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Anxiety, Depression, and Post-Traumatic Stress Disorders in Pediatric Oncology Patients and Their Mothers

Çocuk Onkoloji Hastalarının ve Annelerinin Anksiyete, Depresyon ve Travma Sonrası Stres Bozukluğunun Değerlendirilmesi

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ABSTRACT

Objective: This prospective study aims to investigate the prevalence of anxiety, depression, and post-traumatic stress disorder (PTSD) in pediatric oncology patients and their mothers.

Methods: All patients (n=61) aged 8-18 years who were actively treated patients (ATP) and patients in remission (ReP) and their mothers (n=61) were recruited as the study group. The first control group for anxiety and depression consisted of healthy mothers and children (n=60). In contrast, the second control group for PTSD consisted of mothers and children who had experienced non-disease trauma, such as divorce, death of a parent, and loss of income (n=30). The questionnaires were administered to the children and mothers.

Results: There was no significant difference between ATP and ReP in depression, anxiety, or PTSD (p=0.35, p=0.56, p=0.20). The children of the patient group were significantly more depressed and anxious than the healthy controls (HCs) (p=0.001, p=0.005). ATP mothers were more anxious than ReP mothers (p=0.004), but there was no difference in depression and burnout between the two groups (p=0.09, p=0.526). Mothers in the patient group were more anxious and depressed than mothers in the HC (p<0.001). The patient group and their mothers showed more PTSD symptoms compared to the HCs with trauma (p<0.05).

Conclusion: Pediatric cancer is a significant stressor for both children and mothers. A combination of medical treatment with psychosocial support is imperative.

Keywords: Children, cancer, post-traumatic stress disorder, anxiety, mothers

ÖZ

Amaç: Bu kesitsel çalışmanın amacı, pediatrik onkoloji hastaları ve annelerinde anksiyete, depresyon ve travma sonrası stres bozukluğu (TSSB) yaygınlığını sağlıklı kontrollerle (SK) karşılaştırmalı olarak araştırmaktır.

Yöntemler: Aktif tedavi gören ve remisyondaki 8-18 yaş arası tüm hastalar (n=61) ve anneleri (n=61) çalışma grubu olarak alınmıştır. İki farklı karşılaştırma grubu oluşturulmuştur. İlk karşılaştırma grubu, sağlıklı kontrol grubu ve anneleridir. TSSB karşılaştırması için ikinci kontrol grubu ise, hastalık dışında travması olan çocuklar ve annelerinden (n=30) oluşturulmuştur. Anketler çocuklara ve annelere klinisyen eşliğinde ayrı ayrı uygulanmıştır.

Bulgular: Depresyon, anksiyete ve TSSB açısından aktif tedavi gören ve remisyonda izlenen hastalar arasında anlamlı bir fark saptanmamıştır. (p=0,35, p=0,56, p=0,20). Hasta grubunun çocukları, sağlıklı kontrol grubu çocuklarına göre anlamlı derecede daha depresif ve kaygılı bulunmuştur (p=0,001, p=0,005). Aktif tedavi gören hastaların anneleri sağlıklı kontrol grubu annelerine göre daha kaygılıdır (p=0,004) ancak depresyon açısından fark saptanmamıştır (p=0,09). Hasta grubunun anneleri sağlıklı kontrol grubunun annelerine göre daha kaygılı ve depresif bulunmuştur (p≤0,001). Aktif tedavi gören ve remisyonda izlenen çocuklar ve anneleri travma geçiren ikinci kontrol grubuna göre daha fazla TSSB belirtisi göstermiştir (p<0.05).

Sonuç: Bu bulgular, pediatrik kanserin hem çocuklarda hem de annelerde önemli bir stres faktörü olduğuna işaret etmektedir. Psikososyal destek tıbbi tedavi ile eş zamanlı uygulanmalıdır.

