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RESEARCH ARTICLE

EFFICACY OF PELVIC FLOOR MUSCLE TRAINING IN ELDERLY WOMEN WITH STRESS URINARY INCONTINENCE

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ABSTRACT

As defined by the defined by the *International Continence Society*- any involuntary loss of urine, is a socially hygienic problem and it is objectively demonstrable. The prevalence rate of SUI ranges from 75- 80 %. Recommended Physical Therapy Management is least invasive and only method without undesirable side effects; apart from classical Kegel's exercises, recent studies have been experimenting with multiple training options. Interventional studies have been including females aged 60-74 yrs and used the QUID questionnaire for choosing the type of incontinence. Perineometer has been an established and valid strength assessment device in a comparative study for digital palpation by OXFORD scale. This study demonstrates the use of perineometer as a strength assessment and endurance and the use of Pilates as an exercise tool for controlling stress urinary incontinence.

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INTRODUCTION

The most common type of UI in pregnant women is SUI, with global prevalence ranging from 18.6 % to 75 % and it increases with gestational age. Sangsawang *et al* 2013). Specifically stress incontinence is related with exacerbation of symptoms during coughing, laughing or giggling. It is a common and upsetting medical condition, & many women are too discomfited & self-conscious to talk about it.This problem is more vigilant in India with prevalence ranging among women from 5% to 60%. Women usually do not approach treatment options for their reproductive health problems and do not vocalize their symptoms (Haylen, *et al* 2010; Ditkin, et a 1984l). As the menopausal health demands are at priority in the Indian scenario in the rural areas due to increase in life expectancy and growing population of menopausal women; large efforts are required to educate and make the women aware of menopausal symptoms in the rural women. (Sagdeo M M, Arora Dimple *et al* 2013).Often involuntary loss of urine becomes a clinical problem for the ageing women because of the trauma to the pelvic muscles during child birth, development of acute and chronic illnesses, and loss of estrogenic stimulation at menopause and decreasing amount of normal homeostatic reserve available to cope with stresses placed on the bladder (Hunskaar *et al*., 2002).

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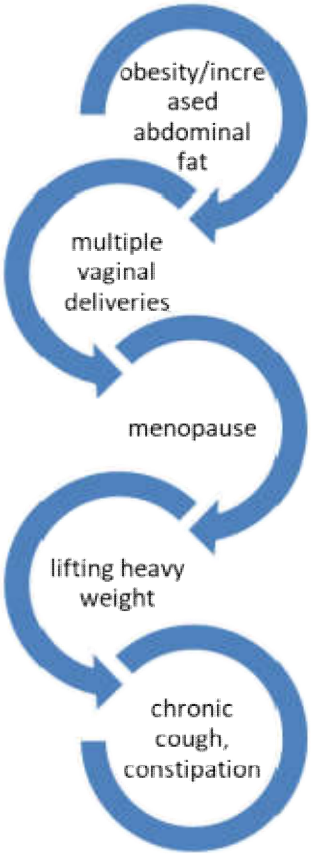
In a large European randomised study with 9487 women, more than 60% of them with medium to severe symptoms reported restriction in their activities, including physical exercise, due to a possible incontinence episode. Brown et al reviewed the information collected by more than 41000 women in the Australian Longitudinal Study on Women's Health (ALSWH) and found that more than 33.3% of women between the ages of 45 and 50 report that they avoid athletic activities fearing an incontinence episode during exercise. (Brown WJ *et al* 2001). Listed are a few causes of stress urinary incontinence which are usually linked to each other and exacerbate the problem more –Dr. Arnold Kegel in 1948 has found to successfully treat stress incontinence. A meta-analysis conducted to determine the effectiveness of kegels exercise on the basis of Randomized controlled trials (RCTs) were conducted on females with stress urinary incontinence who met inclusion criteria in articles published between 1966 and 2012. (Gyhagen, M., Bullarbo, M., Nielsen, T. and Milsom, I. *et al* 2013) Fritel *et al* conducted a retrospective survey of cases 4 years after first delivery, revealing 29% (89/307) prevalence of SUI. According to multiple logistic regression analysis, the independent risk factors for development of urinary incontinence were any signs of urine leakage before the first pregnancy or during the first pregnancy, duration of first labor ≥ 8 hr, mother's age > 30 years at the first delivery and caesarean section at the first delivery. Whereas, maternal age during first delivery, any history of previous incontinence (before or during the first pregnancy), prolonged labor, and vaginal delivery constituted

the main risk factors for incontinence. (Singh Abha, Agrawal Priti, Sachdev Nanakram *et al*. 2007)



