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Depression and stressors in children with Cancer in Jakarta: A cross-sectional study

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Abstract This study aimed to identify the predictors of depression in children with cancer in Jakarta, Indonesia. A cross-sectional design was employed, involving 72 children aged 7 to 18 years who received at Dharmasi Cancer Hospital, Jakarta. The Children's Depression Inventory (CDI), consisting of 27 items, assessed the children's feelings and thoughts. Each item was rated on a scale of 0-2, with total scores ranging from 0-54, which were used to determine the level of depression. Data were analyzed using an independent t-test and one-way analysis of variance (ANOVA). The results indicated that the primary factors associated with depression were negative self-image (42%), self-rejection (41%), doubt (40.5%), doubts about relationships with peers (31%), and physical issues (28%). Among the respondents, 72.2% showed no signs of depression, 11.1% exhibited mild depression, 9.7% had major depression and 6.9% experienced moderate depression. A significant difference in depression levels was observed based on gender, age, and duration of treatment ($p<0.05$). The findings highlight that children with cancer are at an increased risk of psychological distress, including anxiety and depression. Effective communication with healthcare providers is essential to identifying the underlying causes of these symptoms and formulating appropriate interventions.

Keywords: children, cancer, depression, triggers, self-image, self-criticism, doubt

1. Introduction

Childhood and adolescent cancers represent one of the most serious global health challenges (Lewandowska et al., 2021). Worldwide, 43% of childhood cancer cases remain undiagnosed, with the highest prevalence of undiagnosed occurring in African countries (Ward et al., 2019). While the survival rate for childhood cancer has significantly improved in high-income countries, reaching 80%, cancer remains the leading cause of death among children under 19 years of age (The Lancet Child Adolescent Health, 2019). In contrast, available data show that survival rates in lower-income countries range from 10-30%, considerably lower than in developed nations (Ward et al., 2019 ; Bhakta et al., 2019). In Indonesian, the Indonesian Pediatric Center Registry reported 3,834 new cases of childhood cancer between 2021 and 2022. According to WHO data, Indonesia had the highest number of childhood cancer cases in Southeast Asia, with 8,677 cases recorded in 2020 (WHO, 2020). Consequently, the survival rate for children with cancer in Indonesia is estimated to be below 30%. Children with cancer commonly experience numerous comorbid symptoms related to both the diagnosis and treatment, which significantly affect their quality of life. These children often endure physical and emotional side effect that can several impair their physical and mental well-being, potentially delaying or restricting the course of their treatment. Depressive and anxiety disorders are among the most common forms of emotional distress, affecting approximately 25%–35% of children with cancer (Yardeni et al., 2020; Kunin-Batson et al., 2016). Similarly, a previous study reported that 37.4% of cancer patients aged 7–21 years met the DSM-5 criteria for depressive and/or anxiety disorders (Yardeni et al., 2020).

Given the high prevalence of these conditions, organizations such as the American College of Surgeons Commission on Cancer, the Institute of Medicine, the American Cancer Society, and the National Comprehensive Cancer Network require cancer care centers to implement psychosocial distress screening programs as part of their clinical accreditation criteria (Myers et al., 2014; Lazor et al., 2019). While numerous studies have highlighted the prevalence of depressive and anxiety disorders in pediatric cancer patients (Dejong & Fombonne, 2006; Kunin-Batson et al., 2016), data on the progression and risk factors associated with these disorders remain limited. Research on the trajectory of depression and anxiety symptoms in children with cancer has yielded inconsistent findings. Some studies utilized questionnaires designed to assess depression and anxiety

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(Myers et al., 2014; Lazor et al., 2019; Dobrozsi et al., 2017; Sargin et al., 2017), while others relied on health-related quality-of-life measures (Sargin et al., 2017; Hedén et al., 2013; Furlong et al., 2012).

