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Effect of yoga program on stress incontinence and quality of life in middle age obese women at the end of 6 weeks

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Abstract
Aim: The study focus on the effect of yoga program and quality of life in middle age obese women at the end of 6 weeks. In this study effort has been made to highlight the more effective treatment for stress incontinence and quality of life. Urinary incontinence is defined as the complaint of any involuntary leakage of urine. Stress incontinence is involuntary leakage of urine without detrusor contraction and the intravesical pressure exceeds urethral pressure. Excess fat accumulation in abdominal area is more likely to increase pressure on pelvic floor which leads to incontinence.
Methodology: 40 subjects were selected for the purpose of study from Pune. Data was collected and evaluated through Modified oxford scale, stop test and IIQ-7 (Incontinence impact questionnaire).
Procedure: Stress incontinence was evaluated in 40 middle age obese women. Subjects were divided into 2 groups by simple random sampling. Group A being yoga program and group B was conventional exercises for 3 days a week for 6 weeks. Statistical tool: Wilcoxon rank sum test was used for pre and post data analysis of same group and Mann Whitney U test was used for intergroup analysis.
Conclusion: The findings of the study concluded that Yoga program and Kegel's exercises (Control group) are both effective in treating stress incontinence and improving quality of life in middle age obese women. Yoga program showed better improvement in stress incontinence and Quality of life in middle age obese women.

Keywords: Yoga, women, Kegel's exercises, Urinary incontinence, Modified oxford scale, stop test, IIQ-7, Pelvic floor muscles

Introduction
Urinary continence is the normal ability of a person to store urine temporarily with conscious control over time and place of micturition [1]. Urinary incontinence is defined as the complaint of any involuntary leakage of urine [1]. Stress incontinence is involuntary leakage of urine without detrusor contraction and the intravesical pressure exceeds urethral pressure [1]. According to Indian Journal of Urology 21.8% women were incontinent with highest were found to have stress incontinence (73.8%). In women above 30 years of age prevalence ranged from 27.8% - 42.8% and thus significantly higher among women above 40 years of age with BMI > 25 i.e. 72.4% in stress incontinent women [2]. There are 3 main types of urinary incontinence namely urge incontinence, stress incontinence and mixed incontinence. In stress incontinence there is involuntary leakage of urine on effort or exertion with increased intra abdominal pressure due to insignificant urethral support from endopelvic fascia and muscles or deficiency of intrinsic muscles. Excess fat accumulation in abdominal area is more likely to increase pressure on pelvic floor which leads to incontinence. The weakness of PFM may result from following reasons; Trauma to muscles or adjacent tissues (abuse, surgeries or childbirth). Stretching from overuse (Repeated coughing, heavy lifting or obesity, straining ay stool because of constipation).

Pelvic floor muscles:
Outer most layer: Anal sphincter
2nd layer: urogenital triangle
3rd layer: urovaginal sphincter
4th layer: levator ani muscles

Levator ani muscles are responsible for continence by supporting the pelvic organs and enhancing urethral closure [4]. By promoting awareness and control over individual muscle group through the practice of specific yoga postures, yoga can be used to help women identify and strengthen pelvic floor muscles [5]. It showed improvement in stress incontinence as well as significantly greater improvement in bothersomeness of their symptoms.[5]Kegel reported that 84% of his patients with UIC were cured after doing PFM exercises [6]. They strengthen and build up structural support of pelvis by elevating levator plate and enhancing hypertrophy and stiffness of PFM and connective tissue. This facilitate a more effective automatic motor unit firing preventing descend during increase in abdominal pressure.

Need of study: Urinary incontinence poses limitations to daily-living activities associated with emotional problems such as embarrassment, depression, sadness and low body image ultimately leading to negative impact on quality of life [6]. Yoga exercise program is proved beneficial not only to increase PFM strength but also reducing anxiety, perceived stress [6]. But there is paucity in research of yoga program for effectiveness in treatment of stress incontinence and quality of life in middle age obese women.

Hence our study is an effort to highlight more effective treatment of yoga program and kegel's exercises on stress incontinence and quality of life in middle age obese women.

