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Cancer Profile in Central Jakarta : A 5-Year descriptive study

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Abstract

Background: Global Burden of Cancer 2012 (GLOBOCAN 2012) estimated 14.1 million new cases of cancer worldwide in 2012. This data was obtained from countries that have a population-based cancer registry. Cancer registration is useful in classifying information from all cancer cases to generate statistics of cancer incidence in a particular population as well as providing a framework for interpreting and controlling the impact of cancer in the community. Indonesia has not had a population-based cancer registry currently. The Minister of Health of Indonesia has designated Dr. Cipto Mangunkusumo Hospital as a control center for cancer registration to establish a population-based cancer registry in Jakarta province.

Methods: This cross-sectional descriptive study aimed to describe the cancer profile in Central Jakarta 2008-2012 based on data of RSCM as cancer registry control center in Jakarta province. The data were collected using Srikandi form, a form for cancer registry in Dr. Cipto Mangunkusumo Hospital.

Result: The results obtained 1,797 cases of cancer in Central Jakarta from 2008 - 2012 with male and female ratio of 1:1.9. The majority of patients came to health providers with advanced stage. The most common cancers were breast cancer, uterine cervical cancer, hematopoietic and reticuloendothelial system cancer, nasopharyngeal cancer, lung and bronchial cancer and lymph node cancer.

Conclusions: This research has some similarities with data from GLOBOCAN 2012. However, it is to be noted that data showed that many patients come in an advanced stage of cancer. Moreover, some part of the research data is incomplete due to inadequacy in the filling process of Srikandi form.

Keywords: Cancer profile, Central Jakarta, cancer registry

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INTRODUCTION

Cancer is the leading cause of death in the world, exceeding the number of deaths caused by AIDS, tuberculosis, and malaria. Approximately 1 in 7 causes of death is cancer. In 2012 it was estimated by GLOBOCAN that there are 14.1 million new cases, 8 million of it in developing countries.¹ These data collected from countries with cancer registry. For the example, in the United States the registration held by National Cancer Institute with Surveillance, Epidemiology, and End Results (SEER), the Cancer for Disease

Control and Prevention (National Program of Cancer Registries) and the North American Association of Central Cancer Registries. Mortality rates were collected by the National Centre for Health Statistics.²

The main purpose of a cancer registry is to collect and classify information from all cancer cases in a certain population and also provide a frame for interpretation dan control the impact of cancer in the community. Population-based cancer registration (PBCR) is a gold

standard to provide cancer statistic in population.^{3,4} A database of cancer cases around the world called The Cancer Incidence in Five Continent (CI5) has been published, and the latest volume provides information about the incidence of cancer from 2003 to 2007.^{4,5}

According to Indonesian Basic Health Research Data (Risikesdas) in 2007 cancer is the seventh leading cause of death with prevalence around 4.3 per 1000 person.⁶ In 2013, the prevalence decreased to 1.3 per 1000 person. However, the data were taken by a cross-sectional survey.^{6,7} The correct way to collect statistic data is to do population-based cancer registry. Dr. Cipto Mangunkusumo Hospital (RSCM) as a public hospital in Jakarta already constructed PBCR in Jakarta Province following the verdict of Indonesian Health Ministry in 2016 about National Cancer Data Registry dan Controller. This study will report the profile of cancer patients in Central Jakarta as a regional part of Jakarta province. The result can be used to form PBCR from Jakarta province.

METHODS

This is a cross-sectional descriptive study based on data collection from hospitals to form a sub-regional cancer profile in Central Jakarta between January 1st 2008 to December 31st 2012. It was held from Mei to June 2017. Subjects were assigned by total sampling method from patients who reside in Central Jakarta area based on cancer registry in Dr. Cipto Mangunkusumo Hospital. The inclusion criteria are (1) patient who was diagnosed with cancer from histopathologic features or other examination, (2) registered in a healthcare facility in Jakarta province.

