

# Behavioral Intervention Techniques Used in the Treatment of Obsessive Compulsive Disorder: Systematic Review

## Obsesif Kompulsif Bozukluk Tedavisinde Kullanılan Davranışçı Müdahale Teknikleri: Sistematik Derleme

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### Abstract

While obsessions are defined as unobtrusive, disturbing thoughts, compulsions are behaviors performed in the form of rituals to relieve the feeling of discomfort caused by obsessions. Behavioral therapy is based on determining the relationship and interfering with behavior by looking at the individual's responses to environmental stimuli. The aim of this study is to describe behavioral therapy techniques used in the treatment of individuals with obsessive-compulsive disorder (OCD) and to investigate their effectiveness. The study was carried out in accordance with the PRISMA directive. Web of Science, Pubmed, Science Direct, YÖK National thesis Center and TR Index databases were scanned in order to identify studies using behavioral techniques in OKB treatment between 2000 and 2020. As a result of the scan, 632 studies have been reached, 11 results have been evaluated. All of the reviewed studies are published research papers. Five of the articles reviewed used virtual reality, three used psychoeducation and exposure, two used exposure and response prevention techniques and one used psychoeducation, exposure and response prevention techniques. The total number of participants of the researches included in the study is 438. Based on the results of researches, techniques such as virtual reality, exposure, response prevention, psychoeducation seem to be effective when used alone or together in the treatment of OCD.

**Keywords:** OCD, behavior therapy, exposure, systematic desensitization, virtual reality

### Öz

Obsesyonlar engellenemeyen, rahatsız edici düşünceler olarak tanımlanırken, kompulsiyonlar, obsesyonların ortaya çıkardığı rahatsızlık hissini giderebilmek için ritüeller şeklinde gerçekleştirilen davranışlardır. Davranışçı terapinin ise temelinde, bireyin çevresel uyaranlara verdiği tepkilere bakarak ilişkiyi belirlemek ve davranışa müdahalede bulunmak vardır. Bu çalışmada, obsesif kompulsif bozukluğa (OKB) sahip bireylerin tedavisinde kullanılan davranışçı terapi tekniklerini betimlemek ve etkililiğini araştırmak amaçlanmıştır. Çalışma "Preferred Reporting Items For Systematic Review and Meta-Analysis Protocols (PRISMA)" yönergesine uygun şekilde gerçekleştirilmiştir. 2000 ve 2020 yılları arasında OKB tedavisinde davranışçı teknikleri kullanan çalışmalarını belirlemek amacıyla Web of Science, Pubmed, Science Direct, YÖK Ulusal Tez Merkezi ve TR Dizin veri tabanları taranmıştır. Tarama sonucunda, 632 çalışmaya ulaşılmış, 11 sonuç değerlendirmeye alınmıştır. İncelenen çalışmaların hepsi yayımlanmış araştırma makalesidir. Ulaşılan makalelerin beşi sanal gerçeklik uygulaması, üçü psikoeğitim ve alıştırmaya, ikisi alıştırmaya ve tepki önleme ve biri de psikoeğitim, alıştırmaya ve tepki önleme tekniklerini kullanmıştır. Çalışmaya dahil edilen araştırmaların katılımcı sayıları toplamı 438'dir. Araştırmaların sonuçlarına bakıldığında OKB'nin tedavisinde, sanal gerçeklik uygulamaları, alıştırmaya, tepki önleme, psikoeğitim gibi teknikler yalnız kullanıldığında da, beraber kullanıldığında da etkili görünmektedir.