The assessment of Quality Of Life has been shown to be of prognostic importance for treatment-seeking in cases of UI. Several questionnaires have been developed and tested to measure the impact of UI on the QOL. The incontinence Quality of life instrument (I-QOL)- self report quality of life measure, the Health related Quality of women(HRQOL)- measures day to day life impact of SUI, Urogenital Distress Inventory(UDI) are a few QOL assessments which can be used for measuring QOL. Recent publications show improvement in the Quality Of Life of women who were undergoing some form of conservative treatment; they were assessed on the King's Health Questionnaire (KHQ) (Uemura S1, Homma Y *et al*. 2004). The IIQ-7 has been developed to assess the severity of genuine stress incontinence among women. Item responses are assigned values of 0 for "not at all," 1 for "slightly," 2 for "moderately," and 3 for "greatly."

In a study conducted by Chaliha *et al*, when the assessment of the reliability and sensitivity to change of the king's health questionnaire, incontinence impact questionnaire-short form (IIQ-7) and incontinence quality of life questionnaire (iqol) were compared; it was seen that KHQ had multiple domains on which an individual could be assessed. However, IIQ-7 only produces an overall score without individual domains. Also the IIQ-7 can be used to evaluate the severity and the symptoms of lower urinary tract dysfunctions on a scale of 0-3. The KHQ determines how effective a particular treatment or intervention is in inducing change in an individual's Quality of Life. (Kelleher CJ, Cardozo LD, Khullar V, Salvatore S *et al*. 1997) (Kelleher CJ, Pleil AM *et al*, Reese PR, Burgess SM, Brodish PH 2004) Therefore, KHQ & IIQ -7 were chosen in this study corresponding to the same reasons.

Isherwood & Rane compared digital assessment of pelvic floor contraction strength & vaginal perineometry and to evaluate the effective practice of pelvic floor exercises by women. They concluded, there was a good co relation between the readings of the digital assessment of contraction strength and the vaginal perineometry readings of the pelvic floor muscles (Kegal ah *et al*.1951). With new and advancing theories to control incontinence and strengthen the pelvic floor musculature is the practice of Pilates. Pilates is practiced for the whole body; i.e the upper & lower body musculature. The effect of Pilates can be seen in improving the posture, increasing kinaesthetic & also helps to regain the core muscle strength (Nahid rehmani, Mohamad A *et al* 2012). The founder of Pilates, Mr Joseph Pilates founded the traditional Pilates which underwent changes gradually introducing the modern Pilates- now. The traditional Pilates principles are based on 8 principles namely, concentration, breathing, centering, control, precision, flowing movements, integrated isolation, routine. (Nahid rehmani, Mohamad A *et al* 2012). Pilates teaches to concentrate on the five key elements and to separate the control in CNS for the TrA (transverse abdominis muscle) which plays a crucial role in strengthening of the pelvic floor muscles.(Bo k.2004, Groutz A, Helpman L, Gold R, Pauzner D, *et al*.2007). Pilates therefore helps to strengthen the core muscles which form a part of the pelvic floor musculature and help in improving stress incontinence (Fritel X, Fauconnier A, Levet C, Bénifla JL.2004).

MATERIALS AND METHODS

This study has been designed to find out the effectiveness of pelvic floor muscle training programme in stress urinary incontinent elderly women. Requisite permission and approval was obtained from head of the institution and institutional ethical committee before the commencement of work.

Research Design: Experimental study design or (pre – post trial study design) is selected to find out the effect of particular treatment . This study was carried out to examine the relationship between pelvic floor training program(Pilates) & stress urinary incontinence. This design was used to investigate the additional effect of pelvic floor training program on the Quality of life of women suffering from stress incontinece in elderly women.

Sampling: A purposive sampling method was used and participants were recruited from various community level and through personal contacts. Here the sample selection is based on the judgment of the person entrusted with the job. Hence Purposive sampling method was deliberately selected based on inclusion and exclusion criteria.

