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General

Managing anxiety disorders with the neuro-biofeedback method of Brain Boy Universal Professional

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Background

Biofeedback is a non-invasive therapeutic method used independently or as an adjunct alongside other methods.

Objective

This study evaluated the efficacy of biofeedback in the treatment of anxiety disorders.

Methods

The sample consisted of 85 individuals with anxiety symptoms who underwent neuro-biofeedback therapy using Brain Boy Universal Professional. Anxiety was assessed by both the Hamilton Rating Scale for Anxiety (HAM-A) and Zung Anxiety Self-Assessment Scale (SAS) before the initiation and after completing ten sessions with biofeedback.

Results

Before biofeedback and based on the HAM-A scale, 27.0% of the individuals showed mild to moderate anxiety, 16.5% medium anxiety, and 56.5% severe anxiety. After the completion of biofeedback, 90.6% of the individuals experienced mild to moderate anxiety, 5.9% medium anxiety, and 3.5% severe anxiety. Based on the SAS scale, before biofeedback, 42.4% of the individuals showed minimal to moderate anxiety, 21.2% marked severe anxiety and 36.5% most extreme anxiety. After the biofeedback, 68.2% of the individuals were within a normal range, 27.1% had minimal to moderate anxiety, 4.7% marked severe anxiety, and none in most extreme anxiety.

Conclusion

Both HAMA-A and SAS scales showed statistically reduced anxiety levels after biofeedback therapy. Thus, the primary symptom of anxiety can be addressed by the biofeedback method.

1. INTRODUCTION

Biofeedback therapy is a non-invasive, drug-free treatment that uses electrodes and electrical sensors attached to an individual's body to collect information about specific involuntary physiological processes and to gain voluntary control over the mind and body.[1,2] This information about the body's functions is provided by utilizing visual and auditory stimuli to control physiological responses. Thus, through specialized biofeedback devices, the individual becomes aware of his physiological responses to learn how to make positive changes in controlling involuntary physiological processes such as blood pressure, heart rate, muscle tension, respiration, and brain waves.[3] Different types

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of biofeedback applications are used to monitor different functions of the body, including electromyography (EMG), electroencephalograph (EEG), electrodermograph (EMG), electrocardiograph (ECG) and heart-rate variability (HRV).[4] Biofeedback has many clinical applications for various medical disorders at an organic, psychological, and emotional level. Examples of such medical conditions where biofeedback can be applied are relieving stress,[5] migraines,[6] stress urinary incontinence,[7] anger management,[8] chronic anxiety disorders,[9] anxiety disorders,[10] and insomnia,[11] among others.

Anxiety disorders are a group of mental disorders characterized by anxiety expressed through a series of symptoms at a physical, emotional, and cognitive level.[12] States of anxiety are characterized by fear, nervousness, excessive worrying, tension, negative thinking, sweating, and heart palpitation, among others.[13] Consequences of extreme anxiety can interfere with the individual's ability to function normally and may lead to reduced quality of life, sometimes making the individuals experience suicidal behaviors.[14]

This research aimed to elucidate the effectiveness of biofeedback by using the Brain Boy Universal Professional to treat anxiety disorders and the rate at which this application can aid the individual.

2. MATERIALS AND METHODS

2.1. RESEARCH POPULATION

The research study sample consisted of 85 individuals suffering from anxiety symptoms who attended a private practice where biofeedback has been practiced for the last 30 years. The sample was obtained between November 2017 and May 2019. Individuals under the age of 18 were excluded from the study.

2.2. RESEARCH TOOLS

For this study, three self-administered questionnaires were used, the first questionnaire with demographics, the second for measuring anxiety by Hamilton Rating Scale for Anxiety (HAM-A), and the third for measuring anxiety by Zung Anxiety Self-Assessment Scale (SAS). During the first session and before the initiation of the biofeedback intervention, individuals completed all three questionnaires, whereas HAM-A and SAS were also completed for the second time after the completion of 10 sessions following biofeedback treatment.

