

# Epidemiologic profile of skin tumors in the Philippine General Hospital: A descriptive cross-sectional study

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## Abstract

**Background and Aims:** Skin tumors are one of the most common complaints among patients due to their external location and esthetic reasons. Skin tumors have a wide spectrum from being benign, with only esthetic problems, to malignant, which can be fatal. This study aimed to describe the epidemiologic profile of skin tumors in the Philippine General Hospital Out-patient Services.

**Methods:** This is a cross-sectional study that describes the epidemiologic profile of the different skin tumors among Filipinos who consulted at the Philippine General Hospital Out-patient Services.

**Results:** Benign skin tumors are more common than malignant ones. Benign skin tumors are commonly seen in middle-aged adults, with a median age of 33 years. There was a higher proportion of benign tumors among females ( $n = 1256/1529$ , 82.15%) compared to males ( $n = 690/923$ , 74.76%). The site of predilection was the head and neck region. The most common benign skin tumor was the intradermal nevus. The older adult age group had a higher predilection for malignant tumors, with a median age of 57 years. Relatively, there was higher proportion of malignant tumors among males ( $n = 223/923$ , 25.24%) compared to females ( $n = 273/1529$ , 17.85%). The site of predilection is also the head and neck region. Among malignant skin tumors, basal cell carcinoma is the most common skin cancer.

**Conclusion:** The epidemiologic profile of skin tumors from patients seen in the Philippine General Hospital in terms of median age at diagnosis, sex preponderance, site of predilection, and tumor classification was similar to various Asian countries located in relatively the same latitude as the Philippines.

## KEYWORDS

benign, epidemiology, Filipino, malignant, skin tumors

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## 1 | INTRODUCTION

Skin tumors are one of the most common complaints among patients due to their easy visibility and esthetic effects. Skin tumors had a wide spectrum from benign, with only esthetic problems, to malignant, which can be fatal.

The most recent locally published study on Filipino patients to date, included only 40 patients with histopathologic diagnoses of malignant skin tumors in the University of the East Ramon Magsaysay Memorial Medical Center (UERMMMMC). Among these, 22 (55%) patients had basal cell carcinoma (BCC), 17 (27.5%) had squamous cell carcinoma (SCC), and 7 (17.5%) had malignant melanoma (MM). BCC was more common in females; SCC and MM had almost equal sex distribution. Most of the cases were diagnosed in the older age group. Predilection sites for BCC and SCC were on areas of greater sun exposure like the nose and lids, and acral areas for MM. The profile of malignant skin tumors at UERMMMMC approximated foreign studies.<sup>1</sup>

Published literature from various Asian countries located in relatively the same latitude as the Philippines, such as Nepal, India, Thailand, Singapore, Indonesia, and Taiwan, mostly reported only malignant skin tumors. Of these, BCC was the most common malignant tumor among fair-skinned races, while SCC was the most common among darker-skinned races. MM mostly comprised <5% of skin tumors despite the skin tone. The nonmelanoma skin cancers (NMSCs) were more common among males and were predilected in the head and neck region, while MM had no sex predilection, but was predilected to the back and acral areas.<sup>2-12</sup>

The objective of this study was to describe the epidemiologic profile of skin tumors among Filipino patients who consulted in the Philippine General Hospital Out-patient Services (PGH OPD) and compare it with studies from other populations.

## 2 | METHODS

This was a cross-sectional study that described the epidemiologic profile of the different skin tumors in Filipinos who consulted in the PGH OPD from January 1, 2010 to December 31, 2014. The majority of patients who consulted in PGH OPD were from the National Capital Region and surrounding provinces of Cavite, Laguna, Rizal, and Bulacan; this also served as the study population in terms of geographic region. The inclusion criteria included cases with a definite histopathologic diagnosis of a skin tumor, both benign and malignant. The exclusion criteria were non-Filipino cases, and cases requiring additional immunohistochemical studies for a definite diagnosis. Sampling was not performed because all of those who passed the inclusion and exclusion criteria were included. The histopathologic diagnosis, age, sex, tumor location, and other relevant data were collected. The histopathologic diagnosis was classified according to behavior: benign and malignant, as well as according to World Health Organization (WHO) skin tumor classification: keratinocytic, melanocytic, appendageal, hematolymphoid, and soft tissue.

Age was also categorized into age groups: pediatric—18 years and below; young adult—19–24 years; middle-aged adult—25–44 years; older adult—45–64 years; and elderly—65 years and above. The tumor location was categorized into head and neck, trunk, genitoperineal, and extremity. These were collected and tabulated using Microsoft Excel 2011 and were analyzed using STATA version 17.

Descriptive statistics, such as prevalence per 100,000 population with skin tumor, median age at diagnosis, and sex ratio were computed and described.  $\chi^2$  or Fisher's exact test of association was used to determine if age group, sex, and tumor location are associated with tumor classification. For tumors with significant association with tumor location, the most common location is reported as the site of predilection. A binomial test was used to determine significant differences in distribution between sexes and between tumor behavior. All statistical tests were two-sided and were evaluated with a significance level  $\alpha = 0.05$ .

