

Cutaneous melanoma in Latin America: a population-based descriptive study

Melanoma cutâneo na América Latina: estudo descritivo de base populacional

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Abstract

Cutaneous melanoma incidences vary between geographic regions and are a health concern for Caucasians and for all ethnic populations. In Latin America, data from population-based cancer registries of cutaneous melanoma incidence rates have rarely been reported. We searched the Cancer Incidence in Five Continents volume IX (CI5-IX) database for cutaneous melanoma and select cases by topography (C43) from 11 population-based cancer registries in Latin America. Between 1998 and 2002, a total of 4,465 cutaneous melanoma cases were reported in Latin America. The average age-standardized incidence rates (per 100,000 persons-year) was 4.6 (male) and 4.3 (female). This study presents an overview of cutaneous melanoma incidence in Latin America, highlighting the need to enhance coverage of population-based cancer registries in Latin America, to allow for a better understanding of this neoplasm in the region. Thus it can help in implementing primary prevention programs for the whole Latino population. At this point in time, early detection messages should target young women and older men in Latin America.

Melanoma; Neoplasms; Incidence

Introduction

Cutaneous melanoma incidence rates vary considerably between geographic regions and represent a public health concern for all ethnic populations ¹. In a global scale, melanoma of skin is estimated to be the 12th and 15th most commonly diagnosed cancer, with 3.1 and 2.6 age-standardized incidence rates (ASRW) per 100,000 persons-year, in males and females respectively ². Nevertheless, in some developed countries it is the first or second tumor in young adults ³. High melanoma occurrence is observed in Australia and regions where the Caucasian population is predominant. Intermediate and low incidence rates are seen in Latin America, however the lowest rates are in areas of mainly Asian or African inhabitants ⁴.

It has been postulated that skin melanoma is a good example of a disease for which an age-specific incidence pattern can be explained by an environmental stress being suddenly and permanently imposed on a whole population ⁵. Both familial and environmental factors play a role in the etiology of melanoma ⁴. Sun exposure, dysplastic nevi and fair skin are risk factors extensively discussed in the literature ^{6,7}. More recently, studies have presupposed that DNA repair capacity may modify the risk of melanoma in the presence of other strong risk factors ^{5,8}. A reduced efficiency of the cell-repairing mechanisms is capable of explaining the increasing trends of melanoma in-

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cidence that has been noticed since the mid-20th Century⁹. Additionally, melanoma can occur in any ethnic group and in people who have not had substantial sun exposure¹⁰.

In Latin America, most epidemiological studies describe cases from a single institution^{11,12} and rates on melanoma incidence have rarely been reported¹³. Our main goal was to verify the incidence rates for cutaneous melanoma in Latin America by gender and age-group for the period of 1998 to 2002, using the Cancer Incidence in Five Continents volume IX (CI5-IX), a secondary database where patients are not identified³.

Patients and methods

Incidence data are based on primary malignant tumors diagnosed among the population covered by eleven cancer registries in Latin America and then submitted to the CI5-IX, for the period of 1998 to 2002. All population-based cancer registries submitted the following variables: case registration number, gender, age-group, date of incidence, most valid basis of diagnosis, tumor topography, morphology and behavior. The data was aggregated by 5-year periods. All cases were coded using the International Classification of Diseases for Oncology (ICDO3)¹⁴. Primary invasive melanoma of skin were retrieved from the database with topography codes C43.0-lip, C43.1-eyelid, C43.2-ear, C43.3-unspecified parts of face, C43.4-scalp and neck, C43.5-trunk, C43.6-upper limb, C43.7-lower limb, C43.8-overlapping and C43.9-melanoma – not otherwise specified (NOS). To allow comparison within different regions the direct method of standardization by the world standard populations of Segi was used. The age-standardized incidence rates are calculated first by estimating the age-specific rates and then applying these rates to the reference population of each registry area¹⁵.