HAM-A consisted of 14 self-report questions to measure the severity of anxiety symptoms, each defined by a series of symptoms, and measure psychic anxiety and somatic anxiety. Each question was based on a Likert-type scale ranging from 0 to 4, where 0= not present, 1= mild, 2= moderate, 3= severe, and 4= very severe. The questionnaire's total score ranges from 0 to 56, where <17 indicates mild severity anxiety, 18-24 mild to moderate severity anxiety, and 25-56 moderate to severe anxiety.[15]

SAS consisted of 20 self-report questions to measure anxiety levels based on scoring in four groups of manifestations: cognitive, autonomic, motor, and central nervous system symptoms. Each question was based on a Likert-type scale of 1 to 4 where 1= a little of the time, 2= some of the time, 3= good part of the time, and 4= most of the time. Some of the questions were negatively worded to avoid the problem of set response. The Overall assessment was calculated by the raw score total, which ranges from 20 to 80. The raw score total was then converted to an anxiety index score, which was used to find the anxiety level. Anxiety index 20-44 falls within a normal range, 45-59 indicates mild to moderate anxiety levels, 60-74 severe anxiety levels, and above 75 extreme anxiety levels.[16,17]

The application of biofeedback was performed using the Brain Boy Universal Professional, a small medical device with nine different difficulty levels. Each difficulty level consisted of eight exercises. These exercises included visual and hearing stimuli, where the individual is called to respond. During the initial session, the exercises were completed twice, the first time at the normal level and the second time at the test level. The discrepancy observed in each exercise between the left and the right brain hemispheres was recorded, as well as the shorter and longer response times, the number of stimuli received, and the percentage of correct responses that the individual completed. These are important as this biofeedback method's specific goal is to ensure a balanced brain function with only minor differences between the left and right hemispheres and a high rate of identifying visual and hearing stimuli.

The exercises performed at the normal level suggest the level of difficulty from which the individual can start training to gradually progress, aiming to achieve the highest level of difficulty in exercises, level nine. Subsequently, individuals underwent ten biofeedback treatment sessions once a week, starting at the level of difficulty obtained from their performance of the exercises at the normal level. Once the individual reaches and completes the last level with as little difference as possible between the two brain hemispheres, the therapy is considered completed.

2.3. DATA ANALYSIS

The data obtained and its subsequent analysis were performed using the IBM SPSS v.25 statistical packages. The statistical analysis provided outcomes regarding the frequencies, means, and standard deviations of the answers to each question of the questionnaires. The means and the standard deviations of every answer were calculated. Subsequently, the core of the statistical analysis provided the final results, performing T-tests. Specifically, paired-samples T-tests were performed for the difference of the means, the standard deviations, and the p-value in each quantitative variable of both the Hamilton questionnaire and Zung questionnaire, before and after ten sessions of biofeedback. A separate analysis was carried out for each parameter and every subgroup (gender, age, family status, education, employment, previous treatment and therapy, use of drugs, and homeopathic formulations) in both the questionnaires. Finally, Cross Tabs analysis was performed to determine the correlations between the parameters and the anxiety level before and after the biofeedback intervention for both questionnaires. The Cronbach's alpha internal consistency factor for the Hamilton total scores before and after the completion of biofeedback was 0.88 and 0.85, respectively, while the corresponding Cronbach's alpha internal consistency

factor for the Zung total scores was 0.94 and 0.86, respectively.

2.4 ETHICAL CONSIDERATIONS

The present study followed all ethical principles such as the complete confidentiality of the individuals who participated in the research, the safety of the material, and the individuals' anonymity. Informed consent was obtained from the individuals that participated in the study. Furthermore, this research study complied with the Helsinki Declaration as revised in 2013 and was approved by the Faculty of Human Movement and Quality of Life Sciences Ethical Committee, University of Peloponnese.

3. RESULTS

From the total sample of 85 individuals, 62.4% visited the private practice to manage anxiety, 10.6% for emotion management, and 22.4% for depression. 62.4% of the sample had made previous efforts to solve their problems using various other treatment forms. 36.47% had visited a psychiatrist or psychologist before, while 35.29% had followed alternative forms of treatment such as homeopathy, acupuncture, and reflexology, among others. It was noted that some people who had visited a psychiatrist or psychologist also tried alternative treatment methods; many used medication (52.9%) or took homeopathic medicines (67.1%).

According to HAM-A, before biofeedback, 27.0% of the participants showed mild to moderate anxiety, 16.5% indicated a medium severity of anxiety, and the remaining 56.5% experienced severe anxiety. After completing 10 sessions of biofeedback, 90.6% of the participants experienced mild to moderate anxiety, 5.9% medium severity of anxiety, and only 3.5% severe anxiety. Similarly, by using SAS, the percentages before biofeedback were 42.3% for minimal to moderate anxiety, 21.2% for marked to severe anxiety, 36.5% for most extreme anxiety, and no individuals were found within a normal range. After completing 10 sessions of biofeedback, 68.2% were estimated within a normal range, 27.1% of the participants experienced mild to moderate anxiety, 4.7% with medium severity of anxiety, and none of the participants were found with the most extreme anxiety (Table 1). Additionally, Table 1 shows the changes in the severity of the anxiety grades after biofeedback therapy. According to HAM-A, 48 individuals were assessed with severe anxiety levels before the initiation of biofeedback therapy.

