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Effectiveness of Pelvic floor muscle training versus Pfilates exercise program to treat stress urinary incontinence in females: A randomized control trial

Sameera Mushtaq[1], Ashfaq Ahmed[2]

ABSTRACT

Objective: To determine the comparative effectiveness of pelvic floor muscle exercises with Pfilates exercises for the treatment of stress urinary incontinence among females.

Study Design: Randomized controlled clinical trial

Place and Duration: The study was conducted in Women Health Clinic near Jinnah hospital, Lahore for the duration from 5th August 2017 till 15th April, 2018.

Methodology: Participants were randomized into two groups (27 in each group). Group A and B received pelvic floor muscle exercises and Pfilates exercise program respectively. Exercise therapy consisted of 12 sessions biweekly for 6 weeks for the duration of 1 hour per session for both groups. Baseline assessment of pelvic floor muscle strength was done using manual muscle testing and graded with Modified Oxford Scale. Two questionnaires- Urinary Incontinence diagnosis (QUID) and Incontinence Impact questionnaire (IIQ-7) were also collected. The post-treatment assessments were made at 3th and 6th week.

Results: Total 54 patients were randomized of which 47 completed the study. Mean pre-treatment score of questionnaire for Urinary incontinence diagnosis for the group A and B were 11.00 ± 2.12 and 10.70±1.82 which were improved to 7.83± 1.90 and 8.17±1.37 respectively. Similarly, mean baseline incontinence impact questionnaire scores for group A and B were 50.00 ± 12.60 and 49.30 ± 9.00 which were improved to 41.13 ± 9.78 points (18% improved) in group A (p=0.001) and to 32.27 ± 6.18 points (35% improved) in group B (p=0.001). Mean baseline Modified Oxford scale scores for group A and B were 1.58 ± 0.59 and 1.27 ± 0.45 which were improved to 3.09 ± 0.72 (p=0.039) and 2.74 ± 0.69 (p=0.101) respectively.

Conclusion: The Pfilates method promoted similar outcomes in comparison to pelvic floor muscle training when applied to patients for a span of 6 weeks. None of the group is superior statistically over the other.

Keywords: Pelvic floor muscle, Urinary incontinence, Female, Pfilates exercise, Modified oxford scale, Pilates, exercises,

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INTRODUCTION

Urinary Incontinence (UI) is a distressful and psychologically unsettling situation. Urinary incontinence is becoming more prevalent in Asian countries so it is necessary to find an optimal treatment option to encounter the psychosocial and physical needs of the patients. Urinary Incontinence has effected 200 million people worldwide and it is estimated that it will affect over 423 million people by 2018[1]. In underdeveloped or low- income countries like Indian subcontinent, there is a very scarce data showing actual prevalence of UI. However, there are some studies like Jokhio et al in rural areas of Pakistan which concluded that although prevalence of UI is lower in Pakistan (Sindh) than in more developed countries but it still impacts their quality of life[2]. Another study of similar context was conducted in West Bengal by Biswas et al. which concluded that countryside females are at higher threat of developing UI with greatly compromised quality of life and these females generally do not sought for optimal treatment due to lack of awareness[3].

The International Continence Society (ICS) defines UI as the complaint of involuntary leakage of urine[4]. Urinary incontinence is primarily divided into three main categories i.e. Urgency incontinence (UI), Stress urinary incontinence (SUI), and mixed incontinence (MI), all the conditions although share the same symptom i.e. the incontinence of urine, but do have separate etiologies. SUI can be defined as the involuntary loss

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of urine while putting effort or physical exertion (e.g., sporting, activities), or on sneezing or coughing[5].

Pertinent risk elements for stress urinary incontinence are obesity, pregnancy, work with weights, excessive gym sessions, asthma, and chronic cough. Several other possible causes of SUI include prolapsed uterus, recurrent urine infections, cystocele, and rectocele and less frequently neurological diseases or radiation in the area[6]. Parity (number of times she has given births) is another reported risk factor for urinary incontinence. It is evident in literature that primiparous women are 3 times more prone to SUI when they are equated with their nulliparous counterparts of same age[7].

