Original Article

Examining the Effectiveness of Home-Based Pelvic Floor Muscle Training in Treating Sexual Dysfunction in Women

Sukran Basgol, MSc
Research Assistant, Istanbul University, Florence Nightingale Nursing Faculty, Gynecologic and Obstetrics Nursing Department, Sisli-Istanbul, Turkey

Umran Oskay, BSN, MSc, PhD
Associate Professor, Istanbul University, Florence Nightingale Nursing Faculty, Gynecologic and Obstetrics Nursing Department, Sisli-Istanbul, Turkey

Correspondence: Sukran Basgol, MSc. Istanbul University, Florence Nightingale Nursing Faculty, Gynecologic and Obstetrics Nursing Department, Abide-i Hurriyet Cad. 34381 Sisli-Istanbul, Turkey
E mail: sukranbasgol@gmail.com

Abstract

Background: Sexual dysfunction is a common problem among women during their reproductive period and can decrease the quality of women's social lives, as well as their overall quality of life.
Aim: The purpose of this paper was to determine the effects of pelvic floor muscle training (PFMT) with home biofeedback therapy (HBT) on sexual life and quality of life in patients with sexual dysfunction.
Methodology: The sample consisted of 36 patients who were randomized into a PFMT group (n=18) and a control group (n=18). The PFMT group was treated with HBT for 10 weeks, while the control group did not receive any treatment during this time**.** Frequency, percentages, mean, χ^2, Wilcoxon rank, and Mann-Whitney U test was used to analyze.
Results: There was no significant difference between the groups in terms of age, education, employment status, level of income, number of pregnancies, births, mode of delivery, and health problems. The average age of women was 34±3 years old in the biofeedback group and 35±2 years old in the control group. Sexual dysfunction, quality of life and pelvic floor muscle strength improved significantly in women who received the HBT compared to the controls.
Conclusions: PFMT with HBT is an effective treatment for improving sexual dysfunction in women. HBT increases pelvic floor muscle strength, which leads to significant improvement in women's sexual function and quality of life.

Key words: Biofeedback, pelvic floor exercise, quality of life, sexual dysfunction

Introduction

Sexuality is one of the basic needs of human beings and an inseparable part of life. Having a healthy sexual life is one of the important parameters of health and a good quality of life (Nobre & Pinto-Gouveia, 2006; Meston & Bradford, 2007). The World Health Organization defines *sexual health* as the integration of the physical, emotional, intellectual and social aspects of sexual being, in ways that enhance personality, communication and love (World Health Organization, 2014). Biological, psychological or physical conditions may have a significant impact on sexuality and sexual function (Saunamäki et al., 2010; Ayaz, 2013). Studies have demonstrated that the pelvic floor muscle (PFM) has an important role in sexuality, and strengthening

the PFM improves sexual function (Bø et al., 2000; Beji et al., 2003; Dumoulin et al., 2014); this is especially true in genital arousal, stimulation and attainment of an orgasm (Rosenbaum, 2007; Mohktar et al., 2013). PFM contractions are important in the female orgasmic response. PFM training (PFMT) has been shown to have a positive effect on the sexual life of women. Women with weaker pelvic muscles notice a positive impact on their sexual life after strengthening their muscles with PFMT (Citak et al., 2010).

According to the literature, there are various preferred treatment options for sexual dysfunction in women. One of the most effective treatments is biofeedback therapy (BT), which provides strength to the pelvic floor muscle and measures the contraction of muscles with the help of sensors inserted inside the anus or vagina (Newman, 2014). Most studies show that BT has a positive impact on urinary incontinence, fecal incontinence, chronic low back pain, and constipation (Hirakawa et al., 2013; Vonthein et al., 2013; Tan et al., 2014; Li et al., 2014). When BT was used in patients with incontinence, patients' sexual function was also improved (Bø et al., 2000; Rivalta et al., 2010). In systematic reviews, it is reported that female sexual dysfunction has an effect on women's well-being, and BT is an effective behavioral treatment. Patient compliance is considered important in BT, as treatment effects are partially dependent on compliance; the efficacy of the therapeutic exercises can only be established when patients adhere to the exercise regimen (Lofrisco, 2014).