Anahtar Sözcükler: Çocuklar, kanser, travma sonrası stres bozukluğu, anksiyete, anneler

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INTRODUCTION

Although childhood cancer is rare, its incidence is increasing worldwide. Advances in early diagnosis and treatment have significantly improved survival rates, transforming childhood cancers from fatal diseases into chronic conditions. However, the psychological burden of cancer extends beyond the physical illness, affecting both pediatric patients and their caregivers. Studies indicate that children with cancer are at higher risk of developing anxiety, depression, and post-traumatic stress disorder (PTSD) due to the stress of diagnosis, intensive treatment protocols, and long-term hospitalizations (1,2). Parents (especially mothers) who are primary caregivers experience significant emotional distress. The constant fear of disease progression, the burden of caregiving, and disruptions in daily life contribute to heightened levels of anxiety and depression among parents (3). Previous research has shown that mothers of children undergoing cancer treatment report higher levels of psychological distress compared to those of healthy children, and these symptoms may persist even after the completion of treatment (4). Understanding the psychological impact of childhood cancer on both patients and their families is crucial for ensuring better treatment adherence and overall well-being. Mental health disorders that emerge during this period may affect the child's response to treatment and long-term recovery. Given the increasing survival rates, addressing the psychosocial needs of both children and caregivers has become a key aspect of pediatric oncology care (5). This study aims to evaluate and compare the levels of anxiety, depression, and PTSD symptoms in pediatric oncology patients and their mothers with those in a healthy control (HC) group. By distinguishing between patients undergoing active treatment and those in remission, the study seeks to explore the psychological burden associated with different phases of the illness trajectory, particularly in mothers. During the long-term follow-up of patients, different psychiatric symptoms in the cognitive and emotional domains may emerge. With the increase in cancer survival rates, improving the quality of life of patients and their families has become increasingly important. Early recognition and treatment of psychiatric disorders that may occur during this period are crucial for ensuring treatment compliance and long-term success (6). In this context, it is expected that children diagnosed with cancer will display higher levels of anxiety, depression, and PTSD symptoms than their healthy peers. Similarly, psychological distress in mothers is anticipated to vary depending on the treatment stage, with greater emotional burden observed during the active treatment phase. These findings aim to contribute to the growing body of literature emphasizing the importance of holistic care in pediatric oncology.

MATERIALS AND METHODS

The sample group of our study was randomly selected from patients aged 8-18 years, who were followed up in the pediatric oncology department with a diagnosis of malignancy. The distribution of disease types in the sample group is shown in Table 1. The actively treated patients (ATP) for at least 1 month, patients in remission (ReP) between 3 months and 60 months, as well as their mothers (n=122), were taken as the sample group. The sample group distribution is shown Table 2. During the follow-up visit at our institute or by phone, we contacted the participants and invited them to participate in the study with their family caregivers. As a control group, healthy children and their mothers (n=60) who applied to the general pediatric outpatient clinic, were compared in terms of anxiety and depression. For the comparison of PTSD, a group of healthy children and their mothers (n=30) who had experienced trauma from various causes were selected as the second control group. The ATP for at least 1 month, ReP between 3 months and 60 months, as well as their mothers (n=122), were taken as the sample group. We were contacted and were invited to participate in the study with their family caregivers. As a control group, healthy children and their mothers (n=60) who applied to the general pediatric outpatient clinic, were compared in terms of anxiety and depression. For the comparison of PTSD, a group of healthy children and their mothers (n=30) who had experienced trauma from various causes were selected as the second control group.

The ATP for at least 1 month, ReP between 3 months and 60 months, and their mothers (n=122) were taken as the sample group. We were contacted during the follow-up visit at our institute or by phone and were invited to participate in the study with their family caregivers.

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A clinician performed a one-on-one interview with each member of the second control group to evaluate PTSD, while a questionnaire was used to measure anxiety and depression in the first control group. The demographic information was obtained via a retrospective file review, the hospital information management system database, and personal information forms from their mothers. The mothers participating in the study were given questionnaires including the Beck Depression Scale (7), Maslach Burnout Inventory MBI (8), Social Support Scale (9), Problem-Solving Inventory (10), and State-Trait Anxiety Inventory (STAI-I/STAI-II) (11). Children and adolescents were administered the Child Depression Inventory (12) and STAI-I/STAI-II for children (13) questionnaires, by their age groups. To assess PTSD symptoms, two scales were administered: the Clinician-Administered PTSD Scale (CAPS) (14) and the Clinician-Administered PTSD Scale for Children and Adolescents, CAPS-CA (15), were administered to the children and their mothers in separate rooms during one-to-one interviews, with a clinician. The exclusion criteria were unwillingness to participate in the study, voluntary withdrawal, duration of diagnosis or treatment less than 1 month, and a patient child or mother with mental retardation. Because there were only five (16.67%) relapsed patients in the

