

Epidemiological characteristics of non-melanoma skin cancer in Indonesia: preliminary results

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Abstrak

Kanker kulit non-melanoma merupakan jenis yang terbanyak terjadi diberbagai negara. Pada studi kasus-kontrol yang dilakukan di Rumah Sakit Umum Pusat Nasional Dr. Cipto Mangunkusumo, Jakarta, dengan 139 kasus kanker kulit, distribusi pada wanita dan pria tidak menunjukkan perbedaan bermakna. Sebagian besar (75%) kasus berlatar belakang pendidikan rendah. Tingkat pendidikan menunjukkan hubungan yang bermakna dengan pajanan terhadap rokok, kebiasaan memakai lengan panjang dan konsumsi tinggi lemak, protein dan sayuran. Jenis pekerjaan di luar gedung berhubungan dengan pendidikan yang lebih rendah dan konsumsi sayuran dan buah yang lebih rendah, sedangkan pekerjaan di dalam gedung berhubungan dengan pendidikan menengah keatas dan konsumsi tinggi sayuran dan buah yang lebih tinggi. Khusus untuk kelompok yang berpendidikan sekolah menengah keatas, dengan uji kecenderungan terlihat adanya kecenderungan yang sangat bermakna. Terlihat bahwa makin tinggi pendidikan maka risiko dari pajanan berbagai faktor diatas menjadi lebih rendah. Dilihat dari jenis kanker kulit, karsinoma sel basal (KSB) merupakan tipe terbanyak disusul oleh karsinoma sel skuamosa (KSS). Secara epidemiologis terlihat bahwa KSB memang lebih banyak terdapat pada pria, pada yang berpendidikan rendah dan pada individu dengan jenis pekerjaan dan kebiasaan dengan tingkat pajanan pada sinar ultraviolet lebih tinggi. Berdasarkan uji kecenderungan, tidak terlihat adanya perbedaan yang bermakna pada kedua tipe kanker kulit, kecenderungan KSB menurut tingkat pendidikan. Hasil yang diperoleh dalam studi epidemiologi ini, memperkuat hasil-hasil yang dilaporkan oleh peneliti lain. Untuk lebih menjelaskan pengaruh beberapa faktor risiko, sedang dilakukan analisa lebih lanjut dengan pengumpulan data yang lebih besar.

Abstract

Non-melanoma in the most common type occurring in various countries. In case-control study performed at Dr. Cipto Mangunkusumo National General Hospital, Jakarta, with 139 skin cancer cases, the distribution in females and males did not show significant difference. The majority (75 %) of cases had low educational background. Educational level showed significant correlation to exposure to smoking, using long sleeve and high consumption of fat, protein and vegetables. Working outdoor associated with lower level of education and lower consumption of vegetables and fruits, while working indoor associated with higher level of education and higher consumption of vegetables and fruits. In particular for junior and high school educated individuals, the test for trend showed high significance. The higher the educational level the lower the risk of the above mentioned factors. Basal cell carcinoma (BCC) in the most frequent type, followed by squamous cell carcinoma (SCC). Epidemiologically, BCC was found higher among males, in lower educational level and in individuals with occupation and habit with high exposure to ultraviolet. Test for trend did not show significant difference in comparing BCC to SCC, except for the trend for BCC according to educational levels. The results obtained in this epidemiological study confirmed the results reported by others. In order to clarify the effects of several factors, further analysis using larger data is in progress.

Keywords: Epidemiology, skin cancer, non-melanoma

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In Indonesia, according to the nearly nation-wide data collected from 13 Pathology Laboratories by the National Cancer Registry (pathology based), the non-melanoma skin cancer (NMSC) rank the first among males and the fourth among females in 1992.¹ The relative frequency was 11.79 and 6.23 respectively. In a study conducted in Semarang (Central Java) based on a population-based cancer registry in 1988, the figures also showed high incidence for non-melanoma skin cancer, 6.67 per 100,000 among males and 6.54

per 100,000 among females.² Basal cell carcinoma and squamous cell carcinoma were the most common types. Epidemiologic characteristics showed that the peak age of cases was on 50-59 years (27.1 %). The most frequent site of all skin tumors were on the head and neck (58.5 %), while the rest (27.1 %) were on the extremities.³ For the malignant melanoma, the study found that incidence in males is 56.8 % and 43.2 % in females. The distribution of the localization is 78.3 % in lower extremities in males and 54.8 % in females respectively. The geographic distribution, comparing between the urban and rural, showed that the lesion on the foot was found lower in the urban area either in males and females.

