



JURNAL BERKALA EPIDEMIOLOGI

DEPARTEMEN EPIDEMIOLOGI, FAKULTAS KESEHATAN MASYARAKAT UNIVERSITAS AIRLANGGA

P-ISSN : 2541092X ↔ E-ISSN : 2541092X Subject Area : Health, Science



1.20833

Impact Factor



4413

Google Citations



Sinta 2

Current Accreditation

[Google Scholar](#) [Garuda](#) [Website](#) [Editor URL](#)

History Accreditation

2017

2018

2019

2020

2021

2022

2023

Garuda

[Google Scholar](#)

[PREDICTOR OF ANEMIA AMONG PEOPLE LIVING WITH HIV TAKING TENOFOVIR+LAMIVUDINE+EFAVIRENZ THERAPY IN JAYAPURA, PAPUA: Prediktor Anemia pada Orang Hidup dengan HIV yang Menjalani Terapi Tenofovir+Lamivudine+Efavirenz di Jayapura, Papua](#)

Universitas Airlangga [Jurnal Berkala Epidemiologi Vol. 11 No. 1 \(2023\); Jurnal Berkala Epidemiologi \(Periodic Epidemiology Journal\) 32-39](#)

2023 [DOI: 10.20473/jbe.V11I12023.32-39](#) [Accred : Sinta 2](#)

[FAMILY SMOKING STATUS AND PHYSICAL HOUSE CONDITION WITH THE PULMONARY TUBERCULOSIS IN PRE-PROSPEROUS ECONOMIC COMMUNITY:](#)

[Status Merokok Keluarga dan Kondisi Fisik Rumah dengan Kejadian Tuberkulosis Paru Kelompok Masyarakat Ekonomi Pra-Sejahtera](#)

Universitas Airlangga [Jurnal Berkala Epidemiologi Vol. 11 No. 1 \(2023\); Jurnal Berkala Epidemiologi \(Periodic Epidemiology Journal\) 40-49](#)

2023 [DOI: 10.20473/jbe.V11I12023.40-49](#) [Accred : Sinta 2](#)

[RISK FACTORS OF LEPROSY IN DAHA HUSADA GENERAL HOSPITAL, KEDIRI CITY: Faktor Risiko Kejadian Kusta di Rumah Sakit Umum Daha Husada Kota Kediri](#)

Universitas Airlangga [Jurnal Berkala Epidemiologi Vol. 11 No. 1 \(2023\); Jurnal Berkala Epidemiologi \(Periodic Epidemiology Journal\) 68-75](#)

2023 [DOI: 10.20473/jbe.V11I12023.68-75](#) [Accred : Sinta 2](#)

[BARRIER PERCEPTION FACTORS AFFECTING THE ACCEPTANCE OF THE COVID-19 VACCINE IN SALATIGA CITY: Hubungan Faktor Penghambat Vaksinasi dengan Penerimaan Vaksin COVID-19 di Kota Salatiga](#)

Universitas Airlangga [Jurnal Berkala Epidemiologi Vol. 11 No. 1 \(2023\); Jurnal Berkala Epidemiologi \(Periodic Epidemiology Journal\) 60-67](#)

2023 [DOI: 10.20473/jbe.V11I12023.60-67](#) [Accred : Sinta 2](#)

Volume 8, Issue 1, January 2020

ISSN 2301—7171

Jurnal Berkala
EPIDEMIOLOGI

JBE	Volume 8	Issue 1	Page 1—96	Surabaya January 2020	ISSN 2301-7171
-----	----------	---------	--------------	--------------------------	-------------------

Editorial Team



Chatarina Umbul Wahjuni

Editor in Chief

Department of Epidemiology, Biostatistics, Population Studies, and Health Promotion,
 Faculty of Public Health, Universitas Airlangga, Indonesia

0000-0001-9518-5930 C U Wahyuni **Scopus'** 22958724600 6055273



Kurnia Dwi Artanti

Managing Editor

Department of Epidemiology, Biostatistics, Population Studies, and Health Promotion,
 Faculty of Public Health, Universitas Airlangga, Indonesia

0000-0002-2372-666X Kurnia Dwi Artanti **Scopus'** 57208226137 5991894



Arief Hargono

Managing Editor

Department of Epidemiology, Biostatistics, Population Studies, and Health Promotion,
 Faculty of Public Health, Universitas Airlangga, Indonesia

0000-0001-8978-9877 Arief Hargono **Scopus'** 57208225627 5975513



Fariani Syahrul

Managing Editor

Perhimpunan Ahli Epidemiologi Indonesia (PAEI), Indonesia

0000-0002-8100-215X Fariani Syahrul **Scopus'** 57208227712 6069583



Laura Navika Yamani

Managing Editor

Indonesia-Japan Collaborative Research Center for Emerging and Re-emerging Infectious
 Diseases, Kobe University, Japan

0000-0002-2900-908X Laura Navika Yamani **Scopus'** 56185456000 6690253



Febi Dwirahmadi

International Editorial Board

Centre for Environment and Population Health, Griffith School of Environment, Nathan
 Campus, Brisbane, Queensland, Australia