Sample Size: The sample size were calculated from www.openepi.com (Significance level - 0.05, associate value – 1.96) (Power – 80 %, associated value – 0.8416). The idea for selection of sample size is to achieve 60 individuals which were participated in sensory motor training program and they were only community dwelling elderly individuals. So to fulfill this purpose 100 community dwelling elders were screened, to achieve 60 population.

The study is done in a community.

Targeted population: Community dwelling elderly women, aged from 55 to 65 years.

Duration of study: 2 years from the date of institutional ethical clearance

Criteria: Inclusion Criteria

- Age 55 yrs – 65yrs females
- Undergone vaginal delivery
- Primiparous / multiparous
- Females with a complaint of stress incontinece with a score of ≤ 4 on QUID

Exclusion Criteria

- Females with uterine prolapse
- Patients with abdominal / vaginal hystrectomy, pelvic organ prolapse,incomplete bladder emptying or neurological conditions
- Severe medical condition that prevents them to perform exercise
- ≥ 6 on the QUID
- any recent surgery
- patients who do not understand the commands

Procedure: Here the targeted population were elderly women with stress urinary incontinenece. The focus of the study was to find the effect pelvic floor training programme i.e Pilates on stress urinary incontinece in elederly women. The ethical clearance was obtained from institution head and ethical committee before starting the procedure and the individual consent was taken who meet the inclusion criteria. The nature and duration of the study was explained to the participants.The importance of study, its benefits and risks along with requirment of regular visit was explained to patients. The subject were questioned about their knowledge of the pelvic floor muscles. Then they received information about the location and basic anatomy of the female pelvis , the musculature and its function in the form of a power point presentation. It was also emphasized on how to correctly contract the pelvic floor musculature. They were taught the importance of tightening and contracting the pelvic muscles in the treatment of stress incontinence as well. Those subjects who were voluntarily willing to participate in the study, were also included. This was followed by documentation of the data and evaluation.

Screening: The subjects were screened according to inclusion and exclusion criteria which was given in study protocol. Only those who were meeting the criteria were included in this study. 100 community dwelling elderly individuals had been screened,via an advertisement in the newsapaper in the form of a pamphlet consisting of information about the symptoms and causes of stress urinary inconitnce; out of which 60 participants met the inclusion criteria. During the screening 100 participants were undergone the assessment of QUID-quesstionaire for urinary inconinece diagnosis. The IIQ-7 was used for symtoms severity and Kings Health Quesstionaire-KHQ detremined the Quality of life score. From the QUID, Stress scores ≥ 4 for Stress Urinary Incontinence were included and Urge scores ≥ 6 for Urge Urinary Incontinence were excluded. The participants who were selected, their baseline measurement was taken i.e., QUID score, perineometer measurements, IIQ-7 and KHQ QoL score.
Post training measurements were taken at 2nd week and at end of 4 weeks.

Intervention Programme:

Plevic floor muscle training program was inducted in the form of Pilates exercises. Participants were instructed to use proper and comfortable clothing. All the exercises were performed on a comfortable at placed on the floor. All subjects were participated in 45 minutes pilates exercise protocol for a duration for 4 weeks i.e, 5 days/wk. Before treatment, 5 minutes Warm up exercises were done.the pilates exercise form included basic exercises of pilates as warm up. There were 8 forms of pilates exercise forms used in the training protocol, divided into 4 exericses for each set. Which made the exercsies as a "2 set" exercise regime protocol. They were performed with rest periods between each set of exercises. At the end of the Pilates exercises, cool down exercises were performed for 5 minutes. While performing each exercise participant was monitored to avoid risk of overexertion.

Warm up

- 5 minutes marching
- Light stretching - Hamstring stretch, Gluteus maximus and hip flexor stretch, Gastrocnemius and soleus stretch, Paraspinal stretch (5 repetitions and 10 seconds hold).

Pilates Exercise Program

- **Pilates breathing**: Inhale slowly, deeply focusing on diaphragm movement and exhale.
- **Neutral pelvis**: lie on the back, knees bent, feet flat on the ground and maintain the low back curve.
- **Knee folds**: Lie on back, knees bent, feet off the floor, pelvis neutral.
- **Knee sways :** Lie on back, bent knees, feet off mat, arms are extended out to the side, rotate the pelvis to the left, use abdominals to bring the pelvis back to neutral and alternate sides.

