Acta Dermatovenerol Croat 2008;16(4):193-203 SCIENTIFIC ARTICLE

Epidemiology of Nonmelanoma and Melanoma Skin Cancer in Zagreb, Croatia

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Received: April 2, 2008
Accepted: November 3, 2008

SUMMARY The purpose of this retrospective and hospital-based study was to evaluate the epidemiology of nonmelanoma and melanoma skin cancer at University Department of Dermatology and Venereology, Zagreb University Hospital Center and School of Medicine during the 2003-2006 period. The study yielded population based results on 2911 cases of skin tumors in 2402 patients out of 16938 biopsies performed at Laboratory of Dermatologic Histopathology, University Department of Dermatology and Venereology, Zagreb University Hospital Center nd School of Medicine during the study period. All newly diagnosed invasive and in situ skin cancers were recorded by use of the histopathology record forms. Basal cell carcinoma was most commonly identified in the histopathology material (n=2002), followed by squamous cell carcinoma (n=533), melanoma (n=46) and cutaneous lymphoma (n=35). Other, less common tumors were noted. The number of tumors, and differences in age, sex and localization were analyzed. During the study period, there was no increase in the total number of cases recorded: 4305, 4202, 4116 and 4315, respectively. Study results showed skin tumors to be mostly diagnosed in elderly population (median age, 71 years). There were no significant sex differences, with the exception of the adult age group in 2006. As expected, skin tumors were mostly found in sun-exposed areas with some specific localization of individual tumor types. Study results were consistent with recent literature data.

KEY WORDS: epidemiology, skin tumors, melanoma skin tumors, nonmelanoma skin tumors

INTRODUCTION

The Croatian National Cancer Registry covers all estimated melanomas but not all nonmelanoma skin cancers recorded in Croatia. Cutaneous melanoma and nonmelanoma cancers represent more than one-third of all malignant tumors and therefore present great burden for health services worldwide. Skin cancer is therefore an important public health issue in Caucasians and a major burden for dermatologists, general practitioners and surgeons. There is a significant increase in the incidence of these skin tumors worldwide. Many authors describe the rising incidence of nonmelanoma skin cancer (NMSC) and melanoma (MM) (1-33).

Epidemiology, clinical appearance, diagnosis and therapy are the most important aspects to identify and understand the nature of cutaneous tumors. Historically, ascertainment of NMSC worldwide has been shown to be incomplete in several studies; however, recent evidence suggests some

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improvement of the situation since these records are now mainly collected *via* electronic systems (9). While clinical aspects and therapy are well known, there are little data available on the epidemiology of NMSC in Croatia, since data on these tumors have not yet been systematically collected. Mandatory notification is required only for patients admitted to hospital.

In Croatia, only data on patients hospitalized at University Departments of Dermatology and Venereology in Zagreb, Split and Rijeka have been systematically collected using oncotypes and then analyzed. Dermatovenereologists have studied cancer registration only in some centers in Croatia, pointing out that the importance of NMSC is underestimated, since most of the patients with NMSC are not admitted to hospital but are treated at outpatient services without registration in the Croatian National Cancer Registry in Zagreb. Therefore, the total number of cutaneous cancers and their incidence are obviously underestimated. Although an increase has recently been observed in the number of cutaneous cancers, to date no study has been conducted to assess this trend.

Basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), referred to as NMSC, cause significant morbidity and generate substantial cost to health care system. NMSC are 18-20 times more frequent than cutaneous MM (5). There is a great need for defining the epidemiological trend of these tumors in order to take appropriate preventive actions. Precise population based estimates are crucial for the development of prevention strategies and caregiving.

Our retrospective study established epidemiological data on cutaneous cancers at University Department of Dermatology and Venereology, Zagreb University Hospital Center and School of Medicine, and compared them with recent literature data (2,5,11,17,25,33). Accurate epidemiological data can be used to predict future cancer incidence by using trend modeling of the NMSC and MM rates observed. In recent literature, predictions are described by de Vries *et al*. (2005) for The Netherlands to up to 2015 (11).

We were also interested to see whether the epidemiology of cutaneous tumors in younger population in Croatia showed similar trends that were observed and described in the literature (23,27,28).

PATIENTS AND METHODS

Data for four consecutive years (January 2003 – December 2006) were retrieved from our Laboratory of Dermatological Histopathology database. The study was of a retrospective and partly hospital-based design. We recorded all newly diagnosed invasive and in situ skin cancers by use of histopathology record forms containing the following data: patient name, clinical history and diagnosis, location, sex, birth date and histopathologic description with definitive histopathologic diagnosis. Data were mainly collected on patients from Zagreb and also those from different parts of Croatia referred to our Department. Recurrences and diagnostic duplicities (cancer after biopsy and then surgically excised) were excluded. On statistical analysis, we used STATISTICA, Version 7.1. (StatSoft, Inc.) software.

