

Epidemiologic features of non-melanoma skin cancers in Albania

Xhiliola Doci¹, Agim Sallaku², Sonela Xinxo³, Ermira Vasili⁴, Irena Savo⁵, Helidon Nina²

¹Regional Hospital of Durres, Department of Dermatology;

²University Hospital Center “Mother Theresa”, Oncology Hospital, Tirana, Albania;

³Institute of Public Health, Tirana, Albania;

⁴University Hospital Center “Mother Theresa”, Department of Dermatology, Tirana, Albania;

⁵American Hospital II, Department of Dermatology, Tirana, Albania.

Corresponding author: Xhiliola Doçi;

Address: Regional Hospital of Durres, Rr. A. Goga, L. 18, Durres, Albania;

Telephone: +355696080880; E-mail: xhilioladocimedicine@yahoo.com

Abstract

Aim: Non-melanoma skin cancers (NMSC) represent a burden to health services all over the world and their frequency is rising. The epidemiology of these tumors in Albania is poorly documented. The aim of this study was to describe selected epidemiological features of NMSC in Albania for the period 2005-2013.

Methods: This was a cross-sectional study of non-melanoma skin cancer cases during 2005-2013. The information was retrieved from the Service of Statistics at the premises of the University Hospital Centre “Mother Theresa” during 2014 and consisted of the following variables: age at the moment of diagnosis, sex, residence, type of work environment, type of NMCS and anatomic localization of the lesion. Information about the number of the population was retrieved from the Institute of Statistics. SPSS, version 16 was used for data analysis.

Results: 5289 patients were diagnosed with NMSC for the first time during 2005-2013, of whom 63.7% were males. Basal cell carcinoma was the most frequent tumor and the ratio with squamous cell carcinoma was 2.42 : 1.00. The mean age of NMSC patients was higher for males than females (67.57 years vs. 66.64 years, respectively, $P < 0.05$). NMCS was more frequent among outdoor than indoor working individuals. The incidence has increased steadily over the years in Albania.

Conclusion: The incidence of NMSC in Albania shows an increasing trend over the past decade, with males and individuals working outdoors being more often affected by such health conditions. These data should guide early detection and prevention strategies in order to lower the increasing burden on NMSC in Albania.

Keywords: basal cell carcinoma, epidemiology, non-melanoma skin cancer, squamous cell carcinoma.

Introduction

Basal cell carcinoma (BCC) and cutaneous squamous cell carcinoma (SSC) are malignant neoplasms that represent the most common malignancies in humans and the most important types of non-melanoma skin cancers (NMSC). BCC mostly arises *de novo*, whereas SCC generally originates from precursor lesions of Bowen disease and actinic keratosis. Although these malignancies are not generally documented in Europe through state Cancer Registries, their incidence is on the rise with about 2-3 million cases occurring each year (1). Increased exposure to sunlight (increased time spent out), changes of lifestyle (greater use of tanning salons, changes of clothing styles), changes of the global environment (depletion of ozone layer) and also the increase of the longevity nowadays, are the most accused factors for this rising of NMSC incidence.

In some countries the registries for these malignancies do not include data for primary multiple skin cancers, also low-grade carcinomas like SCC *in situ* and superficial BCC or the information about clinical or histopathological features is not recorded (2-5). Therefore the real incidence of these cancers is not properly evaluated or may be even underestimated. BCC makes up 80% of non-melanoma skin cancers, while SCC represents 20% (4). BCC is more common in elderly individuals but its frequency is rising in people younger than 50 years of age (6). SCC is also highly associated to old age and an increase is seen after the age of 40 years. Despite the rising incidence of SCC in the past decades, its mortality has decreased by around 20%, mainly because of increased public awareness and effective treatment of high risk lesions (7). Bower et al. concluded that a patient diagnosed with BCC has a threefold higher risk for developing malignant melanoma (8). On the other hand, a patient diagnosed with SCC, has a 44% to 50% higher cumulative risk to develop another non-melanoma skin cancer (in the subsequent 3 to 5 years, 18-30% risk of another SCC) (9). Despite this, patients

diagnosed with SCC carry on an increased risk for extra cutaneous cancers (10).

