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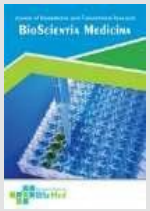

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Profile of Non-Melanoma Skin Cancer and Malignant Melanoma at Dr. Mohammad Hoesin General Hospital Palembang from 2017 - 2019: A Retrospective Study

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A B S T R A C T

Background: Currently, there is an increasing trend in skin cancer incidence, especially non-melanoma skin cancer (NMSC), including basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), also malignant melanoma (MM), causing an increase in morbidity and mortality rates. The high treatment cost causes an economic burden of disease in the country and negatively impacts public health issues. This study aimed to determine the profile of NMSC and MM regarding the sex, age, occupation, location of the lesion, clinicohistopathological diagnosis of skin cancer in Dr. Mohammad Hoesin General Hospital Palembang January 2017-December 2019. **Methods:** A retrospective analytical observational study obtained from medical records of NMSC and MM patients in Dr. Mohammad Hoesin General Hospital Palembang from January 2017-December 2019 as confirmed using histopathological results from the Pathology Department. **Results:** There were 324 new cases of NMSC and MM, including BCC 162 cases (50%) and SCC 130 cases (40.1%), whereas MM 32 cases (9.9%). Women had a higher probability of developing skin cancer with a ratio of 1.13:1. The average age of skin cancer was between 55-64 years old (33.6%), with a mean age of 57 years old. There was a statistically significant relationship between gender, age, occupation, and areas of skin cancer against skin cancer. Furthermore, overexposure to ultraviolet (UV) radiation is related to high-risk occupations, including farmers (50%), while the most frequent location of skin cancer was the face (67.3%). **Conclusion:** Our study implicated a 1.5-fold increase in new cases of skin cancer between 2017 to 2019. BCC cases were more prevalent than SCC and MM cases. There was also a significant association between skin cancer and occupation also the location of skin cancer as the risk factor for UV exposure. Nevertheless, further research involving larger samples or a multicenter approach is needed.

1. Introduction

The global incidence of skin cancer has surged sharply over the last few decades worldwide.[1,2] The most common skin cancer worldwide is NMSC, which includes BCC and SSC.[1,3,4] Skin cancer was more common in Caucasians than in dark-skinned ethnic groups. In America, Asian and Hispanic people with colored skin had an increased incidence of skin cancer. The increasing incidence of skin cancer caused an increase in mortality and morbidity rates.[1,2] High treatment cost have a negative impact on public health and becomes a high burden on the state.[2]

In some developed countries, such as Australia, England, and America, there was an increase in skin cancer. The incidence of new cases of BCC per year in Australia was 2,448/per 100,000 population, 450/per

100,000 population in America, and 220/per 100,000 population in England. The incidence of BCC was higher than SSC, with a ratio of 4:1,2.[5]. In the 19th century, the incidence of melanoma in the world ranged from 2.8 to 3.1/100,000 population. The highest incidence of MM was reported in Australia atper 37/100,000 population, and the lowest was in Asia at 0.2/100,000 population.[6] The incidence of NMSC cases was 18-20 fold than MM cases.[1] Australia and New Zealand were the countries with the highest incidence of skin cancer in the world.[5,7] In Asia (Korea), skin cancer research between 1999 and 2014 recorded as many as 54.3% cases of BCC, 30.5% cases of SCC, and 15.1% cases of MM; females had 1.3 times higher incidence compared to males, mostly between 60-79 years, and face appeared as the most common site.[8]

National skin cancer registration data is still not clearly known.[9] A retrospective study at Dr. Mohammad Hoesin General Hospital, Palembang, within January-December 2014 reported 63 cases of skin cancer, consisting of 34 BCC cases (53.9%), 19 cases (30.1%) of SCC, 2 cases (3.2%) of MM, 3 cases (4.7%) of other skin cancers including T-cell and B-cell type cutaneous lymphoma and 5 cases (7.9%) of precancerous lesions consisting of Bowen's disease, mammary Paget disease (MPG) and extramammary Paget disease. (EMPD).[10]

