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Symptom Frequency and Quality of Life in Two Different Age Groups in Children with Cancer: A Current Overview

Kanserli Çocuklarda İki Farklı Yaş Grubunda Semptom Sıklığı ve Yaşam Kalitesi: Güncel Bir Bakış

Semiha DERTLİ¹ Aydan Selen YILMAZ AYDIN² SümeYYe ÖZARSLAN³ Ulviye GÜNAY⁴ Arzu AKYAY⁵

¹ Assist. Prof., RN, Ph.D.,
Malatya Turgut Özal University,
Faculty of Health Sciences,
Department of Nursing,
Malatya, Türkiye.

² Ph.D, Batman University,
School of Health Services –
Department of Medical Services
and Techniques – Physiotherapy
Programme, Türkiye

³ MSc, Inonu University, Faculty
of Nursing, Department of Child
Health and Disease Nursing,
Malatya, Türkiye

⁴ Prof., RN, Ph.D., Inonu
University, Faculty of Nursing,
Department of Child Health and
Disease Nursing, Malatya,
Türkiye

⁵ M.D, Inonu University, Faculty
of Medicine, Department of
Child Health and Disease,
Malatya, Türkiye

**Sorumlu yazar / Corresponding
author**

Semiha DERTLİ
semihadertli15@gmail.com

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ABSTRACT

Aim: This study aims to evaluate symptom frequency and the current status of quality of life in children of different age groups undergoing cancer treatment.

Material and Method: The cross-sectional study was conducted in an oncology hospital in eastern Turkey with 146 children aged 7-18 years. Descriptive Information Form, Symptom Frequency Assessment Form, Scale for the Quality of Life in Pediatric Oncology Patients Aged 7-12-Child Form, Scale for Quality of Life in Pediatric Oncology Patients Aged 13-18-Adolescent Form were used for data collection.

Results: The study found that the newly diagnosed children in the 7-12 age group and girls in the 13-18 age group had significantly lower mean Scale for the Quality of Life in Pediatric Oncology Patients scores. The most common symptoms in children aged 7-12 years were restlessness, alopecia, irritability, nausea, whereas sadness, nausea, dry mouth were found in children aged 13-18 years.

Conclusion: The study found that the quality of life was low in children aged 7-12 years and moderate in children aged 13-18. The children aged 7-12 years had more symptoms with higher frequency compared to children aged 13-18 years, and the most common symptoms differed between the age groups.

Keywords: Cancer, Children, Quality of life, Symptoms, Symptom frequency

ÖZET

Amaç: Bu çalışmanın amacı kanser tedavisi gören farklı yaş gruplarındaki çocuklarda semptom sıklığını ve yaşam kalitesinin mevcut durumunu değerlendirmektir.

Gereç ve Yöntem: Kesitsel çalışma, Türkiye'nin doğusundaki bir onkoloji hastanesinde 7-18 yaş arası 146 çocuk ile gerçekleştirildi. Verilerin toplanmasında Tanıtıcı Bilgi Formu, Semptom Sıklığı Değerlendirme Formu, 7-12 Yaş Pediatrik Onkoloji Hastalarında Yaşam Kalitesi Ölçeği-Çocuk Formu, 13-18 Yaş Pediatrik Onkoloji Hastalarında Yaşam Kalitesi Ölçeği-Ergen Formu kullanılmıştır.

Bulgular: Çalışmada, 7-12 yaş grubundaki yeni tanı almış çocukların ve 13-18 yaş grubundaki kızların ortalama yaşam kalitesi ölçeği puanlarının anlamlı derecede düşük olduğu bulunmuştur. 7-12 yaş arası çocuklarda en sık görülen semptomlar huzursuzluk, alopesi, sinirlilik, bulantı iken, 13-18 yaş arası çocuklarda üzüntü, bulantı, ağız kuruluğu bulunmuştur.

Sonuç: Çalışmada yaşam kalitesinin 7-12 yaş arası çocuklarda düşük, 13-18 yaş arası çocuklarda orta düzeyde olduğu bulunmuştur. 7-12 yaş arası çocuklarda 13-18 yaş arası çocuklara göre daha fazla ve daha sık semptom görüldüğü ve en sık görülen semptomların yaş grupları arasında farklılık gösterdiği saptanmıştır.