Emerging evidence suggests that depression may also impact immunological function (Dobrozsi et al., 2016; Erdmann et al., 2021). Historically, research in pediatric cancer has focused primarily on physical outcomes, with comparatively limited attention to psychological aspects, particularly in children (Li et al., 2010; Naughton et al., 2015; Li et al., 2013). The stressors faced by children with cancer are multifaceted, including social, economic, and familial challenges, underscoring the need for a holistic approach to understanding and addressing these factors (Sisk et al., 2020; Donnan et al., 2015). The emotional toll can be severe and long-lasting, often triggering profound emotional crises that affect the children's development into adulthood. The complexity and challenges associated with cancer stem form the demanding treatment regimens, feelings of uncertainty, and the significant adjustments required in their daily routines (Lewandowska, et al., 2021).

It is assential to understand the psychosocial needs and stressors faced by children with cancer to effectively address these challenges. By gathering more comprehensive data, we can better support children undergoing cancer treatment and develop individualized care plans. Accurately assessing the psychological symptoms they experience is crucial to ensure that they receive high-quality, tailored care. This study provides an opportunity to gain insights into the factors contributing to depression in hospitalized children with cancer by identifying potential triggers. It also offers healthcare professionals a broader understanding of the unique challenges faced by children with cancer.

2. Materials and Methods

2.1. Study Design and Settings

This study employed a cross-sectional descriptive design to assess the symptoms and depression levels in children diagnosed with cancer. This design anables researchers to observe associations between variables without implementing any intervention (Lameky & Nugroho, 2024).

2.2. Sample

The study included a total sample of 72 children aged 7 to 18 years, selected based on stringent inclusion and exclusion criteria to ensure the accuracy and relevance of the data collected. The inclusion criteria were: (1) a confirmed diagnosis of cancer, (2) a life expectancy exceeding six months, (3) no history of chronic or severe comorbid conditions, (4) the ability to communicate in Indonesian, and (5) a willingness to participate in the study. The exclusion criteria were: (1) a diagnosis of mental retardation, (2) insufficient proficiency in the Indonesian language, (3) an inability to complete self-assessment scales, and (4) refusal or inability of the child or their parents to participate.

2.3. Recruitment

Participant recruitment involved explaining the study's purpose and procedures to the parents or caregivers of children who met the inclusion criteria. Those who agreed to participate were required to sign an informed consent form before enrollment. Data were collected using the Children's Depression Inventory (CDI) questionnaire, consisting of 27 questions. The CDI is designed to assess participants' feelings and thoughts, with each statement scored from 0 to 2, yielding a total score ranging from 0 to 54. The CDI scores were then categorized into different levels: no depression, mild depression, moderate depression, and severe depression.

2.4. Data Collection Tools

Data were collected using the Children's Depression Inventory (CDI) questionnaire, a 27-item questionnaire designed to assess respondents' feelings and thoughts. Each statement is scored on a scale from 0 to 2, yielding a total score ranging from 0 to 54. The CDI scores are then categorized into four levels : no depression, mild depression, moderate depression, and severe depression.

2.5. Statistical Analysis

Descriptive statistics were used to summarize continuous variables, presented as means, standard deviations, and ranges (min-max). Categorical variables were described using frequencies and percentages. The association between depression levels and factors such as gender, age, children's education, family income, place of residence, type of cancer, and duration of therapy was examined using One-Way ANOVA for comparisons of more than two groups and an independent sample t-test for comparisons between two groups. The appropriateness of these statistical tests was assessed by evaluating the underlying assumptions. The normality of continuous variables was tested using the Shapiro-Wilk test and visual inspection of histograms and Q-Q plots. Homogeneity of variance for ANOVA was evaluated using Levene's test. For variables that did not meet these assumptions, non-parametric alternatives, such as the Kruskal-Wallis test, were considered. The significance level was set at $p<0.05p$, and all analyses were performed using (SPSS version 29).

