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Comparison of the Effectiveness of Three Interventions for Specific Phobia in Children and Adolescents: A Systematic Review

Çocuk ve Ergenlerde Görülen Özgül Fobi için Kullanılan Üç Müdahalenin Etkililiğinin Karşılaştırılması: Sistematik Gözden Geçirme

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ABSTRACT

This study aims to review evidence-based treatment approaches with cognitive, behavioral, and cognitive-behavioral dimensions for the treatment of specific phobia in childhood and adolescence. The databases Google Scholar, PubMed Central, Scopus and Web of Science were searched using the terms "treatment", "adolescent", "child", "children", "phobia". Articles containing at least two of the relevant terms in their titles were selected, and after applying the exclusion criteria, a total of 14 articles were included in the review. One-Session Treatment (OST), Cognitive Behavioral Therapy (CBT), Eye Movements Desensitization and Reprocessing therapy (EMDR) are the treatment methods examined in this study. According to the results of the study in which cognitive-behavioral and behavioral techniques were used, it was observed that all three of OST, CBT and EMDR were significantly effective, and OST played the dominant role when the ease of use and advantages were taken into consideration. In this study, it was observed that in-vivo exposures were used and virtual-reality exposures did not occupy a large place.
Keywords: Child adolescent, specific phobia, one session treatment, cognitive behavioral therapy, EMDR

ÖZ

Bu araştırma çocukluk ve ergenlik çağında görülen özgül fobinin tedavisine yönelik bilişsel, davranışsal ve bilişsel davranışsal boyutlara sahip kanıta dayalı tedavi yaklaşımlarının gözden geçirilmesini amaçlamaktadır. Google Scholar, PubMed Central, Scopus ve Web of Science veri tabanlarında "treatment", "adolescent", "child", "children", "phobia" terimleri kullanılarak arama yapılmıştır. İlgili terimlerin en az ikisini başlığında barındıran makaleler seçilmiş ve dışlama kriterlerinin uygulanmasının ardından toplam 14 makale gözden geçirmeye dahil edilmiştir. Tek Seanslık Tedavi (One-Session Treatment [OST]), Bilişsel Davranışçı Terapi (BDT) ve Göz Hareketleri ile Duyarsızlaştırma ve Yeniden İşleme (Eye Movement Desensitization and Reprocessing [EMDR]) bu çalışmada incelenen tedavi yöntemleridir. Bilişsel davranışçı ve davranışçı tekniklerin kullanıldığı araştırma sonuçlarına göre; OST, BDT ve EMDR'nin her üçünün de anlamlı düzeyde etkili olduğu, kullanım kolaylıkları ve avantajlar göz önünde bulundurulduğunda başat rolün OST tarafından üstlenildiği gözlenmiştir. Bu çalışmada bahsi geçen tedavi yöntemlerinde gerçek hayatta (in vivo) maruz bırakmaların kullanıldığı ve sanal gerçeklik uygulamalarının ise geniş bir yer kaplamadığı görülmüştür.
Anahtar sözcükler: Çocuk ergen, özgül fobi, bilişsel davranışçı terapi, EMDR, tek seanslık tedavi

Introduction

Specific phobia, which is listed under the heading "Anxiety Disorders" in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (APA 2013), is characterized by the presence of a specific fear or anxiety response to a specific situation/stimulus. The most relevant response in specific phobia is to avoid the feared event or object. It is stated that specific phobia cases seen in children and adolescents account for 5%-10% of the sample selected from the society (Kessler et al. 2005). In a study conducted with primary school students in Turkey, it was reported that specific phobia accounted for 11% of anxiety and mood disorders (Bilaç et al. 2014). The most common specific phobias are needle injection, seeing blood, fear of heights, and animals. In children and adolescents, reactions to phobic stimuli can be manifested in different ways, such as feelings of fear-anxiety, shouting, crying, or hugging people close to them (APA 2013).

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It is mentioned that specific phobia cases differ in terms of gender; the ratio of diagnosed women to men is 2:1 (APA 2013). Bal et al. (2013) stated that when it comes to specific phobias, women are diagnosed two to four times more frequently than men. Çeri et al. (2018) reported that specific phobia is more common in girls. On the other hand, when the literature on child-adolescent specific phobia is considered, it is seen that there are also studies revealing that boys are diagnosed more frequently than girls (Göker et al. 2015, Görmez et al. 2017). In addition, there are five subtypes of specific phobia: Animal (dog, cockroach, bird, etc.), natural environment (height, water, storms, etc.), blood/injection/medical care, situational (closed places, elevator, boarding an airplane, etc.) and other (e.g. fear of people wearing clown clothes). It is important to emphasize that the findings in the literature are not consistent in terms of the prevalence of specific phobia types. For example, in a study involving a USA sample, adolescent girls were diagnosed more frequently in all subtypes, and it was reported that natural environment, animal, blood injection type, and situational phobias were observed from the most common to the least (Burstein et al. 2012). In another study, it was found that blood injection, natural environment, situational, and animal type specific phobias were observed from most to least common (Kerrick 2000). In the study conducted by Iancu et al. (2007) with young adults in Israel, the prevalence ranking of specific phobias was as follows: Natural environment 49.2%, animal 31%, situational 22.8%, blood/injection type 16.7%. In the study, male participants diagnosed with specific phobia were twice as likely as female participants, as the authors say.

In almost all types of specific phobias, encountering a stimulus causes an increase in blood pressure and an increased heart rate, with the only exception being blood/injection phobias: When patients with this specific phobia encounter situations such as giving blood or receiving vaccinations, the increase in blood pressure is characteristically followed by a sudden drop (Chapman and DeLapp 2014). The drop in blood pressure is caused via stimulation of the vagus nerve (vasovagal), and patients may faint as a result of this process (Engel 1978). Ritz et al. (2005) noted that "hyperventilation" (breathing more than necessary) plays a key role in blood/injection type phobia.

