as a basis of study. Two researchers involved in the study were at the sampling sites. A consensus was reached and recorded on the number of individuals who worked in that period. 1200 individuals were observed working in that space of time in the places involved in the study. Thus, the sample for the pilot study was 120 subjects. In the pilot study, 112 workers were examined at the beaches and, thus, the prevalence of lesions discussed in this study was obtained for the effective calculation of the sample. From the prevalence in the pilot study concerning cold sores lesions (36.6%), considering a margin of error of 5% and response rate of 20%, the sample size of 285 individuals was reached. The prevalence of labial lesions served as the basis for being less than the perioral since the sample was calculated based on the sampling design of the study "Prevalence and factors associated with cold sores lesions and perioral resulting from sun exposure in workers of beaches [9]."

The independent variable all obtained through the questionnaire were: age, gender, income, actual years of study at the individual level, type of work, the frequency of sun exposure, daily and weekly time of sun exposure, the cumulative time of sun exposure and photoprotection measures at an occupational level. Finally, information was collected on health status, habits (smoking and drinking), and they were classified according to the number of cigarettes smoked in the past thirty days, and beverage consumption in standard doses. Skin type was also researched according to the Fitzpatrick classification [10] as very clear, clear, less clear, light brown,

dark brown and black. The presence of perioral lesions resulting from sun exposure was the dependent variable.

The collected data were imported into the STATA 10.0 platform. Next, the descriptive analysis of all data on the dependent and independent variables was performed (mean, median, standard deviation, absolute and relative frequencies), along with the Chi-square, calculated prevalence ratios and confidence intervals statistical tests. A significance level of 5% was considered for all tests.

## Results

A cross-sectional study was carried out that provides important insight for understanding the extent and severity of perioral disease resulting from exposure to sunlight and allows for the verification of the association of certain factors with their appearance. From the operational point of view, it is an individualized study. Regarding the position of the investigator, it is an observational study and considering the temporal reference, it is classified as a transversal study [8].

Results for 362 workers were obtained. It was observed that most of the sample was male (72.6 %), at approximately 37 years of age, income of R\$510.00 (monthly) and six years of education (Table 1). The population works directly exposed to the sun (outdoor), informally, for 6 hours a day, 5 days a week, for 8 months a year, and the most of them use some means of photoprotection for the perioral region (80.1%), highlighted by the cap/hat (66.2 %) and sunscreen (41.6%).

A fourth sample related to smoking (24.9%), and more than half of the related sample don't consume alcoholic drinks (59.9%). According to the Fitzpatrick's scale, light brown color (35.5%) and dark brown (30.4%) predominated. Photoprotection was reported by 81.8% of workers with lesions, among which sunscreen (44.9%) and cap / hat (67.4%) stood out. In total, 412 lesions were diagnosed in 258 workers. Approximately one third (36.8 %) of the workers were affected by perioral lesions. Considering only the group of perioral lesions, ephelides and solar lentigo had the higher occurrence. Cutaneous horn and lentigo maligna melanoma had a lower prevalence (Figure 1).

It was observed that female workers had significantly higher incidence of perioral lesions when compared to men. Most people

**Table 1:** Sample description according to sociodemographic and occupational variables. Natal, Brazil, 2014.

Variable						
<b>Sociodemographic</b>	n	Mean ± sd	Median	Chi 25-75	Min	Max
Age	355	37.17 ± 11.88	37.00	27.00 - 45.00	18.00	68.00
Years of schooling	355	6.49 ± 3.98	6.00	4,00 - 10,00	0	17.00
Income	337	686.02 ± 477.92	510.00	400.00 - 800.00	50.00	4200.00
<b>Occupational</b>	n	Mean ± sd	Median	Chi 25-75	Min	Max
Start time	361	8.62 ± 1.37	9.00	8.00 - 10.00	5.00	13.00
Finishing time	361	15.84 ± 1.98	16.00	14.00 - 17.00	8.00	24.00
Daily exposure time (hours)	361	5.89 ± 1.26	6.00	7.00 - 6.00	0	7.00
Weekly sun exposure (days)	361	4.76 ± 2.17	5.00	2.50 - 7.00	1.00	7.00
Exposure (years)	361	10.07 ± 9.66	8.00	3.00 - 15.00	0.08	60.00
Exposure (months)	361	121.27 ± 115.60	96.00	180.00 - 36.00	1.00	720.00