2.6. Ethical Consideration

Ethical considerations were paramount in this study, particularly in safeguarding the rights and welfare of the child participants. The researchers ensured that both the children and their parents received clear information regarding the study's purpose and procedures, and written informed consent was obtained prior to data collection. The study protocols were carefully designed to minimize risks and ensure participant comfort. Ethical approval for the study was granted by the Ethics Committee of the Dharmais Cancer Hospital, under the Ministry of Health of the Republic of Indonesia, Directorate General of Health Services (protocol number DP.04.03/D.XII/20776/2023).

3. Results

As shown in Table 1, the most common stressors experienced by children with cancer include negative personality traits (42%), self-doubt (41%), indifference (40.5%), limited social connections (31%), physical axiety (31%), pain (28%), pessimism (25.5%), sleep disturbances (25%), apathy (23.5%), lack of motivation at school (23%), violence (23%), anxiety-related pessimism (20%), boredom at school (19.5%), frustration, and loss of interest (18%).

In table 2, the distribution of depression levels among children aged 7-18 years reveals that the majority did not experience depression (72.2%), followed by mild depression (11.1%), severe depression (9.7%) and moderate depression (6.9%) .

Table 3 presents the results of the analysis of the relationship characteristics and depression levels, indicating a significant difference in avarage depression levels based on gender, and duration of treatment ($p<0.05$).

Table 1 Description of Stressor Symptoms of Children with Cancer at Dharmais Cancer Hospital, Jakarta (n=72).

Symptom	N (%)	Mean (SD)	Min-Max
Sadness	72 (7%)	0,14 (0,421)	0-2
Pessimism	72 (25,5%)	0,51 (0,671)	0-2
Self-criticism	72 (41%)	0,82 (0,602)	0-2
Anhedonia	72 (23,5%)	0,47 (0,604)	0-2
Misbehavior	72 (13%)	0,26 (0,628)	0-2
Pessimistic worry	72 (20%)	0,40 (0,592)	0-2
Self-hate	72 (14,5%)	0,29 (0,592)	0-2
Self-blame	72 (18%)	0,36 (0,635)	0-2
Suicidal ideation	72 (3%)	0,03 (0,165)	0-1
Tearfulness	72 (12%)	0,24 (0,593)	0-2
Irritability	72 (17,5%)	0,35 (0,675)	0-2
Antisocial feelings	72 (10,5%)	0,21 (0,442)	0-2
Indecisiveness	72 (40,5%)	0,81 (0,573)	0-2
Negative self-image	72 (42%)	0,42 (0,496)	0-1
School motivation	72 (23%)	0,46 (0,804)	0-2
Sleep problems	72 (25%)	0,50 (0,712)	0-2
Fatigue	72 (13%)	0,13 (0,333)	0-1
Reduced appetite	72 (18%)	0,36 (0,635)	0-2
Somatic concerns (pain)	72 (28%)	0,56 (0,729)	0-2
loneliness	72 (9,5%)	0.19 (0,464)	0-2
Boredom in school	72 (19,5%)	0,39 (0,683)	0-2
Few friends	72 (31%)	0,31 (0,464)	0-1
Academic decline	72 (16,5%)	0,33 (0,581)	0-2
Negative peer comparison	72 (16,5)	0,33 (0,605)	0-2
Feeling unloved	72 (16,5%)	0,33 (0,605)	0-2
Disobedience	72 (23%)	0,46 (0,604)	0-2
Fighting	72 (1,5%)	0,03 (0,236)	0-2

Table 2 Description of Depression Rates in Children with Cancer.

Depression rates by CDI	7-18 years (n=72)		7-12 years (n=36)		13-18 years (n=36)	
	Total N (%)	Mean ± SD	Total N (%)	Mean ± SD	Total N (%)	Mean ± SD
Not depressed	52 (72,2%)	1,54 ± 0,992	26 (72,2%)	1,64 ± 1,150	26 (72,2%)	1,44 ± 0,809
Mild depression	8 (11,1%)	1,54 ± 0,992	3 (8,3%)	1,64 ± 1,150	5 (13,9%)	1,44 ± 0,809
Moderate depression	5 (6,9%)	1,54 ± 0,992	1 (2,8%)	1,64 ± 1,150	4 (11,1%)	1,44 ± 0,809
Major depression	7 (9,7%)	1,54 ± 0,992	6 (16,7%)	1,64 ± 1,150	1 (2,8%)	1,44 ± 0,809