0000-0002-9367-3452 Febi Dwirahmadi, Ph.D **Scopus'** 55900228400





Ryosuke Suzuki

International Editorial Board

National Institute of Infectious Diseases (NIID) Tokyo, Japan

0000-0003-0296-8843



Scopus 35741905400



Yen Hai Doan

International Editorial Board

National Institute of Infectious Diseases (NIID) Tokyo, Japan

0000-0001-7543-3589



Scopus 54402515900



Alden K. Henderson

International Editorial Board

Centers for Disease Control and Prevention (CDC), Atlanta, United States

0000-0002-0707-1093



Scopus 7403092686



Yashwant Vishnupant Pathak

International Editorial Board

University of South Florida, United States

0000-0002-5251-4308



Yashwant Pathak

Scopus 7004822104



Normala Ibrahim

International Editorial Board

Universiti Putra Malaysia, Malaysia

0000-0003-2868-9834



Normala Ibrahim

Scopus 54414227000



Chung-Yi Li

International Editorial Board

Department of Public Health, National Cheng Kung University, Taiwan, Province of China

0000-0002-0321-8908



李中一 Chung-Yi Li

Scopus 56829729900



Yano Yoshihiko

International Editorial Board

Department of Clinical Laboratory, Faculty of Medical Sciences, Kobe University, Japan

0000-0002-5177-7480



Scopus 7203014656



Zhao Ni

International Editorial Board

Yale School of Nursing, Yale University, United States

0000-0002-9185-9894



Scopus 57190430263





Thalia Nadhila Rachmawati

Administrative Assistant

Universitas Airlangga

-

-

Scopus' -

-



Teresina Ika Pertiwi

Administrative Assistant

Universitas Airlangga

-

-

Scopus' -

-

Login

Username *

Password *

[Forgot your password?](#)

Keep me logged in

[Login](#)

[Register](#)

National Accreditation



Accreditation Number: 3/E/KPT/2019

[\(View certificate here\)](#)

Information For Author

[SUBMIT YOUR MANUSCRIPT HERE](#)

[Guide For Authors](#)

[Online Submission](#)



Journal Policy

Focus and Scope

Publication Ethics

Article Processing Charge

Peer Reviewers Process

Open Access Statement

Archiving

Plagiarism

Old Website

Meet Our Editorial Team



Chatarina Umbul Wahjuni
Editor in Chief
Universitas Airlangga, Indonesia
Scopus[®] 22958724600



Kurnia Dwi Artanti
Managing Editor
Universitas Airlangga, Indonesia
Scopus[®] 57208226137



Arief Hargono
Managing Editor
Universitas Airlangga, Indonesia
Scopus[®] 57208225627

[▶ Read More](#)

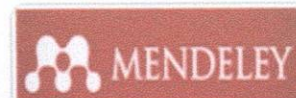
Download For Author

Document Template

Copyright Transfer Agreement

Indexed In





Citedness



In Collaboration With



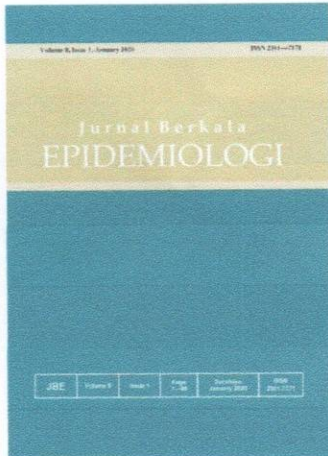
MOU JBE & PAEI

Diversity of Authors of JBE



Vol. 8 No. 1 (2020): Jurnal Berkala Epidemiologi (Periodic Epidemiology Journal)

Current Issue



Vol. 8 No. 1 (2020): Jurnal Berkala Epidemiologi (Periodic Epidemiology Journal)

Published: 28-01-2020

Articles

THE ROLE OF "MY VILLAGE MY HOME" IN THE KNOWLEDGE AND ATTITUDES OF INTEGRATED HEALTH POST CADRES AND MOTHERS

 Anasiya Nurwitasari , Fariani Syahrul , Hario Megatsari , Ratna Dwi Wulandari , Arief Hargono , Djazuli Chalidyanto , Yashwant Vishnupant Pathak

 1-7

 Abstract : 1609

 PDF : 1301



 DOI : 10.20473/jbe.V8I12020.1-7

CLINICAL PROFILES OF VITILIGO WITH NARROWBAND UVB AND TOPICAL CORTICOSTEROID THERAPY AT DR. SOETOMO HOSPITAL

 Sarah Fauzia , Rahmadewi Rahmadewi , Dyah Fauziah

 8-15

 Abstract : 1260

 PDF : 1531



 DOI : 10.20473/jbe.V8I12020.8-15

EPIDEMIOLOGICAL INVESTIGATION OF NOMA IN PAPUA PROVINCE IN 2017

 Asrul Kaimudin , Atik Choirul Hidajah

 16-25

 Abstract : 1660

 PDF : 2549




 DOI : 10.20473/jbe.V8I12020.16-25

SPATIAL MODELING OF ENVIRONMENTAL-BASED RISK FACTORS OF TUBERCULOSIS IN BALI PROVINCE



AN ECOLOGICAL STUDY

 Firman Firdauz Saputra , Chatarina Umbul Wahjuni , Muhammad Atoillah Isfandiari

 26-34

 Abstract : 1528

 PDF : 1656

 PDF

 DOI : 10.20473/jbe.V8I12020.26-34

THE OVERVIEW OF DENGUE HEMORRHAGIC FEVER IN EAST JAVA DURING 2015-2017

 Dewi Putri Dayani

 35-41

 Abstract : 1165

 PDF : 2773

 PDF

 DOI : 10.20473/jbe.V8I12020.35-41

CORRELATION BETWEEN ACCESS OF DRINKING WATER AND SANITATION WITH DIARRHEA INCIDENCE IN EAST JAVA

 Ilham Dwi Prakoso

 42-49

 Abstract : 1698

 PDF : 2289

 PDF

 DOI : 10.20473/jbe.V8I12020.42-49

EPIDEMIOLOGY OF DERMATITIS IN FARMERS

 Yarmaliza Yarmaliza , Teungku Nih Farisni , Fitriani Fitriani , Veni Nella Syahputri , Zakiyuddin Zakiyuddin , Fitrah Reynaldi

