

# Cutaneous Malignant Melanoma in Central Iran: A 20-Year Study

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**Background:** Skin cancers are the most common cancers around the world. Cutaneous malignant melanoma (CMM) is the malignancy of melanocytes that are mainly located in the skin and mucous membranes.

**Objective:** This study tried to evaluate the incidence and mean survival time of cutaneous malignant melanoma (CMM) in Yazd, Iran. It seems that the epidemiology and clinical aspects of CMM in Iran are different from those in other parts of the world; also due to the limited and scattered studies there isn't lot in the literature regarding CMM in Iran.

**Materials and Methods:** This study used data obtained from the cancer registry center in the province of Yazd for a period of 21 years (1988 - 2008). Population and statistical data were gathered from "National Organization for Civil Registration". Population-based data were analyzed, focusing on the incidence and mean survival time over this 21 year period.

**Results:** The mean incidence rate for CMM in Yazd-Iran between 1988 and 2008 was 0.40 per 100,000 for males and 0.27 per 100,000 for females per year, and the incidence of CMM was relatively constant during this period of time. The mean survival rates for women were better than men (80.5% and 76.3% respectively).

**Conclusions:** CMM in Yazd is a low-incidence skin tumor that shows a relatively fixed incidence between 1988 and 2008, Higher incidences of CMM were found in sun-exposed areas (especially head and neck areas), with more incidence in men. Skin cancers and CMM incidence in Iran is lower than western countries, most probably due to geographical zone, genetic factors, skin type, society-related customs including clothing styles.

**Keywords:** Cutaneous Malignant Melanoma; Epidemiology; Prevalence; Survival Rate

## 1. Background

Skin cancers are the most common cancers around the world (1-5). Cutaneous malignant melanoma (CMM) is the malignancy of melanocytes that are mainly located in the skin and mucous membranes. As CMM has the highest rate of skin cancer-related deaths worldwide, its early detection is the mainstay of reducing mortality. Melanoma shows great potential for dissemination, and for this reason it constitutes one of the severe tumors amongst skin lesions, with high mortality rates when diagnosed late (6-8). Solar UV-Rays are amongst the most important causes of skin cancers (including CMM). In tropical countries with sunny climates, working outdoor increases the risk of skin malignancy in fair skin people (1, 5, 9). The frequency of such lesions increases with age (10).

Amongst other causes of skin cancer are exposure to X-Ray, viruses and diseases that weaken the immune system (1, 2, 6, 11-14). Nevi are generally benign and very scarcely transform to skin cancers (especially CMM), and in such a case congenital nevi pose the highest and com-

mon moles with the lowest risk of transformation (1-15%) (1-3, 15). Skin malformations are easily visible even with untrained-bare eye. Most skin cancers can be easily diagnosed and efficiently treated if patients are provided with basic information, and medical students are properly trained (5, 9). In Iran higher incidences of skin cancers and CMM can be expected because of direct bright sunlight in most seasons of the year, direct exposure of individuals to solar UV-Rays, and insufficient use of protective measures such as apparel and hats. Studies of skin cancer situation in Iran have been limited and scattered (16, 17).

## 2. Materials and Methods

This is a cross-sectional analytic study using simple census sampling. The sample population consists of patients referred to public health centers in province of Yazd with the diagnosis of skin cancer confirmed by pathology between 1988 and 2008. We gathered descriptive data from cancer registry center in the province, and death records

### Implication for health policy/practice/research/medical education:

In this manuscript, we report the results of epidemiology and statistical analysis of cutaneous Malignant Melanoma in central Iran. We believe that our findings could be of interest to the readers of Journal, because they could have a great impact on the situation of skin cancer especially malignant melanoma in this area of world with some differences with others. Indeed, we know most skin cancers can be easily diagnosed and efficiently treated if patients are provided with basic information, and medical students are properly trained.

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and causes for deaths from patient's profiles at times of admission and discharge. Population and statistical data were gathered from "National Organization for Civil Registration". For analysis the data we used chi-square test to calculate prevalence of Melanoma, Kaplan - Meier and Mantel-Cox test to calculate annual death rates and mean five year survival for CMM.

