ORIGINAL ARTICLE ÖZGÜN ARAŞTIRMA

Social Relations and Self-Esteem After Leukemia Treatment Among Adolescent Survivors

Lösemi Tedavisini Tamamlayan Ergenlerde Sosyal İlişkiler ve Kendilik Saygısı

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Abstract

Introduction: This study aimed to examine the variables related to leukemia treatment with age, gender, and perceived parental attitudes that may affect adolescent leukemia survivors' peer relations, social support, and self-esteem when they return to school.

Materials and Methods: ALL and AML survivors between 12-17 years of age were recruited if they completed treatment (in remission) and are schooling. Participants' treatment duration is 1 to 2 years. Some survivors are treated with cranial radiation, but none have a bone marrow transplant. Dependent variables were obtained from, The Parent Attitude Scale, Self-Esteem Rating Scale-Short Form, Peer Relations Scale, and Social Support Assessing Scale for Children and Adolescents.

Results: The female participants had more negative self-esteem, received less support from their teachers, less trust and identification, and commitment to peers, and received their fathers more autocratic than male participants. The results show that none of the leukemia-related variables (leukemia type, duration of treatment, duration of schooling, and receiving radiation treatment) differ through self-esteem, peer relations, and perceived social support. The results also show that the perception of the father as authoritative, lower teacher support, and lower commitment to peers could predict self-esteem.

Conclusion: The study's findings might point out that not only do leukemia treatment characteristics affect social functioning. Perceived authoritarian parenting, teacher support, and peer relations such as commitment are essential, especially in self-esteem.

Öz

Giriş: Bu çalışma, lösemili ergenlerin okula döndüklerinde akran ilişkilerini, sosyal desteğini ve benlik saygısını etkileyebilecek yaş, cinsiyet, algılanan ebeveyn tutumları ile lösemi tedavisi özelliklerini incelemeyi amaçlamıştır.

Gereç ve Yöntem: ALL ve AML tanısı almış, 12-17 yaşları arasında ergenler, tedavilerini tamamlamış (remisyonda) ve okula gidiyorlarsa çalışmaya alınmıştır. Katılımcıların tedavi süresi 1 veya 2 yıldır. Ergenlerden bazıları kraniyal radyasyonla tedavi edilmiş, ancak hiçbirinde kemik iliği nakli yapılmamıştır. Bağımlı değişkenler, Ebeveyn Tutum Ölçeği, Benlik Saygısı Ölçeği-Kısa Form, Akran İlişkileri Ölçeği ve Çocuk ve Ergenler İçin Sosyal Desteği Değerlendirme Ölçeğinden elde edilmiştir.

Keywords
Leukemia, social relations, parenting, self-esteem

Anahtar kelimeler
Lösemi, sosyal ilişkiler, ebeveynlik, benlik saygısı

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Bulgular: Kız ergenlerin, erkek ergenlere göre daha fazla olumsuz benlik saygısı olduğu, öğretmenlerinden daha az sosyal destek algıladığı, akranlarıyla daha az güven ve özdeşleşme ile bağlılık geliştirdikleri ve babalarını daha otoriter algıladıkları bulunmuştur. Lösemi ile ilgili değişkenlerin benlik saygısı, akran ilişkileri ve algılanan sosyal destek açısından farklılık göstermediğini bulunmuştur. Sonuçlar ayrıca babanın otoriter olarak algılanmasının, algılanan düşük öğretmen desteğinin ve akranlara düşük bağlılığın benlik saygısını yordadığını göstermektedir.
Sonuç: Çalışmanın bulguları, sadece lösemi tedavi özelliklerinin sosyal işlevselliği etkilemediğini gösterebilir. Algılanan otoriter ebeveynlik, öğretmen desteği ve bağlılık gibi akran ilişkileri, özellikle benlik saygısında önemli olabilmektedir.

Introduction

Acute leukemia treatments in childhood and adolescence brought the 5-year survival rate to more than 80%, leading some psychologically oriented studies to examine the adaptation of the survivors to their lives after treatment (1).