Set-2:

- **Bridging :** Lie on the back with knees bent and feet in parallel. Press feet down into the floor to engage the hamstrings, lift the pelvis up towards the ceiling and the feet simultaneously. Lower the pelvis down to the floor using the legs. The spine is in neutral
- **Circles:** Lie on the side lying position, below knee bent and the above knees straight, straighten one leg to ceiling then circular motion across body first
- **The clams**: lie straight on the mat with knees folded and feet on the floor. Get on to one side and clam both the hands above the head and join both the feet. Raise your feet above the ground and gradually open and close both the knees.
- **Rolling knees**: lie on the back with knees bent. Hands wide open and angled at 45 deg from the body. Lift the knees and position at 90 deg in mid air. With side to side swaying alternately. Repeat 5 on each side.

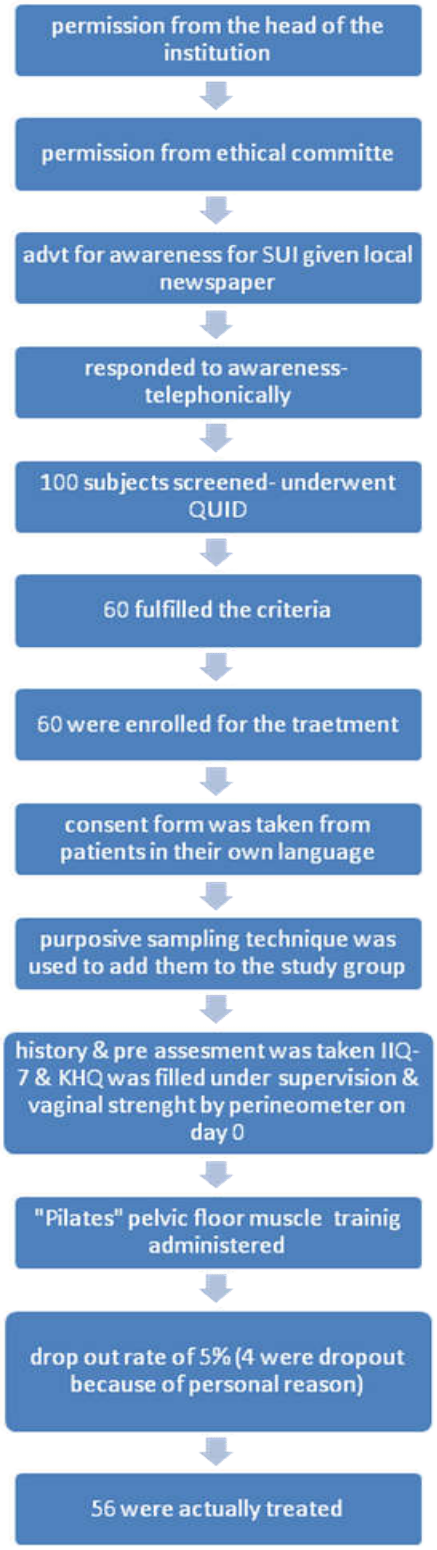
Cool Down

- 5 minutes marching and breathing
- Light stretching - Hamstring stretch, Gluteus maximus and hip flexor stretch, Gastrocnemius and soleus stretch, Paraspinal stretch (5 repetitions and 10 seconds hold).

Table 1. Age wise distribution of cases in study group

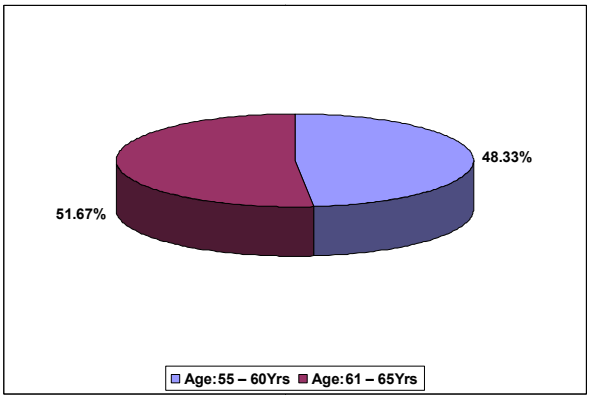
Age (Yrs)	No of cases	Percentage (%)
55 – 60	29	48.3
61 – 65	31	51.7
Total	60	100.0

Flow Chart



RESULTS AND OBSERVATION

Table and graph 1 shows the age distribution of patients. Here for this study elderly women were chosen from the age group 55-65 years, total 48.3% of population participated for the age group of 55-60 and 51.7 % participated for 61-65 years.