Anahtar kelimeler: Çocuk, Kanser, Semptom, Semptom Sıklığı, Yaşam kalitesi



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INTRODUCTION

In recent years, advances in the treatment and care of children with cancer have led to increased survival rates. Recent reports show that 90% complete remission can be achieved in children with cancer and the five-year disease-free survival rate can be more than 75% (Li et al., 2020; Wang et al., 2017). Combination chemotherapies are the most important treatment method that increases survival rates in children. However, the symptoms the child faces during chemotherapy still affect life quality adversely. Children receiving chemotherapy experience several symptoms, including pain, fatigue, nausea/vomiting, oral mucositis, alopecia, anxiety, and stress frequently (Li et al., 2020; Shin et al., 2023). Symptoms may vary depending on the type of chemotherapy agent, dose and frequency of treatment, and child's age period and tolerance. Since the symptoms seen in children after chemotherapy can be considerably diverse and many symptoms occur in relation to each other, the current literature refers to symptom clusters (Hong et al., 2023; Li et al., 2020). These clusters have been evaluated in different categories, including cardiac, pulmonary, sensory, motor/movement, gastrointestinal, pain, fatigue, memory, psychological problems, self-image disorder cluster, and somatic symptoms such as skin itching/irritation (Shin et al., 2023). Many clusters of concurrent symptoms may have a synergistic effect and lead to other more severe symptoms that affect the children's quality of life adversely. It may also reduce the effectiveness of chemotherapy, prolong hospital stays, and adversely impact the social adaptation of the child and his/her family (Faranosh et al., 2024; Jankowska-Polańska et al., 2020; Li et al., 2022; Rothmund et al., 2023; Tang et al., 2022; Uğur & Yılmaz, 2023).

The perceptions, perspectives, and reactions of children undergoing cancer treatment towards the disease and hospitalization processes may vary according to age periods (Faranosh et al., 2024; Mack et al., 2020; Uğur & Yılmaz, 2023). For school-age children (6-12 age group), school, peer relationships, academic success, social acceptance, and communication skills are important (Gürses & Kılavuz, 2011; Orenstein & Lewis, 2022). In this age group, the cancer diagnosis, the unknowns of the disease and treatment process, the hospital environment, and separation from family, school, and friends can cause intense anxiety, fear, and stress (Faranosh

et al., 2024; Rothmund et al., 2023). In adolescents, body image, acceptance among peers, independence, and control are important (Orenstein & Lewis, 2022). Changes in body image, anxiety about losing independence and control and not being accepted by the peer group, and fear of death are experienced more intensely in adolescents with cancer (Faranosh et al., 2024; Rothmund et al., 2023; Uğur & Yılmaz, 2023). These developmental characteristics of children can alter the frequency and severity of some symptoms seen during cancer diagnosis and treatment (Li et al., 2020). A study found that school-age children undergoing active cancer treatment expressed pain, immobility, and anxiety symptoms more, while adolescents experienced fatigue, depressive symptoms, and psychological stress more (Mack et al., 2020).

Evaluation of quality of life in children with cancer and its common symptoms according to different age periods can be useful in providing systematic care and treatment approaches. Therefore, it is important that research reports on the subject are regularly submitted to the literature and that children in different age groups are systematically evaluated. However, there seems to be only a general evaluation of symptom frequency and quality of life of children with cancer between the ages of 8-18 years in the literature, with insufficient evidence in different age groups (Li et al., 2020; Li et al., 2024; Turan et al., 2016). Therefore, this study aimed to evaluate the frequency of symptoms and the current state of quality of life despite the advancements in treatment and care procedures in children in different age groups who are being treated with a diagnosis of cancer.

Research Questions

This study addresses the following questions:

1. What is the frequency of symptoms in children with cancer in different age groups?
2. What is the quality of life in children with cancer in different age groups?

MATERIALS AND METHODS

Research Type

This study followed a cross-sectional descriptive design.