The limitations of this study were as follows: (1) Cases requiring immunohistochemical studies for definite histopathologic diagnosis were not included. (2) There were 179 cases without tumor location listed in the records. (3) There were 187 nevus cases in which the specific type was not specified. These limitations may have underestimated the prevalence of several skin tumors and may have affected the reported site of predilection.

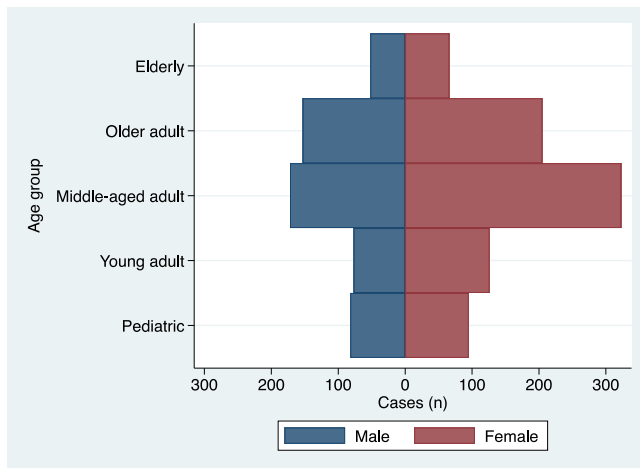
The study protocol was submitted to, reviewed, and approved by the University of the Philippines Manila Research Ethics Board (UPMREB CODE: (LAB) 2015-309-01).

## 3 | RESULTS

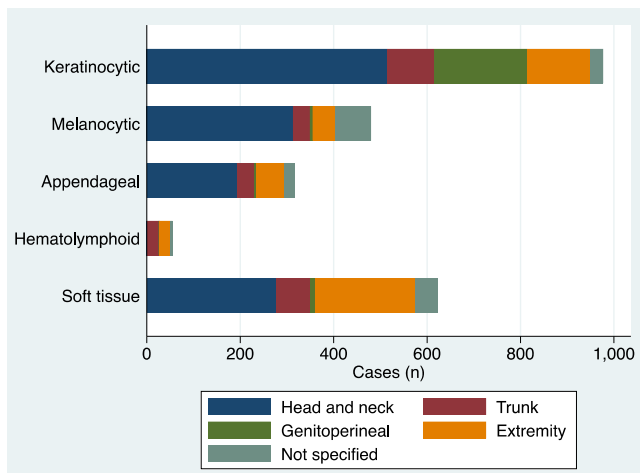
A total of 2452 cases of skin tumors fulfilling the inclusion and exclusion criteria were included in the study. Among the study population, there were more females ( $n = 1529/2452$ , 62.36%; 95% confidence interval [CI]: [60.42, 64.26]) with skin tumors than males ( $n = 923/2452$ , 37.64%; 95% CI: [35.74, 39.58]),  $p < 0.001$ . Skin tumors were common with the middle-aged adult group ( $n = 804/2452$ , 32.79%; 95% CI: [30.96, 34.68]) (Figure 1). The median age at diagnosis was 39 years old; 95% CI: [37, 40].

Among the 2273 skin tumor cases that has specified the location in the records, the head and neck region is the most common site ( $n = 1303/2273$ , 57.33%; 95% CI: [55.28, 59.35]), followed by extremity ( $n = 482/2273$ , 21.21%; 95% CI: [19.57, 22.94]), trunk ( $n = 268/2273$ , 11.79%; 95% CI: [10.53, 13.18]), and genitoperineal region ( $n = 220/2273$ , 9.68%; 95% CI: [8.53, 10.97]) (Figure 2). The distribution of skin tumors according to WHO tumor classification is summarized in Table 1. The most common class of skin tumor is keratinocytic type ( $n = 977/2452$ , 39.85%; 95% CI: [37.92, 41.80]).

Age group, sex, and tumor location were associated with tumor classification, each with a  $\chi^2$  test of association  $p < 0.001$ . The frequency and proportion of skin tumors seen in the Philippine General Hospital, including the median age at diagnosis, sex ratio, and site of predilection, are summarized in Tables 2–6.



**FIGURE 1** Distribution according to age group and sex of skin tumor cases seen in the Philippine General Hospital. The majority of skin tumors were from females and middle-aged adults.



**FIGURE 2** Distribution according to location and World Health Organization classification of skin tumor cases seen in the Philippine General Hospital. Most of the skin tumors seen were located in the head and neck region and were of keratinocytic type.