Pelvic floor muscle exercises have been considered as the primary and reliable treatment option of SUI and its efficacy has been proven in plentiful randomized controlled trials[8]. However, Researchers have focused on some advanced techniques that target at enhancing quality of contraction of pelvic floor muscles through the involvement of regional musculature. An example of such recent technique is Pfilates (Pelvic Floor Pilates)[9]. Pilates were based on the idea of harmonizing body and mind through controlled movement. In 2008, Dr. Bruce Crawford nominated 10 basic mat based Pilates exercises observing the electromyographic recordings which showed the well contracting pelvic floor during each of these exercises and named these as Pfilates.[10]

In the light of author's knowledge and research through electronic gadgets and journals, no study has yet judged the effects of Pfilates on incontinent females in Pakistan. We have conducted this study with the objective to compare pelvic floor muscle training with Pfilates exercise program in the treatment of stress urinary incontinence in females.

METHODOLOGY

This randomized controlled clinical trial was conducted in Women Health Clinic, Lahore from 5th August 2017 till 15th April, 2018 in accordance with the CONSORT guidelines. This study was ethically permitted by the Institutional Review Board (IRB) of University of Lahore. A total of fifty-four females having age between 20-55 years, presenting with episodes of SUI at least once per week were included in the study from local community of Lahore. However, pregnant, females having pelvic prolapse ≥ stage II or those having medications that may impact bladder function were not eligible to participate in the study. Participants with active vaginal or urinary tract infection were also excluded from the study. Participants were excepted if they were ever formally educated about PFMT or Pilates/Pfilates techniques by a physiotherapist or a Pilates instructor.

Simple random sampling technique was used to determine the participants' allocation to the treatment group. Randomization occurred immediately after enrollment. Allocation of participation to their treatment groups was blindly performed through a simple random number table. Participants (n=54) were randomized 1:1 into two groups having 27 participants in each group. Group A will receive pelvic floor muscle exercises regime and group B will receive Pfilates exercises program.

After taking informed written consent English /Urdu from the patient, pre-treatment evaluation was done by a physiotherapist. Pelvic floor muscle strength was evaluated by using manual palpation technique and graded according to modified oxford scale (MOS). It is consisted of a 6-point scale in which 0 means no contraction, 1 is for flicker, 2 means weak contraction while 3, 4 and 5 represent moderate, good (with lift) and strong respectively[11]. Other outcome measures included history, Questionnaire for Urinary Incontinence Diagnosis (QUID) and health related quality of life (HRQOL) assessment by using Incontinence Impact Questionnaire (Short Form IIQ-7).

Both the PFME and Pfilates exercise regimes comprised of 12 sessions (i.e., biweekly for six weeks) for the duration of 1 hour per session. Two different physical therapists were involved in the program and both of them followed the designed plan of exercises for both groups (Table: I-II). Participants of group A were taught the way that how they can contract the pelvic floor.

Table-I: Pelvic floor muscle exercises plan

Week	Positions	Reps each position	Sets	Contractions daily
1&2	Lying and sitting	15-20	2	30-60
3&4	Lying, sitting and standing	30-40	2	60-120
5&6	Lying, sitting and standing	40-50	3	120-150

Patients tightened their pelvic floor muscles, held the contraction for five seconds and then relaxed for another five seconds (Table-I) Participants of group B followed the plan for Pfilates exercises.

Table-II: Pfilates exercises plan

Week	Position /Pose	Repetitions each position	Sets	Hold (secs)	Pulses
1	Butterfly	5	3	3-5	5
2	Butterfly	5	2	5-8	5
	Lunge	5	2	3-5	5
3	Butterfly	5-10	2	8-10	5-10
	Lunge	5-10	2	5-8	5-10
	Squat	5-10	2	3-5	5-10
4	Butterfly	8-10	2	10	8-10
	Lunge	8-10	2	10	8-10
	Squat	8-10	2	5-8	8-10
5	Butterfly	10-12	2	10	10-12
	Lunge	10-12	2	10	10-12
	Squat	10-12	2	10	10-12
6	Butterfly	10-12	3	10	10-15
	Lunge	10-12	3	10	10-15
	Squat	10-12	3	10	10-15

The Pfilates exercises gradually assimilated postures that could engage and activate supportive abdominal muscles like hip adductors, Transversus Abdominus and gluteals. During each stance, participants were instructed to execute a series of rhythms within a minor range of motion while pelvic floor was

contracting maximally and simultaneously (Table-II). Post treatment assessment was performed by an independent physical therapist, who was blinded of the patient's regime groups and their pre-treatment evaluations.

