ISSN: 0976-3031

Available Online at http://www.recentscientific.com

International Journal of Recent Scientific Research
Vol. 8, Issue, 1, pp. 15427-15433, January, 2017

International Journal of Recent Scientific Research

Research Article

EFFECT OF TANZBERGER EXERCISE VERSUS KEGEL EXERCISE ON PELVIC FLOOR MUSCLE STRENGTH IN POSTMENOPAUSAL WOMEN WITH STRESS INCONTINENCE- AN EXPERIMENTAL STUDY

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ARTICLE INFO

Article History:

Received 20th October, 2016
Received in revised form 29th November, 2016
Accepted 30th December, 2016
Published online 28th January, 2017

Key Words:

Tanzberger exercise, kegel exercise, perineometer, pelvic floor muscle strength, revised urinary scale.

ABSTRACT

Background: Stress urinary incontinence, the complaint of involuntary leakage during effort or exertion, occurs at least weekly in one third of adult women. It affects not only the patient, but also her family and society at large. Due to the embarrassing nature of incontinence, it is both underreported and under diagnosed. It affects women's quality of life.

Objective: To find the effect of tanzberger exercise versus kegel exercise on pelvic floor muscle strength in postmenopausal women with stress incontinence.

Material and Method: 18 participants were taken in study. They were divided into two groups, 9 in each group. Group A was given tanzberger exercise and group B was given kegel exercise. Treatments were given for 4 weeks thrice a week. Outcome measures taken were pelvic floor muscle strength and revised urinary incontinence scale on the 1st day before the treatment and after 4 weeks of the treatment.

Results: Group A & B showed significant improvement in both two outcome measures. However, there was no significant difference in between the two groups.

Conclusion: Both the treatments were effective in improving pelvic floor muscle strength and reducing stress incontinence in postmenopausal women with stress incontinence.

INTRODUCTION

According to World Health Organization (WHO), urinary incontinence is a "wide spread global disease and one of the last medical taboos to many people".[1] International Continence Society (ICS) has defined urinary incontinence as the involuntary loss of urine which is a social or hygiene problem.[2] Approximately so million people worldwide suffer from urinary incontinence.[3] In a survey done in Asia, the prevalence of urinary incontinence in India is 12%.[4]

As a result of the various etiological factors mainly being weak pelvic floor muscle strength, there are three types of urinary incontinence namely Stress incontinence, Urge incontinence and mixed urinary incontinence. The pelvic floor muscles consists of 67-76% of slow twitched fibers and 23-30% fast twitched fibers.[5] The layers of pelvic floor are outer most Anal Sphincter, second layer: Urogenital triangle, Third layer: Urovaginal Sphincter, Fourth layer: levator ani muscles .[6]

The menopause is a universal physiological event related with the drop in ovarian hormone secretions (oestrogens and progestin) that occurs as the stock of ovarian follicules is depleted. Menopause is diagnosed when menstruation has stopped for 12 successive months, and the average age at which it occurs is between 47 and 51. Its clinical expression varies very considerably between socio-cultural groups and individuals. These variations depend on many factors, such as women's social status, their nutrition, life style (smoking) and weight, not forgetting genetic factors. It is difficult to draw the distinction between the effects of menopause and those of ageing. In addition to the menopausal "syndrome" itself, which mainly comprises vasomotor symptoms and vaginal dryness, urinary symptoms including incontinence (UI) have been attributed to menopause.[7]

40% menopausal and postmenopausal women suffer from urinary incontinence. Two primary types of urinary incontinence related to menopause are Stress urinary incontinence and urge urinary incontinence.[8] Stress urinary incontinence is the involuntary loss of urine during increase intra-abdominal pressure produced from activities such as coughing, sneezing, laughing or exercising.[3] Although urinary incontinence is not life threatening, it can be debilitating and affect confidence, as well as physical and social activities, which may lead to social isolation.[11] Urge urinary incontinence

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is a sudden need to urinate, often leading to uncontrollable release of urine .[9]