It is known that 75% of specific phobia cases involve avoidance of more than one situation/stimulus. In other words, the odds of a person diagnosed with a specific phobia having a specific phobia towards another situation are quite high. To be diagnosed, the person needs to experience great distress "almost all the time" when encountering the situation in question. For example, a person who experiences anxiety one out of every five times when boarding an airplane is not diagnosed with specific phobia- unless functioning is significantly impaired (social, emotional, academic, familial) (APA 2013). Sancassiani et al. (2019) found that the diagnosis of a specific phobia can have a negative impact on quality of life. Especially in the case of comorbidity, quality of life is significantly affected. In addition, it is also reported that specific phobia is one of the diagnoses associated with school refusal, especially for children and adolescents (Heyne et al. 2001). In this respect, it can be said that specific phobia has a negative impact on the academic, emotional, and social development of children and adolescents, and therefore, their treatment is quite important.

Specific phobia usually starts in early childhood and has a chronic prognosis (Koç and Hocaoğlu 2023). Although the DSM-5 (APA 2013) states that specific phobia often occurs before the age of 10 years, a relatively recent meta-analysis reported that the age of onset of specific phobia is 5.5 years, which is considerably earlier compared to other psychopathologies in the same study (Solmi et al. 2021). The emergence of specific phobia can occur in different ways: A person may experience a traumatic life event (being attacked by a dog), observe someone experiencing this event (seeing a dog bite someone), experience an unexpected panic attack during interaction with the phobic stimulus (experiencing an unexpected panic attack on the subway), or be exposed to frequent media coverage of an accident (APA 2013). Traumatic experiences at a young age bring along the lack of a sense of control in the child, and the child with a low sense of control may feel vulnerable to the stimuli (Muris et al. 2002). Considering these, it is important to discriminate the case from diagnoses such as separation anxiety, panic disorder, and agoraphobia when making the diagnosis.

The development of specific phobias in children and adolescents is explained by multiple risk factors, including "child-related characteristics" such as genetic factors and temperament and "environmental characteristics" such as parental psychopathology and family dynamics (communication styles, parenting practices, and attachment history) (Muris et al. 1998). One of the most accepted approaches to phobias, behavioral theory, ascribes it to "classical conditioning, operant conditioning and modeling". The causes of specific phobia, according to behavioral learning, are classical conditioning, indirect reinforcement, and negative information learned about the phobic object (Arkar 2020).

There are different methods for the treatment of specific phobias. Although studies show that pharmacotherapy is effective (Abene and Hamilton 1998, Balon 1999), it has been stated for many years that

the golden standard for specific phobia treatment is exposure-based interventions (Antony and Stein 2008). Medications are often used when the patient does not prefer exposure or when psychotherapy is not an option (Çıtak 2018). The combination of medication and exposure-based psychotherapy has also been reported to be effective (Ressler et al. 2004).

The primary treatment for specific phobia is Cognitive Behavioral Therapy, which uses exposure (Çıtak 2018); in the literature, Cognitive Behavioral Therapy (CBT) is superior to other applications with high effect sizes (Thng et al. 2020). In CBT for specific phobia, after psychoeducation, thoughts about the phobia object (catastrophic beliefs, etc.) are detected, and cognitive restructuring is performed for those thoughts; after cognitive restructuring, exposure practices are applied. Exposure-based interventions are widely accepted to be effective, empirically, for specific phobias (Antony and Swninson 2000), and these interventions are frequently used in the specific phobia protocol of CBT (Alvarez-Perez et al. 2021). On the other hand, it should not be forgotten that the cognitive restructuring phase has a key role in preparing the client for exposure practices (Sokol and Fox 2019). The psychotherapist and children cooperatively build the exposure practices, where the feared situations/objects are listed hierarchically according to the patient's perception of difficulty, followed by gradual exposure of the patient to the feared situations (Stiede et al. 2023): Here is an example for that: Thinking about a spider at first, then looking at a picture of a spider, and finally being in the same environment with a spider.

Another technique that emerged from cognitive behavioral practices and is used in the treatment of specific phobias is One-Session Treatment (OST), developed by Swedish clinical psychologist Lars-Göran Öst. OST is an evidence-based, very short-term treatment for specific phobias that involves a three-hour intensive exposure session (Davis III et al. 2013). The core of OST is gradual exposure to the phobic stimulus. OST shares many of the same principles as CBT, but unlike CBT, it lasts only two sessions. These two sessions include an initial assessment/planning session- lasting approximately one hour- and a treatment session with gradual exposures lasting up to three hours (Wright et al. 2022). OST's treatment protocol is largely based on “real life” (“in vivo”) exposure (Zlomke and Davis III 2008). It should be noted that OST, which stands for “one-session treatment”, is a systematic method. There are other single-session intervention programs, but those are not considered OST (Mühlberger et al. 2003, Perkins 2007). Although OST is an evidence-based approach that is influenced by cognitive-behavioral therapy that focuses on cognitions and exposures and contains CBT's principles, it is considered as a separate technique from CBT for reasons such as the shortness of the session duration and the use of only exposure, and is handled in this way. Exposure practices in OST, just like in CBT, have a hierarchical structure (Davis III et al. 2013).

Eye Movement Desensitization and Reprocessing (EMDR) is an empirical, integrative approach first developed for the treatment of post-traumatic stress disorder (PTSD). According to EMDR, psychopathology occurs when the brain cannot process information adequately (Shapiro 2001). EMDR is a therapy approach that integrates different components of different therapy schools such as psychodynamic, cognitive behavioral, client-centered, and body-based therapies (Shapiro and Maxfield 2002). Therefore, this approach has gained a special place in the literature. Meta-analysis and review studies in the literature emphasize that EMDR is a promising therapy method for children (de Jongh and Broeke 2009, Faretta and Dal Farra 2019, Cuijpers et al. 2020, Yunitri et al. 2020). Although EMDR originally emerged for the treatment of PTSD, it is now seen as an effective therapy method used to treat various anxiety disorders and depression (Meentken et al. 2020). In their meta-analysis study, Bradley et al. (2005) examined the effectiveness of EMDR, CBT, and exposure applications on PTSD patients and concluded that all three treatments are highly effective. The factor that distinguishes EMDR from the exposure technique is that it includes a “distraction” component; having that component is the main point where EMDR differs from exposure practices in OST and CBT protocols (de Jongh and Broeke 2007).