Table 1. Disease characteristics of the patient group

Diseases	Actively treated patients		Patients in remission	
	n	%	n	%
Hodgkin lymphoma	0	0	4	12.9
Non-Hodgkin's lymphoma	6	20.3	7	22.6
Diffuse pons glioma	1	3.3	0	0
Ewing Sarcoma	2	6.7	1	3.2
Germ cell testicular tumor	2	6.7	0	0
Glioblastoma multiforme	1	3.3	0	0
Alveolar soft part sarcoma	1	3.3	1	3.2
Intracranial germ cell tumor	0	0	1	3.2
Langerhans cell histiocytosis	2	6.7	1	3.2
Malignant mesenchymal tumor	1	3.3	0	0
Medulloblastoma	4	13.3	2	6.5
Nasopharyngeal carcinoma	1	3.3	2	6.5
Neuroblastoma	4	13.3	1	3.2
Osteosarcoma	1	3.3	1	3.2
Ovarian germ cell tumor	1	3.3	1	3.2
Rhabdomyosarcoma	1	3.3	3	9.7
Renal cell carcinoma	0	0	1	3.2
Sertoli Leydig cell tumor	1	3.3	0	0
Synovial sarcoma	0	0	2	6.5
Thyroid papillary carcinoma	0	0	1	3.2
Wilms tumor	1	3.3	2	6.5

Table 2. Sample group distribution

Study Center	Children	Mothers	Total number
ATP	30	30	60
ReP	31	31	62
HC	30	30	60
HC-trauma	15	15	30

ATP: Actively treated patients, ReP: Patients in remission, HC: Healthy control

study sample group, relapsed patients were excluded from further analyses as a statistically significant comparison could not be made. The study was conducted with the approval of the Ethics Committee of Gazi University Faculty of Medicine (number of documents: E.41646, research code number: 2017-108, number: 77082166-302.08.01 2017-108, date: 07.03.2017), Gazi University, Ankara, and in compliance with the Declaration of Helsinki (1951) by the World Medical Association. The verbal and informed consent of the parents was obtained before the questionnaire and after a detailed clarification of the study's objectives and conduct.

Statistical Analysis

Statistical evaluations were performed using the SPSS 21.0 IBM software package. Non-parametric tests were used in all evaluations. Descriptive analysis methods were used to evaluate socio-demographic data; the t-test was used for comparisons between groups; Mann Whitney U test and chi-square test were used if the groups constituting the sample were less than 30 people. The Pearson correlation method was used to examine the relationship between dependent variables. The significance level is set at below 0.005.

RESULTS

In this section, the results of the anxiety, depression, and PTSD scales administered to children with and without oncologic disease and their mothers will be presented. While there was no significant difference between the patient groups in terms of gender distribution (X^2=3.655, p=0.301), there was a significant difference in terms of age distribution (X^2=15.243, p<0.01). According to the post-hoc analysis, the mean age of the ReP (13.90±3.44) was significantly higher than the mean age of both ATP (11.67±3.49) and HC (10.77±2.75). There was no significant difference between ATP and ReP in terms of depression (p = 0.35), anxiety (p=0.56), and PTSD symptoms (p=0.20)(p=0.35, p=0.56, p=0.20). The patient group was found to be significantly more depressed and anxious than the HC (p=0.001, p=0.005). the patient group showed more trauma-related avoidance behavior and hyperarousal symptoms than the HCs with a history of trauma, and they experienced more current and lifelong trauma.

Mothers of ATP had higher anxiety than ReP (p=0.004), whereas there was no discernible difference between the two groups in terms of burnout (p=0.09) and depression (p=0.526). Mothers of the patient group were found to be more anxious, depressed, and exhausted than the mothers of HC (p=0.001, p<0.001). The patient group and their mothers had more present and lifetime PTSD symptoms than HC with a history of trauma (p<0.05). Sample group comparison of PTSD Scale Scores is shown in Table 3.

None of the control group mothers, who had a history of trauma while having HC, were diagnosed with PTSD. This suggests that illness trauma causes more post-traumatic stress symptoms and PTSD diagnoses than other traumatic events. It was found that as the social support level of the mothers in the patient group decreased, their depression, anxiety, emotional exhaustion, and total burnout levels increased; their current PTSD levels increased; and their problem-solving skills and personal achievement decreased. The patient group's depression scores did not significantly differ from those of their mothers (r=0.233, p=0.070); however, there was a positive correlation between the anxiety scores and the lifetime PTSD total scores (r=0.655, p<0.01; STAI 2-continuous anxiety, p<0.01; PTSD-Present Total, r=0.578, p<0.01). It was found that as the PTSD symptoms and anxiety of mothers increased, similar symptoms increased in their children.