In contrast, only three participants remained in the same anxiety level after completing the biofeedback therapy, and the rest 45 were distributed to the other two categories, as seen in Table 2. Likewise, according to SAS, 31 individuals were assessed in the most extreme anxiety group before initiating the biofeedback therapy, but none was observed after the completion of the therapy due to their distribution to other anxiety categories (Table 2).

The overall HAM-A total scores and the SAS total anxiety index scores were also evaluated according to the demographic characteristics before and after biofeedback therapy, as shown in Table 3. The demographic characteristics showed statistically significant differences in all subgroups for both HAM-A and SAS, showing reduced anxiety levels after biofeedback therapy.

Subsequently, Table 4 presents the overall HAM-A scores and the overall anxiety index of SAS for each reason reported about their visit to the biofeedback center by the participants. All reported reasons showed a marked reduction in anxiety levels after completing the biofeedback therapy as measured by both HAM-A and SAS. However, a statistically significant reduction was observed with anxiety-stress, emotion management, and depression-phobias-panic, whereas the sample for the rest two reported reasons for the participant's visit was extremely small (n=2) to make safe conclusions.

Furthermore, the interchangeable correlations were evaluated between the severity of anxiety, as measured by both HAM-A and SAS, and the demographic characteristics' independent variables. Based on HAM-A, a statistically significant correlation was found only between the severity of anxiety and the marital status after biofeedback therapy ($p= 0.017$). Based on SAS, statistically significant correlations were observed between severity of anxiety and age ($p= 0.004$ before and 0.621 after) and family status ($p= 0.020$ before and 0.344 after) prior to biofeedback therapy, whereas education ($p= 0.996$ before and 0.015 after) and employment ($p= 0.294$ before and 0.023 after) were statistically significant after the biofeedback treatment with remaining demographics not statistically significant.

4. DISCUSSION

The present research results revealed significant reductions in anxiety levels after completing the therapy compared to before the initiation using the Brain Boy Universal Professional biofeedback method as assessed by both the Hamilton scale and Zung Anxiety scale. These reductions were observed in all categories of anxiety levels, and a high number of the participants changed to a lower level of anxiety. In fact, after the completion of the therapy, as assessed by the Hamilton scale, 90.6% of the participants experienced only mild to moderate anxiety, whereas 68.2% were found within a normal range, and 27.1% of the participants experienced mild to moderate anxiety when assessed by Zung scale. Thus, individuals reported with the most severe anxiety levels were reported to change into lower levels of anxiety after completing the therapy, and only three remained to the most severe anxiety level in Hamilton's score. However, none of the individuals remained at the most severe anxiety level in the Zung anxiety index scale.

The statistically significant correlations between the severity of anxiety and age groups ($p= 0.004$) and family status ($p= 0.020$) before biofeedback treatment can be explained because the participants are more vulnerable to anxiety. Age groups with the most severe anxiety before biofeedback were participants of 55-64 (mean score 73.58) and 45-54 (mean score 68.11) that might have children, so they face everyday problems, worried about money, fear for losing their job and it would be challenging to find a new one at the age they are, the economic crisis in Greece for the last ten years. The statistically significant correlation between the severity of anxiety and the family status

Table 3. HAM-A total scores and SAS total anxiety index scores for the subgroups of the demographic characteristics before and after the completion of 10 sessions with biofeedback therapy.

