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# Investigation of Clinical Features and Comorbid Psychopathologies of Children with Sleep Terrors

# Uyku Terörü Olan Çocukların Klinik Özellikleri ve Komorbid Psikopatolojilerinin İncelenmesi

Özlem Şireli [1*], Ayla Uzun Çiçek[1], Elif Abanoz[1], İlknur Ucuz [2], Yüksel Sümeyra Naralan[3]

[1] Sivas Cumhuriyet Üniversitesi Tıp Fakültesi Çocuk ve Ergen Ruh Sağlığı ve Hastalıkları Anabilim Dalı,Türkiye
[2] İnönü Üniversitesi Tıp Fakültesi Çocuk ve Ergen Ruh Sağlığı ve Hastalıkları Anabilim Dalı,Türkiye
[5] Recep Tayyip Erdoğan Üniversitesi Tıp Fakültesi Çocuk ve Ergen Ruh Sağlığı ve Hastalıkları Anabilim Dalı,Türkiye

e-mail: ozlemsireli@gmail.com, dr.f.ayla@hotmail.com, elifabanoz_17@hotmail.com, ilknur_27@yahoo.com, drsumeyrakaragoz@yahoo.com
ORCİD: 0000-0002-5549-4154
ORCİD: 0000-0003-2274-3457
ORCİD: 0000-0002-9214-4735
ORCİD: 0000-0003-1986-4688
ORCİD: 0000-0002-7788-5711

*Sorumlu Yazar / Corresponding Author: Özlem Şireli
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**Öz**

**Giriş ve Amaç:** Bu çalışmada, uyku terörü tanısı konulan çocukların uyku ortamı ve uyku alışkanlıkları, eşlik eden psikiyatrik bozukluklar, diğer parasomnialar ve tedavi geçmişi dahil klinik özelliklerinin incelenmesi amaçlanmıştır.
**Gereç ve Yöntemler:** Çalışmaya, 2020-2024 yılları arasında 3 farklı Çocuk ve Ergen Psikiyatri polikliniğinde DSM-5 tanı kriterlerine göre uyku terörü tanısı konulmuş 51 çocuk dahil edilmiştir. Olguların sosyodemografik ve klinik özellikleri geriye dönük olarak dosya üzerinden incelenmiştir.
**Bulgular:** Of the 51 participants, 30 (58.8%) were male, 21 (41.2%) were female and the mean age at the time of admission was 6.76±1.45 years (min-max: 3-10 years). Olguların15'inin (%29.4) gürültülü bir ortamda uyduğu, 41'inin (%80,4) uyku terörü atağı dışında uykularının kesintiye uğradığı belirlenmiştir. 17'sinde (%33,3) en az bir psikiyatrik bozukluk saptanmış olup, en sık [n=5 (%9,8)] komorbid psikiyatrik bozukluk dikkat eksikliği hiperaktivite bozukluğudur. 14'ünde (%27,5) diğer parasomnilerin eşlik ettiği belirlenmiştir. Olguların klinik özellikleri yaş grubuna göre karşılaştırıldığında, okul öncesi dönemdekilerde tam retrograd amnezinin, okul çağındakilerinde ise atak sırasındaki motor aktivitenin, bedensel yaralanma ve/veya maddi hasarın, atak esnasında tam uyanmanın anlamlı olarak yüksek olduğu saptanmıştır. Ebeveynlerin %64,7'sinin atak esansında yanlış müdahalede bulunduğu, olguların %29,4'ünde endikasyon dışı ilaç kullanıldığı belirlenmiştir.
**Sonuç:** Çocukluk dönemi uyku teröründe, tanısal değerlendirme sürecinde olası tetikleyici etmenlerin tespiti, eşlik eden psikiyatrik bozuklukların saptanması, tedavide ebeveynlerin psikoeğitimi, gerekli olduğu durumlarda medikasyonda uygun ilaç seçimi oldukça önemlidir.
**Anahtar Kelimeler:** Uyku terörü, parasomnia, komorbid psikiyatrik bozukluklar

**Abstract**

**Aim:** In this study, it was aimed to investigate the clinical characteristics of children diagnosed with sleep terrors, including sleep environment and sleep habits, clinical features and comorbid psychiatric disorders.