Data Analysis: After collection, the data was analyzed SPSS version 20. The demographic variables like weight, age etc. were measured by using means, standards deviations and standard errors. To compare the significance at different time intervals, repeated measure ANOVA was used. However, to compare the between group effectiveness independent T-test was used.

RESULTS

During this clinical trial 70 patients were selected, out of these 16 patients (23%) declined while 54 (77%) agreed to participate in the study. Each group initially received 27 subjects however, seven participants dropped out due to various reasons during the study. Hence a total of 47 patients were selected for the study. Mean participant age was 40.17±8.71 and 42.41±11.15 years in PFMT and Pfilates groups, respectively (Table-III). The two groups were similar across number, demographic and other specific (pregnancy etc.) related variables at baseline.

A mean pre-treatment Modified Oxford Scale (MOS) scores for the PFMT and Pfilates groups were 1.58 ± 0.59 and 1.27 ± 0.45, respectively. After, MOS scores improved to 3.09 ± 0.72 points in the PFMT group (p=0.039) and to 2.74 ± 0.69 points in the Pfilates group (p=0.101). These improvements in MOS scores were not meaningfully different between groups when compared to each other. (Table-IV)

Mean baseline muscle strength for the PFMT and Pfilates groups under the urinary incontinence diagnosis were 11.00 ± 2.12 and 10.70±1.82 respectively. Both groups validated better strength at the end of the study. Mean improvement in the PFMT group was 7.83± 1.90 and in the Pfilates group was 8.17±1.37 (Table-IV).

Table-III: Baseline Characteristics (N=47)

	PFMT (n=24)	PFILATES (n=23)
Mean Age	40.17±8.71	42.41±11.15
Minimum/ Maximum	23-55	20-57
Mean History*	4.94±5.11	5.16±6.64
Minimum/ Maximum	1-25	1-30
Mean No. of Pregnancies	3	4
Minimum/ Maximum	0-8	1-10
Mean No. of Cesareans	NA	NA
Minimum/ Maximum	0-1	0-4
Mean No. of Abortions	NA	NA
Minimum/ Maximum	0-3	0-22

PFMT: Pelvic floor muscles training; **PFILATES**: Pelvic Floor Pilates Exercises; MOS: Modified Oxford Scale
*Number of years of sufferings in the disease

Mean pre-treatment Incontinence Impact Questionnaire (IIQ-7) scores for the PFMT and Pfilates groups were 50.00 ± 12.60 and 49.30 ± 9.00, respectively. After treatment, IIQ-7 scores improved to 41.13 ± 9.78 points (18% progress) in the PFMT group (p=0.001) and to 32.27 ± 6.18 points (35% progress) in the Pfilates group (p=0.001) which shows that the participants of the Pfilates group demonstrated better quality of life as compared to PFMT group. (Table-IV)

Table-IV: Intra Group Mean Comparison (N=47)

Intervention	Time Point	Estimate ± SD	(95% CI)		p-value
Urinary Incontinence Diagnosis (QUID)					
PFMT (n=24)	Baseline	11.000 ± 2.1264	-0.86080	1.46950	0.601
	3 Weeks	9.7917± 1.9776	-0.69201	1.31882	0.533
	6 Weeks	7.8333± 1.9034	-1.31867	0.63751	0.487
PFILATES (n=23)	Baseline	10.6957±1.8199	-0.85729	1.46599	0.600
	3 Weeks	9.4783±1.3774	-0.68703	1.31384	0.531
	6 Weeks	8.1739±1.3702	-1.31399	0.63283	0.484
Incontinence Impact Questionnaire (IIQ-7)					
PFMT (n=24)	Baseline	50.000 ± 12.6009	-5.7631	7.1544	0.829
	3 Weeks	46.4167 ± 11.5642	-3.1064	8.7223	0.344
	6 Weeks	41.1250 ± 9.7771	4.0344	13.6939	0.001
PFILATES (n=23)	Baseline	49.3043 ± 9.00220	-5.7319	7.1232	0.828
	3 Weeks	43.6087 ± 8.20609	-3.0776	8.6936	0.341
	6 Weeks	32.2609 ± 6.18074	4.0591	13.6691	0.001
Modified Oxford Scale (MOS)					
PFMT (n=24)	Baseline	1.5833 ± 0.5836	0.0156	0.6294	0.040
	3 Weeks	2.1666 ± 0.6370	0.0203	0.7479	0.039
	6 Weeks	3.0833 ± 0.7173	-0.0692	0.7577	0.039
PFILATES (n=23)	Baseline	1.2609 ± 0.4489	0.01692	0.628007	0.039
	3 Weeks	1.7826 ± 0.5997	0.02070	0.74742	0.100
	6 Weeks	2.7391 ± 0.6887	-0.06886	0.75726	0.101