Several conservative treatment options are available for the management of stress urinary incontinence, eg physical therapies, behavioral modifications and pharmacological intervention. Physical therapies involving pelvic floor muscle training with or without other treatments such as vaginal cones, biofeedback and electrical stimulations are the standard for conservative treatment .[12]

Pelvic floor muscle exercises were first described as a possible treatment for urinary incontinence by Kegal in 1948. The aim of pelvic floor muscle exercise is to strengthen the perivaginal and perianal musculature in order to increase a woman's control of urine leakage.[16] In 1948, Kegal reported that pelvic floor training produces a cure rate of 84% for women with various types of urinary incontinence. [17]

Rehabilitation of the pelvic floor muscle in form of Kegal exercises is done which helps in stabilizing the urethra by increasing pelvic floor muscle strength .[3] This traditional method brings about the contraction of only the pubococcygeus muscle.[6] Fast pelvic floor muscle contraction will clamp the urethra , thereby increasing the urethral pressure and prevent urinary leakage during abrupt increase in intra abdominal pressure .[18] The exercise does not require any instrument and can be done anywhere. It will also improve pelvic organ support.[19] This traditional method brings about the contraction of only the pubococcygeus muscle. [6]

The German physical therapist Tanzberger, developed exercises, derived from klein-vogalbach, using the Swiss ball for treatment of incontinence. [20]The goal of the exercise is to integrate the function of the muscles as a procedural program by improving the sensory awareness and functional retraining using a Swiss ball. [6]

Tanzberger exercises incorporate the use of a Swiss ball for the retraining of the weak pelvic floor musculature. [6] If client is to use the pelvic floor muscles correctly restoration of diaphragmatic breathing is vital, as in co ordination with all muscles of abdominal compartment. Tanzberger has incorporated all the anatomical and mechanical principles that are essential for the overall improvement in the function of pelvic floor since pelvic floor muscles are a part of chain system.[5]

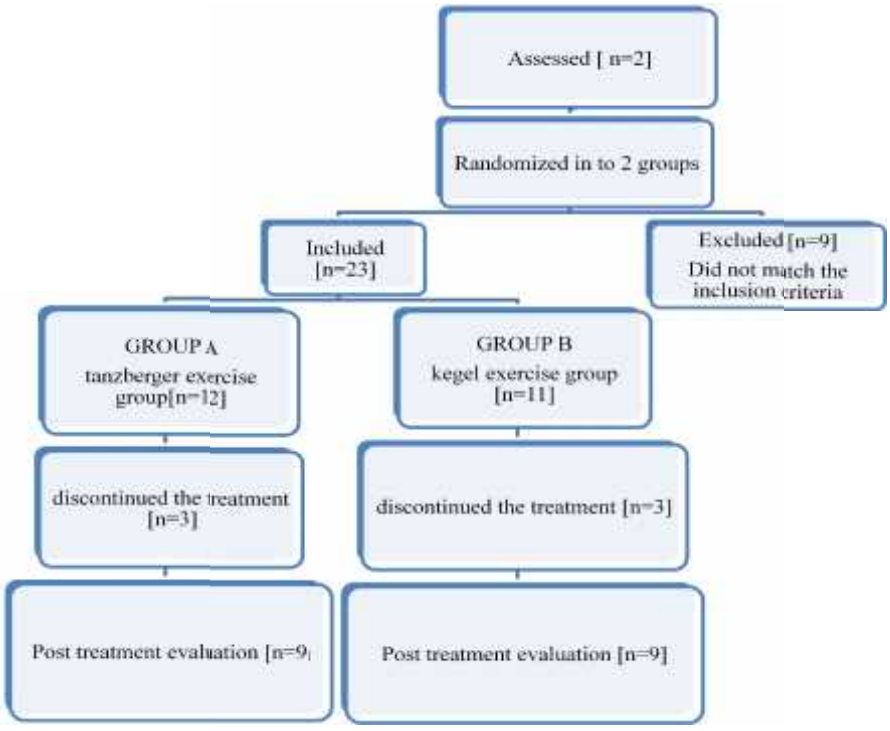
There are very few studies done on the effect of tanzberger exercises. Moreover, this exercise is not frequently used in clinical practice in India. There are studies available which shows effectiveness of kegal exercise. But there is no study done which shows comparison of tanzberger exercise and kegal exercise. Hence this study was undertaken to find out the effectiveness of tanzberger exercise versus kegal exercise in postmenopausal women.

