Effects of home based pelvic floor muscle training based on severity of incontinence on pelvic floor muscle strength in women with stress urinary incontinence

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Abstract

Introduction: Indian women suffering from urinary incontinence differ from those of developed nations due to cultural, economic and religious nuances that are specific to their environment. It has been observed that though Stress Urinary Incontinence (SUI) is prevalent, Indian women ignore its existence consider it as part of ageing or the consequences of delivery. Consequently, there is a strong need to address this very debilitating disorder that can easily be remediated by engaging in a simple exercises program.

Aim: The aim of this study was to evaluate the effect of Pelvic Floor Muscle Training (PFMT) based on severity of incontinence on pelvic floor muscle strength in women with SUI.

Materials and Methods: 73 subjects suffering from SUI were recruited for this experimental study. Each subject was given a six (6) weeks home based PFMT based on severity of incontinence which was decided by Incontinence Severity Index (ISI). Pre and post data were analysed using SPSS 21.0. The outcome measures were Per Vaginal MMT (PVMMT) and Vaginal Squeeze Pressure (VSP).

Results: Wilcoxon test was used to compare the pre and post data for all the subjects. Significant differences were found for PVMMT ($Z = -7.43$) and VSP ($Z = -6.66$), pre versus post training respectively.

Conclusions: The home based PFMT for six weeks was found to be effective in improving pelvic floor muscle strength in Indian women with SUI.

Keywords: Pelvic floor muscle training, Vaginal squeeze pressure, PVMMT, Stress urinary incontinence.

Introduction

Stress Urinary Incontinence (SUI) is the non-volitional leakage of urine on effort or exertion, sneezing, coughing, or laughing.[1] A sphincter closure mechanism helps in preventing urinary leakage when there is an increase in the intra-abdominal pressure while coughing, sneezing, laughing or lifting heavy weights. However, when there is a weakness in pelvic floor muscles (PFM), the sphincter closure mechanism fails, causing leakage of urine known as SUI.

The prevalence of urinary incontinence in women ranges from 10 to 40%.[2] Approximately 50 million people worldwide suffer from Urinary Incontinence (UI) wherein a woman to man ratio is 2:1.[3] The prevalence in India has been found to be approximately 12%.[4] In Tamil Nadu, out of 197 surveyed women, about 40 (20.8%) had UI and of these 50% of them suffered from stress urinary incontinence (SUI).[5]

Pelvic Floor Muscle Training (PFMT) is the first line treatment for stress incontinence.[6] Though it does not have any serious side effects, proper instructions and close follow-ups are required to make the outcome effective.[6]

The women of our country are different from those residing in developed or other developing countries due to its cultural, economic and religious contextual behaviours. It has been observed that though SUI is highly prevalent, Indian woman most often hide its acceptance and consider it as a part of an ageing process or a consequence of child bearing and delivery. There is thus, a strong need to prepare a protocol of exercise for such women who suffer in silence. The aim of this study was to evaluate the effects of a home based PFMT program based on severity of incontinence, on pelvic floor muscle strength in women with SUI.

Materials and Methods

This study is an experimental clinical trial which was conducted from Jan 2013 to Dec 2015. Data were collected from 73 participants visiting a Department of Obstetrics and Gynaecology OPD and an free standing women's clinic that addresses Menopause health. Subjects were provided with an home exercise program for a period of six (6) weeks. Participants were asked to repeat the exercises 1-3 times in a day depending on severity of incontinence.

Women were include in the study if the suffered from slight, moderate or severe incontinence categorised as per the Incontinence Severity Scale (ISI) (Fig. 1). The confirmation of diagnosis was done by a cough test. The exclusion criteria was prolapsed perineal organs, neurogenic bladder, pregnancy, acute urinary tract infection and ISI score 0 (no incontinence) or 12 (very severe incontinence).

The study was approved by the institutional ethics committee (PTC/IEC/59/2012–13) under a broad titled study "Efficacy of Physiotherapy Management in Women with SUI". The main trial was registered in Clinical Trial Registry of India (CTRI/2016/12/007614).