**Method:** Between 2020 and 2024, 51 children who were diagnosed with sleep terror according to DSM-5 diagnostic criteria in 3 different Child and Adolescent Psychiatry clinics were included in the study. The sociodemographic and clinical characteristics of the cases were examined retrospectively through the files.
**Results:** Of the 51 participants, 30 (58.8%) were male, 21 (41.2%) were female and the mean age at the time of admission was 6.76±1.45 years. It was determined that 15 (29.4%) of the cases slept in a noisy environment and 41 (80.4%) of the cases had their sleep interrupted except for sleep terror attacks. At least one psychiatric disorder was detected in 17 (33.3%) patients, and the most common (9.8%) comorbid psychiatric disorder was attention deficit hyperactivity disorder. It was found that complete retrograde amnesia was significantly higher in preschoolers, and motor activity during the attack, physical injury and/or material damage, and full awakening during the attack were significantly higher in school-age children. It was determined that 64.7% of the parents made the wrong intervention during the attack and off-label medication was used in 29.4% of the cases.
**Conclusion:** In sleep terrors, identification of triggering factors and comorbid psychiatric disorders during the diagnostic evaluation process, psychoeducation of parents in treatment, and selection of appropriate medication for medication are very important.
**Keywords:** Sleep terrors, parasomnia, comorbid psychiatric disorder.

## 1.Introduction

Sleep terrors (ST) is a sleep disorder defined among NREM (non-rapid eye movement) parasomnias in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) [1]. It is a disease that starts with a panic-shaped scream, repetitive, accompanied by periods of sudden awakening from sleep with great fear, tachycardia accompanied by fear, rapid breathing, mydriasis and autonomic arousal periods such as sweating. While the person is unresponsive to the effort to be comforted by others, the imaginary image is not remembered and forgetfulness is present for these periods [1,2].

Although ST is typically seen in children between the ages of 4-12, its prevalence is 1-6% [2,3]. The most common age period is between the ages of 5-7 and it mostly disappears with adolescence [3-5]. Although the etiology of ST is not known exactly, studies on the subject suggest that genetic factors play a role [6]. The incidence of ST increases 10 times compared to the general population in those whose first-degree relatives have ST [7,8]. It has been suggested that it may be related to perinatal risk factors and developmental comorbidities because its incidence decreases with age [9,10]. Although genetic factors are at the forefront in the etiology of ST, it is known that some environmental and biological factors play a triggering role. According to studies, sleep deprivation, noise, fever, drugs (neuroleptics, sedatives) and diseases such as obstructive sleep apnea syndrome, asthma and gastroesophageal reflux are among the triggering factors [2,6, 11-13].

Although studies show that psychological factors are mostly associated with ST in young people and adults, there are studies suggesting that ST in children is associated with psychiatric disorders [6,14-16]. According to studies on the subject, ST in children is more frequently associated with neurodevelopmental disorders such as autism spectrum disorder and attention deficit hyperactivity disorder [17,18]. Gau and Suen Soon (1999) found that anxiety disorder, panic disorder, social phobia and suicide thoughts were significantly higher in adolescents with ST and sleepwalking [19]. Petit et al. (2007) found a positive relationship between ST and separation anxiety in children, and Laganière et al. (2022) found a positive relationship between ST and emotional problems [20,21].

Although ST is a common disorder in children, studies examining psychosocial factors and clinical features in children with ST are very limited [11,12,19-22]. ST is a disorder that negatively affects the quality of life as well as a high risk of injury, although the clinical prognosis is generally good. It is thought that the examination of the related factors will be a guide in terms of diagnosis and treatment interventions. In this study, it was aimed to examine the sleep environment and habits, clinical features, comorbid psychiatric disorders of children diagnosed with ST.

## 2.Materials and Methods

The sample of this retrospective study consisted of 51 children diagnosed with ST according to DSM-5 criteria and followed up in three different Child and Adolescent Psychiatry clinics between 2020 and 2024. Sociodemographic characteristics of the sample, features of children's sleeping environments and sleeping behaviors/habits, evaluation of children and their families in terms of psychiatric disorders and parasomnias, clinical features of ST, and seeking help and treatment approaches for ST were retrospectively evaluated. Children who had incomplete data were excluded from the study. Only those with sporadic sleep terrors were included in the study. Other exclusion criteria include the presence of medical diseases that disrupt sleep and the presence of a sleep-related breathing disorder; the presence of chronic medical and/or neurological diseases, including medical diseases that can trigger sleep terrors, receiving regular medical drug therapy (including psychotropic drug use); and a family history of sudden infant death. We also excluded patients with

intercurrent febrile and painful illness and previous history of febrile/afebrile seizures.

Diagnoses of sleep terrors and accompanying psychiatric disorders were based on a standard psychiatric interview in accordance with DSM-5 criteria [1]. In addition, The Clinical Global Impressions Scale (CGI) was used to evaluate the patients and observe their clinical course and changes caused by the treatment during the follow-up period. CGI is a clinical evaluation scale that can be applied to patients of all ages [23]. It includes three dimensions: Clinical Global Impression-Severity (CGI-S), Clinical Global Impression-Improvement (CGI-I), and Clinical Global Impression-Side Effects (CGI-SE) component. In our study, the disease severity section of the scale was applied at the first interview at the start of treatment and therapy, and the improvement section of the scale was applied at the final visit. All procedures were performed in accordance with the Good Clinical Practice procedures and the current revision of the Declaration of Helsinki and the study protocol was approved by the local institutional Ethics Committee.

