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Original Article

A province-wide childhood malignancy profiles in Indonesia (2010-2019): *Yogyakarta Pediatric Cancer Registry*

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Abstract

Background The global burden of childhood cancer is poorly quantified, but it is estimated that 80% of all children with cancer live in low- and middle-income countries with cure rates of childhood cancer far lower than in high-income nations.

Objective To describe the Yogyakarta Region pediatric cancer profile from 2010-2019 and compare it to that of a 2000-2009 study in the same setting.

Methods This retrospective study of childhood cancer was conducted in patients aged ≤18 years and diagnosed in Dr. Sardjito General Hospital, Yogyakarta, Central Java, from 2010 to 2019. Pediatric cancer patient data were collected from hospital hardcopy and electronic medical records. An estimated annual average incidence rate of childhood cancer was calculated and the number of patients by their regions of origin were visualized. The number of childhood malignancies recorded is also compared by the number found in 2000-2009 study.

Results There were 1,839 new cases registered in Yogyakarta Pediatric Cancer Registry during the study period. The mean age at diagnosis was 6.3 years and male-to-female ratio was 1.4: 1.0. Fifty-six% of cancers were diagnosed in the 0-5-years age group. The most common diagnosis category was leukemia, which accounted for 60% of all childhood malignancies. The three most common diagnoses were acute lymphoblastic leukemia (44%), acute myeloid leukemia (12%), and retinoblastoma (7%). The annual average incidence rates of leukemia and solid tumors were 26.8 and 17.5 per million, respectively. The number of patients registered in 2000-2009 study was 1,124 case. Therefore, there was an increase of 63.6% in the number of childhood malignancies registered in 2010-2019 compared to the 2000-2009 study.

Conclusion There is an increase in the number of childhood malignancies registered in 2010-2019 compared to the 2000-2009 study. The number of patients referred to our hospital increased, indicating a more inclusive registry, better referral system, and better access to health care facility. **[Paediatr Indones. 2023;63:226-37; DOI: https://doi.org/10.14238/pi63.4.2023.226-37**].

Keywords: *epidemiology; Indonesia; leukemia; pediatric oncology; registries; retinoblastoma*

The magnitude of the global burden of childhood and adolescent cancer is poorly quantified, but an estimated 80% of all children with cancer live in low-income and middle-income countries (LMIC), where cure rates of childhood cancer are far below those of high-income countries.[1] This indicates a need for improved registration and documentation of cancer cases.[2,3]

Dr. Sardjito General Hospital (SGH) is a tertiary care academic hospital associated with Universitas Gadjah Mada, located in the Yogyakarta Special Region (YSR), Indonesia. Indonesia is an archipelago with more than 16,000 islands, although 56% of the population lives on the main island of Java. The YSR, in South-central Java, is the 4th most populated province in Indonesia, with a total population of 3,762,200 and a population density of 1,201 per km^2 as of 2017.[4] Dr. Sardjito General Hospital is the only

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tertiary referral hospital for pediatric cancer patients in the YSR Province and surrounding area. The referral area comprises most of the southern region of Central Java, with an estimated 9,908,5017 inhabitants.[4]

The earliest cancer registry in Indonesia started in Semarang, Central Java, in 1970. Subsequently, many hospital-based, pathology-based, and population-based cancer registries developed until 2004. Nevertheless, these efforts had varying success due to a lack of human resources, no institutional unit responsible for developing the registry, and a lack of clear policies. In 2006, the Indonesian Ministry of Health established the Sub-Directorate of Cancer Control within the Directorate of Non-Communicable Diseases. This directorate initiated the establishment of a sustainable national cancer registry.[5] Indonesia's national cancer registry is primarily hospital-based, compiles data across centers, and focuses on adult cancer rather than pediatric cases, resulting in likely underreporting of the pediatric cancer incidence.

In 2001, SGH did a collaborative project with the Saskatchewan Cancer Agency, Canada, to establish the *Yogyakarta Pediatric Cancer Registry* (YPCR), an electronic, hospital-based, pediatric cancer registry in SGH, Yogyakarta City. Given the relatively large number of children with cancer in LMICs, the opportunity for epidemiologic research makes hospital-based registries potentially cost-effective.[6] A prior ten-year study1 using data from YPCR was done to describe basic pediatric cancer profiles of patients treated in SGH during 2000-2009. Since then, the YPCR has continued to register pediatric cancer cases and has undergone continuous development. We aimed to describe the recent pediatric cancer profiles from 2010-2019 and compare this profiles with that of the previous study.[7]

Methods

Since 2001, pediatric cancer patient data have been collected via hospital hardcopy and electronic medical records and entered into a *Statistical Package for the Social Sciences* (SPSS) database. Intensive training on the registry methodology was provided on-site at the *Saskatchewan Cancer Registry* office from July to August 2002.[1] Quality control checks were performed, with particular attention paid to the completeness of records, standard consistency of data generated, and checks to avoid duplication of records. During the data collection process, verification of information for accuracy and completeness was performed manually by registry staff.