Thus, the aim of this study is to determine the effects of PFMT with HBT on the sexual life and quality of life of women with sexual dysfunction.

Subjects and Methods

Study design and sample

This was a randomized control study to determine the effects of PFMT using a HBT on the sexual life and quality of life of patients' with sexual dysfunction. The study group consisted of women who consulted the Istanbul University, Istanbul Medical Faculty Obstetric and Gynecology department's gynecology polyclinic from March 2013 - March 2014. Fifty-nine patients visited to the gynecology polyclinic with sexual dysfunction complaints. A flowchart is displayed in Figure 1. The written ethical approval was obtained from the Ethics Committee of Istanbul University, Istanbul Faculty of Medicine and from the Ethics Committee of the institution. Verbal and written informed consent was obtained from women who participated in the study.

Out of the women with sexual dysfunction, 47 met the inclusion criteria. Inclusion criteria included having complaint of orgasmic difficulty, being sexually active, being between the ages of 20-45, not having any psychological and physical problem in using the biofeedback device or in communicating, not affected by incontinence, being at least primary school graduates, and voluntary to participate.

Exclusion criteria included pregnancy or planning a pregnancy, having heart disease or cardiac pacing, having prolapse on stage ≥ 2 according to the Pelvic Organ Prolapse Quantification System (POP-Q), and having pelvic muscle strength <3/5 in Oxford scale according to the digital palpation method. The women who came to the gynecology polyclinic were randomly assigned into the experimental group (n=18) or control group (n=18) using random numbers. All patients were evaluated on their sexual history and gynecological examination; there was no statistically significant difference between the PFMT and control groups.

Instruments

Data were collected through a questionnaire to identify patients' demographic characteristics, obstetric and gynecological features, general health status, sexual function (evaluated by the Female Sexual Function Index (FSFI)), and quality of life (evaluated by the World Health Organization Quality of Life Scale Brief-Turkish

(WHOQOL- BREF-TR) scale). The FSFI was first described by Rosen and is a brief, self-report measure of female sexual function that includes desire, arousal, lubrication, orgasm, satisfaction and pain domains (Rosen et al., 2000). The reliability and validity of the adaptation of the scale into Turkish was enhanced by Aygin and Aslan (2005). In the FSFI, the optimal cut-off between normal and pathological values was set at 26.55; thus, women who had sexual dysfunction scores <26.5 were included in the study (Oksuz & Malhan, 2006). The WHOQOL-BREF was developed by the World Health Organization, and the validity and reliability of the Turkish form was studied by Eser et al. (1999). The WHOQOL-BREF TR is a 27-item questionnaire with four domains: physical health, psychological health, social relationships, and environment (Eser et al., 1999).

The forms were administered to the women (n=36) at the beginning of the research and at the end of the 10-week treatment.

Data Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) (version 16.0, SPSS Inc., Chicago, IL, USA). The frequency, mean, standard deviation, median, minimum and maximum, χ^2, Wilcoxon rank and Mann-Whitney U test were used in the analysis of data.

Procedure and data collection

This study was carried out with 59 women who had applied to the gynecology polyclinics seeking a remedy for sexual function problems. Women who consulted to the gynecology polyclinics with sexual dysfunction were evaluated and received a gynecological examination from the gynecologist in charge. In their examination, the women who were in a phase ≥ 2 prolapse according to the Simple POP Q test and had <3/5 pelvic muscle strength according to the digital palpation method were excluded from the study. The women who met the research criteria according to the examination results were interviewed face-to-face for approximately 45 minutes. During the interview, they completed the informed consent form, personal identification form, FSFI and WHOQOL- BREF-TR data collection tools. Then, the BT group was familiarized with the location of the levator ani muscle, pelvic floor anatomy, PFMT, and EMG-assisted biofeedback device (FemiScan Home Trainer).