Specific phobia is a mental health problem that is frequently observed in children and adolescents, negatively influences functionality, and causes social, cognitive, and academic difficulties when left untreated. Therefore, it seems very important to address the treatment options and to determine which treatment option has the highest effectiveness. Since there is no review addressing this issue in the national literature, the current systematic review aims to examine how effective the mentioned interventions are for the treatment of childhood and adolescence-specific phobia cases.

Method

In this review, the PICO format was used to identify the research question. In this context: The Population: Children and adolescents suffering from specific phobia in clinical and subclinical samples; Intervention: OST,

CBT and EMDR treatments; Comparison: Comparison of OST, CBT and EMDR treatments; Outcome: Effectiveness of the mentioned treatments.

Google Scholar, PubMed Central, Scopus, and Web of Science databases were used to review the interventions in this study. The literature search was conducted until 19.01.2025 and ended on this date. The review and reporting of the articles were conducted in accordance with the PRISMA 2020 Statement (Page et al. 2021), Figure 1 was prepared in this direction.

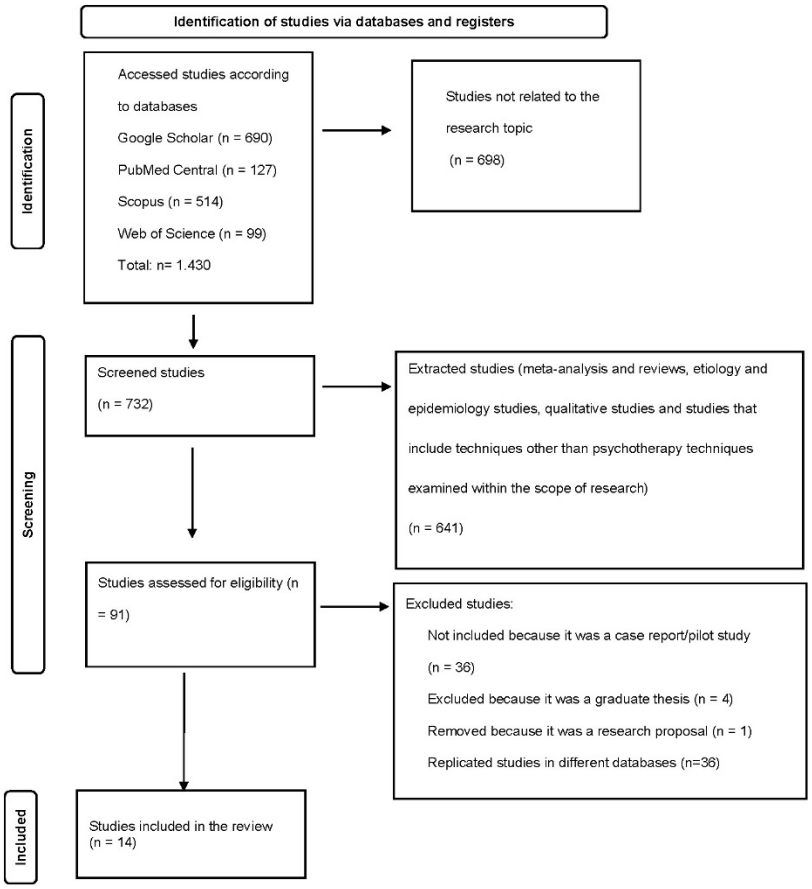

Figure 1. PRISMA flow chart for identification of studies

For the selection of the articles to be used in the research: “treatment”, “youth”, “child”, “children”, “phobia”, “adolescent” keywords were used, articles with at least two of these keywords in the title were selected, and after applying the inclusion and exclusion criteria, the research was executed with 14 articles. It was considered to be appropriate to use the word “phobia” instead of “specific phobia”, which is the counterpart of specific phobia in the keywords, since it was predicted that if a search was made with the term “specific phobia”, a phobia type among the subtypes of specific phobia (e.g. dog phobia) could not be filtered, to prevent this, the keyword “phobia” was determined and the articles that did not meet the necessary criteria (e.g. social phobia) were not included in the study.

The criteria for inclusion in this review are as follows: Being an article published in a journal, being a quantitative research, having at least two relevant keywords in the title of the article (one of which must be related to specific phobia), being written in English, including cases of specific phobia, including behavioral or cognitive behavioral techniques as a treatment method. The exclusion criteria for the review are: Articles written in any language other than English (if the authors' first language was not English and the article was published in English as well as their native language, it was included in the study), review articles, meta-analyses, or book chapters. There were no exclusion criteria related to subtypes of specific phobias in this study. When the relevant databases were searched using the mentioned keywords, 1,430 articles were filtered. A total of 732 articles were selected for screening. As a result of the inclusion and exclusion criteria, 91 articles were selected for inclusion in the study. As a result of detailed examination of the articles, 77 of these 91 articles were excluded from the study on the basis that they would not be suitable for the study (excluded because they were case reports/pilot studies [n = 36], excluded because they were postgraduate thesis studies [n = 4],

excluded because they were research proposals [n = 1], excluded because they were repetitive studies in different databases [n = 36]). The review is conducted with 14 articles (Figure 1).

Results

Characteristics of the Studies

When the studies were reviewed, it was observed that the minimum number of participants was 4 and the maximum number was 268. 12 of the 14 studies included research specifically on specific phobia; one study was conducted with adolescents with test anxiety in addition to specific phobia, and one study focused on subthreshold PTSD and depression in addition to specific phobia. Table 1 was created to summarize the treatment methods used in the studies. Table 1 provides a summary of information about the samples, treatment methods, measurement tools, measurement frequencies, and phobia types in the studies.

