# Role Of Pelvic Floor Muscle Therapy In Obese Perimenopausal Females With Stress Incontinence: A Randomized Control Trial

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**Abstract**

Objective- Pelvic floor muscle exercises are effective in treating stress incontinence, yet prevention studies demonstrate equivocal findings. This study identifies the presence of stress urinary incontinence and compares the role of conservative physiotherapy management in perineal muscle function among obese, older Saudi women.Methods- Randomized controlled trial of perimenopausal overweight women recruited from Jazan general hospital, KSA. Data were collected from 2010-2011. Females were randomized to an intervention (n = 29) and control group (n = 27). The intervention group received regular pelvic floor muscle exercise training (8-12 maximal contractions) taught at the physiotherapy clinic with repeated sessions at home for a period of three months. Results- The intervention group reported fewer episodes of incontinence and a better score on the visual analogue scale and periniometry, indicating better pelvic floor muscle function.Conclusion- Pelvic floor muscle treatment is most beneficial in older obese multiparous women with stress urinary incontinence who participate in a supervised pelvic floor muscle training program for at least three months.

## INTRODUCTION

Obesity is considered a major public health problem today, although there are limited statistics for in general prevalence and incidence of obesity in Saudi female population. Obesity increases with age in both sexes; this increase is more marked among women than men. Urinary symptoms, especially stress urinary incontinence (SUI) are common after pregnancy and vaginal delivery resulting from direct trauma to levator ani muscles and endo pelvic fascia. SUI can occur in upto 34%.of women. Obesity is a potent risk factor for urinary incontinence and has been linked to the development, recurrence and urgency of urinary incontinence.[1] While pelvic floor exercises are considered generally effective in the treatment of SUI; few studies have elucidated the relationship between obesity and SUI in perimenopausal women and the role of active physical therapy sessions in such women. Moreover, while objective evidence corroborates racial trends in urinary incontinence,[2,3] literature regarding the situation of Saudi females is scant. This paper identifies the presence of stress urinary incontinence and compares perineal muscle function among older obese Saudi women before and after active pelvic floor muscle regime as the mainstay of conservative management.

## MATERIALS AND METHODS

In a randomized control trial, we enrolled 68 perimenopausal (Age 40-50years) , multiparous (3-6 children), obese women (BMI > 32/Kg/$M^2$ when measured through weight-height scale) reporting at the outpatient gynecology clinic of Jazan general hospital during 2010-2011with complaints of pelvic floor dysfunction and stress urinary incontinence. We excluded women with history of genetourinary pathology, neurological disorders, chest infection, chronic cough, diabetes or having participated at aerobic training programs within recent three months.

The presence of SUI was further confirmed through patient's hospital records and the Stress Incontinence Questionnaire was administered to determine occurrence and severity of the condition. This included the question “During an activity such as coughing, sneezing, laughing, running, exercising or lifting ; how many times in the last seven days have you had an accidental leakage of urine onto your clothing, underwear, or pad?”? The degree of incontinence on hard cough was assessed using five point visual analogue scale [graded as 0= not wet /1= mild wet / 2= moderate wet / 3=severe wet / 4=complete wet]. Surface electromyography (SEMG) and peritron perineometer (model 9300V) with

vaginal sensory was used for objective assessment of pelvic floor muscle strength in these women.

Women were randomly divided into two groups; Group A , n=29 served as intervention and received a 3 month intensive pelvic floor exercise protocol while Group B , n=27 served as control and received no therapy.

Therapy procedure: All women in group A were instructed about pelvic floor anatomy and how to control pelvic muscles voluntarily. Kegel's pelvic floor muscle therapy (PFMT) protocol was used for 3 consecutive months. The exercise comprised of 10 repetitions of 8 contractions each; with contraction held for six seconds and two minutes rest in between each contraction. At the end of each session, three to four fast 'flicker' contractions were added. At 12 weeks, the number of contractions per repetition had been increased to twelve. Women in group A regularly attended physiotherapy clinic for three months (36 sessions) with additional follow up pelvic floor exercises at home daily. Some women who missed their sessions were requested for compliance in future.

