

The Effect of Pelvic Floor Muscle Exercises in Two Different Positions on Urinary Incontinence in Menopausal Women - A Comparative Study

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ABSTRACT

Background: The International Continence Society (ICS) defines incontinence as a condition where involuntary loss of urine is a social or hygienic problem and is objectively demonstrable. This definition may not be ideal for epidemiological purposes. More common in epidemiological studies are definitions based on frequency of urine loss, e.g. any uncontrolled urine loss in the prior year or more than two episodes in a month. Pelvic floor muscles give us control over the bladder and bowel. Weakened pelvic floor muscles mean the internal organs are not fully supported and you may have difficulty controlling urine. This problem advances as the age advances.

Methods: 28 participants were included in the study as per inclusion and exclusion criteria. The baseline measurements were taken for all the patients, which included the detailed assessment, pelvic floor muscle strength by perineometer and ICIQ-UI SF questionnaire. Participants were then divided into Group1(n=15) where pelvic floor muscle exercise in crook lying and Group2(n=13) where pelvic floor muscle exercise in standing position with time duration of approximately 15 – 20 minutes for 5 days in a week up to 4 week were given.

Results: Result shows significant improvement ($p \leq 0.05$, $N=28$) in ICIQ-UI SF score and perineometer reading. However on comparing a mean of both the Groups improvement is greater in Group 1 as compare to Group 2.

Conclusion: The present study thus concludes that pelvic floor muscle exercise in crook lying position in comparison to standing position for 4 weeks has significant improvement in pelvic floor muscle strength and severity of urinary incontinence.

Keywords- Pelvic Floor Muscle Exercise, Menopause, Incontinence.

INTRODUCTION

Menopause is a stage when the menstrual cycle stops for longer than 12 months and there is a drop in the levels of estrogen and progesterone, the two most important hormones in the female body. [1] Worldwide, the estimates for the median age at menopause range from 45 to 55 years [2-4] with women from Western countries having a higher menopausal age compared to women from other parts of the world. [5,6]

A number of studies have shown that biological; sociocultural and lifestyle factors affect the age of menopause. [7] Women at midlife and beyond are at increased risk for urinary incontinence, or the involuntary leakage of urine. The main risk factors for developing urinary incontinence are vaginal childbirth and increased age (decrease in level of oestrogen and progesterone). Urinary incontinence does not lead to death but it causes substantial debility, social seclusion, psychological stress and

economic burden. [8,9] Urinary incontinence is defined by the international continence society as a condition in which involuntary loss of urine is a social or hygienic problem and is objectively demonstrable. [10]

It is more common in women than men. The prevalence of incontinence may be significantly underestimated since physicians rarely ask patients about the problem and the patients seldom initiate discussion about incontinence with the physician. Older patients may assume that urinary incontinence is a normal consequence of aging. The prevalence of urinary incontinence in a community is as high as 30%. [11] Incontinence may be genuine stress incontinence, detrusor instability or mixed incontinence. [12]

Though prevalence rate in women between 15 and 64 is from 10% to 30% and only quarter of all women with this problem seeks help. [9] Surgery has been widely accepted as the treatment of choices for urinary incontinence. However there has recently been an increased interest in the conservative management of this condition. Because the initial treatment ideally should be the least invasive with the fewest potential side effect. [13,14,9] The aim of the conservative rehabilitation therapy is to stabilize the urethra by increasing pelvic floor muscle strength. Pelvic floor muscle training has been part of exercise programs in Chinese Taoism for over 6,000 years. [15]

It first entered modern medicine in 1936; a paper by Margaret Morris describing tensing and relaxing of the pelvic floor muscle introduced the use of pelvic floor muscle training as a preventative and treatment option for urinary and faecal incontinence to the British physiotherapy profession. [16]

Some 50 years have elapsed since Kegel first introduced pelvic floor muscle training to treat female urinary incontinence.

Pelvic-floor muscle exercises often are taught and practiced with the participant in a relaxed, supine position. However, of a recent study, observed that the mean resting vaginal pressure was 8.6 cm of H₂O higher when recorded with women standing may be influenced by gravity than when recorded with women lying supine. No differences were observed in the subjects' abilities to produce maximum squeeze pressure or maximum contraction duration when the two postures were compared. If muscle activity demands are influenced by body position, then a pelvic floor muscle exercise program performed in a gravity-eliminated position may be less effective than one performed in upright positions. [17] A Kegel perineometer or vaginal manometer is an instrument for measuring the strength of voluntary contractions of the pelvic floor muscles. Both the Kegel perineometer and a digital examination are effective. The ICIQ-UI Short Form questionnaire provides a brief and robust measure to assess the impact of symptoms of incontinence on quality of life and outcome of treatment. It is a self reported survey tool for incontinence. 4 main items (of 6 totals) that ask for rating of symptoms in the past 4 weeks. Take sum score of items 3, 4, 5 (items 1 and 2 are demographic item that is unscored). Score 0 – 21 with a higher score indicating greater severity.