Although these studies yield different results, likely due to differences in design, study interval, or sample size, they generally show a decrease in quality of life (2-4), an increase in psychiatric problems (5,6), and a decline in neurocognitive abilities (7-9).

Some of the problems reported before may be due to the treatment itself. The treatment characteristics of leukemia are receiving a high dose of cortisol, and intravenous and intra-cranial chemotherapies might cause prolonged hospitalization due to neutropenia with oral mucous. Whether or not to receive radiation during the treatment (as are t-cell acute lymphoblastic leukemia (ALL) patients), receive high-risk treatment protocol (as are acute myeloid leukemia (AML), or have a bone marrow transplant (among high relapse risk patients) may impose an extra burden on patients. Getting radiation therapy prolongs the treatment duration by a few months, and having bone marrow transplants is up to one year in some cases. These treatment characteristics bring more social isolation due to side effects and prolonged treatment duration.

In our country, Berlin-Frankfurt-Münster Chemotherapy (10) protocol is used to treat ALL and AML widely. According to these protocols, treating ALL takes approximately two years, and AML takes at least one year. During this treatment period, leukemia patients experience severe social isolation (the patients cannot go to school, spend very little time with their peers, and cannot attend social activities or courses) primarily due to neutropenia.

After the treatment period, adolescents in return to school and social life soon. However, both their classes and possibly their friend group have changed. When they return to social life, the side effects of the treatment (weakness, baldness, malaise) might continue, which could expect this situation to affect self-esteem, as identify "a set of self-attitudes that reflects a description and an evaluation of one's behavior and attributes'", negatively (11).

The quality of the relationship with parents in early life shapes self-esteem dominantly. Self-esteem is a mental self-representation first built from early relations with parents. The relationship with parents is generally studied as parenting styles (authoritarian, indulgent, authoritative, and neglectful) are differently associated with positive or negative impacts on developmental outcomes, including personal and social adjustment (12). The authoritative style has been associated with the best socialization outcomes, but the authoritarian style is most closely associated with externalizing problems (13). Cross-sectional studies found small to moderate positive associations of authoritative parenting with self-esteem, while authoritarian and neglectful parenting was related to lower self-esteem (14).

Social development issues occur through social interaction with family and society, but leukemia treatment might affect them negatively. Can those survivors quickly return to social life? Some recent studies show that this is not the case. A study shows that by increasing age and when pediatric patients have received a hematopoietic stem cell transplantation at the stop-therapy time, their perception of relationships at school and academic performance decreases (15). Experiences of social isolation evolved as survivors grew through childhood, adolescence, and young adulthood (16). Feelings of alienation from friends, difficulty in studying, being stuck being different from others, apologetic feelings for family, and feelings of uncertain future (17). Survivors' global self-worth scores were significantly lower than those of sibling controls (18). Higher treatment severity is often associated with more late effects, which can be physical, somatic, or psychological (19). Survivors

with more aggressive therapy, including cranial radiation (as are AML and ALL-HR treatment), would report lower self-esteem scores, as suggested in the study of Hill et al. (20).

Thus, might perceived parental attitudes and leukemia treatment characteristics impact survivors' social relations and self-esteem at the end of the treatment? What awaits adolescents who return to social life? Should we expect adolescents to have positive social functions? Could the types of leukemia and different treatment characteristics (duration of treatment and getting radiation treatment, etc.), parental attitudes, or how long they have been attending school (or schooling time) have a predictive effect on social relations and self-esteem among survivors? We expect that exposure to radiation during treatment, having AML-type leukemia because of a more extended hospital stay, might cause more infectious diseases and high-risk treatment, the prolongation of the total duration of treatment, and less time spent at school will negatively affect self-esteem, peer relations and perceived social support. Besides, gender, age, and perceived parenting attitudes contribute to these variables examined. Based on that, we developed the following research questions, are gender, age, perceived parenting attitudes, leukemia type, duration of treatment, duration of schooling, and receiving radiation treatment make a difference in peer relations and perceived social support and self-esteem? (research question 1)

Which gender, age, perceived parenting attitudes, leukemia type, duration of treatment, duration of schooling, and received radiation might predict leukemia survivors' peer relations, perceived social support, and self-esteem? (research question 2)

Materials and Methods

This study was conducted in the Pediatric Oncology-Hematology Hospital in Bursa, Turkiye, in the 2022 late autumn and 2023 early spring.