Etiopathogenesis of NMSC and MM remains unclear. Intrinsic and extrinsic risk factors play important roles, although previous studies had shown exposure to ultraviolet (UV) A and B were the crucial factors that could increase the incidence of skin cancer.[11,12] Perera et al. (2016) in Australia showed a higher incidence among males than females.[13] Skin cancer advances, especially in the older age.3.5 Sonal et al. in India found the average age of skin cancer was 62± 14.2 years with a male to female ratio of 0.79:1.[14]

Skin cancer remains a health problem worldwide, including in Indonesia.[2,3] According to WHO, in 2018, NMSC was reported to be the fourth most common cancer in the world, while MM was ranked 19th among all cancers in the world.[15] By knowing the profile of NMSC and MM, practitioners and other health workers could have an early diagnosis of NMSC and MM so that treatment could be provided as quickly and as appropriately as possible in order to prevent an increase in morbidity and mortality rate.[3.7] A study of NMSC and MM was conducted in Dr. Mohammad Hoesin General Hospital within the period January 2017-December 2019. This study was aimed to evaluate the profile of NMSC and MM conducted at Dr. Mohammad Hoesin General Hospital from January 2017 to December 2019, according to the distribution of NMSC and MM based on gender, age, occupation, sites of NMSC and MM in the form of a clinical and histopathological feature.

2. Methods

This retrospective observational analytic study was designed using secondary data from medical records of all patients with the diagnosis of NMSC and MM in Dr. Mohammad Hoesin General Hospital within a period of 3 years, from January 2017 to December 2019.

The subject of the study included all NMSC and MM patients with a diagnosis of NMSC and MM who were treated at Dr. Mohammad Hoesin Palembang General Hospital. Data were collected using consecutive sampling. The study participants were all new cases of NMSC and MM who met the inclusion criteria.

The inclusion criteria in this study were all new cases diagnosed with NMSC and MM confirmed by histopathological features from the Department of Anatomical Pathology of Dr. Mohammad Hoesin Palembang General Hospital. Skin cancer patients included non-melanoma skin cancer (NMSC), consisting of BCC and SSC, and MM. Exclusion criteria were patients with duplicated histopathological data, duplication of medical records, and patients with incomplete data (identity, clinical diagnosis, and clinicohistopathological examination).
The research variables consisted of dependent variables, namely NMSC and MM, and independent variables, namely gender, age, occupation, sites of

cancer, and clinicohistopathological examination. The data were analyzed by observational analytic study.

The data were analyzed using Statistical Analysis Software Package (SPSS) version 22.0 (SPSS, Inc., Chicago, Illinois). This research had been approved by the Committee of Ethical Research and National Health Development of Dr. Mohammad Hoesin Palembang General Hospital (Ethics Letter Number: No.21/KEPKRSMH/2020). The success parameter could be seen from the p-value, which was considered significant if $p < 0.05$.

3. Results

In this retrospective observational study, 324 new cases of NMSC and MM from the total number of 1394 visits from all NMSC and MM patients at Dr. Mohammad Hoesin Palembang General Hospital were recruited from the medical records from January 2017 – to December 2019 according to inclusion and exclusion criteria. During the research, we recorded as many as 85 (26.2%), 109 (33.7%), and 130 (40.1%) cases in 2017, 2018, and 2019, respectively. Of 324 new cases of NMSC and MM, there were 96 (29.6%), 171 (52.8%), 34 (10.5%), and 23 (7.1%) cases from the Department of Dermato-venereology (DV) Surgery, Ophthalmology, and Otorhinolaryngology (ENT), respectively. The distribution of NMSC and MM is presented in Figure 1.