4. Discussion

Previous studies have demonstrated that cancer management can significantly impact various aspects of an individual's life, including psychological, social, and physical health. Numerous stressors affect the mental and physical well-being of

children diagnosed with cancer. Key sources of stress include the inability to spend time with friends, alopecia, medical procedures, concerns about body image, and fears regarding the will to live. These factors contribute to outcomes such as low self-esteem, feelings of unhappiness, the perception of growing older than peers, school dropout, withdrawal from sports, and weight loss (Lewandowska et al., 2021). Our study that 42% of reported stress was attributed to concerns about body image. Anather study identified body image as the primary source of stress for 85% of pasticipants, which can lead to low self-esteem and hinder the ability to form relationships with peers (Lewandowska et al., 2021).

Table 3 Relationship of characteristics with depression rates of children with cancer

Characteristics		Depression Levels			P value
	Total N (%)	Mean ± SD	Lower ± Upper	Min ± Max	
Sex					
Male	39 (54,2%)	9,33 ± 6,179	7,23 ± 11,23	0 ± 30	0,043
Female	33 (45,8,5%)	11,21 ± 8,695	8,13 ± 14,30	1 ± 30	
Education Level					
No School	3 (4,2%)	9,33 ± 2,082	4,16 ± 14,50	7 ± 11	0,689
Elementary school	27 (37,5%)	11,41 ± 9,166	7,78 ± 15,03	2 ± 30	
Junior high school	26 (36,1%)	8,92 ± 6,633	6,24 ± 11,60	0 ± 25	
Senior High School	16 (22,2%)	10,13 ± 6,131	6,86 ± 13,39	0 ± 21	
Age of child					
7-12 years	36 (50,0%)	10,33 ± 8,931	7,31 ± 13,36	0 ± 30	0,015
13-18 years	36 (50,0 %)	9,94 ± 5,722	8,01 ± 11,88	0 ± 24	
Residence					
City	53 (73,6%)	10,42 ± 7,979	8, 22 ± 12,61	0 ± 30	0,189
Village	19 (26,4%)	9,37 ± 5,842	6,55 ± 12,18	1 ± 24	
Family Income					
< 1 Million (Poor line)	1 (1,4%)	21,00	-	21 ± 21	0,327
1-< 3 Million (Lower middle income)	23 (31,9%)	9,57 ± 6,714	6,66 ± 12,47	0 ± 29	
> 3 Million (Middle to upper income)	48 (66,7%)	10,19 ± 7,751	7,94 ± 12,44	0 ± 30	
Types of Cancer					
Acute Lymphoblastic Leukemia (ALL)	23 (31,9%)	9,91 ± 7,942	6,48 ± 13,35	0 ± 30	0,773
Acute Myelogenous Leukemia (AML)	6 (8,3%)	11,67 ± 6,683	4,65 ± 18,68	7 ± 25	
Hodgkin's limpoma	7 (9,7%)	6,57 ± 8,677	-1,45 ± 14,60	0 ± 24	
Osteosarcoma	7 (9,7%)	9,00 ± 5,657	3,77 ± 14,23	1 ± 18	
Wilms tumor	1 (1,4%)	14,00	-	14 ± 14	
Ewing's sarcoma	4 (5,6%)	15,50 ± 11,240	12,39 ± 33,39	4 ± 30	
Non-Hodgkin's lymphoma	3 (4,2%)	5,67 ± 4,041	-4,37 ± 15,71	4 ± 10	
CML	3 (4,2%)	6,00 ± 2,646	-0,57 ± 12,57	4 ± 9	
Leiomyosorcoma	1 (1,4%)	21,00	-	21 ± 21	
Rhabdomysarcoma	5 (6,9%)	11,60 ± 10,526	-1,47 ± 24,67	3 ± 29	
Ependymoma	2 (2,8%)	6,00 ± 2, 828	-19,41 ± 31,41	4 ± 8	
Angiosarcoma	1 (1,4%)	11, 00	-	11 ± 11	
Liver cell carcinoma	2 (2,8%)	20,00 ± 5,657	-30,82 ± 70,82	16 ± 24	
Ovarian tumors	1 (1,4%)	13,00	-	13 ± 13	
Nasopharyngeal carcinoma	2 (2,8%)	10,00 ± 0,00	10,00 ± 10,00	10 ± 10	
Germ cell tumor (GCT)	1 (1,4%)	11, 00	-	11 ± 11	
Neuroendoctrine tumor	1 (1,4%)	12, 00	-	12 ± 12	
Blastoma medulla	1 (1,4%)	3,00	-	3 ± 3	
Colon cancer	1 (1,4%)	11, 00	-	11 ± 11	
Long Duration of Getting Therapy					
<1 Year	37 (51,4%)	12,43 ± 8,150	9,72 ±15,15	0 ± 30	0,028
1-3 Years	31 (43,1%)	7,65 ± 5,846	5,50 ± 9,79	0 ± 29	
4-6 Years	2 (2,8%)	3,50 ± 0,707	-2,85 ± 9,85	3 ± 4	
> 7 Years	2 (2,8%)	13,00 ± 5,657	-37, 82 ± 63,82	9 ± 17	

