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Cancer Profile in Jakarta: A 5-year Descriptive Study

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Abstract

BACKGROUND: According to the World Health Organization reports in 2020, cancer was the second leading cause of death in developing countries following cardiovascular diseases and infections. As one of the strategies to prioritize cancer control in Indonesia, it is crucial to establish a population-based cancer registry, thus necessitating a well-recorded study with a robust methodology of documentation and reporting of cancer profile.

AIM: This study aims to describe the cancer profile in Jakarta based on the data from Cipto Mangunkusumo Hospital as the cancer registry control center for Jakarta Capital Region.

METHODS: We conducted a cross-sectional and descriptive study by collecting data from the cancer registry in Cipto Mangunkusumo Hospital, which were pooled from five subregional hospitals in Jakarta from 2008 to 2012. Statistical analysis was performed using IBM SPSS Statistics 20.0.

RESULTS: We obtained data from 15,042 cancer patients in Jakarta with a male-to-female ratio of 1:1.8. The majority of patients were from the group of 45–54 years old. Late-stage presentation (stages III and IV) was observed in 24.6% of patients. The highest number of patients was from West Jakarta (27.7%), followed by East Jakarta (26.1%). The five most common cancer found in both sexes was breast cancer, cervical cancer, hematopoietic and reticuloendothelial system malignancy, lung and bronchial cancer, and nasopharyngeal cancer.

CONCLUSION: The findings from this study correspond to GLOBOCAN 2012 for South-east Asia Region, particularly regarding the male-to-female ratio and patients' age group. However, we highlighted the need to optimize data collection by involving all health-care facilities in Jakarta.

Introduction

According to data from Global Burden of Cancer (GLOBOCAN) 2018, the incidence of cancer reached 19.3 million with 9.9 million cancer mortality worldwide [1], [2]. There was an increasing trend compared to data from GLOBOCAN 2012, which reported 14.7 million new cancer cases and 7.6 million cancer-related deaths [3]. In addition, more than half of the deaths occurred in less developed regions and low-to-middle-income countries [4], [5]. Cancer burden is predicted to rise in the future due to lifestyle changes that expose people to cancer risk factors, such as smoking, alcoholism, junk food consumption, obesity, and limited physical activity [6].

The Basic Health Research 2018 (Riskesdas) conducted by Indonesia's Ministry of Health estimated that the prevalence for all cancers combined in all age groups was 1.79%, highlighting an increase of 1.4% from the total population compared with the 2013 data [7], [8]. Yogyakarta ranked the highest in the proportion of cancer in Indonesia with the prevalence rate of 4.89‰ followed by West Sumatera, Gorontalo, and Jakarta (2.47‰, 2.44‰, and 2.33‰,

respectively) [7]. It is surprising that the proportion of cancer is high in Jakarta despite having better access to health services with the establishment of cancer centers in several regions, compared with the other provinces of Indonesia.

Until recently, Indonesia does not have its well-documented cancer profile data. This is partly caused by the lack of coordination between health-care facilities in recording and reporting cancer patients. On the other hand, the lack of awareness of healthcare personnel, medical record officers, and other administrative processes are also thought to interfere with data quality. Consequently, the current cancer data in Indonesia are the result of data interpolation from neighboring countries, such as Malaysia, Vietnam, Thailand, and other South-east Asia countries [3].

This study analyzed and presented the data acquired from the population-based cancer registry in Cipto Mangunkusumo Hospital to provide accurate information regarding the profile of cancer patients in Jakarta. Furthermore, the results of this study may be used as a reference in deciding the priority of programs and plans for cancer control in Indonesia.

Methods

This research was a cross-sectional and descriptive study conducted by obtaining secondary data from Cipto Mangunkusumo Hospital as the cancer registry control center for Jakarta Capital Region. This study was approved by the Ethics Committee of the Faculty of Medicine, Universitas Indonesia-Cipto Mangunkusumo Hospital. Eligible subjects were defined as all cancer patients living in Jakarta and were diagnosed by clinical examination, laboratory investigation, and diagnostic imaging from 2008 to 2012. Consideration as to why the time frame was limited to 2008–2012 was due to the initial time point of data collection started in 2008. Hence, 2008–2012 was the latest available data for 5-year study period. The data for the years following 2012 were still in the process of collection. The data were pooled from five sub-regional hospitals in Jakarta. Subjects were recruited by the total sampling method. The retrieved results were screened and deduplicated. Information about cancer patients was obtained from Canreg5 software used for the cancer registry system in Indonesia based on data from the Srikandi form (data collection form for Indonesia cancer registry). The data were subsequently analyzed to demonstrate the frequency and distribution of cancer patients based on age, sex, topography, stage, residence, morphology, and histopathological type using the SPSS version 20.0.