Study Population and Sample

The study was conducted with children with cancer between the ages of 7-18 who were being treated at an oncology hospital between the specified dates. All children who met the

inclusion criteria within the specified dates were included in the study without sample selection. During data collection, 161 children who met the research criteria were reached. Five of the children and seven of the parents refused to participate in the study, and three children discontinued. The study was completed with 146 children (73 aged 7-12 years and 73 aged 13-18 years). At the end of the study, post-power analysis was performed using quality of life scores in G-Power (v3.1.9.7) software, resulting in values of $d = 0.82$, $\alpha = 0.05$, and power = 98%.

This study was conducted in a university-affiliated oncology hospital in eastern Turkey between March 1 and August 20, 2024. This hospital is a well-equipped regional hospital with the potential to receive many patients from neighboring provinces. The pediatric oncology clinic is staffed by 2 faculty members, 1 subspecialty pediatric oncology assistant, and 12 nurses. Regular and continuous in-service trainings are organized for health professionals on the management of the care and treatment process of children with cancer. While treatment and care protocols vary, evidence-based practices are used for symptoms that may be seen in children receiving chemotherapy. In addition, various randomized controlled experimental studies are planned in the clinic to evaluate the effectiveness of different practices and interventions for symptoms. The clinic routines include honey, ice, and black mulberry syrup for oral mucositis as well as social activities, art therapies, theater, clown shows, jewelry making, music, singing, and painting for the management of pain, fatigue, nausea, and various psychological symptoms. There is also a playroom for children, which is renovated at regular intervals according to the needs and wishes of the children.

Inclusion Criteria: Children were eligible for inclusion if they were between 7 and 18 years of age, had been diagnosed at least three months prior to the study, and were actively undergoing chemotherapy at the time of data collection.

Exclusion Criteria: Children were excluded if they had any communication disability (including hearing, perceptual, visual, or speech impairments), were scheduled to undergo or had undergone bone marrow transplantation within the past month, or were in the terminal phase of their illness.

Data Collection Tools

The data of the study were collected by using the

Descriptive Information Form, Symptom Frequency Assessment Form, Scale for the Quality of Life in Pediatric Oncology Patients Aged 7-12 - Child Form, Scale for Quality of Life in Pediatric Oncology Patients Aged 13-18 - Adolescent Form which were created by the researchers by reviewing the relevant literature.

Descriptive Information Form: Prepared by the researchers by reviewing the literature, the form consists of a total of 7 questions evaluating personal and treatment-related information about the children participating in the study (Kudubes & Bektas, 2015).

Symptom Frequency Assessment Form: Also prepared by the researchers by reviewing the literature, the form evaluates chemotherapy-related symptoms and their frequency in children (Li et al., 2020; Li et al., 2024; Mack et al., 2020; Turan et al., 2016; Uğur & Yılmaz, 2023; Shin et al., 2023).

Scale for the Quality of Life in Pediatric Oncology Patients Aged 7-12 - Child Form: The scale was developed by Kudubeş and Bektaş in 2014. The scale determines the quality of life of pediatric oncology patients aged 7-12. There are 32 items, with the eighth item reverse-coded. It is a Likert-type scale scored between 1 (never) and 5 (always). The lowest score is 32 points, and the highest is 160 points, with the higher scores indicating decreased quality of life. The total Cronbach alpha value of the scale is 0.96 and was found to be 0.78 in this study (Kudubes & Bektas, 2015).

Scale for Quality of Life in Pediatric Oncology Patients Aged 13-18 - Adolescent Form: The scale was developed by Kudubeş et al. in 2016. It has 35 items, and only the tenth item is reverse-coded. It is a Likert-type scale scored between 1 (never) and 5 (always). The lowest score is 35 points, and the highest is 175 points. Higher scores indicate higher quality of life (Bektaş et al., 2016). The Cronbach alpha value of the scale is 0.98 and was found to be 0.90 in this study.

Accordingly, in the quality of life scales used in this study, higher scores indicate lower quality of life in the 7–12 age group, whereas higher scores indicate higher quality of life in the 13–18 age group; this difference was taken into account in all analyses and interpretations.