Pie diagram showing age wise distribution of cases in study group

Table. Comparison of overall part II score by KHQ at baseline, 2 weeks and 4 weeks in study group

Parameter		Part I overall score		Wilcoxon Z Value	P Value	
	n	Mean	SD			Significant
Baseline	60	59.87	±4.160	-	-	
At 2 weeks	60	47.78	±4.694	6.75	<0.0001	Y
At 4 weeks	56	25.20	±3.477	6.52	<0.0001	Y

At 2 weeks Vs At 4 weeks: Z = 6.52, P<0.0001

Table and graph no 18 shows the comparison of overall part II score by KHQ at baseline, 2nd week and 4th week. The mean and standard deviation was calculated and the Wilcoxon test, which is a non-parametric statistical test was used; it showed that there were statistically significant results, p value <0.0001.

Comparison of overall part I score by KHQ at baseline, 2 weeks and 4 weeks in study group

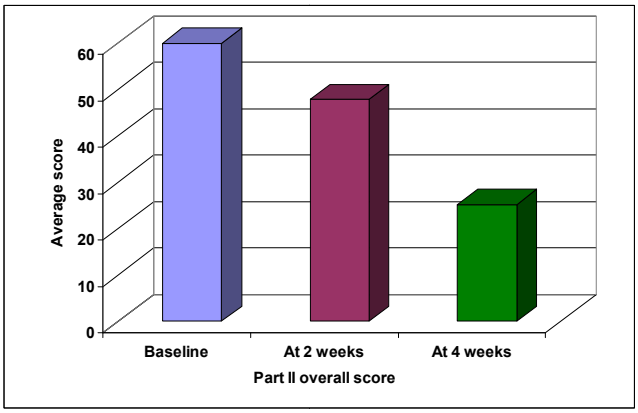
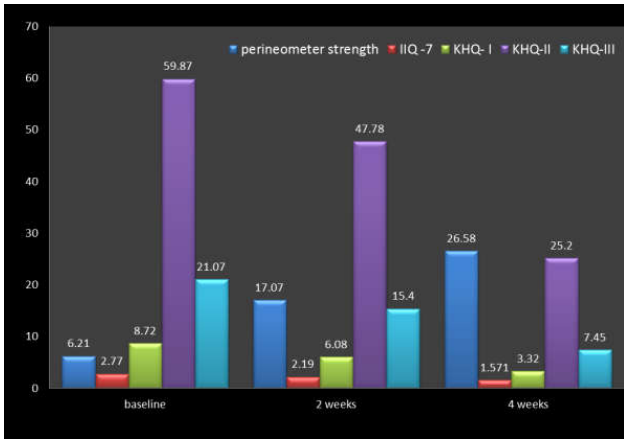


Table 2. Overall depiction of Perineometer strength, IIQ-7 & KHQ-part I, II & III in the study group at baseline, 2 weeks & 4 weeks



DISCUSSION

The present study was undertaken to ascertain the effect of Pilates pelvic floor training program in the management of stress urinary Incontinence in elderly women. In this study, 60 subjects were included on the basis of QUID questionnaire. The vaginal strength was evaluated objectively by the BIONICS Perineometer along with the Quality Of Life. The present experimental study demonstrated that, in community dwelling elderly women, 4 week Pilates training protocol for pelvic floor muscle training is effective in treating stress urinary incontinence. The results of this study were favoring the alternate hypothesis. The Pilates Pelvic floor exercise is effective in the management of stress Urinary Incontinence. The study population here, was taken from age 55 to 65.The high prevalence of urinary incontinence among women in general practice has become well known over recent years, & is confirmed by various studies in the past. The major percentage of stress urinary incontinence affected women were seen between age group 61-65 corresponding to increasing age (Table 1).