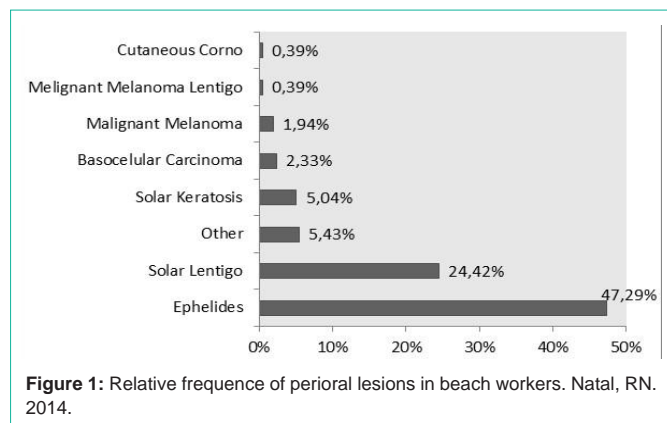


Figure 1: Relative frequency of perioral lesions in beach workers. Natal, RN, 2014.

up to 37 years old, up to 6 years of education and with an income less than R\$510.00 also presented higher occurrence of lesions, however, this was not statistically significant (Table 2).

Table 2: Frequencies, chi<sup>2</sup> test, p-value, prevalence ratios (PRs) and respective confidence intervals (IC) for perioral lesion associated with sociodemographic, occupational and general health variables. Natal, RN, 2014.

Variable	Presence of perioral lesion					
	n	%	Qui <sup>2</sup>	p value	PR	IC (95%)
<b>Sex</b>						
Male	124	47.1	7.184	0.007	0.741	(0.609-0.902)
Female	63	63.6				
<b>Age</b>						
37 years and older	84	49.4	0.444	0.505	0.923	(0.754-1.131)
Up to 37 years	99	53.5				
<b>Years of schooling</b>						
Up to 6 years	101	53.2	0.296	0.586	1.070	(0.873-1.311)
6 years and over	82	49.7				
<b>Income in dollars</b>						
Up to \$ 510.00	93	54.1	0.130	0.718	1.050	(0.857-1.285)
\$ 510.00 and over	85	51.5				
<b>Worker</b>						
Outdoor	162	50.9	0.325	0.569	0.897	(0.678-1.185)
Indoor	25	56.8				
<b>Daily exposure</b>						
6 hours and over	78	50.6	0.073	0.786	0.962	(0.786-1.178)
Up to 6 hours	109	52.7				
<b>Weekly exposure</b>						
5 days and over	90	50.3	0.132	0.716	0.953	(0.780-1.165)
Up to 5 days	96	52.7				
<b>Accumulated exposure</b>						
8 years and over	89	54.9	1.135	0.287	1.127	(0.923-1.376)
Up to 8 years	97	48.7				
<b>Photoprotection</b>						
No	34	47.2	0.504	0.478	0.895	(0.685-1.169)
Yes	153	52.8				
<b>Sunscreen use</b>						
No	103	48.8	1.536	0.215	0.872	(0.715-1.063)
Yes	84	56.0				
<b>Use of a Cap/Hat</b>						
No	61	50.0	0.143	0.706	0.948	(0.766-1.175)
Yes	126	52.7				
<b>Skin type</b>						
Fair	64	55.7	0.722	0.395	1.108	(0.902-1.362)
Dark/Black	122	50.2				
<b>Habit</b>						
Yes	100	54.6	1.092	0.296	1.124	(0.920-1.374)
No	87	48.6				
<b>Alcohol consumption</b>						
Yes	78	53.8	0.311	0.577	1.071	(0.876-1.309)
No	109	50.2				
<b>Smoking</b>						
Yes	49	54.4	0.239	0.625	1.073	(0.859-1.340)
No	138	50.7				

## Discussion

To understand and analyze the factors related to the development of diseases, it's necessary to refer to the knowledge of the socioeconomic, environmental and political determinants of health in a given community. Instead of considering only the concept of etiology and risk factors which are restricted to the biological aspects of individual character, the studies must turn to the characteristics of collectivity determinants [11].