MATERIALS AND METHODS

It was an experimental study. This Study Was Conducted at Various out Patients Departments and General Hospital of Ahmedabad. The total duration of study was 4 weeks. Sample size:

Based on a standard deviation of 0.5676 / pelvic floor muscle strength (jose mary sangeetha et al ,2010) , a sample size of 6 subjects per group provides a 95 % power to detect an effect on the pelvic floor muscle strength assuming a significance level of 0.05.

Group A: 9 patients (TANZBERGER EXERCISE GROUP)
Group B: 9 patients (KEGEL EXERCISE GROUP)



Inclusion Criteria

- Subjects suffering from stress urinary incontinence.
- Subjects having age group above 40 years.
- Subjects who are post-menopausal women, defined by the absence of vaginal bleeding for 12 months, with at least one episode of SUI symptom during the previous 1 month.
- Subjects willing to participate in the study.
- Subjects able to understand commands.

Exclusion Criteria

- Subjects having diabetic neuropathies.
- Subjects with congenital urological disease.
- Subjects with any other associated cardiovascular, orthopaedic or neurological disorder.
- Subjects having tumors of the bladder.
- Subjects with prolapsed.
- Women with morbid obesity.

Procedure

Total 18 subjects with stress urinary incontinence and history of menopause were taken for study. They were referred from Shivam Hospital, Opposite Gomtipur fire station, Gomtipur, Ahmedabad -21. On the first visit a complete assessment was done. Subjects who have been found suitable to participate were explained the nature of the study and were requested to sign the consent form.

Pre participation evaluation form consisted of personal database, history, chief complaint was being documented.

The subjects were divided randomly into two group using randomization sheet .The subjects were evaluated with the perineometer for pelvic floor muscle strength and then were asked to fill revised urinary incontinence scale (RUIS).

Assessment with perineometer

To maintain hygiene glove was applied on a sensor. KY jelly, vegetable oil or water was applied to the sensor before insertion.

Subject was in supine position with hip and knee in 90 ° flexion. Deflated sensor of perineometer was inserted in to the vagina. There should be a little bit of a resistance that should not be painful. Then subject was asked to contract the pelvic floor muscles. Subjects were given command to contract as she is trying to stop urine flow. As subject try to stop urine flow there will be increase in pressure. This pressure can be measured by movement of the needle. And gradings were given according to the increase measured by perineometer. The reliability of the instrument was checked by using chronback's alpha. Value of chronback's alpha is 0.83 which suggests that the instrument used is reliable.

Revised urinary incontinence scale: The RUIS is a short, reliable and valid five item scale that can be used to assess urinary incontinence and to monitor patient outcomes following treatment. It was originally developed by selecting the best performing urinary incontinence items The RUIS total score is then calculated by adding up a person's score for each question. Adding the score for each of the five questions results in a possible score range of 0 - 16.

Then subjects were distributed into two group named as group A and group B. The participants in the group A were given the tanzberger exercise and the participants in group B were given kegel exercise.

Group A Tanzberger Exercise

Rehabilitation was done using the Tanzberger Exercises, given by German physical Therapist, Renate Tanzberger. The participant was made to sit on a Swiss Ball, with the hip and knee flexed to 90° and the feet properly placed on the ground. The participants were explained in detail about the PFM. The landmarks were explained by making them sit on a firm surface (chair) and by making them feel for the contraction and relaxation of the gluteal, anal and the vaginal muscles.