**Anahtar sözcükler:** OKB, davranış terapisi, maruz bırakma, sistematik duyarısızlaştırma, sanal gerçeklik

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**OBSESSIONS** and compulsions are observed at the same time in obsessive-compulsive disorder (OCD). Obsessions are thoughts, images and impulses that come to a person's mind in a constant, persistent, involuntary and irrepressible way. On the other hand, compulsions are behaviors or mental actions to suppress and eliminate anxiety and distress caused by obsessions [American Psychiatric Association (APA) 2013]. Obsessions are images, distressing impulses or thoughts that occur in repetitive and compulsive form which the person knows are false and absurd (Bayar and Yavuz, 2008, Karamustafalıoğlu and Yumrukcal, 2011). Compulsions are usually motor or mental actions performed in the form of certain rituals to relieve the anxiety caused by an obsession (Bayar and Yavuz, 2008). OCD is a chronic and neuropsychiatric anxiety disorder in which one or both obsessions and compulsions occur. Obsessions are stubborn ideas and thoughts, impulses and dreams that cause stress, experienced inappropriately. On the other hand, compulsions are behaviors, ideas, or movements that the person repeats, even though s/he knows it is absurd, in order to relieve the effect of anxiety associated with obsessions (Miguel et al., 2005).

OCD had entered the literature of Western medicine in the Middle Ages firstly (Barahona-Corrêa et al. 2015). In later times, the first definition of obsessions and compulsions was made by J. E. D. Esquirol in 1838 (Berrios 1996, Öztürk 2004). With the third edition of the Diagnostic and Numerical Manual of Mental Disorders (DSM), published in 1980, OCD entered structured mental disorder classifications (APA 1980). DSM- IV classifies OCD under the heading "anxiety disorders", while in the fifth edition that is the last edition of DSM, a new unit was created that was called "obsessive-compulsive disorder and related disorders" by separating from the Anxiety Disorders Unit (Regier et al. 2013).

According to current studies, OCD is the fourth most common mental health disease. Its lifetime prevalence varies from country to country. Looking at Turkey as a whole, its lifetime prevalence was found to be between 2.5-6.2% and its 12-month prevalence was between 0.5-5.6% (Bayar and Yavuz 2008). The most common obsessions are religious, infection and sick, sexual, damaging, symmetry obsessions and the most common compulsions are hand washing, repetition, touching, sorting, symmetry and counting compulsions (Foa et al. 1995).

The foundations of behaviorism date back to the Russian physiologist Pavlov in the late 1800s. In a study of the digestive systems of dogs, I. P. Pavlov discovered classical conditioning, which is one of the most important concepts of psychology and behavioral approach. J. B. Watson, a pioneer in the United States, conducted experiments that showed that classical conditioning could also be implemented to humans. J. B. Watson argued that psychology's goal should be to anticipate and control behaviors. B. F. Skinner was the person who systemized behaviorism. B. F. Skinner has put behaviorism in a position to explain the behavior of all people with the principles of operational conditioning and reinforcement (Turkcapar and Sargın 2012). Behaviorism has increased its effectiveness with these developments, especially after the 1950s (Sargın and Sargın 2015). Behaviorism is based on determining the relationship and interfering with behavior by looking at the individual's responses to environmental stimuli, without looking at consciousness or mental processes. If

environmental stimuli can be controlled, behaviors can be controlled. The goal of behavioral therapy is to bring about a change in behavior related to a problem that exists in an individual with classical and operational conditioning. Indeed, these conditions are the most basic learning principles for behavioral therapy (Spiegler and Guevremont 1993). The origin of modern behavioral techniques is based on J. Wolpe. Wolpe has also developed the systematic desensitization technique, which is often used in behavioral therapies. In behavioral therapy, systematic desensitization, on-site exposure, imaginary exposure, psychoeducation, virtual reality are currently used along with techniques such as breathing and novelization exercises. Although the definitions and implementations of each of these techniques are different, actually they are all aimed at changing behavior towards an individual's existing problem.