		HAM-A BEFORE MEAN ± SD	HAM-A AFTER MEAN ± SD	P-value	SAS BEFORE MEAN ± SD	SAS AFTER MEAN ± SD	P-value
Gender	Male (30)	24.67 ± 10.96	12.87 ± 8.33	<0.001	62.60 ± 17.04	37.73 ± 9.22	<0.001
	Female (55)	27.58 ± 11.45	13.33 ± 8.03	<0.001	67.67 ± 16.49	38.89 ± 9.12	<0.001
Age	18-24 (9)	19.56 ± 5.05	7.89 ± 3.65	<0.001	53.56 ± 7.99	31.67 ± 4.47	<0.001
	25-34 (21)	27.33 ± 12.92	11.24 ± 7.72	<0.001	67.09 ± 18.97	35.71 ± 9.09	<0.001
	35-44 (24)	25.62 ± 12.06	14.12 ± 9.14	<0.001	64.17 ± 16.86	40.00 ± 10.66	<0.001
	45-54 (18)	27.55 ± 10.62	14.28 ± 6.66	<0.001	68.11 ± 15.80	39.11 ± 6.63	<0.001
	55-64 (12)	31.08 ± 10.34	16.33 ± 9.46	0.002	73.58 ± 15.97	43.83 ± 8.39	<0.001
	>65 (1)	23	20		60	46	
Family Status	Single (39)	25.77 ± 11.92	12.31 ± 8.51	<0.001	64.41 ± 17.08	37.67 ± 9.97	<0.001
	Married (39)	26.82 ± 10.80	13.46 ± 7.31	<0.001	66.64 ± 16.28	38.61 ± 7.85	<0.001
	Divorced-Widower (7)	29.43 ± 11.63	16.28 ± 10.09	0.026	69.85 ± 19.23	42.28 ± 11.11	0.03
Education	Basic (2)	26.50 ± 12.02	15.00 ± 11.31	0.028	63.50 ± 21.92	47.00 ± 18.38	0.096
	Senior High (27)	28.59 ± 11.54	13.63 ± 8.96	<0.001	69.00± 17.54	38.96 ± 9.05	<0.001
	College (16)	26.81 ± 11.07	15.87 ± 7.90	<0.001	67.25 ± 16.97	40.19 ± 10.43	<0.001
	BSc (30)	25.10 ± 11.55	11.33 ± 6.76	<0.001	63.33 ± 16.73	36.43 ± 7.24	<0.001
	MSc-PhD (10)	25.00 ± 11.57	12.70 ± 9.37	0.013	63.40 ± 15.36	38.90 ± 10.75	<0.001
Employment	Public (11)	25.72 ± 10.90	9.90 ± 5.26	0.002	64.36 ± 15.90	34.18 ± 6.17	<0.001
	Private (28)	27.85 ± 10.72	14.64 ± 7.96	<0.001	68.35 ± 16.27	39.46 ± 9.21	<0.001
	Free Lancer (18)	22.88 ± 11.11	13.05 ± 9.04	<0.001	60.27 ± 14.72	37.77 ± 10.36	<0.001
	Retired (8)	33.62 ± 11.77	16.87 ± 9.56	0.013	78.12 ± 16.27	45.75 ± 8.64	<0.001
	Unemployed-Household (13)	26.30 ± 12.86	11.46 ± 8.66	<0.001	64.84 ± 19.74	37.23 ± 7.96	<0.001
	Student (7)	24.43 ± 10.42	11.57 ± 6.26	0.006	60.71 ± 16.08	37.14 ± 9.22	<0.001
Previous Treatment	No (34)	22.06 ± 9.56	11.62 ± 7.52	<0.001	59.17 ± 14.14	36.23 ± 8.67	<0.001
	Yes (51)	29.54 ± 11.46	14.19 ± 8.36	<0.001	70.35 ± 17.00	39.98 ± 9.18	<0.001
Previous Therapy	None (33)	21.90 ± 9.67	11.66 ± 7.63	<0.001	58.97 ± 14.30	36.24 ± 8.80	<0.001
	Psychotherapy (11)	28.72 ± 12.50	10.72 ± 8.21	<0.001	69.72 ± 16.72	36.54 ± 9.84	<0.001
	Psychology-Alternative (29)	26.75 ± 11.08	14.41 ± 8.05	<0.001	66.82 ± 17.52	39.48 ± 9.12	<0.001
	Drugs (5)	36.60 ± 11.30	15.80 ± 9.17	0.047	76.40 ± 16.37	42.80 ± 6.14	0.014
	Psychotherapy + Drugs (7)	37.00 ± 5.59	17.00 ± 9.00	0.004	81.00 ± 10.52	44.86 ± 8.61	<0.001
Drugs	No (34)	26.70 ± 11.68	12.03 ± 8.33	<0.001	66.53 ± 17.19	37.32 ± 9.58	<0.001
	Yes (51)	26.45 ± 11.15	13.92 ± 7.91	<0.001	65.45 ± 16.62	39.25 ± 8.81	<0.001
Homeopathic	No (6)	26.16 ± 16.35	10.50 ± 5.01	0.066	68.00 ± 20.96	39.33 ± 6.91	0.008
	Yes (79)	26.58 ± 10.97	13.36 ± 8.26	<0.001	65.72 ± 16.55	38.41 ± 9.29	<0.001
TOTAL	**(85)**	**26.55 ± 11.3**	**13.16 ± 8.09**	**<0.001**	**65.88 ± 16.76**	**38.48 ± 9.12**	**<0.001**

Table 1. Overall score of Hamilton Rating Scale for Anxiety (HAM-A) and overall anxiety index score of Zung Anxiety Self-Assessment Scale (SAS) for measuring anxiety levels both before biofeedback and after the completion of 10 biofeedback sessions (N=85).