Table 1. Summarized information about the articles

Author	Year	Sample	Interventions	Type of Phobia	Measurements	Measurement Frequency
Azimisefat et al.	2022	16-18 years (adolescent)	CBT, EMDR	Natural environment	ASI-R, SCID-5, SMA	Measurement before and 1 week after intervention
Berge et al.	2017	10-16 years (child-adolescent)	CBT	Blood/injection	CFSS-DS, IOIF-s, IS-c, MQ-c	Measurement before and 1 week after intervention, 1-year follow-up
Dewis et al.	2001	10-17 years (child-adolescent)	CBT	Animal	BATs, CIDI, PT-WARS, SPQ-C, SUDS, WAIS/WISC Short Form	Measurement before and after intervention, 1-month follow-up
Farrel et al.	2018	4-6 years (child)	OST	Animal	ADIS-C/P, BATs, CGAS, CGI, KFQ, PAS-R	Before intervention, during intervention, after intervention measurement every 3 weeks, 1-month follow-up, 3-months follow-up
Farrel et al.	2021	8-12 years (child-adolescent)	OST	Animal	BATs, FSSC-R, SCAS-C/P	Measurement before and 1 week after intervention, 1-month follow-up
de Jong et al.	2023a	8-17 years (child-adolescent)	CBT	Animal, natural environment, blood/injection, other	ADIS-C/P, BATs, CEQ-C, SEQ-C, SSS-C, TASC-r, VAS	Measurement before and 1 week after intervention, 1-month follow-up
de Jong et al.	2023b	8-12 years (child-adolescent)	CBT	Animal, natural environment, blood/injection, other	ADIS-C, BATs, CDQ, FQ, RCADS, SEQ-C, SSS-C, TASC-r	Measurement before and 1 week after intervention, 1-month follow-up

Table 1. Summarized information about the articles

Author	Year	Sample	Interventions	Type of Phobia	Measurements	Measurement Frequency
Meentken et al.	2020	4-15 years (child-adolescent)	EMDR	Blood/injection	CDI-2, CRTI, SCARED-NL, SSR	Measurement before intervention, follow-up after 8 weeks
Oar et al.	2015a	8-18 years (child-adolescent)	CBT, OST	Blood/injection	ADIS-C/P, BATs, CGAS, CTS, FSSC-R, PTS, SCAS-C/P, SMFQ-C/P	Measurement before and 1 week after intervention, 1-month follow-up, 3-months follow-up
Oar et al.	2017	8-18 years (child-adolescent)	OST	Blood/injection	ADIS-C/P, CGI-I, DES-C/P, IPS-Anx, MQ	Measurement before and 1 week after intervention, 1-month follow-up, 3-months follow-up
Ollendick et al.	2009	7-16 years (child-adolescent)	OST	Animal, natural environment, situational, other	ADIS-C/P, BATs, CBCL, CDI, FSSC-R, MASC, Treatment Satisfaction Survey	Measurement before and 1 week after intervention, 6-months follow-up
Öst et al.	2001	7-17 years (child-adolescent)	OST	Animal, natural environment, blood/injection, situational, other	ADIS-C/P, BATs, FSSC-R, RCMAS, STAIC	Measurement before and 1 week after intervention, 1-year follow-up
Wright et al.	2022	7-16 years (child-adolescent)	CBT, OST	Animal, blood/injection, other	ADIS-C/P, BATs, CAIS, CHU-9D, EQ-5D-Y, RCADS	Measurement before intervention, 6-months follow-up
Yıldırım and Bahayi	2023	11-16 years (child-adolescent)	EMDR	Animal, natural environment, blood/injection, situational, other	DSM-5 Specific Phobia Scale for 11–17 Year Old Children, Test Anxiety Inventory	Measurement before and after intervention (time not specified)

ADIS-C: Anxiety Disorder Interview Schedule for Children, ADIS-C/P: Anxiety Disorders Interview Schedule for Children Parent Version, ASI-R: The Anxiety Sensitivity Index, BATs: Behavioural Assessment Tests, CAIS: The Child Anxiety Impact Scale, CASI: Children's Anxiety Sensitivity Index, CBCL: Child Behavior Checklist, CDI: Children's Depression Inventory, CDI-2: Dutch Children's Depression Inventory 2, CDQ: Child Development Questionnaire, CEQ-C: Credibility and Expectancy Questionnaire for Children, CFSS-DS: Children's Fear Survey Schedule–Dental Subscale, CGAS: Children's Global Assessment Scale, CGI: Clinical Global Impressions Scale, CGI-I: Clinical Global Impression-Improvement Scale, CHU-9D: The Child Health Utility 9D, CIDI: Composite International Diagnostic Interview, CRTI: Children's Responses to Trauma Inventory, DES-C/P: Disgust Emotion Scale for Children Child and Parent Versions, EQ-5D-Y: The EuroQol-5 Dimensions Youth Version, FQ: Fear Questionnaire, FSSC-R: Fear Survey Schedule for Children–Revised Child Version, IPS-Anx: Injection Phobia Scale–Anxiety, IS-c: Injection Phobia Scale for Children, KFQ: The Koala Fear Questionnaire, MASC: Multidimensional Anxiety Scale for Children, MQ: Mutilation Questionnaire, PAS-R: Preschool Anxiety Scale—Revised, PT-WARS: Phobic Targets-Work and Adjustment Ratings Scales, RCADS: Revised Child Anxiety and Depression Scale for Children, RCMAS: Revised Children's Manifest Anxiety Scale, SCARED-NL: Dutch Screen for Child Anxiety Related Emotional Disorders, SCAS-C/P: Spence Children's Anxiety Scale Child and Parent Versions, SCID-5: Structured Clinical Interview for DSM Disorders, SMA: Severity Measure for Acrophobia, SEQ-C: Self Efficacy Questionnaire for Children, SPQ-C: Spider Phobia Questionnaire for Children, SSR: Dutch Sleep Self Report, SSS-C: Service Satisfaction Scale for Children, STAIC: State-Trait Anxiety Inventory for Children, SUDS: Subjective Units of Distress Scale, TASC-r: Therapeutic Alliance Scale for Children, VAS: Visual Analogue Scales, WAIS/WISC: Wechsler Adult Intelligence Scale/Wechsler Intelligence Scale for Children

When Table 1 is analyzed, it is seen that 4 articles include CBT, 5 articles include OST, 2 articles include EMDR, 2 articles include both CBT and OST, and 1 article includes both CBT and EMDR. When Table 1 is considered, it is observed that 12 articles were conducted with child-adolescent samples, 1 article with child and 1 article with adolescent samples.