There were more benign skin tumors ( $n = 1946/2452$ , 79.36%; 95% CI: [77.71, 80.95]) than malignant ( $n = 506/2452$ , 20.64%; 95% CI: [19.05, 22.29]),  $p < 0.001$ . Benign skin tumors were most common in the middle-aged adults ( $n = 717/1946$ , 36.84%; 95% CI: [34.70, 39.03]). They had a median age at diagnosis of 33 years old; 95% CI: [32, 35]. There were higher proportions of benign skin tumors seen among females ( $n = 1256/1529$ , 82.15%; 95% CI: [80.13, 84.03]) than males ( $n = 690/923$ , 74.76%; 95% CI: [71.82, 77.53]),  $p < 0.001$ . The most common site of predilection was the head and neck region ( $n = 995/1786$ , 55.71%; 95% CI: [53.37, 58.03]).

The most common benign skin tumor was intradermal nevus ( $n = 378/1946$ , 19.42%; 95% CI: [17.69, 21.25]). The median age at diagnosis was 33 years old; 95% CI: [32, 34]. It was more frequently seen among females ( $n = 303/378$ , 80.16%; 95% CI: [75.81, 83.89])

**TABLE 1** Distribution of the skin tumors in the Philippine General Hospital according to WHO tumor classification

| Tumor          | Frequency | Percentage | 95% CI       |
|----------------|-----------|------------|--------------|
| Keratinocytic  | 977       | 39.85      | 37.92, 41.80 |
| Melanocytic    | 480       | 19.58      | 18.05, 21.20 |
| Appendageal    | 317       | 12.93      | 11.66, 14.32 |
| Hematolymphoid | 55        | 2.24       | 1.73, 2.91   |
| Soft tissue    | 623       | 25.41      | 23.72, 27.17 |

Abbreviations: CI, confidence interval; WHO, World Health Organization.

than males ( $n = 75/378$ , 19.84%; 95% CI: [16.11, 24.19]),  $p < 0.001$ . It was commonly seen in the head and neck region ( $n = 257/307$ , 83.71%; 95% CI: [79.10, 87.66]). The second most common benign skin tumor was seborrheic keratosis ( $n = 217/1946$ , 11.15%; 95% CI: [9.79, 12.63]) with statistically similar proportions with condyloma acuminata ( $n = 193/1946$ , 9.92%; 95% CI: [8.63, 11.33]). For seborrheic keratosis, the median age at diagnosis was 60 years old; 95% CI: [57, 62]. It was more frequently seen among females ( $n = 125/217$ , 57.60%; 95% CI: [50.88, 64.06]) than males ( $n = 92/217$ , 42.40%; 95% CI: [35.94, 49.12]),  $p = 0.003$ . It was commonly seen in the head and neck region ( $n = 125/205$ , 60.98%; 95% CI: [53.93, 67.69]). Patients with condyloma acuminata had a median age at diagnosis of 30 years old; 95% CI: [27, 32]. It was more frequently seen among females ( $n = 141/193$ , 73.06%; 95% CI: [66.21, 79.18]) than males ( $n = 52/193$ , 26.94%; 95% CI: [20.82, 33.79]),  $p < 0.001$ . It was commonly seen in the genitoperineal region ( $n = 169/190$ , 87.56%; 95% CI: [82.06, 91.88]). They were followed by verruca vulgaris, pyogenic granuloma, and dermatofibroma, with statistically similar proportions.

Malignant skin tumors were most common in older adults ( $n = 233/506$ , 46.05%; 95% CI: [41.64, 50.50]). They had a median age at diagnosis of 57 years old; 95% CI: [55, 59]. There were higher proportions of malignant skin tumors seen among males ( $n = 233/923$ , 25.24%; 95% CI: [22.47, 28.18]) than females ( $n = 273/1529$ , 17.85%; 95% CI: [15.97, 19.87]),  $p = 0.016$ . The most common site of predilection was the head and neck region ( $n = 308/487$ , 63.24%; 95% CI: [58.79, 67.54]). Among malignant skin tumors, BCC was the most common ( $n = 198/506$ , 39.13%; 95% CI: [34.85, 43.54]). The second most common malignant skin tumor was SCC ( $n = 176/506$ , 34.78%; 95% CI: [30.63, 39.11]). The median age at diagnosis of NMSC was 63 years old, 95% CI: [60, 65] and 56 years old; 95% CI: [54, 60] for BCC and SCC, respectively. The site of predilection was the head and neck region, BCC ( $n = 168/198$ , 84.85%; 95% CI: [79.08, 89.54]), and SCC ( $n = 109/176$ , 61.93%; 95% CI: [54.32, 69.13]). BCC had a sex ratio of 171 ( $p < 0.001$ ), while SCC had a sex ratio of 142 ( $p < 0.001$ ). MM were seen in 23 cases ( $n = 23/506$ , 4.55%; 95% CI: [2.90, 6.74]). Median age of diagnosis was 56 years old; 95% CI: [47, 61] and the site of predilection was the extremity ( $n = 16/23$ , 69.57%; 95% CI: [47.08, 86.79]). MM had a sex ratio of 65 ( $p = 0.181$ ). Other malignant skin tumors including the abovementioned tumors seen in our study population are listed in

