

A Study to Compare the Effectiveness of Hypopressive Exercise versus Pilates Exercise for Urinary Incontinence Among Multiparous Women

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Abstract: Background: Urinary incontinence (UI) is a common and distressing condition among multiparous women, primarily caused by pelvic floor muscle weakness. It significantly affects quality of life, leading to physical discomfort, social embarrassment, and psychological distress. This study aims to compare the effectiveness of hypopressive exercise and Pilates's exercise, both combined with Kegel exercises, in managing urinary incontinence among multiparous women. Methodology: A total of 30 subjects aged between 45 and 55 years were selected and randomly divided into two groups: Group A (hypopressive exercise with Kegel exercises) and Group B (Pilates's exercise with Kegel exercises). The intervention was carried out over a period of 6 weeks, with sessions conducted four times per week. Outcome measures included the King's Health Questionnaire (KHQ), International Consultation on Incontinence Questionnaire (ICIQ), and the pad weight test. Results: Both groups demonstrated significant improvement in reducing urinary leakage and improving quality of life. Statistical analysis using paired t-tests revealed significant improvements within Group A and Group B ($p < 0.05$). Independent t-test analysis between groups showed a statistically significant difference ($t\text{-value} > 2.0$, $p < 0.05$), indicating variation in effectiveness between the interventions.

Keywords: Hypopressive Exercise, Multiparity, Pelvic Floor Muscle Training, Pilates, Urinary Incontinence

1. Introduction

Urinary incontinence (UI) is defined as the involuntary leakage of urine and is a common health concern, particularly among women [1]. It commonly occurs due to weakness of the pelvic floor muscles, which play a crucial role in maintaining continence. Multiparous women, those who have experienced multiple pregnancies and childbirth, are at a higher risk due to repeated stretching and damage to pelvic floor muscles, nerves, and connective tissues [2]. The prevalence of urinary incontinence is reported to range between 25% and 45%, with higher incidence observed in middle-aged and older women [3]. Several risk factors, including aging, obesity, chronic coughing, hormonal changes, and previous pelvic surgeries, further contribute to pelvic floor dysfunction [4]. Stress urinary incontinence, which occurs during activities such as coughing, sneezing, or physical exertion, is the most common type observed in multiparous women [5].

Urinary issues significantly impact quality of life, leading to social embarrassment, reduced self-confidence, and psychological distress. Women with UI often experience embarrassment, reduced confidence, social withdrawal, and decreased participation in daily activities [6]. Therefore, effective and non-invasive management strategies are essential. Physiotherapy interventions, especially pelvic floor muscle training, are widely recommended as first-line treatment [8]. Techniques such as Kegel exercises, hypopressive exercises, and Pilates exercises have shown promising results in strengthening pelvic floor muscles and improving bladder control [9].

Previous studies have demonstrated that hypopressive exercises, which involve specific breathing and postural techniques to reduce intra-abdominal pressure, are effective in improving pelvic floor muscle strength and reducing urinary leakage [10]. Similarly, Pilates exercises focus on core strengthening, flexibility, and muscle coordination, which contribute to improved pelvic floor function [11].

Research has indicated that both Pilates and pelvic floor muscle training are effective in managing stress urinary incontinence, while combined approaches with Kegel exercises yield better outcomes [13]. However, there is limited comparative evidence regarding the effectiveness of hypopressive versus Pilates exercises among multiparous women [14]. Hence, this study aims to compare the effectiveness of hypopressive exercise versus Pilates exercise, combined with Kegel exercises, in managing urinary incontinence among multiparous women.

2. Materials and Methodology

Source of Data: Data were collected from Peri college of physiotherapy. This journal got an approval from Institutional Human Ethical Committee – PERIHS/IHEC/2026/12. Subjects around the age group of 45 to 55 years included in this study. They are included in the study of the fulfilment of inclusion criteria. A total of 30 subjects were randomly divided into GROUP/ A & GROUP B. GROUP A receives hypopressive with Kegel exercise and GROUPB effect of Pilates exercise with Kegel's exercise.