Exercise 1

Rolling the Ball Forward: The participant was asked to roll the ball forward towards the knee without lifting off the feet and keeping the lumbar spine erect. While rolling, contraction of the PFM was to be done and while returning, relaxation.

Exercise 2

Back to Back Sitting: The participant and the therapist sat on the Swiss Ball back to back. The participant was asked to pull the ball towards the knees which do not move and this activity was restricted or slowed down by the therapist who tried to pull the ball in opposite direction. This brings about the isometric contraction of the pelvic floor muscles. The participant was asked to contract the pelvic floor muscles (50 contractions for each exercise) while exhaling and relaxing while inhaling. Treatment was given for 4 weeks, 3 sessions per week. Each session continued for about 20-30 minutes depending upon the fatigue level of each individual subject with sufficient rest break in between each exercise.[6]

Figure 1 Tanzberger Exercise 1

Figure 2 Tanzberger Exercise 2

Group B Kegel Exercise

Group B received kegel exercises

The treatment protocol was carried out as outpatient activities. The treatment for the kegel groups consisted of 12 sessions, with three sessions per week and total of 4weeks of treatment. During the sessions, participants received instructions about anatomy of the pelvic floor muscles and continence mechanisms and carried out exercises to strengthen the pelvic floor muscles in supine, sitting, and standing positions. The difficulty degree progressed according to the positions adopted, increasing the number of repetitions and time of sustained contraction. An average of 100 contractions were performed per session, with phasic contractions, lasting 3 sec with 6 sec of rest, and tonic contractions, lasting 5–10 sec followed by 10–20 sec of rest. To minimize muscle fatigue, resting time was rigidly observed in all sessions and the time of sustained contraction was slowly increased.[13]

After 4 weeks again pelvic floor muscle strength was checked with perineometer.

And patient was asked to fill revised urinary incontinence scale again.

RESULT

In present study 18 participants were randomly divided into 2 groups: GROUP A and GROUP B in TANZBERGER and KEGEL exercises respectively. The outcome measures were pelvic floor muscle strength with perineometer and revised urinary incontinence scale to measure severity of the condition.

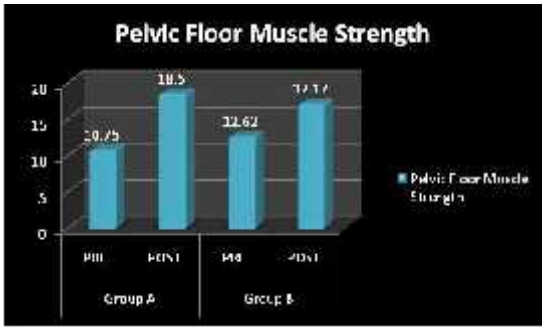
Data analysis was performed by using Statistical package of social sciences [SPSS] version 20.0.Normality test was performed by using SPSS version 20.0.Level of significant for whole statistical analysis was kept at 5%.

The results were expressed in term of Mean and standard deviation and p-value. The age distribution among 18 participants. In group A mean age was 54.78 years with standard deviation 9.32 and in group B mean age were 52.67 with standard deviation 6.59.

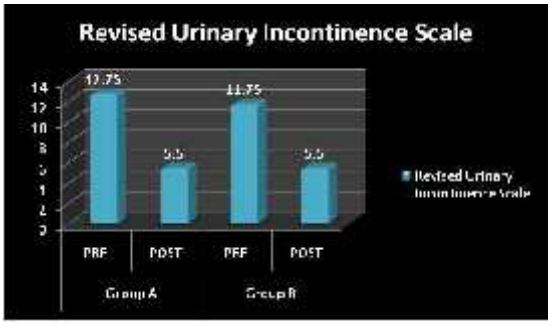
The pre-test mean value Pelvic Floor Muscle Strength, Revised Urinary Incontinence Scale in Group-A was 10.75, and 12.75post-test is 18.5and 5.5, ‘z ’ value = 2.533, and 2.533, $p<0.05$.