 50-56

 Abstract : 6305

 PDF : 3369

 PDF

 DOI : 10.20473/jbe.V8I12020.50-56

RISK FACTORS FOR RESPIRATORY DEATH AMONG INDONESIAN PILGRIMS IN 2018

 Prillia Safira Liani , Putri Bungsu Machmud

 57-64

 Abstract : 867

 PDF : 1247

 PDF

 DOI : 10.20473/jbe.V8I12020.57-64

THE EPIDEMIOLOGY OF PEDIATRIC CANCER IN THE PALLIATIVE CARE UNIT AT DR. SOETOMO GENERAL HOSPITAL, SURABAYA

 Izzatul Fithriyah , Agustina Konginan , Margarita Maramis , Marlina Mahajudin , Nalini Muhdi , Hendy Margono , Endang Warsiki , Lestari Basoeki , Suksmi Yitnamurti

 65-71

 Abstract : 2226

 PDF : 4266

 PDF

 DOI : 10.20473/jbe.V8I12020.65-71

VIABILITY STATUS OF DIABETES MELITUS PATIENTS WITH COMPLICATIONS OF HYPERGLYCEMIA, CETOASIDOSIS, AND GANGRENE

 Norshinta Anggraini Putri , Hari Basuki Notobroto

 72-80



CORRELATION BETWEEN NUTRITIONAL STATUS AND WAIST CIRCUMFERENCE WITH THE INCIDENCE OF HYPERTENSION IN THE ELDERLY

Munyati Sulam

81-88

Abstract : 5580

PDF : 3160



DOI : 10.20473/jbe.V8i12020.81-88

CORRELATION BETWEEN IMMUNIZATION STATUS AND MOTHER'S HEIGHT, AND STUNTING IN CHILDREN 2-5 YEARS IN INDONESIA

Risna Nur Fajariyah , Atik Choirul Hidajah

89-96

Abstract : 3548

PDF : 3757



DOI : 10.20473/jbe.V8i12020.89-96

Login

Username *

Password *

[Forgot your password?](#)

Keep me logged in

Login

Register

National Accreditation

Jurnal Berkala Epidemiologi

S2 H-INDEX : 12
HS-INDEX : 32




last update: 2019-10-29 powered by: [infocentre.kemdiktis.go.id](#)

Accreditation Number: 3/E/KPT/2019

[\(View certificate here\)](#)

Information For Author



THE EPIDEMIOLOGY OF PEDIATRIC CANCER IN THE PALLIATIVE CARE UNIT AT DR. SOETOMO GENERAL HOSPITAL, SURABAYA*Epidemiologi Kanker Pada Anak di Instalasi Paliatif Rumah Sakit Umum Daerah Dr. Soetomo, Surabaya***Izzatul Fithriyah^{1,2,3}, Agustina Konginan^{2,3}, Margarita M. Maramis^{2,3}, Marlina S. Mahajuddin^{2,3}, Nalini Muhdi^{2,3}, Hedy M. Margono^{2,3}, Endang Warsiki^{2,3}, Lestari Basoeki^{2,3}, Suksmi Yitnamurti^{2,3}**¹ Universitas Airlangga Hospital, izzatul-fithriyah@fk.unair.ac.id² Faculty of Medicine Universitas Airlangga³ Dr. Soetomo General HospitalCorrespondence Author: Izzatul Fithriyah, izzatul-fithriyah@fk.unair.ac.id, Faculty of Medicine, Universitas Airlangga; Dr. Soetomo General Hospital, Prof Dr. Moestopo 6–8, Surabaya, Indonesia

ARTICLE INFO*Article History:*Received January, 8th, 2019Revised form April, 16th, 2019Accepted January, 17th, 2020Published online January, 28th, 2020**Keywords:**epidemiology;
cancer;
children;
palliative**Kata Kunci:**epidemiologi;
kanker;
anak;
paliatif

ABSTRACT

Background: Children with cancer require special interventions and palliative care to improve their quality of life. The epidemiology of pediatric cancer is needed as a basis for determining health policy. **Purpose:** This study describes pediatric cancer patients in the palliative outpatient clinic in Dr. Soetomo General Hospital, Surabaya. **Methods:** This study is an observational descriptive study that uses the medical records of pediatric patients with cancer at the palliative care unit in Dr. Soetomo General Hospital between June 2014 and July 2015. The data included the demographic characteristics of the pediatric cancer patients and was analyzed using descriptive statistics. **Results:** The number of children in the 1–5 years, 6–10 years, and 11–15 years age groups was similar, while noticeably fewer children fell into the 16–18 years group. The majority of children suffering from cancer were male (68,70%). The most common type of cancer in was blood cancer (leukemia) with a percentage of 51.91%, while the rarest types were retinoblastoma and lymph node cancer (malignant lymphoma) with percentage of 3.05%. **Conclusion:** The incidence of pediatric cancer patients in the palliative outpatient clinic was quite high. These patients tended to be male, aged 6–10 years, and suffered from leukemia.