RESULTS

From all histopathologically examined biopsies only reports related to skin tumors were selected. Overall, there were 2911 epidermal skin tumors out of 16938 biopsies, including MM and NMSC

Table 1. Results of histopathology verified skin tumors in female and male patients during period 2003-2006

YEAR	MALE SEX	FEMALE SEX	NUMBER OF SKIN TUMORS RECORDED DURING THE SPECIFIC YEAR/ NUMBER OF PATIENTS WITH SKIN TUMORS	NUMBER OF ALL HISTOPATHOLOGY MATERIALS EXAMINED DURING THE SPECIFIC YEAR
2003.	394 (51.50%)	371 (48.49%)	765 tumor cases 600 patients	4305
2004.	367 (47.35%)	408 (52.65%)	775 tumor cases 634 patients	4202
2005.	335 (50.52%)	328 (49.47%)	663 cases 572 patients	4116
2006.	335 (47.31%)	373 (52.68%)	708 cases 596 patients	4315
TOTAL	1431	1480	2911 cases 2402 patients	16938

Table 2. Number of skin tumors according the age groups of patients during 2003-2006

Age group	2003	2004	2005	2006
1900-1910	6	2	7	4
1911-1920	54	57	33	36
1921-1930	280	231	208	194
1931-1940	222	273	198	238
1941-1950	123	124	93	129
1951-1960	35	47	59	57
1961-1970	20	17	30	21
1971-1980	9	6	13	8
1981-1990	3	2		
1991-2000	1			1
2001-2006	3			
unknown date of birth	9	16	22	20
total number of skin tumors in specific year	765	775	663	708

(Table 1). The percentage of skin tumors ranged between 16.11% and 18.44%, depending on the year. During the period of observation, we recorded patients with multiple tumor lesions. Relationship between the number of patients and number of skin tumor cases is shown in Table 1.

Sex

According to sex distribution of patients with skin tumors during the study period, a slight male predominance was found in 2003 and 2005, whereas female predominance was observed in 2004 and 2006. Total number of tumors in males and females, and percentage of tumors recorded during the specific year are shown in Table 1.

Analysis of sex distribution by use of x^2-test showed statistically significant differences only in 2005 and 2006, however, it was not reliable. Therefore Fisher exact test was used, which yielded significant sex difference (Pr<=P 0.0236) in favor of female in the 30-64 age group in 2006.

Age

Age groups of patients divided into decades (ten-year range) are shown in Table 2. Data revealed the patients born from 1921 to 1930 and from 1931 to 1940 to be most frequently affected, immediately followed by those born from 1941 to 1950. Skin tumors were rarely found in younger patients, those born between 1961 and 1970 in particular, now represented by patients aged 30-39.

For simplicity of expression in further analyses, age grouping according to WHO was used to divide study population into groups of young patients (less than 29 years), adults (from 30 to 64 years) and old population (older than 65 years). During the observed period, the mean patient age was 69.48 years, standard deviation 12.227; and median of patient age 71 years. During the study period, there was no change in the mean age or age median (Table 3).

Histopathologic diagnosis

The number of cases of skin tumors according to histopathologic diagnosis is presented in Table 4. BCC, SCC, MM and cutaneous lymphomas (CL) were closely analyzed. Other, less common skin tumors were also noted. BCC was found to be most common.

Localization

During data collected, 36 different localizations of skin tumors were considered (Table 5); 14 localizations were differentiated on the face due to sun exposure. The five most common localizations of skin tumors observed during the study period are shown in Table 6. Of these the nose was most frequently involved. In 2003, nose was the most frequent localization with 127 cases, followed by buccal region (cheeks) with 118 and frontal region with 115 cases. In 2004, nose was the most frequent localization with 136 cases, followed by frontal region with 133 cases. However, in 2005, the most frequent localization was the back with 106 cases, followed by the nose with 97 cases. In 2006, nose was the most frequent site of skin tumors again with 101 cases, closely followed by the back with 99 cases. During the study period, the nose, frontal region, buccal region and the back were the most commonly affected areas. For convenience, total number of tumors and percentage of all skin tumors recorded during the specific year are presented in Table 6.