DISCUSSION

The process of diagnosing, treating, and following up on cancer is exhausting and stressful for both the child and the family. Recent studies in the literature suggest that emotional, behavioral, and psychiatric disorders are common in cancer patients and that they should receive psychological support, at the same time as their diagnosis and treatment (16,17). In addition to the effects of medical care and medication, the relationship between family members plays a role in the success of the fight against childhood cancer. Studies in the literature suggest that in our study, it would be most useful to evaluate the patients and their mothers together (18). There are many studies in the literature comparing depression, anxiety, and PTSD in cancer patients at different time points with a HC (19-22). However, to our knowledge, no other studies have compared patients and their mothers during active treatment and remission. In our study, no significant difference was found between ATP and ReP in terms of depression, anxiety, and PTSD symptoms. In contrast, the patient group was found to be more depressed and anxious than HC, as reported in the literature (19-22). In our study, similar to the literature, we found that ATP and ReP had higher PTSD symptoms, compared to HC with a history of trauma (23). In the literature, unlike our study, some studies found no significant PTSD difference between cancer patients and HC (19,20). They defended this result by emphasizing that the adaptation mechanisms of cancer patients were more effective (19,20,24). As demonstrated in our study, the patient group has a higher risk of anxiety, depression, and PTSD compared to HC. Therefore, it has been suggested in the literature that cancer patients should receive psychological support at the same time as their diagnosis and treatment (22,25). A recent study confirmed that this support improves patient compliance, quality of life, and treatment success (26). Studies in the literature on caregivers of children with cancer have found severe emotional disturbance, anxiety, depression, health problems, and alcoholism in these families (23). In our study, patient group mothers were found to be more anxious, depressed, and exhausted than control group mothers, similar to what is reported in the literature (27). While no significant difference in depression was found between the mothers of ATP and ReP, higher levels of anxiety and PTSD were found in the mothers of ATP. These findings support our hypothesis that the depressive mood of mothers persists after the diagnosis of the disease and even during the remission period. In our study, similar to the literature, mothers with children diagnosed with cancer were found to be more depressed and anxious than mothers of HC (27). The results suggest that the course of the disease, the demanding treatment process, the duration of hospitalization, and the uncertainty about the future increase mothers' anxiety. However, in our results, persistent anxiety was also found in about half of the mothers of ReP. These findings suggest that mothers of cancer patients continue to be concerned about the possibility of a recurrence of the disease in their children. In our study, ATP mothers had more PTSD symptoms than ReP mothers, but there was no significant difference in burnout and depression. To our knowledge, there are no studies in the literature comparing anxiety, depression, and PTSD symptoms in mothers of ATP and mothers of ReP. In our study, when mothers of ill children and mothers of healthy children with a history of trauma were compared in terms of PTSD, they showed significantly more trauma-related avoidance behaviors, hyperarousal, and re-experiencing symptoms, similar to the literature (28,29). None of the control group mothers who experienced trauma was found to have PTSD symptoms. This suggests that illness trauma causes more PTSD symptoms than other traumatic events. Similar to the literature, a positive correlation was found between trait anxiety and lifetime post-traumatic stress symptoms in the patient group and their mothers. In contrast, there was no significant relationship in terms of depressive symptoms (19,28). It was thought that environmental factors besides mothers' emotional states might be effective in the development of depression in children. Our study, in line with previous research, found no correlation between children in the HC group and characteristics of their mothers. Still, it did find a positive correlation between lifetime PTSD among the mothers of the patient group and the patients themselves.