Total score for HAM-A Anxiety Levels	Before Biofeedback Mean ± SD	Before Biofeedback N (%)	After Biofeedback Mean ± SD	After Biofeedback N (%)	P-value	Change N
Mild to Moderate Anxiety (score 0-17)	12.91 ± 2.76	23 (27.06)	7.74 ± 4.04	77 (90.59)	<0.001	+54
Medium Anxiety (score 18-24)	19.93 ± 2.09	14 (16.47)	12.36 ± 5.48	5 (5.88)	<0.001	-9
Severe Anxiety (score 25-56)	35.02 ± 6.79	48 (56.47)	16.00 ± 8.84	3 (3.53)	<0.001	-45
Total Anxiety index score for SAS Anxiety Levels	**Before Biofeedback Mean ± SD**	**Before Biofeedback N (%)**	**After Biofeedback Mean ± SD**	**After Biofeedback N (%)**	**P-value**	**Change N**
Within normal range (anxiety index below 45)	0	0 (0)	33.17 ± 4.06	58 (68.23)		+58
Minimal to Moderate Anxiety (anxiety index 45-59)	49.30 ± 3.35	36 (42.35)	32.61 ± 5.09	23 (27.06)	<0.001	-13
Marked to Severe Anxiety (anxiety index 60-74)	65.72 ± 4.17	18 (21.18)	40.55 ± 7.04	4 (4.71)	<0.001	-14
Most Extreme Anxiety (anxiety index 75 and over)	85.22 ± 6.89	31 (36.47)	44.09 ± 9.90	0 (0)	<0.001	-31

Table 2. Movement of participants from their anxiety level before the initiation of biofeedback to other anxiety levels after the completion of biofeedback therapy as assessed by HAM-A total score and SAS total anxiety index score.

HAM-A Total score	Participants before biofeedback N	Participants moved to <17 after biofeedback N (%)	Participants moved to 18-24 after biofeedback N (%)	Participants moved to 25-30 after biofeedback N (%)	Participants moved to >30 after biofeedback N (%)
<17	23	23 (100)	0 (0)	0 (0)	0 (0)
18-24	14	10 (71.43)	4 (28.57)	0 (0)	0 (0)
25-30	14	10 (71.43)	4 (28.57)	0 (0)	0 (0)
>30	34	20 (58.82)	6 (17.65)	5 (14.71)	3 (8.82)
SAS Total anxiety index score	**Participants before biofeedback N**	**Participants moved to <45 after biofeedback N (%)**	**Participants moved to 45-59 after biofeedback N (%)**	**Participants moved to 60-74 after biofeedback N (%)**	**Participants moved to >75 after biofeedback N (%)**
<45	0		0 (0)	0 (0)	0 (0)
45-59	36	33 (91.67)	3 (8.33)	0 (0)	0 (0)
60-74	18	10 (55.56)	8 (44.44)	0 (0)	0 (0)
>75	31	15 (48.39)	12 (38.71)	4 (12.90)	0 (0)

is that divorced-widowed participants (mean score 69.85) might feel lonely and withdrawn from social life.

The statistically significant correlations between the severity of anxiety and education level (p= 0.015) and employment (p= 0.023) after biofeedback therapy are because the participants can respond better to the therapy. The correlation between the severity of anxiety and education level after biofeedback treatment is most specific because participants with a high educational level can perceive what has to be done during the therapy a lot easier than those who are not educated well and therefore are more receptive to biofeedback therapy.

Although many studies in the literature have investigated the treatment of stress and anxiety with biofeedback, the present research is characterized by originality, since none of these studies have used Brain Boy Universal Professional as a specific biofeedback method apart from our previous study, which showed statistically significant reductions in anxiety levels as assessed by Hamilton's anxiety score. Of the 31 individuals with severe anxiety before the initiation of therapy, only five remained at the same anxiety

Table 4. Overall distribution score of Hamilton Rating Scale for Anxiety (HAM-A) and the overall distribution anxiety index of Zung Self-Assessment Scale (SAS) for measuring anxiety levels according to the participant request for visiting biofeedback center both before and after the completion of 10 biofeedback sessions.