Table 3. Median, mean patients' age and standard deviation during the observed period

PHD	Mean patients' age	Std. Deviation	Median of age	Minimum	Maximum
Mycosis fungoides	58.78	14.811	62.00	23	79
Other types of cutaneous lymphomas	69.56	16.210	74.00	45	91
Melanoma	62.96	16.966	68.00	19	90
Planocellular carcinoma	72.72	11.124	74.00	28	103
Basocellular carcinoma	68.52	12.116	70.00	9	99

Table 4. Type and number of skin tumors according to histopathology diagnosis during observed period

PHD	2003	2004	2005	2006
CARCINOMA BASOCELLULARE	491	535	442	534
CARCINOMA PLANOCELLULARE	167	158	124	84
CARCINOMA BASOPLANOCELLULARE (carcinoma mixtum)	2	1	2	2
BOWEN DISEASE	40	41	43	42
MELANOMA	7	9	18	12
MELANOMA METASTATICUM	2			
KERATOACANTHOMA	13	15	7	8
MELANOACANTHOMA	1			
MYCOSIS FUNGOIDES	10	2	7	7
LYMPHOMA CUTIS	7		1	1
ANGIOKERATOMA	3			
CLEAR CELL ACANTHOMA	2	2		
MORBUS PAGET	2	1	1	3
SARCOMA KAPOSI	3	11	13	9
ANGIOSARCOMA				1
SARCOMA			1	
LEIOMYOSARCOM				2
DERMATOFIBROSARCOMA PROTUBERANS			1	
LYMPHANGIOMA			1	
CARCINOMA SEBACEUM			2	1
SYRINGOMA	2			
MASTOCYTOSIS	8			
NEUROFIBROMA	2			
SCHWANOMA	1			
CYLINDROMA				1
LEIOMYOMA				1
total number of skin tumors	765	775	663	708

Basal cell carcinoma

During the study period, 2002 BCC cases were recorded, accounting for 68.77% of all skin tumors registered during this period (Fig. 1). The highest number of BCC were recorded in 2004 (n=535), whereas in 2005 it was the most commonly diagnosed skin cancer (Table 4).

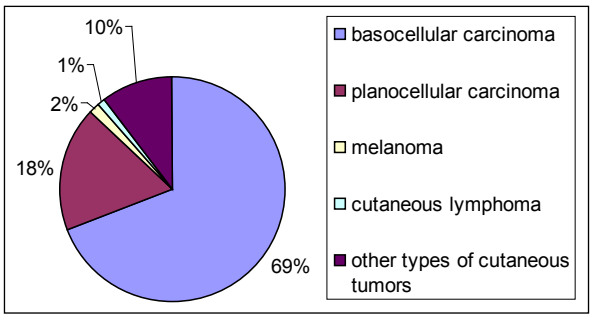

Figure 1. Percentage of all skin tumors

Table 5. Number of all skin tumors according to their localizations

Localization	2003	2004	2005	2006
Frontal region	115	133	70	85
Buccal region (cheeks)	118	89	51	70
Nose	127	136	97	101
Upper palpebra (if specified so)		5	1	3
Lower palpebra (if specified so)	1	2	17	13
Medial eye corner		4	3	2
Lateral eye corner		1		
Lower lip (if specified so)	12	14	12	15
Upper lip (if specified so)	7	13	2	4
Mental region	4	4	5	13
Nasolabial sulcus	5		7	9
Ears	18	29	26	23
Preauricular region	21	26	15	14
Retroauricular region	13	11	7	19
Scalp	21	13	15	18
Neck	26	21	24	33
Trunk	34	5	1	1
Back	85	79	106	99
Chest	17	29	39	41
Abdominal region	26	23	13	11
Mammilar region		2	7	
Shoulder and brachial region	26	32	29	27
Antebrachial region	20	17	15	10
Dorsal and palmar hand side	14	7	4	7
Axillar region	4	1	2	1
Fingers		1	6	1
Femoral region	11	20	14	17
Crural region	16	33	27	32
Foot	9	5	8	7
Toe fingers			1	
Gluteal region	2	5	4	1
Vulva				5
Penis		2		
Inguinal region	4		2	
Genital and perigenital region	1			
Unknown localization (not specified)	8	6	32	26
Number of skin tumors during the specific year	765	775	663	708

The BCC *vs*. SCC ratio was 2.93 in 2003, 3.39 in 2004 and 3.56 in 2005. In 2006, the number of SCC decreased, yielding a higher BCC *vs*. SCC ratio of 6.45. The mean BCC to SCC ratio throughout the study period was 4.08. The relationship and