Sampling Size: For the study, 30 multiparous women between the age group of 45–55 years with urinary incontinence were recruited. The subjects were screened for eligibility based on the inclusion and exclusion criteria. The purpose of the study was explained to all participants, and informed consent was obtained before participation. Institutional ethical approval was obtained. Age group between 45–55 years, Female gender, Multiparous women, Subjects with urinary incontinence, Subjects free from any medical and gynaecological risk conditions, Subjects free from neurological problems and urinary tract infections, Subjects reporting a minimum of one episode of involuntary urine leakage per week were included in the study. Pregnancy, History of caesarean section delivery, Previous urinary incontinence surgery, Previous pelvic surgery, Presence of bladder cancer or other malignancies, Subjects with severe medical or neurological disorders were excluded. The duration of the study was 6 weeks, weekly 4 days, 1 session per day. The subjects were assessed using Pad weight test, King's Health Questionnaire (KHQ), International Consultation on Incontinence Questionnaire (ICIQ).

3. Procedure

Group A- Hypopressive Exercise with Kegel Exercise:

Hypopressive Exercise:

Hypopressive exercises involve breathing techniques combined with specific postures to reduce intra-abdominal pressure and activate deep abdominal and pelvic floor muscles. These exercises help in strengthening the pelvic floor and improving bladder control. The subject is positioned in lying, sitting, standing, and kneeling positions. The subject is instructed to inhale deeply, followed by complete exhalation, and then perform breath holding with abdominal contraction (apnea). The rib cage is expanded while maintaining the abdominal vacuum. The exercise is performed in sets and repetitions with gradual progression in duration and positions for a period of 6 weeks.

Group B – Pilates Exercise with Kegel Exercise: Pilates exercises are low-impact exercises focusing on core strength, flexibility, and coordination, which help improve pelvic floor muscle function. The subject performs Pilates exercises such as breathing exercises, hip opening, pelvic tilt, pelvic bridging, and wall squat. Each exercise is performed in sets and repetitions with controlled movements and proper breathing. The intensity and duration are gradually increased for a period of 6-weeks.

Kegel Exercises: The exercises are administered to both Group A and Group B.

In a crook lying position, the subject is instructed to contract the pelvic floor muscles, hold for 5 seconds, and relax for 10 seconds. The exercise is progressed to sitting and standing positions. One set consists of 10 repetitions, and subjects are advised to perform 8–10 sets per day.

Duration of Intervention

Each session lasted approximately 35 minutes, including 20 minutes of specific exercise (hypopressive or Pilates) and 15

minutes of Kegel exercise. The intervention was carried out for 6 weeks, 4 days per week.

4. Statistical Methodology

Table 1: Descriptive Statistics of all measures- Group A

	Count	Min	Max	Mean	SD
AGE	15	45	52	48.27	2.19
KHQ PRE	15	2	4	3.07	0.80
KHQ POST	15	1	3	2.00	0.85
ICIQ PRE	15	7	13	9.80	2.01
ICIQ POST	15	5	9	6.73	1.28

Table 2: Descriptive Statistics of all measures – Group B

	Count	Min	Max	Mean	SD
AGE	15	45	52	48.80	2.46
KHQ PRE	15	2	4	3.07	0.80
KHQ POST	15	1	3	2.00	0.85
ICIQ PRE	15	7	13	9.73	1.75
ICIQ POST	15	5	9	6.33	1.29

The descriptive statistics for Groups A and B reveal similarities and changes across the measured variables. In Group A, participants ranged in age from 45 to 52 years, with a mean of 48.27 years (SD = 2.19). The KHQ (King's Health Questionnaire) scores decreased from a pre-intervention mean of 3.07 (SD = 0.80) to a post-intervention mean of 2.00 (SD = 0.85), indicating improvement. Similarly, the ICIQ (International Consultation on Incontinence Questionnaire) scores dropped from a pre-intervention mean of 9.80 (SD = 2.01) to 6.73. Questionnaire) scores dropped from a pre-intervention mean of 9.80 (SD = 2.01) to 6.73 (SD = 1.28) post-intervention.