The pre-test mean value Pelvic Floor Muscle Strength, Revised Urinary Incontinence Scale in Group-B was 12.62, and 11.75post-test is 17.12nd 5.5, ‘z’ value = 2.371 and 2.524, $p<0.05$.

The independent‘t’ test is done to calculate the significance of difference in Pelvic Floor Muscle Strength between Group-A and Group-B. The mean of differences in Pelvic Floor Muscle Strength scores between pre and post- test in Group-A is 7.75(SD=3.33) and in Group B is 4.5 (SD=3.38), U= 15.00. The independent‘t’ test is done to calculate the significance of difference in Revised Urinary Incontinence Scale between Group-A and Group-B. The mean of differences Revised Urinary Incontinence Scale between pre and post- test in Group-A is 7.25 (SD=2.815) and in Group B is 6.25(SD=2.1213), U=21.50. Thus from above statistical data of Pelvic Floor Muscle Strength, Revised Urinary Incontinence Scale, This result suggests that there is no statistically significant difference found between GROUP A and GROUP B. This result can be because the treatment was not given for long duration and there was a small sample size. But there is a clinical difference between GROUP A and GROUP B.



Graph 1 Pelvic floor Muscle strength Group A &B



Graph 2 Revised urinary incontinence scale (RUIS) score

DISCUSSION

The participants in GROUP A received tanzberger exercise for four weeks and showed statistical improvement in pelvic floor muscle strength (Z= -2.533, p= 0.011). This is because Tanzberger Exercises incorporate the use of a Swiss ball for the retraining of the weak pelvic floor musculature. Exercises are functional because they activate the pulmonary diaphragm, the abdominal and back muscles which results in the restoration of the pelvic floor and with each movement the sensory awareness of the pelvic floor is also improved. Strengthening is done for the fibres running in all direction. This result is in accordance with the study done by Heena A. Bhatt(2013). They have performed a study to evaluate the effect of tanzberger exercise in women with stress incontinence. The result of their study suggested that tanzberger exercise shows significant improvement in women with stress incontinence. [6]

The other reason for improving the strength in tanzberger group can be because the pelvic floor muscle fibers run in a sagittal and frontal plane, as well as in a diagonal direction, movements in different directions should be included to maximize the benefit of strengthening exercise. The Swiss ball allows for movements in all direction. When two persons sit back to back on a ball there will be isometric muscle activity as they both pull at the same time and with the same force on opposite direction.[20]

In GROUP B, participants were given kegel exercise for four weeks. According to the results, the kegel exercise group shows statistical improvement in pelvic floor muscle strength (Z= -2.317, p =0.018). This result is because kegel exercise in the management of urinary incontinence is based on two functions of pelvic floor muscle: support of the pelvic organs, and a contribution to the sphincteric closure mechanism of the urethra. For stress urinary incontinence, the aims of kegel exercise are to improve pelvic organ support (particularly of the bladder, bladder neck, and urethra) and increase intraurethral pressure during exertion. Fast and strong pelvic floor muscle contraction will clamp the urethra to increase intraurethral pressure; may press the urethra against the symphysis pubis, further increasing the urethral pressure; and may prevent urethral descend during effort and exertion.[47]

This result is in accordance with the study done by Rodrigo A. Castro (2008). They compare the pelvic floor muscle exercise with electrical stimulation and vaginal cones. The result of their study shows that there is a significant improvement in pelvic floor muscle strength in participants receiving kegel exercise.

As per result of GROUP B, the pelvic floor muscle strength improves significantly. There is a systemic review done by Hay-Smith J (2009). In this systemic review they compare pelvic floor muscle training with no treatment, or inactive control treatment. They mentioned that pelvic floor muscle training be included in first-line conservative management programme for women with stress, urge, or mixed, urinary incontinence but women with stress incontinence benefit most.