Results

A total of 29,956 subjects were extracted from the population-based cancer registry (PBCR) in Jakarta during 2008–2012. We excluded 14,914 subjects (49.8%) who lived outside of the Jakarta Capital Region from the retrieved data. As a result, only 15,042 subjects (50.2%) were eligible for this study.

Patients' characteristics

Out of 15,042 subjects who were diagnosed with cancer during 2008–2012, more than half of the subjects were female (64.5% vs. 35.3%). The majority of subjects were in the age group of 45–54 year -old (3,891 subjects, 25.9%). Most of the occupation of cancer patients was housewives. Subjects predominantly (27.7%) resided in West Jakarta.

Most of the subjects presented to health-care facilities in later stages, particularly in Stage III (17.9%). However, the diagnosis of several types of cancer did not follow numeral staging systems, such as hematological cancer, ophthalmological cancer, meningeal cancer, cancer of the central nervous system, and endocrinal

gland cancer. Thus, there were 708 subjects (4.7%) with non-applicable cancer staging. Moreover, we were unable to retrieve staging information from 8851 subjects (58.8%) since it was not stated in their medical records. The summary of patients' characteristics is shown in Table 1.

Table 1: Patient characteristics

Variables	Frequency	Percentage
Sex		
Male	5,341	35.5
Female	9,701	64.4
Age at diagnosis (years)		
<5	326	2.2
5–14	331	2.2
15–24	498	3.3
25–34	1,299	8.6
35–44	2,781	18.5
45–54	3,891	25.9
55–64	3,173	21.1
65–74	1,951	13.0
≥75	792	5.3
Occupation		
Employee	1,142	7.6
Farmer	24	0.2
Laborer	172	1.1
Soldier/Police	21	0.1
Housewife	3,473	23.1
Medical personnel	11	0.1
Teacher	27	0.2
Trader	207	1.4
Others	4,692	31.2
Unknown	5,273	35.1
Stadium		
1	119	0.8
1A	97	0.6
1B	257	1.7
1C	376	2.5
2	67	0.4
2Ar	335	2.2
2B	498	3.3
2C	21	0.1
3	1,450	9.6
3A	164	1.1
3B	778	5.2
3C	174	1.2
4	801	5.3
4A	132	0.9
4B	49	0.3
4C	17	0.1
Not available	3	0.0
Not applicable	1,090	7.2
Unknown	8,614	57.3
Residence		
Seribu Islands	13	0.1
West Jakarta	4,162	27.7
Central Jakarta	1,828	12.2
South Jakarta	2,929	19.5
East Jakarta	3,920	26.1
North Jakarta	2,190	14.6

Number of new cancer cases from 2008 to 2012 in Jakarta

We observed an increasing trend of new cancer cases per year (Figure 1a). The highest climb was seen in 2010-2011, in which the new cases increased by 2.5%. The greatest number of new cases occurred in 2012 with 3472 new cases from all subregions.

Top five cancers based on tumor location

Based on the cancer topography, the breast remained the most frequent (47%) primary site of malignancy, followed by cervical cancer (24%) among the five most common primary sites. Figure 1b displays the five most common tumor sites of primary cancer in Jakarta.
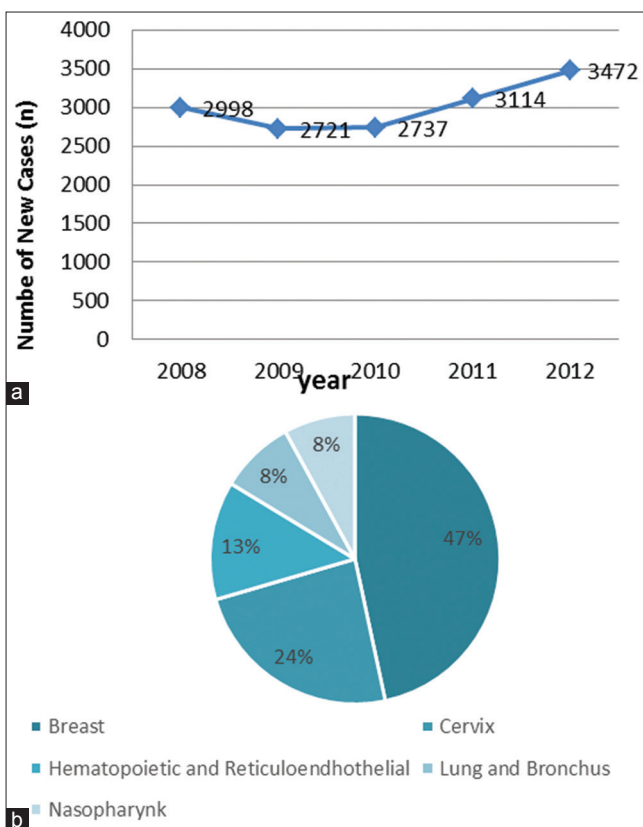
Figure 1: (a) Trend in number of new cancer cases in Jakarta in 2008–2012. (b) Distribution of top five cancer in Jakarta in 2008–2012 based on primary site.

