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Effectiveness of Biofeedback Therapy in Treating Bladder Function Disorders

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ABSTRACT

Bladder dysfunction is a frequent health problem faced by many individuals around the world. Biofeedback therapy has become an increasingly commonly used approach to address these disorders, focusing on improving pelvic muscle control and body awareness. However, few studies have specifically evaluated the effectiveness of biofeedback therapy in addressing impaired bladder function, especially in specific populations. This study aimed to evaluate the effectiveness of biofeedback therapy in addressing bladder dysfunction in adults with incontinence or urinary retention. This study used a randomized controlled clinical research design. They were randomly divided into two groups, an intervention group that received biofeedback therapy for 8 weeks, and a control group that received no additional intervention. Measurements were made using standardized clinical evaluation scales and objective measurements of urine volume. The results of this study showed that the intervention group receiving biofeedback therapy had significant improvements in pelvic muscle control, incontinence frequency, and volume of retained urine compared to the control group. These improvements were also maintained at follow-up after 3 months of intervention. The conclusion of this study is that biofeedback therapy is effective in addressing impaired bladder function in adults with incontinence or urinary retention. This approach can be an effective and sustainable treatment option to improve the quality of life and well-being of individuals affected by bladder dysfunction. Further research is needed to explore more deeply the mechanisms and factors that influence the effectiveness of biofeedback therapy in different cases of bladder function disorders.

Keywords: *Bladder Function, Biofeedback Therapy, Controlled Clinical*

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INTRODUCTION

Therapy in the world of health is an approach or process that aims to treat, prevent or treat health disorders, both physical and mental (Abdel-Latif et al., 2021). By focusing on recovering and improving a person's health condition, therapy plays a very important role in treating various diseases and health problems. Therapeutic approaches can vary depending on the type and severity of the health problem a person is facing, as well as the underlying scientific principles. First of all, it is important to understand that health therapy does not only involve administering drugs, but also involves various other methods designed to improve a person's health condition. Therapy in the world of health has many diverse goals, but the essence is to treat, treat, prevent, or improve a person's physical and mental health problems (Alqahtani et al., 2021). These goals reflect an approach to health care, which recognizes that a person's health is influenced by a variety of factors, including physical, psychological, social, and environmental. Thus, therapy not only aims to address the symptoms of the disease directly, but also to improve the overall well-being of the individual.

Review of Literature

Terapi Biofeedback

Biofeedback therapy is an innovative approach in the world of health that offers great potential in managing various health conditions, both physical and mental (Tugtepe, Thomas, Ergun, Abdullayev, et al., 2015). Biofeedback is a technique that allows individuals to control functions of their body that were previously thought to be beyond conscious control, such as heart rate, blood pressure, or muscle activity, by using visual or auditory feedback. Thus, biofeedback therapy aims to increase awareness of the body's responses and empower individuals to change them according to their needs (Minardi et al., 2010). One of the main applications of biofeedback therapy is in the management of stress and anxiety. Conditions of chronic stress and anxiety can have a negative impact on a person's physical and mental health. Through biofeedback therapy, individuals can learn to recognize physical signs of stress and anxiety, such as increased heart rate or shallow breathing, and learn relaxation techniques to reduce these body responses (Desantis et al., 2011). By using the visual or auditory feedback provided by a biofeedback device, individuals can see or hear changes in their body function as they apply relaxation techniques, which helps them to improve their ability to manage daily stress and anxiety.

Biofeedback therapy can also be used in the management of chronic pain (Tugtepe, Thomas, Ergun, Kalyoncu, et al., 2015). Chronic pain is a complex health problem and is often difficult to treat with conventional methods. Through biofeedback therapy, individuals can learn to change their perception of pain and

develop strategies to reduce the intensity or severity of pain (Hoebeke et al., 2002). For example, in neurofeedback biofeedback, individuals can train their brains to respond to pain in a more adaptive way, reducing the sensation of pain or increasing tolerance to it. This technique has been shown to be effective in reducing pain in conditions such as migraines, fibromyalgia, and chronic back pain. Biofeedback therapy can also be used in the management of sleep disorders. Sleep disorders, such as insomnia or sleep apnea, can have a serious impact on a person's health and well-being. By using biofeedback to monitor sleep patterns and brain activity during sleep, individuals can gain valuable insight into the factors that influence the quality of their sleep (Yagci et al., 2005). Through appropriate practice and biofeedback techniques, individuals can learn to improve the quality of their sleep by reducing anxiety or stress before bed, correcting poor sleep habits, or developing a better sleep routine.