Data were analyzed to generate descriptive statistics using *IBM SPSS version 21* software. Continuous data were presented as mean and standard deviation (SD) or median and interquartile range (IQR) for normally distributed and skewed data, respectively. Categorical variables were presented as percentages and counts. The numbers were classified by the diagnosis and the family residential origin. We performed geographic mapping of the number of patients by location of family residence using *Tableau 10.2 software*.

Children aged 0-18 years of age diagnosed with cancer and registered in YPCR between January 2010 and December 2019 were included. Primary demographic data (age, sex, diagnosis, and patient origin) were collected and diagnoses were categorized according to the *International Classification of Childhood Cancer* (ICCC-3).[8] The average annual incidence rate (AAIR) was calculated as the annual average of ten-year incidence divided by the pediatric population in the respective area during a single year, then multiplied by a million.[7] Anticipating the fluctuation of population size over a decade, the pediatric population estimates in 2015 were used, as it was the middle year between 2010 and 2019.[9] The number of childhood cancer from 2010-2019 recorded is compared with 2000-2009 study in the same setting1.

Results

There were 1,839 newly diagnosed children registered in the YPCR from January 2010 to December 2019. Of these, 57% were male and 43% were female, with a ratio of 1.4: 1.0. Most cancers were diagnosed in children aged 0-5 years (**Table 1**).

Of a total of 34 provinces in Indonesia, SGH received referrals from 26 provinces. Most patients were from the Central Java province (60%; n=1,078), followed by YSR (29%; n=519). Eighty patients (4%) came from outside Java Island. The furthest referral was from the Papua province, more than

Table 1. Basic demographics of childhood malignancy in Dr. Sardjito General Hospital, Yogyakarta, Indonesia from 2010-2019

All childhood malignancy cases (N=1,839)	
Gender, n(%)	
Male	1,055 (57)
Female	784 (43)
Age group, n(%)	
0-5 years	1,026 (56)
6-12 years	514 (28)
13-15 years	229 (12)
16-18 years	70 (4)
Leukemia (N=1,097)	
Gender, n(%)	
Male	623 (57)
Female	474 (43)
Age group, n(%)	
0-5 years	592 (54)
6-12 years	319 (29)
13-15 years	148 (14)
16-18 years	38 (3)
Diagnosis, n(%)	
Acute lymphoblastic leukemia	813 (74)
Acute myeloid leukemia	225 (20)
Chronic myeloid leukemia	41 (4)
Myelodysplastic syndromes	14 (1)
Others	4 (0.3)
Solid tumor (N=742)	
Gender, n(%)	
Male	425 (57)
Female	317 (43)
Age group, n(%)	
0-5 years	450 (61)
6-12 years	190 (26)
13-15 years	82 (10)
16-18 years	20 (3)
Diagnosis, n(%)	
Retinoblastoma	137 (19)
Lymphomas and reticuloendothelial neoplasms	134 (18)
Soft tissue sarcomas	82 (11)
Germ cell tumors	77 (10)
Neuroblastoma	62 (8)
Renal tumors	60 (8)
CNS neoplasms	42 (6)
Benign tumors	41 (6)
Malignant bone tumors	41 (5)
Carcinoma and melanomas	38 (5)
Hepatic tumors	24 (3)
Others	4 (0.5)

3,000 kilometers away from YSR (0.4%; n=7). As the majority of patients came from YSR and Central Java, a focused mapping into these two regions is depicted in **Figure 1**. The YSR comprises four regencies and one city. Central Java consists of 29 regencies and six cities. Patients came from the whole area of YSR, while from Central Java, patients mostly came from the Southern area. Most of the patients from the northern part of Central Java are treated in DR Kariadi, Semarang (the capital city of Central Java). Mapping of the number of patients per location is shown based on disease categories, including leukemia (see **Additional file**