**2.1.Statistical Analysis**

Statistical data were analyzed using SPSS 26.0 software. The Kolmogorov-Smirnov Test was used to test the compatibility of the data to normal distribution. The numerical and categorical data were given as mean ± standard deviation (SD), number (n), median (min-max), and percentage (%) as appropriate. Descriptive statistics were used to summarize variables. The chi-square ($\chi 2$) test was used for testing relationships between categorical variables. Statistical significance was considered as $p < 0.05$.

**3.Results**

Of the 51 participants, 30 (58.8%) were male, 21 (41.2%) were female and the mean age at the time of admission was 6.76±1.45 years (min-max: 3-10 years). Participants were divided into two groups according to their ages: "preschool group" (n=36, 70.6%) and "school-age" (n=15, 29.4%) (Table 1).

**Table 1. Sociodemographic characteristics of the sample**

| Variables | Number (%) or mean±SD |
|---|---|
| Age (mean-years±SD) | 6.76±1.45 |
| Age groups | |
| Preschool group | 36 (70.6) |
| School-age group | 15 (29.4) |
| Sex | |
| Male | 30 (58.8) |
| Female | 21 (41.2) |
| Level of education of the mother | |
| Primary education and lower | 6 (11.8) |
| Upper primary education | 45 (88.2) |
| Regular job of the mother | |
| Yes | 24 (47.1) |
| No | 27 (52.9) |
| Level of education of the father | |
| Primary education and lower | 4 (7.8) |
| Upper primary education | 47 (92.2) |
| Regular job of the father | |
| Yes | 41 (80.4) |
| No | 10 (19.6) |
| Family income level | |
| The minimum wage/less than minimum wage | 21 (41.2) |
| Above the minimum wage | 30 (58.8) |
| Family type | |
| Nuclear | 31 (60.8) |
| Single-parent | 8 (15.7) |
| Extended | 12 (23.5) |
| Number of siblings | |
| 0 | 12 (23.5) |
| 1 | 21 (41.2) |
| 2 | 10 (19.6) |
| $3^{+}$ (3 and above) | 8 (15.7) |

When features of children's sleeping environments and sleeping habits were examined, it was determined that a small number of participants (n=15, 29.4%) had their own bedroom and slept alone in the bedroom, while 15 participants (29.4%) had a noisy sleeping setting. It was found that 52.9% (n=27) of the participants had difficulty falling asleep, and only 9 (17.6%) did not have the habit of using electronic devices before going to bed. It was determined that 17 of the children (33.3%) were "sometimes" and "usually" exposed to scary/horrifying movies, videos or stories before going to bed. Before going to bed, twenty-three (45.1%) of the children had a pattern of doing something active. It was discovered that only 19.6% (n=10) of the participants did not have nighttime awakenings (except ST), whereas 21 participants (41.2%) got up on their own in the morning (Table 2).

**Table 2. Features of children's sleeping environments and sleeping behaviors/habits**

| Variables | Number (%) |
|---|---|
| A bedroom of one's own | |
| Yes | 15 (29.4) |
| No | 36 (70.6) |
| People he/she sleeps within the bedroom | |
| Alone | 15 (29.4) |
| Sibling(s) | 28 (54.9) |
| Grandparent(s) | 8 (15.7) |
| Parent(s) | 0 (0) |
| Number of people sleeping within the bedroom | |
| None | 15 (29.4) |
| 1 | 21 (41.2) |
| $2^{+}$ (2 and above) | 15 (29.4) |
| A noisy sleeping setting | 15 (29.4) |
| A pet at home or in the sleeping setting | 9 (17.6) |
| Toy, plush, or other soft objects in bed | 23 (45.1) |
| Falling asleep state | |
| Spontaneously, in the bedroom | 12 (23.5) |
| With an adult in the bedroom | 21 (41.2) |
| In the living room or the crowd | 18 (35.3) |
| Difficulty falling asleep | 27 (52.9) |
| Using electronic device(s) before sleeping | |
| No | 9 (17.6) |
| Sometimes | 24 (47.1) |
| Usually | 18 (35.3) |
| Consumption of tea and/or coffee before sleeping | |
| No | 30 (58.8) |
| Sometimes | 16 (31.4) |
| Usually | 5 (9.8) |
| Relaxing stories to fall asleep | |
| No | 30 (58.8) |
| Sometimes | 11 (21.6) |
| Usually | 10 (19.6) |
| Scary movies, videos, or stories before sleeping | |
| No | 34 (66.7) |
| Sometimes | 12 (23.5) |
| Usually | 5 (9.8) |
| Engaging in active activities before bedtime | |
| No | 28 (54.9) |
| Sometimes | 15 (29.4) |
| Usually | 8 (15.7) |
| Nighttime awakenings (except sleep terrors) | |
| No | 10 (19.6) |
| Sometimes | 24 (47.1) |
| Usually | 17 (33.3) |

| | |
|---|---|
| Morning awaking state | |
| Spontaneously | 21 (41.2) |
| Forced by others | 20 (39.2) |
| Easily by others | 10 (19.6) |