### 3. Results

In a period of 21 years (1988 - 2008), 15056 cases of can-

cers were recorded; 3071 cases had Non-Melanoma skin cancer (NMSC) and 71 cases had CMM. Table 1 demonstrates the prevalence of these cancers categorized by gender and registration year. The prevalence of NMSC during this period was 18 - 22.4% with mean of 20.39% of all body cancers. A total of 71 cases of CMM were reported; 28 (39.43%) women and 43 (60.56%) men. This was about 2.3% of all recorded cases with skin cancer. The frequencies of CMM based on age groups are shown in table 2. More than 42% of patients were between 40 - 60 years of age.

**Table 1.** Distribution of Reported Cancers (All, NMSC, CMM) in Different Years (1988-2008)

Year	Malignant Melanoma			Non-Melanoma Skin Cancer	All Reported Cancers
	Total	Male	Female		
1988	4	3	1	153 (23.3%)	656
1989	5	2	3	162 (22.4%)	723
1990	2	2	0	148 (21.5%)	687
1991	1	0	1	137 (19.6%)	698
1992	3	2	1	149 (20.9%)	712
1993	4	2	2	136 (21.8%)	623
1994	3	2	1	129 (19.5%)	659
1995	5	2	3	134 (18.5%)	724
1996	4	3	1	117 (18.6%)	628
1997	3	2	1	146 (19%)	767
1998	3	3	0	143 (18.8%)	785
1999	4	2	2	142 (19.1%)	742
2000	2	1	1	159 (20%)	794
2001	3	2	1	169 (20%)	842
2002	5	3	2	157 (19%)	823
2003	2	2	0	127 (16.5%)	768
2004	3	1	2	157 (19.4%)	806
2005	3	2	1	166 (20.8%)	796
2006	4	2	2	141 (16.8%)	839
2007	4	3	1	153 (18.4%)	828
2008	4	2	2	146 (18%)	812
<b>Total</b>	<b>71</b>	<b>43</b>	<b>28</b>	<b>3071(20.39%)</b>	<b>15056</b>

**Table 2.** Malignant Melanoma Patients Based on Age Groups

Age Group	Number	%
Under 40	5	7
40-49	11	15.5
50-59	19	26.7
60-69	12	17
70-79	15	21.1
80 and over	9	12.7
<b>Total</b>	<b>71</b>	<b>100</b>

Table 3 shows the localization of the lesion and the treatment procedures. Face with 38% is the most common area of involvement. In total 60% of CMM lesions were in the

head and face area. 53.5% of cases were treated with surgery, 12.7% with chemotherapy, 11.3% with radiotherapy and 22.5% with combination of radiation and chemotherapy.

**Table 3.** Localization of Involved Area with CMM

Location of Lesion	Number	%	Treatment Type	Number	%
Face	27	38	Surgery	38	53.5
Limbs	19	26.7	Chemotherapy	9	12.7
Head and Neck	17	24	Radiotherapy	8	11.3
Other body site	8	11.3	Combination	16	22.5
<b>Total</b>	<b>71</b>	<b>100</b>	<b>Total</b>	<b>71</b>	<b>100</b>

Table 4 shows the mean five year survival rates and standard errors based on gender. The mean survival rates for women were better than men (80.5% and 76.3% respectively). Also table 4 shows that highest survival rate (based on career) belong to clerks with 92.1%, and for the treatment procedures correspond to surgery with 85.6%. Table 5 shows mean cumulative probability survival according to gender.

**Table 4.** Mean Survival Time According to Gender, Occupation and Type of Treatment

Survival, 5 Years	Mean of Survival	Standard Error
<b>Sex</b>		
Male	76.3	0.010
Female	80.5	0.013
<b>Occupation</b>		
Farmer	79	0.010
House wife	73.2	0.018
Clerk	92.1	0.025
Worker	88.2	0.021
<b>Treatment Type</b>		
Surgery	85.6	0.010
Chemo-therapy	31.9	0.014
Radio-therapy	64.7	0.019
Combination therapy	43.2	0.025

**Table 5.** Cumulative Probability Survival According to Gender

	Mean			
	Estimate	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
<b>Male</b>	43.603	5.129	33.551	53.655
<b>Female</b>	37.202	4.333	28.709	45.695
<b>Overall</b>	44.648	3.988	36.831	52.464

#### 4. Discussion

Epidemiological studies around the world indicate that CMM accounts for about five percent of all types of skin cancer leading to about three-quarters of all deaths due to skin cancers (18).