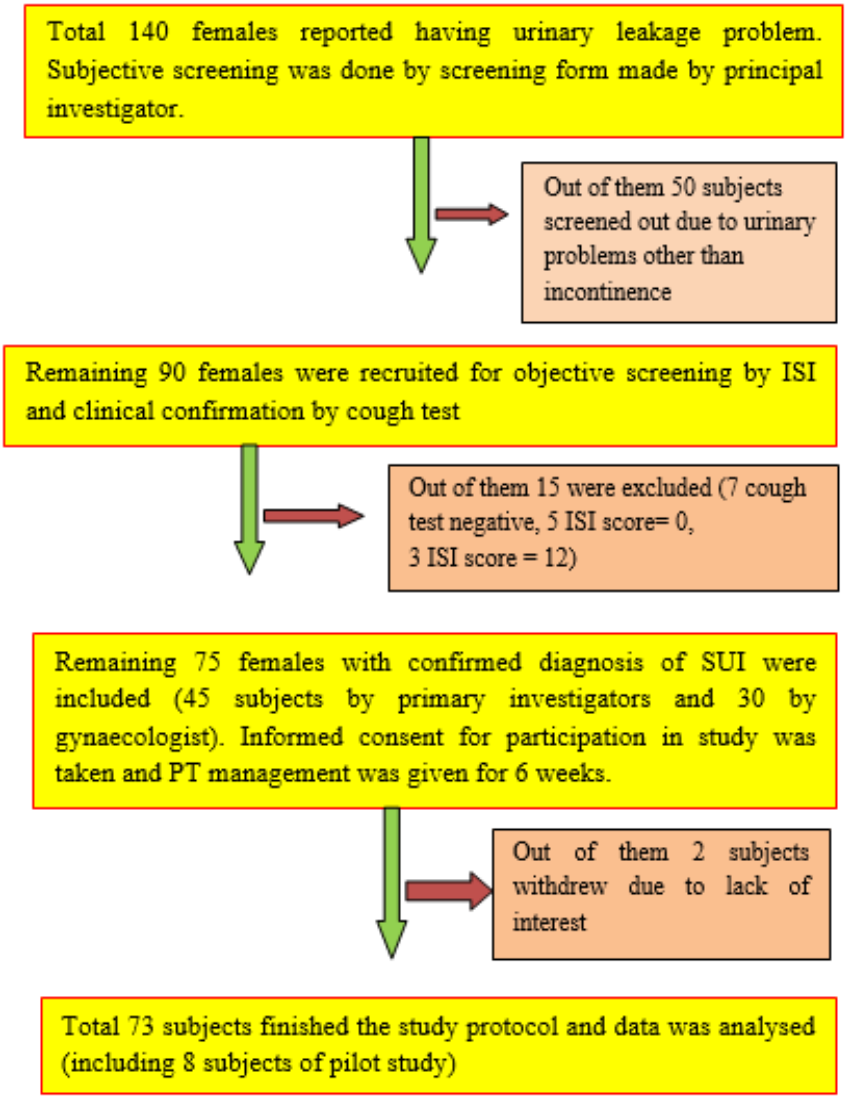

Fig. 1: Patient recruitment and details of drop-outs and follow –up

The ISI scale is an ordinal scale which has two questions of frequency of leakage and quantity of leakage. The principal investigator has translated the scale into Gujarati by forward-backward-forward method as all the participants were Gujarati speaking. The score from the ISI scale is established by multiplying the two scores of the two questions. The score range from 0 to 12, 0 meaning no incontinence and 12 meaning very severe incontinence. Categories are defined as follows: slight - 1–2 score, moderate - 3–4, and, severe - 6–8. This scale has been validated by Sandvik et al in 1993.[7,8]

The primary investigator first examined subjects' perineum and then measured PFM strength using modified oxford scale.[9] The data was recorded before and after the study. PFX II kegel exerciser by laborie was used to measure Vaginal Squeeze Pressure (VSP). The VSP was recorded on 0 to 12 arbitrary scale. The perineometer used here is found to be highly reliable for measuring pelvic floor muscle strength and endurance when measurements are taken in young healthy continent subjects by the same investigator (r = 0.887 for correlation of PVMMT and Vaginal Squeeze Pressure).[10]

The PFMT protocol based upon the severity of SUI was as follows:

1. 5 repetitions of general stretching and warm up for pelvic floor muscles and hip adductors (butterfly posture).
2. 10 repetition of voluntary pelvic floor muscle contraction with 5 second hold and 10 second rest, progress at 2 weeks to 10 second hold and 20 second rest.
3. 10 repetitions of isometrics of hip adductors and irradiation to pelvic floor muscle with 5 sec hold and 10 sec rest, progress to 10 sec hold and 20 sec rest.
4. 5 repetitions of transverse abdominis muscle contraction and pelvic floor muscle contraction simultaneously, 5 sec hold and 10 sec rest.
5. Cool down with slow stretching of adductors and perineal muscles.