Upon ethic board's approval, data extraction was performed from Dr. Cipto Mangunkusumo Hospital. The data were collected using Srikandi form, a form for cancer registry in Cipto Mangunkusumo Hospital. A screening process to obtain data from patients in Central Jakarta was done, and correction for duplicated data was performed using Microsoft Excel 2010. Data collected includes: demographic (age, gender, occupation), cancer diagnosis based on location (ICD-O), and cancer diagnosis based on morphology. Data analysis was done using Statistical Package for the Social Science (SPSS) version 20.0 and Microsoft Excel 2010.

RESULTS

A total of 1.797 cancer cases were obtained from 2008 to 2012 period, and the most number cases were found

in 2008 (407 cases). A Diagram showing numbers of cases per year will be shown in **Figure 1**.

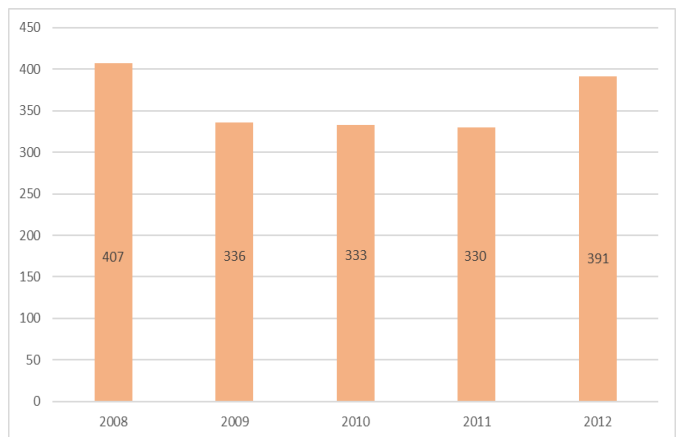


Figure 1: Number of cases from 2008 – 2012

Patient Characteristic

Based on the data collected, the number of cases in women is higher than men in Central Jakarta. The most common age range is between 45 – 54 years old (27.3%). We also found 36 cases (2.0%) of cancer in children below 5 years old. Most of the patients were housewives (19.4%) and followed by office workers (7.2%). However, a large number of patients did not specify their occupation.

Number of cases based on ICD – O system

Based on ICD – O system, we collected 52 cancer topographies. The most common type of cancer was breast cancer (22.1%), followed by the uterine cervical cancer (10.2 %). The frequency of each type of cancer was presented in **Table 2**.

Based on staging, the highest number of cancer patients were in stage 3 (7.57%). Nevertheless, there are still many cases with inapplicable (6.57%) or unknown (65.33%) cancer staging. The frequency table is shown in **Table 3**.

Top 5 most common cancer based on location

Five most common cancer type based on location regardless of the gender were breast cancer with 397 patients, uterine cervical cancer with 183 patients, hematopoietic and reticuloendothelial system cancer with 118 patients, nasopharyngeal cancer with 101 patients and lymph nodes, lung and bronchial cancer (tied in fifth place with 88 patients), the other types of cancer are 882 patients. The diagram can be seen in **Figure 2**.

Top 5 most common cancer in male patient

In men, the five most common cancer is hematopoietic and reticuloendothelial system cancer, nasopharyngeal

cancer, intrahepatic biliary duct and liver cancer, lungs and lymph nodes cancer. The remaining were another type of cancer. A pie chart showing the distribution can be seen in **Figure 3**.

Table 1. Patient Characteristic in Central Jakarta

	(n)	(%)
Gender		
Female	1,177	65.5
Male	620	34.5
Age at diagnosis (years)	(n)	(%)
Less than 5	36	2.0
5-14	28	1.6
15-24	71	4.0
25-34	152	8.5
35-44	321	17.9
45-54	491	27.3
55-64	364	20.3
65-74	218	12.1
More than 75	114	6.3
Unknown	2	0.1
Occupation	(n)	(%)
Unknown	628	34.9
Others	630	35.1
Housewife	348	19.4
Office Worker	129	7.2
Salesmen	33	1.8
Factory worker	24	1.3
Farmer	2	0.1
Medical Staff	2	0.1
Teacher	1	0.1
Total	1,797	100

