

Skin Cancer in Bahrain

Fayek Al-Hilli, PhD*

Objective: Study the incidence and pattern of skin cancer diagnosed in Bahrain among the indigenous Arabs and expatriate population

Methods: Review of histopathology archives in Bahrain between 1952-1999.

Results: Skin cancer account for 6.7% of all malignancies among Bahraini Arabs with 70.2% of the patients above the age of 60 years as compared to 43.8% in the expatriate group. It is 2.5 times more common in the expatriate population in their 4th and 5 decades of life than the Bahraini group. There were no Bahraini patients with MM in their 4th decade as compared to 52.9% in the expatriate group. In both groups, skin cancer particularly BCC predominantly affected the sun the exposed parts of the body. However, BCC and MM of the trunk and lower extremities is 3 times more common among the expatriate group than the Bahraini. Similarly the former group develop 7 times more non-invasive cancers than the Bahraini and also show 9 times more multicentric lesions than Bahraini. Four percent of skin cancers in Bahraini are lymphomas as compared to 0.4% in the expatriate group.

Conclusions. The incidence of skin in Bahrain and the Arabian Gulf countries is low as compared to those of Europe, North America and Australasia. The differences between the Arabs and expatriate population are due to the influence of genetic and ethnic background, local cultural habits of avoiding exposure to the biological effect of solar radiation and the protection provided by local costumes worn by men and women.

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The cumulative effect of exposure to solar ultraviolet (UV) radiation in the causation of skin cancer, namely basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and malignant melanoma (MM) is well known¹⁻³. Since Bahrain and the nearby Arabian Gulf countries have one of the greatest solar energy intensities in the world it would be expected that the incidence of skin cancer in this region, which also shares common cultural, environmental, ethnic, family, and social structure, would be the highest in the world^{4,5}. There are however, no published reports on skin cancer from Bahrain and

* Consultant Pathologist

Salmaniya Medical Complex &
Assistant Chief Editor
Bahrain Medical Bulletin
Kingdom of Bahrain

reports from nearby countries indicate low incidence rates as compared to international figures^{3,5-19}.

We report the frequency and pattern of skin cancer in Bahrain between 1952-1999, a country with a total population of 650,604 individuals, 62% of whom are indigenous Arabs (CSO 2001). The report is based on the data-analysis of patients of all histologically confirmed skin cancers diagnosed in Bahrain between 1952-1999. The results are compared to those obtained from the other Arabian Gulf countries with regard to frequency, sex distribution, age at onset, anatomical location, histological types, and multiplicity of the lesions.

METHODS

The histopathology archives from all government and private hospitals and clinics in Bahrain between 1952-1999 were scrutinized and those with cutaneous malignancies occurring among the indigenous Bahraini Arabs and expatriate residents were analysed with regards to their sex, age at onset, anatomic location, biological behaviour, histological type and multiplicity of the lesions. The 1990 codes and guidelines of the WHO International Classification of Diseases for Oncology (ICD-O) were applied²⁰. Accordingly, skin cancers of genital organs were excluded. Furthermore, only primary cutaneous cancers of behavioural code B/2 (non-invasive- intraepithelial lesions) and B/3 (i.e. invasive tumours) were included in the study. Tumours of uncertain behaviour (B/1), metastatic deposits of unknown primary sites (B/6), and malignancies of uncertain origin whether primary or metastatic (B/9) were not included. Multiple (and recurrent) lesions of the same histological type and from similar or different anatomical sites were considered as one.

RESULTS

Incidence and Sex Distribution. During the 48-year period of this study, there were a total of 5698 histologically confirmed malignant conditions diagnosed among the indigenous Bahraini Arabs and of these 383 (6.7%) were primary cutaneous malignancies. There were 239 (62%) males and 144 (38%) females with a M:F ratio of 1.7:1. During the same period, there were 252 expatriate patients with primary skin cancer and of these the gender was recorded in 249 patients; 184 (74%) males and 65 (26%) females with M:F ratio of 2.8:1.