**TABLE 2** Summary of the keratinocytic skin tumors in the Philippine General Hospital

| Tumor                                | Frequency | Prevalence <sup>a</sup> | Median age | Sex ratio <sup>b</sup> | Site of predilection   |
|--------------------------------------|-----------|-------------------------|------------|------------------------|------------------------|
| <i>Squamous cell carcinoma</i>       |           |                         |            |                        |                        |
| Squamous cell carcinoma <sup>c</sup> | 166       | 10.81                   | 56         | 131                    | Head and neck          |
| Verrucous carcinoma <sup>c</sup>     | 10        | 0.65                    | 56.5       | 900                    | Head and neck          |
| <i>Basal cell carcinoma</i>          |           |                         |            |                        |                        |
| Basal cell carcinoma <sup>c</sup>    | 196       | 12.77                   | 63         | 58                     | Head and neck          |
| Basosquamous carcinoma <sup>c</sup>  | 2         | 0.13                    | 58.5       | 100                    | Head and neck          |
| <i>Verruca</i>                       |           |                         |            |                        |                        |
| Condyloma acuminata                  | 193       | 12.57                   | 30         | 37                     | Genitoperineal         |
| Verruca vulgaris                     | 155       | 10.10                   | 53         | 110                    | Head and neck          |
| Verruca plana                        | 4         | 0.26                    | 30.5       | 300                    | Extremity              |
| Verruca plantaris                    | 5         | 0.33                    | 46         | 150                    | Extremity              |
| <i>Acanthoma</i>                     |           |                         |            |                        |                        |
| Lentigo simplex                      | 9         | 0.59                    | 48         | 80                     | Head and neck          |
| Clear cell acanthoma                 | 1         | 0.07                    | 56         | 0:1                    | Trunk                  |
| Acantholytic acanthoma               | 1         | 0.07                    | 73         | 1:0                    | Head and neck          |
| Seborrheic keratosis                 | 217       | 14.14                   | 60         | 75                     | Head and neck          |
| Lichen planus                        | 4         | 0.26                    | 49.5       | 34                     | Extremity              |
| Keratoacanthoma                      | 4         | 0.26                    | 55         | 100                    | Head and neck          |
| Actinic keratosis                    | 8         | 0.52                    | 65.5       | 15                     | Head and neck          |
| Bowen's disease                      | 2         | 0.13                    | 71         | 0:2                    | No significant finding |

<sup>a</sup>Prevalence per 100,000 population with skin tumor.

<sup>b</sup>Sex ratio is the number of males per 100 females; except when there is a value of 0, the raw values are written as male:female.

<sup>c</sup>Malignant skin tumor.

**TABLE 3** Summary of the melanocytic skin tumors in the Philippine General Hospital

| Tumor                                 | Frequency | Prevalence <sup>a</sup> | Median age | Sex ratio <sup>b</sup> | Site of predilection   |
|---------------------------------------|-----------|-------------------------|------------|------------------------|------------------------|
| <i>Malignant melanoma<sup>c</sup></i> | 23        | 1.50                    | 56         | 65                     | Extremity              |
| <i>Nevus</i>                          |           |                         |            |                        |                        |
| Junctional nevus                      | 3         | 0.20                    | 33         | 0:3                    | No significant finding |
| Epidermal nevus                       | 38        | 2.48                    | 18         | 81                     | Head and neck          |
| Lentiginous nevus                     | 1         | 0.07                    | 36         | 0:1                    | No significant finding |
| Intradermal nevus                     | 189       | 12.31                   | 33         | 25                     | Head and neck          |
| Compound nevus                        | 31        | 2.02                    | 27         | 48                     | Head and neck          |
| Spitz nevus                           | 2         | 0.13                    | 25.5       | 0:2                    | No significant finding |
| Blue nevus                            | 4         | 0.26                    | 19.5       | 0:4                    | No significant finding |
| Unspecified type                      | 187       |                         |            |                        |                        |

<sup>a</sup>Prevalence per 100,000 population with skin tumor.

<sup>b</sup>Sex ratio is the number of males per 100 females; except when there is a value of 0, the raw values are written as male:female.

<sup>c</sup>Malignant skin tumor.