The management of these malignancies represents a big economic burden for the healthcare systems in Europe, taking into account that there are more than 50 million persons aged over 80 years (11,12). In Albania, the information about NMSC is scarce. Patients diagnosed with such health conditions are usually referred to the University Hospital Center "Mother Theresa" in Tirana for further evaluation and treatment. However, the information about NMSC has largely not been synthesized. In Albania, it would be of a great value recording and elaborating epidemiological data about NMSC that will help to understand its epidemiology based on which efficient prevention and managing strategies about this potentially emerging healthcare problem could be designed. In this context, our aim was to describe the epidemiology of NMSC in Albania during 2005-2013.

Methods

Type of study

A cross-sectional study was carried out in 2014 in the premises of the Service of Statistics in the University Hospital Center "Mother Theresa", in Tirana, Albania. The data collecting team scrutinized all the clinical charts of patients and recorded all cases of patients diagnosed with non-melanoma skin cancer. We reviewed the clinical charts of the Oncology Hospital, Dermatology department and Plastic Surgery department as well in order to increase the chances of fully covering potential patients who were suitable to be included in the study. This reasoning was based on the fact that these are the major diagnostic and treatment endpoints for patients diagnosed with such tumors.

Data collection

From the clinical charts where the diagnosis of NMSC was confirmed, the following information was retrieved: age at the moment of diagnosis, sex, residence, type of work environment (classified as

outdoor and indoor employment), histologic type of non-melanoma skin cancer (spino-cellular, basal cellular, unknown) and anatomic localization of the lesion (frontal, orbital, facial, nasal, labial, auricular, upper extremity, lower extremity, truncal, coli, capitis, temporal, multiple locations). In total 5289 patients were diagnosed with NMSC during 2005-2013. Only patients with a diagnosis of NMSC set for the first time were included in this study.

The number of total population for each year of the period under study was taken from the releases of the Institute of Statistics.

Statistical analysis

The mean age of the NMSC patients was calculated and reported. Based on population figures, the incidence of NMSC (per 100,000 population) for each year under study was calculated. The absolute number and respective percentages were calculated and reported. For the comparison of continues variables we used the Student's t-test through the ANOVA procedure, whereas for the comparison of

categorical variables the Chi-square test was used. Statistical Package for Social Sciences (SPSS), version 16, was used for data analysis.

Results

In total, there were 5289 patients diagnosed with non-melanoma skin cancer during the period of 2005-2013 in Albania. The majority of patients were males (63.7%) (data not shown in the tables).

Figure 1 shows the average age of patients when they were first diagnosed with NMSC. It can be noted that the average age fluctuates little over the years, being around 66 and 69 years old (Figure 1). However, when taking into consideration the extremes of the study period, there is a significant increase in the average age of first NMSC diagnosis between 2005 and 2013 (66.24 years vs. 67.50 years, respectively, $P < 0.05$). The peak mean age has been 68.60 years during 2007 (Figure 1). The average age was significantly higher among male than female patients (67.57 years vs. 66.64, respectively, $P < 0.05$) (data not shown in tables).