In Group B, the participants also had ages ranging from 45 to 52 years, with a slightly higher mean of 48.80 years (SD = 2.46). KHQ scores followed a similar pattern to Group A, declining from a pre-intervention mean of 3.07 (SD = 0.80) to 2.00 (SD = 0.85) post-intervention. The ICIQ scores also showed a reduction, with a pre-intervention mean of 9.73 (SD = 1.75) decreasing to 6.33 (SD = 1.29) post-intervention.

Both groups demonstrated consistent improvements in their KHQ and ICIQ scores after the intervention, reflecting positive outcomes.

5. Inferential Statistics

Intra-Group Analysis – Group A

To test the effectiveness of Treatment A in decreasing the value of KHQ

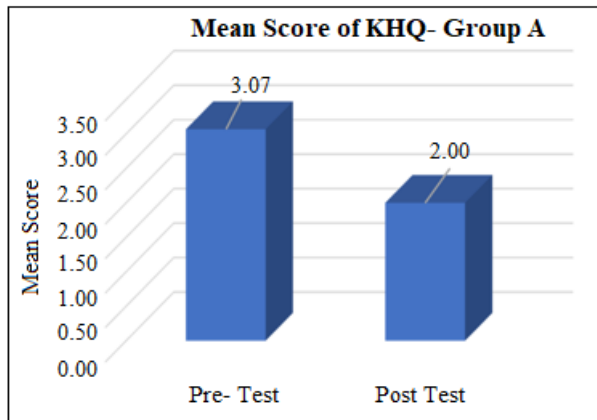
H_0 : There is no significant effect of Treatment A in decreasing the value of KHQ.

H_1 : There is a significant effect of Treatment A in decreasing the value of KHQ

A paired samples t-test was applied to test the above hypothesis and the corresponding output is presented below:
t-Test: Paired Two-Sample for Means

Table 3: Pre and Post Test Values of KHQ in Group A

	B KHQ PRE	B KHQ POST
Mean	3.07	2.00
SD	0.80	0.85
Observations	15.00	15.00
Df	14.00	
t Stat	-16.00	
t Stat	-16.00	
P-value	0.000	

Interpretation**Figure 1**

There is a significant reduction in KHQ score from pre-test to post-test ($t = -16.00$, $p = 0.000 < 0.05$). In addition, the mean KHQ score has decreased from 3.07 to 2.00. Hence, the evidence is sufficient to conclude that the Treatment A is significantly effective in decreasing the value of the KHQ score.

To test the effectiveness of Treatment A in decreasing the value of ICIQ

H_0 : There is no significant effect of Treatment A in decreasing the value of ICIQ

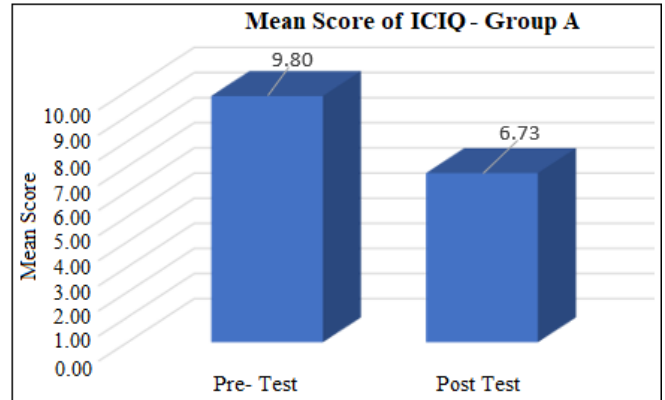
H_1 : There is significant effect of Treatment A in decreasing the value of ICIQ