**Systematic desensitization:** Systematic desensitization, developed by J. Wolpe in 1958, is a technique implemented to reduce avoidance behavior in relation to a specific stimulus. While the individual is engaged in a behavior that struggles with anxiety, s/he imagines situations that activate more and more anxiety. Gradually, the individual becomes less susceptible to these situations (Rachman 1967). In this technique, the practitioner teaches the individual a response that struggles with anxiety. Stimuli and events that cause anxiety are sorted by the amount of anxiety they create. Each scene in this sequence is presented repeatedly until the individual feels little discomfort (Spiegler and Guevremont 1993).

**Exposure:** Mainly, this technique, which has various methods, shows that the negative consequences that are actually feared will not occur by intense exposure to the situation in which the individual is concerned. In other words, anxiety is treated with anxiety (Foa and Kozak 1986). On-site exposure involves implementing the technique in a real event. An imaginary exposure is an imaginary implementation of the technique, not in real life, it means that it is an imaginary raising of anxiety (Spiegler and Guevremont 1993).

**Virtual reality:** This technique is actually a version of the exposure technique. Sensors are placed on the individual's head and arms, and the individual is exposed to the image in the virtual world (Emmelkamp 2005).

**Relaxation exercises:** They are used in addition to the other techniques. The goal is to reduce increased reactions such as muscle tension, heart rate, blood pressure or breathing (Spiegler and Guevremont 1993).

Behavioral therapy techniques are often used in the treatment of OCD. The principle of behavioral techniques is to prevent the individual's obsessive thoughts and anxiety caused by stimuli through a number of practices. Obsessions increase anxiety, and compulsions occur to reduce this anxiety (Bayar and Yavuz 2008). At this point, the *exposure* technique aims to reduce anxiety by exposing the patient to an anxiety-inducing situation in real life or in a clinical setting, in clinician observation. On the other hand, *systematic desensitization* involves the introduction of stimuli to the patient in a gradual way from the least anxious state to the most anxious state. For this reason, the stages from the situation in which the patient is least concerned to the situation in which s/he is most concerned are listed as a hierarchy of anxiety. *Virtual reality* is a kind of exercise that has been implemented with the development of technology. In a clinical setting, it involves exposing the patient to anxiety

situations by using computer software and videos. *Relaxation exercises* serve as an additional technique that serves to reduce the anxiety that occurs in the patient after other methods used. It aims to reduce the patient's anxiety level and allows the patient to develop coping skills. Behavioral therapy can be used in both inpatient and out patients (Köse 2010). In particular, these techniques can be used with other therapy techniques today (Whittal and McLean 1999, Watson and Rees 2008). There are many studies that behavioral techniques have proven their effectiveness in treatment. The main aim of this study is to systematically review the results of many studies that have recently investigated the effectiveness of behavioral techniques used in the treatment of OCD. For this aim, the sample showing the general characteristics of the interventions in the studies and the intervened variables investigated the effectiveness of behavioral therapy methods by comparing them according to the intervention methods.

In this research, the effectiveness of behavioral treatment programs and intervention programs in individuals with OCD was investigated as a result of the literature review.

As a result of the studies obtained, the research also tries to answer to the following questions:

1. What behavioral therapy method has often been studied in studies in the literature?
2. According to the results obtained from these studies, what is the effectiveness of behavioral techniques in OCD treatment?

## Method

"Systematic review", also known as "research synthesis", aims to provide a comprehensive and unbiased synthesis of many related studies in a single document (Aromataris and Pearson 2014). In this research, behavioral techniques used in the treatment of OCD were systematically reviewed.

This systematic review research was conducted in accordance with the directive "Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P)". PRISMA is a guide that specifies standards for reporting the results of systematic reviews, providing transparency in the presentation of results and partnership between reviews (Moher et al. 2009).