Aim: To find the effect of yoga program on stress incontinence and quality of life in middle age obese women at the end of 6 weeks.

Objectives: To find the effect of yoga program on stress incontinence in middle age obese women at the end of 6 weeks.

To find the effect of yoga program on quality of life in middle age obese women at the end of 6 weeks.

Methodology

Study type – Experimental study
Study design – Randomized control trial
Sample size – 40
Sampling method – Simple random sampling
Study population – Middle age obese women
Study setting – Gynecological hospitals and clinics in and around city
Treatment duration – 6 weeks

Inclusion criteria

Women subjects
Age group 40-65 years
BMI > 25
Women with stress incontinence
Women who are having pelvic floor strength between 0-3 according to modified oxford scale (MOS)

Exclusion criteria

Pregnancy within past 6 months
Current urinary tract infection (UTI) or haematuria or history of 3 or more UTI in past year
Neurologic condition such as stroke, multiple sclerosis, Parkinson's disease
Fistula in bladder or rectum
Pelvic cancer or radiation

Outcome measures

Modfied oxford scale (0.92) Power is measured by modified oxford scale (MOS). It evaluates muscle strength. Grade 3 is moderate contraction.

Grading	Description
0	No discernible PFM contraction
1	A very weak PFM contraction
2	A weak PFM contraction
3	A moderate PFM contraction
4	A good PFM contraction
5	A strong PFM contraction

Stop test (0.9) Studies have suggested that the ability to stop urine quickly correlates with good muscle function (ie, no urine leaking in most cases). It gives indication of function of muscle.

Patient is asked to urinate, if it is stopped abruptly and repeatedly, it is judged accordingly.

Test grade	Description of function	Results of stop test	Exercise position
5/5	Good	Urine stop abruptly and stopping can be repeated	All positions; stand, sit, lying down
4/5	Fairly good	Urine stops abruptly but cannot be repeated	All positions; stand, sit, lying down
3/5	Fair	Can stop the flow of urine but with difficulty	Sitting, lying down on back or side
2/5	Poor	Can slow the stream of urine but cannot stop it	Lying down on back or side
1/5	Very poor	Unable to slow the stream of urine	Lying down on back or side, hips in an elevated position

Incontinence Questonniare (0.9): It measures the impact of incontinence on physical activities, emotional health, travel and social relationships.

Proceudure: Patients were selected as per the inclusion and exclusion criteria.

Consent was obtained from patients to conduct the study. Total 40 patients were taken. The patients were divided into two groups according to random allocation by chit method. Patients in group A were given yoga program and for 40 minutes 3 days a week for 6 weeks.[5] Patients in group B (control group) were given conventional exercises for 3 days a week for 6 weeks.[6]Pre and post exercises pelvic floor strength with the help of modified oxford scale and stop test was measured on 1st day of treatment and on last day of treatment. Quality of life was assessed pre and post treatment with IIQ-7.

The program is based on iyengar yoga, a form of Hatha yoga. It maximize both efficacy and safety in older women with incontinence. It is focused on core set of 8 yoga postures. While doing these postures, patient is asked to foster awareness of pelvic floor structures with rectal and pelvic muscles squeezing (5 to 10 secs) with proper breathing during the posture. 40 mins sessions 3 times a week for total of 6 weeks.[5]

1. Tadasana (mountain pose)
2. Utkatasana (chair pose)
3. Trikonasana (triangle pose)
4. Malasana (squat pose)
5. Viparita Karani Variation (legs up the wall pose)
6. Salamba Set Bandhasana (supported bridge pose)
7. Supta Baddha Konasana (reclined cobbler's pose)
8. Savasana (corpse pose)[5]

Conventional exercises: Conscious PFM pre contraction during physical stress often termed as "counterbracing" or "*the Knack*". The patient is taught to contract PFM just ahead of physical stressors, and to hold throughout the stress such as during coughing, lifting, jumping, etc [7].