Paired Samples t-test was applied to test the above hypothesis and the corresponding output is presented below:

t-Test: Paired Two Sample for Means

Table 4: Pre and Post Test Values of ICIQ in Group A

	A ICIQ PRE	A ICIQ POST
Mean	9.80	6.73
SD	2.01	1.28
Observations	15.00	15.00
Df	14.00	
t Stat	-10.80	
P-value	0.000	

**Interpretation**

There is a significant reduction in ICIQ score from pre-test to post-test ($t = -10.80$, $p = 0.000 < 0.05$). In addition, the mean ICIQ score has decreased from 9.80 to 6.73. Hence, the evidence is sufficient to conclude that the Treatment A is significantly effective in decreasing the value of the ICIQ score.

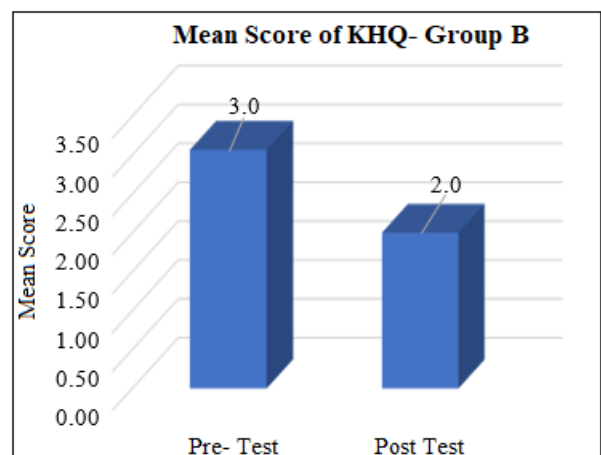
Intra-Group Analysis – Group B

To test the effectiveness of Treatment B in decreasing the value of KHQ H_0 : There is no significant effect of Treatment B in decreasing the value of KHQ. H_1 : There is a significant effect of Treatment B in decreasing the value of KHQ

Paired Samples t-test was applied to test the above hypothesis and the corresponding output is presented below: t-Test: Paired Two Sample for Means

Table 5: Pre and Post Test Values of KHQ in Group B

	B KHQ PRE	B KHQ POST
Mean	3.07	2.00
SD	0.80	0.85
Observations	15.00	15.00
Df	14.00	
t Stat	-16.00	
t Stat	-16.00	
P-value	0.000	



Interpretation: There is a significant reduction in KHQ score from pre-test to post-test ($t = -16.00$, $p = 0.000 < 0.05$). In addition, the mean KHQ score has decreased from 3.07 to 2.00. Hence, the evidence is sufficient to conclude that the

Treatment A is significantly effective in decreasing the value of KHQ score.

To test the effectiveness of Treatment B in decreasing the value of ICIQ

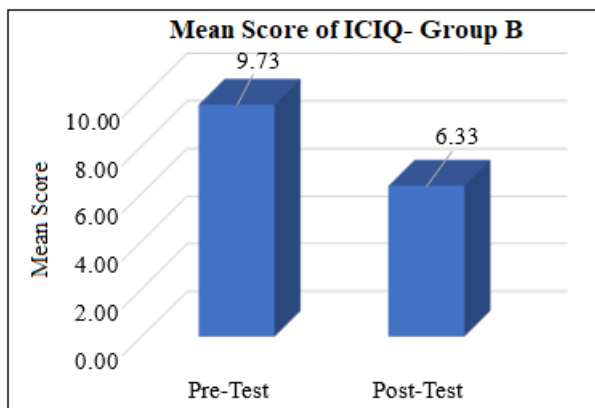
H_0 : There is no significant effect of Treatment B in decreasing the value of ICIQ

H_1 : There is significant effect of Treatment B in decreasing the value of ICIQ

Paired Samples t-test was applied to test the above hypothesis and the corresponding output is presented below: t-Test: Paired Two Sample for Means

Table: 6 Pre and Post Test Values of ICIQ in GROUP B

	B ICIQ PRE	B ICIQ POST
Mean	9.73	6.33
SD	1.75	1.29
Observations	15.00	15.00
Df	14.00	
t Stat	-14.47	
P-value	0.000	



Interpretation: There is a significant reduction in ICIQ score from pre-test to post-test ($t = -14.47$, $p = 0.000 < 0.05$). In addition, the mean ICIQ score has decreased from 9.73 to 6.33. Hence, the evidence is sufficient to conclude that the Treatment A is significantly effective in decreasing the value of the ICIQ score.