The research was conducted in the form of a retrospective searching of publications on the subject. Literature review has been limited to studies conducted in the last 20 years (2000-2020) to determine the current effectiveness of studies conducted on behavioral techniques in the treatment of OCD. Web of Science, Pubmed and Science Direct electronic databases for English studies and Ulakbim and YÖK Thesis databases for Turkish studies were searched manually. Keywords selected for searching in these databases are scanned to match the keywords contained in Medical Subject Headers (MESH) and the keywords like "behavioral therapy in obsessive-compulsive disorder", "behavioral techniques in obsessive-compulsive disorder", "behavioral techniques in the treatment of obsessive-compulsive disorder" and "behavioral therapy in the treatment of obsessive-compulsive disorder" are scanned between

the dates of September-November 2020. Keywords are scanned in summary, keyword, and working title so that they are combinations of each other in the relevant databases. Due to the systematic compilation feature of the study carried out, research studies were included in the studies obtained.

In the study carried out in Turkish and non-English languages, techniques used other than behavioral techniques, publications whose full text is inaccessible, publications without research studies and studies other than 2000-2020 were determined and not included as exclusion criteria.

The diagram of the selection flow of the studies is included in Figure 1.

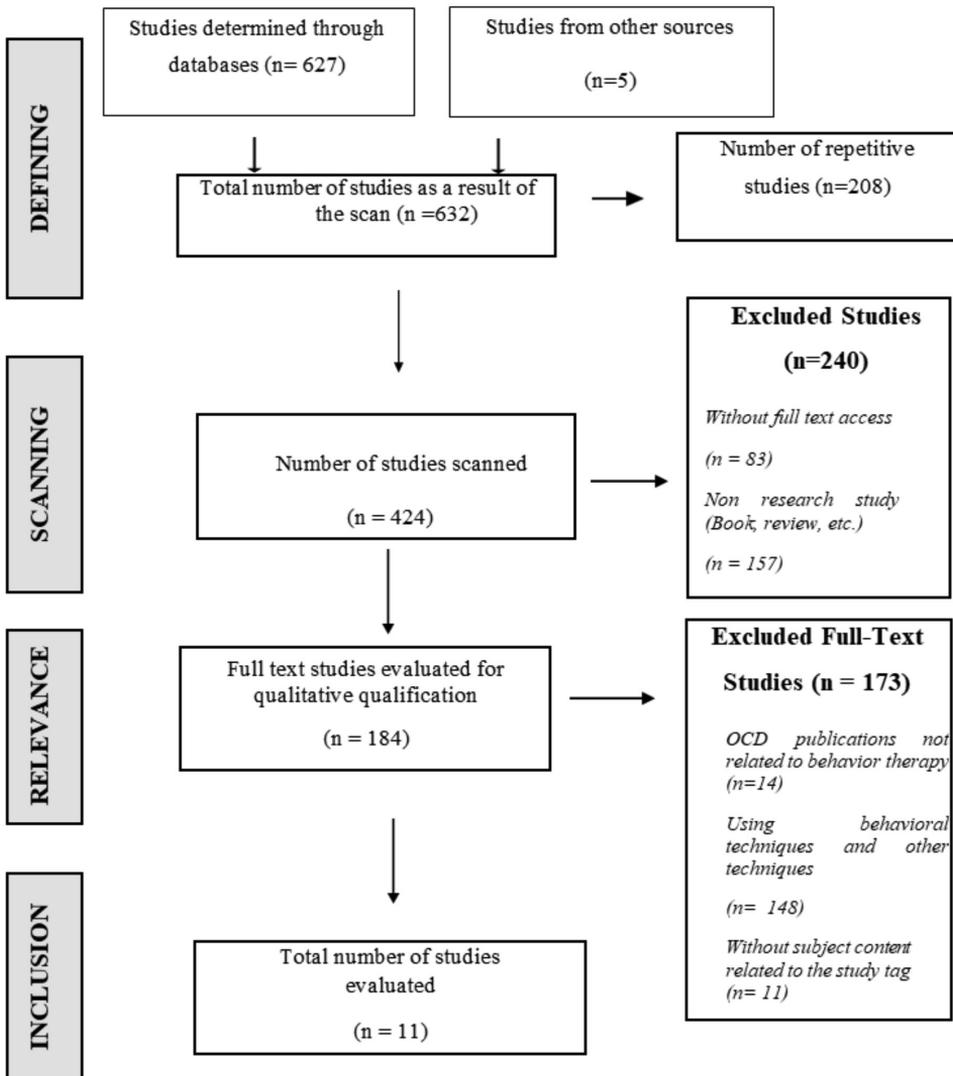


Figure 1. Selection of studies

## Results

As mentioned above, some of the studies obtained after the searching were excluded in accordance with the exclusion criteria and the result of it, the evaluation was conducted over 11 studies. In this direction, the works are evaluated on the axis of the titles shown in Table 1. The table is sorted by year of studies.

### Study designs

In all 11 studies evaluated, research designs were used in which pre-test and final-test measurements were taken. A control group was used in seven (64%) of these studies. None of the studies with a control group are not randomized controlled studies. In 10 studies, long-term individual or group therapy was used (91%) (Himle et al. 2001, Rosqvist