Participants

ALL and AML survivors between 12-17 years of age were recruited through follow-up clinics in our hospital. All the participants have completed treatment (in remission) and are schooling. Participants' treatment duration is 1 to 2 years. Some survivors treat with cranial radiation, but none have a bone marrow transplant. Participants matched with the exact socio-economic (middle) background. See Table 1 for information on the participants.

Data Collection Procedures

All participants and guardians provided written informed consent to participate in the study. Those willing to participate, which totaled 54 individuals, were directed to informed consent obtained from all participants in the study. The study was approved by Ethics Committees in Uludağ University Medical University Ethical Committee (date: 08.06.2022 approval number: 2022-12/9).

One psychologist conducted data collection. Participants were individually invited to the hospital interview room and responded to all measures using Likert-type scales. All data for the study were collected in one session. Socio-demographic characteristics were assessed through a short questionnaire.

Data Collections

The scales evaluate mother-father parenting attitudes, self-esteem, peer relations, and perceived social support assessment.

Table 1. Participant characteristics

Characteristics	N	Percentile
Age		
14-15	15	27,8%
12-13	17	31,5%
16-17	22	40,7%
Gender		
Female	22	40,7%
Male	32	59,3%
Leukemia type		
ALL	40	74,1%
AML	14	25,8%
Cranial radiation therapy		
No	40	74,1%
Yes	14	25,8%
Treatment duration		
1 year	12	22,2%
2 years	42	78,8%
Schooling duration		
Up to 6 months	12	22,2 %
6 months- 1 year	19	35,2 %
1-2 years	23	42,6%

The Parent Attitude Scale

The Parent Attitude Scale was developed by Lamborn, Mounts, Steinberg, and Dornbush (21). The scale has three dimensions; support, control, and psychological autonomy. The support dimension aims to measure how children perceive their parents as caring, involved, and involved. The size of control seeks to measure how controlling both parents are separate. Finally, the measurement of psychological autonomy aims to estimate how much they apply the mother's and father's democratic attitude and to what extent they encourage their individuality. According to the answers given to the three sub-dimensions, parental perspectives are evaluated from authoritarian to democratic styles. It is a 5-point Likert-type scale with responses ranging from strongly disagree (1 point) to agree (5 points) completely. When reverse-coded items are changed, low scores indicate authoritarian parenting style perception. Yılmaz (22) conducted a validity and reliability study of the scale in our country (22).

Self-Esteem Rating Scale-Short Form

The scale reliability and validity studies were carried out by Çuhadaroğlu (23). The Turkish validity and reliability study of the RBSS points to high self-esteem, 2-4 points to medium self-esteem, and 5-6 points to low self-esteem. The positively and negatively charged items are listed sequentially. 1. 2. 4. 6. 7. items positive, 3. 5. 8. 9. 10. items are negatively loaded. 4-point Likert-type scale with responses ranging from strongly agree (1 point) to disagree (5 points) completely strongly. When reverse-coded items are changed, a low score on the scale scores high self-esteem; a high score indicates low self-esteem.

Peer Relations Scale

The scale was developed to evaluate peer relationships in our country by Kaner (24) and has four subscales. The commitment subscale assesses adolescents' feelings of closeness and love for each other. The trust and identification subscale measures the degree of trust and identification that adolescents have with each other, and the self-disclosure subscale measures how well they can express themselves with their friends. The loyalty subscale measures their loyalty to their friends even if they are in trouble. The Cronbah-alpha value of the subscales ranged from 0.58 to 0.86. On the other hand, test-retest reliability ranged from 0.77 to 0.93, a 5-point Likert-type scale with responses ranging from strongly agree (1 point) to disagree (5 points) completely. A low score on the ranking points to high friendship relations.