Inter-Group Analysis:

Comparing Treatment A and B in terms of reduction in KHQ.

H_0 : There is no significant difference between Group A and B in terms of mean reduction in

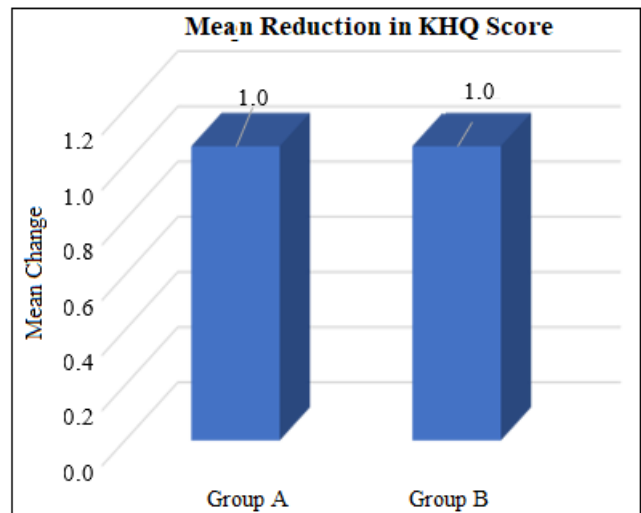
KHQ

H_1 : There is a significant difference between Group A and B in terms of mean reduction in KHQ.

The independent samples t-test was applied to test the above hypothesis, and the corresponding output is shown below:

Table 7: Inter Group Analysis of KHQ (Group A and Group B)

t-Test: Two-Sample Assuming Equal Variances		
	A KHQ Diff	B KHQ Diff
Mean	-1.07	-1.07
SD	0.26	0.26
Observations	15	15
t Stat	0	
P-value	1	



Interpretation

There is no significant difference between Group A and Group B in terms of mean reduction in KHQ score ($t = 0$, $p = 1 > 0.05$). In addition, the mean-decrease in KHQ score in Group A (1.07) is equal to that of Group B (1.07). Hence, the evidence is not sufficient to conclude that Treatment A is significantly different from Treatment B in terms of mean reduction in KHQ score.

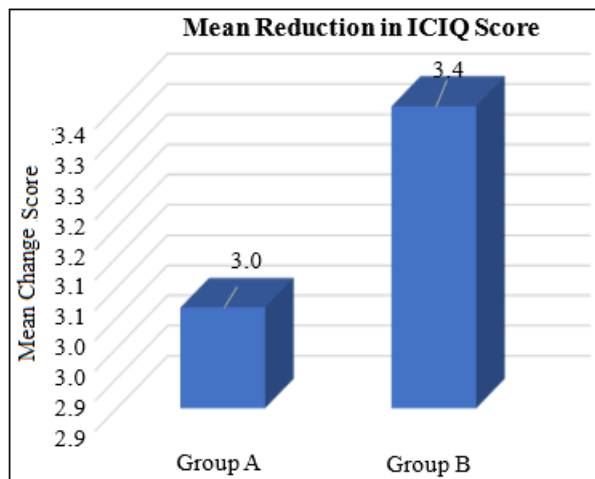
Comparing Treatment A and B in terms of reduction in ICIQ score.

H_0 : There is no significant difference between Group A and B in terms of mean reduction in ICIQ score. H_1 : There is a significant difference between Group A and B in terms of mean reduction in ICIQ score.