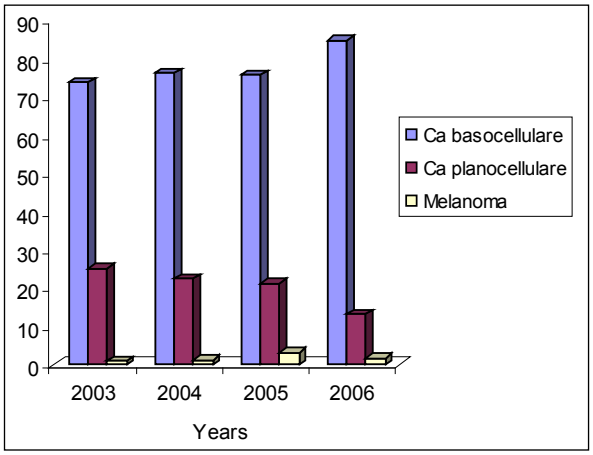

Figure 2. Percentage of three most important skin tumors in observed period

percentage of the three most frequent skin cancers are shown in Figure 2 and according to age groups in Figure 3. However, during the study period, no statistically significant change was noted either for BCC or SCC. BCC was found in younger patients, with the exception of 2004 (Figs. 4-7). BCC was most frequently diagnosed in elderly patients (age group over 65). The percentage of BCC increased with age. The mean age of BCC patients was 68.52, standard deviation 12.116 and median age 70 years (Table 3).

According to sex distribution, BCC was slightly more common in female (n=1029; 51.39%) than in male population (n=973; 48.60%. Analysis of sex differences in BCC localization showed nose to be more frequently affected in females (20.79% *vs.* 16.03%), while ears, neck and chest were more frequently affected in males (3.59% *vs.*1.65%; 5.14% *vs.*3.49%; 5.75% *vs.* 3.49%). No differences were observed in other localizations of BCC (Fig. 8).

Squamous cell carcinoma

Total number of SCC was 533. This type of skin cancer accounted for 18.31% of all skin tumors during the 4-year study period (Fig. 1). SCC was found in the 30-64 and >65 age groups, with the exception of 2004 when one case of SCC was identified in the <29 age group. We found 78.91% of SCC patients to be older than 65 years (Figs. 4-7). The mean age was 72.72 years, standard deviation 11.124 and median age 74 years (Table 3). There was no statistically significant change in SCC during the study period.

Analysis of sex distribution revealed a slight male predominance (54.78%). Frontal region was the most common localization of SCC (18.76%), followed by buccal region (15.95%) and nose

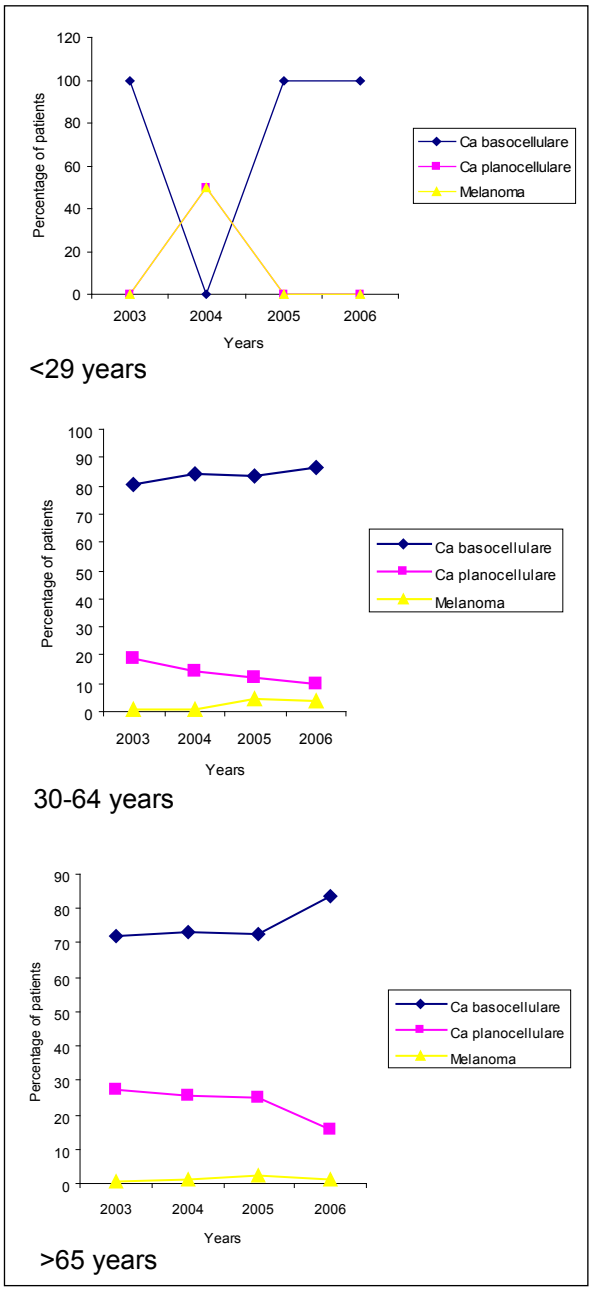

Figure 3. Percentage of skin tumors during observed period shown in different age groups

(15.19%). However, lower lip was also frequently involved (9%). According to our study results, lower lip was the most frequent localization of SCC.