Social Support Assessing Scale for Children and Adolescents

The scale developed by Dubow and Ullman (25) assesses children's family, friends (close friends and class friends), and teachers perceived perceptions of social support. The items measure the extent to which the child evaluates themself as someone loved, cared for, valued, and accepted by their social network. The items measure the time to which the child considers themself as someone loved, cared for, valued, and accepted by their social network. The scale consists of 3 subtests; perceived friend, family, and teacher support, and consists of 41 items. A low score on the ranking points means high perceived support from friends, family, and teachers. Gökler (26) carried out reliability and validity studies in our country.

Statistical Analysis

In this study, gender, age, perceived parental attitudes, leukemia type, receiving radiation therapy, duration of treatment, and duration of schooling were used as independent variables. The dependent variables were self-esteem, peer relations, and perceived social support (perceived family, peers, and teacher support; commitment, trust and identification, loyalty, and self-closure to peers). We ran the analysis with IBM SPSS version 22 and used $p \leq 0.05$ for the significance level. Descriptive statistics characterized the demographic and clinical characteristics of the sample. The data observed was customarily distributed and homogeneous (according to Skewness and Kurtosis analysis). Univariable testing (e.g., Pearson correlation, ANOVA) and linear regression analysis assessed associations with scores among variables of interest.

Results

The mean and standard deviation values of the study are shown in Table 2.

According to the results of the correlation analysis performed to evaluate which independent variables have a significant relationship with the

Table 2. Means and standart deviations of variables											
		Self-esteem	**Peer support**	**Family support**	**Teacher support**	**Mother attitude**	**Father attitude**	**Peer commitment**	**Peer trust**	**Peer Self-disclosure**	**Peer loyalty**
Female	Mean	24,63	56,95	33,22	29,00	190,45	154,22	22,36	12,13	9,50	11,27
	N	22	22	22	22	22	22	22	22	22	22
	Std. Deviation	7,75	5,70	3,76	4,20	16,41	19,67	6,79	3,10	2,220	2,99
Male	Mean	17,59	57,21	31,90	32,28	182,06	164,75	14,96	8,96	10,53	11,68
	N	32	32	32	32	32	32	32	32	32	32
	Std. Deviation	4,71	6,38	2,037	2,66	24,78	18,33	6,68	3,28	2,89	2,71
12-13 years	Mean	19,40	58,20	31,46	30,93	186,13	165,20	18,73	10,33	10,80	12,20
	N	15	15	15	15	15	15	15	15	15	15
	Std. Deviation	6,28	7,27	2,82	3,91	17,79	12,71	7,74	3,39	2,30	2,33
14-15 years	Mean	22,00	56,47	33,52	29,76	193,70	167,47	17,64	10,29	10,05	11,88
	N	17	17	17	17	17	17	17	17	17	17
	Std. Deviation	8,04	5,25	2,55	4,73	17,52	14,44	8,75	3,70	2,38	2,42
16-17 years	Mean	20,00	56,86	32,27	31,86	178,68	151,81	17,72	10,18	9,68	10,77
	N	22	22	22	22	22	22	22	22	22	22
	Std. Deviation	6,71	5,93	3,07	2,35	25,91	23,48	6,86	3,69	3,09	3,29
ALL	Mean	20,37	56,65	32,40	30,87	185,52	160,12	17,40	10,07	9,90	11,42
	N	40	40	40	40	40	40	40	40	40	40
	Std. Deviation	6,98	5,77	2,89	3,74	21,60	17,63	8,09	3,65	2,68	2,79
AML	Mean	20,71	58,42	32,57	31,14	185,35	161,42	19,64	10,78	10,71	11,78
	N	14	14	14	14	14	14	14	14	14	14
	Std. Deviation	7,30	6,89	3,05	3,75	23,90	24,58	5,95	3,30	2,61	2,96
CRT Yes	Mean	21,20	56,27	32,55	30,52	184,12	159,50	18,27	10,50	10,15	11,25
	N	40	40	40	40	40	40	40	40	40	40
	Std. Deviation	7,36	5,53	3,02	4,05	22,22	20,66	7,89	3,46	2,27	3,00
No	Mean	18,35	59,50	32,14	32,14	189,35	163,21	17,14	9,57	10,00	12,28
	N	14	14	14	14	14	14	14	14	14	14
	Std. Deviation	5,54	7,04	2,62	2,21	21,61	15,68	6,90	3,83	3,67	2,09