The pathophysiology of stress urinary incontinence is multifactorial and is strongly associated with pregnancy, maternal age & aging. (54) The study focused only on stress incontinence, which is found to be affecting maximally in this age group. Trupti N Bodhare, Sameer Valsangkar *et al*, in 2010 conducted an epidemiological study of urinary incontinence & its impact on quality of life among women aged 65 years & above in a rural area in India. In a sample of 552 women the highest prevalence of 57% was seen in stress incontinence, and hence we have taken the stress incontinent group for training with pelvic floor Pilates. We screened 100 community dwelling elderly woman in the community for complains of stress urinary incontinence, out of which 60 fulfilled the inclusion criteria by undergoing the QUID questionnaire. The strength of QUID is that it is relatively short with only 6 items. It is a valid & responsive instrument that serves as a diagnostic tool to determine UI type & also as a measure of stress & Urge UI symptom frequency before the treatment (Viktrup L, Lose G. 2001) (Catherine S. Bradley, David D. Rahn *et al*.2010). From a health promotion & awareness perspective, this is an important group to target, as many older people do not seek health professional advice until the problem is very severe. The early assessment and evaluation of this problem may allow treating this problem as early as possible (Cherie Wells *et al*., 2012).

In addition to this, potential benefits from training with Pilates are improved posture & balance & improvement in overall quality of life related to stress urinary incontinence. Importantly, the significant outcome of this study is an increased level of physical activity, which leads to other health benefits as well in the elderly women. In the study, only 20 % women were with higher BMI (BMI 30 n above) & maximum were in the range 18.5-24 BMI (healthy BMI)(Table 2). Khullar V, Sexton CC *et al* reported a positive relationship between increasing BMI (25-29.9 i.e. overweight) and urinary stress incontinence. The IIQ-7 measures the impact of stress urinary incontinence based on 7 questions, divided into 5 domains. It measures the impact of incontinence on the life of women on a scale from not at all- greatly, rating them as 0 to 3 Schumaker *et al*. In this study, it was shown that there was a moderate to greatly impact in the 1st week baseline assessment, which was improved by the 4th week, though with the number of women who could retain for the treatment & failed to follow up to the 4th week had slight difficulties by the end of 4th week. Victoria L Handa *et al* (2004) found that women with Stress Urinary Incontinence had the most difficulty engaging in ‘‘physical recreational activities’’ and the least difficulty participating in ‘‘relationship with family.’’ This correlation was found in the current study as well. They also assessed the ability of the IIQ to discriminate between individuals with respect to disease severity & found that most of the items in the IIQ are useful for discriminating incontinence severity among women with mild or moderate incontinence, but very few IIQ items distinguish among women with severe incontinence (Dannecker, .2005). The association between health related QOL & severity has been previously described by several authors in the context of care seeking behaviors. This study shows that UI severity is negatively associated with QOL in all the five items listed on the severity scale. The distribution of cases at baseline was mostly seen under moderately & greatly affected. By the end of 4 weeks the distribution pattern changed to a maximum of moderately & slightly affected population.

Sara Aguilar *et al* reported that there was a decrease in Quality of life in community dwelling elderly with increase in severity of urinary incontinence; hence in this study we assessed the severity using the IIQ-7 which is a valid tool for symptom severity assessment (Uebersax, 1995). Several reports confirmed the effect of pelvic floor exercises (PFE), but very few studies have used Pilates as sole training program for training of the pelvic floor muscles on female stress urinary incontinence. The PFE program as Pilates, in this study cured or improved 75% according to the patient’s subjective & objective assessments. (On the basis of Perineometer readings) Our results are comparable to those reported by Hahn *et al* (1993) who found that 71% of patients were cured or improved following a PFE program, and to those of Henella *et al* (1998), who reported that 67% of patients were cured or their condition improved. In addition, Wilson *et al*., (1987) found 66% cure rate immediately after a hospital exercise program.
A study reported that the results of PFM exercise are dependent on the degree and duration of treatment and frequent supervision by a therapist or instructor. Although the effects of PFM exercise have been seen in a large number of studies, the intervention conditions were different in these studies, and direct comparison of results is difficult.