17 children (33.3%) had at least one psychiatric disorder that had been discovered at the time of the study during the evaluation. The most frequently detected psychiatric disorder was attention deficit hyperactivity disorder (ADHD) (alone) (n=5, 9.8%). The frequency of other parasomnias was 27.5% (n=14) and the most common was teeth grinding (bruxism) during sleep (Table 3). Fifteen of the mothers (29.4%) and ten of the fathers (19.6%) said that they had a psychiatric disorder. The frequency of any parasomnia history in family members was 78.4% (n=40). (Table 3).

**Table 3. Evaluation of children and their families in terms of psychiatric disorders and parasomnias**

| Variables | Number (%) |
|---|---|
| Previous psychiatric disorder(s) in the child | 8 (15.7) |
| Current comorbid psychopathology in the child | |
| Yes | 17 (33.3) |
| No | 34 (66.7) |
| Concomitant psychiatric disorders in the child | |
| None | 34 (66.7) |
| ADHD | 5 (9.8) |
| ADHD + CD + Enuresis | 2 (3.9) |
| ODD | 3 (5.9) |
| MDD | 2 (3.9) |
| Any Anxiety Disorder + Enuresis | 3 (5.9) |
| PTSD + GAD | 2 (3.9) |
| Nighttime fears or dark fears in the child* | 23 (45.1) |
| The presence of other parasomnias in the child | 14 (27.5) |
| Other parasomnias in the child | |
| None | 37 (72.5) |
| Teeth grinding (bruxism) in sleep | 5 (9.8) |
| Sleep talking | 3 (5.9) |
| Teeth grinding (bruxism) in sleep + Sleep talking | 1 (2.0) |
| Sleep talking + Nocturnal Enuresis | 3 (5.9) |
| Sleepwalking + Nocturnal Enuresis | 2 (3.9) |
| The presence of psychiatric disorder in the mother | 15 (29.4) |
| The presence of psychiatric disorder in the father | 10 (19.6) |
| The presence of parasomnia(s) in family members | 40 (78.4) |
| The presence of history of sleep terrors in family members | 9 (17.6) |
| The presence of history of nocturnal enuresis in family members | 18 (35.3) |
| *Nighttime fears or dark fears that don't meet diagnostic criteria | |

The average age of onset of ST was 5.65±1.09. ST occurred in the first third of sleep in the majority of patients (n=47, 92.2%), autonomic hyperactivity was observed in all of them, and the ST attack lasted a few seconds in 39 (76.5%) patients. All patients had retrograde amnesia for the attack; of these, 44 (86.3%) had total amnesia and 7 (13.7%) had partial amnesia. Twelve (23.5%) of the patients exhibited physical motor activity during the episode. Bodily injury and/or property damage were reported in 5 (9.8%) patients. The frequency of awakening fully during a ST attack was 7.8% (n=4). It was learned that the majority of parents (n=33, 64.7%) displayed an inappropriate approach (such as trying to arouse, consoling, or slapping) during the ST episode (Table 4).

An interesting finding of this study that may be culturally related is that 12 patients (23.5%) had previously sought spiritual/religious help for ST. Before presenting themselves to us, 24 patients (47.1%) had either received or were undergoing medication treatment for ST. The most frequently prescribed drug previously for ST was melatonin (41.2%, n=21), and the second most frequently was hydroxyzine (29.4%, n=15). Data regarding help-seeking and treatment approaches for ST are presented in Table 5.