The EMG-assisted biofeedback device (FemiScan Home Trainer) has an internal microprocessor that contains a training program, a sound processor for verbal instructions and enough memory to collect training results performed at home. The device also consists of a vaginal probe and connected headphones which gives a voice signal if the contraction is too weak. The EMG device saves data from every contraction into its memory, where it can be downloaded and analyzed at the clinic. Pelvic floor muscle activity signals were visible on a computer screen. Each exercise program consisted of three 5-s contractions with 10-s intervals in the supine position with knees bent (Aukee et al., 2004).

Each participant in the PFMT group were verbally instructed to contract their pelvic floor muscles as strongly as possible, ‘‘as if they had gas that they did not want to let go,” and avoid contraction of the gluteus and abdominal muscles. They were asked to do the exercise program recorded on the device (three 5-s contractions with 10-s intervals) for 5 days a week, twice a day and for a period of 10 weeks, except during menstruation. They received a personal EMG-assisted biofeedback device and were asked to return the device at the last visit. They also visited the same nurse (researcher) four times (0, 2, 6, 10 weeks) during the intensive training period of 10 weeks, while the control group visited only at the beginning and end of the 10 weeks.

At the end of the 10th week, all 36 women were re-evaluated with the FSFI, WHOQOL-BREF-TR scales, and pelvic muscle strength measurement.

Results

In this research, 36 women were randomly divided into 2 groups: PFMT group (n=18) and control (n=18) groups. There was no significant difference between the groups in terms of age, education, employment status, level of income, number of pregnancies, births, mode of delivery, and health problems. The average age of women was 34±3 years old in the biofeedback group and 35±2 years old in the control group. The sexual function of women in this study was evaluated through the FSFI. The differences in the FSFI total score and six dimensions of sexual function between the two groups are shown in Table 1. Before treatment, the total FSFI scores of the women in the biofeedback group were 13.65±2.61, and the control group scores were 15.32±2.31. It was found that the improvement in the total score and six dimensions of FSFI 10 weeks after the conclusion of biofeedback treatment were statistically significant (p=0.000), whereas no statistically significance was detected in the control group before and after the treatment (p<0.19) (Table 1).

The average scores of women in the PFMT and control groups on the WHOQOL-BREF scale are displayed in Table 2. after biofeedback treatment, the women in the PFMT group were found to have positive changes in their physical, psychological, social, and environmental functions when compared to the scores from 10 weeks earlier and control group scores (Table 2).

In addition, there was a highly significant difference between the psychological and social sub-dimension mean scores (p=0.000) in the PFMT group, whereas no statistically significant difference was detected in the control group before and after the treatment. It is clearly seen in the PFMT group that a change in pelvic muscle strength occurred during the intensive treatment period (Figure 2). Pelvic muscle strength increased from 11.2 µV to 18.1 µV in the PFMT group, while it decreased from 11.7 µV to 11.5 µV in the control group after 10 weeks. None of the patients reported any side effects as a result of the treatment.

Discussion

In this research, there was no significant difference between the control and PFMT groups in terms of age, education, employment status, level of income, number of pregnancies, births, mode of delivery, and health problems. The lack of potential confounding variables between the groups enhances the reliability of the data obtained in this study. Most studies report that women's sexual dysfunctions are mostly seen during their reproductive period, around their thirties (Oksuz & Malhan, 2006; Oniz et al., 2007). The results of the study by Ozturk et al. (2012) determined that women who have sexual dysfunction have a mean age of 36.5±7.87 years old. In this study, the average age of women was 34±3 years old in the biofeedback group and 35±2 years old in the control group. The results of this study are consistent with the aforementioned studies (Oksuz & Malhan, 2006; Oniz et al., 2007; Ozturk et al., 2012).

Sexual dysfunction can have a major impact on a woman's quality of life. Studies show that women with sexual dysfunction reported lower quality of life mean scores than women without sexual dysfunction (Naeinian, 2011). The present study also found that the various dimensions of quality of life were lower in woman with sexual dysfunction, and the FSFI scores improved towards the end of the treatment. It is not surprising that female sexual dysfunction affects QOL negatively, as sexual function is an important component of quality of life. In addition, the physical, mental, social and environmental factors that are used to assess quality of life are also very important in the evaluation of one's sexual life (Rivalta et al., 2010).