The patient’s subjective report of improvement is crucial in clinical practice, but from a scientific standpoint it is unreliable measurement. In the present study the results of treatment were also assessed objectively using a perineometer device, made specifically to measure the vaginal muscle strength & endurance. The perineometer demonstrated that around 53% of patients under the Pilates training protocol were either cured completely or improved their condition at the 4th week. Also the endurance or hold time increased significantly after treatment in the patients. Although the objective evaluation of PFM strength using a perineometer has been validated by the International Continence Society (ICS), there is no normative data for pelvic floor muscle strength (Bo k, lilleas f, talseth t, hedland h *et al*.2001). The measurements obtained with the (BIONICS)Perineometer were done with a medium sized probe and readings were measured by an ammeter in mmhg. The position of the probe inside the vagina was kept at the highest contraction (3cm inside the vagina) or the point of greatest pressure as identified in a prior study.

While measuring the PFM strength & endurance, it was made sure that women were aware of the procedure and the correct way of maintaining the contractions, i.e. without performing the valsalva maneuver. Therefore any contractions for which retroversion of the hip or a valsalva maneuver was noticed were discounted. Reports indicate that both an improvement in contraction performance and muscle fatigue may influence the data from the final day of testing. The possibility of muscle fatigue was discussed in the study by Bo *et al*. (2005), with regard to the results that were obtained by using the Peritron (cardio-design). With the intention of seeking to eliminate the possibility of muscle fatigue; because these muscles very small, our study tested with only one size probe with rest interval between each strong contraction. Although some patients reported that they felt that they achieved stronger contractions on the last day, the values were significantly higher for strength & had improved endurance as well.

Bo *et al*. concluded that vaginal palpation was not a reproducible, valid & objective method of measuring PFM strength & endurance. And therefore, in this study we used the BIONICS Perineometer. According to Scheer , the support of the pelvic organs weakens significantly following the first vaginal delivery, but not during the pregnancy. Hay-Smith J *et al*, evaluated nulliparous & primiparous women & observed reduced PFM strength after Vaginal compared to caesarean delivery. Basseler & Schussler also reported that the strength of this musculature was not changed in women who underwent caesarean delivery.

Leijonhufvud, MD, Cecilia Lundholm *et al* conducted a study to estimate the risk for stress urinary incontinence and pelvic organ prolapse surgery related to vaginal birth or cesarean delivery. It was a cohort study, comprising of all women who had their first and all subsequent deliveries by cesarean with an age-matched sample of women only having vaginal deliveries. Their study concluded that, having only vaginal childbirths was associated with a significantly increased risk of stress urinary incontinence and pelvic organ prolapse surgery later in life compared with only having cesarean deliveries. The Mode of delivery may have a significant impact on the persistence of incontinence. Viktrup *et al*. Prospectively studied incontinence symptoms before, during, and after pregnancy in 305 primiparous women. The multivariate analysis identified the length of labor pushing, fetal head circumference, episiotomy, and birth weight as risk factors for postpartum SUI, whereas cesarean birth was protective against incontinence.

Viktrup *et al* conducted a longitudinal cohort study to examine the impact of onset of SUI, in first pregnancy or postpartum period, for the risk of symptoms 12 years after the first delivery. The study demonstrated that the presence of SUI may be present 5 & 12 years later after vaginal delivery. In a prospective observational study over 10 years, Altman *et al* assessed the long term effects of childbirth on stress incontinence after first delivery. They demonstrated a significant increase in prevalence of SUI at 10 years follow up. Considering this, in the present study, we included primiparous and multiparous women who had undergone vaginal delivery only. PMFT is extensively used treatment for pelvic floor disorders such as stress urinary incontinence. Two Cochrane systematic reviews described PFMT as the recommended foremost conservative prevention and management program for women with stress, urge or mixed incontinence.

It is also worth considering lumbopelvic stability as an important component of the continence system. (Grewer and McLean 2008) advised correcting postural and movement dysfunction and treating coexisting back pain or breathing disorders as part of the management of stress incontinence. The pelvic floor musculature consists of a group of twelve striated muscles arranged in 3 layers. This muscular plate expands like a fan, from the pubic symphysis to the side walls of the ileum towards the coccyx. The striated muscle fibers of each muscle run in the same direction in each muscle but in a different direction in relation to the other muscles of the pelvic floor group. However,when the pelvic floor contracts, the muscles contract always together, moving the pelvic girdle in one direction.