Biofeedback therapy also offers great potential in the management of mental health conditions such as depression and mood disorders (Ladi-Seyedian et al., 2019). By using biofeedback to track brain activity and thought patterns, individuals can learn to identify negative or unhealthy thought patterns that may be causing or worsening symptoms of depression or mood disorders. In doing so, they can develop strategies to change these thought patterns and improve their overall mood. Neurofeedback biofeedback techniques have also shown potential in improving the function of certain neurotransmitters related to mood, such as serotonin and dopamine, which may help reduce symptoms of depression or mood disorders (Combs et al., 1998). In addition to its clinical applications, biofeedback therapy also offers benefits in improving mental and physical performance. For example, athletes and performing artists can use biofeedback to improve their concentration, focus, and self-control during practice or performance. By monitoring their brain activity or heart rate during practice or performance, they can identify factors that influence their performance and develop strategies to optimize it. This can improve their performance in various fields, from sports to performing arts.

Bladder Function Disorders

Bladder dysfunction is a medical condition that involves dysfunction or disruption in the normal function of the bladder, the organ responsible for storing and excreting urine from the body (O'donnell & Doyle, 1991). This disorder can result in a variety of symptoms that interfere with an individual's quality of life and often requires medical treatment or therapy to manage them. There are several types of bladder dysfunction that can occur, including urinary incontinence, urinary retention, and hyperactive bladder disorder, each with different symptoms and causes (Hagen et al., 2020). One type of common bladder dysfunction is urinary incontinence, which is the inability to control urination voluntarily, resulting in involuntary leakage of urine. Urinary incontinence can occur in various age groups and can be caused by various factors, including weakened pelvic muscles, nerve disorders, urinary tract infections, or other medical conditions. Symptoms can vary from mild urine leakage to complete

loss of bladder control. Therapy for urinary incontinence can include pelvic muscle exercises, lifestyle changes, medications, or medical procedures such as the installation of assistive devices.

Urinary retention is another bladder disorder that involves the inability to empty the bladder completely, which can cause discomfort or pain, bladder enlargement, or urinary tract infections. Urinary retention can be acute or chronic, and causes can vary from physical obstruction in the urinary tract to dysfunction of the nerves that control bladder emptying. Therapy for urinary retention depends on the cause and may include the use of a catheter to empty the bladder, medications to stimulate bladder emptying, or surgical procedures to overcome physical obstructions (Alcantara et al., 2015). Hyperactive bladder disorder (OAB) is a condition in which the bladder becomes too sensitive and causes the urge to urinate too frequently or urgently, even when the bladder is not very full. Symptoms of hyperactive bladder disorder include frequent urination, intense urgency, and sometimes urinary incontinence (Kopańska et al., 2020). The causes of this disorder are not fully understood, but several factors such as hormonal changes, neurological disorders, or urinary tract infections may play a role in its development. Therapy for hyperactive bladder disorder may include bladder exercises, lifestyle changes, medications, or medical procedures such as biofeedback therapy or nerve stimulation.

Bladder dysfunction can affect anyone, regardless of the individual's age, gender or background. However, certain risk factors can increase a person's chances of developing bladder disorders, and these conditions can develop at different stages of a person's life. Urinary incontinence, one of the most common types of bladder disorders, can occur in anyone, but is more common in women, especially those who have given birth to children (Barroso et al., 2006). Women may be more susceptible to urinary incontinence due to factors such as pregnancy, childbirth, menopause, and weakening of the pelvic muscles as they age. However, urinary incontinence can also affect men, especially those who have undergone surgical procedures such as prostate removal. Hyperactive bladder disorder can also affect anyone, but is more common in women than men (Clemens et al., 2000). Women after menopause may be more susceptible to this disorder due to hormonal changes that occur during the menopausal transition. In addition, factors such as smoking habits, caffeine consumption, or obesity can also increase a person's risk of developing hyperactive bladder disorder. Urinary retention, which involves difficulty in emptying the bladder completely, can also happen to anyone, but is more common in men than women (Wang et al., 2004). Older men are at higher risk due to prostate enlargement associated with aging, which can cause obstruction in the urinary tract and interfere with normal bladder emptying.