The evidence in the literature is inconclusive regarding the impact of pelvic floor muscle exercises on improving sexual function; thus, more randomized control studies are required. However, sexual organs have close

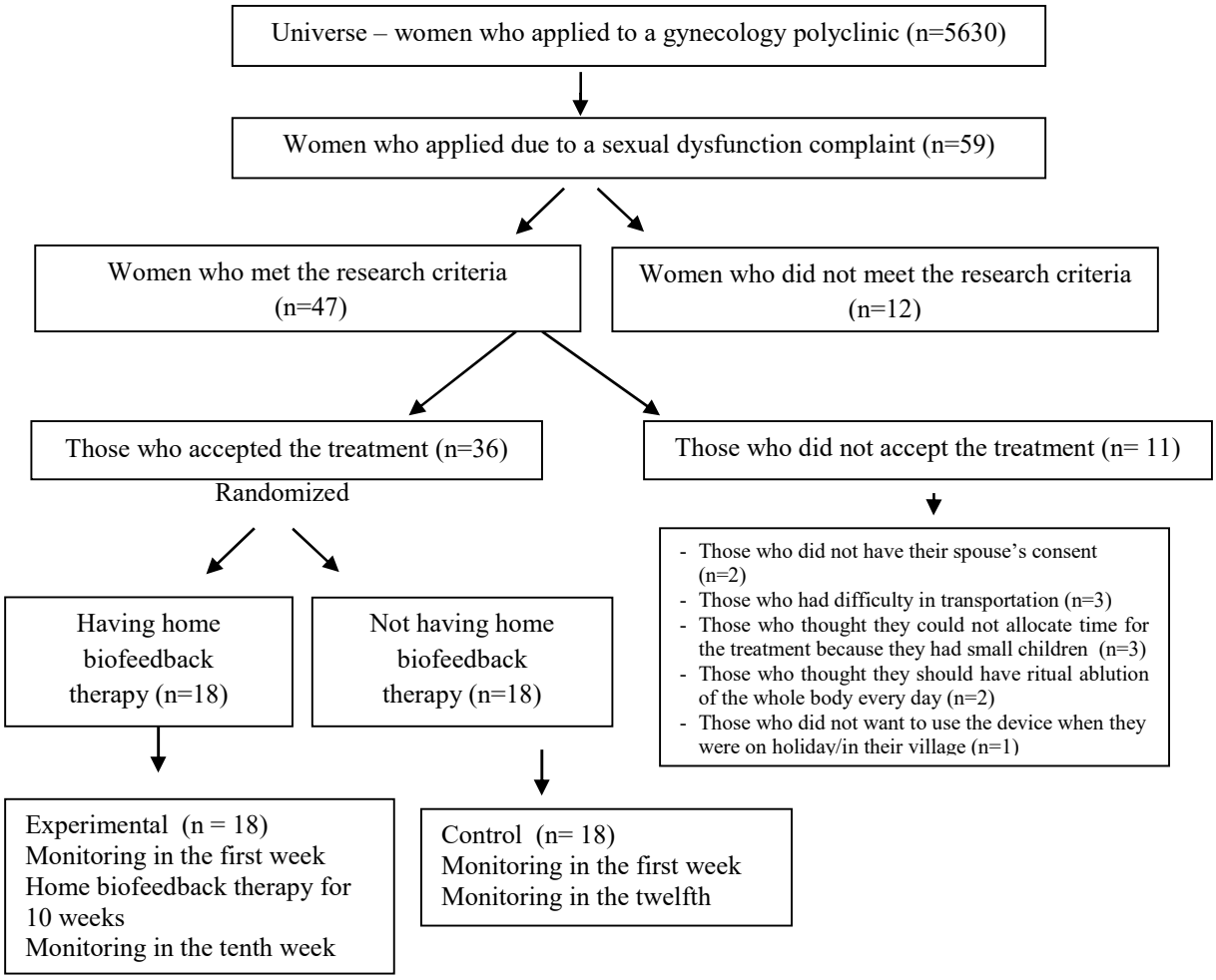

Figure 1. Flowchart of the research.