Data were organized by gender, age-groups (from 0 to 70 and older, in 5-year periods) and topography (head and neck, trunk, upper limb, lower limb and NOS). Skin melanoma age-standardized incidence rates were calculated for the period 1998-2002. In the database 321 men and 443 women were reported as age unknown and 20 cutaneous melanoma cases were registered in the younger age groups (seven cases in the 0-4 age-group and 13 cases in the 10-14 age-group), therefore they were excluded from graphical analysis. Male to female incidence rate ratios were calculated for each Latin America population-based cancer registry¹⁶. For data tabulation and figures Excel for windows (version 10.0; Microsoft Corp., USA) was used.

The relatively high incidence in the city of São Paulo, Brazil, lead us to search the CI5-IX website for graphical comparisons of cutaneous melanoma between this big urban cluster and: (1) a region of similar latitude, due to a possible link between risk of cutaneous melanoma and latitude¹⁷; (2) regions with Hispanic and Non-Hispanic white population based on similar incidence in the USA, Surveillance Epidemiology and End Results (SEER) for the period studied¹⁸.

Results

Population-based cancer registries in the region have a coverage of 22.7 million inhabitants, representing approximately 4.3% of the Latin America population. Between 1998 and 2002, a total of 4,465 cases of melanoma were reported to the CI5-IX database by eleven cancer registries in Latin America. This geographic region represents 1.2% of all cutaneous melanoma registrations in the CI5-IX database (n = 382,371 cases). In Latin America, incidence rates for melanoma varied widely from 1.1 to 6.5 (ASRW) per 100,000 persons-year within both sexes for all ages and regions. Based on our dataset, the average incidence rates were 4.6 and 4.3 (ASRW) per 100,000 persons-year for women and men, respectively.

The gender distribution of cutaneous melanoma cases was: 2,041 (46%) men and 2,424 (54%) women. The male:female ASRW incidence ratios were highest for Cuiabá, Brazil (1.4) and lowest for Valdivia, Chile (0.5). The number of melanoma cases and ASRW incidence rates for all ages according to gender and geographic region are shown in Table 1. The mean age of cutaneous melanoma diagnosis for both sexes and all registries in Latin America falls into the 60 to 64 age-group. In the younger, 25-49 age groups the ASRW is higher for females than for males. Conversely, in the older age-groups (60 or more), the ASRW for males is higher than for females (Figure 1). In regard to data quality and morphology, microscopic verification was available for 97.2% of all registered skin cancers (melanoma and non-melanoma) cases.

In Latin America the incidence of melanoma is slightly higher in males than in females (male:female ratio of 1.1). For all ages, the highest ASRW (per 100,000 person-years) were observed among men (6.5) and women (5.7) in São Paulo, Brazil and the lowest were found for men (1.4) and women (1.1) in La Martinique, France. The age-specific incidence pattern shows remarkably higher rates among the elderly, especially men 70 years or older with an ASRW of 36.5 (Figure 1).

Table 1

Age-standardized incidence rates of skin melanoma per 100,000 people by gender and population-based cancer registries for all ages.

