

# Nonmelanoma skin cancer in Saudi Arabia: single center experience

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**BACKGROUND:** Skin cancer is the most common cancer worldwide; one in every three diagnosed malignancies is a skin cancer. However, skin cancer is rarely reported in Saudi Arabia so we conducted this study to highlight these underreported neoplasms.

**OBJECTIVES:** Determine the prevalence and patterns of basal cell carcinoma (BCC) and primary squamous cell carcinoma (SCC), the most common types of nonmelanoma skin cancer (NMSC) with respect to age, sex, and anatomic location and to identify potentially associated risk factors.

**DESIGN:** Retrospective, descriptive medical record review.

**SETTING:** A tertiary care centre.

**PATIENTS AND METHODS:** We did a retrospective chart review of all patients diagnosed with basal cell carcinoma and primary squamous cell carcinoma between 2003-2016.

**MAIN OUTCOME MEASURES:** Prevalence and pattern of BCC and SCC with respect to age, sex, and anatomic location.

**RESULTS:** Of 593 cases reviewed, 279 had NMSC. Most (95%) were diagnosed with BCC or SCC or both in a few cases. The mean age at diagnosis was 59 (19.5) years. Sixty-two percent of the patients were males. However, 24.3% (n=68) of skin cancers occurred in patients younger than 50 years. The frequency of BCC and SCC was 50.2% and 44.8%, respectively. The head and neck was the most common location (79.6%). In patients younger than 50 years, xeroderma pigmentosum and previously treated solid malignancies were the major factors.

**CONCLUSIONS:** BCC and SCC are uncommon but not rare. However, skin cancers are underreported in our population. NMSC in individuals younger than 50 years of age requires more careful evaluation of possible risk factors.

**LIMITATIONS:** Retrospective in a single tertiary care setting.

Skin cancer has become one of the most frequent malignancies worldwide, with one in every three cancers diagnosed as skin cancer.<sup>1</sup> The majority of such cancers are either malignant melanoma (MM) or nonmelanoma skin cancer (NMSC); the latter encompasses mostly basal cell carcinoma (BCC) and primary squamous cell carcinoma (SCC).<sup>2</sup> Generally NMSC is BCC or SCC unless otherwise specified. According to the World Health Organization, between 2 to 3 million NMSCs and 132000 MMs are diagnosed annually worldwide.<sup>1</sup> In our region, the latest Saudi Cancer Registry revealed that this disease was ranked the ninth

most common among both sexes, accounting for 3.2% of all newly diagnosed cases in the year 2010.<sup>3</sup> The five regions with the highest age-specific rates (ASR) were Riyadh at 4.4/100000, Tabuk at 4.3/100000, Jazan at 3.8/100000, the Eastern region at 3.6/100000, and the Northern and Qassim regions at 3.4/100000 each.<sup>3</sup>

Many factors play a role in the cause of NMSC, including environmental (ultraviolet radiation, ionizing radiation, and chemicals such as arsenic and polycyclic aromatic hydrocarbons) and host factors (genetic vulnerability, age, sex, presence of precursor lesions, and pre-existing medical conditions).<sup>2,4,5</sup> Saudi Arabia is

located in low northern latitudes, and has high sun exposure.<sup>5</sup> Precise population-based studies of the prevalence, patterns, and risk factors for skin cancer are essential for the evaluation of the disease burden and development of prevention strategies.

## PATIENTS AND METHODS

We conducted a retrospective chart review of all patients diagnosed with BCC or primary SCC or both between 2003–2016 after the approval of the Office of Research Affairs (RAC# 2161207). Demographic data were extracted from records as well as tumor location, clinical and histological variants and possible risk factor. Only patients with BCC or primary SCC were included. IBM SPSS software (version 22) was used for this descriptive analysis.