et al. 2001, Nakatani et al. 2003, Himle et al. 2006, Yamanishi et al. 2009, Whiteside et al. 2012, Belloch et al. 2014, Laforest et al. 2016, van Bennekom et al. 2017, Inozu et al. 2020), while an implementation was made in just a study (9%) (Kim et al. 2008). Pre-test and final-test implementations of studies vary in terms of the number of sessions.

### Sample characteristics

When examining the sample characteristics of the studies, it seems that OCD patients were used in only five studies (45%) (Himle et al. 2001, Rosqvist et al. 2001, Nakatani et al. 2003, Himle et al. 2006, Belloch et al. 2014). Two of these studies were conducted by using a control group from OCD patients (Himle et al. 2001, Himle et al. 2006). The remaining studies were conducted using a healthy control group (55%) (Kim et al. 2008, Yamanishi et al. 2009, Whiteside et al. 2012, Laforest et al. 2016, van Bennekom et al. 2017, Inozu et al. 2020).

A total of 438 people diagnosed with OCD were reached through the studies included in the systematic review and various intervention programs based on behavior therapy were implemented. Adult sample was used in nine of the studies and child sample was used in only one study (Whiteside et al. 2012). The average age of the child sample study was 13.59, while the average age of the studies involving adult sample participants was 20.85 - 37.91. The average age of one of the studies was not reached (Kim et al. 2008).

### Aim of the studies

The common main objective of the studies included in the review is to determine the effectiveness of behavioral therapy techniques in the treatment of OCD. The studies also touched on different issues for this aim. These are the effectiveness of the duration of group therapy in the treatment of OCD (Himle et al. 2001), examining the role of insight in the treatment of OCD (Himle et al. 2006), determination of the effectiveness of virtual reality use in the treatment of OCD (Kim et al. 2008, Belloch et al. 2014, Laforest et al. 2016, van Bennekom et al. 2017, Inozu et al. 2020), determination of the effectiveness of behavioral therapy techniques on brain structures (Nakatani et al. 2003, Yamanishi et al. 2009) and the effectiveness of behavioral therapy techniques in the treatment of OCD (Rosqvist et al. 2001, Whiteside et al. 2012).