Top 5 most common cancer in female patient

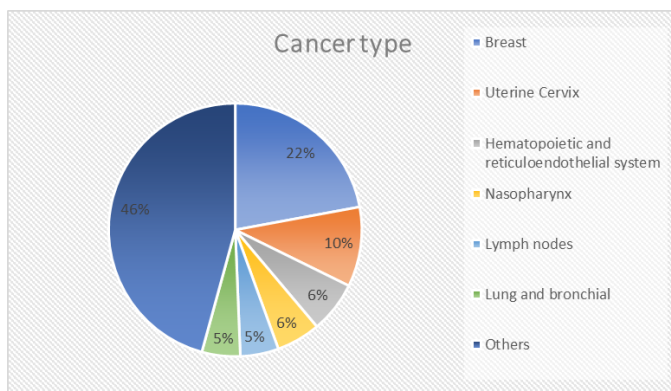
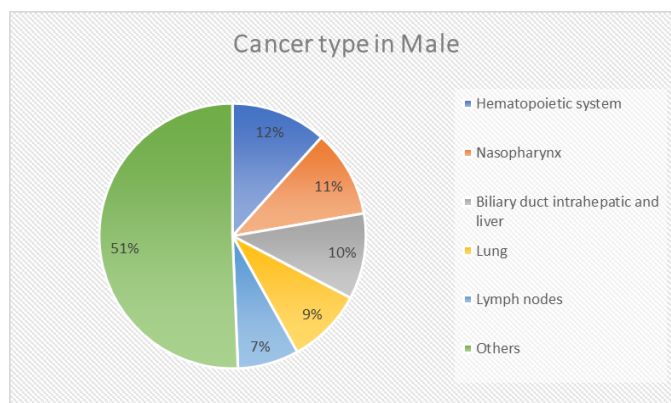
In Female patients, five most common cancer types are breast cancer, uterine cervical cancer, ovarian cancer, hematopoietic and reticuloendothelial system cancer, thyroid gland cancer, respectively. Data can be seen in **Figure 4**.

Table 2. Number of cases based on ICD - O

Topography	(n)	%
Breast	397	22.1
Cervix	183	10.2
Hemopoietic and reticuloendothelial system	118	6.6
Nasopharynx	101	5.6
Lymph nodes	88	4.9
Lungs and bronchial	88	4.9
Intrahepatic biliary ducts and liver	86	4.8
Ovarium	75	4.2
Unknown primary site	67	3.7
Colon	58	3.2
Thyroid gland	55	3.1
Skin	48	2.7
Prostate	42	2.3
Rectum	36	2.0
Endometrium	31	1.7
Bones, cartilage and joint	30	1.7
Connective tissues, subcutaneous, and other soft tissues	24	1.3
Brain	24	1.3
Pancreas	20	1.1
Uterine Corpus	19	1.1
Sinonasal and middle ear	18	1.0
Parotid and other saliva glands	18	1.8
Bladder	17	0.9
Tongue	17	0.9
Stomach	16	0.9
Ill-Defined Site	11	0.6
Larynx	10	0.6
Placenta	10	0.6
Ampulla vateri, gall bladder, and biliary tract	9	0.5
Kidney	8	0.4
Oral cavity	7	0.4
Testis	7	0.4
Spinal cord	5	0.3
Penis	5	0.3
Retroperitoneum	5	0.3
Tonsil	5	0.3
Vagina	5	0.3
Eye	4	0.2
Meninges	4	0.2
Thymus	4	0.2
Small bowel	4	0.2
Vulva	3	0.2
Oropharynx	3	0.2
Digestive tract	2	0.1
Heart, mediastinum, and pleura	2	0.1
Anal	1	0.1
Lips	1	0.1
Oesophageal	1	0.1
Hypopharynx	1	0.1
Other endocrine systems	1	0.1
Myometrium	1	0.1
Peripheral and autonomic nervous system	1	0.1
Total	1,797	100

