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PHYSICAL AND PSYCHOLOGICAL IMPACT ON CHILDREN UNDERGOING CHEMOTHERAPY

Tiara Maharani, Ririn Muthia Zukhra*, Syeptri Agiani Putri
School of Nursing, Faculty of Nursing, Universitas Riau, Simpang Baru, Tampan, Pekanbaru, Riau 28293, Indonesia
*ririnmuthiazukhra@lecturer.unri.ac.id

ABSTRACT

Cancer is a non-communicable disease in which cells or tissues grow uncontrollably and malignantly and require long-term treatment. Chemotherapy is the primary treatment used to treat cancer by giving a type of drug that is tailored to the type of cancer suffered by the child. The mechanism of action of chemotherapy drugs is very strong to kill cancer cells but this also affects other normal cells. This shows that chemotherapy has side effects in its treatment. The side effects of chemotherapy are physical and psychological impacts. Objective: this study aims to determine the physical and psychological impact on children who undergo chemotherapy. This research was conducted at Arifin Achmad Regional Hospital. Methods: This research design uses descriptive quantitative with cross sectional approach. The sample of this study was 66 respondents. Sampling used a purposive sampling technique with inclusion criteria namely children who received chemotherapy treatment and were aged 5 to 7 years. The analysis used was univariate analysis. Results: The results of this study show that the physical impacts that often arise are hair loss (71.4%), dry mouth (40.5%), lack of energy (38.1%), changes in skin color (38.1%), nausea (38.1%), weight loss (35.7%) and others. Frequent psychological effects were irritability (69.0%), sleep disturbance (42.9%), worry (31.0%) and others. sadness (28.6%) and others. Conclusion: From the results of the study, it can be seen that the most frequent impacts on children undergoing chemotherapy are hair loss and irritability.

Keywords: cancer; chemotherapy; children; physical impact; psychological impact

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INTRODUCTION

Cancer is a chronic disease that requires long-term treatment and is the leading cause of death worldwide. In 2021, approximately 10,444 people died from cancer (World Health Organization , 2022) . Childhood cancer is a cancer that attacks people under 18 years of age. Childhood cancer can start in any part of the body, including the brain, spinal cord (central nervous system), kidneys, lymph nodes, and other organs or tissues (Pangribowo, 2019) . The World Health Organization (2019) notes that every year an estimated 400,000 children and adolescents aged 0-19 years suffer from cancer. At least 280,000 children aged zero to 19 years in the world are diagnosed with cancer each year. According to Global Burden of Cancer data (Globocan) in 2020, more than 11 thousand new cases of cancer were found in children. More than 11,000 children in the United States younger than 15 years of age were diagnosed with cancer in 2020 (M. Hockenberry et al., 2021) . According to the Pan American Health Organization (PAHO) in Latin America and the Caribbean, it is estimated that as many as 29,000 children and adolescents under the age of 19 are at risk of developing cancer every year. Approximately 15,590 children and adolescents aged 0 to 19 years were

diagnosed with cancer in 2021 and 1780 children died as a result of cancer in the United States (NCI, 2021).