Table 6 shows incidence of CMM for 23 selected countries (19). The highest have been reported from Queensland, Australia with 56 new cases per year per 100,000 for men and 43 for women (20). This rate for the United States is 14 for men and 11.33 for women. In Northern Europe it is less than five per 100,000 (18, 21). The highest rates belongs to Scandinavia (especially Sweden) with 15 cases per 100,000 inhabitants, and the lowest rates are from the Mediterranean countries (about 5 - 7 cases per 100,000 inhabitants per year) (22).

In Iran limited studies have been accomplished, with estimated incidence of 0.3 new cases of CMM per 100,000 per year (23). This study is consistent with the previous results indicating that the incidence of CMM is much lower compared to Non-Melanoma Skin Cancers (NMSCs). The incidence of CMM during this study (1987 - 2008) was relatively constant, which is in contrast to current literature that shows a rise in fair-skinned populations throughout the world for several decades (24, 25). Available data suggests that the frequency and distribution of CMM in men and women could be related to part of the body exposed to the sun (26). In an epidemiological study in Brazil, CMM affected men and women equally (5, 27-29), in Europe; a German study showed equal incidence in both sexes, whereas, in countries with a lower incidence, such as Great Britain, a higher incidence of CMM was found in women (30). In countries with a high CMM incidence, such as Australia, there was a higher rate of CMM in men (31-33).

A study in Iran - Isfahan (1988) showed that melanoma was 1.5 times more frequent in men than in women. (16). This study also showed that CMM is 1.5 times more frequent in male than female. It is very likely that clothing style and body covering routines, and the lower levels of employment of women in outdoor activities in this area,

**Table 6.** Incidence of Cutaneous Malignant Melanoma (per 100,000) for 23 Selected Countries

Country	Male		Female	
	Crude	ASR	Crude	ASR
Australia	51.6	40.5	40.7	31.8
New Zealand	45.2	36.7	44.4	34.9
Sweden	19.8	12.6	19.9	13.3
U.S.A.	16.4	13.3	12.9	9.4
Denmark	14.8	10.6	17.6	13.0
Switzerland	12.5	9.3	15.0	11.1
The Netherlands	12.2	9.4	16.7	12.9
Austria	11.5	8.8	15.4	10.4
Canada	10.6	8.2	10.6	8.0
Hungary	10.3	7.6	10.3	6.8
Israel	9.7	9.4	11.0	9.8
Germany	9.3	6.5	11.4	7.1
France	8.6	6.8	11.1	7.9
U.K.	8.3	6.1	11.3	7.7
Poland	6.6	5.6	8.6	6.7
Italy	6.5	4.6	8.2	5.5
Russian Federation	6.3	5.4	6.4	4.7
Spain	4.0	2.8	6.8	4.5
South Africa	3.8	6.4	3.6	4.8
Brazil	2.9	3.5	2.0	2.2
Greece	2.5	1.9	3.2	2.0
Japan	0.63	0.40	0.49	0.29
China	0.21	0.22	0.17	0.17
Iran (Yazd)	0.40	0.38	0.27	0.22

may play a role in such differences. Skin cancers mainly appear in the sixth, seventh and latter decades of life. But CMM mostly appears about 10 years earlier as the literature suggests (1, 4, 11, 34, 35). In the present study more than 42 percent (30 out of 71) of CMM cases were between 40 – 60 years of age that shows a 10 year earlier onset of CMM in comparison with other types of skin cancers, which is in concordance with the literature.