There are many factors related to skin cancer, sun exposure and skin type are the most outstanding in many studies. In Japan, the incidence varied from 0.1-0.3/100,000 for melanoma and 1.5-5.0 for non-melanoma skin cancer.⁴ The prevalence rates of basal cell carcinoma (BCC) were 16.5 per 100,000 population.⁵ The study also showed that skin type 1 (burn easily, tan poorly), showed a higher risk for non-melanoma skin cancer (NMSC). The prevalence of skin cancer of outdoor workers was higher than indoors ones.

Epidemiological studies concerning skin cancer in Indonesia, had not been done extensively. However, result of Household Health Survey (1992), indicated that carcinoma was the 10th cause of mortality. Several areas in Indonesia are located just in the equator belt with extensive sunlight exposure. As commonly occurred in developing country, most of the population used to work as farmers or having occupation with heavy sun exposure.

Based on the above reasons a multidisciplinary research (pathology, surgery, dermatology and epidemiology) was conducted from 1996 to 1999 with case-control design.

Besides the risk assessment by comparing the cases to the controls, the epidemiological characterization of the skin cancer cases was also performed. The results of the latter will be presented in this paper.

MATERIALS AND METHODS

The study on etiology and clinicopathology of skin cancer was conducted using a case-control design with 1 to 2 ratio of case to control. Both cases and controls were collected from patients visiting the Dr.

Cipto Mangunkusumo National Central General Hospital. Population used for cases were skin cancer patient newly diagnosed in the Departments of Dermatology and Surgery. The eligible cases were the skin cancer cases collected from January 1996 to March 1999 with both clinical and histopathological diagnosis. All cases of skin cancer and non-melanoma, i.e. basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) were subjected to epidemiological characterization.

Population used for controls were other patients (inpatients & outpatients) in the same departments who had been confirmed as having no skin cancer. The matching variable were age (ca 3 yrs), gender and socio-economic status, indicated from the type of hospital room they used or intended to used. Based on statistical calculation using several consideration, the study plan to collect 300 triplet cases. The controls were recruited within 3 months after the enrollment of the cases.

Besides clinical and pathological data, there were 4 general epidemiological characteristics collected in the study, namely demographic, health, environment and nutritional. Data were collected through 3 types of questionnaires, clinical, pathological and epidemiological forms. Epidemiological data were collected by paramedics while the clinical and pathological data by oncologist/surgeon and pathological specialist.

The analyses included: 1) the demographic, health, environment and nutrition status among skin cancer; 2) the relationship between education and occupation with sun exposure and nutrition factors among skin cancer and 3) the difference between BCC and SCC in demographic and nutrition factors.

Chi-square, log linear regression test for trend were used to analyze the epidemiologic characteristics of skin cancer.

RESULTS

Demographic characteristics

By demographic characteristics, we refer to gender, age, education and occupation of the skin cancer patient enrolled in the study. Among 139 cases of skin cancer, female has a slight higher percentage compared to male (56.8 % vs 43.2 %). More than half (73.4 %) of the patients were older than 50 years and 8.6 % were less than 40 years old. About 75 % of

patients in this study had less than 6 years education, and only 12.2 % graduated from junior high school. Percentage of patients with occupation outside or inside the building representing sun-exposed or non-sun exposed situation was not different (49.6 % vs 50.4 %), see Table 1.

Table 1. Demographic characteristic of skin cancer patients

Variable	n=139	%
Gender		
Male	60	43.2
Female	79	56.8
Age		
< 40 years	12	8.6
40 – 50 years	25	18.0
51 – 60 years	41	29.5
> 60 years	61	43.9
Education		
Elementary school	109	78.4
Junior High school	13	9.4
Senior High school	17	12.2
Occupation		
Outside	69	49.6
Inside	70	50.4

Health characteristics

Cancer history, nutritional status, hormonal exposure and smoking habit were the health risk factors observed. Table 2 shows that 72 % patients still have a normal-good nutritional status, only 18 % were underweight. History of cancer was low among the skin cancer patients, only 4.6 % had a relative with any cancers. Almost all of the skin cancer cases had never been exposed to hormone (97.7 %) and almost 75 % of the patients did not smoke.

Table 2. Health characteristics of skin cancer patients

Variable	n=139	%
Nutritional status		
Underweight	25	18.0
Normal weight	60	43.2
Overweight	54	38.8
Cancer history		
Yes	6	4.6
No	133	95.4
Hormonal		
Yes	3	2.3
No	136	97.7
Smoking		
Yes	32	23.0
Ex smoker	22	2.3
No	68	

Environmental characteristics

Environmental characteristics are referred to the exposure to cigarette and sun/ UV. Table 3 shows that almost the half (44.6 %) of cases were exposed to cigarette, 50 % of them were actually the non smoker patients (Tables 1 & 2). Using hat as a protection to sun was higher than using long sleeve (73.4% vs 42.4%).

