

# ACTINIC CHEILITIS: EPIDEMIOLOGICAL STUDY IN A RIVERINE POPULATION OF NORTHERN BRAZIL

## ABSTRACT

**AIM:** The aim of this survey was to assess the prevalence of AC in riverine population in countryside of Amazonas, northern Brazil. **MATERIAL AND METHODS:** Patients answered a questionnaire and were examined between January and December of 2008. Data were gathered on the following participant's characteristics: 1) age group; 2) gender; 3) ethnicity 4) outdoor activities (sunlight exposure); 5) smoking habits; 6) drinking habits; and 7) access to oral health services (the last dental visit). Clinical observation of the lips for determination of AC presence was used. Patients who presented clinical manifestation of moderate and severe AC were submitted to incisional biopsy to confirm the diagnosis. In case of a positive result after histopathological examination, patients were advised and appropriate treatment was offered. All patients received information about AC and its prevention. **RESULTS:** Among the 200 participants that were examined, the prevalence of AC was 2% (4 cases). Of all patients surveyed, women were the majority totalizing 124 patients (72.0%). According to age, 48 (24.0%) people were 20-34 year-old; 42 (21.0%) were 35-44-year-old; 50 (25.0%) were 45-60-year-old; and 60 (30.0%) were 61 or older. **CONCLUSION:** Even though AC was present in a low prevalence rate, an epidemiological variety is expected, once geographic and ethnic differences should be considered.

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## KEYWORDS

Epidemiology. Actinic cheilitis. Oral lesions. Ultraviolet rays.

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## INTRODUCTION

Actinic cheilitis (AC) is a lip lesion caused by solar radiation that occurs mostly in the lower lip, as this area is more directly exposed to sunlight than the upper one. It affects mainly fair skinned people, primarily Caucasian, especially men aged between 40 and 80 year-old, living in rural areas or outdoor workers<sup>1-4</sup>. It is considered a potentially malignant lesion since a squamous cell carcinoma (SCC) can arise on it<sup>5-7</sup>. Reports have found that the presence of AC increases in more than double the SCC risk in an individual, especially in light-skinned people<sup>8</sup>.

In an early lesion, the lip shows discoloration with pale or yellow areas as well as dryness and/or atrophy. After that, swelling of the lip with loss of the tenderness and elasticity and blurring of the demarcation between the lip vermilion border and the skin are seen. Some parts of or the entire vermilion of the lip may present rough, scaly, flaky keratotic patches<sup>5,9</sup>. In a more advanced stage, the keratotic patches progress to palpable thickening and induration and one or more of them may become clearly demarcated or may ulcerate. Shallow erosions and fissures may also be present and such changes are suggestive of malignant transformation<sup>9-11</sup>.

These clinical aspects reflect the variable histological changes along the progression of the lesion that range from atrophy or hyperplasia of the squamous cell

epithelium of the vermilion border, with varying degrees of keratinization, to high grade of epithelial dysplasia with cellular pleomorphism, disordered maturation, and increased mitotic activity. The next phase of these alterations is the called squamous cell carcinoma (SCC) that is recognized by the degradation of the basement membrane and invasion of these atypical cells into the lamina propria. SCC of the lip metastasizes much more frequently than analogous lesions elsewhere on the skin; a metastatic rate of 11% for SCC of the lip vs. a metastasis rate of 1% for SCC on sun-damaged skin has been reported in the literature<sup>12</sup>. For this reason, the early diagnosis of the AC as well as its careful follow up and adequate treatment, when necessary, is crucial for the prevention of SCC of the lips.

The north region of Brazil, which contains most of the Amazon rainforest, has the country's lowest population density (3.9 people per km<sup>2</sup>), is the second poorest region<sup>13</sup>, where most of the people are outdoor workers. Also the region is the most affected by solar radiation, once it is localized close to the Equator, with no further studies and information<sup>13</sup>. Based on the exposed above, the aim of this survey was to assess the prevalence of AC in countryside of Amazonas, northern Brazil.

## MATERIAL AND METHODS

The present study protocol was approved by the Local Ethics Committee and informed consent was obtained from all participants.

The sample was composed by 200 people from a riverine population in the countryside of Amazonas, northern Brazil. Patients answered a questionnaire and were examined between January and December of 2009. Oral health examinations were carried out by one well-trained dentist by two experienced researchers in carrying out clinical examinations for recording AC. Inclusion criteria for patients were: 18 year-old or older; living in the countryside and having an outdoor activity (work or leisure).

Data were gathered on the following participant's characteristics: 1) age group; 2) gender; 3) ethnicity 4) outdoor activities (sunlight exposure); 5) smoking habits; 6) drinking habits; and 7) access to oral health services (the last dental visit).

Clinical observation of the lips for determination of AC presence was used. Patients who presented clinical manifestation of moderate and severe AC were submitted to incisional biopsy to confirm the diagnosis. In case of a positive result after histopathological examination, patients were advised and appropriate treatment was offered. All patients received information about AC and its prevention.

Descriptive statistics was performed using frequency analysis for categorical variables and descriptive analysis for continuous variables.

## RESULTS

Among the 200 participants that were examined, the prevalence of AC was 2% (4 cases). Of all patients surveyed, women were the majority totalizing 124 patients (72.0%). According to age, 48 (24.0%) people were 20-34-year-old; 42 (21.0%) were 35-44-year-old; 50 (25.0%) were 45-60-year-old; and 60 (30.0%) were 61 or older. Other demographic results are presented in Table 1.

## DISCUSSION

Actinic cheilitis (AC) is a pathologic condition affecting mainly the lower lip and it is caused by chronic and excessive exposure to the ultraviolet radiation in sunlight<sup>10,14</sup>. This lesion can progress to squamous cell carcinoma but cannot always be clinically distinguished from it<sup>15</sup>. Despite of being a pre-malignant lesion, AC prevalence is not well known among population, once many cases are not diagnosed or notified. Moreover, an epidemiological variety is expected, once there are geographic and ethnic differences.