In this study pelvic floor muscle strength of GROUP A and GROUP B were compared and there was no significant difference found (U=15.00,p=0.071). This result may be due to small sample size and less study duration. This result can be compared with the study done by Jose Mary Sangeetha(2010). They have checked the effectiveness of comprehensive pelvic floor rehabilitation program. In which one group received only pelvic floor muscle exercise and another group received Comprehensive Pelvic Floor Muscle Rehabilitation Program (CPFMRP) which included PFME, timed Voiding, Tanzberger exercise concept along with Functional activities. The result of this study shows that there is no significant difference in pelvic floor muscle strength between two groups.[3]

Though there is no statistical significant difference found between the groups, but Tanzberger exercise showed improvement in pelvic floor muscle strength clinically than kegel exercise because in tanzberger exercise strengthening is done for the fibres running in all direction whereas, Kegels exercises help in strengthening of the muscle fibres running in only one plane.[6]

The result of this clinical trial showed that tanzberger and kegel both reduce severity of the stress incontinence by reducing revised urinary incontinence scale (RUIS) score.

As the results shows in GROUP A there is reduction in the severity of the stress incontinence by reducing the score in revised urinary incontinence scale (Z= -2.533,p=0.011) which is statistically significant. This result may be because tanzberger exercise improves function of the entire abdominal muscles and it improves pelvic floor muscle strength. This improved pelvic floor muscle strength will reduce the leakage of urine while doing any exertional activity which increases intra abdominal pressure.

Result also shows that in GROUP B there is also significant reduction in revised urinary incontinence scale (Z= -2.524,p=0.012). This result is because the bladder neck is supported by the pelvic floor muscles, which limit the downward movement of the urethra during exertion and thereby prevent leakage of urine (Bo 2004, Peschers 2001). Intensive training of any striated muscle will build muscle bulk; similarly strength training of the pelvic floor muscles will build muscle bulk and thereby provide structural support to the pelvic floor by permanently elevating the levator muscle plate to a higher position in the pelvis. Kegel will, in addition, facilitate more effective automatic motor unit firing of the pelvic floor musculature, preventing pelvic floor descent during increased intra-abdominal pressure, and hence prevent leakage of urine. So there is reduction in score. This result is in accordance with the systemic review done by Natalia Price (2010). They suggested that kegel exercise should be first line of treatment for stress urinary incontinence.[4]

There is a significant reduction in revised urinary incontinence scale score within GROUP A and GROUP B. While comparing mean difference between GROUP A and GROU B (U = 21.500,p=0.264). This result suggests that there is no statistically significant difference found between GROUP A and GROUP B. This result can be because the treatment was not given for long duration and there was a small sample size. But there is a clinical difference between GROUP A and GROUP B.

CONCLUSION

This study rejects the experimental hypothesis "There is a significant difference between tanzberger exercise and kegel exercise on pelvic floor muscle strength in postmenopausal

women with stress incontinence." and accept the null hypothesis" There is no significant difference between tanzberger exercise and kegel exercise on pelvic floor muscle strength in postmenopausal women with stress incontinence." hence the conclusion of the study is that tanzberger exercise and kegel exercise both were effective with improving pelvic floor muscle strength and reducing score of revised urinary incontinence scale in women with stress incontinence, but none intervention is better than other.

Limitation of the Study

- The sample size was small so the results could not be generalized to population.
- Another problem is recruiting participants within the time window of the study.
- The study only examined the short-term effect; long-term follow up was not taken.

Future Research

- The study duration in present study was of small duration so in future the duration of the study should be increase for better implication in clinical set ups.
- Future study should increase large sample size.
- In future needed to understand how long training benefits are sustained among the women with stress incontinence and additional strategy are necessary to sustain and maximize benefits.

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How to cite this article:

Tithi Gadhavi, MPT.2017, Effect of Tanzberger Exercise Versus Kegel Exercise on Pelvic Floor Muscle Strength in Postmenopausal Women With Stress incontinence- An experimental study. *Int J Recent Sci Res.* 8(1), pp. 15427-15433.