Evaluation of Interventions

CBT

Berge et al. (2017) describe a 5-session CBT intervention in their research with a Norwegian sample aged 10-16 years. All participants had blood/injection (oral) type-specific phobia. The total number of participants was 67 (39 girls, 28 boys). The study consisted of two groups: the experimental group (34 participants) and the waiting list-control group (33 participants). It is reported that there was a significant difference between the CBT group and the control group after the intervention; fear and injection phobia scores in the self-report scales of the participants in the group receiving the intervention decreased, and avoidance behaviors decreased. Within the scope of the design of the experiment (randomized delayed intervention), CBT was applied to the participants in the control group after the significant results of the experimental group were reached. In the 1-year follow-up measurements, it was stated that CBT maintained its effectiveness, and 70.1% of the 67 participants were able to be exposed to oral injection during the CBT interventions.

Dewis et al. (2001) conducted a randomized controlled trial with child adolescents suffering from animal (spider) type specific phobia. The total number of participants was 28 (18 girls and 10 boys). The study consists of two experimental and one control group. In one of the experimental groups, participants were exposed to real-life spider pictures, while participants in the other group were exposed to spider images in a computer program. According to the results of one-way analysis of variance, it is stated that there was no difference between the groups before the treatment. It is stated that the group that was shown real-life spider pictures showed a significant improvement from the exposure interventions, while the effect of the computer-based exposure interventions was relatively low. In conclusion, the researchers stated that exposure to real-life pictures was superior, and the reason for this was the "habituation effect" that occurs as a result of prolonged or repeated exposure.

de Jong et al. (2023a) created two different intervention programs based on cognitive behavioral techniques frequently used in specific phobias. The total number of participants was 50 (32 girls and 18 boys). Participants were randomly assigned to one of the two groups, and one of the intervention programs created by the researchers was applied to these groups. In the first intervention program, the exposure practices were gradually given to the participants step by step (for example, the participants completed each of the steps 1-2-3-4-5 one by one). In the second intervention program, the exposure practices were not given to the participants gradually (participants in this group did not complete the steps consecutively; for example, they completed step 5 after completing step 1). The number of sessions (3 sessions) and the duration of each session (60 minutes) were the same for both groups, and the interventions were delivered in real life (in vivo). Measurements were taken before and after the intervention, and follow-up measurements were taken after 1 month. In both interventions, it was observed that the decrease in specific phobia symptom severity was maintained at the 1-month follow-up. After the follow-up, it was stated that 32.5% of all participants no longer met the diagnostic criteria for specific phobia. While both interventions were found to be significantly effective, when both intervention groups were evaluated from the first measurement to the end of the 1-month follow-up period, it was observed that participants in the exposure condition in which the steps were applied consecutively had a greater decrease in the measurements of specific phobia symptoms compared to the participants in the exposure condition in which the steps were not consecutive (first step 1, then step 5, etc.). As a result, it was stated that short-spaced exposure was more effective.

In the study by de Jong et al. (2023b), CBT applications were used. The total number of participants was 55 (31 girls and 24 boys). There were three groups in the study, and participants in each group were included in the CBT interventions. Before the intervention, all three groups were subjected to a 4-week waiting period so that the effect of the time variable could be measured. In one group, participants participated in exposure practices with the therapist during the session (45-60 minutes) and practiced each exposure exercise as homework for 45 minutes without the help of their families (therapist-guided group). In another group, participants spent the entire session with hierarchy and exposure planning, while their parents were present throughout the session as observers in the exposure planning; as homework, participants completed a minimum of one 90-minute exposure exercise with the help of their parents (parent-guided group). In the last group, participants spent the entire session with hierarchy and exposure planning and practiced the minimum 90-minute exposure tasks without the help of their families (minimum-guided group). The one-hour weekly CBT sessions lasted three weeks each for all three groups in the study. The researchers summarized their findings as follows: In all three groups, the interventions were significantly higher than the reduction in waiting time. 55% of participants were in remission concerning specific phobia at follow-up measurements. Participants in the therapist-guided group had significantly lower scores on the severity of their specific phobia

compared to those in the minimally-guided group. There was also a significant decrease in the therapist-guided group compared to the other two groups (parent-guided group and minimum-guided group) in participants' anxiety about individual goals (e.g., petting a dog's head). In the parent-guided group, parents' anxiety level was observed to be a mediating variable in treatment success, which is a notable outcome. In terms of effectiveness, all three treatments appear to be similarly effective.

OST

Farrell et al. (2018) studied children with specific phobia (4-6 years old). The total number of participants was 4 (3 girls and 1 boy). As an alternative to the basic OST protocol, the first 1 hour of the 3-hour intervention was devoted to play-integrated practices. The play interventions aimed to increase the therapist's motivation while simultaneously understanding the child's cognitions (the play environment was designed to reveal the child's cognitions about the phobia). 75% (n = 3) of the participants' parents reported that their children were better able to cope with dog phobia. When the 1-month follow-up measurements were reviewed, it was stated that 3 of the 4 participants were at a non-diagnostic level, and one still met the diagnostic criteria. In the 3-month follow-up measurements, it is stated that all participants reached the non-diagnostic level.