Figure 1. Mean age of the patients with NMSC during 2005-2013

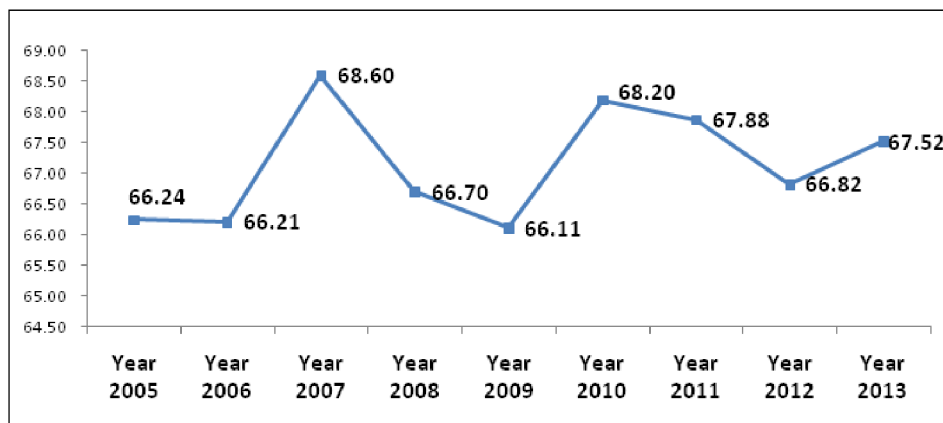
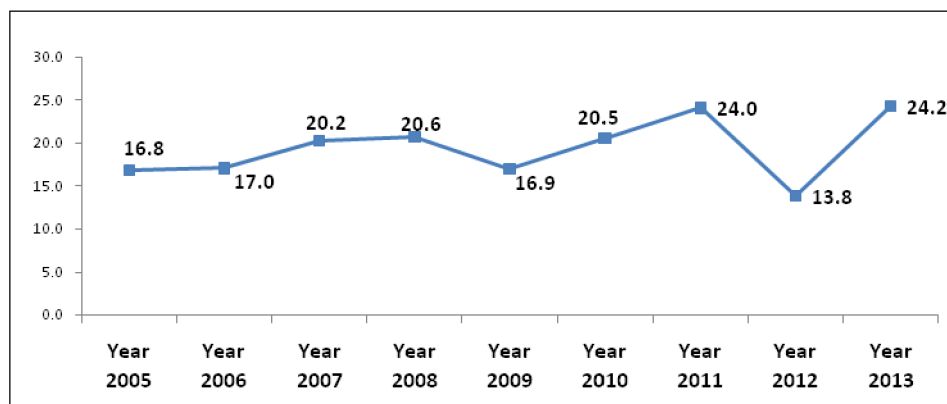


Figure 2 presents the incidence rate of non-melanoma skin cancer per 100,000 population. As it is easily noticed this incidence has increased almost steadily over the years with the year 2012 being an exception. The incidence rate has been

increasing from a minimum of 16.8 NMSC cases per 100,000 population in 2005 to 24.2 cases per 100,000 population in 2013. The highest incidence is recorded in the 2013 (Figure 2).

Figure 2. Incidence of NMSC per 100,000 habitants during 2005-2013

The most frequent type of NMSC was the basal cell carcinoma, present in 63% of patients under study, followed by squamous cell carcinoma with 26% of patients whereas in the remaining 11% of cases it was not possible to detect the histological type of the tumor (data not shown in tables or figures).

Regarding the working environment, the majority of those being diagnosed with NMSC (3296 or 62.3%) had declared that they used to work outdoors whereas the remaining 1993 NMSC patients (or 37.7%) used to work indoors (Table 1).

As we can see in Table 1, for the majority of the patients the anatomical location of NMSC has been

facial (center) with 21.9% of them, followed by the nasal region with 13.1%, frontal and orbital regions with 9.4% and 9.3%, respectively. The least frequently affected location were the lower extremities with only 2.2% of the total NMCS cases (Table 1). Also, regarding the sex differences in the location of tumor lesions, the location in facial region, nasal and orbital region was significantly more frequent among female rather than male patients (Table 1). On the contrary, the anatomical location of the non-melanoma skin lesions in the auricular region, temporal and multiple regions was significantly more frequent in male rather in female patients (Table 1).