the disease; 197 subjects (23.9%) were on Stage IV and 147 subjects (17.9%) were on Stage III, respectively. It was evident that in those four aforementioned cancers, late-stage presentation (Stage III and IV) was more common than early-stage presentation (28.2% vs. 18.4%, respectively).

Distribution of cancer morphology in top five cancers in Jakarta

The malignant neoplasm was the most frequent morphology found in the top five cancers in Jakarta. The distribution of malignant neoplasm in the top five cancers was the highest in breast cancer (1067 subjects, 32.8%). The distribution of cancer morphology is shown in Table 3.

Age distribution in top five cancers in Jakarta

The age distribution varied among the top five cancer in Jakarta (Figure 2a). More than 30% of breast and cervical cancer cases were diagnosed in people aged 45–54. Meanwhile, lung and bronchial cancer was commonly diagnosed later in life at age 55–64 (32.32%). Younger ages of presentation were observed in hematopoietic and reticuloendothelial system malignancies, in which 167 subjects (18.8%) were under 5-years-old.

Sex distribution in top five cancers in Jakarta

Male subjects outnumbered their female counterparts in nasopharyngeal cancer, lung and bronchial cancer, and hematopoietic and reticuloendothelial system malignancies. Although breast cancer was almost exclusive to females, we found that 40 male subjects (1.23%) were diagnosed with breast cancer. Sex distribution in the top five cancers is presented in Figure 2b.

Discussion

The GLOBOCAN 2012 statistics showed that the incidence of cancer in Indonesia between 2008 and

Top five cancers in Jakarta based on sex group

In the male group, the most prevalent cancer was [1] lung and bronchial cancer (10.6%). On the other hand, breast cancer was the most common cancer in the female group. A side-by-side comparison of the top five cancer in the male and female groups is presented in Table 2.

Stage distribution in top five cancers in Jakarta

As stated above, the late-stage presentation was prevalent in our study (Table 3). Eight hundred and thirty-one subjects (25.6%) with breast cancer were found on Stage III on initial diagnosis. The late-stage presentation was also common in cervical cancer as 24.6% of subjects presented on Stage III. Lung and bronchial cancer, as well as nasopharyngeal cancer patients, were diagnosed with more advanced stages of

Table 2: Distribution of top five cancer in Jakarta 2008–2012 based on sex group

Male			Female		
Topography	Frequency	Percentage	Topography	Frequency	Percentage
Lung andbronchus	568	10.6	Breast	3,251	33.1
Nasopharynx	556	10.4	Cervix uteri	1,644	16.9
Hematopoietic and reticuloendothelial system malignancies	509	9.5	Ovary	690	7.1
Liver	408	7.6	Unknown Primary Site	418	4.3
Lymphoma	381	7.1	Hematopoietic and reticuloendothelial system malignancies	379	3.9
Others	2,919	54.7	Others	3,359	34.6
Total	5,341	100	Total	9,701	100

Table 3: Distribution of top five cancer in Jakarta 2008–2012 based on pathology and cancer stage