Histopathological subtypes and Nationality Distribution. The histological types of skin cancer in the Bahraini group were as follows (Table 1): 192 (50%) patients with BCC, 120 (31.3%) with SCC, 19 (5%) with dermatofibrosarcoma, 16 (4.2%) with melanomas, 15 (4%) with lymphomas, and 21 (5.5%) with other tumours. The corresponding rates in the expatriate group were 167 (66.2%) with BCC, 51 (20.2%), with SCC, 17 (6.8%) with melanomas and 17 (6.8%) with other malignancies. The nationalities of the latter group were known in 248 patients: 103 (41.5%) European, 54 (21.8%) Americans, 27 (11%) from the Indian subcontinent, 14 (5.6%) Arabs, 8 (3.2%) Australasian, 7 (2.8%) Arabian Gulf nationals, and 35 (14.1%) from other nationalities.

Table 1. The WHO ICD codes and histological types of skin cancer in 383 Bahraini and 252 expatriate patients. (*) This include 3 MM patients with unrecorded sex.

ICD Codes	Histological Types	Bahraini				Non-Bahraini			
		M	F	T	%	M	F	T	%
8000-8101	Neoplasm NOS	3	1	4	1.0				
8050-8082	Squamous Cell Tumours	81	39	120	31.3	41	10	51	20.2
8090-8110	Basal Cell Tumours	118	74	192	50.0	123	44	167	66.3
8390-8420	Adenexal Tumours	2	6	8	2.1	3	1	4	1.6
8720-8790	Melanotic Tumours	9	7	16	4.2	7	7	17	6.7*
8830+8832	Dermatofibrosarcoma	12	7	19	5.0	6	2	8	3.2
8890+8910	Muscle Tumours	1	1	2	0.5		1	1	0.4
9130+9140	Blood Vessels Tumours	6	1	7	1.9	3		3	1.2
9590-9827	Lymphomas	7	8	15	4.0	1		1	0.4
TOTAL		239	144	383	100.0	184	65	252	100.0

Age Distribution. The age distribution was recorded in the files of 325 Bahraini patients (Table 2), 30 (9.2%) below the age of 30 years, 67 (20.6%) in their 4th and 5th decades of life and 228 (70.2%) above the age of 60 years. The corresponding rates among the 224 expatriate patients with recorded ages were 15 (6.7%), 111 (49.5%), and 98 (43.8%) respectively.

Table 2.

Anatomic Site of Skin cancer Lesions. The anatomic sites of skin lesions in the Bahraini group were recorded in the files of 340 patients (Table 3): 206 (60.6%) in the face, 27 (8%) in scalp and neck, 55 (16.2 %) in trunk and upper extremities, 46 (13.5%) in lower extremities, and 6 (1.7%) in other sites. The corresponding rates in the 241 expatriate group with recorded site were 121 (50.2%), 18 (7.5%), 54 (22.4%), 32 (13.3%), and 16 (6.6%) respectively.

Table 3.

Intraepithelial non-invasive lesions. There were 23 patients with non-invasive skin cancer in this study (B/2): 3 (13%) Bahrainis and 20 (87%) from other nationalities. All lesions of the former group were squamous cell neoplasms while in the latter group 19 were squamous and one melanotic lesion.

Multicentricity. There were 6 (1.6%) Bahraini patients with multiple skin cancers, all of whom had BCC. On the other hand, there were 53 expatriate patients with multiple lesions, 23 (43.4%) with BCC, 5 (9.4%) with squamous lesions, 14 (26.4%) with BCC

and squamous lesions, 6 (11.3%) with BCC and MM, 2 (3.8%) with BCC and dermatofibrosarcoma and 3 (5.7%) with BCC, SCC and MM.