Analysis of sex differences in SCC localization showed it to more frequently occur on lower lip in male than in female patients (10.27% *vs.*7.47%) (Fig. 9). In addition, it was more commonly found in male patients on ears, and in preauricular and retroauricular region (15.07% *vs.* 5.81%). Males had SCC on the neck, while in females it was extremely rarely found at this location (7.88% *vs.*

Table 6. Five most frequent localizations of skin tumors during years 2003 to 2006

	2003	2004	2005	2006
1.	Nose 127 (16.6%)	Nose 136 (17.55%)	Back 106 (15.98%)	Nose 101 (14.26%)
2.	Buccal region-cheeks 118 (15.42%)	Frontal region-forehead 133 (17.16%)	Nose 97 (14.63%)	Back 99(13.98%)
3.	Frontal region -forehead 115 (15.03%)	Buccal region-cheeks 89 (11.48%)	Frontal region-forehead 70 (10.55%)	Frontal region-forehead 85 (11.69%)
4.	Back 85 (11.11%)	Back 79 (10.19%)	Buccal region-cheeks 51 (7.69%)	Buccal region-cheeks 70 (12%)
5.	Trunk 34 (4.44%)	Lower leg 33 (4.26%)	Chest 39 (5.88%)	Neck 33 (4.66%)

0.41%). In female patients, SCC was more common on the cheeks (21.99% *vs*. 10.96%) and nose (19.09% *vs*. 11.99%). However, SCC on lower legs was almost exclusively found in female patients.

Melanoma

MM was a rare finding in our material (n=46). MM was found and verified in 1.58% of all cases of skin tumors and 0.27% of all biopsies examined (Fig. 1). The number of MM was observed to rise from 2003 to 2005, when the highest number of MM recorded (Table 4). In 2005, 18 MM cases were histopathologically verified. However, there was no statistically significant change in MM group during the study period.

MM was found in all three age groups (Figs. 4-7). MM was most frequently found in elderly population (54.35%), closely followed by the group of adults (41.30%), while only one case was recorded in younger population in 2004. The mean age was 62.96 years, standard deviation 16.966, median age 68 years (Table 3). According to sex distribution, a slight male predominance was observed, with 52.17% of all MM cases recorded in male patients.

Analysis of MM according to localization showed the majority of cases to occur on the back (23.91%), followed by the face (19.56%) and lower legs (13.04%) (Fig. 10).

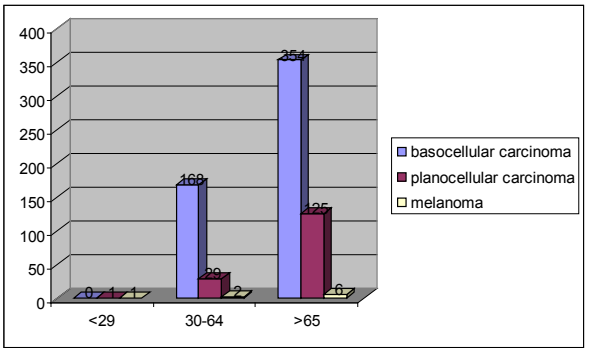

Figure 5. Distribution and number of skin tumors according to age groups in year 2004

MM localization showed sex differences. In female patients MM was found on the face (28.57%), back (23.81%) and femoral region (19.05%). Other localizations included abdomen, antebrachial region and lower leg (Fig. 10). In men, the most frequent localization of MM was on the back (24%), whereas all other localizations were less common and included the face, neck, chest, abdomen, brachial and antebrachial region, femoral region, and lower leg.

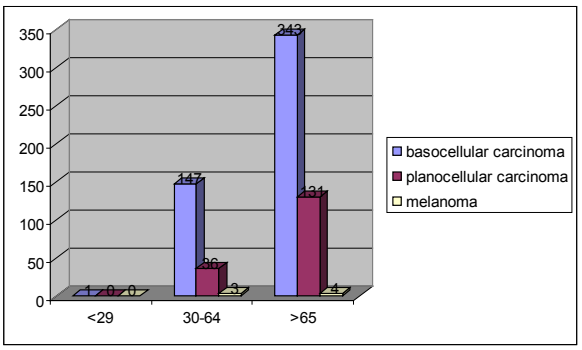

Figure 4. Distribution and number of skin tumors according to age groups in year 2003

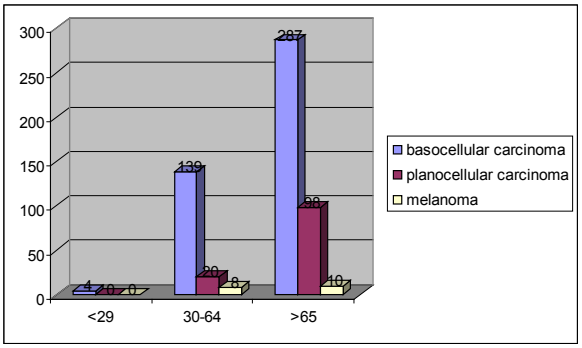

Figure 6. Distribution and number of skin tumors according to age groups in year 2005