Additionally, our findings indicated that 41% of children with cancer tended to self-criticism. To our knowledge, research specifically addressing self-criticism in young cancer patients is limited. However, studies involving women diagnosed with breast cancer have shown notably elevated levels of self-criticism (Austin et al., 2021; St. Jude Children's Research Hospital, 2023). Importantly, our study did not explore the tendency of children with cancer toward self-criticism. While several studies have examined how children with cancer perceive themselves (Austin et al., 2021; Ljungman et al., 2014; Neves et al., 2023), they primarily focus on self-esteem and self-perception, rather than explicitly addressing self-criticism.

Children with cancer experience indecisiveness in decision-making, with 40.5% reporting this challenge. While previous research has not specifically addressed hesitancy among children with cancer, some studies have highlighted concerns expressed by parents regarding their children's decision-making abilities (Sisk et al., 2020; Robertson et al., 2019). Indecision can arise from various factors, including fear of failure and a lack of confidence or information (Michinobu et al., 2022). Therefore, parents need to communicate effectively with their children and actively participate in the decision-making process. Pediatric oncologists should also focus on involving families in the deliberative phase, rather than solely in the final decision-making (Robertson et al., 2019).

Children with cancer often have fewer friends due to their illness and treatment, leading them to perceive themselves as having less social support compared to their peers. However, friendships are crucial for providing emotional support and reducing feelings of isolation (Robertson et al., 2019). In this study, 31% of children reported having fewer friends. Additionally, children with cancer frequently experience somatic concerns, such as pain (Graungaard et al., 2019; Lindsey et al., 2020). Long-term survivors of childhood cancer also report persistent somatic symptoms (Michinobu et al., 2022). It is important to note that these somatic symptoms may indicate somatic symptom disorder, where children excessively worry about serious illness despite having no or only mild symptoms. This anxiety may lead them to interpret normal pain as indicative of cancer or another serious condition, causing significant stress that interferes with daily activities, such as school and social interactions (Kovacs, 2015).