BCC. Of the 192 Bahraini patients with BCC there were 118 (61.5%) males and 74 (38.8%) females with M:F ratio of 1.6:1. The age distribution was recorded in the files of 170 patients: 7 (4.1%) below the age of 30 years, 35 (20.6%) in their 4th and 5th decades of life, and 128 (75.3%) above the age of 50 years. The corresponding rates from 146 expatriate patients with recorded ages were 5 (3.4%), 75 (51.4%), and 66 (45.4%) respectively. The M:F ratio in latter group was 2.8:1. The anatomic locations of BCC lesions in the Bahraini group was known in 181 patients; 145 (80.1%) in the face, 12 (6.6%) in scalp and neck, 15 (8.3%) in trunk and upper extremities, 4 (2.2%) in lower extremities, and 5 (2.8%) in other sites. The corresponding rates in the 160 expatriate patients with recorded sites were 99 (62%), 11 (6.8%), 30 (18.7%), 8 (5%), and 12 (7.5%) respectively. There were 6 (3%) Bahraini patients with multiple BCC lesions: 4 had 2 lesions each, one had 2 and one had 5 lesions respectively. Similarly there were 23 (14%) expatriates with multiple BCC: 14 had 2 lesions, 4 had 3, and 5 had lesions varying from 4 to 9.

SCC. Of the 120 Bahraini patients with squamous neoplasms, there were 81 (68%) males and 39 (32%) females with a M:F ratio of 2.1:1. The age distribution was known in 91 patients; 4 (4.4%) below the age of 30 years, 20 (22%) in their 4th and 5th decades of life and 67 (73.6%) above the age of 50 years. The corresponding rates in the 47 patients of the expatriate group with recorded ages were 4 (8.5%), 18 (38.3%), and 25 (53.2%) respectively. The M:F ratio in the later group was 4.1:1. The anatomic location of the squamous lesions in the Bahraini group was known in 97 patients; 44 (45.4%) in the face, 12 (12.3%) in scalp and neck, 18 (18.6%) on trunk and upper extremities, 22 (22.7%) in lower extremities, and 1 (1%) in other parts of the body. The corresponding rates in the 49 expatriate patients with recorded site were 14 (28.6%), 7 (14.3%), 12 (24.5%), 12 (24.5%), and 4 (8.1%) respectively. All the 5 expatriate patients with multiple squamous lesions had 2 lesions each.

Malignant Melanoma. There were 16 Bahraini patients with melanotic lesions; 9 (56.3%) males and 7 (43.7%) females with M:F ratio of 1.3:1. The age distribution was known in 14 patients; 6 (43%) below the age of 30 years and 8 (57%) above the age of 50 years. The distribution in the 15 expatriate group with recorded age were as follows: 1 (6.7%) below the age of 30 years, 9 (60%) in their 4 th and 5 th decade of life and 5 (33.3%) above the age of 50 years old. The anatomic locations of the melanotic lesions in the Bahraini group were known in 13 patients: 4 (30.8%) in the face, 2 (15.4%) in trunk and upper extremities, and 7 (53.8%) in lower extremities. The corresponding rates in the 15 expatriate group with recorded site were 5 (33.3%), 6 (40%), and 4 (13.3%) respectively. In both groups no melanotic lesion was recorded in the scalp, neck or overlapping sites.

DISCUSSION

In many countries, the incidence of skin cancer is under-estimated and inaccurately reported despite the ease and accessibility of the skin to clinical examination and biopsy procedures. This is because skin lesions including cancer are diagnosed and treated in private or outpatient clinics and not reported to central registries. Moreover, even when cancer is reported, many tumour registries exclude BCC because their high frequency tends to inflate the national cancer figures. Cancer registration in Bahrain was started in 1994 but reports on the frequency rates of cancer have not yet been published. Therefore in the absence of such data, the analysis of histopathology reports should provide a good reflection on the pattern of skin cancer in Bahrain.