**TABLE 4** Summary of the appendageal skin tumors in the Philippine General Hospital

| Tumor   | Frequency | Prevalence <sup>a</sup> | Median age | Sex ratio <sup>b</sup> | Site of predilection   |
|---|-----------|-------------------------|------------|------------------------|------------------------|
| <i>Apocrine/eccrine</i>                       |           |                         |            |                        |                        |
| Chondroid syringoma                           | 13        | 0.85                    | 31         | 63                     | No significant finding |
| Cylindroma                                    | 1         | 0.07                    | 46         | 1:0                    | No significant finding |
| Eccrine angiomatous hamartoma                 | 1         | 0.07                    | 4          | 1:0                    | No significant finding |
| Hidradenoma                                   | 24        | 1.56                    | 29.5       | 85                     | Head and neck          |
| Hidradenoma papilliferum                      | 4         | 0.26                    | 32         | 34                     | No significant finding |
| Hidrocystoma                                  | 6         | 0.39                    | 38.5       | 20                     | Head and neck          |
| Poroma  | 19        | 1.24                    | 48         | 90                     | Extremity              |
| Spiradenoma                                   | 10        | 0.65                    | 47.5       | 400                    | Extremity              |
| Syringocystadenoma papilliferum               | 12        | 0.78                    | 41         | 100                    | Head and neck          |
| Hidradenocarcinoma <sup>c</sup>               | 3         | 0.20                    | 48         | 200                    | No significant finding |
| Malignant chondroid syringoma <sup>c</sup>    | 1         | 0.07                    | 64         | 1:0                    | No significant finding |
| Porocarcinoma <sup>c</sup>                    | 1         | 0.07                    | 60         | 1:0                    | No significant finding |
| Paget disease <sup>c</sup>                    | 11        | 0.72                    | 53         | 10                     | Trunk                  |
| <i>Follicular</i>                             |           |                         |            |                        |                        |
| Pilar sheath acanthoma                        | 2         | 0.13                    | 58.5       | 0:2                    | No significant finding |
| Pilomatrixoma                                 | 52        | 3.39                    | 22         | 68                     | Head and neck          |
| Trichilemmoma                                 | 4         | 0.26                    | 40         | 100                    | No significant finding |
| Trichoblastoma                                | 36        | 2.35                    | 49.5       | 29                     | Head and neck          |
| Trichofolliculoma                             | 12        | 0.78                    | 53         | 72                     | Head and neck          |
| Proliferating trichilemmal tumor <sup>c</sup> | 17        | 1.11                    | 39         | 55                     | Head and neck          |
| <i>Sebaceous</i>                              |           |                         |            |                        |                        |
| Nevus sebaceous of Jadassohn                  | 33        | 2.15                    | 19         | 50                     | Head and neck          |
| Steatocystoma simplex                         | 40        | 2.61                    | 35.5       | 54                     | Head and neck          |
| Steatocystoma multiplex                       | 12        | 0.78                    | 30.5       | 72                     | Head and neck          |
| Sebaceous carcinoma <sup>c</sup>              | 3         | 0.20                    | 48         | 50                     | No significant finding |

<sup>a</sup>Prevalence per 100,000 population with skin tumor.

<sup>b</sup>Sex ratio is the number of males per 100 females; except when there is a value of 0, the raw values are written as male:female.

<sup>c</sup>Malignant skin tumor.

Table 7. Characteristics of the benign and malignant skin tumors are summarized in Table 8, including the number of cases per differentiation, and the top 5 tumors.

## 4 | DISCUSSION

Most of the published literature from various Asian countries located in relatively the same latitude as the Philippines focused more on describing the distribution of the different histologic types of malignant skin tumors. There were two studies that have described the distribution of the different histologic types of benign skin tumors. Both studies have similar findings with our population, that the most common benign skin tumor were intradermal nevus and seborrheic keratosis.<sup>8,9</sup>

In the Philippines, skin cancers constitute about 1% of all diagnosed cancers recorded in the Philippine Cancer Registry.<sup>13</sup> Notably, there was only one recently published study regarding skin tumors in the Philippines, which has only described SCC, BCC, and MM. Our findings were similar to the study of Adao-Grey in that NMSCs are more common among our study population than MM.<sup>1</sup> In comparison, we have other cases of malignant skin tumors seen in PGH OPD aside from the abovementioned ones. Mycosis fungoides ( $n = 44/506$ , 8.70%; 95% CI: [6.39, 11.50]) was the most common "other skin cancer" in our institution, followed by proliferating trichilemmal tumor ( $n = 17/506$ , 3.36%; 95% CI: [1.97, 5.32]), with statistically similar proportions with dermatofibrosarcoma protuberans ( $n = 15/506$ , 2.96%; 95% CI: [1.67, 4.84]). Patients with mycosis fungoides had a median age at diagnosis of 49 years old;

**TABLE 5** Summary of the hematolymphoid skin tumors in the Philippine General Hospital

| Tumor                                      | Frequency | Prevalence <sup>a</sup> | Median age | Sex ratio <sup>b</sup> | Site of predilection   |
|--|-----------|-------------------------|------------|------------------------|------------------------|
| <i>T cell</i>                              |           |                         |            |                        |                        |
| Mycosis fungoides <sup>c</sup>             | 44        | 2.87                    | 49         | 84                     | Extremity              |
| Sezary syndrome <sup>c</sup>               | 1         | 0.07                    | 58         | 1:0                    | No significant finding |
| <i>B cell</i>                              |           |                         |            |                        |                        |
| Plasmacytoma <sup>c</sup>                  | 1         | 0.07                    | 54         | 1:0                    | No significant finding |
| Leukemia cutis <sup>c</sup>                | 2         | 0.13                    | 26         | 100                    | No significant finding |
| Langerhans cell histiocytosis <sup>c</sup> | 7         | 0.46                    | 1          | 134                    | Trunk                  |

<sup>a</sup>Prevalence per 100,000 population with skin tumor.