Strength training- Patients are taught to contract the PFM or tightening up the pelvic floor like holding your urine (contract-relax technique).For average incontinent patient eg; hold for 3-4 secs and repeat 10-15 times which can be progressed. Twice as much rest period is advised for weak muscle. Rest time is decreased as strength increases. The number of contractions per day are varied from 36 to 360 for 3 days in a week the total exercises program is of 6 weeks [7].

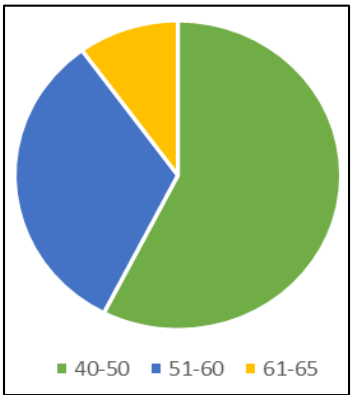
Indirect training of PFM via abdominal muscle training. A strong abdominal contraction termed as 'hallowing' is taught to the patient in which transversus abdominis muscle and internal obliques are forcefully contracted, increased the urethral pressure as much as a maximal PFM contraction [7].

Data Analysis: Improvement in the strength of PFM and Quality of life were analysed using Modified oxford scale, Stop Test and IIQ-7 Questionnaire respectively. The data was entered in Excel spread sheet, tabulated and subjected to Statistical Analysis. Data entered was analysed with the help of Primer of biostatistics version 7.0, checking the effectiveness of Yoga program and Kegel's exercises respectively in patients with stress incontinence. The demographic data and baseline characteristics for each group (pre study) are given in the table below:

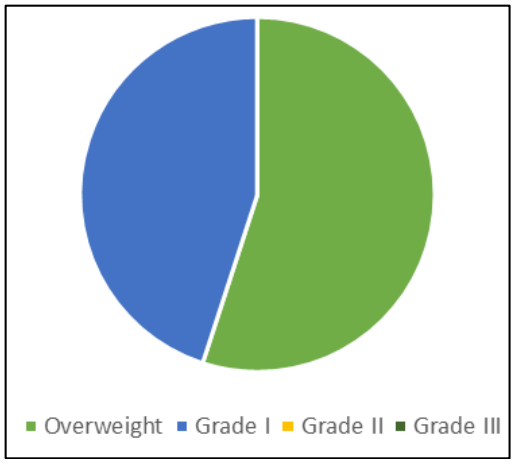
	Group A	Group B
Age	49.11±6.02	48.9±8.69
Bmi	29.52±2.20	30.50±2.04
Mos	2.25±0.85	2.2±0.767
Stop Test	2.25±0.716	2.15±0.81
Iiq-7 Questionnaire	13.25±4.128	13±4.34

Age and BMI distribution in demographic data

Age Wise Distribution	NO.
40-50	23
51-60	13
61-65	4



BMI	NO.
Overweight	22
Grade I	18
Grade Ii	0
Grade Iii	0



Statistical analysis

Data analysis was done for Group A and Group B using Modified oxford scale and Stop test (for strength of PFM) and IIQ-7 Questionnaire (for Quality of life). The data passed the normality test with $p<0.05$

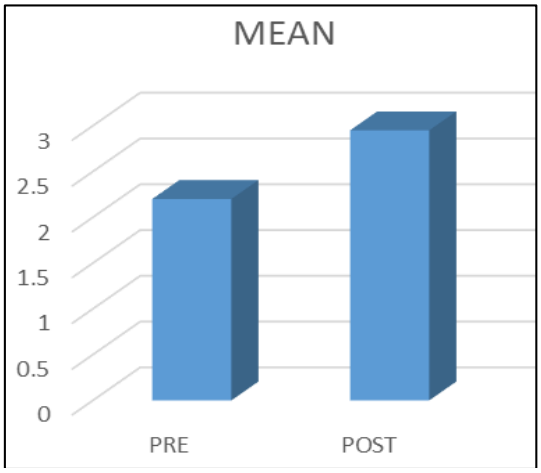
Pre and post data analysis of the Modified oxford scale, Stop test and IIQ-7 Questionnaire for Group A was done by Wilcoxon rank sum test.