Table 3. Frequency of cancer stage

Stage	(n)	%
1	46	2.56
1A	9	0.50
1B	24	1.34
1C	13	0.72
2	9	0.50
2A	40	2.23
2B	45	2.50
2C	1	0.06
3	136	7.57
3A	15	0.83
3B	68	3.78
3C	11	0.61
4	72	4.01
4C	9	0.50
Inapplicable	118	6.57
Unknown	1,174	65.33

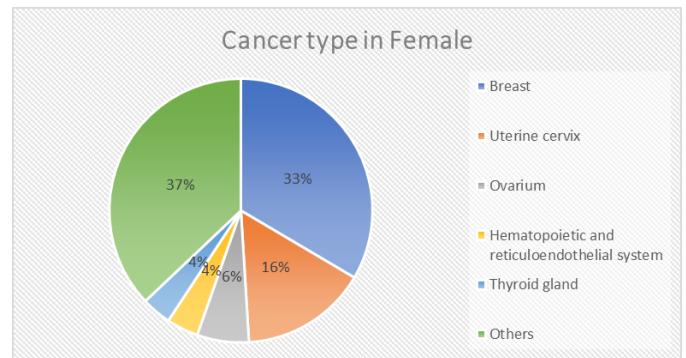
**Figure 2.** Top 5 most common cancer in Central Jakarta – all genders**Figure 3.** Top 5 most common type of cancer in Male

Age distribution in top five cancer cases in Central Jakarta

Four out of the five most common cancer occurred between 45 – 54 years old except lung cancer. For lung cancer, the most common age is between 55 – 64 years old. The distribution of age can be seen in **Table 4**.

Gender Distribution in top five cancer cases in Central Jakarta

Across the most common cancer, hematopoietic and reticuloendothelial system, nasopharyngeal, lymph nodes, lung, and bronchial malignancy tend to happen more often in men than women. Whereas breast cancer far more often occurs in women than men. Gender distribution in the top five most common cancer is shown in **Table 5**.

**Figure 4.** Top 5 most common type of cancer in Female

Stage distribution in top five cancer in Central Jakarta

Table 6 describes the five most common cancer types and its staging. Breast cancer most commonly found in stage 3, uterine cervical cancer in stage 3B, lymph nodes in stage 3, lung and bronchial malignancy in stage 4. However, this system of staging cannot be applied to hematopoietic and reticuloendothelial malignancy. It is also to be noted that most of the cancer cases are not classified into the proper staging system.

Morphologic distribution in top five cancer in Central Jakarta

Table 7 present the most frequent morphology in the top five cancers in Central Jakarta. For breast cancer, the most common morphology was invasive ductal carcinoma. For uterine cervix and nasopharyngeal cancer, the most common morphology is malignant neoplasm. In hematopoietic and reticuloendothelial cancer, the most common type is Leukaemia of lymphoblastic precursor cell, whereas in lymph nodes cancer the most common morphology is Non-Hodgkin Lymphoma. For Lung and bronchial cancer, the most common type was adenocarcinoma.

Table 4. Age Distribution in the five most common cancer cases

Topography	Age Range (years)									Total
	< 5	5-14	15-24	25-34	35-44	45-54	55-64	65-74	≥75	
Breast	0	0	4	36	103	133	67	39	15	397
Cervix	0	0	1	11	41	60	45	19	6	183
Hematopoietic & Reticuloendothelial	16	11	10	15	17	20	13	12	4	118
Nasopharynx	3	0	8	13	18	28	21	8	2	101
Lymph Nodes	0	0	7	15	13	23	14	11	5	88
Lungs	0	0	0	1	6	19	33	19	10	88

Table 5. Gender Distribution in the five most common cancer

Topography	Gender				Total (n)
	Male		Female		
	(n)	%	(n)	%	
Breast	3	0.756	394	99.24	397
Cervix	0	0	183	100	183
Hematopoietic and reticuloendothelial system	71	60.17	46	36.98	118
Lymph nodes	46	52.27	42	47.73	88
Lung and bronchial	57	64.77	31	35.23	88