The effectiveness of biofeedback assisted PFMT was assessed pre and post training in group A and this was statistically compared with group B (at 1st week and after 3 months). Pre and post BMI was measured in both groups to rule out the confounding effect of any significant change in body weight. Data were processed with descriptive (simple frequencies, percentages, measures of position and dispersion) and inferential statistics (Chi-square or Fisher Exact Test and Mann-Whitney) with a significance level of <0.05.

## RESULTS

At the end of 3 months, no significant difference was observed in the BMI of women of both groups.(p>0.05; Table1) Trends indicate a definitely positive effect in women who participated in a supervised PFMT training program for at least three months in terms of severity of SUI ,incontinence episodes and degree of 'bother symptoms' ( Table 2 ,Figure 1) and pelvic muscle strength ;peak and duration of contraction (Table 3, Figure 2);although these differences were not statistically significant in comparison to no treatment (p>0.05). Base line SUI scores of visual analogue scale in intervention group A showed a statistically significant improvement after 1st week (t=2.45, p<0.02) and at 3 months (t=2.12, p<0.05) , while women in control group B showed no change or deterioration in condition. At the end of the three months, SUI disappeared in 90% women of group A while it still persisted in 81% women in group B ( group A- 3 cases with mild SUI after 3 months, group B- 15 cases with mild & 7 cases with moderate SUI after 3 months). The strength of pelvic floor muscles as assessed by pereniometry and SEMG increased in group A after the PFMT regime while it did not in group B. Repeated measures analysis of variance across five time points suggested a significant improvement of pelvic floor muscle strength (Peak & duration) in group A (F= 4.23, p <0.005 and F =4.29 , p <0.04 respectively. No significant change occurred in group B.

### Figure 1

Table 1 Demographic characteristics of intervention (group A, n=29) and control (group B, n=27) in obese perimenopausal women reporting with stress urinary incontinence at Jazan general hospital during 2010-2011.

| Variables | Group(A) (n=29) | Group (B) ( n= 27 ) | p value |
|---|---|---|---|
| | Mean+_ S.D. | Mean +_ S.D | |
| Age (years) | 42.95 +_ 3.5 | 44.75 +_ 5.1 | |
| BMI(KG/m$^2$) | | | > 0.05 |
| First week | 34.92 +_ 2.1 | 35.02 +_ 2.6 | |
| 3 months | 32.8 +_ 2.4 | 33.1 +_ 2.6 | |

### Figure 2

Table 2- Severity of stress urinary incontinence in obese perimenopausal women reporting at Jazan general hospital during 2010-2011.

| Visual Analogue scale | Group (A) (n=29 ) | | | | p value | Group (B) (n= 27 ) | | | | p value |
|---|---|---|---|---|---|---|---|---|---|---|
| | At first week | | After 3 month | | | At first week | | After 3 month | | |
| | No | % | No | % | | No | % | No | % | |
| 0=Not Wet | 0 | 0 | 26 | 90 | | 0 | 0 | 5 | 19 | |
| 1= Mild Wet | 15 | 52 | 3 | 10 | < 0.05 | 17 | 63 | 15 | 55 | >0.05 |
| 2=Moderate Wet | 8 | 27 | 0 | 0 | significant | 7 | 26 | 7 | 26 | |
| 3= Severe Wet | 6 | 21 | 0 | 0 | | 3 | 11 | 0 | 0 | |

**Figure 3**

Figure 1 Severity of stress urinary incontinence in obese perimenopausal women reporting at Jazan general hospital during 2010-2011.