**Table 1. Summary information on behavioral therapy studies in OCD treatment**

Studies	Measurement	N	Age (range/ mean)	The aim of the study	Treatment/ intervention
Himle et al. 2001	Pre-Test Post-Test	113	? M.: 37 (sd:10.86)	To determine the effectiveness of 7 and 12 weeks group therapy for OCD treatment	Psychoeducation Exposure
Rosqvist et al. 2001	Pre-Test Post-Test	11	25-69 M.: 40 (sd: 12)	"Home-based" exposure and response prevention effectiveness	Exposure Response Prevention
Nakatani et al. 2003	Pre-Test Post-Test	31	? M.: 28 (sd:11.20)	To investigate the effects of behavioral therapy on regional cerebral blood flow	Psychoeducation Exposure Response Prevention
Himle et al. 2006	Pre-Test Post-Test	69	? M.:37.91 (sd:10.68)	Examining the role of poor insight in OCD treatment	Psychoeducation Exposure
Kim et al. 2008	Pre-Test Post-Test	66	? ? ?	The effectiveness of virtual reality use in OCD patients	Using Virtual Reality Glasses
Yamanishi et al. 2009	Pre-Test Post-Test	45	? M.: 34 (sd:7.1)	To investigate the effects of behavioral therapy on regional cerebral blood flow	Psychoeducation Exposure
Whiteside et al. 2012	Pre-Test Post-Test	30	8-18 M.: 13.59 (sd:2.8)	The effectiveness of behavioral therapy in children with OCD	Exposure response prevention
Belloch et al. 2014	Pre-Test Post-Test	4	22-44 Ort: 31 (sd: ?)	The effectiveness of virtual reality use in OCD patients	Using virtual reality glasses
Laforest et al. 2016	Pre-Test Post-Test	32	18-65 M.: 30.16 (sd: ?)	The effectiveness of virtual reality use in OCD patients	Using Virtual Reality Glasses
van Bennekom et al. 2017	Pre-Test Post-Test	16	M.: 31.6 (sd:10)	The effectiveness of virtual reality use in OCD patients	Using Virtual Reality Glasses
Inozu et al. 2020	Pre-Test Post-Test	21	? M.: 20.85 (sd: ?)	The effectiveness of virtual reality use in OCD patients	Using Virtual Reality Glasses

Control group	Therapy type/number of sessions	Measurement inventory*	Results	significance level of the change
(Used) OCD patients who received group therapy for 7 weeks	Group Therapy / 7 and 12 session	YBOCS BDI	YBOCS (↓) BDI (↓)	W.: (+) B.: (-)
(Unused)	Individual therapy/24 session	YBOCS	YBOCS (↓)	W.: (+)
(unused)	individual therapy/multiple sessions	YBOCS HAM-D	YBOCS (↓) HAM-D (↓)	W.: (+)
(Used) OCD patients with sufficient insight	Group therapy/7 session	YBOCS	YBOCS (↓)	W.: (+) B.: (+)
(Used) Healthy individuals	Individual therapy/1 session	YBOCS	YBOCS (↓)	W.: (+) B.: (+)
(Used) Healthy individuals	Group therapy/12 session	YBOCS STAI	YBOCS (↓) STAI (↓)	W.: (+) B.: (?)
(Used) Healthy individuals	Individual therapy/18 session	C-YBOCS SCAS	CYBOCS (↓) SCAS (↓)	W.: (+) B.: (+)
(Unused)	Individual therapy/multiple sessions	YBOCS	YBOCS (↓)	W.: (+)
(Used) Healthy individuals	Individual therapy/multiple sessions	YBOCS STAI	YBOCS (↓) STAI (↓)	W.: (+) B.: (+)
(Used) Healthy individuals	Individual therapy/multiple sessions	YBOCS HAM-A	YBOCS (↓) HAM-A (↓)	W.: (+) B.: (+)
(Used) Healthy individuals	Individual therapy/multiple sessions	YBOCS	YBOCS (↓)	W.: (+) B.: (+)

\*BDI: Beck Depression Inventory, C-YBOCS: Children Yale-Brown Obsessive Compulsive Disorder Scale, B.: Between Groups, HAM-A: Hamilton Anxiety Scale, HAM-D: Hamilton Depression Scale, M.: Mean, SCAS: Spence Children's Anxiety Scale, sd.: Standard Deviation, STAI: State Trait Anxiety Inventory, W.: Within Groups, YBOCS: Yale-Brown Obsessive Compulsive Disorder Scale, ↓: Decrease, +: Significant (p<0.05), -: Not Significant (p>0.05), ?: No Information