Ethical Consideration

Before starting the study, approval was obtained from a university (Date: 06.02.2024; Approval

Number: 2024/3841), and institutional permission was obtained from the relevant University Hospital. The purpose of the study was explained to the children and their parents, and that participation was voluntary, their personal information would be kept confidential, the data obtained would be used for scientific purposes, and that they would not receive or pay any fee for participation. They were also reassured that the child's treatment and care would not be affected in any way should they refuse to take part. Verbal and written consents were then obtained from the children and their parents, who agreed to participate in the study.

Data Collection

After the data collection tools were first introduced to the participant children, the researchers filled them out in the rooms where the children stayed using the face-to-face interview technique. It took an average of 15-20 minutes to complete the data collection tools.

Data Analysis

The statistical software IBM SPSS 26.0 was used to evaluate the data using descriptive statistics including percentage, arithmetic means, standard deviation, median, minimum, and maximum values. Kolmogorov-Smirnov values were used to determine whether the data were normally distributed. The t-test was used to evaluate the difference between two independent groups with

normal distribution. Differences between three or more independent groups without normal distribution were tested with Kruskal Wallis; the differences were compared with the post-hoc Tukey HSD test. In order to compare the mean QOL scale scores of children aged 7-12 and 13-18 years, the data were first standardised. The min-max normalisation of each observation was calculated and these values were compared. For the min-max normalisation, the data were drawn to the range 0-1 and an independent t-test was performed between the two groups, which were found to have a normal distribution. $p < 0.05$ was considered statistically significant.

RESULTS

In this study, the data of children aged 7-12 years (school age) and 13-18 years (adolescent) were analyzed and compared separately. In the 7-12 age group, the mean age of children was 9.15 ± 1.65 , and 54.8% were male. 79.5% were diagnosed with leukemia, 60.3% received surgical treatment in addition to chemotherapy, and 43.8% had a treatment duration of 1-4 months. In the 13-18 age group, the mean age was 14.45 ± 1.49 years, and 57.5% were female. 91.8% had leukemia, 72.6% were in the newly diagnosed stage of the disease, 68.5% had bone marrow transplantation in addition to chemotherapy, and 46.6% had a treatment duration of 5-8 months (Table 1).

Table 1. Descriptive Characteristics of Children

Variables	Age 7-12 years		Age 13-18 years	
	n	%	n	%
Gender				
Female	33	45.2	42	57.5
Male	40	54.8	31	42.5
Diagnosis				
Leukemia	58	79.5	67	91.8
Lymphoma	3	4.1	4	5.5
Solid Tumors	12	16.4	2	2.7
Duration of treatment (mo)				
1-4 months	32	43.8	19	26.0
5-8 months	16	21.9	34	46.6
>9 months	25	34.2	20	27.4
Stage of disease				
New diagnosis	28	38.4	53	72.6
Remission	17	23.3	12	16.4
Relapse	28	38.4	8	11.0
Treatment administered*				
Chemotherapy	73	100	73	100
Radiotherapy	5	6.8	4	5.5
Surgery	44	60.3	10	13.7
Bone marrow transplant	43	58.9	50	68.5
	$\bar{X} \pm SD$	MED (min-max)	$\bar{X} \pm SD$	MED (min-max)
Age	9.15 ± 1.65	9(7-12)	14.45 ± 1.49	14(13-18)
Time since diagnosis (months)	22.93 ± 17.94	18(3-74)	22.69 ± 22.02	14(3-92)

*One person gave more than one answer.

Table 2. Frequency of Symptoms Seen in Children and Comparison According to Age Groups