In Farrell et al.'s (2021) study on OST applications for dog phobia, the total number of participants was 8 (4 girls and 4 boys). Within the scope of the study, virtual reality-based exposure applications were used. In this treatment protocol, exposure practices were performed in a 3-hour session. Following the single-session virtual reality application, a telephone support program was conducted for 3 weeks. A measurement was taken one week after the virtual reality application, and the follow-up measurement was repeated one month later. According to the Freidman $\chi 2$ / Wilcoxon Signed Rank Test results, a significant decrease in target measurements ($p<.01$), a significant decrease in behavioral change ($p<.005$), and a significant decrease in clinical severity ratings ($p<.005$) were observed. Based on this, it was stated that OST is an effective treatment method in animal phobia (dog). The researchers took a one-month follow-up measurement; they stated that there was a significant difference in clinical severity ratings ($p<.05$), but there was no significant difference in the recovery of the participants (not meeting the diagnostic criteria) ($p>.05$).

Oar et al. (2017) studied a sample of child adolescents with blood/injection type phobia. The total number of participants was 20 (13 girls and 7 boys). Within the scope of the study, psychoeducation was given to the participants and their families, and then the participants performed the OST practices. After these practices, both the participants and their families were included in a 4-week therapy continuation program via a video call application. The researchers considered the follow-up measurements of the participants and categorized the participants in four different groups regarding the effects of OST. In this context, the participants were categorized into: Immediate responders to OST (n=5, 25%), late responders to OST (n=8, 40%), partial responders to OST (n=2, 10%), and non-responders to OST (n=5, 25%). While making this categorization, the lack of consistent results in follow-up measurements was taken into consideration. Considering the findings of the study, it is seen that 75% of the participants responded to OST.

The study by Ollendick et al. (2009) was conducted in both the United States and Sweden. The total number of participants was 196 (107 girls and 89 boys). There were two experimental and one control group. While one of the experimental groups included OST practices, the other group received "educational support therapy (EST)". EST involves transferring the logic of specific phobia to the child; it is an awareness-based intervention program based on the quote "knowledge is power" (Silverman et al. 1999), and unlike OST, it does not include exposure practices. While the data obtained at the end, the study showed that there was a decrease in the severity of phobias of the participants in the experimental groups compared to those in the control group and the number of participants at the level to be diagnosed with specific phobia was less; the scores of the participants on self-report scales, family ratings and behavioral avoidance scales did not seem to be superior compared to the control group. When the experimental groups were compared, it was emphasized that OST was superior to the educational support practices after the intervention, and it was stated that this situation continued in the 6-month follow-up.

Öst et al. (2001) conducted a study with 60 child adolescents between the ages of 7-17 (37 girls and 23 boys). There were three groups (two experimental and one control group): In the first group, participants were administered OST; in the second group, participants were administered OST in the presence of a parent; and in the last condition, participants were not administered any intervention (control group). OST applications were conducted face-to-face by two clinical psychologists experienced in the field. Considering the severity of phobia, behavioral activation scores, and participants' self-report ratings of their anxiety levels, it is seen that the scores in both experimental groups differed significantly (positively) compared to the control group, and

this significant difference continued in the follow-up measurements. Another finding obtained from the study is that there is no difference in the treatment results when there is another diagnosis besides specific phobia.

EMDR

The study by Meentken et al. (2020) included an EMDR treatment for secondary psychopathologies (PTSD, depression) co-morbid with a diagnosis of specific phobia. The total number of participants was 74 (25 girls and 49 boys). The treatment process was conducted by five different therapists who were accredited or supervised for EMDR treatment. Participants in the EMDR group received an average of 3.5 (SD=1.9) sessions, each session lasting approximately 50 minutes. After the intervention, an 8-week follow-up was conducted, and the baseline measurements taken before the treatment were compared with the final measurements taken at the end of the process. It was stated that EMDR treatment did not cause a significant change in PTSD symptoms but had a significant effect on depression and anxiety disorders. Blood-injection type-specific phobia was measured using self-report scales from children, and it was reported that EMDR had a significant effect on the phobia ($p<.05$).

Yıldırım and Bahayi (2023) conducted a 5-session EMDR treatment for test anxiety and specific phobias of adolescents and reported that test anxiety and specific phobias of adolescents improved with EMDR treatment, and the decrease in test scores was significant ($p<.001$). Follow-up measurements were not taken in this study. The total number of participants in the study was 15 (10 girls and 5 boys).

CBT and OST

In Oar et al.'s (2015a) study, 24 pediatric adolescents (17 girls and 7 boys) with blood/injection type phobia received OST. Each participant was randomly assigned to one of three groups: Participants in the first group received the same OST protocol after a 1-week waiting period, participants in the second group received the same protocol after a 2-week waiting period, and participants in the third group received the same protocol after a 3-week waiting period. After the OST, a 4-week online homework maintenance program was conducted with the participants. When the outcomes of the therapy were evaluated, one-way analysis of variance results revealed that there was no difference between the groups in terms of waiting time. At the end of the treatment, 33% of the participants reported remission of their specific phobias. At the 1-month follow-up (at the end of the online therapy sessions), 58% of the participants and 62% of the participants at the 3-month follow-up became diagnosis-free for specific phobia.

Wright et al. (2022) compared OST and CBT in terms of effectiveness and cost. The total number of participants was 268 (167 girls, 101 boys). Participants were randomly assigned to the OST and CBT conditions and included in the program of the relevant protocol. The researchers administered CBT in a range of 4-20 sessions (45-60 minutes for each session) and OST as a one-time intervention (1 hour for treatment planning, 3 hours for intervention). A 6-month follow-up was planned after the intervention; this follow-up consisted of interviews with the participants and their families. The researchers stated that OST and CBT had a significant effect on children's anxiety and depression levels, but there was no difference between them in terms of effectiveness. After 6 months, according to the information obtained from the interviews, 27% of the participants included in the follow-up did not meet the diagnostic criteria for specific phobia, and this finding was obtained without any difference between the two intervention groups. It was concluded that the OST protocol was subject to much more affordable fees compared to CBT, so the main difference was cost rather than effectiveness. In conclusion, this study reported that OST is a relatively more feasible and economical approach.