Pre and post data analysis of the Modified oxford scale, Stop test and IIQ-7 Questionnaire for Group B was done by Wilcoxon rank sum test.

Group A and Group B Intergroup data analysis for Modified oxford scale, Stop test and IIQ-7 Questionnaire was done by the Mann Whitney U test.

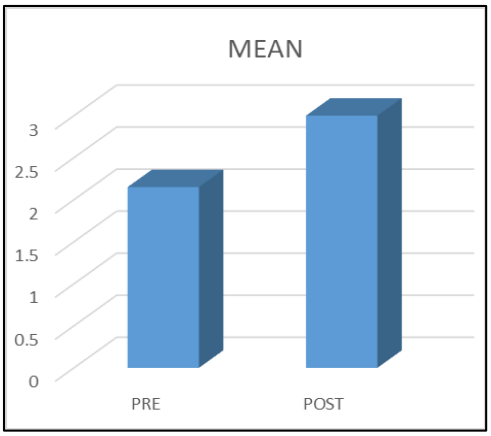
Intra group modified oxford scale: Group A

	PRE	POST
Mean	2.2	2.95
Sd	0.767	0.60
P Value	<0.0001	



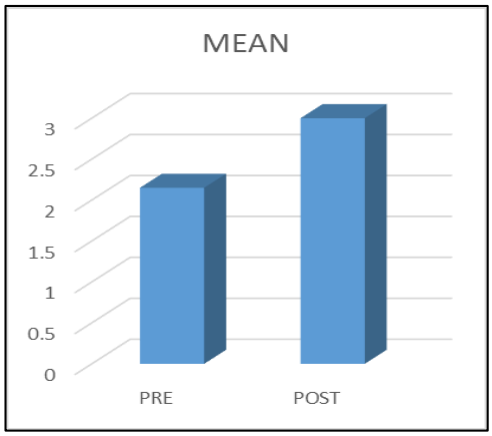
Intra group stop test: Group A

	PRE	POST
Mean	2.15	3
SD	0.81	0.725
p Value	0.002	



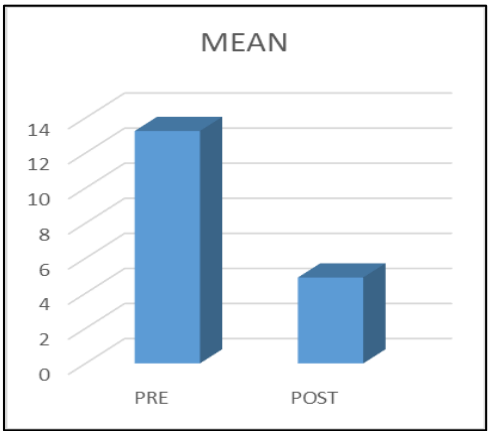
Intra group IIQ-7 questionnaire: Group A

	PRE	POST
Mean	13.25	4.9
SD	4.128	3.177
p Value	<0.0001	



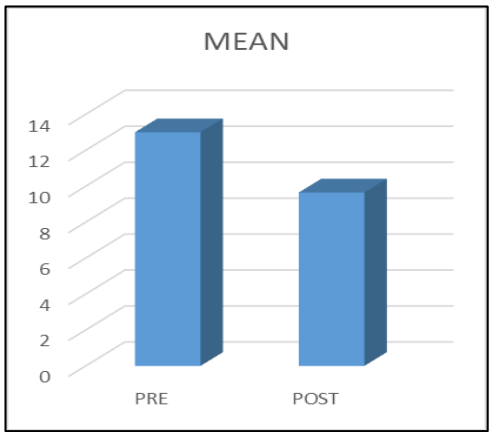
Intra group IIQ-7 questionnaire: Group B