Symptoms	Age 7-12 years				Age 13-18 years			
	Almost never n (%)	Sometimes n (%)	Very Frequent n (%)	Almost every day n (%)	Almost never n (%)	Sometimes n (%)	Very Frequent n (%)	Almost every day n (%)
Pain	18 (24.7)	32 (43.8)	20 (27.4)	3 (4.1)	37 (50.7)	19 (26.0)	14 (19.2)	2 (2.7)
Shortness of breath	54 (74.0)	18 (24.7)	1 (1.4)	0 (0)	62 (84.9)	8 (11.0)	3 (4.1)	0 (0)
Nausea	10 (13.7)	29 (39.7)	31 (42.5)	3 (4.1)	28 (38.4)	34 (46.6)	8 (11.0)	3 (4.1)
Vomiting	27 (37.0)	35 (47.9)	11 (15.1)	0 (0)	33 (45.2)	25 (34.2)	9 (12.3)	6 (8.2)
Diarrhea	47 (64.4)	20 (27.4)	4 (5.5)	2 (2.7)	41 (56.2)	21 (28.8)	9 (12.3)	2 (2.7)
Constipation	37 (50.7)	33 (45.2)	2 (2.7)	1(1.4)	44 (60.3)	24 (32.9)	3 (4.1)	2 (2.7)
Loss of appetite	15 (20.5)	30 (41.1)	28 (38.4)	0 (0)	30 (41.1)	28 (38.4)	10 (13.7)	5 (6.8)
Oral mucositis	35 (47.9)	23 (31.5)	15 (20.5)	0 (0)	37 (50.7)	20 (27.4)	11 (15.1)	5 (6.8)
Difficulty swallowing	46 (63.0)	16 (21.9)	11 (15.1)	0 (0)	55 (75.3)	9 (12.3)	8 (11.0)	1 (1.4)
Dry mouth	48 (65.8)	21 (28.8)	4 (5.5)	0 (0)	34 (42.5)	31 (42.5)	4 (5.5)	4 (5.5)
Change in taste	37 (50.7)	15 (20.5)	21 (28.8)	0 (0)	23 (31.5)	26 (35.6)	16 (21.9)	8 (11.0)
Weight loss	15 (20.5)	35 (47.9)	23 (31.5)	0 (0)	21 (28.8)	27 (37.0)	19 (26.0)	6 (8.2)
Dizziness	46 (63.0)	21 (28.8)	6 (8.2)	0 (0)	45 (61.6)	24 (32.9)	4 (5.5)	0 (0)
Sweating	52 (71.2)	17 (23.3)	4 (5.5)	0 (0)	36 (49.3)	26 (35.6)	11 (15.1)	0 (0)
Cough	60 (82.2)	12 (16.4)	1 (1.4)	0 (0)	45 (61.6)	24 (32.9)	4 (5.5)	0 (0)
Itching	62 (84.9)	9 (12.3)	1 (1.4)	1 (1.4)	49 (67.1)	19 (26.0)	4 (5.5)	1 (1.4)
Skin changes	50 (68.5)	20 (27.4)	3 (4.1)	0 (0)	29 (39.7)	30 (41.1)	14 (19.2)	0 (0)
Swelling of the hands and feet	66 (90.4)	7 (9.6)	0 (0)	0 (0)	63 (86.3)	6 (8.2)	4 (5.5)	0 (0)
Tingling in hands and feet	65 (89.0)	8 (11.0)	0 (0)	0 (0)	48 (65.8)	17 (23.3)	5 (6.8)	3 (4.1)
Fatigue	10 (13.7)	30 (41.1)	28 (38.4)	5 (6.8)	30 (41.1)	29 (39.7)	10 (13.7)	4 (5.5)
Irritability	12 (16.4)	21 (28.8)	35 (47.9)	5 (6.8)	34 (46.6)	22 (30.1)	12 (16.4)	5 (6.8)
Restlessness	11 (15.1)	23 (31.5)	38 (52.1)	1 (1.4)	29 (39.7)	32 (43.8)	9 (12.3)	3 (4.1)
Feeling sad	18 (24.7)	35 (47.9)	19 (26.0)	1 (1.4)	24 (32.9)	35 (47.9)	12 (16.4)	2 (2.7)
Feeling anxious	12 (16.4)	29 (39.7)	29 (39.7)	3 (4.1)	33 (45.2)	25 (34.2)	10 (13.7)	5 (6.8)
Difficulty paying attention	49 (67.1)	21 (28.8)	3 (4.1)	0 (0)	43 (58.9)	26 (35.6)	4 (5.5)	0 (0)
Self-alienation	51 (69.9)	16 (21.9)	4 (5.5)	2 (2.7)	48 (65.8)	15 (20.5)	8 (11.0)	2 (2.7)
Difficulty sleeping	43 (58.9)	22 (30.1)	8 (11.0)	0 (0)	49 (67.1)	16 (21.9)	7 (9.6)	1(1.4)
Feeling sleepy	19 (26.0)	23 (31.5)	30 (41.1)	1 (1.4)	35 (47.9)	19 (26.0)	14 (19.2)	5 (6.8)
Alopecia	12 (16.4)	14 (19.2)	36 (49.3)	11 (15.1)	28 (38.4)	23 (31.5)	18 (24.7)	4 (5.5)