In addition, life style modification advice was given as follows:

1. Educating women with severe (ISI = 6–8) incontinence to wear diapers.
2. Avoiding caffeine, and excessive fluid intake.
3. Weight control exercises like walking or jogging.
4. Asking them to go to void every 2 hours.
5. Ergonomic advices of lifting heavy weight (>5 kg) so that intra-abdominal pressure does not increase and thus avoiding instances of incontinence.
6. Performing PFMT whenever they find time e.g. waiting at traffic signal.

The entire treatment was initially under supervision and subjects were explained in details. They were taught all exercises till they became independent in doing them correctly. They were asked to carry out the entire session at home depending on their ISI score. The subjects who were slight incontinent (ISI = 1 – 2) were asked to perform one session a day, moderate incontinent (ISI 3 – 4) two sessions a day and severe incontinent (ISI 6 – 8) three sessions a day. Pre-treatment readings were taken at first day whereas post treatment readings were taken after 6 weeks.

Results

As all the data of this study was ordinal, Wilcoxon signed rank test was used to analyse the effects of training. Significance levels were set at $p< 0.05$. SPSS 21.0 was used to analyse the data.

There were total 73 subjects. The mean values calculated for age was of 46.92±1.17 years, he BMI 26.76 kg/m2 ± 5.25. The median ISI score was 3.

As seen in table 1, there was a significant improvement in per vaginal manual muscle test ($p<0.001$) and vaginal squeeze pressure ($p<0.001$).

Discussion

In this study the pelvic floor muscle performance was measured here using two outcomes: Per Vaginal Manual Muscle Testing (PVMMT) which was done through digital examination and Vaginal Squeeze Pressure (VSP) which was done by perineometer. These two outcome measures are indirect measures of the anatomical changes in the muscles after 6 weeks of a home based pelvic floor muscle training intervention.

The results of this study suggest a statistically significant improvement is found in pelvic floor muscle performance post a six week intervention program. This increase in performance can be attributed to an increase in the awareness of pelvic floor muscle contractions and consequent action. It is observed that subjects do not perform the action properly the first time, due to lack of knowledge and skill. The skill however, improves day by day with practice. Furthermore, the feedback the participant received with the use of the perineometer, helped them improve their performance with practice.

Contracting transversus abdominis muscle along with PFM is a new idea incorporated in this study. It was found to be an easy and effective way to teach PFM exercises along with transversus abdominis activation. Previous studies have been known to support the effectiveness of this type of intervention.[11]

Improvements in pelvic floor muscle activation may also have been due to instructions given in life style modification, and to perform PFM contraction whenever they feel free and comfortable. The improved muscle helps in controlling leakage while increase in intra-abdominal pressure, thus reducing the number of leakages.

There is strong evidence that PFM strength evidently increases by using a particular strength training regimen between 1–6 months.[12] Here, we have given short duration protocol to see short term effectiveness of a home based physiotherapy management in SUI. The reason for short protocol was difficulty in maintaining adherence to the program with the passage of time and monitoring compliance. Several other studies have also reported significant benefits following shorter intervention periods.[13,14]

According to Zubieta M et al,[15] there is lack of definite evidence to prove that increase in Maximal Urethral Closure Pressure (MUCP) at rest is the mechanism of action that PFMT uses to manage SUI. The extent to which a volitional PFM contraction enhances MUCP is quite varied. However, in their study they found evidence that suggested that PFMT increases enhanced MUCP. But, a strong conclusion was limited as results depend on to the study methodology used.

McLean L et al[16] in their study found that PFMT produces hypertrophy of the urethral sphincter muscle. This they suggest is the possible mechanism that underlies positive treatment results of SUI in females not having intact PFMs or those having adequate strength of the PFMs but damaged or weak urethral sphincters after PFMT programs. In addition, improvement in MUCP and neural adaptation could also have resulted in the beneficial results seen in such cases of SUI.

Table 1: Differences between pre and post-treatment values for PVMMT and VSP in a clinical cohort of SI patients

Outcome measures	No. of subjects	Pre-treatment (Median)	Post-treatment (Median)	Z value	p value
PVMMT	73	2	4	-7.43	<0.001
VSP	65	4	8	-6.66	<0.001

Conclusion

The home based Pelvic Floor Muscle Training for 6 weeks duration was proven to be effective in improving pelvic floor muscle strength in female with SUI.

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Conflict of Interest: None.

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