



Original Article

Fatigue and psychosocial factors associated with self-concept in pediatric cancer patients

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ABSTRACT

Background: Childhood cancer is a chronic disease that requires intensive treatment, such as chemotherapy and radiotherapy. While effective, these treatments often cause various side effects, with fatigue being one of the most common complaints. Fatigue not only impacts the physical health but also significantly impairs the activities, social interactions, and self-concept of children with cancer.

Purpose: This study aimed to analyze the factors that influence the self-concept of children with cancer undergoing treatment at Dr. Moewardi Surakarta Regional Hospital.

Method: This study used a cross-sectional design. It was conducted at Dr. Moewardi Hospital Surakarta in March 2025, involving 90 children with cancer aged 8-18 years old, selected using consecutive sampling from a population of 907 children with cancer. The research instruments used a demographic data questionnaire, the PedsQL multidimensional fatigue scale (MFS), and the self-perception profile for children (SPPC). Data were analyzed using multiple linear regression.

Results: The results of this study that fatigue is the most significant and consistent predictor of various dimensions of children's self-concept, even influencing nearly all subscales measured, including academic competence, athletic competence, physical appearance, and global self-esteem. Regression analysis corroborates this finding by showing that behavioral self-concept is significantly influenced by educational status and fatigue ($p < 0.001$, $R^2 = 0.165$), while global self-esteem is influenced by type of care and fatigue ($p < 0.001$, $R^2 = 0.194$). Although other factors such as educational status and gender are also associated with certain dimensions, fatigue is the only factor that universally and comprehensively influences nearly every aspect of children's self-concept.

Conclusions: Fatigue, child's educational status, gender, and type of treatment influence the self-concept of children with cancer.

INTRODUCTION

Cancer is a chronic disease affecting children, characterized by uncontrolled abnormal cell growth and associated with both complex medical management and substantial psychosocial challenges due to the prolonged treatment process.¹⁻³ Globally, approximately 400,000 children aged 0–19 years are diagnosed with cancer annually, yet the survival rate in low- and middle-income countries, including Indonesia, remains below 30% because of late diagnosis and limited access to optimal care.^{1,2} In Indonesia, the prevalence of childhood cancer is estimated at 11,156 new cases per year, with leukemia, brain tumors, and lymphoma being the most frequent

types.^{1,2} While therapies such as chemotherapy and radiotherapy are essential, they are accompanied by severe side effects.

One of the most prevalent is cancer-related fatigue, reported in 80–100% of pediatric patients.¹⁻³ Unlike ordinary fatigue, cancer-related fatigue is persistent, unrelieved by rest, and interferes with children's daily activities, social engagement, and school participation. Consequently, it can lead to helplessness, social withdrawal, and diminished self-concept.⁴⁻⁶ Self-concept, defined as an individual's perception of themselves, is especially vulnerable in children undergoing cancer treatment.

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Negative self-concept may manifest as feelings of inferiority, embarrassment due to physical changes, and a sense of being different from peers, which can have long-term psychological and social consequences.^{7,8} Previous studies have reported strong associations between high fatigue and decreased physical and social self-concept among pediatric patients.⁹ Moreover, interventions targeting fatigue reduction have been shown to improve self-esteem,¹⁰ while strong social support can act as a protective factor in maintaining a positive self-concept.¹¹

Although these studies provide valuable insights, there is a paucity of evidence from Indonesia, where patient characteristics, cultural norms, and social support structures may influence these associations differently. To address this gap, the present study aimed to analyze fatigue and psychosocial factors associated with self-concept in pediatric cancer patients at Dr. Moewardi Regional General Hospital, Surakarta.

METHOD

Study Design

This research employed a cross-sectional analytical study design.¹²

Setting and Respondent

The study was conducted in March 2025 at Dr. Moewardi Regional General Hospital, Surakarta, Indonesia, specifically in the pediatric oncology inpatient and outpatient units. The source population comprised 907 children with cancer (315 inpatients and 592 outpatients). Using a consecutive sampling technique, a total of 90 eligible children were recruited during the study period. Inclusion criteria were: (1) children aged 8–18 years with a confirmed cancer diagnosis, (2) currently receiving inpatient or outpatient care, and (3) willingness to participate, with parental consent obtained where appropriate. Exclusion criteria included children with deteriorating clinical conditions during data collection.