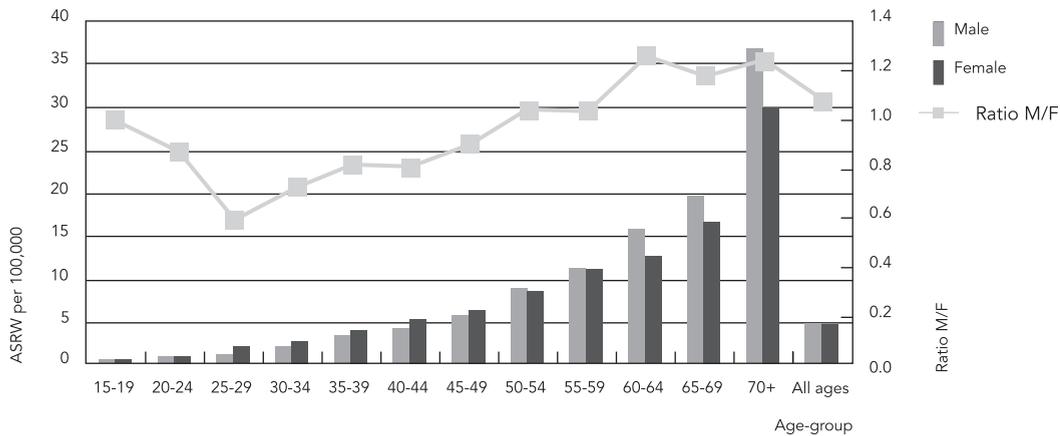
Regions	Male			Female			Ratio M/F	Mean age-group
	Cases	ASRW	95%CI	Cases	ASRW	95%CI		
Argentina, Bahia Blanca	27	3.3	2.0-4.6	29	2.9	1.8-4.1	1.1	55-59
Brazil, Goiânia	69	4.4	3.3-5.5	93	4.5	3.6-5.5	1.0	50-54
Brazil, São Paulo	1,392	6.5	6.1-6.9	1,687	5.7	5.4-6.0	1.1	60-64
Brazil, Brasília	102	4.2	3.3-5.2	122	4.3	3.4-5.1	1.0	50-54
Brazil, Cuiabá	16	2.6	1.3-4.0	15	1.9	0.9-3.0	1.4	50-54
Chile, Valdivia	16	1.8	0.9-2.7	32	3.5	2.3-4.7	0.5	50-54
Colombia, Cali	124	3.5	2.8-4.1	135	2.9	2.4-3.5	1.2	55-59
Costa Rica	188	2.4	2.0-2.8	173	2.1	1.8-2.4	1.1	55-59
Equador, Quito	73	2.5	1.9-3.1	96	2.9	2.3-3.5	0.9	55-59
France, La Martinique	18	1.4	0.7-2.1	19	1.1	0.6-1.6	1.3	60-64
Peru, Trujillo	16	1.8	0.9-2.8	23	2.1	1.2-2.9	0.9	60-64
Total	2,041	4.6	4.3-4.7	2,424	4.3	4.2-4.4	1.1	60-64

ASRW: age-standardized incidence rate; 95%CI: 95% confidence interval.

Source: Cancer Incidence in Five Continents volume IX (CI5-IX).

Figure 1

Skin melanoma ASRW by gender and age-group for Latin America (1998-2002).



ASRW: age-standardized incidence rates.

In regard to topography and considering both genders an expressive number of cutaneous melanoma cases were of unknown sites and therefore classified as NOS and overlap (n = 1,344, 30.1%). However, the most frequent anatomical location for melanoma was the trunk (n = 502, 25%) and head and neck (n = 366, 18%) for men and lower

limbs (n = 681, 28%) and trunk (n = 394, 16%) for females (Figure 2).

The comparison between two regions of similar latitude as the city of São Paulo, Brazil (23°S) and the Western region of Australia (24°S) showed a wide variation of incidence rates (Figure 3).

Figure 2

Skin melanoma topography by age-standardized incidence rates (ASRW) and gender for Latin America (1998-2002).