Table 1. Comparison of groups' FSFI scores

Dimensions of FSFI	Biofeedback group (n=18)				Control group (n=18)				Biofeedback		Control	
	before treatment		after treatment		first week		end of 10 week		BT/AT[1]		first week/end of 10 week	
	Median	Mean ± SD	Median	Mean ± SD	Median	Mean ±SD	Median	Mean ± SD	Z_{WK}	p	Z_{WK}	p
Desire	1.20	1.50±0.47	4.80	4.83±0.72	1.80	1.90±0.65	1.80	1.90±0.72	-3.748	0.000	-0.087	0.93
Arousal	1.50	1.58±0.49	5.70	5.41±0.62	2.10	2.10±0.78	1.80	1.81±0.95	-3.734	0.000	-1.499	0.13
Lubrication	1.95	2.15±0.93	5.40	5.33±0.65	2.70	2.68±1.12	2.55	2.33±1.21	-3.742	0.000	-0.897	0.37
Orgasm	2.00	1.91±0.48	5.40	5.37±0.63	2.00	1.95±0.61	1.80	1.73±0.91	-3.744	0.000	-0.960	0.33
Satisfaction	2.00	2.05±0.58	5.60	5.44±0.63	2.00	2.17±0.72	1.60	1.91±0.91	-3.736	0.000	-1.652	0.09
Pain	4.60	4.44±1.38	6.00	5.68±0.48	4.00	4.51±1.09	4.00	3.97±1.63	-3.190	0.001	-1.549	0.12
Total	13.05	13.65±2.61	32.80	32.09±2.90	15.50	15.32±2.31	14.85	13.67±4.77	-3.725	0.000	-1.293	0.19

[1] Wilcoxon rank test. BT = before treatment; AT = after treatment.

Table 2. Comparison of groups' WHOQOL-BREF TR scores

Dimensions of WHOQOL-BREF TR	Biofeedback group (n=18)				Control group (n=18)				Biofeedback		Control	
	before treatment		after treatment		first week		end of 10 week		BT/AT[1]		first week/end of 10 week	
	Median	Mean ± SD	Median	Mean ± SD	Median	Mean ±SD	Median	Mean ± SD	Zwk	p	Zwk	p
Physical	13.71	14.22±2.09	15.42	16.06±2.64	12.85	13.01±2.75	12.85	12.85±2.29	-2.972	0.003	-0.611	0.541
Psychological	10.66	11.03±1.71	16.66	16.40±2.68	10.66	10.77±1.53	11.00	10.77±1.63	-3.725	0.000	0.000	1.000
Social	9.33	10.00±1.95	16.66	16.29±2.56	10.66	10.66±2.33	10.00	10.51±2.32	-3.744	0.000	-1.414	0.157
Environmental	11.77	12.29±2.45	12.88	13.38±2.59	11.55	11.65±1.24	11.55	11.67±1.18	-2.460	0.014	-0.447	0.655

[1] Wilcoxon rank test. BT = before treatment; AT = after treatment.