Consequently, there is not a consensus in literature, with prevalence rates varying from 0.2% to 30%<sup>10,16,17</sup>. Our findings in a

countryside population from northern Brazil showed an AC prevalence of 2%. These data are corroborated by Jorge et al.<sup>18</sup> in a study conducted with elderly institutionalized people in São Paulo, Brazil, with a prevalence of 2.6%. Even studying a white-skinned population, Kaugars et al.<sup>17</sup> found a prevalence rate of AC of 0.2%, showing that our rate was higher considering ethnicity of the studied population.

Additionally, according to Parkin et al.<sup>19</sup>, a rate of 2.2% was described in Goiania, Central Brazil, corroborating our findings with a similar black-skinned population. Martins-Filho et al.<sup>20</sup> analyzed a fair-skinned population in northeastern Brazil, and due to a difference in ethnicity of people, the prevalence rate found was 16.7%.

Table 1. Demographic information riverine population studied and the presence of AC. Amazon, 2009.

<i>Characteristics</i>		<i>n total (%)</i>	<i>n with AC (%)</i>
Age (years)	20-34	48 (24.0)	-
	35-44	42 (21.0)	-
	45-60	50 (25.0)	2 (50.0)
	> 60	60 (30.0)	2 (50.0)
Gender	Female	124 (62.0)	2 (50.0)
	Male	76 (38.0)	2 (50.0)
Skin color	Amerindian	136 (68.0)	-
	White	36 (18.0)	4 (100.0)
	Black	23 (11.5)	-
	Mulatto	05 (2.5)	-
Sunlight exposure	Yes	188 (94.0)	4 (100.0)
	No	12 (6.0)	-
Smoking Habits	Yes	34 (16.8)	2 (50.0)
	No	168 (83.2)	2 (50.0)
Drinking Habits	Yes	31 (15.4)	2 (50.0)
	No	171 (84.6)	2 (50.0)
Dental Visits	Never	-	-
	< 01 year	54 (27.0)	-
	> 01 year	50 (25.0)	-
	> 03 years	96 (48.0)	4 (100.0)

Skin color has been cited as a risk factor for AC, with white-skinned people presenting higher incidence of disease when compared to dark-skinned population<sup>15-17,21</sup>. This fact can explain the low prevalence of AC found in our study, even in riverine population exposed to solar radiation in a tropical area with high solar incidence close to Equator, once most individuals of the population studied was dark-skinned (Black and Amerindian). This effect is caused by a protective action of melanin in the basal layer of keratinocytes against solar radiation<sup>22-24</sup>. According to Yamaguchi et al.<sup>25</sup> there is an inverse relationship between melanin content and DNA damage induced by UV exposure. Besides, UV induced apoptosis was absent in white-skinned after low UV doses but was relevant in black-skinned, facilitating the effective removal of UV-damaged cells in dark skin. Consequently, white-skinned people have a less efficient mechanism for repairing genetic cells modified by UV radiation.

Solar exposure mechanism of cellular damage has been described in literature. Energy released by free oxygen radicals can break the phosphodiester bonds in the backbone of the DNA helix. When two of these breaks are close to each other, but on opposite DNA strands, a double-strand break is present in the DNA and the cell faces a particularly challenging situation for repair. This situation is not a simple process: to optimally repair

DNA damage, the cell must also control other cellular processes before or during the repair, such as DNA replication or mitosis. However, if a cell cannot deal with both mechanisms simultaneously, a permanent cellular harm can be installed, and daughter cell carrying this damaged DNA, can lead to cancer<sup>26</sup>.

Factors such as gender and age are also described in many reports. A classical profile of high-risk patient for AC is a man older than 50 year-old<sup>10,17</sup>. Although we have found the same proportion of male and female cases, men are more affected as described in many reports<sup>10,16,17,23</sup>. This can be explained by the preferential men's outdoor work being, in this way, more exposed to solar radiation, whereas women have an extra protective effect of cosmetics<sup>27-29</sup>. Moreover, authors have suggested that women are not often affected due to a protective barrier in combination with lipstick application<sup>30</sup>. Nevertheless, a study conducted in Germany observed similar results to ours in this proportion. A change may be occurring, once women are progressively getting more exposed to sunlight for occupational activities, such as in our study, the women presenting AC were farmers.

Age and cumulative solar radiation exposure time also have been identified as variables strongly associated with the development of AC. There is an agreement that most cases occur in people over 50 year-old<sup>20,31</sup>, and there is a direct relationship

between the number of years spent on sun exposure and the severity of the labial changes.

In a case-control study conducted in Spain, authors observed that early exposure to solar radiation increases at 14.6 times the probability of developing lip cancer<sup>32</sup>. A recent Brazilian study showed that 80% of farm workers were over 50 years of age at the time of diagnosis and that the prevalence of the disease among these people with more than 50 years of outdoor work was almost five times greater than those with less than 30 years. Authors have also suggested that AC increases in prevalence with increasing age<sup>16</sup>. It is important to highlight that young adults can have AC if they have a fair complexion and sufficient sun exposure<sup>15</sup>.

### CONCLUSION

This study provided information on epidemiological aspects of AC in a riverine population of countryside of Amazonas, northern Brazil. It is worthwhile to emphasize that not only the exposure to solar radiation is important but also the race of the people exposed. Even though AC was present in a low prevalence rate, an epidemiological variety is expected, once geographic and ethnic differences should be considered. Thus, local differences and prevalence should be analyzed before proposing preventive programs and public health policies for this specific population.

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