Table 3. Environmental characteristics of skin cancer patients

Variable	n=139	%
Exposed to cigarette		
Yes	62	44.6
No	77	55.4
Used hat		
Yes	102	73.4
No	37	26.6
Using long sleeve		
Yes	59	42.4
No	80	57.6

Nutritional pattern

Nutritional pattern of food consumed by cases in the last 5 years, were related to the fat, fibre, vegetable and garlic. Milk, meat and fatty meat were not much consumed by the patients (85.4, 61.9 and 66.2%, respectively). Almost 50% of the patients received their fat from consuming coconut food (food which was cooked by using coconut milk). Vegetables as a source of fiber have not been consumed by almost 50% of cases. Garlic was assumed to have an effect in protecting against skin cancer, in this study about 40% of cases usually consumed it in their daily food (Table 4).

Relationship of education and occupation to some risk factors

By using Chi-square test, in general, Table 5 shows that except for smoking habits a significant relationship ($P < 0.05$) were found between education and several factors, those were occupation, exposure to cigarette, using long sleeve, and intake of fat/protein/ vegetable/ fruit. The test for trend in junior & senior high school group showed a strong relationship with occupation ($P < 0.001$). A very strong significant relationship also were noted between education and

exposure to cigarette ($P < 0.005$), using long sleeve ($P < 0.001$), consumption of fat/ protein/ vegetable/ fruit ($P < 0.001$). In the junior & senior high school using long sleeve and consumption of vegetables/ fruits has a strong relationship ($P < 0.001$ and $P < 0.01$). In the elementary group the trend test showed a strong significant result only in consumption of protein.

Table 4. Nutritional characteristics of the skin cancer patients

Food consumed	Frequency	n = 139	%
Milk	Always (>2 times per week)	6	5.2
	Rarely (twice or less per week)	13	9.4
	Almost never	120	85.4
Tea	Always (>2 times per week)	109	78.4
	Rarely (twice or less per week)	14	10.1
	Almost never	16	11.5
Coconut food	Always (>2 times per week)	19	13.7
	Rarely (twice or less per week)	59	42.0
	Almost never	61	43.9
Fruit	Always (>2 times per week)	45	32.4
	Rarely (twice or less per week)	67	48.2
	Almost never	27	19.4
Meat	Always (>2 times per week)	16	11.5
	Rarely (twice or less per week)	37	26.6
	Almost never	81	61.9
Fatty meat	Always (>2 times per week)	18	12.9
	Rarely (twice or less per week)	29	20.9
	Almost never	92	66.2
Egg	Always (>2 times per week)	14	10.1
	Rarely (twice or less per week)	78	56.1
	Almost never	47	33.8
Vegetable	Always (>2 times per week)	34	24.5
	Rarely (twice or less per week)	41	29.5
	Almost never	64	46.0
Garlic	Always (>2 times per week)	54	38.9
	Rarely (twice or less per week)	62	44.6
	Almost never	23	16.5

Table 5. Relationship of education to some risk factors among skin cancer cases

Factors Determinants	Education		Total	χ^2
	Elementary school	Junior & Senior H.S.		
Occupation				
Outside	62	7	69	
Inside	47	23	70	9.29****
Test for trend :	2.29	8.31****		
Smoking habit				
Active smoker	27	5	32	
Ex smoker	14	8	22	2.04
No smoking	68	17	85	0.08
Test for trend :	0.00	0.01		
Exposed to cigarette				
Yes	42	20	62	
No	67	10	77	8.72****
Test for trend :	1.63	5.91**		
Using long sleeve				
Yes	33	26	59	
No	76	4	80	32.98*****
Test for trend :	6.61**	24.01*****		
Fat consumption				
High	9	9	18	
Moderate	16	13	29	0.42
Low	84	8	92	22.95*****
Test for trend :	5.202**	18.90*****		
Protein consumption				
High	4	12	16	
Moderate	21	16	37	5.885**
Low	84	2	86	66.46*****
Test for trend :	12.04***	43.76*****		
Vegetable/ fruit consumption				
High	22	23	45	
Moderate	60	7	67	24.82*****
Low	27	0	27	21.25*****
Test for trend :	6.69***	22.51*****		

* significant difference at $p < 0.05$ ** significant difference at $p < 0.025$ *** significant difference at $p < 0.01$ **** significant difference at $p < 0.005$ ***** significant difference at $p < 0.001$

Table 6 shows the relationship between occupation and the same some risk factors as in Table 5. The Chi-square test did not show a significant relationship between occupation with those factors, except vegetable/ fruit consumption. The test for trend also showed that there is no significant trend in outdoor/ indoor group, except for vegetable consumption.