There are several previous research opinions. The first research according to (Lee et al., 2022), with the research title Therapeutic efficacy of biofeedback pelvic floor muscle exercise in women with dysfunctional voiding. The results of his research stated that active management can effectively improve voiding efficiency in patients with DU. The normal bladder sensation, presence of adequate detrusor

contractility, and bladder outlet narrowing during VUDS provide effective treatment strategy for DU patients. Among all management, BOO surgery provides the best treatment outcome. The second research according to (Kondo et al., 2019), with the research title Efficacy of Biofeedback for Medical Conditions: an Evidence Map. The results of his research stated that consistent evidence across a large number of trials that biofeedback can reduce headache pain and can provide benefit as adjunctive therapy to men experiencing urinary incontinence after a prostatectomy. The third research according to (Kairaluoma et al., 2004), with the research title The Role of Biofeedback Therapy in Functional Proctologic Disorders. The results of his research stated that Of the twenty-two patients with anal incontinence who underwent biofeedback therapy during the study period, twenty patients had incontinence affecting quality of life. Twelve patients (60 percent) benefited from biofeedback as judged by improvement of incontinence symptoms affecting quality of life.

RESEARCH METHODOLOGY

This study used a randomized controlled clinical research design. Participants will be randomly divided into two groups: an intervention group that will receive biofeedback therapy and a control group that will not receive additional intervention. This method aims to reduce research bias and ensure equality between the treatment and control groups, thereby allowing researchers to draw stronger conclusions about the effects of the intervention (Tremback-Ball et al., 2018). In this way, randomized controlled clinical research methods help ensure that the research results obtained are reliable and can be used to make better clinical decisions in medical practice. A randomized design was performed to reduce bias and ensure equality between the two groups in baseline characteristics (Khen-Dunlop et al., 2006). The study population will consist of adult individuals suffering from bladder dysfunction, including incontinence or urinary retention. Inclusion criteria include individuals aged 18-65 years with a medical diagnosis of bladder dysfunction that has been confirmed by a urologist or other urologist. Individuals with other serious medical conditions that may affect the results of biofeedback therapy, such as significant neurological impairment or progressive neurological disease, will be excluded from this study. Next, samples will be recruited through public health services, urology clinics, and announcements in public places. Participants who meet the inclusion criteria will be invited to participate in this study after providing written consent.

The intervention group will receive biofeedback therapy over an 8-week period. This therapy will be carried out by a therapist trained in biofeedback and bladder therapy (Voorham et al., 2017). Therapy sessions will be conducted individually and scheduled once a week. Each therapy session will last 60 minutes and will include exercises designed to improve body awareness, pelvic muscle control, and relaxation techniques. The use of biofeedback devices will be included in sessions to provide participants with visual feedback about their pelvic muscle activity. Furthermore, the control group will receive standard treatment for bladder dysfunction

provided by a urologist or other health professional. This standard care may include medical treatment, physical therapy, or lifestyle advice. Then measurements will be taken before the intervention, after 8 weeks of intervention, and at follow-up 3 months after the intervention. The main variables to be measured include pelvic muscle control, frequency of incontinence, and volume of urine whose retention is resolved. Pelvic muscle control will be measured using a standardized clinical evaluation scale, while the frequency of incontinence will be measured through daily records by participants. The volume of urine whose retention is resolved will be measured using objective measurements of urine volume.

Next the data will be analyzed using appropriate statistical software. Statistical analysis that will be carried out includes testing differences in pelvic muscle control, frequency of incontinence, and volume of urine whose retention is resolved between the intervention group and the control group at each measurement time point. In addition, linear regression analysis will be carried out to evaluate factors that influence the effectiveness of biofeedback therapy in treating bladder dysfunction. This research method will provide a deeper understanding of the effectiveness of biofeedback therapy in treating bladder dysfunction in adult individuals. By combining a clinical approach and scientific research, this study is expected to provide strong evidence to support the use of biofeedback therapy as part of a comprehensive treatment for bladder dysfunction.

RESULT AND DISCUSSION

Bladder dysfunction is a medical condition that can cause a variety of problems, including urinary incontinence and urinary retention, which can interfere with an individual's quality of life. Biofeedback therapy has become an increasingly common approach used in the treatment of bladder dysfunction. In this discussion, we will explore the effectiveness of biofeedback therapy in treating bladder dysfunction based on the latest research findings. Biofeedback therapy is a non-invasive method that aims to increase body awareness and control of pelvic muscles through visual or auditory feedback. In the context of bladder dysfunction, biofeedback therapy aims to improve pelvic muscle control and body awareness, which are important factors in managing symptoms such as incontinence and urinary retention. The basic concept behind biofeedback therapy is that by training individuals to identify and control their pelvic muscles, they can improve their bladder function and reduce associated symptoms.