Table 1. Distribution of NMSC cases by anatomical location and sex

Variable	Sex		Total
	Male	Female	
Anatomical location			
Frontal	335 (9.9)*	161 (8.4)	498 (9.4)
Orbital	283 (8.4)	210 (10.9)	491 (9.3)
Facial (center)	640 (19.0)	517 (26.9)	1159 (21.9)
Nasal	402 (11.9)	294 (15.3)	692 (13.1)
Labial	27 (0.8)	27 (1.4)	58 (1.1)
Auricular	377 (11.2)	129 (6.7)	507 (9.6)
Upper extremity	121 (3.6)	77 (4.0)	200 (3.8)
Lower extremity	57 (1.7)	58 (3.0)	116 (2.2)
Truncal	202 (6.0)	81 (4.2)	280 (5.3)
Coli	74 (2.2)	31 (1.6)	105 (2.0)
Multiple	304 (9.0)	125 (6.5)	428 (8.1)
Capitis	199 (5.9)	75 (3.9)	269 (5.1)
Temporal	347 (10.3)	137 (7.1)	486 (9.2)
Total	3369 (100.0)	1920 (100.0)	5289 (100.0)

* Absolute numbers and column percentages (in parenthesis)

With regards to anatomical location by working environment (Table 2), the majority of the patients had reported significantly more often operating in outdoor working environments for all the specified

locations of the lesions ($P < 0.01$), except the truncal region where the indoor/outdoor working environment was evenly distributed across those patients (Table 2).

Table 2. Distribution of NMSC cases by anatomical location and work environment

Variable	Work environment		P-value
	Outdoor	Indoor	
Anatomical location			
Frontal	319 (64.2)*	179 (35.8)	<0.001**
Orbital	287 (58.4)	204 (41.6)	
Facial (center)	695 (60.0)	464 (40.0)	
Nasal	448 (64.7)	244 (35.3)	
Labial	38 (66.1)	20 (33.9)	
Auricular	299 (58.9)	208 (41.1)	
Upper extremity	131 (65.3)	69 (34.7)	
Lower extremity	64 (55.3)	52 (44.7)	
Truncal	140 (50.0)	140 (50.0)	
Coli	57 (54.4)	48 (45.6)	
Multiple	345 (80.6)	83 (19.4)	
Capitis	169 (62.9)	100 (37.1)	
Temporal	305 (62.7)	181 (37.3)	
Total	3296 (62.3)	1993 (37.7)	

* Absolute number and row percentage (in parenthesis).

** P-value according to Chi-square test.

When we compare the 2005-2009 and 2010-2013 periods of time and the age-group of patients, it can be noted that there is a significant increase of the proportion of younger patients first diagnosed with NMSC with the passing of time (Table 3). For example, only 7.6% of NMSC patients during 2005-2009 were 50 years old or younger compared to

10.5% of NMSC patients of the same age in 2010-2013 ($P < 0.05$). Obviously, the proportion of individuals aged 50+ years at the time of the first NMSC diagnosis declined between the two study periods from 92.4% in 2005-2009 to 89.5% in 2010-2013 (Table 3).

Table 3. Distribution of NMSC patients by age-group and study period

Variable	2005-2009 (percent)	2010-2013 (percent)	P-value
Age-group			
<40 years	1.3*	3.1	<0.05**
40-50 years	6.3	7.4	
>50 years	92.4	89.5	

* Column percentage.

** P-value according to chi-square test.

Discussion

Our main objective was to present important epidemiologic data on non-melanoma skin cancers in Albania, for the period from 2005-2013. We found that more than 5000 individuals were first diagnosed with some type of NMSC during this period, with an increasing incidence rate varying from 16.8 cases per 100,000 population in 2005 to 24.2 cases per 100,000 population in 2013. The majority of NMSC patients were males and more frequently working in outdoor environments. Also, there was noticed an increase in the proportion of younger individuals being diagnosed for the first time with NMSC over time in Albania. The most important and studied forms of non-melanoma skin cancers are Basal Cell Carcinoma and Squamous Cell Carcinoma. We found that the BCC was more frequent than SCC and the ratio between BCC and SCC was approximately 2.4:1. This finding is consistent with what has been reported in other similar studies (13).