Literature suggests that the anatomical site of CMM varies according to gender. This might represent cultural differences in body coverage. In men most of the tumors are localized on the trunk, in women the more common site is lower extremity as an exposed area, based on the type of clothes used in different parts of the world, followed by head and neck and upper extremities, with nearly equivalence in both sexes (36-38). This study showed that localization of CMM in this area differed from other parts of the world. About 60% (42 out of 71) of all CMMs evolved in head and neck area. This confirmed the important role of exposure to sun in the development of CMM. Based on our study we may conclude that:

1. CMM in Yazd is a low-incidence skin tumor that shows a relatively fixed incidence in the last decades.

2. Higher incidences of CMM were found in sun-exposed areas especially for men.

3. Skin cancers and CMM incidence in Iran is lower than western countries, and it seems that it relates to geographical zone, genetic factors, skin type, society-related customs (including clothing styles and body coverings), and socio-cultural issues and habits.

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## Authors' Contribution

None declared.

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## References

- Quinn AG, Perkins W. Non melanoma skin cancer and other epidermal skin tumors. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. *Rook's Textbook of Dermatology, 4 Volume Set*. Wiley; 2010.
- Newton Bishop JA. Lentigos, Melanocytic Naevi and Melanoma. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. *Rook's Textbook of Dermatology, 4 Volume Set*. Wiley; 2010.
- Grossman D, Leffell DJ. Squamous Cell Carcinoma. In: Fitzpatrick TB, Freedberg IM, editors. *Fitzpatrick's dermatology in general medicine*. USA: McGraw-Hill, Medical Pub. Division; 2008.
- Carucci JA, Leffell DJ. Basal Cell Carcinoma. In: Fitzpatrick TB, Freedberg IM, editors. *Fitzpatrick's dermatology in general medicine*. USA: McGraw-Hill, Medical Pub. Division; 2008.
- Paek SC, Sober AJ, Tsao H, Mihm MC, Johnson TM. Cutaneous Melanoma. In: Fitzpatrick TB, Freedberg IM, editors. *Fitzpatrick's dermatology in general medicine*. USA: McGraw-Hill, Medical Pub. Division; 2008.
- Bennett DC. Human melanocyte senescence and melanoma susceptibility genes. *Oncogene*. 2003;22(20):3063-9.
- Howe HollyL, Wingo PhyllisA, Thun MichaelJ, Ries LynnAG, Rosenberg HarryM, Feigal EllenG, et al. Annual Report to the Nation on the Status of Cancer (1973 Through 1998), Featuring Cancers With Recent Increasing Trends. *J Natl Cancer I*. 2001;93(11):824-842.
- INCA - Instituto Nacional de Cancer. 2008. Available from: <http://www.inca.gov.br>.
- Peterson AnthonyD, Downes Heather, Robinson June. Skin cancer risk assessment11 Disclosure not available at press time. *J Am Acad Dermatol*. 2004;50(3):P8.
- Demers AA, Nugent Z, Mihalciu C, Wiseman MC, Kliewer EV. Trends of nonmelanoma skin cancer from 1960 through 2000 in a Canadian population. *J Am Acad Dermatol*. 2005;53(2):320-8.
- Miller DL, Weinstock MA. Nonmelanoma skin cancer in the United States: incidence. *J Am Acad Dermatol*. 1994;30(5 Pt 1):774-8.
- Federman DG, Kravetz JD, Kirsner RS. Skin cancer screening by dermatologists: prevalence and barriers. *J Am Acad Dermatol*. 2002;46(5):710-4.
- Corona R, Dogliotti E, D'Errico M, Sera F, Iavarone I, Baliva G, et al. Risk factors for basal cell carcinoma in a Mediterranean population: role of recreational sun exposure early in life. *Arch Dermatol*. 2001;137(9):1162-8.
- Geller AC, Zhang Z, Sober AJ, Halpern AC, Weinstock MA, Daniels