According to Childhood Cancer International , every year more than 300,000 children under the age of 18 suffer from cancer worldwide, with 80% of cases occurring in poor and developing countries, including Indonesia. Based on data from the World Health Organization (WHO) , there were 8,677 Indonesian children aged 0-14 years who suffered from cancer in 2020, this number is the largest compared to other countries in Southeast Asia (World Health Organization , 2022) . This shows that the incidence of cancer in children in both developed and developing countries has a high prevalence. According to the Indonesian Ministry of Health (2018) various medical procedures can be carried out as treatment for cancer sufferers, most cancers are treated through surgery, followed by chemotherapy, radiation or other therapies. One type of treatment commonly given to cancer patients with metastases is chemotherapy. Around 24.9% of cancer patients in Indonesia are treated with chemotherapy, while in Riau around 22.7% of childhood cancer patients are treated with chemotherapy. Chemotherapy has been proven to make a significant contribution to the success of the treatment of children with cancer in real terms with the cure rate for most cancers that occur in childhood (Ruggiero et al., 2018) . The mechanism of action of chemotherapy drugs is very strong in killing cancer cells, but it also affects healthy cells, especially cells that have a fast division rate such as cells of the spinal cord, skin, mucosa and hair follicles, so that they can cause several diseases. physical side effects on the body. children (Ranailla et al., 2016) . This shows that chemotherapy is one of the main therapies for cancer treatment which also has side effects in the treatment. Side effects of chemotherapy can include physical and psychological impacts. Side effects of chemotherapy can include physical and psychological impacts. Side effects due to physical chemotherapy include fatigue , nausea, vomiting, diarrhea, mouth ulcers, constipation, decreased appetite, peripheral neuropathy, and hair loss (Hendrawati et al., 2019) . Psychological side effects due to chemotherapy include helplessness, anxiety, shame, decreased self-esteem, stress, depression, emotionality (Rasjidi, 2014) .

Previous research conducted at Rumah Cinta Bandung (2016) showed that the psychological aspect was 40% and the physical aspect was 36.7%. Psychological impacts such as feelings and moods, especially children's emotions, namely changes in mood and irritability. The physical impacts experienced by children include decreased appetite, nausea and vomiting (Ranailla et al., 2016) . Based on the results of a preliminary study conducted on January 2 2024, data from Arifin Achmad Hospital Medical Records for the period January to December 2023, it was found that there were 68 children aged 5-14 years who were undergoing chemotherapy in the inpatient room. Based on the results of interviews at the Indonesian Love Child Cancer Foundation, Riau, Pekanbaru, which were conducted with 9 children suffering from cancer who were undergoing chemotherapy at the Arifin Achmad Regional Hospital along with information from several parents of children undergoing chemotherapy, it was found that the side effects experienced were that three children experienced nausea and vomiting. , two children experienced difficulty sleeping, two children experienced hair loss, one child experienced fatigue, and one child felt restless. This research was conducted at school age and adolescence, because children at that age have experienced development in various aspects ranging from language, emotions and social skills (Dewi et al., 2019) . Emotions at each age show several differences in emotional expression. When children are school age, children already experience stress, but children begin to regulate their feelings of stress. Children are able to express and regulate their emotions influenced by cognitive development (Nurmitasari, 2015) . Adolescence is a time when a child grows to the

stage of becoming an adult which cannot be determined with certainty (Sary, 2015)

Adolescent children usually experience high emotional development. The emotional development of early adolescents shows a sensitive nature, their emotions are negative and temperamental, such as irritability, anger, sadness and depression (Faturochman, 2016) .Based on the explanation above, the aim of this research is to determine the physical and psychological impacts on children undergoing chemotherapy. It is important to identify the effects of chemotherapy, so that child cancer patients undergoing chemotherapy can have the side effects treated, and it is hoped that child patients will be more compliant with chemotherapy and feel comfortable. Therefore, the objective of this research is to identify the physical and psychological impacts of children undergoing chemotherapy.

METHOD

Research design is a guide for researchers during the research process to obtain data or answer research questions (Nursalam, 2015) . The research design used was descriptive quantitative with a cross sectional approach . This descriptive method is used to describe or describe phenomena in a population (Lapau, 2015) . This research was conducted at a hospital in Pekanbaru. The sampling technique used in this research was non-probability sampling with purposive sampling (Notoatmodjo, 2018) . The sampling technique used purposive sampling , namely 66 pediatric patients undergoing chemotherapy. Inclusion criteria included being willing to be a respondent, children receiving chemotherapy treatment, and aged 5 to 17 years. Exclusion criteria included children with cognitive impairment and children who did not complete the questionnaire. The measuring instrument used in this research is the Indonesian version of the Memorial Symptom Assessment Scale (MSAS) questionnaire and its validity has been tested by Haryani et al. (2018) which was named MSAS-I, with the research title " Measuring the Symptom Experience of Patients With Cancer in Indonesia: Cross-Cultural Adaptation and Validation of the Memorial Symptom Assessment Scaled Indonesian Version " with the calculation results, Cronbach Alpha Coefficient for the total and subscales of the MSAS- I ranged from 0.75 to 0.87. The analysis used is univariate analysis.