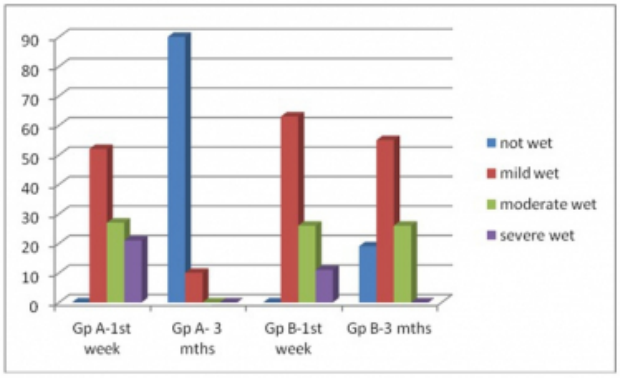


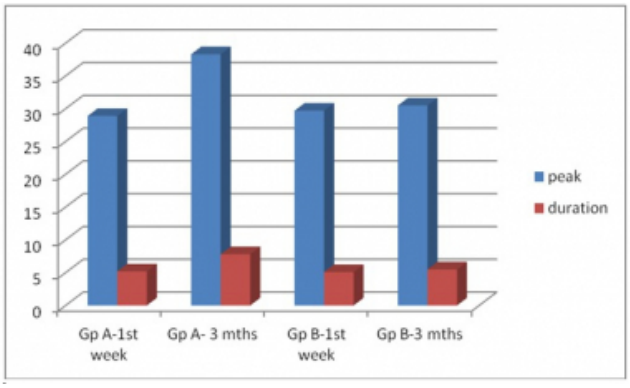

**Figure 4**

Table 3- Mean strength of pelvic floor muscle in obese perimenopausal women reporting with stress urinary incontinence at Jazan general hospital during 2010-2011.

| Data of Assessment | Strength of pelvic floor muscles | | | | | |
|---|---|---|---|---|---|---|
| | Group (A) (n=29 ) | | | Group (B) (n= 27 ) | | |
| At first week | peak (cm h2o ) | duration (seconds ) | p value | peak (cm h2o ) | duration (seconds ) | p value |
| | 28.9 | 5.2 | < 0.05 | 29.7 | 5.1 | > 0.05 |
| After 3 months | 38.3 | 7.8 | significant | 30.5 | 5.5 | |

**Figure 5**

Figure 2- Mean strength of pelvic floor muscle in obese perimenopausal women reporting with stress urinary incontinence at Jazan general hospital during 2010-2011.




## DISCUSSION

Urinary incontinence is a common problem among adults living in the community, more so in women. Its incidence increases with age and estimates of the prevalence of urinary incontinence in women varies from 10% up to 40%.[4,5] However, these figures do not reflect the true magnitude of the problem, because of under-reporting arising from social embarrassment. Racial differences in the prevalence of urinary stress incontinence may be explained by differences in the bulk of urethral muscle. Afro-Carribeans, who have a low prevalence of urinary stress incontinence, have greater urethral sphincter capacity, higher density of urethral striated muscle fibres, larger levator ani cross-sectional area and muscle strength and higher urethral closure pressures both during pelvic contraction and at rest.[3]. Factors commonly affecting the prevalence of urinary incontinence are: age, gender, race and residing in a nursing home. Life events like pregnancy, child birth and menopause have major implications for urinary incontinence. Other risk factors are obesity (body mass index of over 30), high impact sports (e.g. trampolining, pole vaulting), chronic respiratory disorders causing chronic cough, and intra-abdominal masses causing increase in intra-abdominal pressure. Medications like diuretics, endocrine disorders (diabetes), central or peripheral neuropathies, dementia and smoking are other well known culprits of urinary incontinence. Pregnancy and vaginal delivery are main risk factors for the development of urinary incontinence. Prevalence of urinary incontinence increases during pregnancy and decreases following delivery, although overall postpartum prevalence still remains higher than before pregnancy. Estimates of the prevalence of SUI during pregnancy and two to three months after delivery varies between 6% and 67%, and 3% to 38% respectively.[6] SUI also increases with parity. In primiparas who deliver vaginally, it has been associated with decrease in pelvic muscle strength by 22–35% between pregnancy and the postpartum period.[7] The prevalence of urinary incontinence has been reported to increase with age. A large epidemiological study of 27,936 Norwegian women suggested a gradual increase in prevalence with age which peaked at around mid life (50 years).[8] Rud et al. and Enhorning et al. found that maximum urethral closure pressures tend to decrease with age. They reported a 2–4% decrease in the functioning of the urethra after the age of 40 years.[9]

PFMT for the management of urinary incontinence has been described in several ancient texts. “Deer Exercises” were part of the exercise routine in Chi- nese Taoism for over 6000 years. Ancient Indian texts report similar exercises ; Ashwini Mudra ,practiced by the Yogis. Hippocrates and Galen described pelvic floor exercise regimens in the baths of ancient Greece and Rome.[10] It was thought that

strengthening this group of muscles could promote health, longevity, spiritual development and sexual health. PFMT first entered modern medicine in 1936, when Margaret Morris, described tensing and relaxing of the pelvic floor muscle as a preventative treatment option for urinary and faecal incontinence.[6] This formally introduced PFMT into the physiotherapy profession. However, the use of PFMT as a treatment for stress urinary incontinence did not become widespread until after 1948, when Arthur Kegel, a professor of obstetrics and gynaecology in the USA, advocated its regular practice.[11]