©2020 Jurnal Berkala Epidemiologi. Published by Universitas Airlangga.

This is an open access article under CC-BY-SA license

[\(https://creativecommons.org/licenses/by-sa/4.0/\)](https://creativecommons.org/licenses/by-sa/4.0/)

ABSTRAK

Latar belakang: Penyakit dan kondisi anak dengan kanker membutuhkan intervensi khusus yaitu perawatan paliatif untuk meningkatkan kualitas hidup anak. Data epidemiologi kanker anak diperlukan sebagai dasar penentuan kebijakan kesehatan. **Tujuan:** Penelitian ini bertujuan untuk mengetahui gambaran epidemiologi pasien kanker anak di Poli Paliatif dan Bebas Nyeri RSUD Dr. Soetomo, Surabaya. **Metode:** Penelitian ini merupakan penelitian observasional deskriptif dengan menggunakan data rekam medis pasien kanker anak di Rumah Sakit Umum Daerah (RSUD) Dr. Soetomo selama periode Juni 2014 – Juli 2015. Data yang diteliti

How to Cite: Fithriyah, I., Konginan, A., Mahajudin M. S., Maramis, M. M., & Margono, H. M. (2020). The epidemiology of pediatric cancer in palliative care unit, Dr. Soetomo General Hospital, Surabaya. *Jurnal Berkala Epidemiologi*, 8(1), 65-71. <https://dx.doi.org/10.20473/jbe.v8i12020.65-71>

adalah karakteristik demografis pasien kanker anak di poli paliatif dan bebas nyeri. Data diolah dengan menggunakan statistik distribusi. **Hasil:** Jumlah anak dengan kanker yang dikonsulkan ke poli paliatif dan bebas nyeri RSUD Dr. Soetomo adalah sebanyak 131 anak. Proporsi terbanyak anak dengan kanker di poli paliatif dan bebas nyeri RSUD Dr. Soetomo yang berusia 6-10 tahun sebanyak 34% dan jenis kelamin terbanyak adalah laki-laki 69%. Jenis kanker yang paling umum adalah kanker darah (leukemia) dengan persentase 51,91%, sedangkan jenis yang paling jarang adalah kanker retinoblastoma dan kanker kelenjar getah bening (lymphoma maligna) dengan persentase 3,05%. **Kesimpulan:** Prevalensi kanker anak di Poli Paliatif dan Bebas Nyeri cukup tinggi. Jumlah proporsi terbanyak adalah anak laki-laki dan kelompok usia 6-10 tahun. Jenis kanker pada anak yang terbanyak adalah leukemia.

©2020 Jurnal Berkala Epidemiologi. Penerbit Universitas Airlangga.
Jurnal ini dapat diakses secara terbuka dan memiliki lisensi CC-BY-SA
(<https://creativecommons.org/licenses/by-sa/4.0/>)

INTRODUCTION

The worldwide incidence of cancer increases each year. According to the World Health Organization, there were 18.1 million new cases of cancer and 9.6 million deaths from cancer in 2018. The total number of people living with cancer for five years was estimated at 43.80 million (International Agency for Research on Cancer, 2018). The incidence of cancer in 2001–2010 in children aged 0–14 years was 140.60 per one million people per year and 155.80 per one million people per year for children aged 0–19 years (Steliarova-Foucher et al., 2017). A family history of cancer increases the risk of cancer occurring in children, while children with cancer are at risk of their cancer returning and also suffer from a decrease in bodily functions even after they are cured. Therefore, long-term care for pediatric cancer patients is needed (Ward, DeSantis, Robbins, Kohler, & Jemal, 2014). Cancer is a cause of death in countries with low and high income levels (Torre, Siegel, Ward, & Jemal, 2016). Pediatric cancer is also the second highest cause of death after accidents in children aged 4–15 years (Ward, DeSantis, Robbins, Kohler, & Jemal, 2014).

Pediatric palliative care refers to the care of a child's body, mind, and spirit and also involves providing support to the family. Effective palliative care requires a broad multidisciplinary approach that includes the child's family and all the available community resources (van der Geest, van der Heide, Pieters, Darlington, & van den Heuvel-Eibrink, 2016). The children who need palliative care are those with cancer, heart disease,

cirrhosis of the liver, congenital anomalies, endocrine disorders, HIV and AIDS, meningitis, kidney disease, neurological disorders, neonatal conditions, and/or drug-resistant tuberculosis. Palliative care in children is expected to improve their quality of life and positively affect the course of the disease (Connor et al., 2014).

Since 1980, the prevalence of pediatric cancer has increased from 124 per one million per year to 140.6 per one million per year. In Southeast Asia between 2001 and 2010, the total number of cancer cases was 12,251 out of 105,673,000 children and adolescents aged 0–19 years, with leukemia recorded as the most common type (52.70%). Data on the prevalence of pediatric cancer globally is not yet easily available, and the number of children suffering from cancer in low and middle income countries is not well recorded. Global research conducted on 532 cancer data collection agencies in 62 countries during 2001–2010 showed that the number of cancer incidents was 385,509 cases in children aged 0–19 years. The world cancer incidence ratio was 140.6 per one million children aged 0–14 years. The majority of cases involved leukemia, followed by central nervous system tumors and lymphomas (Steliarova-Foucher et al., 2017).