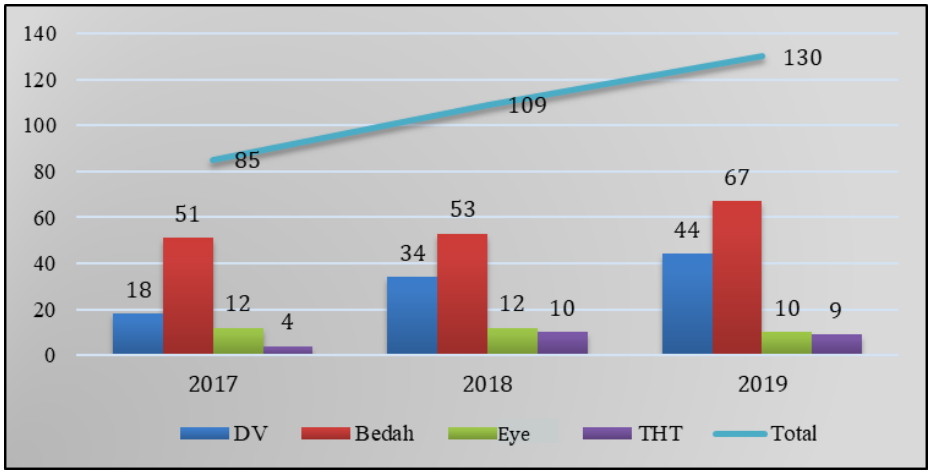

Figure 1. Distribution of NMSC and MM cases in the Department of DV, Surgical, Ophthalmology, and Otorhinolaryngology from 2017 to 2019

This study showed the number of cases in NMSC and MM increased to 1.2 – 1.5 fold between 2017-and 2019. The overall increase in NMSC and MM is presented in Figure 2.

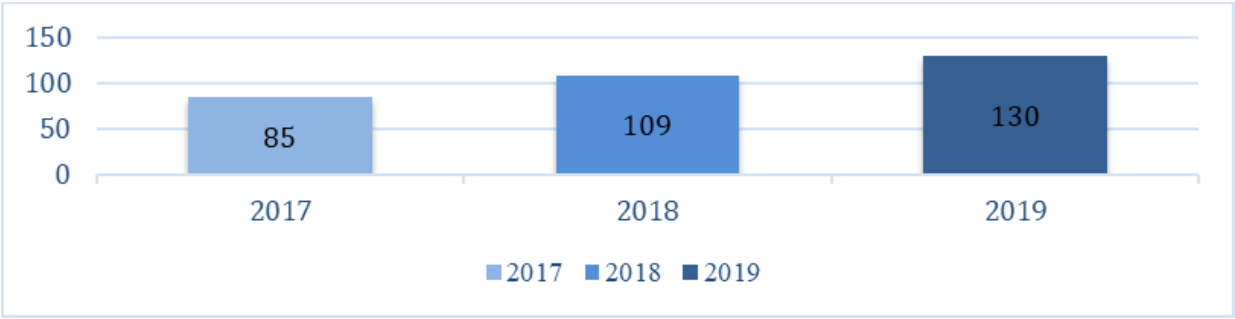

Figure 2. Distribution of NMSC and MM in the period of 2017-2019

Distribution of NMSC and MM based on gender

Based on the clinicohistopathological features, a total of 162 (50%) cases of BCC, 130 (40.1%) cases of SCC, and 32 (9.9%) cases of MM (Figure 3). In this study, there were 172 (53.1%) women and 152 (46.9%) men with a ratio of 1.13:1 (Table 1).

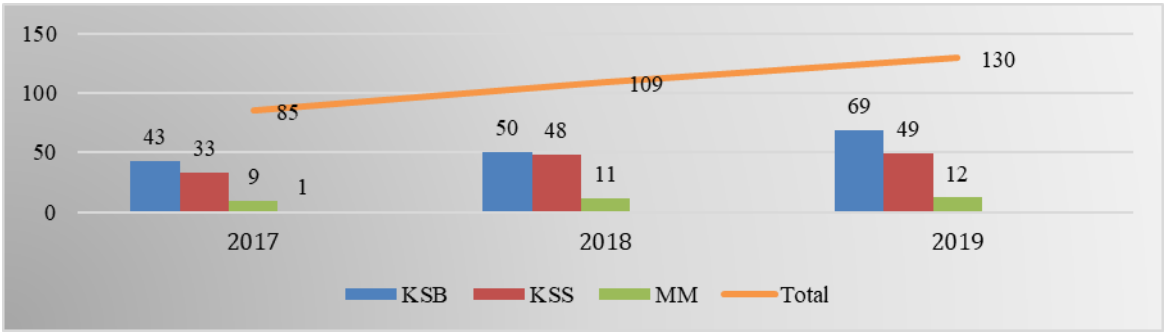

Figure 3. Distribution of NMSC and MM at Dr. Mohammad Hoesin General Hospital Palembang in 2017 - 2019