## **Treatment/intervention methods and duration**

Although some studies differ from each other in terms of content, duration and method, it seems that behavioral therapy-oriented interventions are used in all studies. While three studies have used exposure and psychoeducation from behavioral therapy techniques (Himle et al. 2001, Himle et al. 2006, Yamanishi et al. 2009), additionally a study has used response prevention (Nakatani et al. 2003). Two studies have used exposure and response prevention (Rosqvist et al. 2001, Whiteside et al. 2012). The remaining five studies have used the exposure technique and virtual reality implementations (Kim et al. 2008, Belloch et al. 2014, Laforest et al. 2016, van Bennekom et al. 2017, Inozu et al. 2020). The number of sessions of the studies ranges from 1 to 24.

## **Effects of different behavioral therapy techniques on OCD treatment**

In general, the results of studies in which the effectiveness of behavioral therapy techniques in the treatment of OCD patients was tested by both individual and group interventions were examined in detail under different headings.

As it can be seen in Table 1, three studies have used psychoeducation technique along with exposure therapy. Two of these studies were in the form of group therapy (Himle et al. 2001, Himle et al. 2006), and one of them was in the form of individual implementation (Yamanishi et al. 2009). In a study conducted by Himle and his colleagues in 2001, techniques were implemented in the form of group therapy for 7 weeks and 12 weeks. OCD levels have decreased significantly in both groups compared to before therapy. However, there was no significant difference between the groups' OCD levels after therapy. As a result, it suggested that the effectiveness of behavioral therapies taken as group therapy for 7 and 12 weeks was the same. A study by Himle and colleagues in 2006 was based on the hypothesis that having sufficient insight in OCD patients was a positive factor for treatment. Psychoeducation and exposure techniques were implemented for seven weeks to a group of OCD patients who were separated as having and not having sufficient insight. As a result, OCD levels in both groups decreased significantly, but as a result of the implementation, it was concluded that patients with sufficient insight showed statistically significantly lower OCD levels than patients with low insight. With this result, the hypothesis of the researchers is confirmed. Finally, a study conducted by Yamanishi and his colleagues in 2009 found that OCD levels decreased for OCD patients and a healthy control group, where the same techniques were implemented. In a study by Nakatani and colleagues in 2003, response prevention was used in addition to these techniques. This study, conducted only with OCD patients, also concluded that techniques in individual therapy were effective techniques for decreasing OCD levels.

As it can be seen in Table 1, exposure and response prevention techniques were used in two studies. A study by Whiteside and colleagues in 2012 found that these techniques reduced both the level of OCD and the level of anxiety for children with OCD. Another study was

conducted by Rosqvist and colleagues in 2001. This study also showed that techniques can be effective not only in a clinical setting, but also when implemented in a natural home environment.

As it can be seen in Table 1, exposure techniques and virtual reality implementations were used in five studies. Although virtual reality implementations do not allow group therapy due to the nature of it, effective results were found in individual therapies for each study. Studies have found that OCD levels decreased with the implementation.

## Discussion

OCD is one of the most common diseases in psychiatric disorders (Bayar and Yavuz 2008). The main causes of OCD include factors such as genetic predisposition, higher educational status, being in the adolescent age group, negative parental relationships, overly repressive parental attitude, and inability to tolerate uncertainty (Spiegler and Guevremont 1993). Behavioral therapy, one of the most widely used methods for the treatment of OCD, was systemized in the modern sense and its effectiveness increased in 1950-1960. Behavioral therapy, described as the basis of learning and behavior regulation with reinforcements as a result of environmental stimuli, includes many techniques. These techniques include systematic desensitization, exposure and the use of virtual reality glasses. The techniques are systematically included in therapies with breathing and relaxation exercises (Manzoni et al. 2008, Cenesiz 2015).