**Table 4. Clinical features of ST's**

| Variables | Number (%) or mean±SD |
|---|---|
| Age of first occurrence of sleep terrors (mean-years±SD) | 5.65±1.09 |
| Presence of trigger(s) reported by the family | 5 (9.8) |
| Trigger(s) reported by the family<br>None<br>Domestic conflict(s)<br>Animal attack<br>Sleep deprivation | <br>46 (90.2)<br>2 (3.9)<br>1 (2.0)<br>2 (3.9) |
| Season of attack<br>Any season<br>Spring<br>Summer<br>Autumn<br>Winter | <br>5 (9.8)<br>18 (35.3)<br>5 (9.8)<br>14 (27.5)<br>9 (17.6) |
| The period of sleep in which sleep terrors manifest<br>During the first third of the sleep<br>During any part of sleep | <br>47 (92.2)<br>4 (7.8) |
| The presence of autonomic hyperactivity | 51 (100) |
| Frequency of sleep terrors<br>1-2 episodes per month<br>$3^{+}$ episodes per month | <br>32 (62.7)<br>19 (37.3) |
| Duration of sleep terror episode<br>A few minutes-5 minutes<br>5-10 minutes<br>$10^{+}$ minutes | <br>39 (76.5)<br>8 (15.7)<br>4 (7.8) |
| Retrograde amnesia for the attack<br>Complete amnesia<br>Partial amnesia | <br>44 (86.3)<br>7 (13.7) |
| Verbalization during episode<br>No verbal expression<br>Verbalization is present but disorganized | <br>9 (17.6)<br>42 (82.4) |
| The presence of physical motor activity during the episode<br>No dangerous or potentially dangerous behavior(s)<br>Ambulation (kicking, jumping out of bed, walking, or running) and/or sometimes violent behavior | <br>39 (76.5)<br>12 (23.5) |
| The presence of bodily injury and/or property damage during the episode | 5 (9.8) |
| Awakening fully during the episode | 4 (7.8) |
| The presence of daytime symptoms (such as fatigue, daytime sleepiness, anxiety, and distress) | 9 (17.6) |
| Parental behavior during the attack<br>A suitable approach<br>An inappropriate approach (such as trying to arouse, consoling, or slapping) | <br>18 (35.3)<br>33 (64.7) |
| The presence of significant impairment in daily functioning (such as social, familial, academic, or other areas of functioning) | 19 (37.5) |

| | |
|---|---|
| Clinical Global Impression-Severity (CGI-S) subscale | |
| 1=normal, not at all ill; | 0 (0) |
| 2=borderline mentally ill | 0 (0) |
| 3=mildly ill | 26 (51.0) |
| 4=moderately ill | 16 (31.4) |
| 5=markedly ill | 9 (17.6) |
| 6=severely ill | 0 (0) |
| 7=among the most extremely ill patients | 0 (0) |

**Table 5. Seeking help and treatment approaches for ST's**

| Variables | Number (%) or mean±SD |
|---|---|
| Previous seeking help or being examined for sleep terrors | |
| No | 6 (11.8) |
| Seeking help or examination other than psychiatry | 27 (52.9) |
| Psychiatric help + Seeking help or examination other than psychiatry | 18 (35.3) |
| Previous the branch(s) where help is received for sleep terrors | |
| None | 6 (11.8) |
| General Pediatrics + Pediatric Neurology + Child and Adolescent Psychiatry | 15 (29.4) |
| General Pediatrics | 10 (19.6) |
| General Pediatrics + Pediatric Neurology | 5 (9.8) |
| General Pediatrics + Spiritual/Religious Aid | 5 (9.8) |
| General Pediatrics + Child and Adolescent Psychiatry | 3 (5.9) |
| Family doctor + General Pediatrics + Spiritual/Religious Aid | 3 (5.9) |
| Spiritual/Religious Aid, only | 4 (7.8) |
| Previous Seeking Spiritual/Religious Help | 12 (23.5) |
| Previous Seeking Spiritual/Religious Help | |
| No | 39 (76.5) |
| Yes, but with the help of a doctor | 8 (15.7) |
| Yes, only | 4 (7.8) |
| Previous use of medication for sleep terrors | 24 (47.1) |
| Previously prescribed medications for sleep terrors | |
| Melatonin | 21 (41.2) |
| Hydroxyzine | 15 (29.4) |
| Tricyclic antidepressants (TCAs) | 9 (17.6) |
| Antipsychotics | 9 (17.6) |
| Benzodiazepines | 6 (11.8) |
| Selective serotonin reuptake inhibitors (SSRIs) | 6 (11.8) |
| Current treatment approach for sleep terrors | |
| Behavioral approach, only | 9 (17.6) |
| Behavioral approach + Pharmacotherapy | 42 (82.4) |
| Currently prescribed medications for sleep terrors | |
| Melatonin (alone or as an adjunct to other medications) | 17 (33.3) |
| Tricyclic antidepressants (TCAs) | 15 (29.4) |
| Benzodiazepines (alone or as an adjunct to other medications) | 15 (29.4) |
| Atypical Antidepressants (Mirtazapine, only) | 8 (15.7) |
| Selective serotonin reuptake inhibitors (SSRIs) (in addition to other medications) | 6 (11.8) |
| Antipsychotics (in addition to other medications) | 6 (11.8) |
| Atomoxetine (in addition to other medications) | 5 (9.8) |
| Clinical Global Impression-Improvement (CGI-I) subscale | |
| 1=very much improved since the initiation of treatment | 40 (78.4) |
| 2=much improved | 8 (15.7) |
| 3=minimally improved | 3 (5.9) |
| 4=no change from baseline (the initiation of treatment) | 0 (0) |
| 5=minimally worse | 0 (0) |
| 6= much worse | 0 (0) |
| 7=very much worse since the initiation of treatment | 0 (0) |
| Clinical Global Impression-Side Effects (CGI- SE) subscale* | |

