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EFFICACY OF PELVIC FLOOR MUSCLE TRAINING AND HYPOPRESSIVE EXERCISES FOR TREATING PELVIC ORGAN PROLAPSE IN WOMEN: RANDOMIZED CONTROLLED TRIAL

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Abstract:
To detect any dysfunction in pelvic floor muscles to determine the effectiveness of muscle training and to evaluate the effect of childbirth ultrasonography has been widely used. Two types of ultrasounds has been used more frequently, 2D ultrasound which is more useful in evaluating pelvic floor issues and other is 3D ultrasound which is quite common. Different types of studies have been conducted in order to evaluate the effectiveness of pelvic floor muscle training for treating stress urinary incontinence. The success rate was between 44% and 80% among young adult females. A very limited literature is in favor of improved pelvic organ prolapse and its related symptoms. Some studies have briefly explained the mechanism of action of pelvic floor muscle training in organ prolapse. Women are teaches to contract the PFM before and during increases in abdominal pressure, helps prevent pelvic organ prolapse is known as behavioral therapy. There is significant increase in the cross-sectional area of levator ani muscle in women with pelvic organ prolapse. Pelvic floor muscle training and hypopressive exercise produce beneficial outcomes in the cross-sectional area of levator ani muscle.

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INTRODUCTION

To detect any dysfunction in pelvic floor muscles to determine the effectiveness of muscle training and to evaluate the effect of childbirth ultrasonography has been widely used. Two types of ultrasounds has been used more frequently, 2D ultrasound which is more useful in evaluating pelvic floor issues and other is 3D ultrasound which is quite common. Different types of studies have been conducted in order to evaluate the effectiveness of pelvic floor muscle training for treating stress urinary incontinence. The success rate was between 44% and 80% among young adult females. A very limited literature is in favor of improved pelvic organ prolapse and its related symptoms. Some studies have briefly explained the mechanism of action of pelvic floor muscle training in organ prolapse. Women are teaches to contract the PFM before and during increases in abdominal pressure, helps prevent pelvic organ prolapse is known as behavioral therapy. Greater support for pelvic muscles promoted for strength training to increase muscle volume raises the levator plate and decreases the genital hiatus. Many studies have observed that there was decreased cross sectional area of the levator ani muscle, increased genital hiatus, and decreased muscle strength in the participants who were suffering from pelvic organ prolapse.

The aim of the study is to evaluate the efficacy of pelvic floor muscle training and to calculate the cross-sectional area of the muscle which correlates the hypertrophy of the muscle after the exercise.

METHODS:

It was a randomized controlled study. A three month intervention was designed for the participants for each group allocation. 52 female participants with pelvic organ prolapse were recruited into the study. Participants having stage II pelvic floor prolapse and have not underwent surgery. Those who were having neuromuscular problems were excluded from the study.

The purpose of the study was explained before giving the informed consent. The data was kept confidential at any level. The designed intervention contains three groups. Group A consist of pelvic floor muscle training. Group B contains pelvic floor muscle contraction whereas group C was control group. Computer generated random numbers were used to stratify randomization in group allocation. The group A females were prescribed thoroughly how to contract the pelvic floor muscles only. In the group B women were explained how to contract pelvic floor muscle along with hypopressive exercise suing diaphragmatic breathing. Both groups received home exercise programs as described. The daily home exercise protocol for GA included three sets of 8–12 close-to-maximal contractions per day, in lying down, sitting up and standing positions. Each contraction was held for 6-8 seconds. Group B consisted of 10 repetitions of hypopressive exercises in lying down and standing positions, in association with PFM contractions for 3 to 8 seconds. Whereas the number of contraction between the two groups was change, the times spent on daily exercises were similar. The hypopressive exercises was extensive program. Group C had a single consultation only, and received instructions to contract the pelvic floor muscles during increases in abdominal pressure, without following a defined protocol. All the groups were received advice containing instructions on seeking advice, where appropriate, about weight loss, constipation, coughing and the avoidance of heavy lifting. The statistical analysis was done by using SPSS version 21
The level of significance was 0.05.
Results

Total 54 women were included in the study. The group A had mean age ± 10.7 and group B ± 6.4 whereas group C had mean ± 7.3. The BMI of group A was 30% and group B was having 35% while group C had 37%. The POP-Q classification was used to measure the pelvic organ prolapse in clinical evaluation. Two dimensional transperineal ultrasonography was used to calculate the cross sectional area of levator ani muscle. The CSA was measured in cm^2.
The average CSAs were 1.56, 1.34 and 1.54 cm2 , respectively.