In modern medicine, pelvic floor muscle training is the most commonly recommended physical therapy treatment for women with stress leakage of urine. It is also used in the treatment of women with mixed incontinence, and less commonly for urge incontinence. The content of pelvic floor muscle training programs is highly variable. Bok et al stated the theoretical basis for pelvic floor muscle exercise in USI management on the basis of muscular changes; hypertrophy and increase in muscle mass and tone that occur after specific strength training.[12] Miller et al. showed that this simple maneuver could reduce urinary leakage by 98.2% with medium cough, and by 73.3% with a deep cough, after only one week of training.[13] Slack et al. recommended a dedicated pelvic floor physiotherapy service and found a reduction of 33% in the surgical and urodynamic work load following its use.[14] A 10-year follow-up study of women by Cammu et al comprising pelvic exercise for stress incontinence concluded that pelvic floor training is initially successful and there is 66% chance that favorable results will persist for at least 10 years. [15] Adjuncts, such as biofeedback or electrical stimulation are commonly used with pelvic floor muscle training. In randomized trials, about 50% patients with sacral nerve stimulation achieved complete continence while a 50% improvement in main incontinence symptoms was observed in about 87% . [16] Ishiko et al. advised a supplement of intravaginal oestriol along with pelvic floor exercise in postmenopausal women and found that this resulted in a higher cure rate of incontinence.[17] Women, who do intensive supervised pelvic floor exercises during pregnancy reduce their chances of leakage postpartum during the first year after childbirth. Pregnant women without prior urinary incontinence who were randomized to intensive antenatal PFMT were less likely to report urinary incontinence in later pregnancy or post partum (about 30-56% less).[18]

As previously reported that obese perimenopausal women are at a greater risk for developing SUI, this study has attempted to assess the preventive effect of pelvic floor exercises and extent of benefits in such women. Our results demonstrate a significant reduction in prevalence of SUI and increase in pelvic floor muscle strength in these women. Positive trends similar to our findings of PFMT have been observed in other studies.[19-21] The reduction in SUI symptoms in obese women of the present study shows that most women having these conditions may be treated successfully with intensive pelvic floor muscle exercises. Despite obviously favorable results after conservative management, the difference between control and intervention groups was not statistically significant in our study at the end of a three month period; a proportion of women did not meet the required attendance at physiotherapy clinic; and furthermore, 3 months is a relatively short time period for an intervention therapy. This finding is similar to other prevention studies that demonstrate equivocal findings. [22,23] This brings forth the possibility that although pelvic floor exercises are effective in managing SUI, yet, longer duration intensive regimes, strict protocol adherence, patient compliance and possible adjuncts like electromyographic biofeedback ,magnetic therapy or nerve stimulation may obtain more tangible results in the obese perimenopausal multiparous female population.

## CONCLUSION

Overall, there is objective evidence for widespread recommendation of pelvic floor muscle training as a first line conservative management for obese older women with stress urinary incontinence. There are no long lasting or debilitating adverse effects of pelvic floor muscle training regime. The therapeutic effect is usually enhanced when the PFMT program is taught and supervised by a specialist physiotherapist. Additional physical therapies, such as electrical stimulation and biofeedback may be considered in order to aid motivation and adherence. It is possible that the effects of PFMT might be greater with targeted rather than population based approaches and in certain groups of women like multiparous, obese and overweight. The limited nature of follow-up beyond the end of treatment in this study and a majority of other published studies means that the long-term outcomes of PFMT are less clear. Long term effects with maintained or increased treatment effect may be observed in women receiving supervised PFMT with continued adherence to program; but this hypothesis needs further

testing. Substantial and durable improvements in continence can be achieved, when the patients are appropriately selected and the exercises are adequately performed. Further research is necessary to address issues of adherence and the effect of the 'type' of pelvic floor muscle exercise (number and duration of contractions, frequency and duration of sessions, total regime period etc).Health professionals need to find ways to instruct and encourage predisposed women to perform pelvic floor muscles exercises.

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