The incidence of skin cancer in Bahrain and other Arabian Gulf countries is low. The rates in Europe, North America and Australasia vary from 20% to 32% of all cancers whereas in China, India and Southeast Asia it ranges between 2% to 4%^{1-3,12-14,17}. In the present study, the incidence-rate of 6.7% is close to that of Iraq, Saudi Arabia, and Qatar but lower than the 23% reported from Iran^{5,6,8-11,15,16,18}. Skin cancer is also uncommon in nearby Oman and several other Arab countries accounting for 2% to 4% of all cancers²¹⁻²³. This low incidence among Arabs probably reflects a genetic and ethnic protection²⁴. It is worth noting here that although the Arabian Gulf countries share common ties with free movement of people in this region, there are only seven Gulf Arab nationals and one from Iran registered during the 48 years period of this study. This is again a reflection of the low incidence of skin cancers in the region.

The reason for the low incidence of skin cancer in the Arabian Gulf countries has been attributed to the local cultural habits of avoiding exposure to the biological effects of solar UV radiation and the protective wearing of the head-dress by men (i.e. *Ghutra*) and women (i.e. *Hejab and Veil*). The white body dress (i.e. *Thoub*) and dark garment (i.e. *Abaya, Shayla*) worn by men and women respectively also provide similar protection. In addition, the racial and genetic characteristics of the dark-skinned population of the Arabian Gulf also afford natural protection against UV radiation damage⁵. These protective mechanisms may be responsible for the low incidence of skin cancer in this region.

In Bahrain, 84% of the expatriate population come from the Indian subcontinent as compared to 4% coming from Europe, North America and Australasia, and 3% from nearby Arabian Gulf countries²⁵. But in the present study the corresponding rates of skin cancer of expatriate patients from these regions are 11%, 66.5% and 2.8% respectively. This means that when exposed to additional solar energy environment such as that which prevail in the Arabian Gulf, the dark skinned Asian and Arabian Gulf nationals retain their genetic immunity and show low incidence rate comparable to those of their home countries, whereas the highly susceptible white population demonstrate either similar or higher rates than their national average^{1-3,12-14,17}.

Most of the expatriate white skin population in Bahrain and nearby Gulf countries are outdoor workers wearing costumes exposing most of their bodies. Many other deliberately expose themselves either as a *modes vivendi* or to acquire sun tan and in doing so they become more exposed to the cumulative effect of solar UV radiation⁴. For

this reason they show many differences when compared to the Bahraini group particularly with regards to the sex and age at onset, and the anatomic site and multiplicity of the skin lesions.

The most frequently diagnosed skin cancer in Europe, North America and Australasia is BCC followed by SCC and MM accounting for 75%, 20% and 3% respectively of all reported skin cancers^{1-3,13,14,17}. Again the rates in Bahrain and other Arabian Gulf countries are different from these international figures with lower rate of BCC and higher rates of SCC and MM. Thus, whereas BCC accounts for 50% of all skin cancers in Bahrain, the corresponding rates in Iran, Qatar, and Saudi Arabia are 60%, 56.4% and 38% respectively^{5-7,15}. The rate of SCC in Bahrain is 31.1%, whereas those in Saudi Arabia and Iran are 47% and 28.7% respectively⁵⁻⁷. On the other hand, the 4.2% rate of MM in Bahrain is identical to the 4.3% of Iran but higher than the 0.7% of Saudi Arabia and 0.7% from Iraq^{6,9,11}. The reason for this high incidence of SCC in the Gulf is not known and further studies are required to identify whether the reported cases are complications of scars of burns, osteomyelitis, varicose or chronic leg ulcers. However, the rates of BCC, SCC and MM among the expatriate workers in Bahrain who are predominantly white males from Europe and North America are similar to the rates in their respective countries^{1-4,13,14}. But the rates of BCC and SCC in the Arabian Gulf regions are similar to those of Egypt again indicating the genetic and cultural protections of Arabs against skin cancer^{4,15,22}.

Skin cancer in Bahrain affects more males than females in a proportion of 1.7:1 and this is consistent with international figures. Male dominance is also seen in patients with BCC, SCC and MM and this is also consistent with regional and international rates^{2,3,6,9,11,13,15,17,18}. The M:F ratio among expatriates patients in Bahrain is nearly double and in the case of SCC it is 4 times more common than that of the Bahraini group. These differences can again be attributed to the cumulative effect of solar energy on the predominantly male white expatriate group.