In this study, which examined the treatment of OCD with behavioral therapy techniques, literature on the subject was scanned. Accordingly, it was concluded that behavioral techniques play a significant role in effectively treating OCD. In addition, these techniques have produced effective results in both individual and group implementations. In the exposure technique, it is aimed to determine the condition that will cause anxiety in patients and expose the patient to this stimulus in a clinical setting. Thus, although the patient's anxiety rises to the highest level, it decreases over time, and the stimulus does not create a state of anxiety over time (Karamustafalıoğlu and Yumrukcal, 2011). In addition, technological devices are also used in the exposure technique today. Special software and videos are used to exposure using virtual reality glasses (Anderson et al. 2013). Literature studies have found that virtual reality implementation is effective at OCD level (Kim et al. 2008, Belloch et al. 2014, Laforest et al. 2016, van Bennekom et al. 2017, Inozu et al. 2020). In systematic desensitization, the patient's anxiety situations are sorted in a hierarchical manner. The patient is systematically acclimated from the state that creates the least anxiety to the state that creates the most, and it is aimed to get used to the stimulus, thus, the stimulus does not create anxiety. Although anxiety levels increase as a result of people exposed to certain situations, anxiety levels can be controlled with breathing and relaxation exercises (Whiteside et al. 2012). On the other hand, psychoeducation aims to inform patients and their relatives about the disease and to develop coping skills (Safak et al. 2014). Each technique has been developed and implemented to patients over time.

When looking at the literature, studies on the subject are seen. In a metaanalysis study

conducted by J. S. Abramowitz (1996), 24 studies using exposure and intervention prevention techniques in the treatment of OCD were combined. As a result, the effectiveness of the techniques was estimated at a high effect size (Cohen's  $d > 0.80$ ) (Abramowitz 1996). In a metaanalysis study consisting of 18 studies in which techniques used to treat OCD in children were combined, the effect size of exposure and response prevention techniques in treatment was estimated to be higher than that of drug use therapy (Abramowitz et al. 2005). In another meta-analysis study, 19 studies were combined. Exposure and response prevention treatment techniques were found to be more effective than cognitive reconstruction (Rosa-Alcázar et al. 2008). Behavioral therapy techniques used for more than half a century have been used as effective intervention techniques in the treatment of OCD (Oner & Aysev 2001). According to the results of our research, each technique successfully helps to reduce levels of symptoms (ex. see., Himle et al. 2001, Kim et al. 2008, Whiteside et al. 2012). There is no difference between individual and group implementations of techniques. Looking at the research included in the study, it seems that the most commonly used technique is the use of virtual reality depending on the development of technology. It is effectively reduced symptom levels in both techniques. In addition, the techniques appear to be effective in different age groups. Effective results were found in both adolescents and adults. One point to note is the duration of implementation of behavioral techniques. Although a study found a significant decrease in OCD symptom level compared to initial scores between 7-week practice and 12-week implementation, there was no significant difference between the groups in the final measurement (Himle et al. 2001). In conclusion, it suggests that there is no difference between medium and long interventions of behavioral techniques and they also provide an advantage in terms of duration of treatment. Behavioral techniques have also been used in recent years, especially with cognitive techniques, and it is expected that they will be used for many more years.

## Conclusion

The study has aimed to determine the effectiveness of behavioral techniques used to treat OCD for a long time. Unlike similar research in the literature, it has been systematically reviewed and included studies that have made virtual reality implementations relatively recently used in the treatment of OCD. The limitation of the study is the number of research articles included in the assessment, as a result of the fact that behavioral techniques have not been used alone in recent years. Another limitation is that the study was conducted by searching academic databases with open access and free of charge through Süleyman Demirel University. In addition, the study was conducted based on the PRISMA directive, but because there is an author and criteria such as finding, qualifying and selecting the study were conducted by an individual. It is recommended that future studies, including studies of behavioral techniques were used together with other techniques, should be done through other institutions accessible to other databases, and two more researchers (the selection of two research workers, a worker in studies as a referee and inexplicable) in the decision making process and study selection.

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