| | |
|---|---|
| 1=None<br>2=Do not significantly interfere with patient's functioning<br>3=Significantly interfere with patient's functioning<br>4=Outweigh therapeutic effect | 18 (42.9)<br>24 (57.1)<br>0 (0)<br>0 (0) |
| Response to current treatment<br>Complete response<br>Partial response<br>No response (resistance to treatment) | <br>48 (94.1)<br>3 (5.9)<br>0 (0) |
| *Patients who did not receive medication were excluded from the analysis. | |

Finally, a comparison of the clinical characteristics of ST in preschoolers and school-age children was conducted; the results are displayed in Table 6. There were significant differences between the two groups in terms of the frequency of ST, the kind of retrograde amnesia for the attack, the existence of motor activity during the episode, bodily injury and/or property damage during the episode, and full awakening during the attack ($p < 0.05$).

**Table 6. Comparison of clinical features of sleep terrors between age groups**

| | Preschool group (n=36) | School age (n=15) | p-value* |
|---|---|---|---|
| Frequency of sleep terrors<br>1-2 episodes per month<br>$3^+$ episodes per month | <br>19 (52.8)<br>17 (47.2) | <br>13 (86.7)<br>2 (13.3) | **0.023** |
| Duration of sleep terror episode<br>A few minutes-5 minutes<br>5-10 minutes<br>$10^+$ minutes | <br>28 (77.8)<br>6 (16.7)<br>2 (5.5) | <br>11 (73.4)<br>2 (13.3)<br>2 (13.3) | 0.632 |
| Retrograde amnesia for the attack<br>Complete amnesia<br>Partial amnesia | <br>34 (94.5)<br>2 (5.5) | <br>10 (66.7)<br>5 (33.3) | **0.018** |
| Verbalization during episode<br>No verbal expression<br>Verbalization is present but disorganized | <br>7 (19.4)<br>29 (80.6) | <br>2 (13.3)<br>13 (86.7) | 0.602 |
| The presence of physical motor activity during the episode<br>No dangerous or potentially dangerous behavior(s)<br>Ambulation (kicking, jumping out of bed, walking, or running) and/or sometimes violent behavior | <br>31 (86.1)<br>5 (13.9) | <br>8 (53.3)<br>7 (46.7) | **0.012** |
| The presence of bodily injury and/or property damage during the episode | 1 (2.8) | 4 (26.7) | **0.022** |
| Awakening fully during the episode | 0 (0) | 4 (26.7) | **0.005** |
| The presence of daytime symptoms (such as fatigue, daytime sleepiness, anxiety, and distress) | 5 (13.9) | 4 (26.7) | 0.275 |
| The presence of significant impairment in daily functioning (such as social, familial, academic, or other areas of functioning) | 14 (38.9) | 5 (33.3) | 0.708 |
| The presence of other parasomnias in the child | 8 (22.2) | 6 (40.0) | 0.195 |
| Current comorbid psychopathology in the child<br>Yes<br>No | <br>10 (27.8)<br>26 (72.2) | <br>7 (46.7)<br>8 (53.3) | 0.192 |
| The presence of parasomnia(s) in family members<br>Yes<br>No | <br>29 (80.6)<br>7 (19.4) | <br>11 (73.3)<br>4 (26.7) | 0.568 |
| The presence of history of sleep terrors in family members<br>Yes<br>No | <br>7 (19.4)<br>29 (80.6) | <br>2 (13.3)<br>13 (86.7) | 0.709 |
| Clinical Global Impression-Severity (CGI-S) subscale<br>3=mildly ill | <br>18 (50.0) | <br>8 (53.4) | 0.872 |

| | | | |
|---|---|---|---|
| 4=moderately ill<br>5=markedly ill | 11 (30.6)<br>7 (19.4) | 5 (33.3)<br>2 (13.3) | |
| Clinical Global Impression-Improvement (CGI-I) subscale<br>1=very much improved since the initiation of treatment<br>2=much improved<br>3=minimally improved | <br>28 (77.8)<br>6 (16.7)<br>2 (5.5) | <br>12 (80.0)<br>2 (13.3)<br>1 (6.7) | 0.949 |
| Clinical Global Impression-Side Effects (CGI- SE) subscale**<br>1=None<br>2=Do not significantly interfere with patient's functioning | <br><br>15 (50.0)<br>15 (50.0) | <br><br>3 (25.0)<br>9 (75.0) | 0.139 |
| Response to current treatment<br>Complete response<br>Partial response | <br>34 (94.5)<br>2 (5.5) | <br>14 (93.3)<br>1 (6.7) | 0.979 |

*The chi-square test and Fisher's exact test (as appropriate) were used to test group differences. **Bold font** indicates statistical significance: $p < 0.05$.