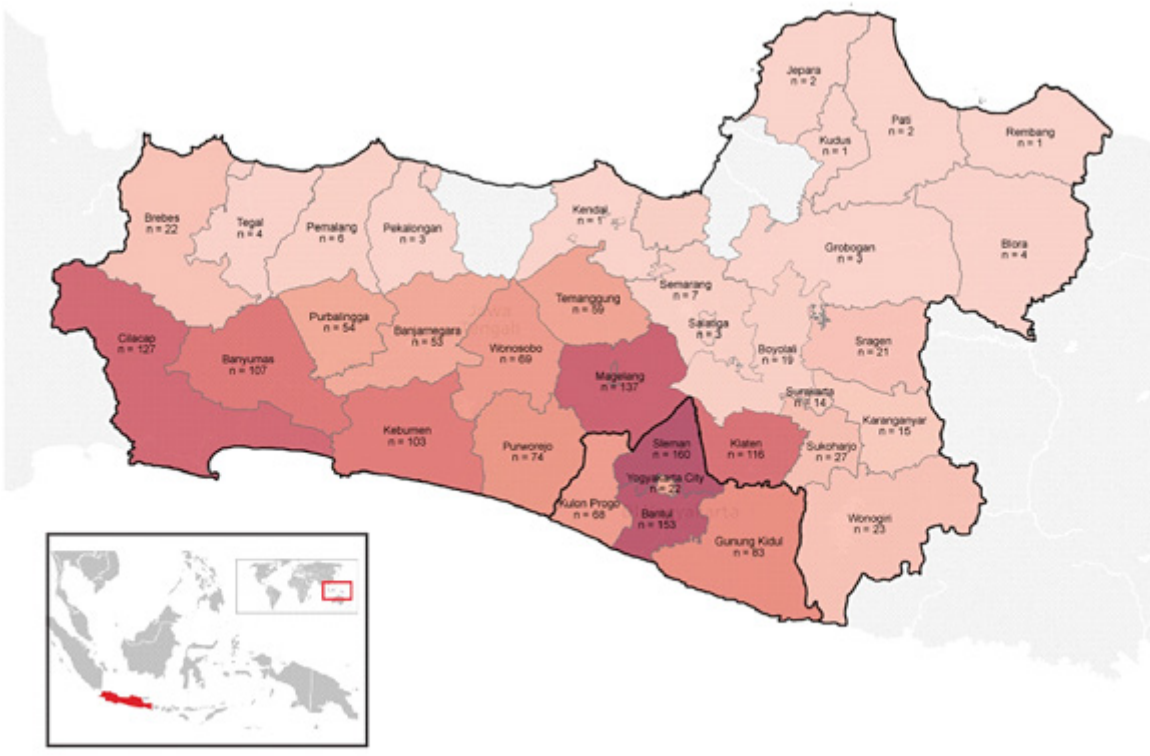

Figure 1. Geographic distribution of family residential origin for children with cancer diagnosed at SGH from 2010-2019 and originating from Central Java or YSR provinces (N=1,597).
A darker shade indicates a greater number of patients. A region without shade indicates that no patients came from these areas. Bold lines are provincial borders.

1), and solid tumors (see **Additional file 2**).

The number of patients fluctuated each year (**Figure 2**). Between 2010 and 2019, 2012 and 2016 had the highest numbers of newly diagnosed patients (212), followed by 2014 (n=209). The number of newly diagnosed children steadily increased from 2010 to 2012, then suddenly plummeted in 2013 with only 158 patients, and rose again in 2014. After 2016, the direction trended downward, with 2018 as the lowest number of patients (n=156). We present data on a number of patients over the year for each disease category, such as leukemia (see **Additional file 3**) and solid tumors (see **Additional file 4**). The decrease in the number of patients in 2013 was mainly due to much lower diagnosis of solid tumor cases.

The most common diagnosis category in YPCR was leukemia (ICCC-3 Category I), which accounted for 60% (n=1097) of all childhood malignancies. The most frequent specific diagnosis were acute lymphoblastic leukemia (52%; n=813), acute myeloblastic leukemia (14%; n=225), and retinoblastoma (9%; n=137) (see **Additional file 5**). Based on these findings, ICCC-3 Groups I (leukemia), II (lymphomas and reticuloendothelial neoplasms), and V (retinoblastoma) comprised the majority of cases diagnosed in SGH. The most frequent diagnosis was acute leukemia (60%; n=1097), consisting of acute lymphoblastic leukemia (74%; n=813), acute myeloblastic leukemia (21%; n=225), chronic myeloid leukemia (4%; n=40), myelodysplastic syndrom

All cancers in ICCC-3 groups II-XII and unclassified (benign tumors) were further categorized as solid tumors. There were 742 patients with solid tumors recorded in the YPCR during 2010-2019, 57% (425) males and 43% (317) females. Solid tumor diagnoses were evaluated by the age at diagnosis (0-5 years, 6-12 years, 13-15 years, and 16-18 years) to examine differences in diagnosis by age. The most

frequent diagnosis was retinoblastoma (ICCC-3 group V), which accounted for 19% of all pediatric solid tumors in SGH diagnosed from 2010 to 2019. In the study period, 137 patients with retinoblastoma were registered in the YPCR, 70 males (51%) and 67 females (49%). As expected, most retinoblastomas were diagnosed between 0-5 years of age (95%; n=130), with only seven children (5%) diagnosed at six years of age or older (see **Additional file 6**). The mean age at diagnosis of retinoblastoma was 2.2 years (median 2). The second most frequent diagnosis of solid tumor was followed by lymphomas and reticuloendothelial neoplasms (ICCC-3 group II) which accounted for 18% of all pediatric solid tumors. There were 134 patients in within this category. Of these, there were 94 males (70%) and 40 females (30%). The majority were diagnosed at 0-5 years of age (50%; n=65). Non-Hodgkin's lymphoma was the most frequently diagnosed cancer in this category (52%; n=69).