CBT and EMDR

Azimisefat et al. (2022) conducted an experimental study with 45 female adolescent participants with natural environment (fear of heights) type phobia. There were three groups in the study: two intervention and one control group. The first one is the CBT group; in this group, there are virtual reality-based exposure applications. The other intervention group includes EMDR applications. Participants in the control group did not receive any intervention; after the research, these participants were allowed to benefit from psychological help services upon their request. Pre-test and post-test measurements were taken in the study. The study lasted six weeks and consisted of six sessions. The researchers analyzed covariance (ANCOVA) to compare the three groups and included the pre-test measurements as a covariate variable in the analysis. According to the ANCOVA results, there was a significant difference ($p<.001$) between CBT and control group in fear of heights and anxiety sensitivity scores; there was also a significant difference ($p<.001$) between EMDR and control group, but no significant difference was found between CBT and EMDR groups ($p>.05$). The researchers stated

that both CBT (with virtual reality) and EMDR interventions were effective in the intervention of natural environment type specific phobia, but there was no difference between both therapeutic interventions. There was no follow-up measurement in this study.

Discussion

When the results of our review are examined, nine of the studies included animal phobia, nine included blood/injection phobia, six included phobias evaluated in the "other" category, six included natural environment type phobia, and three included situational phobia. At this point, it is seen that animal phobias and blood/injection type phobias are superior in number, while natural environment type phobia and phobias in the "other" category follow them with equal shares, and situational phobia is less in number. Since the current study is a systematic review, the articles were analyzed based on research rather than participant-based when evaluating the type of specific phobia, therefore, in line with the outputs obtained here, the question of "which type of specific phobia researchers in the literature are more interested in" can only be answered, the reason being that some studies focus on a single type of specific phobia (Dewis et al. 2001, Oar et al. 2015a, Berge et al. 2017, Oar et al. 2017, Farrell et al. 2018, Meentken et al. 2020, Farrell et al. 2021, Azimisefat et al. 2022) can be given. This leads to a bias in the distribution of specific phobia types.

When the studies are investigated in terms of gender: According to the majority of the studies, specific phobia is found in girls (Dewis et al. 2001, Öst et al. 2001, Ollendick et al. 2009, Oar et al. 2015a, Berge et al. 2017, Oar et al. 2017, Farrell et al. 2018, Azimisefat et al. 2022, Wright et al. 2022, de Jong et al. 2023a, 2023b, Yıldırım and Bahayi 2023), while in one study it was more common in men (Meentken et al. 2020). In addition, in one study, genders were equally distributed (Farrell et al. 2021). Considering the gender of the participants, the total number of girls in the current study was 548, and the total number of boys was 366. This equals to a ratio of 1.5:1 (girls/boys), and considering the mixed findings in the literature, it is thought that these outputs will contribute to the literature.

In this review, no group includes pharmacotherapy used in the treatment of specific phobias when the client does not prefer psychotherapy. In addition, the fact that all therapy methods are based on exposure practices reflects the golden standard in the treatment of specific phobia. As can be understood from the articles reviewed in the current study, the most frequently used empirical intervention in the treatment of specific phobia is OST. The use of OST in seven of the 14 studies analyzed in this review (50%) is evidence for this. The effectiveness of OST has been demonstrated in all of these studies. In addition, Ollendick and Davis III (2013) emphasized that OST is highly effective in a review of OST applications in child and adolescent specific phobia aged 7-17 years. Although this systematic review focused on the child and adolescent sample, there are studies indicating that OST is effective in the treatment of specific phobias in adults as well as children (Oar et al. 2015b, Ollendick et al. 2015). For example, in a study in which OST was used for fear of flying in an adult sample, OST was found to be an effective method (Wannemueller et al. 2020).

Efficacy studies on EMDR are mostly trauma-focused (Rodenburg et al. 2009, Torres-Gimenes et al. 2024, Wright et al. 2024). Recently, it is seen that different psychiatric disorders such as anxiety disorders (Lee and Cuijpers 2013, Yunitri et al. 2020) depression (Sepehry et al. 2021) and obsessive-compulsive disorder (Keenan et al. 2018, Talbot 2021) are also treated with this method. Studies in the literature reveal that EMDR is also an effective treatment method in child and adolescent specific phobia (Muris et al. 1997, 1998, Meentken et al. 2020, Yöyen et al. 2023). However, it is seen that review studies on EMDR in the field of specific phobia are limited. In fact, there is no meta-analysis study on specific phobia and EMDR in the literature; in meta-analyses, specific phobia and anxiety disorders are addressed together - however, in both meta-analyses that address specific phobia and anxiety disorders together, it is stated that EMDR is an effective treatment method (Cuijpers et al. 2020, Yunitri et al. 2020). When the studies in the meta-analysis of Yunitri et al. (2020) are examined; it is seen that the duration of EMDR therapy for phobia is between 1-5 sessions. Compared to trauma-focused EMDR durations of 12-16 sessions (Rodenburg et al. 2009), it is observed that EMDR for specific phobia lasts shorter. On the other hand, drop out rates in EMDR are reported to be 31.97% in a large-scale meta-analysis study (Reinders 2019).

Follow-up measurements are considered an important parameter in terms of interpreting the evidence-basedness and rationale of interventions (Signorell et al. 2021). Follow-up measurements were taken in all studies on CBT included in the review and significant differences were found in all follow-up measurements (Dewis et al. 2001, Berge et al. 2017, de Jong et al. 2023a, 2023b), the same is true for OST (Öst et al. 2001, Ollendick et al. 2009, Oar et al. 2015a, 2017, Farrell et al. 2018, 2021). In the case of EMDR, while a follow-up

measurement was taken in one of the two studies (Meentken et al. 2020), no follow-up measurement was taken in the other (Yıldırım and Bahayi 2023). In the study of Wright et al. (2022), it is notable that almost 30% of the participants did not meet the diagnostic criteria in the 6-month follow-up measurements taken after CBT and OST interventions, while there was no difference between the CBT and OST groups in terms of meeting the diagnostic criteria. In another study involving CBT and EMDR interventions, there was no follow-up measurement (Azimisefat et al. 2022).