Table 2. Continued

		Self-esteem	Peer support	Family support	Teacher support	Mother attitude	Father attitude	Peer commitment	Peer trust	Peer Self-disclosure	Peer loyalty
Treatment duration 1 year	Mean	20,25	58,25	32,66	30,75	186,83	160,00	19,25	10,83	10,58	12,08
	N	12	12	12	12	12	12	12	12	12	12
	Std. Deviation	8,17	4,73	3,31	4,07	25,87	26,06	5,84	3,58	2,81	3,23
2 years	Mean	20,52	56,78	32,38	31,00	185,09	160,59	17,61	10,09	9,97	11,35
	N	42	42	42	42	42	42	42	42	42	42
	Std. Deviation	6,74	6,40	2,82	3,66	21,08	17,47	8,063	3,56	2,64	2,70
Schooling Time 6 months	Mean	17,66	57,08	31,41	30,91	189,83	166,08	17,25	9,66	10,41	12,58
	N	12	12	12	12	12	12	12	12	12	12
	Std. Deviation	6,34	7,52	1,92	2,67	19,34	14,26	7,43	2,99	3,14	2,27
6 -12 months	Mean	21,78	56,47	32,15	30,89	183,84	153,57	18,42	10,47	10,15	11,21
	N	19	19	19	19	19	19	19	19	19	19
	Std. Deviation	7,46	6,10	3,46	3,79	17,04	20,99	7,86	4,37	3,14	3,15
12-24 months	Mean	20,82	57,65	33,21	31,00	184,56	163,21	18,00	10,39	9,91	11,21
	N	23	23	23	23	23	23	23	23	23	23
	Std. Deviation	6,82	5,39	2,72	4,23	26,94	19,50	7,78	3,15	1,99	2,74

CRT: Cranial radiation therapy

dependent variables, gender and self-esteem scores (r= -,050; p ≤.001), teacher support (r= ,438; p≤.001), commitment (r= -,482; p ≤.000), trust and identification (r= -,442; p≤.001) and the father's attitude (r = ,٢٦٩; p ≤ ٠,٠٥) were significantly correlated. There is a positive correlation between the father's perception of autocratic and low support from teachers and the female gender. Being female negatively correlates with self-esteem, commitment, trust and identification to peers Table 3.

To answer our first research question (are gender, age, perceived parenting attitudes, leukemia type, duration of treatment, duration of schooling, and receiving radiation treatment make a difference in peer relations and perceived social support and self-esteem?) we conducted an ANOVA analysis.

According to results, gender and self-esteem (F=17,22; df (1); p≤.000) teacher support (F=12,32; df (1); p ≤ .001) commitment to peers (F=15,75; df (1); p≤.000) trust and identification to peers (F= 12,65; df (1); p≤.001) and perceived father attitude (F=4,05; df (1); p≤.05) were significantly different. The female participants had more negative self-esteem, received less support from their teachers, less trust and identification, and commitment to peers, and received their fathers more autocratic than male participants. The results show that none of the leukemia-related variables (leukemia type, duration of treatment, duration of schooling, and receiving radiation treatment) differ through self-esteem, peer relations, and perceived social support.

Our second research question was, which gender, age, perceived parenting attitudes, leukemia type, duration of treatment, duration of schooling, and received radiation might predict leukemia survivors' peer relations, perceived social support, and self-esteem?

Since we could not find any meaningful relationship between leukemia treatment characteristics and self-esteem, peer relationships, and social support, we investigated what might be predictors of survivors' self-esteem.