The AAIR of all cases of pediatric malignancy in YSR was 48.8 per million population (**Table 2**). The AAIR of leukemia and solid tumors was 26.8 and 17.5 per million, respectively.

The comparison between the average annual incidence rate of childhood cancer between YSR, globally,[10] in Southeast Asia,[10] and in Thailand[11] is shown in **Table 3**. Our center's incidence rates were generally lower than the numbers documented in other countries.

Discussion

This study was done to explore an epidemiological profiles of malignancies diagnosed in 1,839 children in Indonesia. We compared our results with those of the previous study in SGH.[1] The number of patients registered in 2010-2019 increased by 63.6% compared to the 2000-2009 study (1,839: 1,124). The increase does not directly indicate an increase in childhood cancer incidence. An apparent increase can result from fewer undiagnosed cancers, a better referral system, or better awareness in society about childhood cancer. We also suggest that the increased number of diagnoses resulted from the implementation of the national health insurance, called *Universal Health Coverage* (UHC), in 2014. Another possible cause was increased YSR population, which had an increase in the annual population growth rate from 1.04% during 2000-2010 to 1.17% during 2010-2017.[4]

The male-to-female ratio did not change much between the two decades, with ratio of 1.4: 1 compared to 1.7: 1 in the previous study.[1] Male sex has been positively associated with most cancers.[10] Socio-cultural practices might explain the male

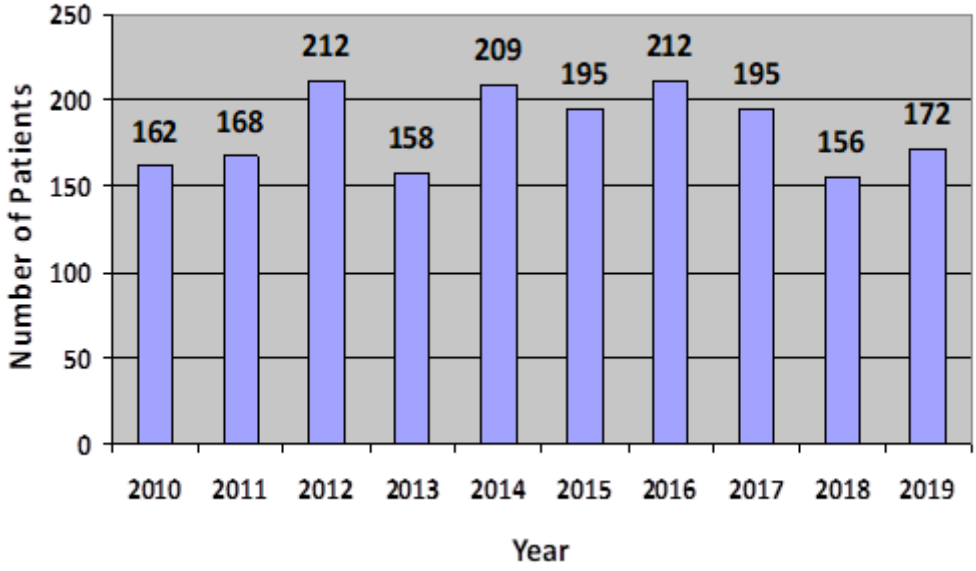

Figure 2. Number of children diagnosed with cancer per year at SGH from 2010-2019 (N=1,839)

Table 2. Number of cases and average annual incidence rate (AAIR) in Yogyakarta Special Region (YSR) based on the ICCC-3 disease category (N=1,839)

ICCC-3 disease category	n	%	YSR AAIR
I. Leukemia	1,097	60	26.8
V. Retinoblastoma	137	7	2.2
II. Lymphomas and reticuloendothelial neoplasms	134	7	4.5
IX. Soft tissue sarcomas	82	5	2.6
X. Germ cell tumors	77	4	2.2
IV. Neuroblastoma	62	3	2.2
VI. Renal tumors	60	3	2.0
III. CNS neoplasms	42	2	2.3
Benign tumors	41	2	1.7
VIII. Malignant bone tumors	41	2	1.3
XI. Carcinoma and melanomas	38	2	0.6
VII. Hepatic tumors	24	1	0.5
XII. Other and unspecified malignant neoplasms	4	<1	0.1
All cases	1,839	100	48.8

ICCC=International Classification of Childhood Cancer; YSR=Yogyakarta Special Region; AAIR=average annual incidence rate; CNS=central nervous system

Table 3. Comparison of the AAIR of childhood cancer between the Yogyakarta Special Region, globally, Southeast Asia, and Thailand