The independent samples t-test was applied to test the above hypothesis, and the corresponding output is shown below:

Table 8: Inter Group Analysis of ICIQ (Group A and Group B)

t-Test: Two-Sample Assuming Equal Variances		
	A ICIQ Diff	B ICIQ Diff
Mean	-3.07	-3.40
SD	1.10	0.91
Observations	15.00	15.00
t Stat	0.90	
P-value	0.374	



Interpretation

There is no significant difference between Group A and Group B in terms of mean reduction in ICIQ score ($t = 0.90$, $p = 0.374 > 0.05$). In addition, the mean decrease in ICIQ score in Group A (3.07) is not much different from that of Group B (3.40). Hence, the evidence is not sufficient to conclude that Treatment A is significantly different from Treatment B in terms of mean reduction in ICIQ score.

6. Discussion

UI is most commonly caused by incompetence of urethral sphincter. Incontinence can be caused by a weak vagina, pipe stem urethra, denervation in neurogenic patients, or estrogens deficiency. UI has a great influence on quality of life and affects mostly the elderly. Pelvic floor dysfunction (PFD) is one of the most common gynecological problems among women worldwide.[1] It is caused by weakness of the pelvic floor (PF) supporting tissues, grouping a set of conditions such as urinary incontinence (UI), pelvic organ prolapse (POP), fecal incontinence, sexual dysfunction, and other urogenital symptoms.[1] This condition is related to a decrease in the quality of life (QoL), with social, health, and economic repercussions.[2] The symptom's severity can be enhanced by childbirth, obesity, constipation, pelvic surgery, heavy lifting activities, and the influence of a genetic history.[3] Pelvic floor muscle training (PFMT) is recommended as a first-line treatment.

Asmaa Anwar Abd elglil et al. in 2023 the result of the current study is in contrast with the study of Mohammed et al. (2021) who found that no a statistically significant relation between severity of stress urinary incontinence and type of family. Finally, the current study posited that hypopressive exercises serve as a non-pharmacological, uncomplicated, convenient, cost-free, non-invasive and efficacious approach to mitigating the intensity of stress urinary incontinence. It ought to be accessible and applicable as a component of nursing care for women afflicted with stress urinary incontinence.

Sahoo Radharani et al. in 2020 results of the study showed that both the experimental group treated with interferential therapy, Kegel exercise, transverse abdominis strengthening and conventional group treated with Kegel exercise, transverse abdominis strengthening improved in quality of life measured by urinary incontinence questionnaire, pelvic

floor muscle strength measured by modified oxford grading scale and transverse abdominis strength measured by modified sphygmomanometer improved from pre-test measurements to post-test measurements.

Dr. Kausar Abdul Raheman Qureshi (2023)

Uma Singh et al that the prevalence of urinary incontinence ranged from 27.8% to 42.8% (moderate). In women above 40 years of age and prevalence is significantly higher among women above 40 years of age.

Pournima Pawar et al. based on Pilates exercises and conventional exercises on core muscle strength in postnatal women supported our study by stating that the 3 weeks of Pilates Training was more effective than the conventional exercises to improve the core muscle strength.

7. Conclusion

The present study concludes that both hypopressive exercises and Pilates exercises, when combined with Kegel exercises, are effective in reducing urinary incontinence symptoms and improving quality of life among multiparous women. .no statistically significant difference was observed between the two intervention groups, indicating that both treatment approaches are equally effective and can be used interchangeably in clinical practice.

8. Limitations and Recommendations

Limitations

Sample size is small, short duration of the study, no long-term follow-up of the subjects, Study limited to a specific age group (45–55 years); lack of control group for comparison.

Recommendations

A larger sample size can be considered for future studies. A study can be conducted by including a control group. Longer study duration and follow-up can be done to assess long-term effects. Comparative studies with other physiotherapy techniques can be performed. Different age groups can be included for better generalization of results.

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