Regarding which variables could predict self-esteem, regression analysis was performed

Tablo 3. Results of linear regression analysis predicting the self-esteem			
Model 3	**β**	**t**	**Sig.**
Constant	36,763	3,873	0,000
Father attitude	-,088	-2,377	0,02*
Teacher support	-,366	-1,872	0,51*
Peer commitment	,510	5,272	0,000*
p≤ .05			

with correlated variables such as perceived family and teacher support, perceived father's parenting attitude, commitment, and trust and identification with peers. The variables that predicted self-esteem were determined when trust and identification to peers and perceived family support were removed in the 3rd step with the linear regression backward method. The results show that the perception of the father as authoritative (β= -,088, p< .021), perceived lower teacher support (β= -,366, p< .051), and lower commitment to peers (β= ,510, p< .000) could predict (R^2 =, 459) self-esteem (Durbin-Watsons; 2,48).

In other words, the results of the regression analyses showed that perceived authoritative fathers, lower teacher support, and lower commitment to peers significantly explained 46% of leukemia survivors' self-esteem variance (F=16.96, p≤=.000).

Discussion

This study aimed to examine the variables related to leukemia treatment characteristics (leukemia type, receiving radiation during the treatment, treatment duration, and high-risk treatment protocol) with age, gender and perceived parental attitudes that may affect adolescent leukemia survivors' peer relations, social support, and self-esteem when they return to school.

Prolonged treatment duration, receiving cranial radiation, and high-risk protocol mean staying away from social environments more. It was expected that shorter schooling time, longer treatment received, high-risk protocol, and radiotherapy would adversely affect these social relations.

Some previous research found no difference in self-esteem scores among adolescent leukemia survivors between control groups (27) or only differed in favor of the female gender (28). Still, other studies found significantly lower self-esteem scores among leukemia survivors (2,29).

However, the current study found differences explicitly based on gender, not leukemia treatment characteristics. Girls received lower self-esteem, teacher support, commitment, trust and identification to peers and perceived their fathers as more authoritarian. The girls' low self-esteem was predicted by the perception of an authoritarian father, low perceived teacher support, and low commitment to their peers.

It has been reported in the literature that girls may have lower self-esteem during adolescence, which may be observed more frequently in societies where gender roles are dominant. At the same time, considering that body image is highly effective on self-esteem, the appearance characteristics of girls (shorter hair, cracks in the skin, physical weakness, etc.) during their return to school may have affected their self-esteem more negatively. A study conducted in Turkiye found that high school female students' dissatisfaction with their body image was positively associated with low self-esteem (30).

Why is the effect of perceiving the father as more authoritarian on self-esteem more effective in girls? As is known, uncompromising, insensitive parenting attitudes are associated with low self-esteem (31,32). Adolescents with warm, caring parents are more likely to develop positive self-esteem (33). According to a study, adolescent girls think that their families have an authoritarian parental attitude; male adolescents have a democratic parental attitude toward their families. The results show that the democratic parenting style and high self-esteem are highly related (34). In this study, we observe that female adolescents perceived more authoritarian fathers and low self-esteem, regardless of the characteristics of leukemia treatment, similar to earlier studies.

Our study also observed that self-esteem is predicted by the perception of the father as authoritarian, low perceived support from the teacher, and low commitment to friends.

Perceived attitudes from parents significantly predict self-esteem throughout adolescence (35). Multiple studies have found that authoritative parents, who maintain high expectations for their children in the context of a close and affectionate relationship, tend to have better-adjusted adolescents in several areas, including self-esteem (36). Caring, supportive relations with non-related adults, such as teachers, can be fundamental to the development of adolescents' self-esteem and reflects the totality of the individual's thoughts and emotions regarding the self. Besides family and friends, teachers are essential sources of support for the adolescent. Teachers need to deal with the students' problems, play a supportive role, and be models for the children in developing their self-esteem. The supportive attitude of the teacher can also increase the support of friends. Self-esteem is positively shaped by the support received from these social support sources, essential for adolescents. Perceived teachers' support is critical for boys' and girls' positive self-esteem (37,38). A study found that, for both boys and girls, changes in perceptions of teachers' support reliably predicted changes in both self-esteem and depression. In particular, those students perceiving increasing teacher support showed corresponding decreases in depressive symptoms and increases in self-esteem (39).