Variables	Yogyakarta	Global[a]	Southeast Asia[a]	Thailand[b]
All childhood cancer	48.8	152.8	-	98.5
Leukemia	26.8	46.4	52.7	36.1
Lymphomas	4.5	15.2	9.5	10.3
CNS neoplasms	2.3	28.2	12.9	12
Neuroblastoma	2.2	10.4	4.4	3.2
Retinoblastoma	2.2	4.5	6.0	2.7
Renal tumors	2.0	8.2	5.4	3.2
Hepatic tumors	0.5	2.3	3.2	2.2
Malignant bone tumors	1.3	5.7	5.6	4.5
Soft tissue sarcomas	2.6	8.9	5.2	4.8
Germ cell tumors	2.2	4.9	5.7	6.2
Carcinoma and melanoma	0.6	4.6	5.0	7.2
Other and unspecified	0.1	1.2	4.1	6

CNS=central nervous system; [a]2017 publication, age range from 0-19 years. Calculated from weighted average from 4 age-specific rates using the weights of the world standard population[10]; [b]2018 publication, age range from 0-19 years. Rates were age-standardized incidence rates calculated per million person-years[11]

predominance, as prioritized males would have better health access, while female children tend to be neglected. While the ratio was still unbalanced from our study period, equity for women might have improved compared to the prior study. Most patients were from Central Java and the YSR area. The proportion from these two regions (89%) decreased compared to the previous study (94%), showing that a greater number of patients came from outside the referral area of SGH, especially from outside Java Island. This finding suggests an improved referral system and may indicate a need for more tertiary

pediatric cancer centers outside Java Island.

Childhood cancers were most often diagnosed in the age group of 0-5 years (56%; n=1,026). This finding was in agreement with a previous study which stated that the 0-4-year age group had the most significant contribution to the global burden of childhood cancer.[2] Moreover, there was a notable change in the proportion of age at diagnosis, with increased proportion of children diagnosed in the 13-15-year and 16-18-year age groups. The percentage of patients diagnosed with cancer at 16-18 years rose from 0.4% in the 2000-2009 period to 4% in the 2010-2019 period. The increased proportion of adolescents and young adults seen in this study could be due to UHC implementation in 2014. Prior to universal coverage, older children and adolescents did not have routine health prevention programs. However, with UHC, people in all age groups can get free medical access, with coverage for 78% of the total Indonesian population.[13] The number of patients in the 16-18 years group might have been underreported in our study, because some patients in this age group were referred to adult oncology specialists.

Leukemia was still the leading disease among pediatric cancers in SGH, accounting for 60% of all childhood malignancies in the 2010-2019 study and 57% in the 2000-2009 study. The number of patients with leukemia and lymphoma peaked in 2014, following the establishment of UHC. The incidence rate of leukemia in YSR was 26.8 per million population, which was lower than the global incidence rate of 46.4 per million population, and lower compared to that of Southeast Asia of 52.7 per million.[10] This could signify underdiagnosis rather than an actual lower incidence.

The incidence rate of retinoblastoma in YSR was 2.2 per million population, which is lower compared to the 6.0 per million population in Southeast Asia.[10] Most of our retinoblastoma patients came in the late stages. Some families seek traditional medicine before finding a healthcare provider. Lack of awareness about retinoblastoma in developing countries causes a delay in seeking medical attention.[14] For example, children with familial retinoblastoma do not present early and have significant mortality.[15] Some of the reasons are inadequate healthcare facilities, delays in the referral system, as well as lack of genetic counseling and testing. A study showed the impact of retinoblastoma awareness programs on early presentation of the disease in healthcare facilities.[16]

Non-Hodgkin's lymphoma in our center (2.6 per million) also had a lower incidence compared to Southeast Asia (5-9 per million). The incidence rate of rhabdomyosarcoma in YSR was 2.5, corresponding to the Southeast incidence rate in 0-14-year-olds (1-4 per million).[17] In the previous study rhabdomyosarcoma was not one of the six most common diagnoses.[1] However, in the past ten years, it was the fourth most diagnosed pediatric cancer in SGH. This finding can be explained by a better referral system and implementation of UHC.

We found an unexpectedly low proportion of patients with central nervous system (CNS) tumors in our center, where CNS tumors ranked sixth most common (3.5%; n=64), although CNS tumors are the second most common childhood cancer globally following leukemia.[3] Some CNS tumors may not have been diagnosed, and some may have been referred to neurologists or neurosurgeons and not included in our registry. The CNS tumors tend to present with non-specific symptoms, such as vomiting and weight loss that require access to advanced technologies to make a precise diagnosis.[10] Missing access to facilities in LMIC may cause underdiagnosis of CNS tumors due to the rarity of childhood cancer, disease awareness, and financial circumstances.[18,19] In SGH, there are barriers to operating on CNS tumors and pathologically confirming the diagnosis due to limitations in performing microsurgery.