RESULTS

Univariate Analysis

Respondent Characteristics

Tabel 1. Based on the results of the 66 respondents who were researched, the highest age results were found, namely school age 5-12 years, 58 respondents (87.9 %). The gender of most respondents was male with 43 respondents (65.2 %). The current educational level of respondents who have not yet attended school and elementary school/equivalent is the same, namely 29 respondents (43.9 %). The type of cancer most commonly found in respondents was Acute Lymphocytic Leukemia (ALL) with 53 respondents (80.5 %). The majority of respondents' first diagnosis time was less than 1 year, 34 respondents (51.5 %). The chemotherapy agent most frequently used by respondents during chemotherapy was Vincristin, as many as 33 respondents (50.0 %). The chemotherapy cycle or phase that most patients are currently undergoing is the manteanace phase with 28 respondents (42.4 %) and with a cycle of 7 respondents (10.6%). The length of chemotherapy that most respondents had undergone was less than 1 year, namely 34 respondents (51.5 %).

Tabel 1.
Responden characteristics (n=66)

Responden characteristics	f	%
Age respondents		
a. Age school (5-12 years)	58	87.9
b. Age teenagers (12.5-17 years)	8	12.1
Type gender		65.2
a. Man	43	34.8
b. Woman	23	
Education		
a. Not yet school	29	43.9
b. Elementary school	29	43.9
c. Junior high school	3	4.5
d. Senior high school	5	7.6
Type Cancer		
a. ALL	53	80.5
b. AML	4	6.1
c. Neuroblastoma	2	3.0
d. Wilms ' tumor	4	6.1
e. T cell leukemia	2	3.0
f. Rhabdomyosarcoma	1	1.5
Time diagnosed Cancer		
a. < 1 year	34	51.5
b. 1-3 years	31	47.0
c. >3 years	1	1.5
Agent chemotherapy used		
a. Vincristine	33	50.0
b. 6-Mercaptopurine	15	22.7
c. Methotrexate	2	3.0
d. Deunorubicine	13	19.7
e. Actynomicin	3	4.5
Cycle chemotherapy (phase chemotherapy)		
a. Phase induction (1-6 weeks)	11	16.7
b. Phase Consolidation (8-12 weeks)	20	30.3
c. Phase Maintenance (13->48 weeks)	28	42.4
d. Cycle	7	10.6
been a long time ."		
a. < 1 year	34	51.5
b. 1-3 years	31	47.0
c. >3 years	1	1.5

DISCUSSION

Respondent characteristics

Age

The results of this study show that the largest age group is school children aged 5 to 12 years with a total of 58 people (87.9 %). These results are in accordance with research by Herfina and Arifah (2019) who found that the majority of child patients with cancer undergoing chemotherapy were aged 5-10 years. This is also supported by research by Novrianda and Arif (2018) which states that the majority of children suffering from cancer are in the age range of 5 to 18 years and the treatment used is chemotherapy.

Gender

The results of this study found that the majority of children suffering from cancer were male with 43 respondents (65.2 %). This research is in line with that conducted by Herfiana and Arifah (2019) who found that most patients undergoing chemotherapy were male (73.3 %)

Education

The research results showed that the highest level of education of the respondents was those who had not yet gone to school and the education level of elementary school/ equivalent was 29 respondents (43.9%). This is in line with research by Wahyudi (2024) which proves that the education level of many children undergoing chemotherapy is at elementary school/equivalent level or at school age .

Types of cancer

The results of this study show that the most common type of cancer is Acute Lymphocytic Leukemia (ALL) with 53 respondents (80.5 %). This is proven by data from the Arifin Achmad Hospital, cases of children with leukemia are around 39.5 % in the 5-9 year age group. This is in line with research conducted at Cipto Mangunkusumo Hospital (RSCM) which found that leukemia is the type of cancer that most often occurs in children under 15 years of age with a percentage of 30-40% (Wolley et al, 2016).