Cancer type	n	%		Stage 1	2	3	4	8*	9†	Unknown	Total
Breast	n	%	n	275	387	831	284	0	0	1,474	3,251
			%	8.5	11.9	25.6	8.7	0	0	45.3	100
Invasive carcinoma of NST/infiltrating duct carcinoma, NOS	1,357	41.7									
Neoplasms, Malignant	1,066	32.8									
Carcinoma, NOS	288	8.9									
Lobular carcinoma, NOS	151	4.6									
Adenocarcinoma, NOS	81	2.5									
Others	308	9.5									
Cervix uteri	n	%	n	166	367	404	53	0	1	653	1,644
			%	10.1	22.3	24.6	3.2	0	0.1	39.7	100
Neoplasm, malignant	481	29.3									
Squamous cell carcinoma, nonkeratinizing, NOS	443	26.9									
Squamous cell carcinoma, keratinizing, NOS	192	117									
Adenocarcinoma, NOS	117	71									
Carcinoma, NOS	113	69									
Others	298	181									
Hematopoietic and reticuloendothelial system malignancies	n	%	n	0	0	0	0	0	888	0	888
			%	0	0	0	0	0	100,0	0	100
Acute lymphoblastic leukemia, NOS	172	19.4									
Chronic myeloid leukemia, NOS	133	15.0									
Acute myeloid leukemia, NOS	130	14.6									
Neoplasm, malignant	87	9.8									
Multiple myeloma	53	6.0									
Others	313	35.2									
Lung and bronchus	n	%	n	82	10	147	197	0	1	386	823
			%	10.0	1.2	17.9	23.9	0	0.1	46.9	100
Neoplasms, Malignant	307	37.3									
Adenocarcinoma, NOS	285	34.6									
Carcinoma, NOS	75	9.1									
Squamous Cell Neoplasms, Malignant	58	7.0									
Non-small cell carcinoma	25	3.0									
Others	73	8.9									
Nasopharynx	n	%	n	43	20	74	91	0	1	567	769
			%	5.4	2.5	9.3	11.4	0	0.1	71.2	100
Neoplasm, malignant	250	31.4									
Carcinoma, undifferentiated, NOS	210	26.4									
Squamous cell carcinoma, nonkeratinizing, NOS	150	18.8									
Carcinoma, NOS	123	15.5									
Squamous cell carcinoma, NOS	16	2.0									
Others	47	5.9									
Total	N			Early Stage 1,360			Late Stage 2,081				
	%			18.4			28.2				

*Not applicable, †Not available.

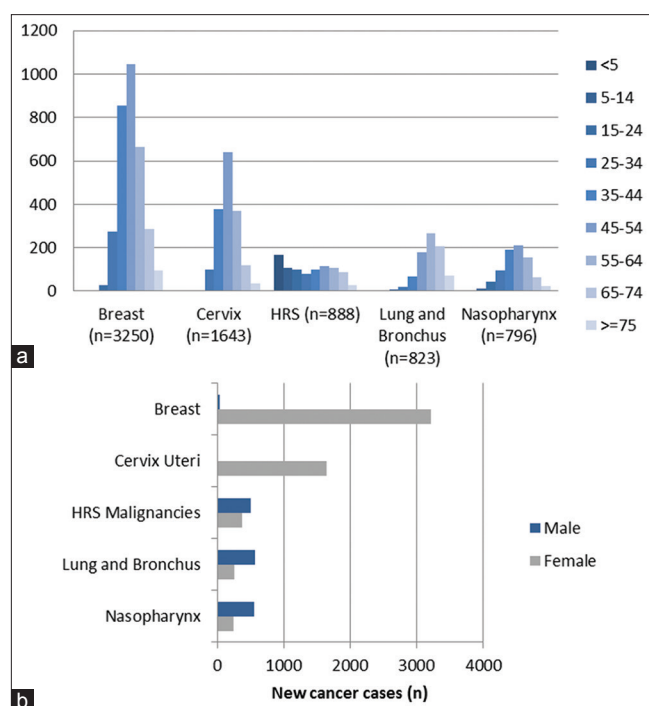2012 was estimated to be 299,673 (2.5‰) [1], [3]. As we only obtained data from the Cipto Mangunkusumo Hospital Cancer Registry, the total number of cancer cases was lower than the national data. It is noteworthy that not all health-care facilities actively participated in recording and reporting data to the cancer registry. The lack of support from healthcare facilities or hospital management may interfere with the performance of the cancer registry team and the quality of recorded data.

Our study showed that the overall male-to-female ratio was 1:1.8. This result was in line with GLOBOCAN 2020 in South-east Asia and the study by Mattiuzzi and Lippi, which also demonstrated higher cancer incidence in the female group compared to their male counterparts [2], [9]. One of the most important factors to explain this phenomenon is the fact that breast cancer and cervical cancer remain the top ranks of new cancer cases [1], [2].