The Variable, Instrumen, and Measurement

The independent variable was fatigue, the dependent variable was self-concept, and covariates included age, gender, educational status, cancer type, treatment type, and treatment duration. Fatigue was measured using the validated Pediatric Quality of Life Inventory Multidimensional Fatigue Scale (PedsQL MFS), which consists of 18 items across three dimensions: General Fatigue, Sleep/Rest Fatigue, and Cognitive Fatigue.¹² Self-concept was assessed with the validated Self-Perception Profile for Children (SPPC), comprising 36 items covering six domains: Scholastic Competence, Social Competence, Athletic Competence, Physical Appearance, Behavioral Conduct, and Global Self-Worth.¹³

Data Analysis

Descriptive statistics were used to summarize participant characteristics. Bivariate analyses were initially performed

to examine associations between independent variables and self-concept. Subsequently, multiple linear regression was conducted to identify predictors of self-concept, with assumptions of normality, homoscedasticity, and multicollinearity assessed prior to analysis.

Ethical Consideration

This study was approved by the Health Research Ethics Committee of Dr. Moewardi Regional General Hospital, Surakarta (Approval No. 337/III/HREC/2025). Written informed consent was obtained from participants and/or their parents before data collection.

RESULTS

Respondent Characteristics

Among the 90 children with cancer included in the study, 56.7% were boys. The majority were diagnosed with hematologic malignancies (76.7%) and received chemotherapy (97.8%) as the primary treatment (Table 1).

Table 1. Demographic and Clinical Characteristics of Pediatric Cancer Patients (n = 90)

Characteristics	Result
Gender	
Male	51 (56.7%)
Female	39 (43.3%)
Educational Status	
Attending school	86 (95.6%)
Not attending school	4 (4.4%)
Type of Cancer	
Hematologic malignancy	69 (76.7%)
Solid tumor	21 (23.3%)
Type of Treatment	
Chemotherapy	88 (97.8%)
Radiotherapy	2 (2.2%)

Descriptive Statistics

The mean age of participants was 12.44 years (SD=2.94), and the average treatment duration was 9.63 months (SD=8.71). The mean fatigue score was relatively high (61.52 ± 14.84), suggesting that fatigue is a prevalent and burdensome symptom in this population. Regarding self-concept, the highest domain score was observed in global self-worth (3.03 ± 0.56), indicating relatively strong psychological resilience, whereas the lowest was in athletic competence (2.36 ± 0.60), likely reflecting physical limitations imposed by illness and treatment (Table 2).

Factors Associated with Self-Concept

Multiple linear regression analysis revealed that fatigue was the most consistent predictor across several domains of self-concept. Higher fatigue scores were significantly associated with lower scholastic competence, athletic competence, physical appearance, behavioral conduct, and global self-worth (all $p < 0.05$). In addition, educational status significantly predicted scholastic competence and -

Table 3. Multiple Linear Regression Analysis of Factors Associated with Self-Concept

Dependent Variable (Self-Concept Domain)	Predictor Variable	B (Coef.)	95% CI (Lower–Upper)	p-value	Adjusted R ²
Scholastic Competence	Education status	-0.602	-1.183 – -0.040	0.038	0.141
	Fatigue	1.212	0.465 – 2.752	0.003	
Athletic Competence	Gender	-0.382	-0.658 – -0.173	0.002	0.140
	Fatigue	1.208	-0.344 – 2.009	0.040	
Social Competence	–	–	–	–	–
Physical Appearance	Fatigue	1.010	0.329 – 2.482	0.011	0.060
Behavioral Conduct	Education status	0.554	0.129 – 0.975	0.011	0.144
	Fatigue	1.110	0.619 – 2.311	0.001	
Global Self-Worth	Treatment type	-0.798	-1.536 – -0.061	0.033	0.176
	Fatigue	1.414	0.861 – 2.971	0.000	

behavioral conduct ($p < 0.05$), while gender was associated with athletic competence ($p < 0.01$), and treatment type significantly influenced global self-worth ($p < 0.05$). The regression models explained 17.6% of the variance in global self-worth (Adjusted $R^2 = 0.176$), 14.1% in scholastic competence (Adjusted $R^2 = 0.141$), and 14.4% in behavioral conduct (Adjusted $R^2 = 0.144$), indicating modest but statistically significant contributions (Table 3). No significant predictors were found for social competence.