It is suggested that this alteration on the pelvic floor muscles leads to permanent elevation & tightening of the levator plate muscle to a higher resting position inside the pelvis itself, termed often as 'lifting' the pelvic viscera and restoring normal reflex activity and activating other protective continence mechanisms to help relieve incontinence. There are two proposed mechanisms by which PFMT may provide prevention & treatment of stress urinary incontinence & pelvic organ prolapse. These two proposed mechanisms are that women develop a "knack" for consciously contracting the pelvic floor muscles before and during increases in abdominal pressure, and that strengthening these muscles can help to build up the structural support of the pelvic floor.

This was an experimental study concentrating on the improvement for stress incontinence symptoms, therefore we focused whether women were able to correctly contract the pelvic floor muscles or not. There was a significant improvement objectively on the Perineometer for the muscle strength & endurance after the administration of Pilate's pelvic floor muscle training program. Our results are complementary to those from a non-randomized longitudinal study by (Brubaker *et al*.2005) in which "Pelvic fitness" classes showed promise for improving symptoms of pelvic floor dysfunction.
The exercise program in the present study combined a total body fitness program with education about pelvic floor muscles and their basic anatomy. The patients expressed gratitude and enthusiasm for their treatment, yet there were a few who were reluctant for not using the perineometer at the beginning of the study which was resolved by giving them complete assurance about the positive effects of using the perineometer. And that was probably the reason for fewer dropouts (3%) from the 4^{th} week assessment schedule.

The important benefit of the Pilates training protocol was the "extra pelvic" benefits! While the Pilates were being used only as treatment protocol, it provided greater strength, flexibility & posture for the whole body. The breathing pattern teaches to start with the correct pattern of starting the Pilates protocol and also forms a crucial basis of this exercise form. Pilates should be performed with slow & controlled movements, with every transition & control of the breath in every posture. Mr. Joseph Pilates emphasized the use of flowy/rhythmic movements which should not be fragmented or isolated from one another and that follows for every transition. Urinary incontinence is a common symptom, with up to 85% of women reporting incontinence in pregnancy and up to 35% postpartum (Kelleher *et al*. 1997) designed and created the King's Health Questionnaire (KHQ) a questionnaire of 21 points to estimate the quality of life of women with urinary incontinence.

Part 1 contains general health perception. Part 2 contains role limitation, social limitation, personal relationships, emotions & sleep/energy cycle, severity measures. Part 3 contains a single item & responses to ten questions. Shripad, *et al*., 2015 conducted the validity, reliability within Indian population and its internal consistency (alpha value >.07) with other incontinence measures of QOL which is indicative of acceptable values. In the current study, women with genuine stress incontinence scored higher in the domain of physical impairment and symptom severity which corresponded to overall greater impairments in all other domains of King's Health Questionnaire as well. Women with genuine stress incontinence also achieved higher scores in the domain of severity of incontinence. This finding would indicate that the questionnaire truly measures the impairment of quality of life due to urinary symptoms. The King's Health Questionnaire through its simplicity is likely to be a useful questionnaire for the routine clinical assessment of women. Certainly condition-specific questionnaires such as the King's Health Questionnaire appear to be sufficiently sensitive to function well in this role.
Our results are encouraging and may eventually lead to widespread use of Pilates based pelvic floor exercise program for pelvic floor dysfunction (TABLE 2).

Few important limitations of this study should be considered. Firstly, there was no control group taken which would compare two treatment protocols. Larger randomized trial design to determine whether a Pilates program can actually improve significant pelvic floor dysfunction would be required before we recommend wide spread use of this exercise protocol. Nevertheless, this exercise protocol has also served to benefit the participants. Another possible criticism of this study could be the lack of a sham group, but we considered it impossible to feasibly create a believable sham treatment protocol. As it is known that, stress urinary incontinence can have serious implication on the self-esteem of women after menopause; Pilates for pelvic floor training program can be a part exercise program in Physiotherapy rehabilitation. Future studies could be directed at identifying appropriate pathological patient profiles that would most benefit from a cost effective exercise program at community – level.

Clinical Implications: The fear of urine dribbling is the most undermining state in a woman's life. It is a serious issue in concern with self-confidence and decreased self-esteem. It is essential for elderly rural women to come up with this problem and seek appropriate treatment at an early stage. We now need to promptly provide awareness and promote this issue, which we were partly able to do with the advertisement given in the form of pamphlets before the study was initiated.
This could help to alleviate and increase the awareness regarding this serious issue and also motivate younger women to adapt the habit of practicing Pilates as a routine.

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