The calculated incidence rate for the most common childhood cancer diagnoses in our center tended to decrease from 2014 to 2018, even with a growing population, better referral system, and increased access to health care due to UHC implementation. The most probable cause was the referral of patients to other clinics in the region. During the study period, a pediatric oncology unit was established with the support of our center in SGH in Solo, Central Java, which is 70 km away and about 2 hours' drive. Also, some patients in the northern part of Central Java may have elected to visit the academic clinic in Semarang, Central Java. Furthermore, it is not clear how many patients were referred to four private hospitals in the area. The role, if any, of the introduction of UHC in 2014 is not clear and further study of this correlation is

needed. This shows that patients might be referred to other pediatric centers besides SGH, emphasizing the importance of collaboration in registration across hospitals in a region or even in a nationwide registry. Undiagnosed cases may also contribute to our low incidence of childhood cancer. A study stated that in South Asia, including Southeastern Asia, the rate of undiagnosed pediatric cancer could reach 49%.[17] These underdiagnoses might have been due to poor access to primary care, which leads to late diagnoses and eventual death from the disease at home, or misdiagnoses due to inadequate diagnostics (such as lymphoma misdiagnosed as tuberculosis, or leukemia diagnosed as dengue).

The International Incidence of Childhood Cancer stated that the number of registered cases needs to be at an absolute minimum number to provide a stable estimated incidence rate, resulting in at least 200 cases in the age range of 0-14 years or at least 300 cases in the age range of 0-19 years.[10] Our incidence rate data for the number of leukemia cases in YSR complied with these conditions. However, the incidence rate of other malignancies besides leukemia does not properly estimate the incidence rate in YSR. It is challenging to estimate incidence from only one hospital-based registry. In addition, collecting epidemiological data in LMIC is challenging because of unreliable census data, under-reporting cases, inaccuracy of diagnoses, and dubious certified documentation of mortality.[20,21] The proposed solution to this problem is a national collaboration between pediatric oncology centers and, essentially, all clinics treating children, be it government or private, in Indonesia, to achieve a nationwide registry. Accurate childhood cancer burden data are crucial for prioritizing resource planning and health policy. Raising awareness of childhood cancer by educating the public and health care workers will help reduce the survival gap between developed and developing countries.[14,16]

For the last 10 years, YPCR underwent much-improved data quality and data collection processes to become the primary data in which various coordinated teams process each diagnosis. YPCR is not only sustainable, but also continues to grow. However, as YPCR was only a single hospital-based registry, the YPCR has limitations in presenting fully accurate childhood cancer data. A national population-based registry should be created as a start. It would be helpful to build an integrated registry between pediatric oncology centers, at least in Central Java and the Yogyakarta area, to provide a better epidemiological study of childhood cancer.

A limitation of the study was that some patients had incomplete medical record data, for example, on socioeconomic status and educational background.

In summary, there was an increase in the number of childhood patients diagnosed with cancer in the 2010-2019 study period by almost 63.6% compared to the 2000-2009 profiles. We also noted improvement in the number of patients coming from outside of the referral area of SGH, especially outside of Java Island. Mapping the number of patients per location over ten years and the incidence rate in our region could be better achieved by more integrated reporting of the various healthcare institutions. Leukemia was reported as the most frequent malignancy, with an increased proportion of malignancies diagnosed in teenagers. This finding could be a sign of improved registry and referral systems from remote areas to the pediatric cancer center. Also, the population has better access to health care facilities. Further collaboration between the pediatric cancer center and the national registry is warranted to facilitate more studies on childhood malignancy. We hope that our study's findings can serve to advocate for pediatric cancer patients to policymakers to improve services and reduce barriers to healthcare access.

Conflict of interest

None declared.