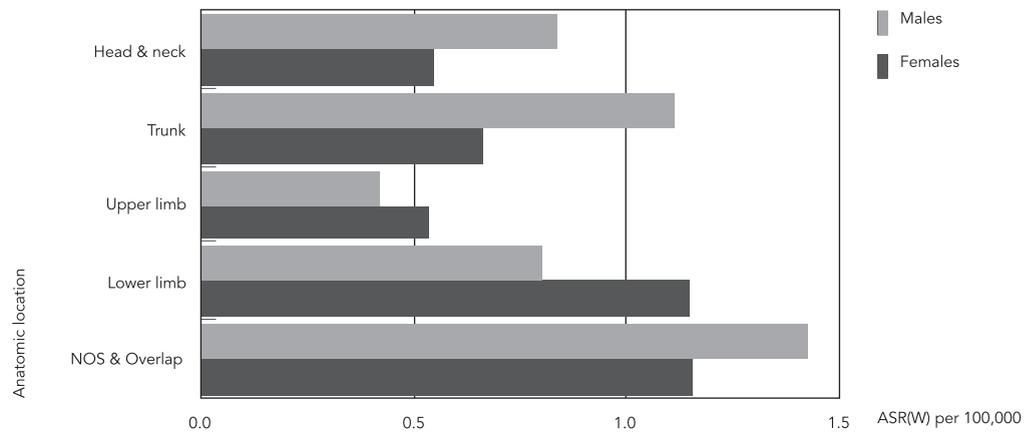
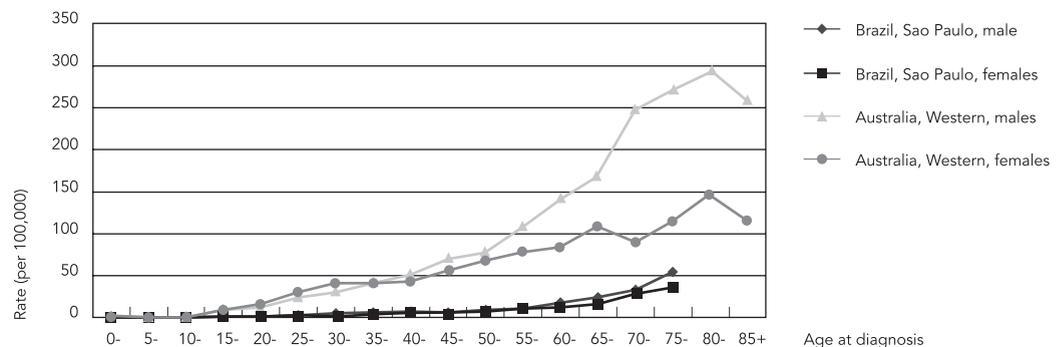


Figure 3

Skin melanoma in São Paulo, Brazil and the Western region of Australia by age-standardized incidence rates (ASRW) and gender (1998-2002).



In Latin America there is no race/ethnicity distinction in the population-based cancer registries. Specific data by race is available in the USA (SEER) where Hispanic males and females had a melanoma rate of 3.0 and 3.2 per 100,000, respectively, between 1998 and 2002³, surprisingly lower than the mean standardized cutaneous melanoma incidence rates for Latin America. When comparing Hispanic-whites from the city of Los Angeles, USA with the population of the city of São Paulo, we see higher incidence rates

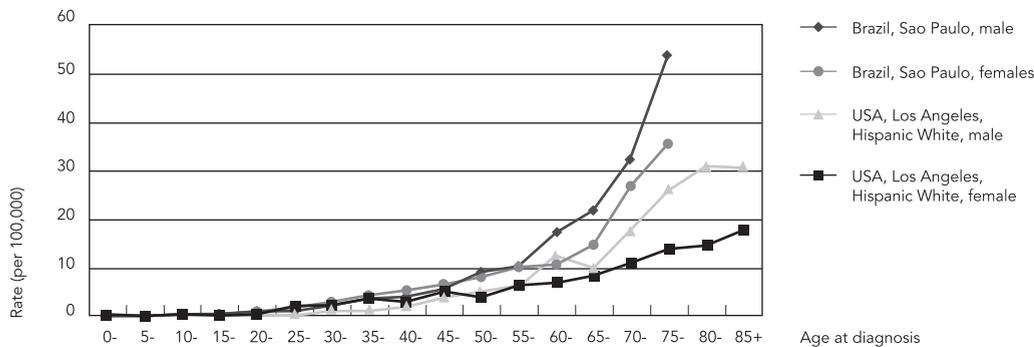
of cutaneous melanoma in São Paulo, for both gender, in individuals 45 and older (Figure 4).