Time of cancer diagnosis

The results of the study found that the number of cancer patients who had just been diagnosed in the last year was 34 respondents (51.5 %). This is also influenced by the population taken in this study, namely the population of pediatric cancer patients in the last 1 year. Based on medical record data from Arifin Achmad Hospital, the population for the last 1 year in the period January to December 2023 was around 68 children. So the results of this study also show that many patients were newly diagnosed with cancer in the last 1 year.

Chemotherapy agents

The results of this study show that the chemotherapy agent that is often used is Vincristine (50.0 %), apart from that the chemotherapy drugs used are 6-Mercaptopurine (22.7%), Methotrexate (3.0%), Dounorubicin (19.7%), Actynomicin (4.5%). These drugs are chemotherapy drugs that are often used in chemotherapy treatment. This is in accordance with the standard provisions that have been stipulated in the chemotherapy administration protocol at Arifin Achmad Regional Hospital, Riau Province. In line with Andarsini (2023) who explains that chemotherapy drugs that are often used for childhood leukemia include Vincristine, Daunorubicine, Doxorubicine, Idarubicine, Cytarabine, L-asparaginase, etoposide, 6-Merkatopurine, Methotrexate, Cyclofostamide and corticosteroids such as Predisone, Dexamethasone, or Hydrocortiso. Patients will receive the chemotherapy drugs at different times according to the chemotherapy protocol. But Vincristine has side effects that can affect the sensory, motor and autonomic nerves. Side effects that may be felt include tingling, numbness, pain, weakness, constipation. Apart from that, the side effects of Vincristine are hair loss, bruising, diarrhea, mucositis, nausea and vomiting (Tsubaki, et al 2018).

Chemotherapy cycle

The results of the study showed that the most frequent cycle or phase was the maintenance phase, which started from week 13 to week 48, with 28 respondents (42.4%), because the population taken in this study was the population of childhood cancer patients in the last 1 year. This is not in line with research by Herfiana (2019) which explains that the most chemotherapy phase undertaken is the consolidation phase (56.7 %).

Long time undergoing chemotherapy

The results of this study show that the maximum length of time children underwent chemotherapy at Arifin Achmad Regional Hospital was in the last 1 year, as many as 34

respondents (51.5%), in line with the time when they were diagnosed with cancer, because chemotherapy is the main treatment given at Arifin Achmad Regional Hospital for children with cancer, especially children with leukemia.

Description of the physical and psychological impacts on children undergoing chemotherapy

Physical impact

Based on the results of research conducted on 66 children undergoing chemotherapy, it was found that the most frequent physical impact was hair loss (66.7%), this is in line with research by Herfiana and Arifah (2019) which shows that the physiological impact of chemotherapy in children with leukemia is 24 children (80%) experienced alopecia (hair loss). Apart from that, the physical impact that often occurs is lack of energy. Energy deficiency in chemotherapy patients is caused by anemia and decreased appetite which causes reduced energy requirements. In addition, chemotherapy causes abnormal activity of the immune system, so this can cause fatigue. Cytokines are proteins released by white blood cells in response to infection. Cytokines carry messages that function to regulate the immune and endocrine systems. But if it is in high amounts it can turn into toxins and inflammation which can cause fatigue. Based on theory, high levels of cytokines can worsen inflammation and interfere with the production of serotonin (Leukemia, 2016).