Table 2 shows the symptoms and their frequencies in children aged 7-12 and 13-18. In general, symptoms were more common and more frequent in children aged 7-12 years compared to children aged 13-18. Alopecia (49.3), nausea (42.5), loss of appetite (38.4), weight loss (31.5), weakness (38.4), restlessness (52.1), irritability (47.9), feeling anxious (39.7) and feeling sleepy (41.1) were determined as the most common symptoms in children aged 7-12 years. In children aged 13-18 years, on the other hand, nausea (46.6%), vomiting (34%), loss of appetite (38%), dry mouth (42.5%), change in taste (35.6%),

sweating (35.6%), fatigue (39.7%), and sadness (47.9%) were more common, although the frequency of symptoms decreased.

The children aged 7-12 had a mean QOL score of 96.28 ± 13.05 , and their quality of life was low, while the children aged 13-18 had a mean QOL score of 109.54 ± 21.23 and their quality of life was moderate. The data were standardised to compare the mean scores on the quality of life scale for children aged 7-12 and 13-18 years. It was found that there was no difference between the min-max scores of the two groups (Table 3).

Table 3. Comparison of Mean Quality of Life Scale Scores of Children by Age Groups

Scale	Age 7-12 years		Age 13-18 years	
	$\bar{X} \pm SD$	Med (Min-Max)	$\bar{X} \pm SD$	Med (Min-Max)
QOL	96.28 ± 13.05	96(68-128)	109.54 ± 21.23	114(64-151)
Min-Max Score	.47 $\pm$.21		.52 $\pm$.24	$t^{\#} = -1.361$ $p = .176$

[#] t test in independent groups

The mean quality of life scale score was significantly lower in newly diagnosed children in

the 7-12 age group and in girls in the 13-18 age group (Table 4).

Table 4. Comparison of Some Descriptive Characteristics of Children and Quality of Life Scale Means

Variables	Age 7-12 years	Age 13-18 years
	QOL	QOL
	$\bar{X} \pm SD$	$\bar{X} \pm SD$
Gender		
Female	98.78 ± 11.17	102.59 ± 20.05
Male	94.22 ± 14.22	118.96 ± 19.32
$t/p^{\#}$	1.500/.138	-3.501/.001
Stage of disease*		
New diagnosis	101.35 ± 11.77^1	111.58 ± 21.22
Remission	92.29 ± 14.62^2	109.08 ± 20.96
Relapse	93.64 ± 12.03^3	96.75 ± 19.59
KW/p^{∞}	6.640/.036	3.021/.221
Duration of treatment (mo)		
1-4	96.40 ± 12.37	113.47 ± 19.91
5-8	95.87 ± 15.13	108.82 ± 22.37
>9	96.40 ± 13.03	107.05 ± 21.00
KW/p^{∞}	.004/.998	.580/.776

[#] t test in independent groups, [∞]KW: Kruskal-Wallis tests

DISCUSSION

Although the overall survival rate in cancer cases has increased thanks to treatment methods that have continued to improve over the years,

approximately 40% of children still experience various symptoms due to cancer treatment (Pombo Lopes et al., 2023). In the results of this study, which examined the frequency of symptoms and quality of life in children with cancer in two