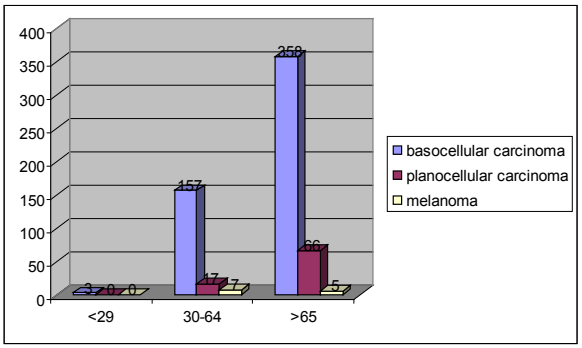

Figure 7. Distribution and number of skin tumors according to age groups in year 2006

In 2003, two metastatic MM cases were verified on the skin. These metastatic MMs were excluded from other types of metastatic tumors that were found in the skin. Primary sites of these metastatic MMs in the skin were unknown to us.

Cutaneous lymphoma

Cutaneous lymphoma (CL) was also rarely found, accounting for 1.2% of all cases of skin tumors and 0.2% of all skin biopsies examined (Fig. 1). During the 4 study years, 35 CL cases were recorded (Table 4). The highest number of CL (n=17) was recorded in 2003. In 2004, only 2 CL cases were recorded, then 8 cases in 2005 and 8 cases in 2006.

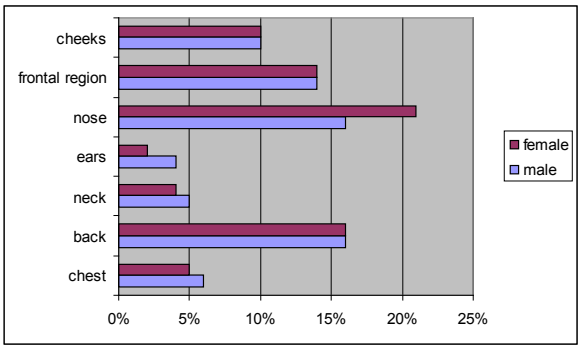

Figure 8. Localizations of basocellular carcinoma according to sex

The most frequent and most commonly found CL was mycosis fungoides (MF). For simplicity of expression, we separated MF from other CL types (group named in charts as lymphoma group). Results are shown in Figure 11. Out of 35 CL cases, 26 were MF (74.29%).

Analysis of CL patients according to age groups showed 100% of MF cases to be in the <29 age group. In adult group, 80% were MF and 20% other types of CL. The percentage of other CL was rising with age (Fig. 12). The mean age of

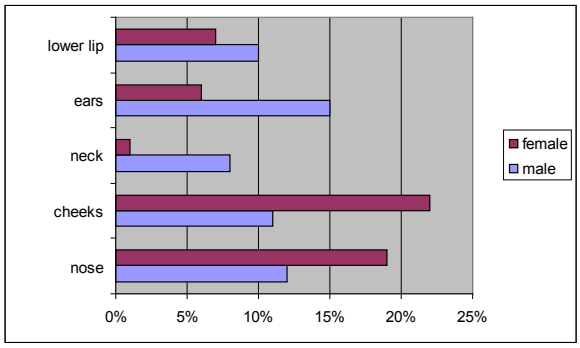

Figure 9. Localizations of planocellular carcinoma according to sex

MF patients was 58.78, standard deviation 14.811 and median of age 62 years (Table 3). The mean age of patients with other types of CL was 69.56, standard deviation 16.210 and median of age 74 years.

DISCUSSION AND CONCLUSIONS

BCC and SCC are usually classified as NMSC. These skin tumors are probably the most common tumors in human population, however, as they have very low mortality rate (15,21,22,32), these tumors have not been systematically collected and included in the National Cancer Registry (1-9,13-15,17-19). The incidence of NMSC and MM is rising throughout the world. Evaluation of these trends in skin cancer will allow for better planning the prevention of skin cancer in the future.