In addition to the aforementioned issues, our study identified several emotional problems among children with cancer. These included pessimism (25.5%), sleep disturbances (25%), moodiness/anhedonia (23.5%), lack of school motivation and disobedience/defiance (23%), worry (20%), boredom in school (19.5%), reduced appetite and self-harm (18%), irritability (17.5%), decreased academic performance, negative peer comparisons, feelings of being unloved (16.5%), self-hatred (14.5%), fatigue and behavioral issues (13%), crying (12%), withdrawal and isolation (10.5%), loneliness (9.5%), sadness (7%), suicidal ideation (3%), and fighting (1.5%). These symptoms may be attributed to stress and anxiety related to illness, treatment, and side effects (Lindsey et al., 2020; Yamaji et al., 2020). A study by Bellizzi et al. (2012) indicated that adolescents with cancer commonly report negative life domains, including financial concerns, body image issues, a diminished sense of control over their lives, and educational difficulties. Furthermore, prolonged treatment has been associated with adverse effects such as depression, low self-esteem, and lack of interest, as well as long-term challenges like loss of purpose and difficulty re-engaging in educational activities (Robertson et al., 2019).

Children with cancer experience varying degrees of difficulty and depression related to their diagnosis and treatment (Bach, 2022). According to the results of this study, the levels of depression among children aged 7-18 years were categorized as follows: non-depressed (72.2%), mild depression (11.1%), major depression (9.7%), and moderate depression (6.9%). The prevalence of depressive symptoms in children with cancer ranges from 5% to 50%, while the prevalence of depressive disorders varies from 0% to 46% (Yardeni et al., 2021). A study conducted in Uganda reported that 26% of children and adolescents with cancer attending the Uganda Cancer Institute were diagnosed with major depressive disorder (Akimana et al., 2019). Another study found that 48% of children and adolescents diagnosed with cancer developed depression and anxiety disorders at least once during a one-year follow-up period (Yardeni et al., 2021).

Several factors can influence depression in children with cancer. Our study identified significant differences in average depression levels based on sex, age, and duration of therapy ($p < 0.05$). Specifically, adolescents (ages 10–17) were found to be four times more likely to develop major depressive disorder compared to younger children (Akimana et al., 2019). This heightened risk may be linked to the identity-seeking behaviors characteristic of adolescence. The limitations imposed by cancer can exacerbate anxiety and depression in children (Sisk et al., 2020; Lewandowska et al., 2021). Researchers suggest that cognitive development also plays a critical role in how children understand chronic illness. Younger children often struggle to grasp abstract concepts such as chronic illness, loss, and the potential long-term impact on their futures, which may contribute to the greater stress observed in adolescents compared to younger children.

Moreover, our study revealed significant differences in depression levels among children with cancer undergoing long-term therapy. These findings are consistent with those of Akimana et al. (2019), who reported that children with a treatment duration of 12–36 months were less likely to experience depression compared to those in the early stages of treatment (0–2 months).

5. Conclusions

Children with cancer face substantial challenges that affect various aspects of their lives, including physical, mental, and social well-being. The physical symptoms of the disease, along with the side effects of treatment—such as fatigue and pain—can significantly diminish their quality of life and limit their ability to engage in essential social activities. The process of adapting to these conditions is complex, requiring children to learn how to manage and accommodate the changes brought on by their diagnosis. Furthermore, the increased risk of developing mental health issues, such as anxiety and depression, exacerbates the emotional strain these children endure. Consequently, it is crucial to highlight that mental health care is equally important as physical treatment in managing childhood cancer.

Healthcare teams must adopt a proactive approach in monitoring and addressing mental health concerns to enhance the overall well-being of children with cancer. Continuous and transparent communication between the child, their family, and the medical team is vital for early detection of psychological distress or emerging mental health disorders. Moreover, incorporating psychological support and counseling programs into the treatment plan can help children and their families navigate the emotional challenges of adapting to the illness. Encouraging participation in social activities, such as support groups and interactions that promote social well-being, is also important for improving their quality of life. Finally, increasing education and training for both parents and healthcare providers regarding the significance of mental health in pediatric cancer care is essential for fostering an environment that supports the healing and emotional resilience of children with cancer.

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Ethical considerations

Ethics Committee Approval: Ethics approval was obtained from the Ethics Commission of Dharmais Cancer Hospital, under the Directorate General of Health Services, Ministry of Health of the Republic of Indonesia, with protocol number DP.04.03/D.XII/20776/2023.

Conflict of Interest

The authors declare no conflicts of interest.

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