After three months, there were significant differences in the CSAs: in GA, the CSA went from 1.56 to 2.3 cm2; and in GB, the CSA went from 1.34. The change in GC was not statistically significant, from 1.3 to 1.2.

Table no 1

Cross-sectional area		Mean (SD)	N
Group A	1st examination	1.5	18
	2nd examination	2.3	18
Group B	1st examination	1.3	18
	2nd examination	1.7	18
Group C	1st examination	1.3	18
	2nd examination	1.2	18

DISCUSSION:

The study has showed that with the training of pelvic floor muscle and transverse abdominis activation there is increase in cross sectional area of levator ani muscle evaluated by 2D ultrasonography. Another study conducted by Ahtianien et al has demonstrated that hypertrophy of muscle is associated with cross-sectional area of the muscle measured by ultrasonography. There is positive association between the contractile capacity and cross-sectional area of muscle. Therefore, ultrasound has been valid method for the measurement of hypertrophy muscles. Literature has reported that there is substantial decrease in muscle mass between 50 and 60 years of age which is also a risk factor of organ prolapse.

There is also a decrease in CSA, infiltration of fat and connective tissue in muscle, a decrease in the size and number of muscle fibers and a decrease in the number of motor units.18 In the current study by considering the age of participants it concludes that the levator ani muscles of those women had become weak and atrophied. In this study The hypoestrogenic state of the women were added to the effects of age. A study done by As Jármy-Di Bella et al. concludes that low level of estrogen causes weakening of the thenar muscle vessels of the pelvic floor and impairs their function, thereby leading to urinary incontinence and other dysfunctions. Muscle atrophy is an aggravating factor for pelvic floor dysfunction. A cross-sectional study performed by Hoyte et al evaluated the volume of levator ani muscle through magnetic resonance imaging. 30 patients were recruited and divided into three groups. In which 10 were asymptomatic, 10 with urinary incontinence and 10 with pelvic organ prolapse. The difference in muscle volume values were 32.2 cm^3, 23.3 cm^3 and 18.4 cm^3, respectively ($P < 0.05$). In women who were having pelvic organ prolapse were observed with low volume of pelvic floor muscle. These data support our results, which showed a small CSA for the levator ani muscle in study subjects with pelvic organ prolapse. Another study has assessed in 63 pre-menopausal women and divided them into three groups' nulliparous, continent multiparous and incontinent multiparous respectively. The values of cross-sectional area were 1.83 cm^2, 1.78 cm^2 and 1.32 cm^2, respectively. The data is accordingly to the current study, in which 58 women with pelvic floor dysfunction showed CSA of 1.53 cm^2. Bernstein observed through ultrasound evaluation that with increase in age there is decrease in cross-sectional area and pelvic floor muscle size. He further added that muscles were thinner in older women over age 60 years as compared to younger age. Between age and strength of muscular contraction of pelvic floor muscle there was negative correlation. Women suffering from pelvic organ prolapse have significantly thinner PFMs than do healthy women, but Bernstein stated that this difference could be eliminated through PFM training. These values are in agreement with Fleck and Kraemer, who reported that the muscle CSA increase ranged from 20% to 40% with a minimum of eight weeks of training. Bø and Aschehoug reported that exercises needed to target the specific muscle group to have positive results. The muscle behavior in the women in the group with specific training supports this statement, and this may explain this group's greater increase in CSA, however there was statistically difference in both groups. A study carried out by Braekken et al. who performed three-dimensional ultrasound scans on the levator ani muscle, the hiatus area and the resting position of the bladder and rectum in 109 women. The participants were having stage I, stage II and stage III pelvic organ prolapse and were randomized to either a treatment group or a control group. The stats demonstrated an increase in muscle volume, a decrease in the genital hiatus area, and an elevated position of the bladder and rectum featuring reduced pelvic organ prolapse. The results are similar with the present study, which demonstrated increased muscle size, and therefore reduced pelvic organ prolapse, using two-dimensional ultrasonography. Importantly, the examinations used for the present study were conducted by the same examiner, both before and after the treatment. Two-dimensional transperineally ultrasonography was chosen for CSA measurements on the levator ani because it is relatively inexpensive and does not cause discomfort to the patient. Oliveira et al. demonstrated the validity and interobserver reproducibility of the technique used in the present study.

CONCLUSIONS:

There is significant increase in the cross-sectional area of levator ani muscle in women with pelvic organ prolapse. Pelvic floor muscle training and hypopressive exercise produce beneficial outcomes in the cross-sectional area of levator ani muscle.

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