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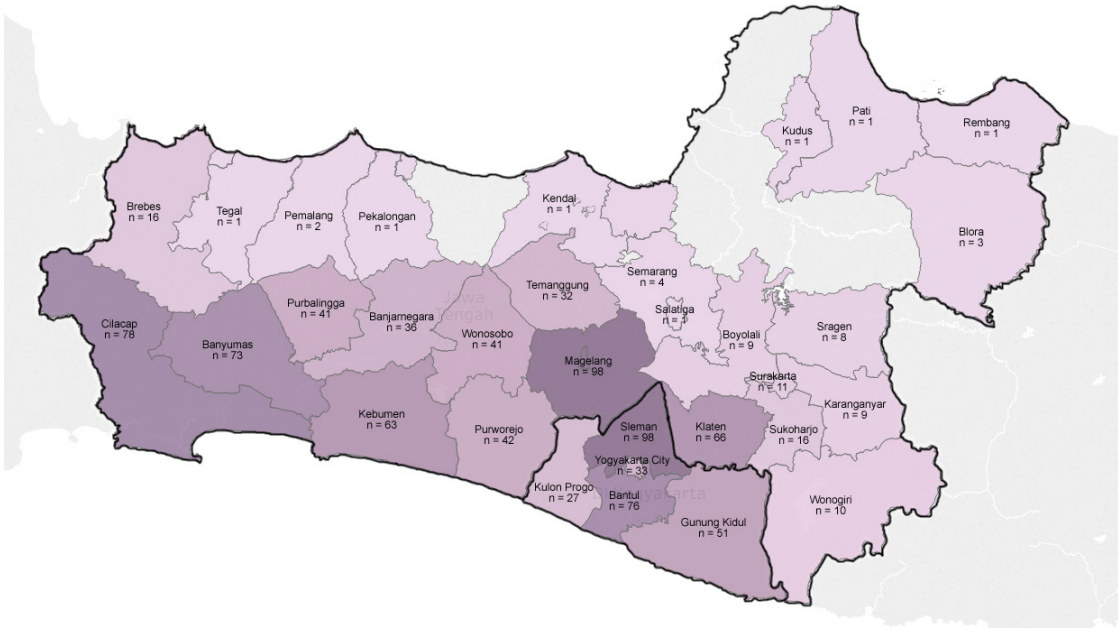
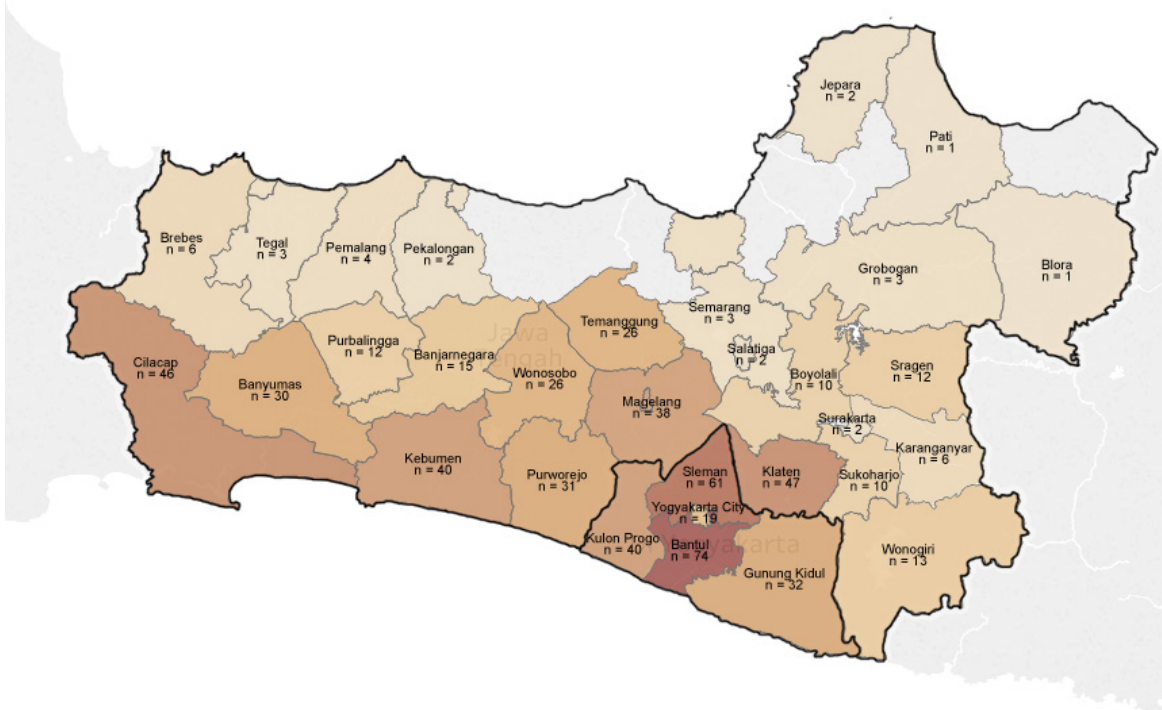
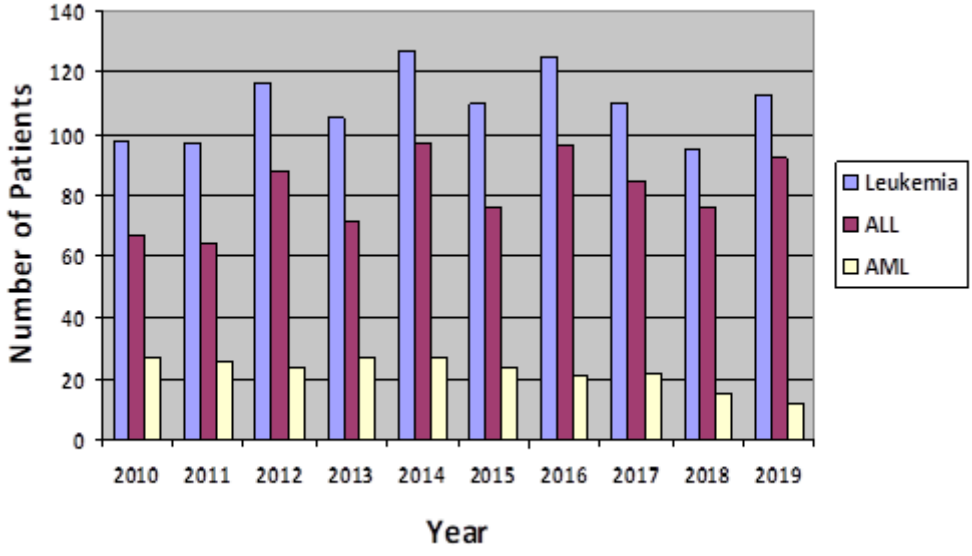
Additional files