Table 6. Stage distribution in top five cancer in Central Jakarta

Stage	Cancer Types											
	Breast		Cervix		Hematopoietic and Reticuloendothelial		Nasopharyngeal		Lymph Nodes		Lung and Bronchial	
	N	%	n	%	n	%	n	%	n	%	n	%
1	25	6.30	2	1.10			3	2.97			11	12.50
1A	4	1.01										
1B	3	0.76	18	9.89								
2	2	0.50	1	0.55					2	2.27		
2A	25	6.30	10	5.49							1	1.14
2B	21	5.29	23	12.64								
3	36	9.07	4	2.20			2	1.98	13	14.77	11	12.50
3A	10	2.52	3	1.65								
3B	32	8.06	30	16.48							2	2.27
3C	7	1.76										
4	22	5.54	1	0.55			1	0.99	1	1.14	15	17.05
4B			3	1.65			1	0.99	1	1.14		
4C							5	4.95				
Unknown	210	52.90	87	47.80			89	88.12	71	80.68	48	54.55
Inapplicable					118	100						
Total	397	100	182	100	118	100	101	100	88	100	88	100

Table 7. Morphologic distribution in top five cancer in Central Jakarta

Cancer types	Morphology	(n)	(%)
Breast	Invasive ductal carcinoma	164	41.31
	Malignant neoplasm	133	33.50
	Carcinoma	42	10.58
	Lobular carcinoma	15	3.78
	Malignant Phyllodes tumor	6	1.51
	Others	32	8.06
	Unknown	5	1.26
	Total	397	100
Uterine Cervix	Malignant neoplasm	66	36.07
	Non-keratinized squamous cell carcinoma	39	21.31
	Keratinized squamous cell carcinoma	24	13.11
	Adenocarcinoma	12	6.56
	Carcinoma	11	6,01
	Others	29	15.85
	Unknown	2	1.09
	Total	183	100
Hematopoietic and reticuloendothelial system	Leukemia of lymphoblastic precursor cell	27	22.88
	Acute myeloid leukemia	24	20.34
	Chronic myeloid leukemia	11	9.32
	Multiple myeloma	7	5.93
	Acute leukemia	6	5.08
	Others	2	1.69
	Unknown	41	34.75
	Total	118	100
Nasopharynx	Malignant neoplasm	37	36.63
	Undifferentiated carcinoma	19	18.81
	Non-keratinized squamous cell carcinoma	19	18.81
	Carcinoma	16	15.84
	Keratinized squamous cell carcinoma	3	2.97
	Others	7	6.93
	Total	101	100
Lymph nodes	Non-Hodgkin lymphoma	25	28.41
	Malignant lymphoma, diffuse, large B cell	21	23.86
	Malignant lymphoma	9	10.23
	Malignant neoplasm	8	9.09
	Hodgkin lymphoma	4	4.55
	Others	3	3.41
	Unknown	18	20.45
Total	88	100	
Lung and bronchial	Adenocarcinoma	32	36.36
	Malignant neoplasm	26	29.55
	Carcinoma	8	9.09
	Squamous cell carcinoma	6	6.82
	Large cell carcinoma	2	2.27
	Others	8	9.09
	Unknown	6	6.82
Total	88	100	

DISCUSSION

Cancer data from cancer registry in Dr. Cipto Mangunkusumo Hospital up until May 2017 has not covered all cancer data in Jakarta province because not every hospital in Jakarta provide and submit cancer data to Cipto Mangunkusumo Hospital. Dharmais Hospital is the only other hospital who has a functional cancer registry (for West Jakarta). Data showed a decreased number of cancer patients from 2008 to 2011, but during this period, the number of populations was increased.

Topographic classification of cancer cases is based on International Classification of Disease for Oncology (ICD – O) third edition which published by the World Health Organization. This system includes leukemia in hematopoietic and reticuloendothelial system cancer. Colon and rectum cancer were divided into two different topography.