## RESULTS

Of 279 patients with NMSC diagnosed between 2000 and 2016 in our institution, 62 percent were male, and the male-to-female ratio was 1.6:1. The majority of patients (82.4%, n=230) were Saudi nationals, and their cities of original residence were in the central (43.7%, n=122), western (22.2%, n=62), northern (6.1%, n=17), eastern (5.4%, n=15), and southern (2.9%, n=8) parts of the country. The mean (SD) age at diagnosis was 59.1 (19.6) years. The frequency of BCC was 50.2% while that of SCC was 44.8% (Table 1). Most of patients were diagnosed in the 6th to 7th decade of life (43.7%) (Figure 1) and most were males (Table 2). Most (79%) of tumors were in the head and neck region; 16.9% over the nose and 9.7% on the scalp, followed by the lower extremities (7.2%), trunk (6.5%), upper extremities (4.3%), and anogenital region (2.2%). The most common type of BCC was nodular, while a moderately differentiated SCC was the most common (Tables 3 and 4). Twenty-four percent of the patients were younger than 50 years of age (n=68) and the primary risk factor in those patients was xeroderma pigmentosum (n=21). No risk factors were identified in 26 (38.2%) under the age of 50 (Table 5). Most (88.9%) patients underwent surgical treatment and 9.4% received radiation either alone or in combination (Table 6).

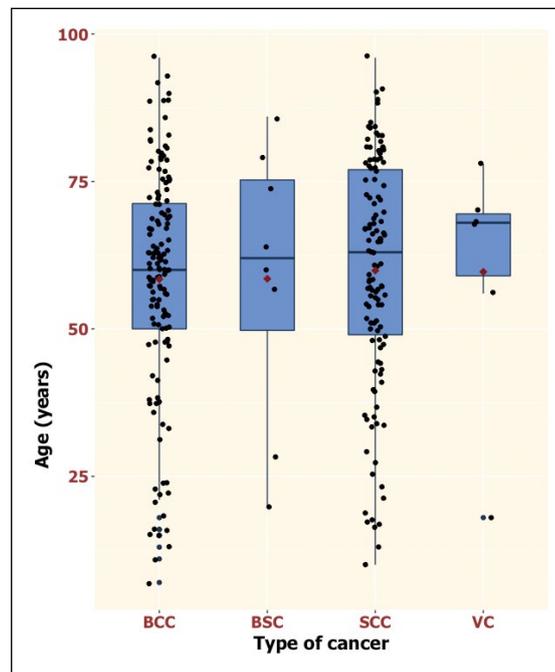
## DISCUSSION

The incidence of skin cancer differs markedly according to race and geographical location. In the United States, where skin cancer is the most common cancer, 34–45% occurs in Caucasians, 4–5% in Hispanics, 2–4% in Asians, and 1–2% in African Americans.<sup>6,7</sup> On the other hand, the rate of cutaneous cancer is highest in

**Table 1.** Types of diagnosed NMSCs at our center between 2000 and 2016.

Type	Number (%)
BCC	140 (50.2)
SCC	125 (44.8)
BSCC	8 (2.9)
VC	6 (2.2)

BCC: basal cell carcinoma; SCC: squamous cell carcinoma; BSCC: basosquamous carcinoma; VC: verrucous carcinoma.



**Figure 1.** Distribution of age by type of skin cancer (n=279). (BCC, basal cell carcinoma; SCC, squamous cell carcinoma; BSC, basosquamous carcinoma; VC: verrucous carcinoma). (Box plot: median, lower and upper hinges correspond to the first and third quartiles (the 25th and 75th percentiles). The upper whisker extends from the hinge to the largest value no further than 1.5 \* IQR from the hinge, where IQR is the interquartile range, or distance between the first and third quartiles). The lower whisker extends from the hinge to the smallest value at most 1.5 \* IQR of the hinge. Data beyond the end of the whiskers are "outlying" points plotted individually. Red diamond is mean).

Australia, where NMSC occurs in 1–2% of the population.<sup>8</sup> Populations with darker skinned individuals have less NMSC due to melanocyte photoprotection.<sup>9,10</sup> BCC is frequently reported in Caucasians, Hispanics, Chinese Asians and Japanese, but is less frequent in Africans.<sup>11,12</sup> Conversely, SCC is the most common skin cancer in Asians Indians and Africans.<sup>13–15</sup> Our study revealed 279 cases of NMSC in our study population; BCC

**Table 2.** The distribution of skin cancers by age, gender, and anatomic location.

	Age in years (mean, SD, range)	Gender (Male: Female)	Site (HN:LE:UE:TR:AG)
BCC	58.4 (19.2) [7–96]	1.2:1	118:5:6:11:0
SCC	59.9 (19.7) [10–96]	2.2:1	94:14:5:7:5
BSC	58.5 (23.5) [20–86]	7:1	8:0:0:0:0
VC	59.7 (21.6) [18–78]	4:2	3:1:1:0:1

BCC: basal cell carcinoma; SCC: squamous cell carcinoma; BSC: basosquamous carcinoma; VC: verrucous carcinoma; HN: head and neck; LE: lower extremity; UE: upper extremity; TR: trunk; AG: anogenital; SD: standard deviation.