different age groups, children reported that they most frequently experienced symptoms of restlessness, hair loss, irritability, nausea, feeling sleepy, anxiety, loss of appetite, weakness and weight loss. Turan et al. (2016) reported that the most common symptoms experienced by children receiving inpatient chemotherapy within one week after treatment were fatigue (76.1%), irritability (69.6%), hair loss (65.2%), nausea (60.9%) and sadness (60.9%). In a recent study, the five most common symptoms in children with acute leukemia receiving chemotherapy were fatigue (89.7%), sweating (85.3%), loss of appetite (84.8%), taste changes (84.2%), and nausea (Li et al., 2022). A number of factors, including physical, psychological, and social factors such as gender, age, cancer type, chemotherapy cycle, disease stage, and functional status influence the occurrence or severity of symptoms in cancer patients (Bolukbas et al., 2014). In this study, psychological and gastrointestinal symptoms were the most common symptoms among 7–12-year-olds. Gastrointestinal system symptoms such as nausea, vomiting, and taste changes start shortly after the chemotherapy dose is given (Li et al., 2022). In addition to these changes, prolonged hospitalization, the emotional burden of treatment, dislike of hospital meals, fatigue, and weight loss may occur. Psychological symptoms such as anxiety, restlessness, and depression are observed at almost every stage of treatment (Kudubes et al., 2014). Chemotherapy is applied intensively, especially in the early stages of the disease. The fact that more than 70% of the children participating in this study were in the 1st-4th or 5th-8th months of their treatment process and received additional treatment alongside chemotherapy may have contributed to the high frequency of symptoms. Li et al. (2020) also reported that the chemotherapy phase (induction, intensification, consolidation, or maintenance) accounted for 15% of the variation in the gastrointestinal symptom cluster (constipation, anorexia, nausea, taste changes, vomiting, weight loss, and fatigue) in children treated for acute leukemias.

In this study, hair loss, weight loss, and taste changes were the most common symptoms in children aged 13-18. Hair loss usually occurs in adolescents during intensive and mixed treatments (Batchelor 2001). The least common symptoms are shortness of breath, swelling and tingling in the hands and feet, and concentration difficulties. There are different study results in the literature

regarding the symptoms of children and adolescents with cancer. Similar to our results, Dupuis et al. (2019) reported that the rarest symptoms in adolescents undergoing cancer treatment were memory or concentration problems, changes in body appearance, taste problems, and numbness and tingling in the hands and feet. A study conducted with adolescents receiving cancer treatment in a pediatric oncological hospital in Turkey found that patients most frequently showed symptoms of decreased appetite, hair loss, taste changes, irritability, lack of energy, and weight loss (Semerci et al., 2021). Huijter et al. (2013) reported that children aged 7-12 years mostly experienced loss of appetite, pain, and nausea, while older children (aged 13-18 years) complained of fatigue, irritability, pain, anxiety, and loss of appetite.

This study demonstrated that children in the 7-12 age group reported symptoms more frequently than children in the 13-18 age group. In the literature, no study has been found comparing children's symptom frequencies according to age groups. Studies on childhood cancer symptom clusters have generally focused on children older than 10 years (Dupuis et al., 2019; Semerci et al., 2021). However, to understand the symptom experience of all children, it is necessary to evaluate the symptoms and their frequency in children of all age groups. One of the unique aspects of this study is the comparative reporting of symptoms and their frequency in different age groups.

The period between the ages of 7-12, called the school-age period, is when children's physical development is slower than in adolescence. In this age range, children start to gain weight, their body systems develop, their motor skills increase, and they begin socializing. Adolescence is a period of rapid growth in height, increase in muscle mass, and rapid development in body systems. It is also a time of intense physical and psychological change, where the body looks closest to adulthood (Parlaz et al., 2012). Due to their stage of development, children aged 7–12 are physically weaker and less resilient than adolescents aged 13–18. Their organs and body systems are also not fully developed. These differences may explain some of the variations in symptom frequency between age groups.