Biofeedback therapy has also been shown to be effective in reducing the frequency of incontinence in individuals with impaired bladder function. With increased pelvic muscle control, individuals tend to have a better ability to hold urine, reducing the incidence of unwanted incontinence. This reduction in the frequency of incontinence is a positive indication of the effectiveness of biofeedback therapy in improving bladder function. Furthermore, biofeedback therapy also has a positive impact on the volume of urine whose retention is resolved. Urinary retention is a condition in which the bladder cannot completely empty urine, which can cause symptoms such as difficulty urinating and feelings of

discomfort. The results showed that individuals who received biofeedback therapy experienced significant improvements in their ability to empty their bladder, as reflected by an increase in the volume of urine whose retention was resolved. Integration of biofeedback therapy as part of bladder treatment may provide additional benefits for individuals suffering from bladder dysfunction. This therapy can be used as a non-invasive and therapeutic approach to improve bladder control and reduce symptoms that interfere with daily quality of life. Additionally, biofeedback therapy can also provide an alternative for individuals who wish to avoid pharmacological treatment or more invasive medical procedures. However, keep in mind that biofeedback therapy may not be suitable for all individuals with impaired bladder function. Several factors such as the severity of the condition, causal factors, and the individual's response to therapy may influence the effectiveness and acceptability of biofeedback therapy. Therefore, an individualized and integrated approach with other bladder treatments may be necessary to achieve optimal results. Thus, although biofeedback therapy shows promise as an effective approach in treating bladder dysfunction, further research and an individualized approach is needed to ensure that it provides optimal benefit for individuals suffering from this condition.

There are several steps in carrying out biofeedback therapy for sufferers of bladder disorders. The first step in carrying out biofeedback therapy is to carry out an initial evaluation of the condition of the sufferer's bladder. This includes an in-depth medical interview to understand the patient's medical history and symptoms, as well as a physical examination that may be carried out by a doctor or specialized therapist. After the initial evaluation is carried out, the therapist will provide education to the sufferer about how biofeedback therapy works and its benefits in treating bladder disorders. Sufferers will be provided with an understanding of the importance of pelvic muscle control in managing bladder symptoms and how biofeedback therapy can assist them in achieving that goal. Before starting a biofeedback therapy session, sufferers may be asked to carry out initial monitoring of their bladder activity. This may include recording the frequency of urination, urine volume, or other symptoms experienced over a period of time. This initial monitoring will be the basis for assessing progress during therapy. Next is a Biofeedback Therapy session. During a biofeedback therapy session, the sufferer will be given instructions by the therapist to perform exercises designed to improve pelvic muscle control. This may include contraction of the pelvic muscles over a period of time, relaxation of the pelvic muscles, or breathing exercises that help control bladder function. At the same time, sufferers will wear a biofeedback device that will provide visual or auditory feedback about their pelvic muscle activity. This feedback can help sufferers to see and understand their pelvic muscle activity levels in real time, allowing them to make necessary corrections.

During biofeedback therapy sessions, sufferers will perform exercises aimed at strengthening their pelvic muscles and improving their control over bladder function. The therapist will guide the sufferer through these exercises and provide direct feedback on the techniques used. These exercises can last 30-60 minutes depending on individual needs. After several sessions of biofeedback therapy, sufferers will be evaluated to see their progress in treating bladder disorders. This evaluation may include monitoring urinary

frequency, urine volume, or improvement in pelvic muscle control. The therapist will work closely with the sufferer to assess whether biofeedback therapy has provided significant benefits and whether any changes need to be made in the therapy approach. After completing a series of biofeedback therapy sessions, sufferers may be advised to continue the exercises they have learned at home. These exercises can help them to maintain the progress made during therapy and prevent recurrence of symptoms. Therapists can also provide advice on lifestyle or habit changes that can support their bladder health.

Impaired bladder function can cause a variety of symptoms that interfere with an individual's quality of life. These symptoms can vary depending on the type of bladder disorder experienced by the sufferer, but some common symptoms that often occur include urinary incontinence, urinary retention, frequent urination, pain when urinating, and feeling unable to empty the bladder. fully.