**Table 3.** Histopathological pattern in patients with basal cell carcinoma.

Histological pattern	Frequency (%)
Nodular	37
Superficial	11
Infiltrative	8
Infiltrative-nodular	7
Nodular-superficial	4

**Table 4.** Histopathological pattern in patients with squamous cell carcinoma.

Histological pattern	Frequency (%)
Moderately differentiated	39
Well differentiated	30
Poorly differentiated	19

was observed in 140 (50.2%) and SCC in 125 (44.8%) patients, which is consistent with other studies in other populations as well as in Saudi Arabia except for a study which was conducted in the South region (Asir) that showed SCC is more common.<sup>16-18</sup> The BCC:SCC ratio in our study was 1.12:1, which is similar to most previously published studies in Saudi Arabia. However, Alzolibani et al, reported that BCC is three times more common than SCC.<sup>19</sup> The results of NMSC among different studies done in Saudi Arabia is shown in **Table 7**. The mean age at diagnosis in these studies was 59 (19) (range 7- 96) years, while the mean (SD) ages of the cases diagnosed as BCC and SCC in our study were 58 (19) and 60 (20) years, respectively. NMSC was mainly observed in patients from the central region, which may

**Table 5.** Risk factors associated with skin cancer in patients younger than 50 years of age (n=68).

Xeroderma pigmentosum	21
History of malignancy (solid)	4
History of malignancy (hematological)	3
Epidermolysis bullosa	2
Received radiotherapy	2
History of trauma	2
Severe immunodeficiency	1
Family history	1
HPV	1
Burn	1
DLE	1
Stem cell transplant	1
Fair skin	1
Hypertrophic lichen planus	1
No risk factor	26

HPV: Human papillomavirus; DLE: discoid lupus erythematosus; SCC: squamous cell carcinoma

**Table 6.** Treatment modalities in patients with NMSC.

Treatment Modality	Number of patients	Percentage
Surgery	248	88.9%
Radiotherapy	10	3.6%
Radiotherapy + surgery	14	5.1%
Others*	3	1.0%
Radiotherapy + others*	2	0.7%
Surgery + others*	2	0.7%
<b>Total</b>	<b>279</b>	<b>100%</b>

\*Others: topical immunotherapy

be attributable to the location of the hospital in Riyadh.

The incidence of skin cancer in patients younger than 50 years is infrequent and necessitates looking into risk factors, e.g. xeroderma pigmentosum (XP) and epidermolysis bullosa (EB).<sup>20</sup> In our study population most of patients with a risk factor have XP and this represent a referral bias to our center.

Our study included some limitations. Mainly, it was

**Table 7.** BCC/SCC among different studies in Saudi Arabia.

Authors	Geographic area	Total number of NMSC cases	Time (yYears)	Ratio BCC:SCC
Our study	Central	279	13	1.12:1
AlDawsari et al <sup>21</sup>	Eastern	123	19	1.5:1
Bahamdan et al <sup>22</sup>	South	107	5	0.8:1
Al-Maghrabi et al <sup>23</sup>	South	135	13	1.4:1
Mufti et al <sup>24</sup>	Western	56	10	1.15:1
Al-Aboud et al <sup>25</sup>	Western	80	10	1.9:1
Alzolibani et al <sup>26</sup>	Central	72	9	3.2:1
Alakloby et al <sup>27</sup>	Eastern	82	20	1.6:1

BCC: basal cell carcinoma; SCC: squamous cell carcinoma;

retrospective in nature, and data were obtained from patient medical record. In conclusion, the most common type of skin cancer is BCC followed by SCC. The

head and neck is the predominant lesion location and skin cancer below the age of 50 requires further investigation to exclude any possible risk factor.

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