Table 1. Distribution of NMSC and MM based on gender

Gender	BCC		SCC		MM		Total		p-value
	n	%	n	%	n	%	n	%	
Male	67	44.1	75	49.3	10	6.6	152	46.9	**0.024**
Female	95	55.2	55	32	22	12.8	172	53.1	
Total	162	50	130	40.1	32	9.9	324	100	

Distribution of NMSC and MM based on age

Of the participants, a total of 109 (33.6%) patients were 55 - 64 years old, 86 (26.5%) patients were more than 65 years old, 65 patients (20.1%) were 44 – 54 years old, 44 (13.6%) patients were 35 – 44 years old, 14 (4.3%) patients were between 25 – 34 years, and 6 (1.9%) patients were 18 – 24 years old. The mean age of the patients was 56±14.4 years. The youngest patient was 23 years old, and the oldest was 93 years old. This result, showed a significant relationship between age and the incidence of NMSC and MM (p-value = 0.003), as seen in Table 2.

Table 2. Distribution of NMSC and MM by age

Age	BCC		SCC		MM		Total				p-value
	♂	♀	♂	♀	♂	♀	♂	♀	♂ & ♀		
	n	n	n	n	n	n	n	n	n	%	
< 18	0	0	0	0	0	0	0	0	0	0	**0.003**
18-24	3	1	1	1	0	0	4	2	6	1,9	
25-34	0	2	7	2	2	1	9	5	14	4.3	
35-44	7	10	13	6	3	5	23	21	44	13.6	
45-54	15	13	12	17	2	6	29	36	65	20.1	
55-64	21	32	27	21	1	7	49	60	109	33.6	
≥ 65	21	37	15	8	2	3	38	48	86	26.5	
Total	67	95	75	55	10	22	152	172	324	100	

Distribution of NMSC and MM based on occupation

The distribution of NMSC and MM was associated with the duration of ultraviolet (UV) light, including UV-A and UV-B exposure. A total of 183 (56.5%) patients exposed to high-degree UV exposure (farmers, laborers); 63 (19.4%) patients exposed to moderate-degree UV exposure (civil servant, armed forces, police, entrepreneurs); and 78 (24.1%) patients exposed to low-degree UV exposure (housewives, retirees).

Occupation groups at high risk of skin cancer were mostly farmers 162 (50%) patients, followed by housewives 66 (20.4%) patients, entrepreneurs, 46 (14.2 %) patients, laborers, 21 (6.5%) patients, civil servants, 15 (4.6%) patients, retirees 12 (3.7%) patients, and armed forces or police 2 patients (0.6%) as seen in Table 3. The occupation was significantly related to the incidence of NMSC and MM (p-value = 0.038).

Table 3. Distribution of NMSC and MM by occupation

UV exposure	BCC		SCC		MM		Total		p-value
	n	%	n	%	n	%	n	%	
High-degree UV exposure									
Farmer	95	58.6	54	33.3	13	8	162	50	
Laborer	8	38.1	12	57.1	1	4.8	21	6.5	
Subtotal	103	56.3	66	36.1	14	7.6	183	56.5	
Moderate-degree UV exposure									
Entrepreneurs	15	32.6	26	56.5	5	10.9	46	14.2	
Civil servants	6	40	6	40	3	20	15	4.6	**0.038**
Armed forces, police	2	100	0	0	0	0	2	0.6	
Subtotal	23	36.5	32	50.8	8	12.7	63	19.4	
Low-degree UV exposure									
Housewives	30	45.5	28	42.4	8	12.1	66	20.4	
Retirees	6	50	4	33.3	2	16.7	12	3.7	
Subtotal	36	46.2	32	41	10	12.8	78	24.1	
Total	162	50	130	40.1	32	9.9	324	100	

Distribution of NMSC and MM based on areas

Skin cancer develops primarily on areas of sun-exposed skin, including 303 (93.5%) cases in the scalp, face, auricle, neck, and extremity, while 21 cases (6.5%) were found in unexposed UV radiation, including trunk and anogenital. The most common sites for BCC were nasal, periorbital, and maxillary areas. In this study, SCC was most commonly located in the periorbital and maxillary areas, while MM most often occurred in the lower extremities. The results showed a significant relationship between areas of the lesion and the incidence of NMSC and MM (p-value = 0.000). The distribution of NMSC and MM is based on areas shown in Table 4.