MATERIALS AND METHODOLOGY

Ethical clearance for this interventional study was obtained from Institutional Ethical committee prior to the study. 55 menopausal women from the community were screened for the eligibility. From that 30 patients with 45-65 age group having urinary incontinence since 6 month were included in the study. Written informed consent was taken from all the patients.



Photograph 1 showing peritron instrument



Photograph 2 showing strength measurement by perineometer

Patients having surgical/medical history around pelvic floor muscle, neurological disease, nulliparous women, psychiatric disease, urinary tract infection, GRADE 3 or 4 prolapse were excluded. Patients were divided into two groups by convenience sequential sampling. On first visit, a complete assessment was done which included the descriptive data for age, sex, height, weight, obstetric and gynaecological history, duration of symptoms, chief complaint, previous surgery, medications, pelvic floor muscle strength testing using peritron perineometer and International Consultation Incontinence Questionnaire Urinary Incontinence Short Form were documented.

- Group A- Pelvic floor muscle exercises in crook lying.

- Group B- Pelvic floor muscle exercises in standing.

Pelvic floor muscle exercises protocol [18] -

The physiotherapist given the Regime: 10 sec contraction/10 sec relaxation, repeated 5 times within each set, with a 1 min break between each of the 5 sets. Group A and Group B will be given pelvic floor muscle exercises in crook lying and standing positions respectively for 5 days a week for 4 consecutive weeks. Total duration of the session is approximately 15 mins.

After 4 week intervention again the baseline measurement was done and then the result were analysed.

Advised given before doing pelvic floor muscle training -Do not hold the breath, Do not contract gluteus and adductor muscle, Empty bladder before training.



Photograph 3 showing PFME in crook lying position



Photograph 4 showing PFME in standing position

RESULTS

Data were analysed using Statistical Package for Social Sciences version 16

(SPSS v.16) and Microsoft Excel 2010. Total 30 patients were included in the study. 2 patients from Group- B discontinued

the treatment. Hence, a total of 28 patients, 15 patients from Group- A and 13 patients of group B completed the study and data analysis was performed on the perineometer reading and ICIQ-UI Short Form questionnaire) In present study the mean age of patient and standard deviation in group 1 and group 2 is 53.53 ± 5.208 and 56.20 ± 7.39 years respectively. Confidence interval was

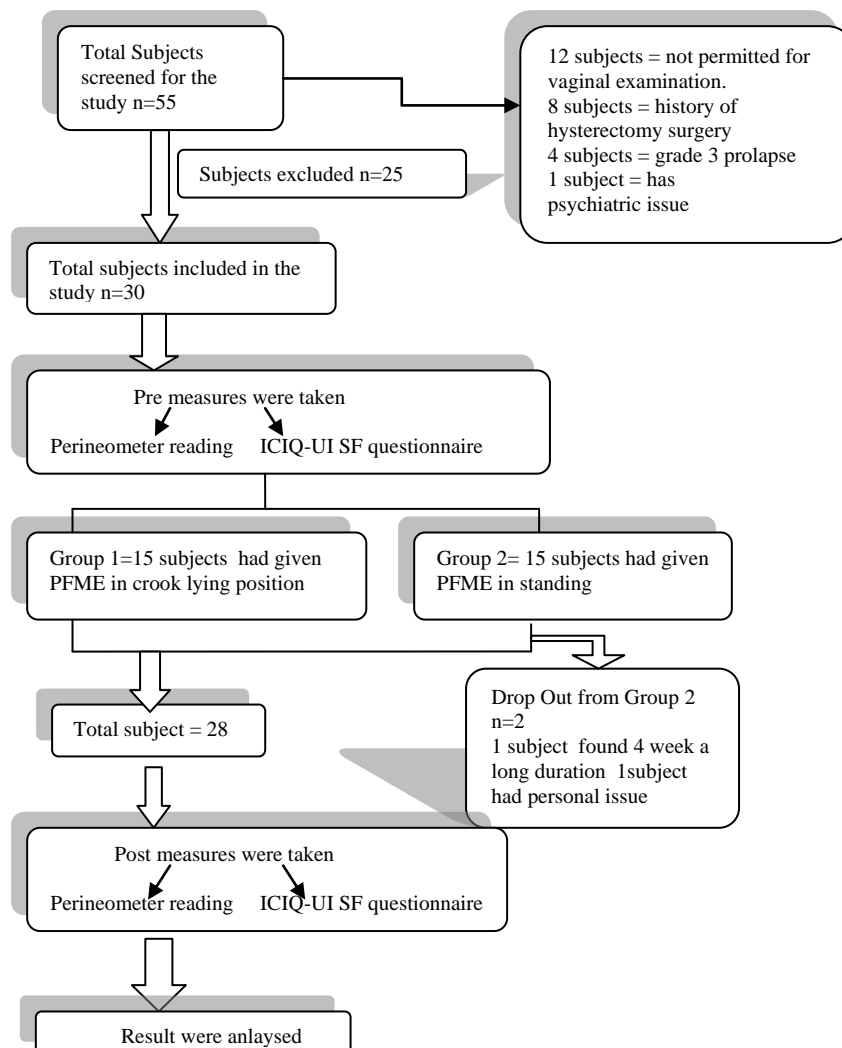
set at 95% & $p \leq 0.05$ was considered as significant. Participant flow through the study is indicated in flow diagram. Mann-Whitney U test was applied to compare the baseline characteristics of the patients in both the groups. . No statistically significant difference was found between both the groups.