From 1,797 cancer cases, two patients were not registered their birth date. The most frequent age interval is between 45 – 54 years old with 491 patients (27.3%). It is different from GLOBOCAN 2012 data which estimated that the highest incident for cancer occurs in older than 75 years old age group. As a comparison, cancer registry from Malaysia in 2017 estimated that the highest incidence occurs in older than 70 years old age group.⁸⁻¹⁰

Based on the data, there were more females patient than male patients (1,177 and 620). This is consistent with IARC data by Bray et al. In Sub Sahara Africa, South East Asia, and Oceania (not including Australia and New Zealand) cancer prevalence were lower in male compared to female with a ratio of 0.6. In developed countries, the ratio of male vs. female is 1.1.

The most common occupational background is others (630 patients or 35.1%), followed by housewives (348 patients or 19.4%). This is due to unspecified option in the occupational section of the Srikandi form.

Based on staging classification from I, II, III and IV, the number of cases diagnosed in stage III was higher than stage I and II. The data shows that patients tend to come in an advanced stage of cancer. According to Sharma et al., the challenge in developing countries is the limit of knowledge about cancer and access to early diagnosis. The cost of treating cancer is also still expensive. Another problem is the availability of health infrastructures to sustain the treatment is which were not spread equally in Indonesia.¹¹ It is to be noted that 1,174 patients (65.33%) were not registered. This should be a concern of medical staffs to fill out the form in the status of patients properly. In all genders,

top five most frequent cancer cases were breast cancer (397 patients or 22.1%), uterine cervical cancer (183 patients or 10.2%), hematopoietic and reticuloendothelial system cancer (118 patients or 6.6%), nasopharyngeal cancer (101 patients or 5.6%), and lymph nodes, lung, and bronchial cancer placed fifth (88 patients or 4.9%). Based on GLOBOCAN 2012 in Asia, the most frequent cases were breast, lung, cervix, liver and colorectal.¹²

In female patient, the most frequent cancer types were breast cancer (33.47%), cervical cancer (15.55 %), ovarium (6.37%), hematopoietic and reticuloendothelial system cancer (3.91 %) and thyroid gland cancer (3.65 %). For male patient, the most frequent types were hematopoietic and reticuloendothelial system cancer (11.61%), nasopharyngeal cancer (10.65 %), intrahepatic biliary ducts and liver cancer (10.48%), lungs and bronchial cancer (9.19 %) and lymph nodes (7.42%) cancer. Based on GLOBOCAN 2012 data, the most frequent cancer types in female were breast, cervix, lungs, colorectal and liver.

Whereas for male, the most frequent types were lungs, liver, colorectal, prostate and stomach.^{13,14} These order of the top five most frequent cancer types possibly influenced by risk factors, environment, and genetic differences in a region.

Based on this research, breast cancer was found being the most commonly occurred in 45 – 54 years age group. According to Leong et al., in Asia the peak number of breast cancer patients occur around 40 – 50 years, while in the USA based on American Cancer Society breast cancer more frequently occurs in 60-70 years old.^{15,16}

There were 3 cases of breast cancer in male patients and 394 cases in female. The peak age interval for cervical cancer was 45 – 54 years old, followed by 55 – 64 years old. Based on GLOBOCAN 2012 data, for the world the peak age interval is 50 – 60 years old while in South East Asia was 55 – 70 years old.^{17,18}

For hematopoietic and reticuloendothelial system, the most frequent cases occur between 45- 54 years old, followed by 35 – 44 years old and less than five years old. Based on current data, the peak of hematopoietic and reticuloendothelial cancer is more than 75 years old.^{19,20} There were 71 male patients and 46 female patients.

Based on this research, the peak age interval for nasopharyngeal cancer was between 45-54 years old, followed by 55-64 years old. This is different from research by Bray et al. that nasopharyngeal cancer

occurs in 15-24 and 65-79 years old.²¹ According to GLOBOCAN 2012, world data for nasopharyngeal cancer is 60-70 years old.²⁰ There were 66 cases in male and 35 cases in female.