Recent literature data confirm rapid increase in the incidence of NMSC worldwide (2,3,5,9,34). Data are mainly available for the USA and Australia, suggesting that the incidence of NMSC has been on an increase. According to Revenga Arranz *et al.*, 43000 new BCC and 15000 new SCC cases will be diagnosed every year in Spain, posing tremendous costs for healthcare systems (25). Direct costs of health services treating NMSC in Australia are by 50% higher than that for the

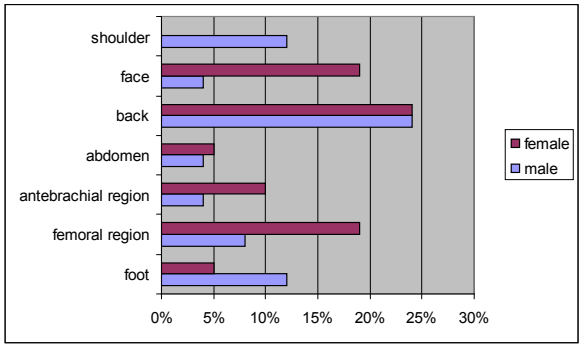

Figure 10. Melanoma localizations according to sex.

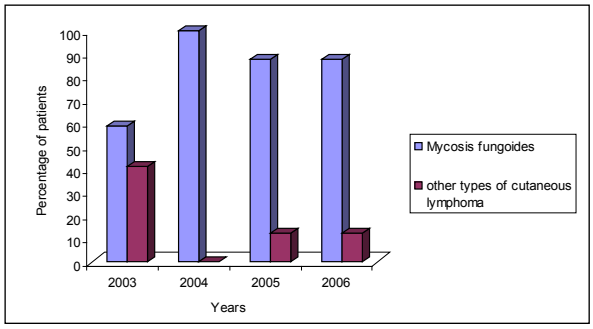

Figure 11. Distribution of the patients by year within cutaneous lymphoma tumor type

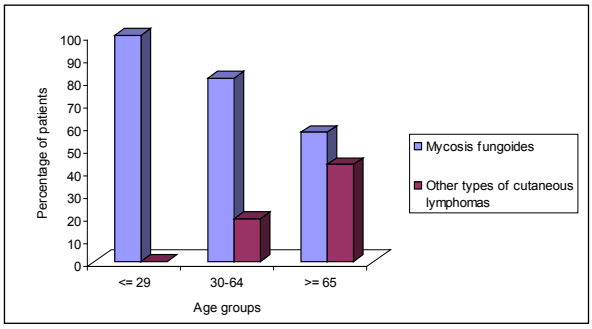

Figure 12. Distribution of the patients by age group within cutaneous "lymphoma" tumour type

treatment of breast cancer (12,15). However, nowadays there is still little information from European countries (5-7,9,17,18,25).

There are no literature data on the epidemiology of NMSC in Croatia, since oncotypes are have only been collected on hospitalized patients. The majority of these skin tumors are excised *in toto* at outpatient facilities. MM, however, is recorded more systematically in Croatia and there are some recently published literature data on the issue (10).

We were mainly interested in four types of skin tumor, i.e. BCC, SCC, MM and CL. Other, less frequently found skin tumors were also noted. Invasive carcinomas and in situ carcinomas were included, whereas cutaneous metastatic tumors were excluded.

We recorded 2911 cases of skin tumors. BCC was the most common skin cancer and the most commonly found NMSC. The second most common skin cancer found in our material was SCC. BCC was found in 2002 (68.77%), SCC in 533 (18.31%), MM in 46 (1.58%) and CL in 35 (1.2%) cases. The highest number of BCC (n=535) were recorded in 2005. In 2005, BCC was the most commonly found skin cancer with 69.03% (the mean percentage throughout the study period was 68.77%). These results are similar to the results of an epidemiological study conducted in Schleswig-Holstein region, Germany (5).

During data collection, we observed multiple skin tumors in our patients, which is comparable to recent literature data (12). When analyzing sex distribution, no statistical sex difference was observed, with the exception of adult group (age 30-64) in 2006, which showed a statistically significant difference in terms of female predominance.

Our results confirm that skin cancers are more frequent in elderly population (mean age 68.94, median 71.00, standard deviation 12.656). These results are comparable with the results of a hospital-based study in northern Spain: mean age 71.4 for BCC and 77.3 for SCC (25). The most frequently affected age groups were those born during the 1921-1930 and 1931-1940 periods.

MM was most commonly found in elderly population (>65) (54.35%) and adult population (age 30-64). It was rarely found in the group of young patients (<29); one case of MM was recorded in this age group.