Regarding the distribution of NMSC between men and females in our study was found a predominance of these cancers in the males group in the ratio 1.8:1 with female patients and this finding is also in agreement with other studies (14,15).

We believe that the steady increase of the incidence over the years (the year 2012 is an exception) with the highest incidence reported in 2013 is also attributed to the raise of awareness on the risk of skin cancers among the people due to TV and magazines information, publicity campaigns from the Albanian Society of Dermatologists and subsequent increased contacts with the medical staff, better self-inspection from the patients and improvement of diagnostic techniques in our country.

In Albania the frequencies of these malignancies are apparently on the rise, but regarding Squamous Cell Carcinoma the frequency in individuals older than 65 years is increasing substantially. The 6th decade of life was the most usual age when people become first diagnosed with these tumors, as evidenced in this study. This may be linked to the accumulative damage caused from sun exposure during many years of life.

Also the significant increase that was noticed in the frequency of the NMSC in people younger than 50 years of age may be attributed to changes in life style and fashion, with the increasing desire of young persons to appear tanned and changes in clothing styles, with more frequent use of exposed or minimal dressing. This finding in our study is concordant to that of other studies (6).

Solar radiation is a confirmed as strong risk factor related to skin cancer (16), and for this reason we aimed to evaluate the distribution of NMSC patterns related to solar exposure. Consistently with findings from other studies (17), regions of the body that are more exposed to chronic sun exposure such as the central-facial region, and the nasal, auricular and frontal regions were the most affected form these tumors. The exaggerated sun seeking behavior, typical for current trends and the non-regular usage of protective measures like sun screen creams and hats may contribute to this predominance.

Regarding working environment, in terms of persons more likely to be exposed to ultraviolet radiation, our results suggest that those working outdoors were more frequently affected by these lesions with a ratio of 1.66:1 in favor of those operating in outdoor environments. In these cases, working outdoors, such as the case with farmers, policemen, construction workers, etc., increases the exposure to high ultraviolet radiation due to increased occupational sun exposure, thus resulting in higher risk of NMSC. This finding is in concordance with international literature reports (18-20).

Conclusion

Non-melanoma skin cancers frequency is rising fast all over the world and also in Albania. Hence, in Albania, there has been a steady increase in the incidence of NMSC during the past decade. NMSC is more frequent among males and people who used to work outdoor. The more frequent histological type is BSC and more frequent anatomical location is the facial region. Epidemiological data are very important in helping health care and public care professionals

to implement effective early detection and prevention strategies, which can lower the burden that these tumors for a country's health care system (21). Non-melanoma skin cancers can also be included in

professional skin diseases and preventive strategies and appropriate measures should be implemented for people working outdoors (21).

Conflicts of interest: None declared.