Table 4. Distribution of NMSC and MM based on areas of the lesion

Location of the lesion	BCC		SCC		MM		Total		p-value
	n	%	n	%	n	%	n	%	
Exposed area									
Scalp									
Occipital	1	33.3	2	66.7	0	0	3	0.9	
Temporal	9	69.2	4	30.8	0	0	13	4	
Total	10	62.5	6	37.5	0	0	16	4.9	
Facial									
Periorbital	48	68.6	15	21.4	7	10	70	21.6	
Nasal	50	84.7	7	11.9	2	3,4	59	18, 2	
Maxillary	24	58.5	15	36.6	2	4.9	41	12.7	
Frontal	14	100	0	0	0	0	14	4.3	
Perioral	8	40	11	55	1	5	20	6.2	
Tongue	0	0	14	100	0	0	14	4.3	
Total	144	66.1	62	28.4	12	5.5	218	67.3	
Auricle	1	6.2	15	93.8	0	0	16	4.9	**0.000**
Neck	3	9.4	27	84.4	2	6.2	32	9.9	
Extremity									
Upper	0	0	4	80	1	20	5	1.6	
Lower	2	12.5	4	25	10	62.5	16	4.9	
Subtotal	**160**	**52.8**	**118**	**38.9**	**25**	**8.3**	**303**	**93.5**	
Unexposed area									
Trunk	1	12.5	4	50	3	37.5	8	2.5	
Anogenital									
Inguinal	0	0	3	75	1	25	4	1.2	
Gluteal	1	33.3	2	66.7	0	0	3	0.9	
Scrotum	0	0	1	100	0	0	1	0.3	
Penis	0	0	1	100	0	0	1	0.3	
Anal	0	0	1	25	3	75	4	1.2	
Total	1	7.7	8	61.5	4	30.8	13	4	
Subtotal	**2**	**9.5**	**12**	**57.2**	**7**	**33.3**	**21**	**6.5**	
Total	**162**	**50.6**	**130**	**40.6**	**32**	**9.2**	**324**	**100**	

Distribution of BCC based on clinicohistopathological features

Based on histopathological features of BCC, the non-aggressive type was more common than the aggressive type. The most common variants of BCC were nodular in 102 (63%) cases, nodulo-infiltrative in 26 (16%) cases, nodulo-pigmented in 15 (9.3%) cases, infiltrative in 10 (6.2 %) casea, basosquamous in 4 (2.5%) cases, superficial in 2 cases (1.2%) cases, micronodular in 2 (1.2%) cases, and fibroepithelioma in 1 (0.6%) case (Table 5).

Table 5. Distribution of BCC cases based on clinicohistopathological features

Clinicohistopathological Category	Total	
	n	%
Non-aggressive		
Nodular	102	63
Nodulo-pigmented	15	9.3
Fibroepithelioma	2	1.2
Superficial	1	0.6
Subtotal	120	74.1
Aggressive		
Nodulo-infiltrative	26	16
Infiltrative	10	6, 2
Basosquamous	4	2.5
Micronodular	2	1.2
Subtotal	42	25.9
Total	**162**	**100**

Distribution of SCC based on clinicohistopathological features

The most common variants based on the histopathological grading of SCC were well-differentiated variants (53.8%), followed by moderately differentiated (23.1%) and poorly differentiated (17%). The distribution of SCC cases based on their grading was presented in Table 6.

Table 6. Distribution of SCC cases based on histopathological features

Grading	Total	
	n	%
Well-differentiated	70	53.8
Moderately-differentiated	30	23.1
Poorly-differentiated	22	17
Unclassified	8	6.1
Total	130	100

Distribution of clinicohistopathological features in MM cases

In this study, MM was less commonly found than BCC and SCC, which were only 32 (9.9%) cases out of 324 cases. MM incidence was generally higher in women than men with a 1.2:1 ratio, and the highest age was 35-64 years.