When an evaluation was made in terms of the techniques specifically used, it was seen that some techniques were at the top of the list. Nine of the 14 articles reviewed included cases of blood/injection type-specific phobia (Table 1), and despite the differentiation in the nervous system in the literature, it was observed that only one of the treatment protocols (Berge et al. 2017) used techniques for this difference (1/9). Consistent with the literature, Wright et al. (2022) reported that breathing exercises played a key role in blood/injection type phobias based on data obtained from qualitative observations. However, some researchers have stated that blood/injection type phobia is the least responsive to treatment and attributed this to the fact that it is not always possible to confront the worst situation (de Jong et al. 2023a).

Considering the studies on CBT and OST, it is observed that OST does not differ significantly from CBT in terms of therapy effectiveness, but OST is superior in terms of both the duration and simplicity of implementation of treatment protocols and cost (Wang et al. 2022, Wright et al. 2022). In one of the articles in the current study, a 4-week online CBT-task (exposure) protocol was applied after the OST application (Oar et al. 2015a). In this direction, it is seen that the two techniques are used together; the aim of the study is not to compare the techniques. When alternatives to CBT are considered in terms of cost reduction, it is notable that OST fulfills this need. Accordingly, OST is not less effective than CBT and is superior to CBT in terms of being cost-effective (Hayward et al. 2022, Wang et al. 2022). The principle of parsimony, which is often emphasized in positive sciences, means that when there are two different solutions to a problem, it is more appropriate to choose the simpler one (Laird 1919). The fact that CBT, which is seen as the "golden standard" for anxiety disorders (David et al. 2018), is being replaced by OST in specific phobias brings some questions to mind: For example, is OST replacing CBT because it is an effective treatment method? Are researchers becoming less interested in CBT, which requires long sessions, as they see the effectiveness of OST in the treatment of specific phobias? Another important issue in the pioneering role of OST in the treatment of specific phobias and its more frequent use than classical CBT is the dropout rate. Meta-analysis studies have revealed that drop-out rates in cognitive behavioral therapy are approximately one in four (Fernandez et al. 2015, Linardon et al. 2018). In other words, one out of every four people who start a session stops coming to therapy in the second or following sessions. Since there are no session breaks in OST, which includes single-session interventions, there is no risk of dropping out of therapy unless participants leave the session. This may increase the chance of success in OST.

While there is a study comparing CBT and EMDR in our review (Azimisefat et al. 2022), it was stated in the current study that there was no significant difference in effectiveness between virtual reality-oriented CBT and EMDR applications. While studies comparing CBT and EMDR in the context of different disorders are available in the literature (Ridic 2018, Gupta 2021, Hudays et al. 2022), future research is needed in specific phobia.

In our review, there is no study comparing OST and EMDR, and it is noticeable that there is a gap in the literature at that point. On the contrary to CBT and OST, it is not possible to make comments on treatment dropout rates in the specific case of OST-EMDR, because OST is a treatment method based on CBT, but EMDR has its own rationale. Further studies are needed to make a more detailed and comprehensive interpretation and to compare OST-EMDR methods.

When the literature is searched, it is seen that there is no current systematic review in our country in which the three methods in the current study are discussed and compared in the treatment of specific phobia for children and adolescents. For example, although OST has been mentioned for many years (Öst 1987), it is seen that the relevant technique has not been discussed and used in the Turkish literature. The fact that this study addresses the OST technique in the treatment of specific phobia in children and adolescents is a major reason for the absence of a systematic review in Türkiye. Although there are reviews in the literature in Türkiye that include exposure practices in specific phobia cases (Demir and Köskün 2023), the comparison of the techniques and methods covered by the current study is the unique part of the study that contributes to the literature. Of the 14 articles reviewed, 12 were conducted with child and adolescent samples, 1 with adolescent samples, and 1 with child samples. The current study covers the treatment of specific phobias in children and adolescents; therefore, the majority of the articles (85.7%) using child and adolescent samples is consistent in terms of

serving the purpose of the study. Lyneham et al. (2007) conducted a validity and reliability study of the ADIS scale and stated that the scale adequately measures DSM-IV criteria for specific phobia. Therefore, the fact that 8 of the analyzed articles used this scale can be considered one of the strengths of the study (shown in detail in Table 1). The fact that all specific phobia subtypes are included in the review can also be considered an advantage in terms of providing a wide range.

Within the scope of this study, a review was conducted by focusing on certain keywords and inclusion and exclusion criteria. Therefore, the fact that some studies do not meet these criteria were not included in the review can be considered as a limitation of the study. Two of the studies included in the review were conducted with participants who had autism spectrum disorder or showed the characteristics of this disorder (Berge et al. 2017, de Jong et al. 2023a). In Meentken et al.'s (2020) study, all participants had subthreshold post-traumatic stress disorder; in addition, issues such as depression and sleep problems were also included in the study. In another study, an EMDR protocol was applied for exam anxiety as well as specific phobia (Yıldırım and Bahayi 2023). Although the presence of comorbid diagnoses is mentioned as a limitation, it is frequently reported in the literature that specific phobia is often seen together with other mental problems (Silverman and Moreno 2005, LeBeau et al. 2010).

Conclusion

In this systematic review, treatment options for specific phobias in children and adolescents were examined, and the most commonly used interventions were compared and presented. Although it has not yet gained a position in our country, it has been observed that One Session Treatment is the most widely used evidence-based psychotherapy method in child and adolescent specific phobia cases. This method seems to be superior to the other two techniques in terms of time, cost, and applicability. However, cognitive behavioral therapy and the EMDR approach are other psychotherapy methods that maintain their effectiveness. Among the techniques used in the treatment of specific phobia, it has been observed that in vivo exposure is actively used. However, it was thought that in addition to real-life exposure, the imaginary (in vitro) exposure technique is also gaining more and more space in the literature (Moldovan and David 2014, Miloff et al. 2016, 2019) and this technique should also be included in future studies.

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