References

- World Health Organization. Ultraviolet radiation and the INTERSUN Programme. Skin cancers. Available from: <http://www.who.int/uv/faq/skincancer/en/index1.html> (Accessed: May 28, 2015).
- Hannuksela-Svahn A, Pukkala E, Karvonen J. Basal cell skin carcinoma and other nonmelanoma skin cancers in Finland from 1956 through 1995. *Arch Dermatol* 1999;135:781-6.
- Holme SA, Malinovsky K, Roberts DL. Changing trends in non-melanoma skin cancer in South Wales, 1988-98. *Br J Dermatol* 2000;143:1224-9.
- Katalinic A, Kinze U, Schäfer T. Epidemiology of cutaneous melanoma and non-melanoma skin cancer in Schleswig-Holstein, Germany: incidence, clinical subtypes, tumour stages and localization (epidemiology of skin cancer). *Br J Dermatol* 2003;149:1200-6.
- Acetuno-Madera P, Buendía-Eisman A, Arias-Santiago S, Serrano-Ortega S. Changes in the incidence of skin cancer between 1978 and 2002. *Actas Dermosifiliogr* 2010;101:39-46.
- Christenson LJ, Borrowman TA, Vachon CM, Tollefson MM, Otley CC, Weaver AL, et al. Incidence of basal cell and squamous cell carcinoma in a population younger than 40 years. *JAMA* 2005;294:681-90.
- Weinstock MA. Nonmelanoma skin cancer mortality in the United States, 1969 through 1988. *Arch Dermatol* 1993;129:1286-90.
- Bower CPR, Lear JT, Etherington D, Harvey I, Archer CB. Basal cell carcinoma and risk of subsequent malignancies: A cancer registry-based study in southwest England. *J Am Acad Dermatol* 2000;42:988-91.
- Marcil I, Stern RS. Risk of developing a subsequent nonmelanoma skin cancer in patients with a history of nonmelanoma skin cancer: A critical review of the literature and meta-analysis. *Arch Dermatol* 2000;136:1524-30.
- Bale AE, Gailani MR, Leffell DJ. Nevoid basal cell carcinoma syndrome. *J Invest Dermatol* 1994;103:126S.
- Boyle P, Dore JF, Autier P, Ringborg U. Cancer of the skin: a forgotten problem in Europe. *Ann Oncol* 2004;15(Suppl 5):5-6.
- Trakatelli M, Ulrich C, Del Marmol V, Euvrard S, Stockfleth E, Abeni D. Epidemiology of nonmelanoma skin cancer (NMSC) in Europe: accurate and comparable data are needed for public health monitoring and interventions. *Br J Dermatol* 2007;156(Suppl 3):1-7.
- Katalinic A, Kinze U, Schäfer T. Epidemiology of cutaneous melanoma and non-melanoma skin cancer in Schleswig-Holstein, Germany: incidence, clinical subtypes, tumour stages and localization (epidemiology of skin cancer). *Br J Dermatol* 2003;149:1200-6.
- Radespiel-Troger M, Meyer M, Pfahlberg A, Lausen B, Uter W, Gefeller O. Outdoor work and skin cancer incidence: a registry-based study in Bavaria. *Int Arch Occup Environ Health* 2009;82:357-63.
- National Cancer Intelligence Network (NCIN). Non-melanoma skin cancer in England, Scotland, Northern Ireland, and Ireland. London: NCIN; 2013.
- International Agency for Research on Cancer (IARC). Solar and ultraviolet radiation. Monographs on the evaluation of Carcinogenic Risks to Humans. No. 55. Lyon: International Agency for Research on Cancer; 1992.
- Youl PH, Janda M, Aitken JF, Del Mar CB, Whiteman DC, Baade PD. Body-site distribution of skin cancer, premalignant and common benign pigmented lesions excised in general practice. *Br J Dermatol* 2011;165:35-43.
- Fartasch M, Diepgen TL, Schmitt J, Drexler H. The relationship between occupational sun exposure and non-melanoma skin cancer: clinical basics, epidemiology, occupational disease evaluation and prevention. *Dtsch Arztebl Int* 2012;109:715-20.
- Radespiel-Troger M, Meyer M, Pfahlberg A, Lauesen B, Uter W, Gefeller O. Outdoor work and skin cancer incidence: a registry-based study in Bavaria. *Int Arch Occup Environ Health* 2009;82:357-63.
- Moehrle M. Outdoor sports and skin cancer. *Clin Dermatol* 2008;26:12-5. Bath-Hextall FJ, Perkins W, Bong J, Williams HC. Interventions for basal cell carcinoma of the skin. *Cochrane Database Syst Rev* 2007;24:CD003412.
- Bath-Hextall FJ, Perkins W, Bong J, Williams HC. Interventions for basal cell carcinoma of the skin. *Cochrane Database Syst Rev* 2007;24:CD003412.