Table 6. Relationship of occupation to some risk factors among skin cancer

Determinant Factors	Occupation		Total	χ^2
	Outdoor	Indoor		
Using long Sleeve				
Yes	33	26	59	
No	36	44	80	1.22
Test for trend :	0.82	0.81		
Fat consumption				
High	5	13	18	
Moderate	16	13	29	4.57*
Low	48	44	92	4.63*
Test for trend :	1.12	1.10		
Protein consumption				
High	8	8	16	
Moderate	16	21	37	0.02
Low	45	41	86	0.53
Test for trend :	0.15	0.15		
Vegetables/ fruits consumption				
High	16	29	45	
Moderate	33	34	67	2.65
Low	20	7	27	
Test for trend :	4.84*	4.77*		11.615*****

* significant difference at $p < 0.05$; ***** significant difference at $p < 0.001$

Analysis of BCC and SCC was shown in Table 7. The number of BCC was 3 times higher than SCC (92 vs 33). BCC was found more frequent in male than female with younger onset of age, has been less exposure to UV compared to SCC. There is no difference of percentage in fat/ protein /vegetable consumption between BCC and SCC. From the test for trend, both in BCC and SCC no significant result were found in demographic (gender, age, occupation), and nutrition (consumption of fat, protein & vegetable) risk factors.

DISCUSSION

This paper is based on the 50% of the actual target of cases in the case-control study on skin cancer. Some difficulties arises in form of getting control for old cases (more than 70 years old) and having a qualified food pattern in the last 5 years. In this study, skin cancer was equally distributed among males and females. This result differs from other study, where males were more at risk compared to women.⁴ Assumption that women in Indonesia had been more exposed to the UV is not supported by our data. The health seeking behavior in women to find immediate help and the location of skin cancer in the face probably could explain this result.

Table 7. Distribution of skin cancer type by age, gender, education, occupation and dietary consumption

Factors determinants	BCC (n=92)	SCC (n=33)	Total	χ^2
Gender				
Male	38	19	57	
Female	54	14	68	3.29
Test for trend :	0.68	1.91		
Age				
< 40 years	5	4	57	
40-50 years	16	7	68	9.61****
51-60 years	31	6	37	20.65*****
> 60 years	40	16	56	13.98*****
Test for trend :	0.11	0.29		
Education				
Senior HS	15	6	21	
Junior HS	8	5	13	0.05
Elementary S	69	22	91	0.49
Test for trend :	19.07*****	0.32		
Occupation				
Indoor	52	12	64	
Outdoor	40	21	61	3.18
Test for trend :	1.04	2.91		
Fat consumption				
High	11	4	15	
Moderate	21	7	28	0.24
Low	60	22	82	0.09
Test for trend :	0.00	0.00		
Protein consumption				
High	10	2	12	
Moderate	28	9	37	0.02
Low	54	22	76	0.29
Test for trend :	0.24	0.66		
Vegetable/ fruit consumption				
High	34	14	48	
Moderate	42	14	56	0.49
Low	16	5	21	0.56
Test for trend :	0.00	0.37		

**** significant difference at $p < 0.005$;

***** significant difference at $p < 0.001$

Almost 75 % cases were more than 50 years old and the increase trend of skin cancer with age has been noted. This observation is in line with the effect of the more or less continuous exposure to the sun throughout life.⁵⁻⁷

Sun exposure in many studies has been shown to be the significant risk factor for skin cancer. Sun exposure in this study was tested in respect to the site of work (outdoor or indoor) and using long sleeve. In this study there was no difference in site work among skin cases, and also there was no relationship between the site of work and using long sleeve. One hypothesis which could explain this situation was that the exposure was received during the early years (before 10 years old), not in the adult phase.⁸⁻⁹

Another interesting result was that education seemed to have a greater effect on some risk factors than occupation. Education had a significant relationship with exposure to cigarette smoke, using long sleeve and food pattern intake of fat/ protein and vegetables/ fruits. Low fat diet has been shown to be a negative risk factor for many cancers, including skin cancer.¹⁰ However, these factors showed no significant relationship with occupation in our study. Some studies also did not reveal the relationship of occupation indoor and outdoor, because there were other factors which also had a role in skin cancer such as skin type. Indonesian with skin type 4 or 5 is assumed to have a protective reaction to solar radiation. Since 78.4 % cases come from lower educational level it is understandable that these cases will have a less protective attitude to prevent skin cancer.

The test for trend in this study confirmed some of the general findings. The data showed that in the higher educated group highly significant relationship exist in occupation, exposure to cigarette, using long sleeve, and consumption of fat/ protein/ vegetables.

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