The physical impact that children often experience after chemotherapy is dry mouth, this can be caused by chemotherapy drugs or immunotherapy drugs. Some drugs can change the cells in the lining of the mouth and make the mouth sore (mucositis). Apart from that, chemotherapy drugs can affect the secretion of saliva (saliva) and cause dry mouth (Xerostomia). Apart from that, patients undergoing chemotherapy also have a risk of mouth ulcers. Thrush also occurs due to damage to epithelial cells due to therapy in 2 ways , namely directly and indirectly. Chemotherapy directly interferes with the production, maturity and replacement of epithelial cells, while indirectly it is caused by bone marrow depression due to chemotherapy, which causes neutropenia and thrombocytopenia, resulting in an increased risk of bleeding and infection (Anver & Manopo, 2017).Nausea and vomiting are also common effects of chemotherapy. This is also proven by the research of Al-ghzyl & Ali Ma'ala (2021) in their research with the theme Physiological impact of Chemotherapy upon Phsiological status of School Age Children with Acute Lymphoblastic Leukemia at Pediatric Teaching Hospitals in Baghdad City that the physiological impact that occurs in children with leukemia are nausea, vomiting (80%) and hair loss (20%). Nausea and vomiting caused by chemotherapy drugs. Chemotherapy drugs cause irritation of the gastric and duodenal mucosa which then stimulates the central nervous system. Chemotherapy also causes activation of the central nervous system obstruction, delayed gastric emptying, and inflammatory reactions. Chemotherapy drugs that cause nausea and vomiting are Methotrexate, Vincristine, Daunorubicine (Hawkins & Grunbeg, in Herfiana and Arifah, 2019).In general, the physical impacts that often occur in children undergoing chemotherapy are hair loss, lack of energy, dry mouth, weight loss, lack of appetite, skin changes, sweating, nausea, vomiting and other physical impacts.

Psychological impact

Based on the results of research conducted on 66 children undergoing chemotherapy, it was found that the most frequent psychological impact was irritability (63.6 %). This is related to research by Alvionita and Arifah (2021) with the research title Description of Symptoms Due to Chemotherapy in School-Age Children with Acute Lymphoblastic Leukemia at Moewardi Regional Hospital, Surakarta, it was found that the most frequent impact was mudak cheap

(80%). Apart from that, this is also in line with research by Ranailla (2016) with the research title Description of the Impact of Chemotherapy on Children According to Parents at Rumah Cinta Bandung, Psychological aspects in the sub-variables of feelings and mood, especially emotional children (mood changes and irritability) are the impact which is considered the heaviest. The results of this study prove that chemotherapy has a great influence on the psychology of children who undergo it.

Apart from irritability, the psychological impact that also often occurs is sleep disorders (39.4 %), in research conducted by Rahmawaty, et al (2014) with the theme of children receiving chemotherapy regarding sleep disorders experienced by children. This sleep disorder is a long-term effect of the disease and also a long-term effect of chemotherapy. Poor sleep quality in children and adolescents during chemotherapy can have a negative impact on reducing body endurance and cognitive development, this is in line with research by Ririn, et al (2017) which suggests that damage to healthy body cells will reduce physical, social and mental status. The patient's psychology, where these three statuses are components in the dimension of a person's functional status (fulfilling the need for sleep and rest), the more chemotherapy drugs are given, the more healthy cells will be damaged. According to Steur et al (2020), children still experience sleep disorders, even though they have entered the maintenance cycle (maintenance phase), where one of the causes is the chemotherapy agent used. Apart from that, the psychological side effects that often occur are, feeling worried, feeling sad, feeling nervous, drowsiness, pain, difficulty concentrating and judging oneself as not usual.

CONCLUSION

Based on the research that has been conducted, it can be concluded that the age of the majority of respondents is 5 to 2 years old, the majority of gender is male, the majority of respondents' education level in the research is not yet in school and elementary school/equivalent, the type of cancer of most respondents is Acute Lymphocytic Leukemia. (ALL, the time most respondents were diagnosed was in the last 1 year, the chemotherapy agent used was Vincristin, the chemotherapy cycle most underwent was in the maintenance phase, the longest period of time respondents underwent chemotherapy was during the last 1 year. The physical impact that occurred most often was hair loss, lack of energy, dry mouth, weight loss, lack of appetite, changes in skin color and nausea. The most common psychological impacts are irritability, sleep disturbances, feelings of sadness, and feeling worried.

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