During data collection, we considered 36 different localizations of skin tumors. Face was the most common localization of skin tumors, especially those with etiopathogenesis related to sun exposure. So, 14 different localizations were differentiated for tumors found on the face. Our data also confirmed NMSC and MM to occur in sun exposed areas. Slight sex differences were observed, which could probably be explained by different sun exposure behavior (sun bathing, use of sunscreens), clothing differences, and hair length differences (especially for ears). BCC was frequently found on the nose, back and forehead, similar to the study reported by Revenga *et al*. in 2004 (25). Analysis of sex differences in BCC localization indicated the nose to be frequently affected in females (20.79% *vs*. 16.03%), while ears, neck and chest were more frequently involved in males (3.59% *vs*.1.65%; 5.14% *vs*.3.49%; and 5.75% *vs*. 3.49%, respectively). Other BCC localizations yielded no sex differences. Lower lip appeared to be exclusively reserved for SCC. SCC localization showed greater sex differences than BCC. Similar patterns were also observed for MM. As compared with female patients, in male patients SCC was more frequently found on lower lip (10.27% *vs*. 7.47%) and ears (15.07% *vs*. 5.81%). Males had SCC on the neck, while it was extremely rarely found at this location in female patients (7.88% *vs*. 0.41%). Female patients had SCC more often on the cheeks (21.99% *vs*. 10.96%) and nose

(19.09% *vs*. 11.99%). However, SCC on lower legs was almost regularly found in female patients.

MM localizations also showed sex differences. In female patients, MM was found on the face (28.57%), back (23.81%) and femoral region (19.05%). Other localizations included abdomen, antebrachial region, and lower leg. In men, the most frequent localization of MM was the back (24%), while all other localizations were less frequent and included the face, neck, chest, abdomen, brachial and antebrachial region, femoral region, and lower leg.

BCC was slightly more frequently found in female population. In younger population, only BCC was found, with the exception of 2004. MM was found in 31.15% of the adult group (age 3-64), while the majority were elderly patients (age >65) (68.43%). The BCC to SCC ratio was 2.93 in 2003, 3.39 in 2004, 3.56 in 2005, and 6.45 in 2006 due to a decreased number of SCC in this year. We could not find any obvious explanation for the change in the BCC to SCC ratio. According to literature data, BCC is four times more frequently reported than SCC (6). The mean BCC to SCC ratio during the study period was 4.08, which is consistent with literature data (25).

SCC was recorded in 533 cases. Our results showed 78.91% of SCC patients to be older than 65, confirming the fact that SCC is mostly found in elderly population. SCC was slightly more commonly found in males (54.78%). The most common localization of SCC was frontal region (18.76%), followed by buccal region (15.95%) and nose (15.19%). According to our study, lower lip (9%) was an exclusive localization of SCC.

There were 46 (1.58%) MM cases. MM was generally found in the elderly age group and group of adults. In our material, a slight male predominance was observed (52.17%).

During the 2003-2006 period, 35 (1.2%) CL cases were histopathologically verified. The most frequent and most commonly found CL was MF. Out of 35 CL cases, 26 (74.29%) were diagnosed as MF. In younger group of patients, only MF was diagnosed. In elderly patients, other types of CL are more likely to be found than MF.

Our retrospective epidemiological study revealed no increase in the rate of NMSC and MM during the 2003-2006 period. There was no significant sex difference either. Age median was 71 years. The trend observed in young population and recently published in the literature was also studied. We recorded skin tumors in younger individuals, which is consistent with literature data (19,27,28,34). As these tumors do occur but are rare in young population groups, definitive conclusions on these groups cannot be made with certainty. In the majority of cases, these tumors are localized in sun exposed areas.

In our study, we faced the problem of incomplete patient data, e.g., mainly localization and personal data such as birth date or place of residence, or data on sun exposure. Since skin tumors pose great burden for healthcare system and their number is growing daily, we suggest tight collaboration of the registering dermatovenereologic and histopathologic facilities and other pathologists with the National Cancer Registry. The more accurate epidemiological data are collected, the more comprehensive is our knowledge about the epidemiology of skin cancers.

Preventive measures are suggested at the national level, such as the German campaign known as *Sonne(n) mit Verstand* (1). Good preventive measures have already yielded satisfactory results, e.g., preventive program in Australia, primarily for melanoma and also for nonmelanoma skin cancers (15). We point to the need of multidisciplinary approach, collaboration of all large national centers of dermatology and venereology, along with other specialties and disciplines. The initiative of the Committee for Dermatology and Venereology of the Ministry of Health and Social Welfare of Republic of Croatia was launched in 2008 on NMSC and MM prevention and preparation of the National Program for Prevention of Malignant Skin Cancers.

CONCLUSION

We have to develop strong interaction of caregivers and patients in order to teach our patients on appropriate preventive measures. Preventive programs can get popularity through mass media (television, radio stations, newspapers and magazines, internet-educational web sites with expert explanations and guidance). In view of the information presented above, it is clear that the management of skin tumors, nonmelanoma and melanoma, will impose significant demands on health services in the years to come. It is up to dermatovenereologists to take guidance in this difficult but not impossible task.

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By bad weather – Nivea cream; year 1936.
(from the collection of Mr. Zlatko Puntijar)