Malignant lesions in the skin are the most frequently reported in the literature. Skin cancers are the most common malignant tumors in Brazil and the United States, where they account for 20-30 % of cancers in Caucasians, 2-4 % in Asians, and 1-2 % in Negros [12]. The worldwide incidence of non-melanoma skin cancer (basal cell carcinoma and squamous cell carcinoma) has grown 4-8 % annually since 1960. Three million cases of non-melanoma skin cancers and 132.000 melanomas are diagnosed each year worldwide. In Brazil, the

number of new cases of melanoma skin cancer in 2012 was estimated at 62,680 in men and 71,490 in women. These data represent an estimated risk of 65 new cases per 100000 in men and 71 per 100000 in women. In Rio Grande do Norte, an estimated 1,910 new cases for men and 1,980 for women in the year 2012 [13]. According to the data from this study, 36.8% from the sample was diagnosed with some perioral lesion and perioral ephelides (101.6/1000) was the most prevalent lesion.

The skin and lips are areas of risk to health if the direct effects from exposure to solar radiation are considered. In exposed workers without adequate protection or control measures for levels of solar radiation, the acceptable exposure limits may be exceeded. People with cumulative exposure to UV radiation with a number of severe burns received especially during childhood have increased risk of developing skin cancer. The outer layers of skin can become thicker after sun exposure and over the years can cause wrinkling and skin tightening. Individuals exposed to the sun may also experience immune system debility [14]. Melanoma, squamous cell carcinoma and basal cell carcinoma are the most important clinical pathologies among the lesions associated with sun exposure. A growing occupational exposure to sunlight has been linked to some types of cutaneous pathologies [15,16,17]. Repeated and prolonged exposure to sunlight for many decades can result in changes in skin aging, development of premalignant and malignant lesions [18].

In the evaluation of gender, the female subjects had significantly higher incidence of perioral lesions. Naturally, it is more likely that men occupy more jobs related to sun exposure, either due to resistance or need for greater strength/force [19,20,21,22]. Likewise, it is not surprising that they develop more skin and lip lesions when compared to women. The reality found is contradictory to that idea. Differences in risk behaviors related to the sun between occupations may partly reflect the habits of a local culture and type of photoprotection. In fact, women reported adopting significantly less photo protective measures when compared to men. The composition of the working groups differs considerably between genders. Women are more prevalent in studies of aquatic and recreation occupations, while men predominate in agriculture, services, construction, transportation, postal and ski industry [23].

A survey done in the city of Kasai - Japan showed that the prevalence of solar keratoses was significantly higher among men who worked directly exposed to the sun. Many male subjects performed activities related to agriculture [17]. In Kauai, Hawaii, Japanese women were diagnosed with non-melanoma skin cancer in a ratio of about 3 to 1 when compared to men. In that region, women were more likely to pursue outdoor activities such as gardening and agriculture [24]. Lucena et al. demonstrated that the prevalence of lip and perioral ephelides in beach workers is higher in female workers [25]. The gender, alcohol consumption and habits were significantly associated with the occurrence of skin diseases. Although the use of sunscreen was reported by most workers, it was observed that people who had some negligence with respect to the use of sun protection factors. In other words, poor or non-existent quality of protection could explain the high prevalence of diagnosed lesions.

The "sunscreen paradox" is an effect observed among individuals who are exposed to the sun. McCarthy et al. showed that bathers that

used sunscreen with higher SPF had a higher frequency of burning, when compared to those who used lower protection factor than those who used nothing [26]. Still in this perspective, Autler et al. concluded that increased numbers of nevi was associated with increased sun exposure and the use of a solar filter [27]. Inadequate protection factor arise if the sunscreen is very low compared to the duration or intensity of sun exposure and insufficient or no application is made prior to sun exposure. In the study, most workers who were protected showed higher occurrence of injuries when compared to individuals who did not adopt photoprotective measures. The way to implement these measures is of paramount importance for understanding the emergence of these lesions.

The number of indoor workers observed in this study was lower in comparison to the outdoor category. A larger sample of subjects in the former would permit better data distribution. Conducting data collection during the low season with less tourist traffic allowed for the participation of individuals who regularly worked at the locations studied. It was expected that most of the sample would have a significant work history [28].

## Conclusions

This study worked with some self-reported information, which may have generated some inquiries and questions about its results. The importance and validity of such information cannot be disregarded, even though its limitations are known. The variables relating to occupation and those who have made mention of the measures of photoprotection and habits are part of that context.

When considering the sample, a high prevalence of perioral lesions was found. Solar lentigo and ephelides were the most frequent injuries. The gender is the only variable that explains the higher incidence of perioral lesions in workers. Individual analysis of the lesion could more clearly demonstrate associations to the variables involved in the study. The development and continuation of these lesions remains unclear. Intermittent or continuous exposure to the sun can have distinct effects on the origin of these pathologies.

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