Cancer is yet to be widely studied in Indonesia, and the only available data refers to the cancer prevalence in Indonesia in 2013, which was 1.40:1,000. Therefore, this study looks at the basic data regarding palliative care in pediatric cancer in Dr. Soetomo Regional Hospital, Surabaya. This data will be the basis for policy makers in the future and will hopefully help to improve the quality of life of children with cancer. his study

aims to identify basic data on pediatric cancer patients in the Palliative Care Unit Dr. Soetomo General Hospital, Surabaya.

METHODS

This research was an observational descriptive study conducted at the Palliative Care Unit Dr. Soetomo General Hospital Surabaya. The research data was taken from the medical records of pediatric cancer patients in the Palliative Care Unit Dr. Soetomo General Hospital for a period of one year, from July 2014 to June 2015.

The variables examined in this study were demographic data, that are child age group, sex, and type of cancer in pediatric cancer patients in the Palliative Care Unit Dr. Soetomo General Hospital, Surabaya. Pediatric cancer patients are all patients who have been diagnosed with cancer in the age range 0-18 years who undergo treatment in palliative care unit, both from pediatric inpatients and palliative outpatients clinic, Dr. Soetomo General Hospital, Surabaya. The samples in this study were 131 pediatric patients with cancer diagnoses who were treated at the Palliative Care Unit, Dr. Soetomo General

Hospital, Surabaya. Data was analyzed using descriptive statistics.

RESULTS

Characteristics of pediatric cancer patients in the Palliative Care Unit at Dr. Soetomo General Hospital, Surabaya

The distribution of children treated in palliative care unit Dr. Soetomo General Hospital varies considerably. The number of children in the 1–5 years, 6–10 years, and 11–15 years age groups was similar, while noticeably fewer children fell into the 16–18 years group (4.59%) The majority of children suffering from cancer were male (68,70%) (Table 1).

The most common type of cancer in was blood cancer (leukemia) with a percentage of 51.91%, while the rarest types were retinoblastoma and lymph node cancer (malignant lymphoma) with percentage of 3.05%. Another cancer that have been treated in Palliative Care Unit are osteosarcoma, abdominal tumor, hepatoma, neuroblastoma, and nasopharyngeal carcinoma. (Table 1).

Table 1

Characteristics of pediatric cancer patients in the Palliative Care Unit at Dr. Soetomo General Hospital, Surabaya.

Category	Percentage	
	n	%
Age (years old)		
1 – 5	37	28.24
6 – 10	45	34.35
11 – 15	43	32.82
16 – 18	6	4.59
Sex		
Male	90	68.70
Female	41	31.30
Type of cancer		
Leukemia	68	51.91
Osteosarcoma	8	6.11
Abdominal Tumor	6	4.58
Hepatoma	5	3.82
Neuroblastoma	5	3.82
Nasopharyngeal Cancer	5	3.82
Retinoblastoma	4	3.05
Lymphoma Maligna	4	3.05
Others	26	19.84
Total	131	100.00

DISCUSSION

Pediatric cancer can affect children's quality of life, and pediatric cancer therapy can be a challenge for clinicians as the children may not fully understand their condition. This type of therapy also requires different interventions in terms of psychological development and family roles (International Agency for Research on Cancer, 2017; Kazak & Noll, 2015).

The external causes of pediatric cancer include birth weight, age, and congenital abnormalities, and the contribution of genetic variations is the focus of research by experts. Rare variations and non-Mendelian inheritance, such as maternal genetic effects or germline de novo mutations, also contribute to the risk of cancer in children (Spector, Pankratz, & Marcotte, 2015). A representative proportion of the global population requires high quality information about cancer incidence. It is needed to predict the prevalence of cancer in children in the future (International Agency for Research on Cancer, 2017).

Age Group of Pediatric Cancer Patients

The majority of children suffering from cancer in Surabaya are aged 6–10 years or 11–15 years. Data from collaborative research from various countries has stated that the highest percentage of pediatric cancer is found in children aged 0–4 years (Steliarova-Foucher et al., 2017). According to data from the Childhood Cancer Registry of Piedmont (CCRP), 24.70% of children aged 5–9, 30% of children aged 1–4 years, 7.50% of children under 1 year, and 12% of adolescents aged 15–19 years have cancer (Isaevska et al., 2017). Similarly, data from Switzerland has shown that highest prevalence of pediatric cancer was in children aged 1–4 years (36%), followed by children aged 5–9 years and children aged 10–14 years (Swiss Childhood Cancer Registry, 2011).

Data from the United States of America shows that the most proportion of the age group that has cancer is 0-14 years. It's suggests that twice as many children aged 0–14 years have cancer compared to adolescents aged 15–19 years (Zhu, Pickle, Zou, & Cucinelli, 2014), while data from Egypt has shown that 44% of children aged 0–4 years have cancer, followed by 26% of children aged 9–15 years and 22% of children aged 5–8 years (Malla, 2017). Research in North West Iran indicates that the highest prevalence of cancer occurs in children aged 0–4 years, while in North East Iran, the highest prevalence is in children aged 3–6 years (Fathi, Bahadoram, &

Amani, 2015). The research from other Asian countries, Japan, also shows that the highest age group suffering from cancer is the age group of 0–4 years (Katanoda et al., 2017). In contrast, research from New Zealand states that the prevalence is similar across age groups (National Child Cancer Network, 2010).