<sup>b</sup>Sex ratio is the number of males per 100 females; except when there is a value of 0, the raw values are written as male:female.

<sup>c</sup>Malignant skin tumor.

**TABLE 6** Summary of the soft tissue skin tumors in the Philippine General Hospital

| Tumor  | Frequency | Prevalence <sup>a</sup> | Median Age | Sex Ratio <sup>b</sup> | Site of Predilection     |
|--|-----------|-------------------------|------------|------------------------|--------------------------|
| <i>Vascular</i>                              |           |                         |            |                        |                          |
| Angiokeratoma                                | 5         | 0.33                    | 36         | 150                    | Extremity                |
| Angiolymphoid hyperplasia w/eosinophilia     | 6         | 0.39                    | 34.5       | 200                    | Head and neck            |
| Arteriovenous hemangioma                     | 13        | 0.85                    | 54         | 63                     | None                     |
| Capillary hemangioma                         | 50        | 3.26                    | 32         | 86                     | Head and neck            |
| Cavernous hemangioma                         | 45        | 2.93                    | 33         | 80                     | Head and neck, extremity |
| Cherry hemangioma                            | 5         | 0.33                    | 56         | 67                     | Trunk                    |
| Hemangioma                                   | 82        | 5.34                    | 29         | 68                     | Head and neck            |
| Macrovenular hemangioma                      | 1         | 0.07                    | 17         | 0:1                    | No significant finding   |
| Pyogenic granuloma                           | 131       | 8.53                    | 24         | 80                     | Head and neck            |
| Kaposi sarcoma <sup>c</sup>                  | 1         | 0.07                    | 33         | 1:0                    | No significant finding   |
| Cutaneous angiosarcoma <sup>c</sup>          | 1         | 0.07                    | 75         | 1:0                    | No significant finding   |
| <i>Lymphatic</i>                             |           |                         |            |                        |                          |
| Lymphangioma                                 | 36        | 2.35                    | 16.5       | 64                     | Extremity                |
| <i>Fibrous/fibrohistiocytic/histiocytic</i>  |           |                         |            |                        |                          |
| Dermatofibroma                               | 127       | 8.27                    | 32         | 41                     | Extremity                |
| Hypertrophic scar                            | 42        | 2.74                    | 24         | 50                     | Extremity                |
| Keloid                                       | 61        | 3.97                    | 22         | 70                     | Head and neck            |
| Dermatofibrosarcoma protuberans <sup>c</sup> | 15        | 0.98                    | 31         | 67                     | Head and neck            |
| Malignant fibrous histiocytoma <sup>c</sup>  | 1         | 0.07                    | 74         | 1:0                    | No significant finding   |
| <i>Muscle</i>                                |           |                         |            |                        |                          |
| Cutaneous leiomyoma                          | 1         | 0.07                    | 62         | 1:0                    | No significant finding   |

<sup>a</sup>Prevalence per 100,000 population with skin tumor.

<sup>b</sup>Sex ratio is the number of males per 100 females; except when there is a value of 0, the raw values are written as male:female.

<sup>c</sup>Malignant skin tumor.

95% CI: [33, 56] and a sex ratio of 84 ( $p = 0.414$ ), which was different from WHO data being more common among older adults and among males. However, it was similar to WHO data that there was no site of predilection.<sup>4</sup> Likewise, patients with proliferating

trichilemmal tumors had a median age at diagnosis of 39 years old; 95% CI: [32, 57] and a sex ratio of 55 ( $p = 0.132$ ), which was in contrast with WHO data, which states that it was common among the elderly and among females. Despite the contrasting age and sex

**TABLE 7** Malignant skin tumor cases seen in the Philippine General Hospital

| Tumor                            | Frequency | Percentage | 95% CI       |
|----------------------------------|-----------|------------|--------------|
| Basal cell carcinoma             | 198       | 39.13      | 34.85, 43.54 |
| Squamous cell carcinoma          | 176       | 34.78      | 30.63, 39.11 |
| Mycosis fungoides                | 44        | 8.70       | 6.39, 11.50  |
| Malignant melanoma               | 23        | 4.55       | 2.90, 6.74   |
| Proliferating trichilemmal tumor | 17        | 3.36       | 1.97, 5.32   |
| Dermatofibrosarcoma protuberans  | 15        | 2.96       | 1.67, 4.84   |
| Paget disease                    | 11        | 2.17       | 1.09, 3.86   |
| Langerhans cell histiocytosis    | 7         | 1.38       | 0.56, 2.83   |
| Hidradenocarcinoma               | 3         | 0.59       | 0.12, 1.72   |
| Sebaceous carcinoma              | 3         | 0.59       | 0.12, 1.72   |
| Leukemia cutis                   | 2         | 0.40       | 0.05, 1.42   |
| Cutaneous angiosarcoma           | 1         | 0.20       | 0.005, 1.10  |
| Kaposi sarcoma                   | 1         | 0.20       | 0.005, 1.10  |
| Malignant chondroid syringoma    | 1         | 0.20       | 0.005, 1.10  |
| Malignant fibrous histiocytoma   | 1         | 0.20       | 0.005, 1.10  |
| Plasmacytoma                     | 1         | 0.20       | 0.005, 1.10  |
| Porocarcinoma                    | 1         | 0.20       | 0.005, 1.10  |
| Sezary syndrome                  | 1         | 0.20       | 0.005, 1.10  |

Abbreviation: CI, confidence interval.