**4.Discussion**

The mean age of the cases in our study was 6.76±1.45 years, 36 (70.6%) of the cases were in preschool age and 15 (29.4%) were in school age. Studies show that the most common age period of ST is 5-7 years of age, and its incidence decreases with age in the school age period [2-4]. Our findings on age seem to be consistent with the literature.

When the sleep environments and sleep behaviors/habits of the cases in our study were evaluated, it was determined that 15 (29.4%) of the participants slept in a noisy environment, 23 (45.1%) engaged in active activities before going to bed, 42 (82.4%) used an electronic device(s) before going to sleep, and 17 (33.3%) were exposed to a scary movie, videos or stories. In our cases, it is noteworthy that there are factors that will adversely affect sleep quality in terms of environment and habits. Sleep environment and habits and behaviors before falling asleep are considered to be important predisposing factors in ST [2]. The results of the study show that factors that will interrupt sleep situations that will increase fear and anxiety before falling asleep may cause ST to be exacerbated [10,22]. In our study, it was determined that 27 (52.9%) of the participants had difficulty falling asleep, 41 (80.4%) had night awakenings other than ST attacks, and 20 (39.2%) had difficulty waking up in the morning. Petit et al. (2007) determined that difficulty falling asleep and frequent awakenings at night were more common in ST in early childhood in their longitudinal study with children diagnosed with parasomnia [20]. In our study, it was determined that approximately 53% of the cases had difficulty falling asleep, while 80.4% had night awakenings. Our results appear to be consistent with the literature. In addition to sleep interruption, sleep deprivation is also one of the factors that facilitate ST [24,25]. As with other parasomnias, an important part of the treatment interventions in ST is to regulate the sleep environment and activities before falling asleep, and to create a fixed and appropriate sleep schedule [2,26]. When our results are evaluated in the light of the literature, it is thought that it is important to question the sleep environment and sleep habits in detail in the clinical evaluation of children diagnosed with ST.

At least one psychiatric disorder was detected in 17 (33.3%) of our cases, 5 (9.8%) had only ADHD, 3 (5.9%) had oppositional defiant disorder (ODD), 3 (5.9%) had anxiety disorder and nocturnal enuresis, 2 (3.9%) had ADHD, conduct disorder and nocturnal enuresis, 2 (3.9%) had only major depressive disorder (MDD), 2 (3.9%) had post-traumatic stress disorder (PTSD) and generalized anxiety disorder. Gau (2006) found a significant positive correlation between parasomnia and ADHD and ODD in his study with 2463 Chinese children [27]. Chiang et al. (2010) found a significant relationship between ST and ADHD in their study with 325 children and adolescents diagnosed with ADHD [28]. In a case-control study conducted by Khalajmehri et al. (2021) with children with nocturnal enuresis, ST was found to be significantly higher in children with nocturnal enuresis than in the control group [29]. Studies show that ST is associated with internal symptoms and disorders such as high anxiety and depression [19-21, 30]. In our study, more than one-third (33.3%) of our cases were found to have a psychiatric disorder, and the most common comorbid diseases were ADHD, ODD, anxiety disorder and nocturnal enuresis, respectively. Although our findings seem to be consistent with the literature, it is thought that longitudinal studies examining the relationship between ST and psychopathology are needed to better interpret our results.

In our study, 14 (27.5%) of the cases were accompanied by other parasomnias. Bruxism was found in 5 (9.8%), sleep talking in 3 (5.9%), sleep

talking and nocturnal enuresis in 3 (5.9%), sleep walking and nocturnal enuresis in 2 (3.9%), sleep talking and bruxism in 1 (2%). Studies show that the concomitant incidence of parasomnias is high, and the most common parasomnias accompanying ST's are sleepwalking, sleep talking and bruxism [31,32]. Laberge et al. (2000) found that the most common parasomnias in children were ST, sleep talking and sleepwalking [33]. In the study of Kilincaslan et al. (2014), it was found that sleep talking and sleep walking predicted ST [34]. Our results appear to be consistent with the literature.