Table 2. Descriptive Statistics of Key Variables (n = 90)

Variable	Mean ± SD	Min–Max
Age (years)	12.44 ± 2.94	8–18
Duration of treatment (months)	9.63 ± 8.71	1–36
Fatigue (total score)	61.52 ± 14.84	36.11–97.22
Self-Concept Domains		
Scholastic Competence	2.50 ± 0.59	1.33–3.83
Social Competence	2.71 ± 0.49	1.33–3.83
Athletic Competence	2.36 ± 0.60	1.00–4.00
Physical Appearance	2.92 ± 0.54	1.50–4.00
Behavioral Conduct	2.92 ± 0.44	1.83–4.00
Global Self-Worth	3.03 ± 0.56	1.50–4.00

DISCUSSION

This study demonstrated that self-concept in pediatric cancer patients is influenced by educational status, gender, type of treatment, and fatigue. These results are in line with prior evidence showing that sociodemographic and clinical factors play a substantial role in the psychological well-being of children with chronic illnesses. Educational status was found to negatively impact scholastic competence, consistent with studies reporting that educational disruption due to prolonged hospitalization leads to decreased motivation, academic efficacy, and self-confidence.^{14,15}

Similarly, gender differences were evident in athletic competence, where girls reported lower scores than boys. This finding aligns with previous literature suggesting that girls are more vulnerable to social and motivational pressures regarding physical activity, which can reduce their perceived physical competence.^{16–19} The association

between treatment type and global self-esteem was also consistent with previous findings. Side effects of chemotherapy and radiotherapy, such as alopecia and weight changes, have been linked to increased anxiety and depressive symptoms, ultimately lowering self-esteem.^{20,21}

A particularly noteworthy finding was the positive association between fatigue and several aspects of self-concept. This appears counterintuitive, as most studies have linked severe fatigue to reduced quality of life and lower self-concept.^{22,23} However, some evidence suggests that patients who effectively manage mild-to-moderate fatigue may experience improved self-concept, supported by theories of self-regulation and self-efficacy.^{24–26} In this study, it is plausible that children with manageable levels of fatigue developed adaptive coping strategies, leading to small but meaningful accomplishments that reinforced intrinsic motivation and confidence.^{27,28} These findings underscore the complex role of fatigue, which, under certain conditions, may act as a catalyst for psychological resilience rather than a barrier.

From a clinical perspective, these findings suggest that interventions should not aim solely at eliminating fatigue but also at equipping children with adaptive coping strategies. By learning to manage their energy more effectively, children may strengthen self-efficacy and maintain a positive self-concept despite ongoing treatment. Several limitations should be acknowledged. First, variation in treatment schedules and heterogeneous clinical conditions may have introduced bias. Second, reliance on parental reporting in some cases may have affected the objectivity of responses. Third, the wide age range of participants (8–18 years) may have led to differences in comprehension and self-reporting.

CONCLUSIONS AND RECOMMENDATION

This study demonstrated that educational status, gender, type of treatment, and fatigue significantly influenced the self-concept of children with cancer at Dr. Moewardi Regional General Hospital, Surakarta. While consistent with previous evidence on the effects of educational disruption, gender differences, and treatment side effects,

the findings also revealed that mild fatigue may positively contribute to certain aspects of self-concept, suggesting adaptive coping mechanisms. These results underscore the importance of integrating educational support, gender-sensitive physical activity, and coping strategy interventions into pediatric oncology care. Future research with longitudinal designs, larger and more diverse samples, and more nuanced fatigue assessments is recommended to clarify causal pathways and strengthen the generalizability of these findings.

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