Table - 1 Means of pre treatment and post treatment of perineometer reading of Group 1

	Perineometer				ICIQUI			
	PRE	POST	Z	P	PRE	POST	Z	P
GROUP 1	20.6 \pm 3.22	37.1 \pm 3.39	-3.403	0.001	10.93 \pm 1.27	2.66 \pm 0.61	-3.42	0.001
GROUP 2	20.22 \pm 3.25	35.01 \pm 4.04	-3.181	0.001	11.1 \pm 1.06	4.6 \pm 1.2	-3.19	0.001

Table 2: Means difference of perineometer and ICIQ UI of group 1 and group 2

Outcome measure	Group 1 Meandiff \pm SD	Group 2 Meandiff \pm SD	U value	P value
Perineometer	17.04 \pm 1.76	14.7 \pm 2.05	41	0.009
ICIQ UI	8.26 \pm 1.3	6.4 \pm 1.5	38	0.006



Wilcoxon signed rank test was applied for the analysis of pre and post treatment outcome measures within the group, within group analysis showed statistically significant difference in perineometer reading and ICIQ UI SF questionnaire ($p \leq 0.05$) for both the groups. (Table 1) Mann-Whitney U test was applied for between group analysis of all the outcome measures. Between group comparison showed statistically significant difference between group. ($p \leq 0.05$) (Table 2) Hence, null hypothesis is rejected and there is significant difference between pelvic floor muscles exercises between crook lying and standing positions on pelvic floor muscle strength and quality of life in urinary incontinence of menopausal women.

Flow chart of study

DISCUSSION

At the end of 4 weeks, the patients in the both group showed significant improvement. But PFME in crook lying showed statistically significant improvement than PFME in standing. Thus, the study result shows that PFME in crook lying is more effective than PFME in standing on outcome of PFM strength and severity of incontinence (ICIQ UI).

In women with stress urinary incontinence, found a decrease in active force and stiffness in the pelvic floor. In incontinent women, the delay between stimulus and contraction of pelvic floor muscle is prolonged and slow-nerve conduction, suggestive of damage to the pudendal nerve, has been identified. Following denervation, there is atrophy of the denervated fibre; however, nearby healthy nerve fibres in pelvic floor muscle can stimulate reinnervation. In this case, the new fibre will assume the characteristics of the original one and change the morphologic nature of the tissue. In this way, following denervation, an original fast-twitch fibre can become a slow-twitch fibre, which affects the functional integrity of the pelvic floor. Also with age there is decrease in the muscle fibre to connective tissue ratio and muscle fibre diameter in the urethral sphincter. Thus weak pelvic floor may lead to problem like urinary incontinence and prolapse. Exercise and effective pelvic floor training regimens play an important role in this process. [19]

Intensive strength training of pelvic floor muscle may build up the structural support of pelvis elevating the levator plate to a higher position inside the pelvis and by enhancing the hypertrophy and stiffness of its connective tissue. [20-22]

The findings of this study are similar to Diane F Borello-France studied the effect of pelvic-floor muscle exercise on position with stress urinary incontinence continence and quality-of-life outcomes in women. They concluded the significant improvement in pelvic floor muscle strength and quality of life but shows exercise

position does not affect continence outcomes in a cohort of women who also are taught a preemptive stress strategy. [23]

From a task difficulty standpoint, pelvic floor muscle exercises in upright positions should be more difficult to perform than exercises in the supine position, as forces acting on the pelvic floor muscle increase. Recently, Morgan et al found that bladder pressure at rest and during maximum voluntary pelvic floor muscle contraction was greater when continent women were standing than when they were lying down. [24] In addition, they observed that most women could not contract their pelvic floor muscle in a standing position without a concomitant increase in intra-abdominal pressure. In our study, several women indicated that they had greater difficulty knowing whether they were exercising correctly in the standing position.

Thus, the pelvic floor muscle strength greatly improves after pelvic floor muscle training in both the position but crook lying position show better result in menopausal women, which go a long way in healthy living. Hence menopausal incontinent women must be trained in crook lying position for pelvic floor muscle weakness under suitable guidance to improve their quality of life.

CONCLUSION

The present study concluded that pelvic floor muscle exercise in crook lying position in comparison to standing position for 4 weeks has significant improvement in pelvic floor muscle strength and severity of urinary incontinence. Hence, it is concluded that pelvic floor muscle exercise in crook lying position has beneficial effects on menopausal women with urinary incontinence.

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