The prevalence of parasomnia in family members was 78.4% (n=40) and the prevalence of ST was 17.6% (n=9). Studies show that familial factors play a significant role in ST [5-7]. Petit et al. (2015) found that a history of sleepwalking in one of the midwives predicted ST [12]. In a study conducted by Guilleminault et al. (2003) with 84 sleepwalker and children with ST, the frequency of parasomnia in family members was determined as 15.3% (n=29) [11]. Our results regarding the family history of parasomnia seem to be consistent with the literature. Of our cases, 15 (29.4%) mothers and 10 fathers (19.6%) had a psychiatric disorder. Pinheiro et al. (2010) found a strong positive correlation between sleep problems in infants at 12 months of life and mothers' depression levels [35]. In a longitudinal study conducted by Guttier et al. (2024) with children with parasomnia, it was determined that the depression levels of mothers were a predictor of chronic parasomnia [36]. Sleep terror is a difficult situation for parents to cope with and can trigger anxiety especially in mothers [2,10]. In our study, 49% (n=25) of the parents had a psychiatric disorder. When our results are evaluated in the light of the literature, it suggests that the clinical approaches of children with ST should also be evaluated in terms of parental psychopathology.

According to studies, the most common age period of sleep terror is 5-7 years and the frequency of attacks decreases with age [3,4]. In our cases, it was found that the mean age of onset of sleep terror was 5.65±1.09 years, and the frequency of 3 or more attacks in the preschool period was significantly higher than in school-age children. It is known that sleep terror in children mostly has complete retrograde amnesia, some of the cases may be accompanied by physical activity during the attack, and bodily injuries and/or material damage may occur as a result [6,13]. In our study, it was determined that 44 (86.3%) of the cases had complete amnesia, 7 (13.7%) had partial amnesia, 12 (23.5%) of the attacks were accompanied by physical motor activity (walking and/or sometimes violent behaviors), 5 (9.8%) had bodily injury and/or material damage, and 4 (7.8%) had complete awakening during the attack. It was found that some clinical features of our cases differed by age group; complete retrograde amnesia was significantly higher in the preschool age group, and motor activity, physical injury and/or material damage during the attack, and full awakening during the attack were significantly higher in school-age children. There is no study examining the clinical features of ST in children according to age. The common expert opinion on the subject is that children experience complete amnesia associated with attacks more frequently [37]. This is explained by the short duration of episodes, the low number of complete awakenings, and possible differences in brain activity during attacks [38]. Although our results seem to be consistent with the literature, it is thought that our findings can be better interpreted with longitudinal studies examining the clinical features of ST, including early childhood and adolescence, and age-specific signs and symptoms.

When the clinical features and past treatments of our cases were evaluated, some important findings were determined. When the parental attitudes during the ST attack were examined, it was determined that the majority of the parents (n=33, 64.7%) exhibited an inappropriate approach (such as trying to wake up, comforting, slapping). It was determined that 12 (23.5%) of the cases had received religious help in the past, and only 18 of them had consulted a specialist doctor for medical assistance. One of the most important therapeutic interventions in ST is parental education [6,10]. In an episode of ST, attempts to wake up the child should definitely be avoided [39]. Considering the frequency of wrong attitudes in the parents of our cases, it is thought that parental attitudes should be questioned in detail in the clinical approach of ST. ST is a disorder that makes parents despair and anxious [2]. Parents may be trying to find religious solutions with the fear they are experiencing. It is also thought that resorting to spiritual means in search of treatment has a cultural relationship. When the treatment history of the cases was examined, it was determined that the most common drug treatment was melatonin [n=21 (41.2%)], and the second most common drug treatment was hydroxyzine [n=15 (29.4%)]. Melatonin has been found to be beneficial in the drug treatment of ST's [40]. However, hydroxyzine has no place in the treatment of ST. Antihistamines can trigger an attack of sleep terror by increasing the amount of sleep in the 3rd and 4th stages of sleep [6,39]. The frequency of hydroxyzine use in the past treatment histories of our cases was quite high (29.4%) and it can be said that the drug was used off-label in the treatment of a group of patients.

This study is one of the few studies investigating psychosocial factors and clinical features of ST in childhood. Our study has some limitations. The small number of cases and the retrospective examination of the clinical features of the cases are an important limitation. The fact that we do not have a healthy control group and the cross-sectional nature of the

study restricts the interpretation of our results. It is thought that our results will be better interpreted by longitudinal studies with sufficient sample size covering a wider age range including early childhood, school age and adolescence.

## 5.Conclusion

Childhood ST is a major disorder that negatively affects quality of life by increasing parental anxiety as well as a common, high risk of injury. Although the most important reason for its emergence is genetic factors, environmental factors play a triggering role. Attacks that are difficult for parents to cope with may cause parents to make wrong interventions and/or resort to ineffective treatment methods. In childhood ST, it is very important to determine the possible triggering factors in the diagnostic evaluation process, to determine the accompanying psychological problems/psychiatric disorders, to psychoeducate the parents in the treatment, and to choose the appropriate medication for medication when necessary.

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