Research in China has shown that the majority of children with cancer are aged 0–5 years (57.14%) (Zheng et al., 2015), while results from Korea between 1999 and 2011 suggest that the highest prevalence is in children aged 10–14 years (32.20%) (Park et al., 2016). Research in Pakistan as a developing country shows that the most common age group to suffer from cancer is 5–9 years, with minimal differences between the other age groups (Badar & Mahmood, 2017). In contrast, research carried out in Thailand between 1985 and 2009 found that the age group most likely to have pediatric cancer was 0–4 years (Wiangnon, Jetsrisuparb, Komvilaisak, & Suwanrungruang, 2014), and research carried out in 1993–2012 in Northeast Thailand found the same (Wongmeerit, Suwanrungruang, Jetsrisuparb, Komvilaisak, & Wiangnon, 2016).

The prevalence of different types of cancer in children varies across countries. For children aged 0–4 years, leukemia is the most common form of cancer (36.10%), while for adolescents aged 15–19 years, the most common is lymphoma (22.50%) (Steliarova-Foucher et al., 2017). This difference could be due to the level of parental awareness of symptoms experienced by children, the different levels of diagnostic progress in different countries, and how easy it is to access healthcare in different countries. Cancer tends to be undiagnosed in low income countries because there is a lack of awareness or because diagnostic equipment is not available. Social factors also affect the awareness of the population. This population group which more concerned with socioeconomic needs rather than health needs is a challenge for health workers (International Agency for Research on Cancer, 2017).

Sex of Pediatric Cancer Patients

The results of this study indicate that the majority of pediatric patients suffering from cancer are male, with a ratio of 2:1. These results are in line with studies conducted in other countries, for example, research in the USA shows that pediatric cancer incidence and mortality is lower in females compared to males, while survival rates are similar for both sexes (American Cancer Society, 2014). The results of research in the State of Iran also

showed that the prevalence of cancer incidence was higher in boys (Habib et al., 2016). The incidence of cancer in boys in India is higher than in girls. The pediatric cancer incidence is at 235.30 per one million population in boys and in girls as much as 152.30 per one million population in Delhi (Bashar & Thakur, 2018). Similar results have been found in Southeast Asia, with male children in Thailand in 1985–2009 1.4 times more likely to have cancer compared to female children (Wiangnon, Jetsrisuparb, Komvilaisak, & Suwanrungruang, 2014).

In contrast, the prevalence of pediatric cancer in Korea, Japan, and New Zealand is similar for males and females (Katanoda et al., 2017; National Child Cancer Network, 2010; Park et al., 2016), while in East Africa (Ethiopia), it is female children who are more likely to have cancer (Stefan, Bray, Ferlay, Liu, & Parkin, 2017).

Lymphoma is a type of cancer that is more commonly found in male children. The incidence of lymphoma throughout the world is widely reported in the Mediterranean region. Hodgkin's lymphoma is rare type in populations in east and south Asia rather than in other parts of the world. Improvement of socioeconomic conditions can change the incidence of lymphomas in Asia which is also the same with western populations (Steliarova-Foucher et al., 2017).

Genetic factors are also one of the causes of cancer in children. Some cancers in children are closely related to genetic factors, that are fanconi anemia and xeroderma pigmentosum which has a recessive inheritance pattern, as well as retinoblastoma, Li-Fraumeni syndrome, DICER1 syndrome and neurofibromatosis which have a dominant inheritance pattern (Saletta, Pozza, & Byrne, 2015). Data from the CCRP in 1967–2011 showed that the incidence of retinoblastoma was 3.40 per million per year and the incidence of leukemia was 50 per million per year (Isaevska et al., 2017).

Type of Cancer in Pediatric Cancer Patients

The most common form of pediatric cancer is leukemia, followed by lymphoma, brain tumor, neuroblastoma, and bone and soft tissue tumors. Different distributions occur in Africa, however, where Kaposi sarcoma has been found to be the most common type of pediatric cancer in South and East African countries, retinoblastoma the most common in Central African countries, and non-Hodgkin's lymphoma the most common in West African countries (Stefan, Bray, Ferlay, Liu, & Parkin, 2017).

The worldwide incidence of leukemia has increased by 3% each year between 1992 and 2013, largely due to an increase in acute lymphoblastic leukemia (ALL) in White Hispanic children (Barrington-Trimis et al., 2017). The cause of this increase is unknown, but environmental factors are the main suspect (American Cancer Society, 2014). The CCRP reported an increased incidence of cancer, specifically leukemia, central nervous system tumors, and neuroblastoma between 1967 and 2001 (Isaevska et al., 2017), and the incidence of leukemia is also high in South and Southeast Asia (Steliarova-Foucher et al., 2017). This type of cancer has also been dominant in CCRP studies, specifically acute lymphoblastic leukemia (Isaevska et al., 2017).