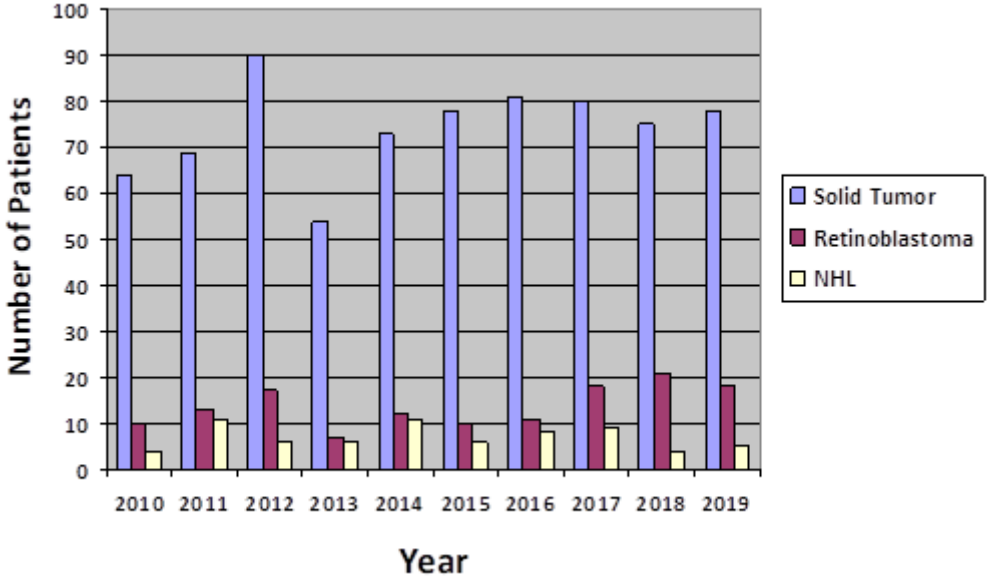
Additional File 1. Geographic distribution and the number of leukemia patients diagnosed at SGH from 2010-2019 and originating from Central Java or YSR provinces



Additional file 2. Geographic distribution and the number of solid tumor patients diagnosed at SGH from 2010-2019 and originating from Central Java or YSR provinces



Additional file 3. Number of children diagnosed with leukemia, further divided into acute lymphoblastic leukemia and acute myeloid leukemia, per year at SGH from 2010-2019 (N=1,097)



Additional file 4. Number of children diagnosed with solid tumor, further divided into retinoblastoma and Non-Hodgkin's lymphoma per year at SGH from 2010-2019 (N=713)

Additional file 5. Top-10 Cancer diagnoses of children at SGH from 2010-2019 and specifically for patients from YSR (N = 1,551)

No	Diagnosis	N	%	Number of cases in YSR	AAIR in YSR
1	Acute Lymphoblastic Leukemia	813	52	209	19.6
2	Acute Myeloblastic Leukemia	225	14	62	5.8
3	Retinoblastoma	137	9	23	2.2
4	Rhabdomyosarcoma	71	5	27	2.5
5	Non-Hodgkin's Lymphoma	69	4	28	2.6
6	Neuroblastoma	62	4	22	2.1
7	Nephroblastoma	60	4	21	2
8	Hemangioma	41	3	14	1.3
9	Chronic Myeloid Leukemia	40	3	7	0.7
10	Malignant Gonadal Teratoma	33	2	10	0.9

YSR=Yogyakarta Special Region; AAIR=average annual incidence rate

Additional file 6. Total cases and age of diagnosis of solid tumors based on the ICCC-3 disease category at SGH from 2010-2019 (N=742)

Solid tumors	Total cases	Age groups, years			
		0-5	6-12	13-15	16-18
V. Retinoblastoma	137	130	7	0	0
II. Lymphomas and reticuloendothelial neoplasms	134	65	43	19	7
IX. Soft tissue sarcomas	82	38	33	10	1
X. Germ cell tumors	77	41	23	10	3
IV. Neuroblastoma	62	50	11	1	0
VI. Renal tumors	60	54	5	1	0
III. CNS neoplasms	42	15	21	5	1
Benign tumors	41	32	7	2	0
VIII. Malignant bone tumors	41	5	15	17	4
XI. Carcinoma and melanomas	38	1	19	15	3
VII. Hepatic tumors	24	19	4	0	1
XII. Other and unspecified malignant neoplasms	4	0	2	2	0

CNS=central nervous system