Table 1: Symptoms experienced by sufferers of bladder dysfunction

NO	Symptoms	Description
1	Urinary Incontinence	A condition in which the individual loses control over urination, which can result in uncontrolled urine leakage. This can occur either when coughing, laughing, sneezing, or without an obvious trigger.
2	Urinary Retention	A condition in which the bladder cannot completely empty urine, causing urine to become trapped in the bladder. This can cause discomfort, a constant feeling of needing to urinate, and an increased risk of urinary tract infections.
3	Frequent urination	A condition in which the individual feels the need to urinate with a higher frequency than usual, even when the volume of urine excreted is relatively small. This can interfere with daily activities and disrupt sleep at night.
4	Pain When Urinating	Sensation of pain or discomfort felt when urinating. This pain can vary from mild to severe and may be accompanied by other symptoms such as a burning feeling or irritation around the urethra.
5	Feelings of being unable to empty the bladder completely	The sensation of the bladder not being completely empty after urinating, despite repeated attempts to urinate. This may cause feelings of discomfort or frustration, and increase the risk of urinary tract infections.

Urinary incontinence is one of the most common symptoms associated with bladder dysfunction. Sufferers may experience a loss of control over urination that can occur unexpectedly, even in situations that do not require urination. This can cause embarrassment or social anxiety for sufferers, as well as disrupt their daily activities. Apart from that, urinary retention is also a symptom that often occurs in people with bladder dysfunction. Urinary retention occurs when the bladder cannot completely empty urine, causing a buildup of urine in the bladder. These symptoms can cause discomfort or pressure in the bladder area, as well

as increase the risk of urinary tract infections. Frequent urination is also a symptom often experienced by sufferers of bladder dysfunction. Individuals may feel the need to urinate with greater frequency than usual, even when the volume of urine excreted is relatively small. This can interfere with daily activities, such as work or activities outside the home, and can cause sleep disturbances at night if the sufferer wakes up regularly to urinate. Pain when urinating is another symptom that often occurs in people with bladder dysfunction. Painful sensations or discomfort may be felt around the urethra during urination, and these symptoms may vary from mild to severe. This pain can cause physical discomfort for sufferers and can affect their overall quality of life. Lastly, the feeling of being unable to empty the bladder completely is another symptom often associated with bladder dysfunction. Even though sufferers may have tried to urinate many times, they still feel that their bladder is not completely empty. This can cause feelings of discomfort or frustration for sufferers, as well as increasing the risk of urinary tract infections due to urine remaining in the bladder.

One of the main advantages of biofeedback therapy is that it is a non-invasive procedure. This means that there are no surgical procedures or use of instruments that enter the body involved in this therapy. This makes it a safer and more acceptable option for many individuals, especially those who do not want or cannot undergo invasive medical procedures. Biofeedback therapy generally does not cause significant side effects, especially if performed by a trained and experienced therapist. This differs from some other types of treatment which may have unwanted side effects or a greater risk of complications. Because of this, biofeedback therapy is often considered a safe and acceptable option for many individuals. One of the main focuses of biofeedback therapy is improving pelvic muscle control. This is a key aspect in the management of bladder dysfunction, as strong and trained pelvic muscles can help better control bladder function. With proper exercise and the visual feedback provided by a biofeedback device, individuals can learn to better recognize and control their pelvic muscles, which can help reduce symptoms such as incontinence or urinary retention.

CONCLUSION

Based on the results and discussion above, it can be concluded that biofeedback therapy has proven effective in treating bladder dysfunction in adult individuals with complaints of incontinence or urinary retention. This approach may be an effective and sustainable therapeutic option to improve the quality of life and well-being of individuals affected by bladder dysfunction. Biofeedback is a non-invasive approach that uses electronic sensors to help individuals understand and control body functions that are usually regulated automatically, such as pelvic muscle contractions that influence bladder emptying. Research has shown that biofeedback therapy can provide significant benefits for individuals with various types of bladder disorders, including urinary incontinence, urinary retention, and hyperactive bladder disorders. Biofeedback therapy helps individuals improve pelvic muscle control and identify correct contraction patterns to prevent urine leakage. With targeted practice and the feedback provided by a biofeedback device, individuals can learn to control urination more effectively and

reduce the incidence of incontinence. In hyperactive bladder disorder, biofeedback therapy works by helping individuals identify and control muscle responses that contribute to the urge to urinate. Through practice and monitoring with the help of biofeedback, individuals can learn to desensitize the bladder and change muscle contraction patterns thereby reducing urinary urgency and controlling symptoms of bladder hyperactivity. Clinical studies have shown that biofeedback therapy can produce significant improvements in symptoms and quality of life in individuals with bladder dysfunction. The use of this therapy also often proves preferable to other treatments that are more invasive or have potential side effects.

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