**TABLE 8** General characteristics of the benign and malignant skin tumors seen in the Philippine General Hospital

|                              | Benign   | Malignant  |
|------------------------------|--|--|
| Number (proportion)          | 1946/2452 (79.36%)   | 506/2452 (20.64%)  |
| Age group (median age)       | Middle-aged adults (33 years)  | Older adults (57 years)  |
| Sex ( <i>n</i> , proportion) | Females (1256/1529, 82.15%)<br>Males (690/923, 74.76%)   | Females (273/1529, 17.85%)<br>Males (223/923, 25.24%)  |
| Site of predilection         | Head and neck  | Head and neck  |
| Top 5                        | 1. Intradermal nevus<br>2-3 (tied). Seborrheic keratosis and condyloma acuminata<br>4. Verruca vulgaris<br>5. Pyogenic granuloma | 1. Basal cell carcinoma<br>2. Squamous cell carcinoma<br>3. Mycosis fungoides<br>4. Malignant melanoma<br>5-6 (tied). Proliferating trichilemmal tumor and dermatofibrosarcoma protuberans |

findings, the site of predilection in our population was the head and neck region ( $n = 15/17$ , 88.24%; 95% CI: [63.56, 98.54]), which was similar to WHO data being more common in the scalp.<sup>4</sup> On the other hand, patients with dermatofibrosarcoma protuberans had a median age at diagnosis of 31 years old; 95% CI: [22, 52], which was similar to WHO data of being more common with early to middle adult life. However, the sex ratio of 67 ( $p = 0.317$ ) and site of predilection, that is, extremities ( $n = 6/15$ , 40.00%; 95% CI: [16.34, 67.71]), was

different from the WHO data that it is more common in males and in the trunk region.<sup>4</sup>

Among the different histologic types of malignant skin tumors in our study population, BCC was the most common, followed by SCC, mycosis fungoides, MM, and appendageal carcinomas. This was similar to the findings of Tan et al.,<sup>11</sup> among Singaporeans, especially since both of our studies have reported that about 9% of the malignant skin tumor cases were mycosis fungoides. Setting aside

mycosis fungoides, after BCC and SCC, appendageal carcinomas, in general, were the next most common malignant skin tumor in our population, similar to the Nepalese and Indian populations.<sup>2,8,12</sup>

Malignant skin tumors, in comparison to benign skin tumors, were more common in older adults, as expected in a malignant neoplasm. Various studies have shown that benign tumors were more common in younger age groups (50 years and below),<sup>8,9</sup> and malignant tumors were mostly seen in older age groups (51 years and above).<sup>2,5,8-10,12</sup> Our findings showed that the median age at diagnosis of 33 years for benign skin tumors and 57 years for malignant skin tumors was consistent with other studies.

With regard to sex preponderance, in our population, most patients who consulted at the Philippine General Hospital for skin tumors were females. This may be due to the female's better health-seeking behavior and greater concern with their physical appearance.<sup>8,14</sup> Hence, they consult physicians more readily, including excision and biopsy of the skin tumor, resulting in inclusion in this study. But when it comes to tumor behavior in our population, males have a higher proportion of malignant skin tumors than females, and females have a higher proportion of benign skin tumors than males. This finding was similar to some of the Nepalese, Indian, Indonesian, and Singaporean populations.<sup>2,5,9,11</sup> This may be explained by the findings of Al-Naggar and colleagues that males usually do not practice skin cancer prevention strategies, such as using sunscreen and wearing a hat compared to females, especially, to a great extent, among men who work outdoors.<sup>15,16</sup> Thus, they are more susceptible to exposure to ultraviolet rays (UVR) from the sun, which is a risk factor for developing NMSC.<sup>17</sup>

The most common site of predilection among the different skin tumors seen in our population was in the head and neck region. This finding was similar to the Nepalese, Indian, and Taiwanese populations as well as among Filipinos living in Hawaii.<sup>2,3,6,8,12</sup> In general, we may attribute it with to be more esthetically displeasing to have tumors in the exposed body parts, and for this cosmetic purpose, lesions in the head and neck region are often excised.<sup>8,9</sup> Therefore, it leads to submission for histopathologic examination and inclusion in this study. With regard to malignant skin tumors, greater sun exposure contributes to the development of NMSCs in the head and neck region since it is usually not covered with clothing and/or accessories.<sup>18</sup>