Subjects from the 45–54 year-old group appeared to contribute more to new cancer cases compared to other age groups. This finding is almost consistent with GLOBOCAN 2020, which reported that cancer was most commonly diagnosed in 45–54 years old (22.6%) and 55–64 years old (25.3%) in South-east Asia [3]. In this study, we are unable to explain how occupational distribution differed from one cancer to another. This may be due to untraceable occupational data that reached 34.9%.

*Figure 2: (a) Age distribution in top five cancer in Jakarta. (b) Sex distribution in top five cancer in Jakarta. *N/A: Not available*

Out of all patients whose stages were recorded, almost half of them have initially been diagnosed with Stage III cancer. Sabrida's study and the data from Surveillance, Epidemiology, and End Result (SEER) Program reported that most cancer patients sought medical help when they are already in an advanced stage of the disease [10], [11].

The number of patients who lived in West Jakarta was the greatest among all subregions, followed by East Jakarta. In 2012, these two areas had the largest number of populations compared to other areas in Jakarta. There are also two renowned oncology centers in these areas, namely, Dharmais National Cancer Center in West Jakarta and Persahabatan Hospital in East Jakarta, which provide better access to oncology care.

Comparing our study to the cancer registry in Thailand during 2010–2012 [12], we found a different pattern of top five cancers based on sex group. In the male group, only lung and liver cancer were similarly included in the top five cancers. Meanwhile, breast cancer and cervical cancer have always been on the top rank of most common cancers in females. The gap in socioeconomic status, education level, oncogenic virus infection, and lifestyle might allow such difference in the order of top five cancer cases [3], [13], [14], [15], [16].

Malignant neoplasm is an unspecified histologic pattern (code 8000/3) that is frequently found in our data. Inaccurate data recording may lead to such findings. By overlooking this unspecific pattern, we were able to find a more typical morphology for each cancer. For instance, invasive ductal carcinoma is the most common morphology found in breast cancer, as well as squamous carcinoma in cervical cancer, lymphoblastic leukemia in hematopoietic and reticuloendothelial system (HRS) malignancy, squamous cell carcinoma in lung cancer, and undifferentiated carcinoma in nasopharyngeal cancer.

While age distribution on several cancers usually peaked over 40 years old, we found that HRS malignancy is more prevalent in children under 5 years old. Robert and Seropian stated that HRS malignancies have bimodal age distributions, which peak in children under 5 years old and adults in their 50s [11], [17], [18]. In terms of lung and bronchial cancer, subjects were diagnosed at a later age (55–64 years old). Nevertheless, this finding is different from a study that reported that lung cancer patients are more prevalent in the elderly over 70 years old [15]. Such variation might be associated with earlier onset of smoking in developing countries and a gap in socioeconomic status and educational level [15], [19].

In our research, we discovered a reversed gender ratio for several cancers. In HRS malignancies, for instance, the male-to-female ratio was 1.2:1. This finding is supported by the Surveillance, Epidemiology, and End Result (SEER) Program, National Cancer Institute (2014), which also found that higher number of men were diagnosed with HRS malignancies than women

with a male-to-female ratio of 1.7:1 [11], [18]. The ratio was even greater in lung cancer and nasopharyngeal cancer, with male-to-female ratios of 2.2:1 and 2.3:1, respectively. Similar findings were also demonstrated by studies by Inaba *et al.*, Horesh and Horowitz, and Bray *et al.* [18], [20], [21]. Another study conducted by Adham *et al.* also showed similar results for the male-to-female ratio of nasopharyngeal cancer (2.4:1) [22].

Inadequacy of data collection in this study is a striking problem that might be due to the retention of the medical record by hospitals involved in the cancer registry. As a result, there was still a lot of incomplete information in the Srikandi forms, particularly on the information about the staging, topography, and patients' characteristics. To tackle these issues, a firm commitment and support from the hospital management and related stakeholders are crucial to carrying out HBCR and PBCR activity. Training for registrars and verifiers is necessary to ensure data quality. By providing coaching in data collecting and recording, they will be able to gather and handle more complete information.

Conclusion

Cancer patients in Jakarta during 2008–2012 were predominantly female. Overall, the vast majority of patients came from the 45–54-year-old age group. Most cancer patients were housewives. However, we were unable to establish any association between occupation and cancer incidence. Late presentation of cancer was not uncommon as a large proportion of patients came with Stage III cancer. Thus, introducing preventive measures, such as early detection and mass screening, is critical to decrease and prevent advanced-stage presentation. The government's role in promotive and preventive measures is critical to reducing the cancer burden in the future.

Acknowledgments

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