Two recent studies on peer commitment among adolescents in our country found that female adolescents had more commitment than males (40,41), which differs from our study. According to Patrick et al. (42), although female adolescents have the same level of commitment to peers, they mentioned receiving negative peer attention more frequently than males and more often cited social dissatisfaction as a significant contributor to decreased involvement or quitting. Perhaps, returning to school with treatment visible side effects, female adolescents feel more uncomfortable and have the anxiety to fear being different from males of the same gender. Those results may also explain why their loyalty, trust and identification with peers scores were significantly lower than that of males.

Although there were differences in the current study of social and peer relationships according to gender and perceived parenting attitudes, leukemia treatment characteristics did not affect these variables. Previous studies, for example, Tremolada et al. (15) report that childhood AML survivors with a high-risk treatment were more at risk in their self-esteem. Some survivors expressed that they encountered peer rejection in school. It has been reported that survivors have low self-esteem, especially in terms of interpersonal relationships, and suffer from anxiety about peer relationships (43). Negative experiences with peers (bullying related to cancer, physical appearance, and chronic problems) may make it difficult for the survivors to adapt to school. Continuing education at a lower level compared to their peers can be disturbing. In addition, they are worried about the possible attitude of their teachers and friends. The support of friends, teachers, and the healthcare team ensures a positive experience returning to school.

The reasons for experiencing problems in social relations and returning to social life at the end of the treatment have been reported such as discrimination (44), low self-esteem, especially in terms of interpersonal relationships, suffering from anxiety about peer relationships, and negative experiences with peers (bullying related to cancer, physical appearance, and chronic problems) may make it difficult for the survivors to adapt to school (15).

Generally, in our country, making fun of or humiliating people who have had something terrible happen to them is perceived as horrible behavior and is avoided. The idea that making fun of it happens to you is shared. For this reason, adolescents treated for leukemia are less likely to be excluded in social settings or schools for only that situation, which might have prevented them from having trouble with social relations.

According to Arpaci et al. (45), adolescents who are not included in the disease and treatment process and are not adequately informed feel worthless. However, doctors and psychologists in our hospital give adolescents continuous information about their disease and treatment process. That approach might lessen the treatment burden reported.

Additionally, theater/art performances, birthday celebrations, sharing experiences when they return to school, celebrations on New Year's, and religious holidays are held regularly for pediatric patients undergoing cancer treatment. There is a group activity hall and play therapy unit in our hospital. Patients often receive gifts, which might let less effect on treatment.

As the reasons for this, we suggest that humiliating leukemia patients are sporadic in our country, adolescents are informed about the disease and treatment from the moment of diagnosis, and their participation in treatment and social activities during treatment in the hospital can alleviate the treatment burden. It can be said that according to our research results, the gender of the girl and the authoritarian perception of the father, not the treatment itself only, harm social relations and self-esteem after leukemia treatment. Especially adolescent girls survivors may need to be supported in social and peer relations, as well as their physical examinations and psychological review regularly.

Conclusion

Leukemia treatment characteristics might burden patients' mental health and social life even after the end of the treatment. Especially in adolescence, when social development areas proliferate, being away from the social environment due to neutropenic isolation could affect social ability negatively. However, our findings might point out that not only do leukemia treatment characteristics affect social functioning. Perceived authoritarian parenting, perceived teacher support, and peer relations such as commitment are essential, especially in self-esteem. Future research with more participants may include more variables (the total length of hospital stay or socialization times, the duration of mucositis or other infections experienced by the patients), which may also affect the results.

To the best of our knowledge, this is the first study in our country to evaluate the post-treatment self-perceptions and social relationships of adolescents treated for leukemia in relation to treatment characteristics. our study may contribute to increased interest in the fact that returning to normal life after serious treatments may be full of difficulties and lead to other studies.

Ethics

Ethics Committee Approval: The study was approved by Ethics Committees in Uludağ University Medical University Ethical Committee (date:08.06.2022, approval number: 2022-12/9).

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Footnotes

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