Discussion

Cancers are complex diseases which show endogenous metabolic changes, imbalances associated to aging and genetic changes, partly caused by exogenous factors, such as lifestyle and exposure to ultraviolet radiation in the case

Figure 4

Skin melanoma in São Paulo, Brazil and Los Angeles, USA (Hispanic White) by age-standardized incidence rates (ASRW) and gender (1998-2002).



of melanomas ^{19,20,21}. Cutaneous melanoma is the most lethal form of skin cancer, accounting for about 75% of all skin cancer deaths. Generally, incidence rates increase with age, peak after the age of 40, and are greater in men than in women. However, these trends do not reflect what is typically seen in minority ethnic groups, where incidence rates are lower ²².

To take a deeper look on cutaneous melanoma in Latin America, we searched the CI5-IX database and found that cutaneous melanoma accounts for 1.5% of all cancers, comparable in magnitude to pancreatic and gallbladder cancer in women and to pancreatic and kidney cancer in men ³. Invasive melanoma represented 7% of all skin cancer registrations in the region for the period, higher than the 4% widely expressed in literature ²³.

When compared to the most frequent solid tumors, melanoma is diagnosed at a relatively younger age ^{4,24}. We found, in younger age groups, a higher incidence of cutaneous melanoma among women, perhaps due to the low perception of sun exposure risks among adolescents and young adults, an excessive aesthetic need to have a tan (natural or artificial) in order to look good and a greater tolerance to sunburn ^{25,26}. Besides, outdoor sports are very common in warmer regions and sun protection has been shown to be insufficient with frequent sunburns ²⁷. Conversely, a 50-year period population-based cancer registry study from Manitoba, Canada, showed decreasing incidence rates for young women ²⁸.

Middle-aged and older men are recognized as a high-risk group ²⁹, probably due to low pre-diagnosis awareness of melanoma warning signs and poor skin self-examination practices ³⁰. In Latin America there are also elevated incidence rates of invasive melanoma among males in older age-groups (60 or more), perhaps associated with age-associated changes in the immune system, lower socioeconomic groups and late diagnosis due to a relative lack of access to medical care ^{29,30,31}.

The literature points to a general melanoma pattern whereby, in relatively low-incidence countries, female incidence rates exceed those of males. On the other hand, in higher-incidence countries such as Australia and the United States, the incidence is either equal, or there is a male preponderance ^{32,33}. In Latin America we found a slight male preponderance, leading to the question: can some countries in the region be moving toward the pattern of an intermediate incidence country?

For the period under study, we found less striking mean standardized cutaneous melanoma incidence rates for Latin America (4.6 for male and 4.3 for female) when compared to developed regions of the world such as Europe (7.5 for male and for 8.3 female), North America (12.9 for male and 9.2 for female) and Oceania (36.4 for male and 28.1 for female) ³. These continents show a continuing rise in incidence, although in some countries figures may be stabilizing or decreasing in younger females ^{28,34}. By looking at melanoma trends in different ethnic groups, recent studies have demonstrated that cutaneous melanoma

is growing among Mediterraneans with a 6.4% mean annual increase in the risk of cutaneous melanoma diagnosis in central Italy³⁵, while Hispanics showed a statistically significant 7.3% annual increase in the incidence of invasive melanoma among males in California, USA, between 1996 and 2001³⁶. One analysis from Goiânia, Brazil, between 1988 and 2000, showed an annual increase in incidence of 6.9% for men and 8.3% for women¹³. These are all higher than the rate in Queensland, Australia, which showed an annual increase of 2.6% for men and 1.2% for women between 1982-2002³² and the overall 3.1% annual statistically significant increase for white Americans between 1992-2004³². Conversely, data analyzed by the Singapore Cancer registry, between 1968 and 2006, showed a constant cutaneous melanoma rate for three different low incidence races: Malays, Chinese and Indians³⁷.