Reason for Visiting Biofeedback Center	Number of patients N	HAM-A before biofeedback Average score ± SD	HAM-A after biofeedback Average score ± SD	P-Value	SAS before biofeedback Average anxiety index ± SD	SAS after biofeedback Average anxiety index ± SD	P-Value
Anxiety-stress	53	25.34±10.42	12.11±7.74	<0.001	63.72±15.77	37.04±8.46	<0.001
Emotion Management	9	22.22±12.92	15.78 ± 10.69	0.008	59.33±16.97	40.11±12.52	0.001
Depression-Phobias	19	32.63±11.11	15.21±8.22	<0.001	75.05±16.40	42.37±9.04	<0.001
Mood-Appetite	2	23.00±18.38	14.00±1.41	0.636	68.00±28.28	37.50±2.12	0.391
Psychosis	2	24.00±14.14	9.00±4.24	0.278	63.50±21.92	33.50±7.78	0.205

level after completing the therapy, and the rest of the individuals changed into medium or mild to moderate anxiety levels.[18]

A recent systematic review conducted by Markieweez in 2017 used EEG biofeedback to rehabilitate patients with psychiatric disorders who were under medication. The outcomes showed that biofeedback therapy, whether used as a primary or ancillary method, can positively affect cognitive processes, mood, and anxiety levels. The mental disorders included in the analysis were depression, dyslexia, post-traumatic disorder anxiety, anorexia, substance abuse, schizophrenia, Alzheimer's disease, and attention deficit hyperactivity syndrome.[19]

Caldwell and Steffen reported the utility of incorporating psychotherapy and the HRV biofeedback method to treat major depressive disorders. Patients who received combined psychotherapy and HRV revealed a more substantial increase in HRV and a more considerable decrease in depressive symptoms over six weeks than those who underwent psychotherapy only, but no improvements in HRV were obtained.[20] HRV is decreased in major depressive disorders, but existing treatments do not return HRV to normal levels even after successful treatment of depression, stating that there is an increased disease risk.[21,22] Thus, the outcomes of the study supported the supplementation of psychotherapy with HRV biofeedback in the treatment of major depressive disorders, and HRV can be used as an adjunct to other treatments.[20]

McAusland and Addington employed the HRV biofeedback method over four weeks for reducing anxiety and distress in young individuals who were at a high clinical rate for developing psychosis. They reported a significant decrease in impaired ability to tolerate normal stressors ($p< 0.001$) and dysphoric mood ($p< 0.001$), with only a trend towards improvement in self-reported anxiety ($p=0.07$). However, they concluded that HRV biofeedback is a feasible option for treating individuals with low tolerance to stress and dysphoric mood.[23]

Goessl et al. conducted a meta-analysis study where they included 24 studies totaling 484 individuals who received HRV biofeedback training for stress and anxiety. HRV biofeedback training was reported to be associated with a considerable reduction in stress and anxiety.[24]

Aritzeta et al. examined the effectiveness of biofeedback in reducing anxiety and improving academic performance. The sample consisted of 152 second-year psychology undergraduate students who submitted in 5 sessions of biofeedback relaxation training program composed of three activities, training of deep breathing, guided imaging, and muscle relaxation. The results showed decreased levels of anxiety and increased academic performance in comparison to control individuals. The researchers also highlighted the vital contribution of biofeedback in understanding people between the body's psychophysiological, cognitive, and emotional processes.[25]

5. CONCLUSION

The present research shows that the biofeedback method of Brain Boy Universal Professional aids in treating anxiety disorders in a completely natural way, allowing treating patients who do not respond to drugs and those who want to apply it alongside other methods such as alternative therapies and psychotherapy. However, the present study has limitations, with most important the lack of control was not included due to ethical concerns and the lack of follow-up assessments. Thus, further research may be necessary by assessing individuals with variable follow-up assessments to see if the improvements seen are sustained or what kind of maintenance might be necessary. Additionally, further research on biofeedback may help change the psychopathological model of using only drug treatment to a learning model through which the patient can receive a unique personalized skill-building therapy such as biofeedback.

COMPETING INTERESTS

There are no competing interests to report.

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