- S, et al. The first 15 years of the American Academy of Dermatology skin cancer screening programs: 1985-1999. *J Am Acad Dermatol*. 2003;**48**(1):34-41.
15. Guibert P, Mollat F, Ligen M, Dreno B. Melanoma screening: report of a survey in occupational medicine. *Arch Dermatol*. 2000;**136**(2):199-202.
  16. A survey on prevalence of skin cancers in center of Iran. *J Surv Med Sci*. 2012;**2**(2):65-7.
  17. Noorbala MT, Kafaie P. Analysis of 15 years of skin cancer in central Iran (Yazd). *Dermatol Online J*. 2007;**13**(4):1.
  18. Diepgen TL, Mahler V. The epidemiology of skin cancer. *Br J Dermatol*. 2002;**146** Suppl 61:1-6.
  19. Lens MB, Dawes M. Global perspectives of contemporary epidemiological trends of cutaneous malignant melanoma. *Br J Dermatol*. 2004;**150**(2):179-85.
  20. MacLennan R, Green AC, McLeod GR, Martin NG. Increasing incidence of cutaneous melanoma in Queensland, Australia. *J Natl Cancer Inst*. 1992;**84**(18):1427-32.
  21. Katalinic A, Kunze U, Schafer 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**(6):1200-6.
  22. Garbe C, Blum A. Epidemiology of cutaneous melanoma in Germany and worldwide. *Skin Pharmacol Appl Skin Physiol*. 2001;**14**(5):280-90.
  23. Rahnema Z, Meymandi SS, Nasiri N. Cutaneous melanoma in a desert climate zone: a retrospective study of 125 cases. *Int J Dermatol*. 2010;**49**(4):406-9.
  24. Armstrong BK, Kricger A, English DR. Sun exposure and skin cancer. *Australas J Dermatol*. 1997;**38** Suppl 1:S1-6.
  25. Armstrong Bruce K, Kricger Anne. The epidemiology of UV induced skin cancer. *J Photoch Photobio B*. 2001;**63**(1-3):8-18.
  26. Oumeish Youssef. Epidemiology of primary cutaneous malignant melanoma in Jordan. *Int J Dermatol*. 1997;**36**(2):113-115.
  27. Tamir G, Milo Y, Rothem A, Sulkes J, Hauben DJ. Cutaneous malignant melanoma in young adults under age 30. *Isr J Med Sci*. 1996;**32**(12):1290-6.
  28. Criado PR, Vasconcellos C, Sittart JA, Valente NY, Moura BP, Barbosa GL, et al. [Primary cutaneous malignant melanoma: retrospective study from 1963 to 1997 at Hospital do Servidor Publico Estadual de Sao Paulo]. *Rev Assoc Med Bras*. 1999;**45**(2):157-62.
  29. Ferrari Junior NM, Muller H, Ribeiro M, Maia M, Sanches Junior JA. Cutaneous melanoma: descriptive epidemiological study. *Sao Paulo Med J*. 2008;**126**(1):41-7.
  30. MacKie RonaM, Bray CarolineA, Hole DavidJ, Morris Arthur, Nicolson Marianne, Evans Alan, et al. Incidence of and survival from malignant melanoma in Scotland: an epidemiological study. *Lancet*. 2002;**360**(9333):587-591.
  31. Marrett LD, Nguyen HL, Armstrong BK. Trends in the incidence of cutaneous malignant melanoma in New South Wales, 1983-1996. *Int J Cancer*. 2001;**92**(3):457-62.
  32. Marks R. Epidemiology of melanoma. *Clin Exp Dermatol*. 2000;**25**(6):459-63.
  33. Marks R. The changing incidence and mortality of melanoma in Australia. *Recent Results Cancer Res*. 2002;**160**:113-21.
  34. Giles GG, Marks R, Foley P. Incidence of non-melanocytic skin cancer treated in Australia. *BMJ*. 1988;**296**(6614):13-17.
  35. Kennedy C, Bajdik CD. Descriptive epidemiology of skin cancer on Aruba: 1980-1995. *Int J Dermatol*. 2001;**40**(3):169-74.
  36. Garbe C, Orfanos CE. Epidemiology of malignant melanoma in central Europe: risk factors and prognostic predictors. Results of the Central Malignant Melanoma Registry of the German Dermatological Society. *Pigment Cell Res*. 1992;**Suppl 2**:285-94.
  37. Garbe C, Buttner P, Bertz J, Burg G, d'Hoedt B, Drepper H, et al. Primary cutaneous melanoma. Prognostic classification of anatomic location. *Cancer*. 1995;**75**(10):2492-8.
  38. Garbe C, Wiebelt H, Orfanos CE. Change of epidemiological characteristics of malignant melanoma during the years 1962-1972 and 1983-1986 in the Federal Republic of Germany. *Dermatologica*. 1989;**178**(3):131-5.