Although age-adjusted incidence rates (per 100,000) for cutaneous melanoma are significantly lower among Hispanics (4.5) compared with non-Hispanic whites (21.6), cutaneous melanoma among minority populations are more likely to present at advanced stages and have poorer outcomes compared with Caucasians³⁸. In addition, Hispanic males have an approximately 11% higher frequency of thick melanomas at diagnosis³⁶, elevating health costs with a solid tumor that can usually be diagnosed and successfully treated at an early stage³⁹. The large economic burden of melanoma in patients aged 65 and over is comparable to that of other common malignant neoplasms in this population⁴⁰. It has been estimated that if all patients were diagnosed and effectively treated in cutaneous melanoma stage 0 or I, the annual direct costs for the over 65 population would be 40% to 65% of the current cost⁴⁰.

The highest non-melanoma skin cancer incidence rates in the world are in Australia and Brazil⁴¹. Our findings also show, that besides the important cutaneous melanoma incidence gap between these two southern countries (Figure 3), São Paulo, has the highest cutaneous mela-

noma incidence rates within Latin America. There are several possible considerations for these findings: Brazil, especially São Paulo and the Southern States, have experienced centuries of immigration, mostly from European countries⁴², with unique racial miscegenation¹³; the city is at an altitude of 790 m or 2,592 ft and approximately 80 kilometers/50 miles from the coast, facilitating intermittent sun exposure habits (weekends, holidays and vacation) of its inhabitants^{43,44,45}; and it is a big urban cluster with an abundant concentration of high-rise buildings and radio frequency electromagnetic radiation that may have an effect on the immune defense system, cell repair and apoptosis mechanisms^{45,46}.

Topographically, our findings are consistent with those in the literature where the trunk is the most common primary site for males and the lower limb for females^{28,34}. Cutaneous melanoma distribution over body surface area may be explained by the hypotheses that working indoors during the day (artificial barrier by window glass) divides UVB from UVA and may have inadvertently increased the incidence of melanomas. It is known that intermittent UVB intense exposure and sunburn promotes melanoma initiation and that UVA may act promoting mutations and tumor growth⁴⁵.

Our analysis has identified low and intermediate incidence rates in Latin America that need to be investigated through in-depth studies in order to better elucidate regional trends and potential risk factors, since it appears to be increasing more rapidly than in developed countries. However, our data covers less than 5% of the population, making clear the importance of continuous efforts in improving cancer registration in low and medium income countries. We are in agreement that, if effective, prevention and early detection attempts may reduce the economic burden of melanoma⁴⁰. Moreover, activities aimed at the early diagnosis of cutaneous melanoma must target young women²⁶ and older men in the region⁴⁰.

Resumo

A incidência de melanoma cutâneo varia entre regiões geográficas e é preocupante tanto para a população de pele clara como outras etnias. Na América Latina, dados de incidência de melanoma cutâneo oriundos de registros de câncer de base populacional são escassos. Uma busca na base de dados do Cancer Incidence in Five Continents, volume IX (CI5-IX), foi realizada para melanoma cutâneo pela topografia (C43), e casos de 11 registros de câncer de base populacional na América Latina foram selecionados. Entre 1998 e 2002, encontrou-se um total de 4.465 casos de melanoma cutâneo na América Latina. Os coeficientes padronizados médios de incidência (por 100 mil pessoas-ano) foram 4,6 (homens) e 4,3 (mulheres). Este estudo descreve o panorama da incidência de melanoma cutâneo na América Latina e pontua a necessidade de reforçar a cobertura dos registros de câncer de base populacional nos países sul-americanos, o que permitiria uma melhor compreensão dessa neoplasia, facilitando a implementação efetiva de programas de prevenção primária para toda a população latina. Neste momento, as mensagens de detecção precoce do melanoma cutâneo devem ter, como alvo, mulheres jovens e homens mais velhos na população da América Latina.

Melanoma; Neoplasias; Incidência

Contributors

A. M. Sortino-Rachou participated in the conception and design, acquisition of data, analysis and interpretation, and drafting the article. M. P. Curado participated in the conception and design, drafting and revising, and final approval. M. C. Cancela participated in the acquisition of data, analysis and interpretation, and revising.

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Submitted on 02/Apr/2010

Final version resubmitted on 20/Sep/2010

Approved on 29/Nov/2010