4. Discussion

Skin cancer, including NMSC and MM, is highly prevalent among Caucasians, Hispanics, and Asians.[3,7,13] In the last decade, there has been an increase in the incidence of NMSC and MM.[1,2] The highest incidence of NMSC and MM were found in Australia, which implicated an increased incidence of NMSC between 1985-2011 with up to a 4.4-fold increase a year, while the increase in MM between 1982-2016 was 1.8 times per year.[13,21] The incidence of NMSC and MM in Asia was not as high as in developed countries, such as Europe and America. There were reports of escalating incidents in several Asian countries such as Singapore, Hong Kong, and Korea.[8,22] Sng, et al. on 1968-2006 in Singapore reported approximately 2.5-fold increase a year in the incidence of NMSC, and MM.[23] Incidence of NMSC and MM in Korea from 1999 to 2014 also increased up to 4 times and 2.2 times per year, respectively.[8] Differences in the trend of NMSC and MM vary in latitude, altitude, race, skin pigmentation, and season.[13,19,23,24]

A number of new skin cancer cases in Indonesia are yet unclear.[9] In this study, the incidence of new cases was mostly from the Department of Surgery and Dermato-venereology (Figure 1). Iskandar, et al reported the total new cases of NMSC and MM in Palembang in 2014 was 55 cases.[10] In this study, the number of skin cancer cases was 324 cases (0.15%). Our study also showed an increase in the incidence of NMSC and MM in 2017, 2018, and 2019 by 85 (26.2%) cases, 109 (33.7%) cases, and 130 (40.1%) cases consecutively (Figure 2). Compared to the research by Iskandar, et al. in Palembang (2014), an increasing number of cases up to 2.4-fold can be concluded.[10] Our study also demonstrated a similar result to Oh et al. in Korea (2003-2014), which reported a 2.2-fold increase in the incidences of skin cancer.[25] It is still unclear why the risk of skin cancer seems to be increasing dramatically over the last few decades, possibly due to multifactorial risk factors, especially the damaging effects of UV exposure. In addition, further research is required as genetic factors tend to modulate susceptibility to the development of NMSC and MM.[26]

In this study, the predominant type of skin cancer was NMSC, including 50% of BCC and 40.1% of SCC cases, whereas MM only contributed 9.9% of all cases

(Figure 3). Sonal, et al. in India (2013-2014) reported similar results, and BCC complied with 54.76% of all cases, while SCC and MM contributed 36.91% and 8.33% of cases, respectively.[14] This study was in accordance with Sonal, et al. (2016), Apalla, et al. (2017), and Jones, et al. (2019), which exhibited that BCC and SCC were more frequently reported than MM and other skin cancers.[3,5,7,14] Wibawa, et al. (2014-2017) at Cipto Mangunkusumo Hospital Jakarta recorded 263 cases of NMSC and MM, comprising 176 (66.9%) cases of BCC, 72 (27.4%) cases of SCC, and 15 (5.7%) cases of MM.[9] Our study also showed BCC and SCC were higher than MM. However, periodic skin cancer registration data is needed to determine the national skin cancer incidence.

In developed countries, NMSC and MM cases seem to be found more commonly in men than women. Olsen, et al. (2014) in Australia obtained men were more likely than women to develop NMSC and MM with a ratio of 1.5:1.[27]. On the contrary, our study implicated skin cancer was 1.13 times more frequent in women than men (Table 1). Iskandar, et al. in Palembang reported a similar result to our study, which implicated the women to men ratio of 1.17:1.[10]. Oh, et al. in Korea also reported women were 1.3 times more likely to develop skin cancer than men.[8] Sonal, et al. in India showed a similar outcome in which the women vs men ratio was 1:0.79.[14]. Different trends of skin cancer based on gender were probably due to the gender difference in healthcare-seeking behavior between men and women.[9,28] In addition, men have lower participant rates for cancer screening than women. Thus the incidence of NMSC and MM was implicated to be higher in women.[8] In contrast, Smith, et al. (2016) in Australia discovered better health promotion in developed countries, especially in the prevention of skin cancer.28 However, further research is necessary to seek any other possible factors.[9]