PFMT: Pelvic floor muscles training; PFILATES: Pelvic Floor Pilates Exercises; *statistically significant (*p*<.05).

The overall result of the study indicate that both the exercise techniques were similar in effectiveness in terms of incontinence and muscle strength. However, Pfilates group patients exhibited more improvement in quality of life as compared to PFMT group.

DISCUSSION

The present study aimed at comparing two regimens for the treatment of SUI i.e. pelvic floor muscle training and Pfilates exercises. The general purpose of this study was not only to benefit our therapists in Pakistan to seek for this novel approach of Pfilates while managing their patients in their clinics but it will also help in creating awareness among general population. Several studies in the past have compared these techniques. In 2018, Lausen et al. has conducted a trial to reveal that Pilates along with the standard Physiotherapy can be proven more beneficial as compared to the pelvic floor training alone[12]. In another study, Gomes et al. observed the effects of Pilates on pelvic floor muscle strength of the patients with post-prostatectomy and concluded that Pilates method promoted similar outcomes as pelvic floor training 4 months post RP[13]. So, Pfilates can create mind-body awareness when appropriately performed; so generally these can impact the entire body in positive way[14].

In our study, we compared the efficacy of pelvic floor muscle training with the Pfilates method and found out that Pfilates exercises were as effective as traditional PFMT for the treatment of SUI in females. The results of this study showed that both the groups showed improvements in terms of muscle strength, QoL and return to continence. The progress was almost similar in both groups except the QoL which was bit more enriched in the Pfilates group. These similar results of both groups were in accordance with another study by Pedrialli et al. in which they experimented the similar parameters on post-prostatectomy urinary incontinence patients[15].

In our study, PFM contractions and strength were assessed by manual muscle testing using Modified Oxford scale. Both the groups showed notable improvements in their muscle strength from baseline, however, there was no statistical difference between the groups. Similarly, both groups showed improved scores of QUID from baseline assessment which relates that patients are getting more continent. A study by Culligan collaborates with our results in which both the groups show notable improvements in terms of results within group but no significant difference between groups[9]. However, when we observed the scores of incontinence impact questionnaire, which is used to estimate the health related quality of life (HRQOL) of patients impacted by urinary incontinence, patients responded well about their improvements in their daily life routines. In terms of results, within group values were statistically significant for Pfilates group which means that patients of Pfilates group were superior in terms of better quality of life as compared to PFMT group. However, more elaborated researches are needed to recommend Pfilates approach as an alternative to traditional training.

Limitations of Study: This study was not fulfilled without any limitations. Firstly, due to a very small sample size, it is very difficult to generalize the results over whole population. Secondly, some essential outcome measures like pad test or bladder diary could not be implemented due to patient's non response and unawareness of its importance and non-availability of the resources. Another notable restraint is that this study was conducted by physical therapists who were not certified trainers of Pfilates or Pilates in our clinical setup. So, evolving gynecological rehabilitation clinics which are fully equipped with all the essential and latest assessment and treatment related equipment is really necessary.

CONCLUSION

The Pfilates method is as effective as pelvic floor muscle training for the treatment of stress urinary incontinence in females when applied to patients for a span of 6 weeks. None of the groups is superior statistically over the other.

CONTRIBUTION OF AUTHORS

Mushtaq S: Conceived idea, Designed research methodology, Data compilation, Data analysis, Manuscript writing, Literature review
Ahmed A: Critical review of manuscript, Data compilation, Final reading

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