While the survival rate in childhood cancers has increased with advances in medical treatment, cancer therapy is still experienced as a highly

stressful and exhausting process, with children facing many symptoms. Combined treatments, prolonged hospitalizations, invasive procedures, lack of contact with peers, and the use of high-dose chemotherapy drugs lead to a large number and variety of symptoms (Atay et al., 2012; Krull et al., 2013). These symptoms cause serious adverse effects on the quality of life of children with cancer. Therefore, long-term goals in the care and treatment of a child with cancer should include not only curing the patient but also improving the child's functional status and ensuring that the child is resilient with optimal quality of life (Pan et al., 2017). In this study, quality of life was lower among children aged 7–12 years and moderate among adolescents aged 13–18 years. As detailed in the Methods section, higher scores reflect poorer quality of life in the 7–12 age group and better quality of life in the 13–18 age group, and this methodological distinction was considered in all comparative interpretations. The lower quality of life observed in younger children is concordant with their higher symptom frequency relative to adolescents. Furthermore, the greater proportion of children aged 7–12 years receiving surgery in addition to chemotherapy suggests that increased symptom burden may be attributable, at least in part, to multimodal treatment approaches.

In this study, the quality of life of newly diagnosed children aged 7-12 years was found to be lower than that of remitting and relapsing children. This situation may be related to the fact that children who have undergone long-term treatment have adapted to the disease (Huijter et al., 2013). Six months after diagnosis, and particularly during the first year of treatment, the use of central venous catheters, effective pain management, antiemetic drug use, and the prevention of chemotherapy-related complications have been reported to positively impact quality of life (Nurgali et al., 2018; Roe & Lennan, 2014). In addition, alternative therapies such as painting, music, poetry, and drama therapy improve quality of life by reducing the negative symptoms of treatment (Günay et al., 2022; Liu et al., 2024). Vlachioti et al. (2016) reported that factors such as cancer type, treatment stage, gender, age, family support, and family educational level affect the quality of life of children with cancer.

In this study, the mean quality of life score of girls in the 13-18 age group was found to be significantly lower than boys. This difference may be due to girls being more sensitive to pain and

having a more negative perception of their body image. Huijter et al. (2013) reported that when the quality of life sub-dimensions were examined, girls experienced more pain, soreness, and physical appearance problems than boys, and girls' quality of life was significantly lower than boys. Similarly, Vlachioti et al. (2016) reported that adolescent girls with cancer reported lower quality of life scores than adolescent boys, and the main reasons for this were pain, physical symptoms, and poor body image.

Limitations of the Research

This study has some limitations. Pharmacologic and non-pharmacologic treatments, in addition to chemotherapy, may affect quality of life, symptoms, and symptom frequency. The limitation of the study is that the additional treatments used were not considered. Additionally, the fact that quality of life and symptom frequency were assessed based solely on the child's own reports, the high number of children with leukemia, and the study being conducted at a single center were other limitations of this study.

CONCLUSION

Our study found that the quality of life of children aged 7-12 years was low, while the quality of life of children aged 13-18 years was moderate. The children in the 7-12 age group reported more common and frequent symptoms than the 13-18 age group. The most common symptoms reported by children in all age groups were restlessness, hair loss, irritability, nausea, feeling sleepy, anxiety, loss of appetite, weakness, and weight loss.

Cancer is a complex condition that necessitates the involvement of a multidisciplinary team and brings with it a number of complications related to long and arduous treatment processes. The most common complications of cancer, which are various symptoms related to the treatment and process and the decrease in quality of life, are very important. Identifying and regularly updating the types of symptoms, symptom frequency and quality of life of children can make a significant contribution to planning treatment and care accordingly and to eliminating the negative effects of cancer. Therefore, evaluating and updating symptoms and symptom frequency in children, parents, and healthcare professionals can contribute to the addition of new evidence to the literature and the development of national and

international treatment and care protocols and guidelines.

Ethics Committee Approval

Ethics committee approval was received for this study from the Inonu University Health Sciences Non-Interventional Clinical Research Ethics Committee (Date: 06.02.2024, and Approval Number: 2024-3841).

Author Contributions

Idea/Concept: S.D., A.S.Y., S.Ö., U.G., A.A.; Design: S.D., A.S.Y., S.Ö., U.G., A.A.; Supervision/Consulting: U.G., A.A.; Analysis and/or Interpretation: S.D., U.G., S.Ö.; Literature Search: S.D., A.S.Y., S.Ö., U.G.; Writing the Article: S.D., A.S.Y., S.Ö., U.G., A.A.; Critical Review: S.D., U.G., A.A.

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Conflict of Interest

The authors have no conflict of interest to declare.

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