With regard to tumor classification, the majority of the cases in our population were of the keratinocytic type. This was similar to the Nepalese and Indian populations.<sup>2,8,9</sup> The second most common tumor classification in our population was the soft tissue type. However, it was different from these other populations since the second most common type for their population was the melanocytic and appendageal type.<sup>2,9</sup>

## 5 | CONCLUSION

The epidemiologic profile of skin tumors from patients seen in the Philippine General Hospital in terms of median age at diagnosis, sex preponderance, site of predilection, and tumor classification was similar to various Asian countries located in relatively the same

latitude as the Philippines. Benign skin tumors were more common in younger age groups, that is, less than 50 years and in females, while malignant skin tumors were more common in the older age groups, that is, more than 50 years and in males. The most common site of predilection was in the head and neck region, and the most common tumor classification is the keratinocytic type. These findings can increase the awareness of clinicians of the possibility of malignancy in skin tumor lesions in the head and neck region presenting among older and male patients. Prompt biopsy and histologic examination are recommended for immediate proper diagnosis and management.

## AUTHOR CONTRIBUTIONS

**Emilio Quilatan Villanueva III:** Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; writing—original draft; writing—review and editing. Emilio Quilatan Villanueva III had full access to all of the data in the study and takes complete responsibility for the integrity of the data and the accuracy of the data analysis.

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## CONFLICT OF INTEREST

The author declares no conflict of interest.

## DATA AVAILABILITY STATEMENT

The deidentified data that support the findings of this study are available from the corresponding author upon reasonable request.

## TRANSPARENCY STATEMENT

Emilio Quilatan Villanueva III affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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## REFERENCES

1. Adao-Grey AL. Profile of malignant skin tumors at UERMMMCC. *UERMMMCC J Health Sci.* 1998;1:36-40.
2. Bhuvan A, Misikin AT, Inamdar SS, Mural P. A histomorphological study of malignant skin tumors. *Int J Life Sci Scientific Res.* 2017;3: 1162-1166.
3. Chuang TY, Reizner GT, Elpern DJ, Stone JL, Farmer ER. Non-melanoma skin cancer and keratoacanthoma in Filipinos: an incidence report from Kauai, Hawaii. *Int J Dermatol.* 1993;32: 717-718.
4. Elder DE, Massi D, Scolyer R, Willemze R, (Eds.). *WHO Classification of Skin Tumours.* 4th ed. International Agency for Research on Cancer; 2018.



5. Harahap M. Skin cancer among Indonesians in three provinces of Indonesia. *Int J Dermatol*. 1982;21:521-525.
6. Liao YH, Chen KH, Tseng MP, Sun CC. Pattern of skin diseases in a geriatric patient group in Taiwan: a 7-year survey from the outpatient clinic of a university medical center. *Dermatology*. 2001;203:308-313.
7. Roongpisuthipong W, Yodla P, Klangjareonchai T. A comparison of diagnosed skin diseases between the years with and without COVID-19 pandemic. *Medicina*. 2021;57:773-781.
8. Shrestha S, Rana A, Karki D, Shrestha A. Skin tumors among biopsy samples in patients attending dermatological out patient department in a tertiary care hospital of Nepal: a descriptive cross-sectional study. *J Nepal Med Assoc*. 2021;59:886-891.
9. Shrestha SB, Hirachand S, Gurung P, Thapa R. Histomorphologic profile of skin tumors. *J Nepal Med Assoc*. 2018;56:953-957.
10. Sng J, Koh D, Siong WC, Choo TB. Skin cancer trends among Asians living in Singapore from 1968 to 2006. *J Am Acad Dermatol*. 2009;61:426-432.
11. Tan SH, Tham SN, Goh CL. Skin cancers at tertiary referral skin hospital in Singapore. *Int J Dermatol*. 1995;34:770-776.
12. Rajbhar R, Anvikar A, Sulhyan K. Clinicopathological correlation of malignant skin tumors: a retrospective study of 5 years. *Int J Health Sci*. 2020;14:18-25.
13. Care PH. Cancer database. Cancer Care Registry Philippines Foundation, Inc. Published March 17, 2022. Accessed August 8, 2022. <https://careph.org/cancer-database/>
14. Benigno MJ, Leonardo B. Mole-like lesions: it's oddities and challenges. *PJSS*. 1984;144:85.
15. Al-Naggar RA. Practice of skin cancer prevention among road traffic police officers in Malaysia. *Asian Pac J Cancer Prev*. 2013;14:4577-4581.
16. Kaldor J, Shagg D. Malignant melanoma in children: ten years of Cancer Registry-Based Surveillance. *Int J Cancer*. 1993;53:886-891.
17. Gloster HM, Jr, Neal K. Skin cancer in skin of color. *J Am Acad Dermatol*. 2006;55:741-760.
18. Armstrong BK, Kricger A, English DR. Sun exposure and skin cancer. *Australas J Dermatol*. 1997;38(Suppl 1):S1-6.

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