Several studies reported that NMSC and MM were more prevalent in the elderly. NMSC were generally identified at an age greater than 60 years old, while the mean age of MM is 63 years old.[4,17,29] This study revealed most patients aged between 55-64 years old (33.6%) and 26.5% aged older than 65 years old, with a mean age of 56±14.4 years (Table 2). Iskandar, et al. in Palembang reported older people were more likely to have skin cancer, with the highest incidence between 50-59 years old.[10] Goh, et al. in Singapore obtained a higher mean age of NMSC and MM, which was 70.9 years old, with the most age range between 81-90 years old (27.1%).[22] In addition, a study in India from 2013 to 2014 showed the mean age of skin cancer was 62± 14.2 years.[14]

Work-related time outdoors may possibly be one of the risk factors for NMSC and MM. Surdu, et al. stated UV exposure intensity of more than 2.5 hours was a risk factor for developing NMSC and MM.[12] In this study, occupation-related sun exposure was associated with the duration of UV exposure, with the highest number of cases were high sun-exposed occupations, including farmers and laborers (56.5%) (Table 3). Our study showed a significant relationship between the increase in NMSC and MM cases with occupation (p-value= 0.038). Szewczyk, et al. (2016) reported that 33.3% of cases of BCC worked as farmers.[30] Schmitt, et al. (2017) also reported overexposure to UV radiation could significantly increase the risk of BCC by 40%.[31] Modenese, et al. (2019) proved a substantial relationship between the incidence of NMSC and duration of UV exposure among fishermen in Italy.[19]

NMSC and MM often develop in the areas of skin exposed to UV, such as the head and neck, although they can also occur in other areas, albeit in small percentages.[3,4,24] In this study, NMSC, and MM saw in sun-exposed areas as 93.5% of cases occurred in the face and neck (Table 4). Oh, et al (2018) implicated a similar result to our study, with the most commonly found areas of skin including the face (64.7%), neck (10.1%), and scalp (4.9%). Szewczyk, et al. (2016) reported the most common areas developing skin cancer were faced (nasal and maxillary), followed by auricle, lip, and scalp as much as 37%, 26%, 18%, and 8%, respectively.[30]

BCC is the most common NMSC worldwide, which

was developed from epithelial keratinocytes. It possibly causes local destruction but rarely metastasizes.[4] In this study, 50% of cases were BCC, with an increase in incidence obtained annually. Toruan, et al. (2000) reported 20 (0.042%) BCC cases in 1999, followed by Yahya FY, et al. (2011) reported 48 BCC cases in 2007, while Iskandar, et al. reported 34 BCC cases in 2014.[10,32–35] Oh, et al. in 2003-2014 also showed an increase in BCC incidence by 2.5 times.[25] This previous study showed the highest prevalence of BCC mostly occurs in patients older than 65 years old (37%) and aged between 55-64 years old (32.7%), with the ratio of men to women approximately 1:1.8 with a mean age of 67.3 ± 12.6 years.[8] Tan et al. (2014) in Singapore also showed a similar age range in BCC cases, with a mean age was 67.5 years old.[20] In Australia, the most common age of BCC patients, was older than 60 years old, although skin cancer incidence started to affect patients aged under 45 years old.[13] Overexposure to UV radiation increases the risk of BCC. Jivani, et al. (2015) reported that less than 1% of BCC lesions were located in unexposed areas to UV radiation.[36] According to the World Health Organization (WHO), the differentiation of BCC subtypes can be identified based on the growth patterns.[37,38] The histopathological subtypes of BCC based on WHO classification are divided into non-aggressive (nodular, superficial, fibroepithelioma, pigmented) and aggressive (infiltrative, micronodular, and metatypical/basosquamous types).[16,37] Our study was in accordance with Pranata, et al (2014), who reported nodular subtypes as the most common subtype, accounting for 63% of all BCC, followed by nodulo-infiltrative (16%), infiltrative (6.2%), nodulo-pigmented (9.3%), fibroepithelioma (0.6%), basosquamous (2.5%), superficial (1.2%) and micronodular (1.2%) (Table 5).[32] Kumar, et al. (2014) reported nodular (77.8%) BCC present as the most common variants, followed by pigmented (22.2%), micronodular (19.4%), and morphea (2.8%) subtypes.[39]