Skin cancer in Bahrain affected male above the age of 30 years with 70.2% of all patients were above the age of 60 years old as compared to 43.8% in the expatriate group. This pattern among the Bahraini group is close to that in Saudi Arabia^{11,18}. In the expatriate group it also affected males above the age of 30 years with 49.50% of all the patients in their 4th and 5th decade of life. However, skin cancer is 2.5 times more common among the expatriate population in their 4th and 5th decade than the Bahrain group. This is because most expatriates workers including those from America, Europe and Australasia come to Bahrain at this age and become exposed to the local solar energy. It would be interesting to know from future studies the duration of the cumulative effect of this energy (i.e. from the time of arrival to Bahrain to the date of diagnosis) as well as how many of these workers who do not develop solar related lesions while working in the Gulf but exhibit such lesions when they return to their home countries.

There were no Bahraini with MM in their 4th and 5th decade of life as compared to 52.9% in the expatriate group. In fact the oldest Bahraini MM patient in this study was 25 years old woman. We have no explanation to this other than the genetic protection of the local

Arab population. However, although the total number of MM patients included in this study, both local Arabs and expatriates is small to draw such a conclusion, the length of the study should justify this.

Despite the genetic and the cultural factors attributed to the protection of the Arabs, skin cancer in the Arabian Gulf countries including Bahrain, predominantly involves the sun-exposed parts of the body^{2,3,5-7,13,15}. Thus 60.6% of all skin cancers amongst the Bahraini occurred on the face as compared to 50.2% in the expatriate group. Similarly 80.1% of BCC and 45.4% of SCC amongst the Bahraini also occurred on the face as compared to 62% and 28.6% respectively in the expatriates. This is because the cumulative effect of solar radiation will continue to exert its effect on the exposed parts even if partially covered by traditional attire^{4,15}. However, there are a number of differences in the anatomic location of skin cancer lesions between both groups. Thus BCC and MM of the trunk and extremities is three times more common among the expatriate groups than the Bahrainis. These differences are again attributed to the enhanced UV exposure on the genetic susceptibility.

Another evidence of the association of solar energy and the development of skin cancer is seen in this study when the number of patients with non-invasive cancer (ICD B/2) and those with multiple lesions are examined. Therefore, because of the prolonged exposure to UV energy and their susceptibility the expatriate population develop 7 times more non-invasive skin cancer than the local genetically protected Bahraini Arabs. Similarly, they also develop 9 times more multicentric lesions than the Bahrainis. Furthermore, while all the multicentric lesions occurring in the Bahraini group are BCC, those in the expatriate group are of mixed histological types.

Except for minor difference in the rate of dermatofibrosarcoma between the Bahraini and expatriate groups, the rates of tumours of skin appendages, muscle, and blood vessel are similar. This indicates that UV energy is only implicated in the pathogenesis of BCC, SCC and MM; the frequency of tumours of these structures follows the international rates. However, in this study 4% of skin cancers among Bahraini Arabs were lymphomas as compared to 0.4% in the expatriates a ratio of 1:10. The rate in Iran is 1%⁶. There are no reports on cutaneous lymphoma from the Arabian Gulf countries and this high rate may be a reflection of high incidence of lymphoma in general in this region^{5-7,9-11,21,22}.

CONCLUSION

In the absence of epidemiological reports on cutaneous cancers in the Arabian Gulf countries, a region which shares common ethnic, family, social, environmental and cultural attributes, it is essential that comparative studies between these countries and other parts of the world be undertaken. Such studies will hopefully identify common local carcinogens and offer possible hypotheses regarding their expressions on the genetic and racial make-up of the population living in the region. However, although the incidence of skin cancer is low in this region, preventive measures such as the initiation of solar exposure-awareness programs must be applied to protect the high-risk expatriate population working in the region.

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