Table 3. Sample group comparison of PTSD Scale scores

Scales	Group	n	Rank mean	Average total	U	p
CAPS-CA child present total	ATP	25	22.96	551	181	0.373
	ReP	18	19.56	352		
CAPS-CA child lifetime total	ATP	25	20.36	509	184	0.312
	ReP	18	24.28	437		
CAPS-CA child present total	ReP	18	20.86	375.5	29.5**	**0.000**
	HC-trauma	13	9.27	120.5		
CAPS-CA child lifetime total	ReP	18	21.25	382.5	22.5**	**0.000**
	HC-trauma	13	8.73	113.5		
CAPS-CA adolescents present total	ATP	5	5	25	0	0.051
	HC-trauma	2	1.5	3		
CAPS-CA adolescents lifetime total	ATP	5	4.6	23	2	0.241
	HC-trauma	2	2.5	5		
CAPS-CA adolescents present total	ReP	13	9	117	0*	**0.027**
	HC-trauma	2	1.5	3		
CAPS-CA adolescents lifetime total	ReP	13	8.77	114	3	0.088
	HC-trauma	2	3	6		
CAPS-CA adolescents present total	ReP	13	9	117	0*	0.027
	HC-trauma	2	1.5	3		
CAPS-CA adolescents lifetime total	ReP	13	8.77	114	3	0.088
	HC-trauma	2	3	6		
CAPS-CA child present total	ATP	25	24.1	578.5	33.5***	**0.000**
	ReP	13	9.58	124.5		
CAPS-CA child lifetime total	ATP	25	24.32	608	42***	**0.000**
	ReP	13	10.23	133		
CAPS present total	ATP mothers	30	29.78	863.5	6.5**	**0.000**
	HC-trauma mothers	15	8.43	126.5		
CAPS lifetime total	ATP mothers	30	25.78	773.5	141.5*	**0.044**
	HC-trauma mothers	15	17.43	261.5		
CAPS present total	ReP mothers	31	30.06	932	29*	**0.000**
	HC-trauma mothers	15	9.93	149		
CAPS lifetime total	ReP mothers	31	28.31	877.5	83.5*	**0.000**
	HC-trauma mothers	15	13.57	203.5		

*p<.05, **p<.01, ***p<.001.
CAPS: Clinician-Administered Scale, CAPS-CA: Clinician-Administered Post-Traumatic Stress Disorder Scale for Children and Adolescents, ATP: Actively treated patients, ReP: Patients in remission, HC: Healthy control

(19,29). Studies support that psychological problems occurring in cancer patients and their caregivers negatively affect their compliance with treatment and quality of life. Furthermore, early recognition of psychological problems and simultaneous support increases compliance with treatment (22,30). When the results of our study are evaluated in relation to the literature, high levels of cancer-related anxiety and PTSD findings are observed in both survivors and the mothers of caregivers even years after the end of treatment (26). Therefore, we believe that child psychiatrists should intermittently evaluate patients with cancer to detect possible adjustment or mental problems related to the disease and its treatment. At the same time, the results of our study confirmed that the caregiver's mental problems triggered the child's cognitive problems and reduced the patient's adherence to treatment. This made us think caregivers should be referred to the psychiatry department at regular intervals, and evaluated by psychiatrists. Our study found an inverse and statistically significant relationship between social support and burnout. In our study, a

negative correlation was found between the social support levels of the mothers of the patient group and anxiety, depression, and PTSD and between the problem-solving skills of the mothers of the patient group and anxiety, depression, burnout levels, and post-traumatic stress symptoms, similar to the literature (31). The literature emphasizes the importance of problem-solving skills training for parents of children with chronic diseases (32).

Study Limitations

In this study, depression, anxiety, and PTSD, which are mental problems that may be caused by the disease and treatment of children with cancer, were examined at any time during the treatment period and remission period. We believe that it would be meaningful to recognize the changes in the symptoms of the patients by performing child psychiatry consultation at intermittent periods, such as the first, third, and sixth months of treatment from the time of diagnosis, and to recognize them early in terms of early psychiatric diagnosis and treatment.

Our study was limited to the pediatric oncology department service and the outpatient clinic of our hospital. It is thought that coping methods for psychosocial problems and psychiatric illnesses are significantly affected by upbringing, culture, and socioeconomic level. For this reason, collecting data from cities with different cultural characteristics may be more useful to reach a more general conclusion and develop guidelines on the subject.

CONCLUSION

Pediatric cancer treatment and follow-up are major stressors for both children and their mothers. Clinicians should be aware of the psychiatric symptoms of children with cancer and their caregivers during the challenging treatment process. Psychosocial support should be provided simultaneously with medical treatment.

Ethics

Ethics Committee Approval: The study was conducted with the approval of the Ethics Committee of Gazi University Faculty of Medicine (number of documents: E.41646, research code number: 2017-108, number: 77082166-302.08.01 2017-108, date: 07.03.2017).

Informed Consent: The verbal and informed consent of the parents was obtained before the questionnaire and after a detailed clarification of the study's objectives and conduct.

Footnotes

Authorship Contributions

Concept: E.Ö.Ö., A.O., E.G., E.G.S., F.G.P., Design: E.Ö.Ö., A.O., E.G., E.G.S., F.G.P., Data Collection or Processing: E.Ö.Ö., Analysis or Interpretation: E.Ö.Ö., E.G., E.G.S., Literature Search: E.Ö.Ö., A.O., E.G., Writing: E.Ö.Ö., A.O., E.G.,

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