Research in India and Pakistan has reported that leukemia is more common in male children aged 0–4 years. Indeed, leukemia is the most common childhood cancer globally, accounting for 30–50% of pediatric cancer cases in Eastern Mediterranean countries, 20–40% in the USA, and 40–50% in Europe (Asthana, Labani, Mehrana, & Bakhshi, 2018; Badar & Mahmood, 2017). The most common types of leukemia that occur in children and adolescents in the USA are ALL and acute myeloblastic leukemia (AML). Chronic leukemia is very rare in children, whereas ALL occurs in 80% of pediatric leukemia cases and 56% of adolescent cases. ALL is more common in industrialized countries than in developing countries.

Clinical evidence shows that several cases of ALL appear in utero, including ALL concordances in monozygotic twins. Risk factors for ALL include trisomy 21 (Down syndrome), genetic syndromes (e.g. Bloom syndrome, Fanconi anemia, and Nijmegen Breakage syndrome), and congenital immunodeficiency diseases. Higher birth weight has also been linked to a higher risk of ALL, and the International Agency for Cancer Research states that parents who smoke during pregnancy and maternal exposure to paint are also risk factors for leukemia in childhood, especially ALL. Other suspected risks include exposure to pesticides and maternal weight. Atopic events (e.g. allergies, asthma, and hay fever) and folic acid supplementation during pregnancy are protective factors that reduce the risk of ALL (Barrington-Trimis et al., 2017). Interestingly, recent studies have also shown that early exposure to infections (such as in daycare) may play a protective factor for ALL (Ward et al., 2014).

Research Limitation

This study has limited access for a longer period and a wider area, and cannot describe the prevalence in Surabaya generally. Future research requires data from all health services associated with pediatric cancer patients in Surabaya to determine the prevalence of cancer in children in Surabaya. Data regarding the number of children in Surabaya overall is also needed to calculate the prevalence of pediatric cancers.

CONCLUSION

Pediatric cancer patients in the Palliative Care Unit at Dr. Soetomo General Hospital tended to be male and aged 6–10 years or 11–15 years. The most common form of cancer was leukemia. This data can be used to determine therapeutic policies and the therapeutic needs of children with cancer.

CONFLICT OF INTEREST

The authors declare that no conflict of interest in this study.

ACKNOWLEDGMENT

The authors thanks the Palliative Care Unit at Dr. Soetomo General Hospital, Surabaya; the Head of the Palliative Care Unit, Dr. Agus Ali Fauzi; and the Chief Director of Dr. Soetomo General Hospital, who gave us permission to conduct this research. We also thank all the medical staff at the Palliative Care Unit who participated in the data collection.

REFERENCE

- American Cancer Society. (2014). Special section: cancer in children & adolescents. *Cancer Facts & Figures, 1*(ICCC), 25–42. Retrieved April, 16, 2019, from <http://www.cancer.org/research/cancerfactsstatistics/cancerfactsfigures2014/>
- Asthana, S., Labani, S., Mehrana, S., & Bakhshi, S. (2018). Incidence of childhood leukemia and lymphoma in India. *Pediatric Hematology Oncology Journal, 3*(4), 115–120. <https://doi.org/10.1016/j.phoj.2017.12.004>
- Badar, F., & Mahmood, S. (2017). Epidemiology of cancers in Lahore, Pakistan, among children, adolescents and adults, 2010-2012: a cross-sectional study part 2. *BMJ Open, 7*(12), 1–15. <https://doi.org/10.1136/bmjopen-2017-016559>
- Barrington-Trimis, J. L., Cockburn, M., Metayer, C., Gauderman, W. J., Wiemels, J., & McKean-Cowdin, R. (2017). Trends in childhood leukemia incidence over two decades from 1992 to 2013. *International Journal of Cancer, 140*(5), 1000–1008. <https://doi.org/10.1002/ijc.30487>
- Bashar, A., & Thakur. (2018). Incidence and pattern of childhood cancers in India: findings from population-based cancer registries. *Indian Journal of Medical and Paediatric Oncology, 38*(2), 240–241. <https://doi.org/10.4103/ijmpo.ijmpo>
- Connor, S. R., Sisimayi, C., Downing, J., King, E., Ah Ken, P. L., Yates, R., & Marston, J. (2014). Assessment of the need for palliative care for children in South Africa. *International Journal of Palliative Nursing, 20*(3), 130–134. <https://doi.org/10.12968/ijpn.2014.20.3.130>
- Fathi, A., Bahadoram, M., & Amani, F. (2015). Epidemiology of childhood cancer in Northwest Iran. *Asian Pacific Journal of Cancer Prevention, 16*(13), 5459–5462. <https://doi.org/10.7314/APJCP.2015.16.13.5459>
- Habib, O., Hassan, J., Al-Diab, J., Greiser, E., Hoffmann, W., Al-Ali, J., & Al-Imara, K. (2016). Cancer of children in Basrah-Iraq: person and time characteristics. *The Medical Journal of Basrah University, 34*(2), 77–85. <https://doi.org/10.33762/mjbu.2016.117158>
- International Agency for Research on Cancer. (2017). *Latest data show a global increase of 13% in childhood cancer incidence over two decades.* [https://doi.org/10.1016/S1470-2045\(17\)30186-9](https://doi.org/10.1016/S1470-2045(17)30186-9)
- International Agency for Research on Cancer. (2018). *Latest global cancer data: cancer burden rises to 18.1 million new cases and 9.6 million cancer deaths in 2018.* Retrieved April, 16, 2019, from <http://gco.iarc.fr/>,
- Isaevska, E., Manasievska, M., Alessi, D., Mosso, M. L., Magnani, C., Sacerdote, C., ... Maule, M. (2017). Cancer incidence rates and trends among children and adolescents in Piedmont, 1967–2011. *PLoS ONE, 12*(7), 1–12. <https://doi.org/10.1371/journal.pone.0181805>
- Katanoda, K., Shibata, A., Matsuda, T., Hori, M., Nakata, K., Narita, Y., ... Nishimoto, H. (2017). Childhood, adolescent and young adult cancer incidence in Japan in 2009–2011. *Japanese Journal of Clinical*