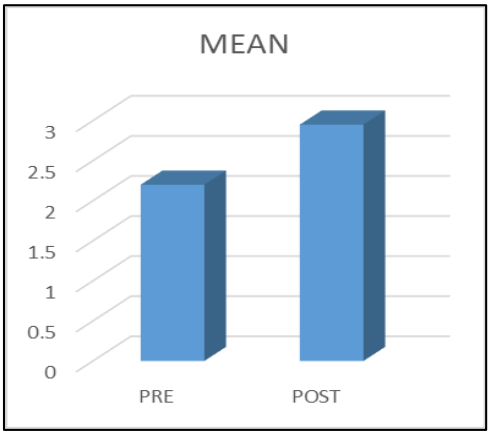
	PRE	POST
Mean	13	9.65
SD	4.034	4.40
p Value	<0.0001	



Intra group modified oxford scale: Group B

	PRE	POST
Mean	2.2	2.95
SD	0.767	0.60
p Value	<0.0001	





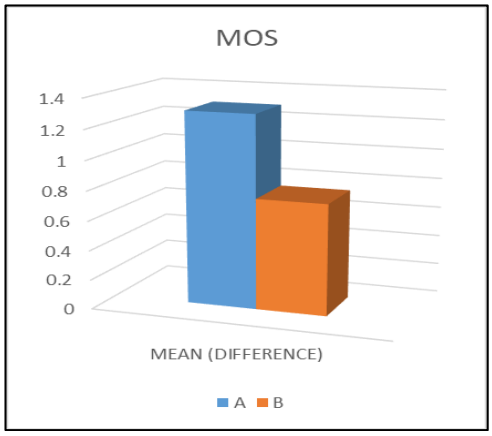
Intra group stop test: Group B

	PRE	POST
Mean	2.15	3
Sd	0.81	0.725
P VALUE	0.002	

Inter group analysis

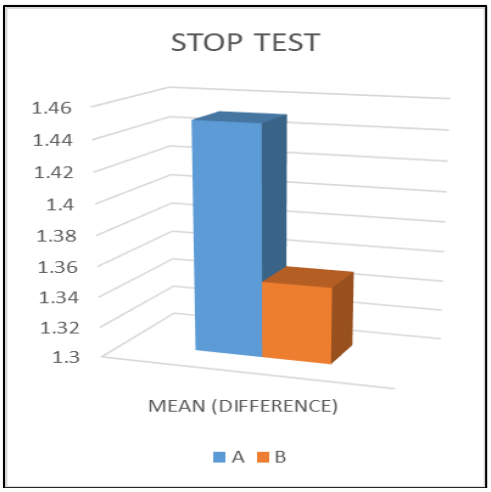
Modified oxford scale

	A	B
Mean	1.3	0.75
SD	0.86	0.63
p Value	0.0009	



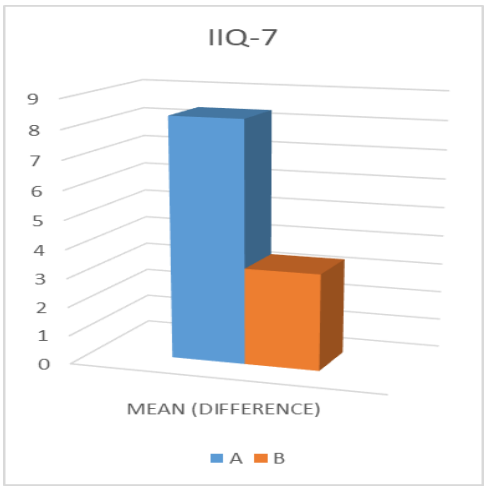
Stop test

	A	B
Mean	1.45	1.35
SD	0.82	2.41
p Value	0.041	



IIQ-7 questionnaire

	A	B
Mean	8.35	3.35
SD	3.37	2.49
p Value	<0.0001	



Result

Modified Oxford Scale (MOS): Mean values for MOS Group A were 1.3±0.86 and for Group B were 0.75±0.63 Mann Whitney U test was used to compare effectiveness in both groups. The obtained p value was 0.009 (significant)

Stop Test: Mean values for stop test Group A were 1.45±0.82 and for Group B were 1.35±2.41
Mann Whitney U test was used to compare the effectiveness in both groups The obtained p value was 0.041(significant)