Lymph nodes malignancy occurs most around 45-54 years old, followed 25-34 years old. Data from South East Asia and the world mention that the most common age interval is more than 75 years old.¹⁹⁻²⁰ For lymph nodes malignancy, there are 46 cases in male patients and 42 cases in female.²² This is consistent with a report from Horesh et al.

In bronchial and lung cancer, the peak age interval is between 55-64 years old. The youngest age group is 15-24 years old. Based on world data and South East Asia data from GLOBOCAN 2012, the peak of lung cancer is more than 75 years old age group.^{19,20} Data shows that lung and bronchial cancer occurs more often in male (57 persons) than female (31 persons). This is also consistent with research published by Ridge et al.²³ 1,174 out of 1,797 data (65.33%) in this research did not specify their stage of cancer. The hematopoietic and reticuloendothelial system applied a different system of classification for staging. This is probably due to incompleteness filling of the form by medical staff. Proper management data need to be done in hospitals to provide better cancer registry in the future.

From the remaining data, breast cancer most frequently occurs in stage 3. Cervical cancer in stage 3B, nasopharyngeal cancer in stage 4, lymph nodes malignancy in stage 3 and lung and bronchial cancer in stage 4.

Morphologic features in this research used guideline from ICD – O. During the filling out process, there are many cases using unspecified code which was malignant neoplasm (8000/3). In the top five most frequent cancer this code placed second in breast cancer, first in cervical cancer, first in nasopharyngeal cancer and fourth in lymph nodes cancer.

In breast cancer, the most frequent morphologic findings were invasive ductal carcinoma (41.31%), malignant neoplasm (33.50 %), carcinoma (10.58 %), lobular carcinoma and malignant Phyllodes tumor (1.51 %). This was consistent with theory from Malhotra et al. that invasive ductal carcinoma is the most common morphologic feature in breast cancer.²⁴

The most frequent findings in hematopoietic and reticuloendothelial system malignancies were leukemia of lymphoblastic precursor cells (22.8 %), acute myeloid leukemia (20.34 %), chronic myeloid leukemia (9.32 %), multiple myeloma (5.93 %) and acute leukemia (5.08 %).

For nasopharyngeal cancer, the most frequent morphologic findings are malignant neoplasm (36.63 %), un-

differentiated and non-keratinized squamous cell carcinoma (18.8 %), carcinoma (15.84 %) and keratinized squamous cell carcinoma (2.97 %). Li Z reported that in a region with a high incidence of nasopharyngeal cancer the dominant morphologic feature is non-keratinized squamous cell carcinoma and this type corresponded with Epstein – Barr Virus.²⁵

This research found that the most common morphologic features for lymph nodes malignancy were Non-Hodgkin lymphoma (28.41 %), Diffuse malignant large B cell lymphoma (23.86 %), malignant lymphoma (10.23 %), malignant neoplasm (10.23 %) and Hodgkin lymphoma (4.55 %).

Adenocarcinoma is the most frequent morphologic findings in lung and bronchial cancer (36.36 %), followed by malignant neoplasm (29.55 %), carcinoma (9.09 %) squamous cell carcinoma (6.82 %) and large cell carcinoma (2.27 %). This is consistent with Travis WD that adenocarcinoma is the most frequent morphologic feature (38%) in lung cancer.²⁶

This research used secondary data from cancer registry in Cipto Mangunkusumo hospital. Primary data were in medical records from all healthcare facilities in DKI Jakarta Province, making it difficult to input data in Srikandi form and cancer registry's software. These data from Cipto Mangunkusumo has not included all Jakarta province cancer data because there were many hospitals that have not performed cancer registry. Inadequacy filling of data also become a problem as we can see in this research. There was a lot of unknown or missing part of the data.

Thus far, no research has published about cancer registry in Central Jakarta. We hope this study can give a brief description of cancer profile in Central Jakarta. Result of this research can be used as initial data to develop cancer registry in Jakarta and expected to contribute for expanding population-based cancer registry in Indonesia.

CONFLICTS OF INTEREST

None declared.

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