SCC represents the second most common NMSC, developing from epithelial keratinocytes and is suspected to be related to actinic keratoses.[17] In this study, SCC also accounted for the second most common NMSC after BCC, accounting for 40.1% of all cases. Compared to the previous study by Iskandar et al., our study implicated an increased incidence of SCC by 2.6 times. It was similar to Oh et al., which showed an increase in SSC cases by 2.2 times.[25] In this study, SCC cases were commonly found between 55-and 64 years old, and men were 1.36 times at greater risk to develop SCC. Similarly, Perera, et al. reported more cases of SCC in men than women by 2:1 in Australia.[13] In contrast, Oh, et al. (2018) showed SCC cases in Korea were more commonly affecting women than men by 1.36:1 with a mean age of 72.7±13.7 years.[8] Histopathological differentiation grade of SCC was divided into well-differentiated, moderately differentiated, and poorly differentiated.[17,37] This classification displayed a relationship between the level of aggressiveness and prognosis. Well-differentiated SCC accounted for as much as 53.8% and was the most frequent histopathological grading of all cases (53.8%) (Table 6). Cheng, et al. (2016) showed the risk of recurrence and metastasis in poorly-differentiated SCC accounted for 28.6% and 32.8%, respectively, whilst the well-differentiated SCC only represented about 13.6% recurrence and 9.2% metastasis.[40]

MM develops from the proliferation of melanocyte cells which arise at the site where melanocyte cells are located.[29,41] MM has a poor prognosis due to its potential to metastasize with a high mortality rate (nearly 90%).[42] Incidence of MM is lower than that of other NMSCs. A total of 32 (9.9%) cases of MM among 324 cases of skin cancers were reported in our study. Iskandar, et al. found only 2 (3.2%) new cases of MM[10], which increased over the past few years, as shown in this study. Oh, et al. also implicated an increase in the incidence of MM by 1.5 times.[25] Our study showed men were less likely to develop MM than women with a 1:1.2 ratio, and it increased around age 35-64 years old. In developed countries, MM is more common in men than women by 3:1.[5] Oh et al. (2018)'s study in Korea reported more cases of MM in women than men

by 1.06:1 with the mean age of 60.5±15.7 years old.[8] Rastrelli et al. in 2014 showed the mean age of 57 years old.[41] MM generally occurred at a younger age than NMSC.[3,41] This study showed a linear increase in the incidence of MM at an age greater than 35 years old. Histopathological features of MM can be divided into superficial spreading melanoma (SSM), nodular malignant melanoma (NMM), lentigo malignant melanoma (LMM), acral lentigo melanoma, and other rare types. SSM was the most common type of melanoma, accounting for 70% of cases, with the most common site for women in the lower limbs, whereas men in the trunk. Meanwhile, NMM accounted for 5% of melanomas, commonly distributed in the trunk and extremities during the fifth or sixth decade of life, with men predominant. LMM accounts for 4%-15% of MM cases.[41] Nevertheless, our study did not list the subtypes of MM due to medical record limitations. MM subtype is very useful for determining aggressiveness and prognosis; thus, it is in fact, necessary to determine the MM subtype.[41,42]

However, our study has several limitations related to incomplete medical records. First, inconsistent and incomplete documentation in the medical record, such as incomplete histopathological record, skin cancer subtypes, size, and location. Second, the inconsistent way of assigning current medical terminology using computerized medical records according to the International Classification of Diseases (ICD), including the differences in using clinical terminology among clinicians.

Therefore, it is recommended to have a standardized medical record of cancer patients accurately to record diagnosis for professionals and provide quality care. The statistic data on skin cancer is essential to be reported periodically to the National Health Council. Furthermore, demonstrating health promotions are necessary to improve knowledge and awareness for health care providers and the public.

5. Conclusion

We found that there was a 1.5-fold increase in skin cancer cases between 2017 to 2019, which occurred mostly in the elderly. The incidence of BCC was higher than SCC and MM, which accounts for 50 % of skin cancer. Women were more likely to develop skin cancer. Skin cancer was more common in women than men. There was a significant relationship between gender, age, and occupation with the incidence of skin cancer. Incidence of skin cancer was likely to be associated with high sun exposure. The main limitation of our study was incomplete medical record data. In addition, further study with a larger patient sample is needed.

6. References

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