IIQ-7 Questionnaire: Mean values for IIQ-7 Questionnaire Group A were 8.35±3.37 and Group B were 3.35±2.49
Mann Whitney U test was used to compare the effectiveness of both groups The obtained was p value was <0.0001 (extremely significant)

Discussion

The objective of this study was to compare the effects of Yoga Program with Kegel's exercises on stress incontinence and quality of life in middle age obese women. Stress incontinence is involuntary leakage of urine without detrusor contraction and the intravesical pressure exceeds urethral pressure. In stress incontinence there is involuntary leakage of urine on effort or exertion with increased intra-abdominal pressure due to insignificant urethral support from endopelvic fascia and muscles or deficiency of intrinsic muscles. Excess fat accumulation in abdominal area is more likely to increase pressure on pelvic floor which leads to incontinence The study included 40 women subjects within age group of 40-65 years of age being 49.11±6.02 years for group A and 48.9±8.69 for group B. The number of women in age group 40-50 years were more in both groups such that 12 in group A and 11 in group B with 6 and 7 in between age group of 51- 60 in group A and B respectively, and 2 in age group of 61-65 in both groups. The BMI of women were 14 and 8 in group A and B were overweight and 6 and 12 were grade I obese respectively. Group A was given yoga program and group B was given kegel's exercises for power of PFM and quality of life in stress incontinence. Treatment duration was 6 weeks which included 3 sessions every week.

Pre and post data was analyzed by Wilcoxon rank sum test within the group A for MOS, Stop test and IIQ-7 questionnaire which showed significant increase in PFM strength and quality of life. G.S. Kim *et al.* in their study stated that significant improvement were found in PFM strength and incontinence factor with quality of life related to urinary tract symptoms. The possible mechanisms behind the result may increase in strength of gluteal, spine, thigh and hip flexors, improve in circulation to lower body in addition breathing control in proper positions help improve concentration on improvement of PFM strength. Huang *et al.* in their study stated that by promoting awareness and control over individual muscle group through specific yoga postures help women identify and strengthen PFM. It also reduces anxiety, perceived stress and associated autonomic nervous system imbalance.

Pre and post data analysis in group B (Kegel's exercises) by Wilcoxon signed rank test for MOS, Stop test, IIQ-7 Questionnaire also revealed increase in PFM strength and improvement in quality of life. Kari Bo *et al.* in their study stated that kegel's exercises builds up long lasting muscle volume and thus provides structural support along with abdominal muscle training which indirectly strengths PFM. The conscious and voluntary PFM contractions causes a squeeze and upward lift of PFM with resistance, urethral closure, stabilization and resistance to downward movement. Co-contraction of other muscles causes structural support to prevent bladder neck and urethral descent. Counter bracing or the 'Knack' then however prevents leakage during increase in abdominal pressure during physical stressors.

The inter group analysis done using Mann- whitney U test for MOS, Stop test and IIQ-7 Questionnaire which reveals that both treatment are effective in improvement of PFM strength and Quality of life. Yoga program (group A) was proved to be more effective than Kegel's exercises (group B) in all variances. The possible reason behind the more effectiveness of yoga program may be proper monitoring of the protocol while the group B was not as closely monitored. Also extremely significant results were seen in quality of life of subjects of group A. The possible reason may be as yoga foster awareness and control over PFM, in addition it improves general fitness and conditioning and promoting mindfulness, deep breathing, and relaxation.

Conclusion: According to the results it is proved that Yoga program and Kegel's exercises are both effective in treating

stress incontinence and improving quality of life in middle age obese women. But Yoga program showed better improvement in stress incontinence and Quality of life in middle age obese women.

Limitations

Sample size was small. Subjective method was used to assess the pelvic floor muscle strength. Treatment protocol was only of 6 weeks.

Future scope of study

Further studies with larger sample size can be conducted.
Further studies can be conducted by using yoga program as preventive measures for stress incontinence. Better objective methods that are available can be used to assess PFM strength. Studies involving more duration of treatment can be conducted for more significant results.

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