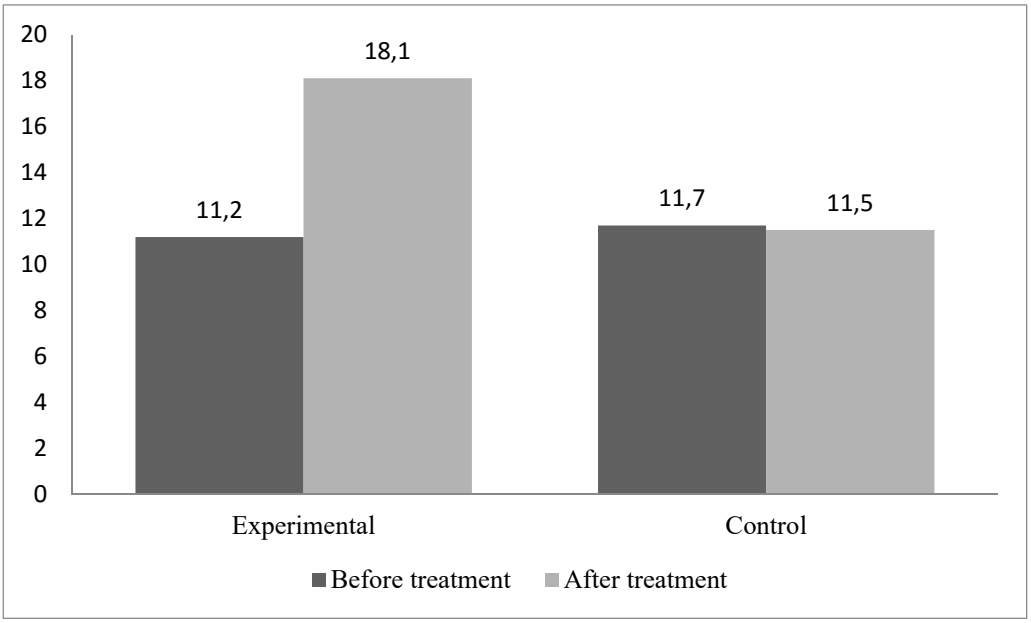

Figure 2. Comparison of muscle strength mean scores before and after the treatment

links with the pelvic floor muscles, and pelvic floor muscle exercises have been recommended for the treatment of female sexual dysfunction in previous systematic reviews (Willans, 2014).

The results of the present study indicate that PFMT with home biofeedback can be an effective and safe treatment for female sexual dysfunction and improve quality of life and pelvic muscle strength without discomfort. Related literature reports a positive association between PFM strength and sexual function. Our results corroborate previous studies' findings that found a significant improvement in sexual dysfunction after increasing pelvic muscle strength (Beji et al., 2003; Mohktar et al., 2013; Rivalta et al., 2010). It is known that the pelvic diaphragm, especially the levator ani muscles, has a crucial role in sexual response. For this reason, strong pelvic floor muscles affect female sexual health in a positive way by increasing vaginal lubrication, sexual arousal, and orgasm (Rosenbaum, 2007). Lowenstein et al. (2010) stated that women with strong or moderate PFM scored significantly higher on the FSFI orgasmic and arousal domains than women with weak PFM (Lowenstein et al., 2010). Martinez et al. (2014) reported that women with stronger pelvic floor muscles have better sexual function (Martinez et al.; 2014). The present study found that lubrication, arousal, and orgasm dimensions of the FSFI improved in the biofeedback group whose pelvic muscle strength was increased; there was no improvement in pelvic muscle strength and FSFI score results in the control group. Again, these results were consistent with the published literature.

Most studies report that pelvic floor muscle strength can be increased with biofeedback therapy, as can sexual function, which is closely related to the strength of the pelvic floor muscles (Rivalta et al., 2010; Willans, 2014). In this study, women's sexual function also improved after PFMT, while their pelvic floor muscle strength increased. Ibrahim et al. (2014) stated that biofeedback-assisted HBT is an effective treatment compared to PFME alone. It is known that biofeedback can provide motivation to patients who may be frustrated over their inability to isolate the pelvic floor muscles or who lack the sensation of muscle contraction. Most women do not exercise these muscles the right way so that biofeedback helps them to learn about their muscles and how to use them (Newman, 2014). Therefore, the present study also determined that pelvic floor muscle strength development with HBT has led to an increase in sexual function.

Two limitations of this study include that it was performed in a single center and did not include patients' spouses.

Conclusion

In conclusion, this study shows that PFMT with HBT is effective for improving sexual function and the quality of life of women with sexual dysfunction. For future studies, it is recommended to include larger sample sizes and compare the results through qualitative and quantitative methodologies; in addition, future studies may benefit by including patients' spouses.

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