- Oncology*, 47(8), 762–771.
<https://doi.org/10.1093/jjco/hyx070>
- Kazak, A. ., & Noll, R. . (2015). The integration of psychology in pediatric oncology research and practice: collaboration to improve care and outcomes for children and families. *American Psychologist*, 70(2), 146–158.
<https://doi.org/10.1037/a0035695>
- Malla, H. El. (2017). Advances in pediatric oncology- a five-year nation-wide survival follow-up at Children’s Cancer Hospital in Egypt. *Journal of Psychology & Clinical Psychiatry*, 7(4), 1–8.
<https://doi.org/10.15406/jpcpy.2017.07.00443>
- National Child Cancer Network. (2010). *The incidence of childhood cancer in New Zealand*. Retrieved April, 16, 2019, from <http://childcancernetwork.org.nz/wp-content/uploads/2017/08/NZCCR-Child-Cancer-Incidence-2010-2014-Final-Report-1.pdf>
- Park, H. J., Moon, E. K., Yoon, J. Y., Oh, C. M., Jung, K. W., Park, B. K., ... Won, Y. J. (2016). Incidence and survival of childhood cancer in Korea. *Cancer Research and Treatment*, 48(3), 869–882.
<https://doi.org/10.4143/crt.2015.290>
- Saletta, F., Pozza, L. D., & Byrne, J. A. (2015). Genetic causes of cancer predisposition in children and adolescents. *Transl Pediatr*, 4(7), 67–75.
<https://doi.org/10.3978/j.issn.2224-4336.2015.04.08>
- Spector, L. G., Pankratz, N., & Marcotte, E. L. (2015). Genetic and nongenetic risk factors for childhood cancer. *Pediatric Clinics of North America*, 62(1), 11–25.
<https://doi.org/10.1016/j.pcl.2014.09.013>
- Stefan, C., Bray, F., Ferlay, J., Liu, B., & Parkin, D. M. (2017). Cancer of childhood in sub-Saharan Africa. *Ecancermedicalscience*, 11(755), 1–95.
<https://doi.org/10.3332/ecancer.2017.755>
- Steliarova-Foucher, E., Colombet, M., Gries, L. A., Moreno, F., Dolya, A., Bray, F., ... Stiller, C. A. (2017). International incidence of childhood cancer, 2001 – 10 : a population - based registry study. *The Lancet Oncology*, 18(6), 719–731.
- Swiss Childhood Cancer Registry. (2011). *Annual Report 2009/2010*.
<https://doi.org/10.1111/j.1365-2338.2010.02400.x>
- Torre, L. A., Siegel, R. L., Ward, E. M., & Jemal, A. (2016). Global cancer incidence and mortality rates and trends - an update. *Cancer Epidemiology Biomarkers and Prevention*, 25(1), 16–27. <https://doi.org/10.1158/1055-9965.EPI-15-0578>
- van der Geest, I. M. M., van der Heide, A., Pieters, R., Darlington, A. S. E., & van den Heuvel-Eibrink, M. M. (2016). Palliative care in children with cancer: implications for general practice. *British Journal of General Practice*, 66(653), 599–600.
<https://doi.org/10.3399/bjgp16X688009>
- Ward, E., DeSantis, C., Robbins, A., Kohler, B., & Jemal, A. (2014). Childhood and adolescent cancer statistics, 2014. *CA: A Cancer Journal for Clinicians*, 64(2), 83–103.
<https://doi.org/10.3322/caac.21219>
- Wiangnon, S., Jetsrisuparb, A., Komvilaisak, P., & Suwanrungruang, K. (2014). Childhood cancer incidence and survival 1985-2009, Khon Kaen, Thailand. *Asian Pacific Journal of Cancer Prevention*, 15(18), 7989–7993.
<https://doi.org/10.7314/APJCP.2014.15.18.7989>
- Wongmeerit, P., Suwanrungruang, K., Jetsrisuparb, A., Komvilaisak, P., & Wiangnon, S. (2016). Trends in survival of childhood cancers in a university hospital, Northeast Thailand, 1993-2012. *Asian Pacific Journal of Cancer Prevention*, 17(7), 3515–3519.
- Zheng, R., Peng, X., Zeng, H., Zhang, S., Chen, T., Wang, H., & Chen, W. (2015). Incidence, mortality and survival of childhood cancer in China during 2000 – 2010 period: a population - based study. *Cancer Letters*, 363(2), 176–180.
- Zhu, L., Pickle, L. W., Zou, Z., & Cucinelli, J. (2014). Trends and patterns of childhood cancer incidence in the United States, 1995-2010. *Statistics and Its Interface*, 7(1), 121–134.
<https://doi.org/10.4310/SII.2014.v7.n1.a13>